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NATIONAL SCIENCE FOUNDATION AUTHORIZATION ACT OF 1972

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HEARING

BEFORE THE

SPECIAL SUBCOMMITTEE ON
NATIONAL SCIENCE FOUNDATION

OF THE

COMMITTEE ON
LABOR AND PUBLIC WELFARE
UNITED STATES SENATE

NINETY-SECOND CONGRESS

FIRST SESSION

ON

S. 1968

TO AUTHORIZE APPROPRIATIONS FOR ACTIVITIES OF THE NATIONAL SCIENCE FOUNDATION, AND FOR OTHER PURPOSES

S. 1168

TO AUTHORIZE APPROPRIATIONS FOR ACTIVITIES OF THE NATIONAL SCIENCE FOUNDATION, AND FOR OTHER PURPOSES

JUNE 2, 1971



Printed for the use of the
Committee on Labor and Public Welfare



AUTHENTICATED
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U.S. GOVERNMENT PRINTING OFFICE
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NATIONAL SCIENCE FOUNDATION AUTHORIZATION ACT OF 1972

WEDNESDAY, JUNE 2, 1971

U.S. SENATE,
SPECIAL SUBCOMMITTEE ON THE NATIONAL SCIENCE FOUNDATION OF THE COMMITTEE ON LABOR AND PUBLIC WELFARE,
Washington, D.C.

The special subcommittee met, pursuant to notice, at 9:30 a.m., in room 6202, New Senate Office Building, Senator Edward M. Kennedy (chairman of the special subcommittee) presiding.

Present: Senators Kennedy and Prouty.

Committee staff members present: Dr. Philip Caper, professional staff member; and Roy H. Millenson, minority professional staff member.

Senator KENNEDY. The subcommittee will come to order.

Senator Prouty has always been very interested in the National Science Foundation. He is a prime sponsor of the administration proposal, and he has followed all of the matters of the Foundation. Science is extremely close to him, so I will yield to him.

Senator PROUTY. Mr. Chairman, I welcome these hearings and the witnesses before the subcommittee.

In reviewing the material attendant with these hearings, I was again reminded of the enormity of the challenge we face in insuring that technology is the servant, not the master of man.

I am pleased by the new directions the National Science Foundation has taken in recent years, and I wish to take the opportunity to commend Doctor McElroy for his stewardship of the Foundation. I see in the fiscal year 1972 budget request for the Foundation a new emphasis on human values and needs. I welcome this new emphasis.

As you know, I have sponsored both the bills before this subcommittee. As the ranking Republican on the subcommittee, I introduced S. 1168 on behalf of the administration.

As one long concerned with adequate support for our schools, I joined as a cosponsor of your bill, Mr. Chairman, S. 1968, which restores, through earmarking, vital NSF education programs.

Senator KENNEDY. At this point in the record I order printed the text of S. 1968 and S.1168.

92D CONGRESS
1ST SESSION

S. 1968

IN THE SENATE OF THE UNITED STATES

MAY 26, 1971

Mr. KENNEDY (for himself, Mr. PROUTY, Mr. CRANSTON, Mr. EAGLETON, and Mr. PELL) introduced the following bill; which was read twice and referred to the Committee on Labor and Public Welfare

A BILL

To authorize appropriations for activities of the National Science Foundation, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "National Science Foundation Authorization Act of 1972".

SEC. 2. (a) There is hereby authorized to be appropriated to the National Science Foundation, to enable it to carry out its powers and duties under the National Science Foundation Act of 1950, as amended, and under title IX of the National Defense Education Act of 1958, out of any money in the Treasury not otherwise appropriated, $668,-

516,215 for the fiscal year ending June 30, 1972, and $900,000,000 for the succeeding fiscal year.

(b) Of the sums appropriated pursuant to subsection (a) of this section for each fiscal year—

(1) not less than $34,500,000 shall be available only for institutional support for science; and

(2) not less than $104,316,215 shall be available only for science education support.

SEC. 3. Appropriations made pursuant to authority provided in sections 1 and 5 shall remain available for obligation, for expenditure, or for obligation and expenditure, for such period or periods as may be specified in Acts making such appropriations.

SEC. 4. Appropriations made pursuant to this Act may be used, but not to exceed $7,500 for official reception and representation expenses upon the approval or authority of the Director of the National Science Foundation, and his determination shall be final and conclusive upon the accounting officers of the Government.

SEC. 5. In addition to such sums as are authorized by section 2 hereof, not to exceed $3,000,000 is authorized to be appropriated for the fiscal year ending June 30, 1972, for expenses of the National Science Foundation incurred outside the United States to be paid for in foreign currencies which the Treasury Department determines to be excess to the normal requirements of the United States.

92D CONGRESS
1ST SESSION

S. 1168

IN THE SENATE OF THE UNITED STATES

MARCH 10, 1971

Mr. PROUTY introduced the following bill; which was read twice and referred to the Committee on Labor and Public Welfare

A BILL

To authorize appropriations for activities of the National Science Foundation, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby authorized to be appropriated to the National Science Foundation for the fiscal year ending June 30, 1972, to enable it to carry out its powers and duties under the National Science Foundation Act of 1950, as amended, and under title IX of the National Defense Education Act of 1958, out of any money in the Treasury not otherwise appropriated, $619,000,000.

SEC. 2. Appropriations made pursuant to authority provided in sections 1 and 4 shall remain available for

obligation, for expenditure, or for obligation and expenditure, for such period or periods as may be specified in Acts making such appropriations.

SEC. 3. Appropriations made pursuant to this Act may be used, but not to exceed $2,500, for official reception and representation expenses upon the approval or authority of the Director of the National Science Foundation, and his determination shall be final and conclusive upon the accounting officers of the Government.

SEC. 4. In addition to such sums as are authorized by section 1 hereof, not to exceed $3,000,000 is authorized to be appropriated for the fiscal year ending June 30, 1972, for expenses of the National Science Foundation incurred outside the United States to be paid for in foreign currencies which the Treasury Department determines to be excess to the normal requirements of the United States.

SEC. 5. (a) If an institution of higher education determines, after affording notice and opportunity for hearing to an individual attending, or employed by, such institution, that such individual has been convicted by any court of record of any crime which was committed after the date of enactment of this Act and which involved the use of (or assistance to others in the use of) force, disruption, or the seizure of property under control of any institution of higher education to prevent officials or students in such institution

from engaging in their duties or pursuing their studies, and that such crime was of a serious nature and contributed to a substantial disruption of the administration of the institution with respect to which such crime was committed, then the institution which such individual attends, or is employed by, shall deny for a period of two years any further payment to, or for the direct benefit of, such individual under any of the programs specified in subsection (c). If an institution denies an individual assistance under the authority of the preceding sentence of this subsection, then any institution which such individual subsequently attends shall deny for the remainder of the two-year period any further payment to, or for the direct benefit of, such individual under any of the programs specified in subsection (c).

(b) If an institution of higher education determines, after affording notice and opportunity for hearing to an individual attending, or employed by, such institution, that such individual has willfully refused to obey a lawful regulation or order of such institution after the date of enactment of this Act, and that such refusal was of a serious nature and contributed to a substantial disruption of the administration of such institution, then such institution shall deny, for a period of two years, any further payment to, or for the direct benefit of, such individual under any of the programs specified in subsection (c).

(c) The programs referred to in subsections (a) and (b) are as follows:

(1) The programs authorized by the National Science Foundation Act of 1950; and

(2) The programs authorized under title IX of the National Defense Education Act of 1958 relating to establishing the Science Information Service.

(d) (1) Nothing in this Act, or any Act amended by this Act, shall be construed to prohibit any institution of higher education from refusing to award, continue, or extend any financial assistance under any such Act to any individual because of any misconduct which in its judgment bears adversely on his fitness for such assistance.

(2) Nothing in this section shall be construed as limiting or prejudicing the rights and prerogatives of any institution of higher education to institute and carry out an independent, disciplinary proceeding pursuant to existing authority, practice, and law.

(3) Nothing in this section shall be construed to limit the freedom of any student to verbal expression of individual views or opinions.

SEC. 6. This Act may be cited as the "National Science Foundation Authorization Act of 1972."

Senator PROUTY. It is not enough that more is known. More people must know how to best use that which is known.

Mr. Chairman, I wish that my schedule would allow me to stay here and explore with the witnesses the new directions of our scientific inquiries. However, the Rules Committee on which I serve as the ranking Republican is now meeting in executive session to markup the campaign expenditure bill. I look forward to reviewing the testimony of Doctor McElroy, President Fuller, and Dean Shull.

I am sure their observations will be of great assistance to us in our further deliberations.

Mr. Chairman, I have a few questions which I would like to submit for Doctor McElroy to answer. As I am unable to remain, I would ask that these questions be submitted on my behalf.

Also, Senator Packwood has asked me to convey his regrets at not being able to attend today's hearing. He has a statement he wishes to be submitted for the record.

Senator KENNEDY. Thank you very much, Senator Prouty, we will insert your questions at an appropriate point in the testimony.

As I mentioned, Senator Prouty has followed these matters extremely closely, and he has been terribly interested in them. The fact that he is here to make these comments is additional indication of his interest in these hearings, so I will be glad to ask the questions for him.

Thank you very much.

Our vitality as a nation depends heavily upon the wisdom with which we establish national priorities. Adequate support of scientific research and education, in a world of growing technological complexity, should certainly be among our highest priorities.

Technology has contributed to many of our society's most pressing problems. But it is only through more, rather than less, research that the answers to those problems will be found. We cannot overestimate the importance of increasing our basic fund of scientific knowledge and our skills in applying that knowledge to the ever more complex problems facing this Nation and the world. Research in the natural sciences has contributed heavily to our ability to develop our technology and industry to its present level.

Now, with the increasing size of our population and concentration of people within our urban centers, a great deal more emphasis must be placed upon the study of and solution to human problems.

Many of the mission-oriented agencies within the Federal Government have begun withdrawing their support of basic research. It is essential to our national welfare that support for basic natural scientific and sociological research be continued at its present levels. It is equally important that effective means be found to apply the findings of basic research to the pressing needs of society, and that a proper balance between basic and applied research be found. It is also important to determine an appropriate distribution of applied research efforts between NSF and mission-oriented agencies. During today's hearings, we hope to be able to determine the answers to some of these important questions.

We will now receive for the record a statement from Senator Packwood, of Oregon.

STATEMENT OF HON. BOB PACKWOOD, A U.S. SENATOR FROM THE STATE OF OREGON

Senator PACKWOOD. Thank you, Mr. Chairman.

First let me say what a great pleasure it is to be serving on the National Science Foundation Subcommittee. Since its creation in 1950, the National Science Foundation has played a key role in the development and strengthening of this Nation's basic research and education in the sciences. The results we have seen in these past 21 years have been dramatic, and have permitted us to move forward with advances in many disciplines. Increasing knowledge in the area of basic science has permitted us to more fully understand the nature and function of our physical environment, and consequently has provided valuable input into our efforts to solve many of the most perplexing problems facing this Nation and the international community today. Notably, of course, are the problems of pollution—both air, water, and land, and the closely related problems of unrestrained population growth.

President Nixon pointed out in his historic population message in July 1969 that one of the sources of our serious and multifaceted problems today is the fact that this Nation had only 50 years to accommodate its second hundred million people. What we all must now realize is that we will have even less time to prepare for our third hundred million, and even less time than that for our fourth hundred million, if present trends continue without restraint. In this regard, it would be my hope that the Foundation could move more actively in the area of population research and education, for example, through additional summer institutes devoted to population and through some sort of policy research on the population problem. Dr. Robert Lamson in the Foundation's Plans and Analysis Office, recently presented a paper to the Commission on Population Growth and the American Future, on which I serve. His comments are quite instructive on the point of needing additional policy research on population, and I ask unanimous consent to have Dr. Lamson's statement, along with an article he authored in BioScience, printed in the hearing record following my remarks.

DROPOUTS

One situation will regard to scientific research which has troubled me, and probably many of my colleagues as well, is the significant reduction of research support from NASA, the AEC and Defense Departments and other agencies, particularly in the field of nuclear physics. The estimated amount of these dropout programs is about $100 million. Both Oregon State and the University of Oregon have excellent nuclear physics programs, which have been funded by the AEC in part. The Foundation hopefully will find it possible to assume the needed financial support for these vitally important programs to allow their invaluable work in the area of nuclear physics to continue without interruption. It is my intention to offer an amendment to S. 1968 to increase the authorization level by $35 million to permit NSF to pick up the $75 million in dropout programs which are felt to be worthy of continued support. In spite of budgetary constraints, this

would seem to be a sound investment of our research dollars to carry on these proven, successful programs in scientific research.

One final comment, and that concerns student assistance. We are told that the United States has a surplus of doctoral candidates, and also a surplus of those already holding advanced degrees. It is difficult, if not impossible, to accept this judgment, for in fact this depends entirely on the demand for those with advanced degrees, which in turn depends entirely on the number of job openings in fields requiring the advanced degree education and training. So perhaps we should be talking about problems in the demand area, and not forfeiting the potential of those yet to be educated by cutting back on our advanced degree programs in science education and student support. These are my feelings, and yet I am fully cognizant of the budgetary limitations being imposed in the important effort to balance our Federal budget and bring inflation under control. In trying therefore to reconcile the two, I am forced to the conclusion that in reducing student support, mid-study students should not be cut off from their source of financial aid. If less funds are available, and if the decision is made to slow down on support for graduate degree candidates, the cut should be taken in the "new student" category, not among those whose studies are already underway, and to whom loss of support might spell disaster.

In short, I commend the National Science Foundation for its excellent achievements and for its devoted efforts in the pursuit of scientific research and education, and its flexibility and continuing willingness to address tomorrow's problems.

(The article referred to follows:)

STATEMENT OF DR. ROBERT W. LAMSON
STAFF ASSOCIATE
PLANS AND ANALYSIS OFFICE
NATIONAL SCIENCE FOUNDATION
BEFORE THE
COMMISSION ON POPULATION GROWTH AND THE AMERICAN FUTURE

April 15, 1971

NATIONAL POPULATION POLICY -- NEEDS AND REQUIREMENTS

Mr. Chairman and members of the Commission, I appreciate having this opportunity to present a statement concerning the nation's need for a population policy.

Since you have copies of the statement, I am not going to read it, but will, instead, cover the highlights, and then attempt to answer any questions which you may care to ask.

My statement will cover the following subjects:

I. Is there a need for a population policy?

II. What should be the key elements of the policy, and what steps are necessary to implement the policy?

III. What policy research is needed on the population problem?

I. Need for a Population Policy

Whether we, as a nation, can protect and enhance what we value and achieve our goals will depend on our ability to influence such important factors and trends as:

1. the development and use of technology;
2. the demand for and use of resources and services;
3. the growth of the economy;
4. the creation and disposal of waste products; and
5. the growth, composition and distribution of population, within the United States, as well as for the world as a whole.

At present, there is no explicitly stated, agreed upon policy for these factors, including population, although in the Employment Act of 1946 we do have a policy for the economy and employment, and although the Environmental Quality Act does provide for a national environmental policy.

However, as a government and as a nation, we do make many decisions which influence, by intent and as an unintended by-product, population growth, composition and distribution, as well as these other factors.

Today, we lack reliable knowledge as well as agreement, within the government and among the public as a whole, concerning:

1. What are the problems created by these factors and trends;
2. What goals should we pursue to solve the problems; and
3. What actions should we take to implement the goals?

Since the urgency of a person's action recommendations tends to depend upon how severe one perceives the problem to be, it is extremely important that we clarify and develop consensus concerning the nature of the population problem which confronts us.

We need to develop policies to increase this knowledge and agreement, and to implement actions based upon the areas of agreement.

We need to begin to develop a national policy to influence population size, growth, distribution and composition, along with the other important factors which I have listed, and in conjunction with and as part of our overall national goals and policies.

Such policies can be an ad hoc, not explicit, combination of policies and actions taken for other reasons, which is the current situation, or they can be more self-conscious and explicit.

It takes a long time to create and implement population policies, and to carry out the needed research, planning and operational programs.

Research takes a long time and since research results are subject to uncertainty, it is therefore difficult to obtain agreement concerning such concepts and goals as:

1. Stable population -- At what level and when?

2. Optimum population -- In terms of what variables, values and goals, for example, national security, economic growth, environmental quality?

We therefore need to begin to act now to develop interim population policy strategies, goals, implementing actions and institutions which we can pursue immediately, based on the best knowledge and the maximum current agreement concerning the problem and what to do about it.

And, as we pursue these goals, we should develop the additional knowledge, understanding, agreement, actions and institutions needed for a more comprehensive policy.

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We should set up time schedules to complete various population policy goals and actions, including the immediate and longer run goals.

Goals which we could currently pursue with regard to overall growth, while we develop more knowledge and consensus, include the following:

1. Every child a wanted child;
2. A slower rate of growth is better than a faster rate;
3. It is better to have the low than the high projection come true.

The hearings of this Commission, by exploring the nature of the population problem, and alternative goals and actions to cope with it, are helping to provide this knowledge, and thereby, to help create the national consensus which is needed if we are to create more effective and coherent policies for population as well as technology, use of resources and services, economic growth, and creation and disposal of waste products.

II. Key Elements and Needed Actions for Population Policy

The key elements of a formal, explicit population policy include a statement and consensus on the Problem and on the Goals, Principles, and Means (Actions and Institutions) to solve it.

The following is an outline for such a statement of policy along with suggestions concerning some of the content which might be included.

A. Problem and Findings:

Population size, growth and distribution, within the United States as well as for the world as a whole, affect our and mankind's ability to protect and promote such values as the quality of human life, of the physical environment (natural and built), and of society.

It is therefore important that we attempt to influence and control the growth and distribution ~~of~~ population, and to do it in such a way that we protect and promote our values of economic well-being, environmental quality, democratic government and individual freedom.

B. Goals: The United States should pursue and integrate the following policy goals concerning population growth and distribution, at various levels -- international, national, state and local, family and individual.

1. International Level:

Give assistance, directly as well as through appropriate international organizations, to assist other nations to control their rates of population gorwth in order, ultimately, to stablize the world's population at a level consistent with the need to protect and promote the quality of human life and of the natural environment. (Stabilization at what level and when?)

2. Federal Level:

Develop, encourage and implement the necessary policies, attitudes and actions which will, at a minimum, attain the low population projection, and as soon as possible, stabilize the population of the United States, in a manner consistent with human rights and individual conscience, in order to provide an example to other nations, to relieve the pressure of our highly industrialized, rapidly growing economy on the world's environment and resources, and to make it more possible to protect and promote the quality of human life, of society and of the environment within the United States. (Stabilization when and at what level?)

3. Federal, State, and Local Level:

Develop short and long range plans which aim to achieve a desirable distribution of population and related economic activity in order to enhance the social quality of life, prevent and minimize environmental degradation, and encourage economic growth in the disadvantaged parts of the United States.

4. Family and Individual Level:

Make it possible for every child to be a wanted child.

5. Total System: Make the pursuit of these goals, at various levels, compatible with each other.

C. Principles:[1]

Means for attaining our population policy goals should:

1. be effective;

2. be voluntary and consistent with human rights, individual conscience and freedom of choice;

3. not penalize children;

4. be consistent with stability of the family;

5. avoid coercion and compulsion;

6. avoid raising death rates, for example, through war, famine and disease;

7. provide for political participation and social and economic justice for minority groups

[1]This outline of Principles and Means is adapted from "Reports and Resolutions of the First National Congress on Optimum Population and Environment", 1970, Topic IV - Governmental Approaches to Problems of Population / Environment, P. 12.

D. Means (Actions and Institutional Changes) to implement the goals could include the following:

1. Modify laws which encourage childbearing and restrict the availability of family planning information and services,

2. Provide adequate funding, manpower, facilities and institutions for:

a. free family planning information and services;

b. research in the biological and medical sciences related to contraceptive development, as well as the behavioral sciences, policy analysis and program implementation fields related to population control and family planning;

c. trained manpower needed to provide these services and research; and

d. public information and education to communicate the nature of the population problem,

3. Include in all federal, state, regional and local development plans comprehensive analyses of the implications of low, medium and high population projections;

4. Extend positive government programs to improve the status of all women and encourage satisfying roles for women that would be alternatives to motherhood.

5. Create the needed organizational and institutional changes needed to implement these goals.

Since an agreed upon formal, explicit policy concerning population growth and distribution is difficult to state and to achieve, I have included in the Appendix an article, "Federal Action for Population Policy -- What More Can We Do Now?", which outlines a range of population policy actions in the area of research, planning and operations which various parts of the federal government could begin to perform now, in an ad hoc fashion. Many of these actions would not require new authority or additional levels of funding.

Such actions should help to develop the knowledge and understanding, the national discussion and consensus needed for a more formal, explicit commitment to population policy goals, principles and actions.

III. Policy Research on the Population Problem:

The following is a statement which I have prepared for the Federal Interagency Committee on Population Research concerning the population policy research supported by the federal government and listed in the inventory prepared by the Department of Health, Education and Welfare.

A. What Is Policy Research?

Policy research analyses a problem, presents alternate goals and means to cope with it, and indicates, in a form which the policy-maker can understand, the probable costs and benefits of the alternatives.

By policymaker, I mean anyone who is in a position to make decisions which affect the future course of history.

In the United States, this includes just about everyone, the legislator and executive in government, as well as the citizen and general public.

In considering policy research, the following nautical metaphor may be useful. If we look at the similarities between the ship Titanic and modern society, we can view policy research as a means whereby a nation or society can steer its way among the "reefs and icebergs of history". The Titanic could have used some radar. As I see it, policy research helps to provide early warning and alternatives for action to enable the social navigators and helmsmen avoid the problems and threats of the future. Policy research also helps to design the steering mechanisms and the rudders to enable a society actually to move in the desired direction.

In sponsoring and performing policy as well as other types of research on population problems, we should keep in mind a number of facts.

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In any policy area, there will always be uncertainty and risk. We always act without perfect knowledge and perfect certainty concerning what the future will be like if we choose one path or another. The time available to us is short and research is long. Decisions will be made whether or not research is ready and all the facts are in. Policy-makers will decide, choose and act with what knowledge they have, in the absence of perfect knowledge, before all the research is done, and in the absence of perfect consensus.

The purpose of policy research is to help the policymaker perceive problems and to choose goals and policies to implement them in the face of uncertainty and risk -- risk concerning the benefits and hazards of action, or inaction -- uncertainty concerning: 1. what are the facts and risks; 2. what causes and effects are operating; 3. what the future will be like if we choose policy A, B, C, etc., or decide to continue as we are; and 4. what will be the costs and benefits of various policies, for whom and what values.

By analyzing the policy implications of the population problem, we can, it is hoped: outline the main choices open to policymakers; help to reduce the element of uncertainty and risk involved in their decisions; help them to become more aware of the uncertainties and risks, and costs and benefits involved in the choices which they make; and thereby, to make better decisions.

B. What Population Policy Research is the Federal Government Supporting:

The primary source of information concerning Federal support for population policy research is "The Federal Program in Population Research" an inventory of population research supported by Federal Agencies. Two editions of this publication have been published, the first on July 1, 1969[1] and the most recent dated December 31, 1970.[2]

The federally supported population policy research projects which these inventories list is as follows:

FEASIBILITY OF RESEARCH ON EFFECTS OF GOVERNMENT POPULATION POLICIES IN EASTERN EUROPE; Henry David; American Institutes for Research, Silver Spring, Maryland

SITUATION REPORTS ON POPULATION PROBLEMS, POLICIES AND PROGRAM; Harrison Brown; California Institute of Technology, Pasadena, California

GOALS AND CONDITIONS OF POPULATION CONTROL; Kingsley Davis; University of California, Berkeley, California

POPULATION/ECONOMIC GROWTH ANALYSIS AND PRESENTATION; (for political and economic policy makers in developing countries); Stephen Enke, General Electric Co. - TEMPO Santa Barbara, California

USIA AND POPULATION MATTERS ABROAD; Irving Wechsler; Mildred Marcy, USIA, Washington, D. C; USIA Intramural

[1]Ad Hoc Group on Population Research, "The Federal Program in Population Research, a Report to the Federal Council for Science and Technology," Office of Science and Technology, Executive Office of the President, 1 July 1969.

[2]U. S. Department of Health, Education and Welfare, Center for Population Research, National Institute of Child Health and Human Development, "The Federal Program in Population Research, Inventory of Population Research Supported by Federal Agencies During Fiscal Year 1970", 31 December 1970.

"Population Growth and America's Future", the Interim Report prepared by the Commission on Population Growth and the American Future, lists the following population policy research projects and papers which it plans to publish.

CONGRESSIONAL-EXECUTIVE RELATIONS IN THE FORMATION OF EXPLICIT POPULATION POLICY; Phyllis T. Piotrow, The Johns Hopkins University

HISTORICAL DEVELOPMENT OF VALUES IN THE AMERICAN POLITICAL-LEGAL TRADITION BEARING ON POPULATION GROWTH AND DISTRIBUTION; Peter Brown and Institute of Society, Ethics and the Life Sciences

PRESENT AND FUTURE AMERICAN ETHICAL NORMS AS LIMITS UPON POSSIBLE POPULATION POLICIES; Institute of Society, Ethics, and the Life Sciences

POPULATION POLICY-MAKING AND THE CONSTITUTION; Authur S. Miller, National Law Center, The George Washington University

GUARDING AGAINST UNINTENDED CONSEQUENCES OF POSSIBLE POPULATION POLICIES; Theodore J. Lowi, University of Chicago

Outside of government, various foundations and organizations such as Resources for the Future and the Population Council are becoming more active in policy research on the population problem, and the National Academy of Sciences is preparing a report on the policy implications of rapid population growth.

C. Types of Policy Research Questions: There are, in general four types of questions in which the population policymaker is interested:

1. Factual - Descriptive:

What is? For example, how many births, deaths and where?

2. Factual - Analytical:

What causes produce what effects? For example, why does country X have a slower rate of growth than country Y? Why does group X have a lower birth rate than group Y?

What are the effects of changes in various demographic variables (size, distribution, composition, etc.) on such problems and goals as: urbanization, industrialization, employment, health and welfare, education and communications, production of goods and services, natural resources and environmental quality, political structure and distribution of power, intergroup conflict. Each discipline (for example, demography, political science, sociology, psychology, economics, biology, chemistry, medicine, etc.) has a contribution to make to answering such factual questions.

3. Policy:

Involving answers to the types of factual questions listed above as well as questions about future problems, probabilities, effects, alternatives, benefits, costs, and risks.

4. Normative:

What policy should we pursue?

The following is a list of questions which need to be asked and answered if policy research is to help the policymaker, and which policy research projects should attempt to answer.

Such a list could serve as a checklist of questions for evaluating past, current and proposed policy research concerning the population problem.

D. What Policy Research Needs to be Done?

1. Alternate Futures:

What range of developments, opportunities, problems and threats confront us, and the world, now and in the future, with regard to population size, growth and distribution, and its relation to:

a. Trends and problems such as development and use of resources and services, and output of waste;

b. Values and goals such as national security and international order, protection and enhancement of the natural, man-made and human environment, provision of resources and services, economic development and welfare, political stability, representative government and freedom.

2. Probability:

What is the probability of their occurrence--under what conditions? (Impossible to inevitable; 0% to 100%)

3. Effects:

What will be the effects if the problems occur?

a. Extent:

To what extent?

When? What time frame: (years, decades, centuries)

Where? What geographic area? (local, regional, national, international)

For whom? What groups and level of abstraction? (individual, family, industry, nation, world, mankind, humanity, etc.)

For what values? Examples?

b. Intensity:

How severe?

4. Priorities:

What priorities should we assign to these events, opportunities, problems and threats?

5. Popularity:

To what extent are specific groups and the public concerned about these events?

6. Desirability:

How desirable or undesirable are these events, in terms of what values, and for what groups, and why?

7. Alternate National Policies:

What alternate values, goals, principles, actions, and policies and programs can we pursue domestically and internationally to influence and control these trends, opportunities and threats, in terms of research, planning and operational programs to:

a. Prevent the development of the problem and the effect if undesirable;

b. Limit damage to values if it occurs;

c. Restore damage done;

d. Create new values;

e. Create the effect or opportunity if it is desired?

8. Feasibility, Benefits and Costs:

What are the feasibilities, benefits and costs--economic, political, social and moral--of each alternative and combination, for whom, in terms of what values?

8. Feasibility, Benefits and Costs (cont'd):

   Which alternatives are desirable and why?

9. Role of Population Policy:

   What is the role of population policy in these alternate national policies?

   What goals, principles, activities, resources, policy processes and institutions are and should be a part of our population policy?

10. Use of Research Results:

    What provision will be made to transmit the results of such analysis to policymakers, the media and the public.

11. Model Legislation and Executive Orders:

    What provision will be made to transform the results of policy analysis into model legislation and executive orders at the relevant level--international, federal, state, and local?

In addition to these general questions which population policy research needs to answer, we need to attempt to answer the following questions:

1. What if various alternative projections for future population growth and distribution (as well as for development and use of technology, economic production and growth, supply and use of resources and services, and waste output) were to come true, the effects would be on the success and costs of our policies:
   a. To supply and conserve resources (land, water, air, food, minerals, energy, timber, wildlife, wilderness, outdoor recreation and park areas, open spaces, natural beauty, silence, etc.);

b. To provide services (transportation, health, welfare, housing, sanitation, education, etc.); and

c. At the same time, to protect and promote environmental quality, that is, to prevent further pollution of our land, air and water, to clean up what pollution remains, to restore the damaged environment, to rebuild our deteriorated cities and to create new ones; and

d. To solve these problems within the existing framework of political and personal values?

2. Which, if any, of the various alternative projections for future population growth and distribution should we regard as goals for population policy and the costs and benefits of achieving each? For example, what would be the effects of a stable population?

3. How could we achieve each goal?

4. What would be the feasibility, probable effects, costs and benefits, and methods of achieving each of a range of projections describing the possible future population of the United States, for example:

a. To achieve population growth in the United States which would increase more rapidly or slowly than is projected;

b. To stabilize United States (and world) population at less than its present size, or double its present size, or greater by a factor of 2.5, 3 or 4? When, in 40, 60 80, 100 or 200 years? How?

E. Needs For Further Research: Given the current population policy projects sponsored within and outside of government, and given the requirements for population policy research, what more needs to be done?

It is difficult to determine exactly what specific products will result from the population policy research projects listed above, and how they will help to answer the foregoing policy research questions. However, it is probably safe to say that the nation's needs for population policy research will not be completely satisfied nor necessarily presented in a form which the policymaker can easily use.

There will, therefore, be a continuing need to compare the results of population policy research projects with a set of criteria and questions such as the foregoing in order to help satisfy the policymaker's needs for analysis.

We will need to evaluate, on a continuing basis, the needs for factual data and causal analysis which various disciplines can provide.

The following are suggestions concerning needs for specific policy-related research and for improving the system for managing policy research.

1. Needed Policy Research Projects:

   a. Population Growth and National Goals:

      Research is needed to analyze the effects of alternate trends in population growth and distribution on the success and cost of federal programs as well as on the capacity of the United States to protect and enhance its values and to meet its goals. This requires us to outline a range of alternate goals in such areas as national security, resources, environment, provision of services and welfare,

a. Population Growth and National Goals (cont'd):

and to analyze their relation to alternate population growth rates, patterns and policies. Many agencies have interests and responsibilities which are affected by population growth and they should have a role and interest in performing such analysis as well as in publicizing the results through Annual Reports, public information materials and reports on proposed legislation.

b. Background Analysis for International Conferences:

The World Population Year is scheduled for 1974 and analysis of policy alternatives and of short and long term initiatives is needed in order to provide for a coordinated strategy of action to cope with the population problem at the international level.

c. Zero Population Growth:

We need more research on the consequences and requirements for stablizing U.S. and world population at various levels and at different rates.

d. Computer Simulation:

A relatively unexplored area is the use of computer simulation, visuals and graphics for the exploration of population policy effects and alternatives. For example, Professor Paul Handler, at the University of Illinois, with assistance from the National Science Foundation, has prepared a computer program for a course in demography which is also useful for policy analysis and public education in that it enables a person to make assumptions about demographic variables and then to see the effects of these assumptions

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d. Computer Simulation (cont'd):

displayed visually, in the form of population pyramids and growth curves. Such techniques should be further developed and used.

e. Incentives:

We need more analysis of the means to implement alternate population policy goals via various types and combinations of incentives and disincentives. In addition to creating, through biomedical research, more efficient means to limit births, we also need more analysis of incentives to use these means and to limit family size for example, through restructuring the social as well as physical environment. We need analysis of various legal and institutional means such as our systems for tax and social security, and insurance.

F. Needs For Better Research Management: If the United States Government is to apply, effectively, knowledge, research and analysis to meet national population problems, goals and needs, then it will have to take a more active role in organizing and managing directed research programs.

We need to analyze the factual, analytic, policy and normative questions involved in our population problems, and alternate goals and means to solve these problems. This requires us to:

1. Outline the types and content of research questions which need to be answered, based on an analysis of:

   a. National problems, goals and needs;

   b. The capabilities and state-of-the-art in various scientific disciplines and fields of technology;

2. Develop research programs to answer these questions.

Policy analysis for the population problem should be based on a program structure of interrelated statements such as:

1. Statement of problem or objective;

2. What we already know and what we need to know;

3. Description of the project and its potential contribution;

4. A projection of requirements needed to complete the project, in terms of time, funds, personnel, facilities, etc.

5. Possible performers

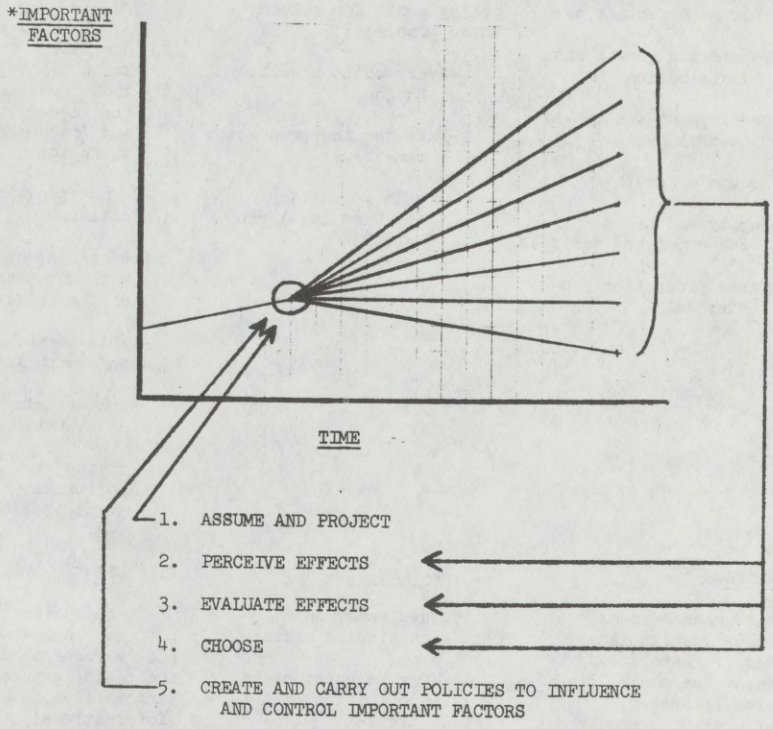
6. Potential users of the policy research results in government and outside;

7. Provide for ways to transmit, effectively, the results of policy analysis to policymakers, and to use the results of research in policy planning and operational programs, at various levels of government and in various sectors of society.

Each specific project should be related to and fit into a larger structure of research and analysis which integrates the results of specific specialized studies. Page 27 contains an example of such a structured program format.

NATIONAL NEED TO

PERCEIVE, EVALUATE AND CONTROL FUTURE PROBLEMS



*For Example:
- Population growth, composition and distribution
- Technology -- development and use
- Economic growth
- Resources and services -- supply and use
- Waste production and disposal

POLICY RESEARCH AND THE POPULATION PROBLEM

Policy research is needed to analyze:

I. PROBLEM

Problems created by trends of such factors as:

- -Population growth and distribution
- -Development and use of technology
- -Economic growth
- -Supply and use of resources and services
- -Waste production and disposal

II. GOALS

Alternative population policy goals for solving these problems:

- -Every child a wanted child
- -Make the low projection come true
- -Stable population (At what level and when?)

III. PRINCIPLES

- -Be effective
- -Be voluntary and consistent with human rights, individual conscience and freedom of choice
- -Do not penalize children
- -Be consistent with the stability of the family
- -Avoid coercion and compulsion
- -Avoid raising death rates
- -Provide for political participation

IV. MEANS

Alternate Actions, Programs, Institutions and Requirements to implement the Goals, via research, planning, operational programs, and laws.

V. EVALUATION

To evaluate, on a continuing basis:

- -Our perception and definition of the problem
- -Effectiveness of our goals in solving the problem;
- -Efficiency of our means in attaining the goals

VI. USE

To communicate, and put the results of policy research into the policy process, at various levels (international, national, state and local) and sectors (executive, legislative, the public)

TENTATIVE SCHEDULE OF POPULATION POLICY GOALS

GOALS	YEAR									
	1971	1975	1980	1985	1990	1995	2000	2025	2050	2075
Population Growth:										
Individual Family Level										
Every child a wanted child			X	X	X	X	X	X	X	X
National Level										
Achieve low rather than high projection		X	X	X	X	X	X	X	X	
Stability (at what level and when?)									?	?
International Level										
Achieve low rather than high projection		X	X	X	X	X	X	X	X	
Stability (at what level and when?)									?	?
Population Distribution										
Population Composition										

FORMAT FOR POLICY RESEARCH PROJECTS

NUMBER:

SUBJECT:

PROJECT:

SUBPROJECT:

STATEMENT OF PROBLEM AND OBJECTIVE:

STATE OF THE ART:

PROJECT DESCRIPTION:

REQUIREMENTS:

	FISCAL YEAR					
	1972	1973	1974	1975	1976	Total
Funds						
Manpower						
Facilities						
Institutions						
Time						
Authority-Responsibility						

POSSIBLE PERFORMERS:

- In-House
- Consultants
- Universities
- Thinktanks

POTENTIAL USERS:

[Reprinted from *BioScience*, Aug. 1, 1970]

Federal Action for Population Policy—What More Can We Do Now?

(By Robert W. Lamson)

A critical problem and a question confront us. The United States and World Population will not increase forever. There are limits. How will they be imposed?

We have roughly three options.[1]

(1) *Physical limits—war, famine, and disease:* to approach more closely the physical capacity of the earth, and thereby, to bring into play the traditional agents—war, famine, and disease—which have helped to limit growth of populations in the past.

(2) *Repression:* to risk, by delaying action now, the use later of more manipulative and repressive social and political techniques, which some individuals now advocate and governments may come to use, in order to avoid the "traditional" physical limiting agents.

(3) *Voluntary limitation:* to control our size and growth, voluntarily, by increasing human awareness and individual decision to regulate family and population size. This option is based on widespread provision of the means to limit births as well as on democratic creation of policies to influence the intent of individuals to use these means.

Current concern over the environment has led to increased discussion of the need to control population size, primarily via the third option.

Consider for example, the following statements which reflect the concern of the Executive Branch as well as the Congress of the United States:

Dr. Roger Egeberg, Assistant Secretary for Health and Scientific Affairs, the Department of Health, Education and Welfare: "What does freedom of choice in family planning imply in the present state of our society? It implies enormous population growth for the simple reason that the typical American family, if it can, will elect to have three children, not two. . . . I think we are going to have to work for a change in national mores, a change based on the public acceptance of the demographic facts of life. I think we are going to have to help the people of this country understand that their vital interest and that of their children demands that we control the growth of population."

Secretary Robert H. Finch, Department of Health, Education and Welfare, when asked at a meeting in Washington, D.C., what young people can do to protect the environment, replied: "I'd begin by saying, have only two children."

The House Committee on Government Operations: "We fully agree that one of the most serious challenges in the last third of this century will be the growth of population and that our response to that challenge will be determined by what we do today."

The House Republican Task Force on Earth Resources and Population: "The overriding concern of the Task Focre is for realization that the time for action is now and that the need is urgent."

Dr. Lee DuBridge, Science Advisor to the President: "Do we need more people on the earth?" We all know the answer to that is 'no.' Do we have to have more people?

"Our spaceship called the Earth is reaching its capacity. Can we not invent a way to reduce our population growth rate to zero? Of ensuring that there be no more births than deaths?

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[1] Provisions of means to limit births and family size include abortion, sterilization, pills, chemicals, various types of contraceptives, rhythm, abstinence, and delayed marriage.

Methods for motivating people to limit family size include clinics, information, and propaganda, removal of incentives of having additional children beyond a given number through the tax and social security system, raising the legal age for marriage, provision of careers for women which will serve as viable alternative means to the self-fulfillment now attained through having and raising children.

Manipulative and repressive techniques include putting contraceptive chemicals in food and water supplies; greatly increasing the legal age for marriage and government licensing of the right to bear children with harsh penalties for violations; compulsory sterilization, abortion, and contraceptive inoculation or immunization against fertility via implantation of fertility-reducing drugs and chemicals; and infanticide.

For a Malthusian anti-utopia, see Anthony Burgess, 1962. *The Wanting Seed,* W. W. Norton & Company, Inc., New York.

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This article represents only the views of the author and not those of the National Science Foundation.

"That is the first great challenge of our time. And we are the first generation to come face to face with this challenge and recognize it. Will we do something about it? Every human institution, school, university, church, family, government—and international agencies, such as UNESCO—should set this as its prime task."

If the nation and the U.S. government are serious about the importance of the population problem and about zero population growth, which the President's Science Advisor stated as a desirable goal for national policy, then we must ask ourselves several questions, and begin to implement the answers.

What can we do now, with existing resources, to carry out this goal through voluntary limitation.

In the future, what measures can we take for which we will need additional funds, personnel, equipment, facilities, authority, and new organizations arrangements?

The federal government can, immediately, with existing authority and resources, take many actions in the areas of research, planning, and operations to cope with our critical domestic population problem—the additional 100 million projected for the year 2000, if current trends continue.

RESEARCH

On 1 July 1969, an interagency Ad Hoc Group on Population Research made a report, "The Federal Program in Population Research," to the Federal Council for Science and Technology.

The Group recommended that the government create an interagency Standing Committee on Population Research to review and evaluate federal population research activities; to advise on gaps, priorities, and uses, as well as appropriate ways to support and administer research; to review efforts to collect, store, and disseminate information; to review federal mechanisms to identify research underway and further research needed in the future; and to identify organizations involved in research.

The federal government, particularly the new Commission on Population Growth and the American Future, now has an opportunity to help implement these actions. In addition, much research remains to be done.

Population Growth Rates and National Goals: For example, we need to analyze the effects of alterate trends in population growth and distribution on the success and cost of federal programs as well as on the capacity of the United States to protect and enhance its values and to meet its goals.

There are many goals and programs affected by population growth as well as agencies which should, therefore, have an interest in this research. Too large a population and too rapid growth make it more difficult for us to achieve these goals. Consider the various agencies with responsibilities for meeting the need to—

protect and enhance the environment, and meet increasing demands for resources and services (Departments of Agriculture; Health, Education and Welfare; Housing and Urban Development; Transportation; and Interior; Smithsonian Institution; Water Resources Council; National Water Commission; Corps of Engineers)

provide energy (Atomic Energy Commission; Federal Power Commission; Department of the Interior)

supply housing and other urban functions (Department of Housing and Urban Development)

provide transportation (Department of Transportation)

solve manpower and unemployment problems (Department of Labor)

solve problems of trade, industrial production, economic growth, location of population and industry, and examine and cope with the effects of population stability on the economy (Council of Economic Advisors; Departments of Commerce and Labor)

provide for education, health, and welfare services (Department of Health, Education and Welfare)

These agencies could introduce their analysis of the impact of population trends into their Annual Reports, public information materials, and reports on proposed legislation.

Environment and Population Policies: Based on its survey of ongoing population research supported by federal agencies as of 30 April 1969, the Ad Hoc Group on Population Research found that, of a total of some $55 million spent

for population research, about $20,000 or 0.04% of it concerned the environment, and about $153,000 or 0.3% concerned population policy and its implementation.

Even allowing for some error in reporting, there does seem to be a need for more research emphasis in such areas as the implementation of alternate population growth rates and policies for the achievement of environmental quality values, goals, and programs. In this regard, population study centers could be encouraged to examine the environmental policy aspects of population growth and distribution; and, environment and resource study centers could be encouraged to analyze the relation between population trends and environmental problems. Federal activities with an interest in such research include: the Council and Cabinet Committee on Environmental Quality; the Departments of Interior; Agriculture; Commerce; and Health, Education, and Welfare; The Atomic Energy Commission; and The Federal Power Commission.

Incentives: In addition to creating, through biomedical research, more efficient means to limit births, we also need more analysis of incentives to use these means and to limit family size. The physical and social environment can be designed to restructure incentives for having children, for example, through housing and community arrangements, and by creating alternate careers for women which provide opportunities, in addition to having and raising children, through which women can find personal self-fulfillment. The Council on Urban Affairs; the Departments of Housing and Urban Development; Labor; and Health, Education, and Welfare, all have interests and responsibilities in this area. In addition, the tax and social security system as well as federal and state laws can accelerate or retard population growth and influence population distribution. There are opportunities here for the Departments of Justice; Commerce; Health, Education, and Welfare; Treasury; and Internal Revenue Service; and the Council on Environmental Quality.

Zero Population Growth: Finally, we need more research on the problem of stabilizing U.S. (and world) population at various levels—less than its present size, or double its present size, or greater by a factor of 2.5, 3, or 4. The critical research questions are: What are the requirements for, and effects of, achieving a stable population, at what level, at what rate, and when—in 40, 60, 76, 100, or 200 years?

PLANNING AND OPERATIONS

We can take, immediately, many practical steps to plan and implement policies for zero population growth, and to translate the results of research into action. Consider the following opportunities.

Planning: In our plans to support science, we can aim directly at developing the manpower, institutions, and medical and social technology necessary to achieve zero population growth. The Office of Science and Technology, the Department of Health, Education and Welfare, and the National Science Foundation have important responsibilities and opportunities in this area.

We can include consideration of population growth, distribution and control in planning, programming, and budgeting studies conducted throughout the government. The Bureau of the Budget can make sure that all agencies plan for a range of alternative demographic futures, based on alternate patterns of population growth, distribution, and use of technology. For example, federal water resource planning should consider a range of contingencies based on the difference between high and low population projections for the nation as a whole as well as for specific river basins.

River Basin Commissions, Regional Commissions and States, in addition to attempting to meet demands for resources, could be encouraged to look at a range of population projections, and to consider the problem of limiting demands for resources by influencing population growth and distribution within a particular river basin or region. In addition to the Bureau of the Budget, agencies in a position to encourage this activity include the Departments of Interior, Agriculture, and Commerce; the Corps of Engineers; Water Resources Council; and National Water Commission.

In commenting on proposed legislation, especially proposals which attempt to meet the demand for some resource or service, agencies of the Executive Branch can discuss the relation of the proposal to popu'ation growth, what difference it would make for the success of the legislation if the high or low population projection came true, and the limits to the proposal's ability to meet the demands which population growth creates. The Bureau of the Budget, in coordinating comments on legislation has an opportunity to encourage agencies to include such considerations in their reports.

FRAMEWORK FOR ANALYZING FEDERAL ACTIONS FOR POPULATION POLICY—TO INFLUENCE CAPACITY AND INTENT TO LIMIT BIRTHS

Research [1]	Planning	Operations	Goals	Options
Reproductive biology Fertility regulation techniques and materials. Description of population size, distribution, characteristics, and trends. Determinants of population size, distribution, characteristics, and trends.	Plan to control population growth as well as to meet the needs (for resources and services) generated by population growth. Contingency planning for a range of alternative demographic futures.	Public information Annual reports Reports on legislation Family planning programs—clinics. Programs with States and cities.	Zero population growth via—	Voluntary limitation. Manipulation and repression. War, famine, and disease.
Consequences of population size, distribution, characteristics, and trends.	Use of planning, programing, and budgeting system.	Possible futures; use of tax and social security.	----------	
Research on operational aspects of population problems.	----------	Careers for women	----------	
Programs to support institutions which perform research on population.	----------	Urban design	----------	

[1] This list of research categories is taken from the report by the Ad Hoc Group on Population Research.

Public Information and Education: This activity is important in influencing people's intent to limit births. To some degree, public information can substitute for positive and negative incentives.

As we have seen, most agencies have interests and programs which are affected by population growth. They could, therefore, adapt their public information programs to convey to the public the interaction between: (1) alternate population growth rates; (2) family size; and (3) the ability of the agency to continue to solve the problems which it is chartered to solve. Federal agencies can do much more to develop public awareness of the population problem through conferences and seminars, and by developing needed public information and media materials, T.V. programs, speechs, charts, graphs, posters, pamphlets, movies, and policy exhibits.

For example, the National Aeronautics and Space Administration, with the Departments of Interior; Health, Education and Welfare; and Agriculture could develop a series of posters on the theme "Spaceship Earth," the need to take proper care of it, and the relation of this theme to population growth, environmental quality, and average family size. The Department of Health, Education, and Welfare could develop teaching aids for use in acquainting students at various grade levels with the demographic facts of life, how to prevent conception, and what needs to be done to preserve and extend the quality of the environment.

The Post Office Department could (1) create a series of stamps concerning the relation between population growth, family planning, family size, and problems of resources, the environment, and society—air, water, and land pollution, transportation, food, housing, medical and welfare services, and education; (2) provide free distribution of information and publicity via pamphlets and posters; and (3) increase the opportunity for employment of housewives.

The Government Printing Office and the Department of Health, Education, and Welfare could create and maintain a special list of available government publications, charts, exhibits, posters, stamps, films, etc., on population and family planning.

All federal agencies could include in their Annual Reports information on the relation between trends in population growth and distribution, and the success or failure of their mission.

Federal agencies such as the Department of Health, Education, and Welfare and Office of Economic Opportunity which have family planning programs could, in addition to enabling families to control births, also attempt to influence their intent to do so, for example, through information concerning the relation between family size, population growth, and other social problems.

Finally, most federal agencies have programs with regions, states, and cities and could encourage them to consider alternatives for population growth and distribution in their planning, programs, and public information.

CONCLUSION

As this article demonstrates, the government currently commands many resources to do more *now*, through research, planning, and operational programs, to implement Dr. DuBridge's priority, no-growth goal for U.S. population.

However, we urgently need the wisdom, will, and decisions to put these many existing capacities to work—to increase quickly capacities to work—to increase quickly public discussion of the population problem and of the goals and means to cope with it, and to expand, among policy makers and the public, the awareness, concern, and understanding which are necessary for effective action.

What do we do now, with the resources at hand, and with the time we have left, will help to determine how, at some future date, we will achieve the inevitab e limits to the world and U.S. population growth.

Our lack of foresight and prompt action increases the likelihood that we will limit our population through some combination of manipulation, repression, war, famine, and disease. Thus, we will fail to protect and promote our values of economic well-being, environmental quality, democratic government, and individual freedom.

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Task Force on Earth Resources and Population, Republican Research Committee, U.S. House of Representatives. "Federal Government Family Planning Programs—Domestic and International," 22 December 1969, reprinted in the Congressional Record, 29 December 1969, 91st Congress, 1st session, 1969. p. E11018.

STATEMENT OF WILLIAM D. McELROY, DIRECTOR, NATIONAL SCIENCE FOUNDATION

Senator KENNEDY. Our first witness this morning is Dr. William McElroy, Director of the National Science Foundation since 1969. Prior to that date, Dr. McElroy was chairman of the department of biology at Johns Hopkins University and director of the McCollum-Pratt Institute at Johns Hopkins. In addition, Dr. McElroy is a member of many societies and has served as the president of three: the Society of General Physiologists; the American Society of Biological Chemists; and the American Institute of Biologic Sciences. He is the author of over 100 articles in various scientific journals, is the author of a book entitled "Cell Physiology and Biochemistry," has edited many books published by Johns Hopkins, and has served on several editorial boards and committees. Among his honors and awards, he most recently was awarded the Andrew White Medal at Loyola College in Baltimore.

Dr. McElroy, I want to welcome you here this morning. Your back-

ground is very impressive, and I am eager to hear your testimony.

Dr. McElroy. Thank you.

With your permission, Mr. Chairman, I would like to ask my assistants to join me.

Senator Kennedy. Most certainly.

Please be kind enough to introduce them.

Dr. McElroy. Mr. Chairman, I think you may know some of these gentlemen.

We have here Dr. Eggers, Dr. Humphreys, Dr. Bisplinghoff, Dr. Cruetz, Dr. Owen, Mr. Sisco, and Dr. Levin.

I think this is a new team that you have not seen before.

We think it is a very good one.

Senator Kennedy. Very impressive.

Dr. McElroy. Mr. Chairman and members of the subcommittee, it is a pleasure for me to appear before you today to present our program for fiscal year 1972. With your permission, Mr. Chairman, I would like to read the first several pages of my prepared statement, which gives an overview of our budget request, and provide the other pages for the record.

The National Science Foundation's total appropriation request for fiscal year 1972 is $622 million, which includes $619 million in the salaries and expenses appropriation and $3 million in the special foreign currency appropriation.

Before proceeding with my statement, I should like to express my deep appreciation to the members of this subcommittee for the confidence and support of the science programs of the Foundation. Your actions on the Foundation's program request last year are indicative of your understanding and concern for those serious national problems which to a large degree fall within the purview of science.

Mr. Chairman, NSF has a major role to play in enabling our science enterprise to meet the challenges of the 1970's. The underlying causes of many of the problems confronting our Nation today are not well understood or even well defined. To improve the quality of our air and water resources, to anticipate and meet our future energy requirements, and to reduce the damage from earthquakes and major storms, as well as to cope with advanced technological developments that may lead to improved economic productivity, we must find more effective ways to focus the science and engineering resources on these issues.

As the members of this subcommittee are well aware, NSF has sponsored problem-oriented research, in such areas as earthquake engineering and weather modification and on a host of important social, economic, environmental, and life sciences matters, for more than a decade within our regular scientific research project support and national and special research programs. I am pleased to report that in fiscal year 1971 the Foundation has initiated a series of programmatic and management actions to greatly enhance NSF's ability to focus the research capabilities of this Nation upon societal needs. Specifically, we have brought together, under the heading of "Research Applied to National Needs" (RANN), most of our problem-focused research on environmental, social, and advanced technological issues of concern to society. In fiscal year 1972, we plan to expand these efforts significantly. As you stated last year, Mr. Chairman, through its support for applied research and the social sciences, NSF can assist mission-oriented

agencies at every level of Government to utilize the results of research investigations in an effective way to benefit our society. Our RANN program represents our major effort to do so.

Mr. Chairman, I know there is concern among some members of Congress that this active role in bringing the Nation's science resources to bear more effectively on the problems of society may detract from the Foundation's central mission to support fundamental research in the sciences. As we examine our programs in detail here today, it will be clear that we are in no way diminishing our support of basic science. We are, in fact, proposing the largest effort in the National Science Foundation's history for the support of research in the basic sciences.

This support, when added to the basic research accomplished under our national and special research programs, plus about 40 percent of the RANN program appropriately classified as basic research, will bring the total level of support for fundamental research in fiscal year 1972 to $422 million as compared to $317 million in fiscal year 1971. I believe that these facts demonstrate clearly NSF's continuing and central commitment to support research capability in the basic sciences.

We are deeply conscious of the need to provide an adequate level of support to maintain the Nation's strength in science. In developing our programs for fiscal year 1972, as reflected in this budget, we have made the hard choices necessary to achieve the balanced total program which will permit us to meet the most urgent priority requirements.

Despite the increase of $116 million in our request, we believe our program is constrained when measured against the strong pressure on NSF for high priority research support.

The scientific community, including technicians and other support personnel, has been disrupted in the past year by the shift of support by Federal mission agencies away from fundamental research to that which is more directly mission related. For this and other reasons, there is an urgent and growing need for NSF to increase its share of the total Federal support for fundamental research to provide the stability and continuity so essential to the vitality of American science.

The increase of $81.9 million requested by NSF for its Scientific Research Project Support program is the minimum required to: (1) Provide support for the outstanding fundamental research projects no longer supported by other Federal agencies; (2) provide for 12 Interdisciplinary Materials Research Laboratories and for the National Magnet Laboratory, all formerly funded by DOD; and (3) meet the urgent requirements for research in environmental, biological and social sciences and engineering, where new knowledge is needed to come to grips with some of the pressing problems of society.

Forty million dollars is included in our Scientific Research Project Support program to fund important research projects being phased out by other Federal agencies.

The research support pressures on NSF as the result of changing mission agency priorities are severe. We now have sufficient detail to indicate that research projects totaling $58 million have already been "dropped" by the mission agencies during fiscal year 1970 and the first half of fiscal year 1971. We estimate that an additional $16 million of research projects will be dropped by AEC during the next several months and about $25 million will be dropped by DOD, NASA,

and others during the same period, bringing the cumulative total of dropout pressure to almost $100 million through fiscal year 1972. This pressure is very real; for example, during the first 10 months of fiscal year 1971, NSF made 248 grants totaling almost $11.5 million in high-priority fundamental research programs formerly funded by other Federal agencies. I have a detailed listing of these research projects which is available for your review. (The list of projects appears in appendix A which starts on p. 137.)

Dr. McElroy. By comparison, and to illustrate our fiscal dilemma, NSF's fiscal year 1971 budget included less than $10 million for this purpose. I should point out that the Special Analysis in the President's Budget for Federal Research and Development programs (Special Analysis R) can give one a mistaken impression of the critical nature of the dropout problem. Accordingly, it is essential to make clear that Analysis R includes all the research and development program costs for the agencies listed. It makes no distinction between mission and nonmission related research, and, therefore, is not a true indicator of the extent to which the other agencies are shifting toward more restrictive mission-relevant research activities. With our cumulative dropout list expected to reach $100 million during fiscal year 1971, NSF's request of $40 million is the barest minimum required to support the superior, priority research projects dropped by other agencies.

NSF's fiscal year 1972 budget provides almost $13 million for the support of 12 Materials Research Interdisciplinary Laboratories (IDLs) and $1.8 million for the National Magnet Laboratory, both previously funded by DOD. As you know, Mr. Chairman, these research facilities are important national resources, and it is essential that their operation be continued. In addition to these facilities, our fiscal year 1972 budget includes $19.3 million for the Antarctic logistical costs formerly funded by DOD, now the responsibility of NSF. These direct transfers total about $35 million, and with the $40 million budgeted for dropouts, the total for transfer-type items is approximately $75 million.

We also propose to emphasize a number of research initiatives with a high potential for providing a fundamental understanding of relevant scientific problems. These efforts—supported under the budget activity, "Scientific Research Project Support"—will include research into the molecular biology of the human cell, of great importance because of the cell's centrality to the knowledge of living organisms; into the basic chemistry and physiological processes of the cell, because these areas are crucial to our understanding of the mechanisms of actions of drugs on human beings and animals; into the physics and chemistry of matter and of the earth's composition, because such studies are expected to yield information useful to the resolution of such environmental problems as waste disposal and recycling and the control of pollution; and into an array of research studies in such engineering areas as superhard materials, and alloys and composites with their critical relationship to improved technology.

Our fiscal year 1972 program provides for a significant increase in the support of research focused on specific problems of national, regional, and local concern. The bulk of this research will be supported under the program designated as "Research Applied to National Needs," or RANN. As I mentioned earlier, this program represents

a regrouping and expansion of our major problem-focused research programs, including earthquake engineering, interdisciplinary research relevant to problems of our society, weather modification, and others. Increased funds for these problem-focused efforts will also permit us to intensify our research in energy conversion and power, resource analysis, hail suppression, and environmental quality and management—including such estuary and river basin studies as those in the Chesapeake Bay and the Tennessee River Valley.

The increases for these programs are greater than the increase of $116 million shown in our appropriation request. This has been made possible, primarily, by reductions in our institutional and science education programs. These programs were judged to be of lower priority than the research programs for the following reasons:

(1) Judgments by our staff and consultants, as well as other evidence, lead me to believe that our institutional development programs have achieved their objectives to a large degree. There now appears to be an adequate number of universities that offer Ph. D. programs of sufficient quality to make special Federal incentives no longer a high priority item. However, we are not abandoning our development programs in toto.

As we indicated last year, Mr. Chairman, a part of our science development program in fiscal year 1971 was devoted to increasing the Nation's academic interdisciplinary research capability to meet the complex requirements of research focused on environmental and other societal issues. The RANN program now includes those institutional development projects designed to develop the academic interdisciplinary research capability required for this essential research objective. Grants for this purpose under the RANN program in fiscal year 1971 totaled $12 million, and such efforts are being continued under RANN in fiscal year 1972.

(2) Current and projected economic and employment conditions suggest that our institutions will graduate sufficient Ph. D.'s in science and engineering—for at least the next several years—to meet the predicted needs of industry, academic institutions, and government in all but a few highly specialized areas. Despite this present situation, the Nation's long-term needs will surely require large numbers of scientifically trained professionals, and we must provide a base support program sufficient to encourage the outstanding young men and women wishing to pursue careers in science and engineering.

For this reason, we are continuing our nationally competitive fellowship program. While our traineeship program is again dropped this year, we anticipate that the higher level of research project support will also provide additional training opportunities for undergraduates, graduates and postdoctoral students. These support activities plus our highly successful undergraduate student originated studies, will be adequate in our view to insure a satisfactory nucleus of scientists and engineers for the immediate future.

I should point out, Mr. Chairman, that the Foundation's role in education, although important, is a very limited one. NSF accounts for less than 2 percent of the total Federal support for education in this country. With such sums, NSF must use its funds in a manner that will focus on the specific science education programs most likely

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to provide leverage for innovation and reform, and that will prove cost-effective in delivering science education to a maximum number of students via the multiplying effect of increased teacher proficiency. In fiscal year 1972 we propose to concentrate our resources for science education support on course curriculum improvement and teacher training programs. We are also giving special attention to those program categories that assist institutions to upgrade their capability in science education.

Mr. Chairman, I doubt if there is any area of human endeavor more subject to continuous, sharp, and dramatic changes than science and technology. It is essential that we retain our flexibility to pursue the excitement of new research discoveries and opportunities as they develop. But today it is also essential to respond to the challenges of environmental quality, social unrest, and other problems of society, as well as to forecast the probable impact of technological change on our way of life. In this environment of continuous and rapid change, I believe it is critically important for NSF to have the same flexibility that we now have. For this reason, I urge that the authorization for fiscal year 1972 be enacted with a minimum of restrictive language, with the clear understanding that the Foundation will continue to keep its cognizant committees of the Congress fully informed of reprogramming actions.

In terms of the total demands being placed upon the Foundation for research and other science support, we are proposing a balanced but constrained program for fiscal year 1972. With increased appropriations in the next few years, NSF will be able to provide a larger share of the total Federal support for fundamental research. Only in this way can we assure the degree of stability and continuity so central to the long-term health of American science.

Five major considerations influenced our priority judgments in developing our fiscal year 1972 program: First was the need to strengthen and reinforce the Foundation's primary commitment to the support of basic science; second was the need to help sustain the Nation's research capabilities by providing the support necessary to employ available scientific manpower at our academic institutions in productive and needed research; third was the growing need to couple the capability and knowledge of science and technology more directly and more effectively to the needs of society; fourth was the need to stabilize Federal support for fundamental research by offsetting the impact caused by reductions in other agency support of important fundamental research; and fifth was the need to acquire scientific and technological knowledge that can provide a basis for the development of improved technology which can have a beneficial impact on the Nation's economic productivity.

As a result of these considerations, we have placed much greater emphasis on our research support activities.

We are proposing a total of $257.8 million, or an increase of $81.9 million over fiscal year 1971, for our core program of scientific research project support The most substantial increases are in the social sciences, engineering, biological sciences, oceanography, and chemistry, where we believe that research results are most likely to be more immediately usable in providing options for solutions to some of our more urgent needs.

The increases proposed in the other major areas of science, particularly physics and the IDLS, result principally from the need to support important research that is no longer supported by other agencies because of their increasing focus on specific mission-related work.

As I mentioned earlier, a major part of the proposed increase for scientific research project support is attributable to the reprogramming of research support by other Federal agencies. Of the $81.9 million increase for our program category, "Scientific Research Project Support," $54.6 million, or more than 65 percent, is for this type of support. Specifically, there is $12.8 million for the former DOD IDLS, $1.8 million for the National Magnet Laboratory, and $40 million for research support in the various fields of fundamental science.

We expect that the amount of $257.8 million requested for scientific research project support will result in the award of 5,300 grants to 450 institutions in all 50 States. This research will involve the efforts of some 7,700 faculty scientists and more than 7,200 graduate science students.

Mr. Chairman, our allocation of resources among the various areas of science provides for balanced and comprehensive support of fundamental research. The results of such research provide the building blocks for progress, and it is essential that we give this type of research adequate support. I doubt that there has been a time in history when research in science and engineering has been more exciting or offered more public benefit than it does today. Let me give two examples.

Recent research on fertility in mammals promises to provide for the development of totally new and physiologically sound methods of birth control in human beings. For some time, it has been known that the sperm of mammals, when first discharged, is incapable of fertilizing the ovum. A triggering substance is required to alter the sperm chemically so that it can perform the fertilization function. This process is termed "capacitation." Recent research has identified a remarkably simple substance, occurring naturally in the vagina, which acts as a decapacitator. This is a remarkably simple substance, consisting of five amino acids, which is called a pentapeptide. By manipulating this substance, it may be possible to inhibit or to increase fertility and, thus, to provide an effective mechanism for fertility control in the human male.

Research on substances known as pheromones may provide the basis for effective biological control of insects. Pheromones are the chemical attractants of the insect world. There is, for example, the "sex substance" found in the virgin female fly which triggers the specific sex response from the male fly. This substance is so potent that a concentration of less than one part in a billion is sufficient to induce in the male fly the entire behavioral sequence of attraction, sexual stimulation, and copulation. Knowledge of this type may lead to the development of effective means of biological control of insect population.

I should like now to mention the Materials Research Interdisciplinary Laboratories, which are generally referred to as the IDLs. There are 12 such laboratories, located on the campuses of as many major universities. The principal funding for these laboratories through fiscal year 1971 has been provided by the Advanced Research Projects Agency of DOD. The work of these laboratories is vital to continuing U.S. scientific strength in the area of materials research.

Materials research increases our understanding of solids and liquids and helps us to find ways to use these materials. The work done at these laboratories is basic to our national effort to advance our technology in such areas as chemistry, ceramics, metallurgy, minerology, medical materials, and many others.

Our request for $5.8 million for Specialized Research Facilities and Equipment is the same level of support as was provided in fiscal year 1971. I know that you appreciate the importance of our helping institutions to obtain major pieces of scientific equipment and instrumentation that are required for the conduct of very advanced research.

Mr. Chairman, I would now like to give you the highlights of the eight programs constituting our National and Special Research Program activity, the second largest budget activity, totaling an estimated $166.6 million in fiscal year 1972.

We are requesting $10 million for the International Biological Program, which represents a $3 million increase over the fiscal year 1971 level. This increase will permit us to intensify the research investigations on six different life zones, or biomes—that is, the Deciduous Forest, the Coniferous Forest, the Grasslands, the Deserts, the Tundra, and the Tropical Forest Biomes.

The knowledge and understanding gained from these biome studies will allow us to predict the consequences of man's manipulation of ecosystems and provide a better basis for their management.

The amount of $2.5 million requested for our Global Atmospheric Research Program, or GARP, will permit NSF to support research on the information gathered from the previous BOMEX (Barbados Oceanographic and Meteorological Experiment) and Line Islands efforts, and planning and design work for a "Tropical Atlantic Experiment" to be carried out in fiscal year 1973. The National Oceanic and Atmospheric Administration (NOAA) is "lead agency" for GARP. NSF supports most of the academic research, as well as the the modeling and simulation studies which are carried out at the National Center for Atmospheric Research (NCAR).

As you know, NSF is the lead Federal agency for the International Decade of Ocean Exploration (IDOE). An amount of $20 million is included in our fiscal year 1972 budget request for the total U.S. involvement in the IDOE. The purpose of the IDOE is to accelerate the understanding of the oceans and to encourage and enable nations, cooperatively, to make wise use of the ocean environment and to better utilize ocean resources.

Our Ocean Sediment Coring Program provides for the acquisition of sediment cores from the deep ocean basins. The analysis of these cores is providing important data on the structure and behavior of the earth's solid crust.

The Arctic Research Program, for which $3.5 million is requested, was established as a result of the Vice President's designation of the Foundation as lead agency for the extension of Arctic research. The research supported under this program includes studies of the Arctic tundra, sea ice, permafrost, and other aspects of the harsh Arctic environment. Priority is given to research efforts which may ameliorate the effects of man's intrusion into the Arctic ecosystem.

We will also continue to support U.S. research efforts in the An-

tarctic and are asking $26.8 million for that purpose in fiscal year 1972. As you know, the President recently directed that the management and budget responsibility for logistic support for the U.S. Antarctic Research Program, as well as for research support for the program, be provided through NSF.

Our budget request for fiscal year 1972 includes an amount of $19.3 million for logistic support which has been funded by DOD in previous years. DOD has made an offsetting adjustment in its fiscal year 1972 program and, therefore, there is no increase in the total Federal Budget for fiscal year 1972 as a result of this transfer.

The primary objective of our Oceanographic Research Operations and Facilities program is to achieve the maximum effective utilization of research ships and related oceanographic facilities. Part of this effort involves the development and implementation of a ship replacement program. This is made necessary by the fact that 15 of the 32 ships of the academic fleet currently in operation have hulls which are 25 years or more in age, with resultant high maintenance costs. Thus, in fiscal year 1972, we are planning to begin a replacement program by supporting the construction of one new oceanographic research ship, about 150 to 160 feet in length, at an estimated cost of $2.8 million.

In my opening remarks, I mentioned that we are increasing our research efforts focused on problems of national, regional, and local concern. Our experience with such programs as Earthquake Engineering, Interdisciplinary Research Relevant to Problems of Our Society (IRPOS), Enzyme Technology, Weather Modification, and other problem-focused research has demonstrated to us the importance of using a special management approach in administering these types of societally relevant programs.

Consequently, in February of 1971, the Foundation brought together, under the heading Research Applied to National Needs (RANN), the bulk of its coordinated problem-focused research efforts.

Our support of ongoing research in RANN in fiscal year 1971 will total $34 million. The total amount requested for RANN for fiscal year 1972 is $81 million. However, about 70 percent, or a little over $55 million of the funds requested for fiscal year 1972, will be used to continue ongoing work started in fiscal year 1971 and prior years. The remainder, $26 million, will be used for research in additional areas, a significant number of which have already been explored under other programs of the Foundation in fiscal year 1971 or previous years. Research supported under the RANN program will help U.S. scientists to develop more effective and efficient methods for coupling the knowledge and methodologies of science to efforts to resolve selected national, regional, and local problems, and to help advance national economic productivity.

Research Applied to National Needs is subdivided into four major program elements: Advanced Technology Application, Environmental Systems and Resources, Social Systems and Human Resources, and Exploratory Research and Problem Assessment. I would like to describe briefly some of the major activities to be supported under RANN in fiscal year 1972.

REGIONAL ENVIRONMENTAL SYSTEMS RESEARCH

A number of coordinated research efforts, initiated under our former IRPOS program on an exploratory basis, are concentrated on regional environmental systems. These will be significantly expanded in fiscal year 1972, and several additional regional research efforts will be initiated. This coordinated program is aimed at understanding the principal environmental threats to individual major regions and at finding ways to more intelligently manage and utilize the resources of these regions. The research techniques developed through these studies are expected to have application to other regions of the Nation.

Among several regions under study is the Tennessee Valley. This research, which includes the development of a regional resource model of the valley, is being carried out in conjunction with planning efforts of the Tennessee Valley Authority, the Appalachian Regional Commission, and the East Tennessee Development District. The work is designed to provide new tools for analyzing and organizing resource, economic, and environmental information which needs to be considered in the further development of the region.

ENERGY RESOURCE RESEARCH AND ANALYSIS

The urgent need to understand the Nation's burgeoning energy requirements and the tradeoffs between the environmental costs of energy production has been underscored by power outages and "brownouts" in each of the past 3 summers, by public concern over oil spills, and by chaotic supply and demand relationships in the fuel industry.

The NSF research effort related to energy includes basic and applied projects in physics, engineering, biology, systems analysis, and economics, as well as interdisciplinary efforts that couple such disparate fields.

I might emphasize that the Foundation will not displace or act as a substitute for agencies of the Government which are effectively supporting research for their own needs. However, the Foundation can and does complement the research capabilities of the other agencies by addressing the long-range requirements of the Nation when reviewed from the perspective of current national needs.

Close working relationships have been established with the mission-oriented agencies through interagency task forces and through a committee of the Federal Council for Science and Technology to aid the Foundation in coordinating its activities with other branches of the Federal Government and in suggesting priorities for research applications. A committee of the Federal Council, with members from the other agencies affected by NSF's program of problem-oriented research, will be responsible for overall Federal coordination. Subcommittees are being created to provide more detailed coordination for each major objective of the RANN program.

It is our expectation that each program in RANN will lead to useful applications which may be implemented by other public and private agencies. Some RANN programs may initially be developed as a cooperative effort, utilizing the expertise of each agency to carry the project through proof of feasibility or proof-of-concept demonstrations. At such a point, the Foundation intends to transfer that program and utilize its resources to support new projects. Thus, the Foundation intends to act as a seed agency and retain its capacity to seek new ideas and allocate funds to new areas.

Mr. Chairman, I should now like to turn to our National Research Centers activity. The Foundation provides support for five National Research Centers. We are requesting a total of $40.2 million for the support of the further development and continued operation of these centers, or an increase of $4.3 million over our fiscal year 1971 program.

You will recall that our fiscal year 1971 budget included an amount of $3.8 million for the resurfacing of the Arecibo antenna. At the time of our appropriation hearings last year, we pointed out the preliminary nature of the $3.8 million estimate for the resurfacing of the antenna and stated that additional engineering, feasibility, and cost studies were being conducted that would provide a basis for a more definitive cost estimate.

The results of these reviews are now available and they show that modifications will be required to increase the strength of the cable support system for this 20-acre reflector. Because of these modifications and other changes, the revised cost estimate is $5.6 million, or $1.8 million above our preliminary estimate.

The increase of $3.7 million requested for the National Center for Atmospheric Research will accommodate new requirements at the National Scientific Balloon Facility in Palestine, Tex. It will also provide scientific equipment at NCAR, including calibration facilities for atmospheric research; planning and instrumentation for participation in a major air pollution control experiment; and efforts in solar-terrestrial physics and aeronomy related to atmospheric phenomena.

Next is our program of Computing Activities in Education and Research for which we are requesting $17.5 million or $2.5 million more than the current level. This program provides a base of computer science knowledge, to make possible innovative approaches for computers in education and research, as well as permitting Government, industry, and other computer users to evaluate the capabilities and limitations of computers and to utilize their potential.

Over the years, we have heard about the potential of computers for providing more effective means for educational techniques; however, it was not until recently that new software and hardware developments made such techniques both technically and economically feasible. We are, therefore, now sponsoring the development of innovative computer equipment, computer-based curricula in selected scientific disciplines, and an evaluation of these advanced techniques on a pilot basis. We feel that this program has the potential for far-reaching improvements in our educational system.

The next activity is science information. Our program for fiscal year 1972 is $9.8 million, which is $1.2 million less than our present funding level. Fiscal year 1972 will be a period of consolidation of our discipline-oriented information systems program. The decrease in the amount requested for this program reflects, in part, the transfer of funding responsibility for the Science Information Exchange (SIE) to the Smithsonian Institute.

I should now like to discuss our International Cooperative Scientific Activities, designed to insure adequate participation of U.S. scientists and scientific organizations in international scientific events to help maintain the overall strength of U.S. science. We are requesting $4 million for this program in fiscal year 1972, which is an increase of $1.8 million over the $2.2 million included in our fiscal year 1971 program for this activity.

Under this program, the Foundation sponsors: (1) United States cooperative research and exchange programs with seven countries; (2) the exchange of scientists between the United States and the Soviet Union and East European countries; (3) the expenses for participation of U.S. scientists in international scientific organizations to assure effective use of resources in international programs which the United States has helped to design; and (4) the participation of the United States in collaborative program with scientifically advanced nations on transnational problems of society. We hope to increase our activity in these areas in fiscal year 1972.

Our fiscal year 1972 program provides for expanding our support for U.S. participation in a multinational program, supported by several other advanced countries, on the study of complex problems of industrialized nations. The principal focus will be on studies in systems analysis, operations research, and management techniques, and their application to problems of advanced societies.

In order to insure the best possible management and arrangements for our increasing overseas scientific programs, the Foundation plans to establish offices in fiscal year 1972 in selected regions abroad. These locations will be determined in consultation with the Department of State and other appropriate organizations. Mr. Chairman, I would now like to address the Foundation's Intergovernmental Science Program, for which we are requesting $1 million, a $600,000 increase over last year.

The Intergovernmental Science Program has concentrated its initial efforts upon developing an understanding, on the part of a variety of State and local government officials, of the potentials for applications of science and technology by the governmental units for which they are responsible. Grants have already been made in 22 states.

Increased program activity in fiscal year 1972 will provide for awards to a larger number of States, a heightened emphasis on local government activities, enlarged programs in areas such as technology transfer and analysis, pilot programs for training State and local government personnel in science administration, and other activities designed to enhance the performance of scientific and engineering staffs of State and local governments.

Earlier, Mr. Chairman, I emphasized that our appropriation request is constrained, when compared with the total demands being placed upon the Foundation. To meet our highest priority research program requirements, we have made a number of shifts in program emphasis. I would now like to cover the details of two major program activities where those shifts in emphasis are particularly noteworthy.

First, within the institutional support for science activity, we are discontinuing the institutional science development program. The Foundation has, since 1965, provided over $200 million to about 100 universities, under our institutional science development programs, to augment their research and graduate scientific education capabilities.

These programs have generally achieved their objective. However, as I stated in my opening remarks we are continuing institutional science development activities under the RANN program in those instances when it is necessary to develop an institutional capability to deal with problem-focused and largely interdisciplinary science efforts. The 1972 budget provides for continuation of our institutional grants for science, awarded on a formula basis. These grants, based upon total

Federal research support, were given last year to over 600 colleges and universities, providing important flexibility to administrators at those institutions in developing and managing their science programs.

Mr. Chairman, I know that the members of this subcommittee are concerned about changes in our science education program. Within the $77.3 million being requested for these programs for fiscal year 1972, we have made these changes for well-considered reasons. They will, we believe, result in more focused, more efficient use of our resources. In formulating our science education program, we have applied four criteria to guide our priority selection in the development of the 1972 program.

The first and most important criterion is societal need. In the last analysis, we depend upon staff judgment, as approved by the National Science Board, in determining these needs. These judgments are based on factual data gathered from various sources. These sources include studies carried out by staff members who administer the various education programs and also studies carried out by others in the Foundation, such as those concerned with manpower analysis and policy studies. Independent external studies, such as those made by the Carnegie Commission on Higher Education, the Presidential Commission on Higher Education, and the National Academy are other important sources.

The second criterion is effectiveness. Both the amount of change and the number of students affected by the change are important. Curriculum development, broadly defined, and teacher development generally benefit more students than do programs of direct student support.

A third criterion for a high priority program is that it should be possible to accomplish the objectives of the program within a reasonable period of time and within the budget which is likely to be available for these programs.

A fourth consideration is that successful programs must be maintained at an effective and efficient size.

When these four criteria are applied within the education program areas, the program priority in order is Instructional Program Development, Instructional Personnel Development, and Student Development.

Instructional program development, for which we are requesting $28.5 million, includes curriculum improvement and educational research projects. This is, clearly, the area in which there is the greatest social need and the greatest possible NSF impact. This science education subactivity includes our Course Curriculum Development work at the precollege and undergraduate levels, the advanced science education program, and the College Science Improvement Program.

As an extension of the College Science Improvement Program, we are proposing for fiscal year 1972 an amount of $5 million expressly for improving the science programs of the traditionally predominant black colleges. Slightly more than 85 4-year colleges in this category still produce almost half of the baccalaureate degrees awarded to black students. In our opinion, the particular requirements of these schools constitute a special category. If our society is to have adequate access to the talents of students at these institutions, we must continue to work toward equal educational opportunity and capitalize on the unique national resource represented by this group of small colleges.

Another area of increasing activity is the development of curricula for technologists.

We have several projects underway in this area: An electronics project at the University of Illinois, Urbana; a chemical project at the Lawrence Hall of Science in Berkeley, Calif.; and a second electronics project at Wentworth Institute, Boston. We need, as a Nation, to attract talented youngsters to technology from all elements in our society, to use them throughout our complex society, and to provide for them the most appropriate curriculum and training opportunities that can be developed. Programs of support in this area will have an important impact on the junior colleges and the community colleges which are the most rapidly growing segments of our postsecondary system of education.

We are particularly interested in continuing adult education in the sciences and plan to increase our activity in this area. Education, of course, does not necessarily require a school, and, for the employed person interested in upgrading himself, the separation of job from school is a distinct handicap. A project at Colorado State University has shown that TV tapes can be used to take graduate courses to employed engineers at their places of employment without loss in the quality of learning. TV tapes, when combined with one of several methods of keeping students and instructors in communication, have very wide applicability and the potential for substantially reducing costs of education.

We are requesting $23.3 million for our program of supplementary training for secondary school teachers of science and mathematics. This includes summer institutes as well as several other particularly effective teacher training programs. This program represents a major portion of the total Instructional Personnel Development budget. The institutes program continues to be useful in upgrading the scientific knowledge of teachers, and in the future they will give further emphasis to the use of new science curricula in the schools and classrooms of the Nation.

By concentrating our resources for science education on those activities which can have the maximum beneficial impact on a wide range of students and teachers, we expect to be able to sustain the quality of our science education program.

Direct support of graduate students has been substantially decreased. However, we plan to continue our program of Fellowships at a sufficient level to insure that a cadre of highly motivated and talented science students are encouraged to pursue careers in science. With respect to our programs of Instructional Personnel Development, we plan to place increasing emphasis on training in new course materials and techniques. Experimental projects are also being introduced that are aimed at improving the training of teachers at less cost, through the introduction of innovative approaches to our teacher institutes program.

We are requesting $24.3 million for Program Development and Management (PD & M). This item funds the entire operational and management costs of all programs and activities of the Foundation. The amount requested is 3.9 percent of the total budget request of $622 million compared to 4.2 percent in fiscal year 1971. The PD & M line item funds the cost of the entire staff of the Foundation, program

management, and all supporting personnel. Personnel costs constitute 80 percent of the fiscal year 1972 estimate for this activity, and two-thirds or $2 million of the $3 million requested increase in PD & M.

The major factors responsible for the proposed increase in personnel costs are: An increase in the number of active grants and contracts from approximately 22,000 in fiscal year 1971 to 26,000 in fiscal year 1972; a 50-percent increase in proposals received, each of which requires individual attention and evaluation, whether or not it is funded; the expansion of our problem-focused research efforts which require more positive, intense, and direct management; the requirement for better planning and assessment activities to keep abreast of rapid scientific and technological changes; and finally, the need to provide adequate support services for our professional staff, thereby allowing increased efficiency of operation.

Therefore, the increased personnel costs for which funding is requested in fiscal year 1972 include an increase in staff manpower which permits the application of 84 additional man years.

I should like to emphasize that increased salaries, resulting from mandatory pay increases effective January 1, 1971, are not included in the budget estimates. Appropriate legislative authority to amend the Program Development and Management limitations in the fiscal year 1971 and fiscal year 1972 appropriation languages will be requested in the supplemental appropriation requests to cover the pay-increase costs for all Federal agencies.

Mr. Chairman, since becoming Director, I have instituted a number of management changes to assure both greater efficiency and better quality control. This is a continuing process and involves a constant and critical review of every aspect of our operation.

In addition to our salaries and expenses appropriation request of $619 million, we are requesting $3 million for our special foreign currency appropriation. This is $1 million more than was provided in fiscal year 1971. These activities utilize foreign currencies which the Treasury Department has determined to be in excess of the normal requirements of the United States.

The utilization of excess foreign currencies provides a means for accomplishing research and science education projects of mutual benefit to the United States and the cooperating countries with funds that were generated, principally, by the sale of surplus agricultural commodities.

Research support in the excess currency countries will include projects in the various major fields of science. Such research will be undertaken in areas of special interest to U.S. investigators. In addition, we plan to continue our programs overseas to obtain translations of scientific journals and related documents.

This concludes my prepared statement. I will be happy to answer any questions you may have, Mr. Chairman.

Senator KENNEDY. Just in terms of the $81.9 million increase for Scientific Research Project support, under item 1 of your statement, that is about $40 million; is that correct?

Dr. MCELROY. I am sorry.

Senator KENNEDY. Item 1, providing support for our outstanding fundamental research no longer supported by other Federal agencies, is approximately $40 million?

Dr. McElroy. Yes.

Senator Kennedy. Item 2, IDL's and the National Magnet Laboratory, is $12 million?

Dr. McElroy. About $15 million.

Senator Kennedy. What about special programs?

Dr. McElroy. Number 3, our new research initiatives in selected areas, Mr. Chairman, is described in my testimony.

Senator Kennedy. In any event, most of the increases are already earmarked?

Dr. McElroy. That is correct. We figure we will require about $27 million of additional funds to support those new research initatives.

Senator Kennedy. How does that compare with the past, as far as new funding? You have had quite a time catching up with new research in the past few years.

Dr. McElroy. Well, as a matter of fact, as I said, I think this is a very constrained budget. The $27 million of new money is our best estimate of the requirement.

I will submit for the record the figures—we see about a $100 million dropout from the beginning of 1970. I think it is fair to say that of the $100 million dropout under the constrained budget we have this year, this is all we can do; that is, use the $40 million I have outlined.

(The information referred to may be found in appendix B for fiscal year 1971 starting on p. 185 and in appendix C for fiscal year 1970 starting on p. 256.)

Senator Kennedy. It would cost about $100 million to fund all of the projects in basic science being dropped by other agencies?

Dr. McElroy. That is correct.

Senator Kennedy. But if you were to make an evaluation, would some of those projects be dropped?

Dr. McElroy. That is right.

Senator Kennedy. Of the requested $27 million for new research projects will any be used for funding dropouts?

Dr. McElroy. We may be forced to use some of that; yes, sir.

Senator Kennedy. So some will be used for support of the Ph. D.'s who would otherwise be unemployed?

Dr. McElroy. I will have Dr. Creutz comment on that.

Dr. Creutz. Actually there are new people—about 7 percent per year is being generated through the country's Ph. D. training programs.

Also, we feel over the past few years the actual average size of research grants is too small. It is not efficient.

There must be some increase in the average grant. That plus the new people, plus the dropouts account for——

Dr. McElroy. I would like to expand on that, Mr. Chairman.

Because of the number of applications coming to us from good young investigators, we have had to reduce the support of some of our senior investigators almost in half in order to support the young investigators.

We think that is a great loss. You have a distinguished group, and they are making an important contribution in basic research, and to cut back its effectiveness by taking away the technicians, and so forth, is not good.

They are making a significant contribution, and it is a real loss to the society.

We hope that we can increase the size of the average grant to get these research teams back to their maximum productivity. We think this is extremely important.

It not only has affected the individual investigator, but it has affected the institution itself. When you cut back on personnel, because the overhead is calculated on salaries and wages, the institution loses part of its overhead money, and this is one of the reasons why the institutions are in difficulty.

Senator KENNEDY. I suppose it puts a tremendous stress as well on your operation, and on how you are going to allocate these resources. You have senior researchers of proven quality and capability, as well as some younger people who might have ideas. Choosing between the two must put an extraordinary burden on the whole Foundation.

Dr. MCELROY. That is correct.

Senator KENNEDY. This $45 million in your statement represents what?

Dr. MCELROY. Applications now coming in.

Senator KENNEDY. In terms of your critical evaluation, how many of those could you pick up if you had the resources?

Dr. MCELROY. Our critical evaluation would suggest we probably would pick up about 75 percent.

Dr. CREUTZ. Yes, sir; that is correct.

Senator KENNEDY. If you had the resources, instead of the 75 percent under the proposed budget, you will only be able to pick up how many?

Dr. MCELROY. About 40 percent.

Now, I would like to point out that the RANN program as a highlight effort is not new in the Foundation.

Senator KENNEDY. I think you would have to be impressed that there is really a most callous disregard for basic research. When these kinds of programs, which have been proven, which have been under the critical eye of such enormously skilled and talented people as you, and which have met every kind of possible criteria, in terms of being worthwhile, but have been terminated, it seems a rather short-sighted investment in our national natural resources.

Dr. MCELROY. We do believe, with this increase, hopefully, we can get the full amount of the President's budget this year, and this will get us going down the right road, and we believe it is a significant step forward, and one of the reasons we have cut back in our educational program, and in our institutional program, is to put those resources into the basic research projects.

We feel that the young man, who has earned his Ph. D., who is now working in the university, has a higher priority at this time than even the stimulation of the young high school students and younger graduates. I know this has caused us some great difficulties, but we felt, in a tight budget and when we have young people ready to go to work, that we have to place that as our No. 1 priority, and for this reason, in this constrained bndget. we have had to cut back on our institutional, and on some of our educational, programs.

We are not saying they were not good programs. What we are saying is that we do not think we have quite the priority of our support and research of the young investigator.

Senator KENNEDY. We will come back to that later. If we could return to these questions about how the Foundation itself reached the determination within a tight budget as to the proper balance between educational support and support for reseach, questions come to mind as to how you determined the importance of basic research as compared to graduate programs, fellowship programs, and high school programs, and the impact that would have in terms of the educational institutions. I suppose you know better than I that it is really impossible for you to cover all your worthwhile activities in a constrained budget.

I am sure I am not unlike many other Members of the Senate in that I have heard from many distinguished colleges and universities in my own State and throughout the country. I am very much concerned about this whole trend, and I expect we will hear some comments later on in the morning about its impact. But I would like to give you the first crack at it.

Dr. MCELROY. Well, as you can understand, Mr. Chairman, there is no question in my mind that these programs have been very good programs.

There were a number of factors that we considered in reaching this conclusion.

One is that we all hear about the overproduction of research, of Ph. D. people.

We felt at this time there was not a need for a Federal incentive program.

Senator KENNEDY. Is there an overproduction of Ph. D.'s?

Dr. MCELROY. There does appear to be at this time, at least with respect to the jobs for which Ph. D.'s have generally been used.

I myself am every cautious about answering such statements. We do not see a great deal of unemployment among the 1970 Ph. D.'s.

Now, the hearsay evidence that was coming along is that it is more difficult this year to get a job of the type that the students had expected to obtain.

We do not have the factual information on that. I do say, however, that there is some unemployment among Ph. D.'s. We think it runs between 1 and 4 percent in the field, but we do feel there are good people going into science.

At this time we do not need the Federal incentive programs to stimulate more of them. We do have problems. I might add we still have fellowship competitive programs. We have an undergraduate program, which is a very exciting program, and it has the students very much interested.

Senator KENNEDY. Let's take the fellowship program. What has been its trend over the period of the last 2 or 3 years? Has it been a downward trend?

Dr. MCELROY. The competitive fellowships, we have reduced only a little.

It is the traineeships we have eliminated.

Senator KENNEDY. How many new starts have there been on the fellowships?

Dr. MCELROY. We are projecting about 500 new starts a year.

Senator KENNEDY. Is that what the trend is?

Dr. MCELROY. It is down a little bit. We made about 750 new, first-year awards last year and about 500 this year.

Now, over and above the overproduction problem, it was the question of do we support youngsters that are at the high school level—the undergraduate level—at the expense of not supporting the young man that has worked for 7 or 8 years to get his Ph. D. degree.

Senator KENNEDY. Is that the kind of choice you have to make? These have been very significant, important and useful programs which have stimulated an interest in science. Are these the kinds of decisions you have to make in order to live within your budgetary ceiling?

Dr. MCELROY. That is correct, Mr. Chairman. I point out there is nothing more discouraging than having a young Ph. D. not being supported.

That information feeds back to the high schools and colleges very rapidly, and immediately discourages even good students from trying to find their way into the system.

That is the kind of thing we must avoid.

If we cannot support your young investigators, that information will feedback and do more damage than if we did not support the younger undergraduate at the high school level.

Senator KENNEDY. How effective has the high school program been?

Dr. MCELROY. I think that it has been quite effective for young people going into science; it has re-enforced their choice. It has given them additional experiences. As I said, I have no argument that it was a good program. It was just a question of priority.

It is the same way with undergraduates.

Senator KENNEDY. We are talking a great deal up here about evaluation, and I think all of us realize we do not do nearly enough in terms of the resources that we provide. I say that as a member of the Education Subcommittee, and of the Health subcommittees and others.

Have you tried to follow these programs over a period of time, even in a rough way, to evaluate them?

Dr. MCELROY. We have data on this, but it is an extremely difficult experiment to control.

I had the first NSF undergraduate research training program at Johns Hopkins.

We followed these students through, and it turned out the student who participates in that kind of activity is more likely to do scholarly work later.

Unfortunately, we do not have a great deal of followup data, but I have no arguments with the program.

Senator KENNEDY. Is your general conclusion that the program has made a significant contribution in stimulating young people's interest in science? Is it a program of a proven quality?

Dr. MCELROY. One of the other considerations that we have in mind is that we could only reach about 5,000 students out of at least 100,000.

Now, we should be reaching more than that if we are really going to operate a program like this.

These are hard decisions to make in terms of when a program gets small, we might be better off in regrouping and going in another direction.

We hope, at least for the undergraduates, and possibly high school students in the summertime, that it may be possible for some of these students to work in some of the research projects we will be supporting; we shall at least encourage their participation.

Some of the graduate students certainly will and must be supported on research funds in this way.

Senator KENNEDY. How will this budget affect equipment that you are making available?

You have a maximum budget for the provision of equipment, do you not? Isn't it a 50–50 program?

Dr. MCELROY. That is correct.

Senator KENNEDY. I am interested in knowing whether that program will continue. Do you feel there is a need for it?

Dr. MCELROY. At this time that program has been discontinued.

That was primarily for the teaching of science in the laboratories, and that has been an effective program.

Senator KENNEDY. Where have those resources been going for equipment?

Have they been going to more "elite" colleges, or have they been going to some other colleges?

Dr. MCELROY. It has been going more or less across the board.

Senator KENNEDY. Across the board?

Dr. MCELROY. Yes, open to all universities and colleges alike.

Senator KENNEDY. I suppose there will be a cutback of this kind of support for many colleges in rural areas or rural States.

I don't know whether all colleges and universities, even those of considerable prominence, are highly pressed in terms of finding resources. I would think a cutback of this dimension would affect the smaller schools and colleges that do not have these kinds of resources, even more than the larger schools and colleges which do have them.

Dr. MCELROY. As I said, in our educational budget, we are very small in our contributions, probably less than 2 percent of the Federal funds for education, and there are so many problems in colleges and universities that the NSF is going to assume full responsibility for that, and——

Senator KENNEDY. There comes a time when you can make up those resources, and can provide an important piece of equipment for the educational process in some of these centers.

I suppose this has been making some useful contributions in the development of the scientific understanding.

Dr. MCELROY. There is no question about that, Mr. Chairman.

Senator KENNEDY. What about cutting back on the fellowships? Are these to be cutback too?

Dr. MCELROY. Yes; those are cut back.

Senator KENNEDY. How much? Will they be eliminated?

Dr. MCELROY. Dr. Humphreys, could you answer that?

Dr. HUMPHREYS. The postdoctoral fellowships, both senior and junior, have been eliminated as have the science faculty fellowships.

Senator KENNEDY. How many did you have last year? Could you fill me in a little bit on where you have been in the last 3 years? What the trend has been?

Dr. HUMPHREYS. We had 126 regular postdoctoral fellowships in fiscal 1971, 47 senior postdoctoral fellowships, and the science faculty fellowships were 214.

Senator KENNEDY. What is the 214 again?

Dr. HUMPHREYS. Science faculty fellowships which were directed primarily at teachers in the small liberal arts colleges.

Senator KENNEDY. Now, is that last year?

Dr. HUMPHREYS. That is last year.

Senator KENNEDY. And will all those be eliminated?

Dr. HUMPHREYS. Those were all eliminated.

Senator KENNEDY. Could you supply, for the record, where those people are located? Could you make any comment generally as to the kind of distribution?

Dr. HUMPHREYS. Yes.

(The information subsequently supplied follows:)

Present or most recent institutional affiliation of individuals offered science faculty fellowships during fiscal year 1971

U.S. Institutions	*Present Science faculty*
Alabama:	
Florence State University	1
St. Bernard College, Alabama	1
University of Alabama, Tuscaloosa	1
Alaska: University of Alaska	1
Arizona:	
Arizona State University	1
University of Arizona	1
Arkansas:	
Arkansas State University	1
University of Arkansas, Fayetteville	1
University of Arkansas, Little Rock	1
California:	
California State College, Hayward	1
Foothill College	1
Harvey Mudd College	1
Los Angeles Valley College	1
Merritt College	1
Occidental College	1
Pacific Union College	1
Pasadena College	1
Reedley College	1
San Diego State College	1
San Fernando Valley State College	2
University of Davis	1
University of Redlands	1
University of San Francisco	1
Colorado:	
Colorado State University	1
Mesa College	1
University of Colorado	1
University of Northern Colorado	1
Connecticut:	
Central Connecticut State College	1
University of Connecticut	1
University of Hartford	1

U.S. Institutions—Continued

	Present Science Faculty
Delaware: University of Delaware	1
District of Columbia:	
Catholic University of America	1
Federal City College	1
Florida:	
Florida Technology University	1
University of Florida	1
Georgia:	
Kennesaw Junior College	1
University of Georgia	1
Idaho: Idaho State University	1
Illinois:	
Eastern Illinois University	1
Illinois State University, Normal	1
MacMurray College	2
Principia College	1
Indiana:	
Indiana University	1
Marian College, Indianapolis	1
Valparaiso University	1
Iowa:	
Cornell College, Iowa	1
Grinnell College	1
Iowa Central Community College	1
Luther College, Iowa	1
Westmar College	1
Kansas:	
Kansas State Teachers College, Emporia	1
Washburn University of Topeka	1
Wichita State University	2
Kentucky:	
St. Catherine College	1
University of Louisville	1
Louisiana:	
Grambling College	3
Northwestern State College, Louisiana	2
Maryland:	
Loyola College, Maryland	1
Montgomery College	1
Mount St. Mary's College, Maryland	1
Massachusetts:	
Amherst College	1
Boston University	1
Bridgewater State College, Massachusetts	1
Lowell Technical Institution	1
Southeastern Massachusetts University, Dartmouth	1
Tufts University	1

U.S. Institutions—Continued

	Present Science Faculty
Michigan:	
Adrian College	1
Albion College	1
Calvin College	1
Central Michigan University	1
Ferris State College	1
Grand Valley State College	1
Hope College	1
Lake Superior State College	1
Michigan Technical University	1
Northern Michigan University	2
University of Detroit	1
Minnesota:	
Bemidji State College	1
Carleton College	1
Concordia College, Moorhead	1
Hamline University	1
St. Cloud State College	1
St. Olaf College, Minnesota	1
Southwestern Minnesota State College	1
University of Minnesota:	
Minneapolis Morris	1
Mississippi:	
Alcorn Agriculture and Mechanical College	2
Mississippi Gulf Coast Junior College, Jeff Davis	1
Mississippi State College for Women	1
Missouri:	
Park College	1
St. Louis University	1
Southwestern Missouri State College	1
University of Missouri, St. Louis	1
Montana: Carroll College, Montana	1
Nebraska: Kearney State College	1
Nevada: University of Nevada	1
New Hampshire:	
Dartmouth College	1
University of New Hampshire	1
New Jersey:	
Luther College, New Jersey	1
Princeton University	1
Rutgers College	1
New Mexico: University of New Mexico	1
New York:	
Cuny, Bernard Baruch College	1
Ithaca College	1
Mohawk Valley Community College	2
Mount St. Mary College, New York	1
New York University School Medical	1
New York Institute of Technology	1
Pace College	1
Packer College Institute	1
Polytech Institute of Brooklyn	1

U.S. Institutions—Continued

	Present Science Faculty
New York—Continued	
Queens College, New York	1
Queensboro Community College	2
Suffolk Community College	1
Suny College, Buffalo	1
Suny College, Fredonia	1
Suny College, Geneseo	1
Suny College, Potsdam	1
University of Rochester	1
Wagner College, New York	1
North Carolina:	
Louisburg College	1
North Carolina State University of Raleigh	1
North Carolina Central University of Durham	1
North Dakota:	
Minot State College	1
North Dakota Study University	1
Ohio:	
Cuyahoga Community College	1
Kenyon College, Ohio	1
Oberlin College	3
University of Cincinnati	2
University of Dayton	1
Wright State University	1
Oklahoma:	
Camerson State Agriculture College, Oklahoma	1
Central State College, Oklahoma	1
East Central State College	1
Southeastern State College, Oklahoma	1
University of Oklahoma	1
Oregon:	
Blue Mountain Community College	1
Lewis and Clark College, Oregon	1
Oregon State University	2
Reed College, Oregon	1
University of Oregon	1
Willamette University	1
Pennsylvania:	
Allentown College, St. Francis	1
Bloomsburg State College, Pennsylvania	1
Bucknell University	2
Dickinson College, Pennsylvania	1
Haverford College, Pennsylvania	1
Indiana University of Pennsylvania	1
Kings College, Pennsylvania	1
Shippensburg State College	1
Slippery Rock State College	1
Swarthmore College	1
Temple University	1
Puerto Rico: University of Puerto Rico	1
Rhode Island:	
Brown University	1
Salve Regina College	1

U.S. Institutions—Continued

	Present Science Faculty
South Carolina:	
Clemson University	1
Presbyterian College South Carolina	1
University of South Carolina	1
South Dakota: Augusta College of South Dakota	1
Tennessee:	
Belmont College	1
Knoxville College	1
Tennessee Technological University	1
University of Tennessee:	
Knoxville	1
Martin	1
Texas:	
North Texas State University	1
Sam Houston State University	1
Southwestern Texas State College	1
Stephen F. Austin State University	1
Texas Christian University	1
University of Houston	1
University of Texas: El Paso	1
Utah:	
Brigham Young University	2
Weber State College	1
Westminster College of Utah	1
Vermont:	
Norwich University of Vermont	1
St. Michaels College of Vermont	2
Virginia:	
College of William and Mary	1
Randolph Macon College	1
Virginia State College, Petersburg	2
Washington & Lee University	2
Washington:	
Gonzaga University	1
Seattle Pacific College	1
University of Washington	2
Washington State University	1
Western Washington State College	2
West Virginia:	
Bluefield State College	1
West Virginia State College	1
Wisconsin:	
Beloit College	1
Lawrence University	2
Wisconsin State University Whitewater	1
Wyoming: Casper College	1

Foreign institutions

Turkey: Robert College, Turkey	1
Total	214

NATIONAL SCIENCE FOUNDATION—INSTITUTIONS GRANTED TRAINEESHIPS AND CHOSEN BY FELLOWSHIP AWARDEES, FISCAL YEAR 1971

UNITED STATES INSTITUTIONS

	Traineeships			Fellowships			
	Total	Graduate (9 or 12 months) continuation	Graduate Tch. Assts. (summer)	Graduate	Post-doctoral	Senior post-doctoral	Science faculty
ALABAMA							
Auburn University	15	10	5				
University of Alabama	13	7	4	1			1
University of Alabama, Birmingham	1		1				
ALASKA							
University of Alaska	5	4	1				
ARIZONA							
Arizona State University	24	17	7				
University of Arizona	53	32	10	8			3
ARKANSAS							
University of Arkansas	13	7	5				1
CALIFORNIA							
California Academy of Sciences	1				1		
California Institute of Technology	122	45	4	65	6		2
City of Hope Medical Center	1				1		
Claremont Graduate School	5	4	1				
Loma Linda University	2	1	1				
Pomona College	1						1
Salk Institute of Biological Studies	1				1		
San Diego State College	1						1
Stanford University	300	86	4	195	10		5
University of California, Berkeley	269	94	11	150	8	1	5
University of California, Davis	41	26	6	7	1		1
University of California, Irvine	20	9	3	7			1
University of California, Los Angeles	79	52	8	15	2		2
University of California, Riverside	27	18	4	4			1
University of California, San Diego	54	19	4	22	7	1	1
University of California, San Francisco	7	4	1	1	1		
University of California, Santa Barbara	27	15	6	4			2
University of California, Santa Cruz	9	1	2	5			1
University of the Pacific	3	2	1				
University of Santa Clara	4	4					
University of Southern California	33	25	5	3			
U.S. Geological Survey, Menlo Park	1				1		
U.S. International University	3	1	2				
COLORADO							
Colorado School of Mines	6	4	2				
Colorado State University	27	19	5	2			1
University of Colorado	63	34	10	12	2		5
University of Denver	7	4	3				
University of Northern Colorado	2						2
CONNECTICUT							
University of Connecticut	31	18	6	5			2
Wesleyan University	8	4	2	1			1
Yale University	162	38		118	5		1
DELAWARE							
University of Delaware	22	17	4				1
DISTRICT OF COLUMBIA							
American University	10	4	3	1			2
Catholic University	19	15	3	1			
George Washington University	16	11	3	2			
Georgetown University	14	11	3				
Howard University	6	4	2				

NATIONAL SCIENCE FOUNDATION—INSTITUTIONS GRANTED TRAINEESHIPS AND CHOSEN BY FELLOWSHIP AWARDEES, FISCAL YEAR 1971—Continued

UNITED STATES INSTITUTIONS—Continued

	Traineeships			Fellowships			
	Total	Graduate (9 or 12 months) continuation	Graduate Tch. Assts. (summer)	Graduate	Post-doctoral	Senior post-doctoral	Science faculty
FLORIDA							
Florida State University	33	23	5	2			3
Nova University	1	1					
University of Florida	42	30	8	3			1
University of Miami	26	12	3	8			3
University of South Florida	8	2	2	3			1
Tropical Atlantic Biological Lab/Miami	1						1
GEORGIA							
Atlanta University	3	2	1				
Emory University	15	10	2	2			1
Georgia Institute of Technology	36	30	4	1			1
Georgia State University	6	2	2	2			
Medical College of Georgia	1	1					
University of Georgia	31	18	8	4			1
HAWAII							
University of Hawaii	30	15	6	6	1	1	1
IDAHO							
Idaho State University	2		2				
University of Idaho	10	7	3				
ILLINOIS							
De Paul University	4	2	2				
Illinois Institute of Technology	27	23	3	1			
Illinois State University	7	4	3				
Loyola University	6	4	2				
Northern Illinois University	9	4	5				
Northwestern University	65	50	4	10	1		
Southern Illinois University	16	10	5				1
University of Chicago	100	38	3	54	3	1	1
University of Illinois, Urbana	141	86	18	34			3
University of Illinois, Chicago Circle	8	2	5	1			
University of Illinois, Medical Center	4	1	2	1			
INDIANA							
Indiana University	61	34	11	10	1		5
Purdue University	103	75	16	10			2
University of Notre Dame	32	23	5	3	1		
IOWA							
Iowa State University	49	32	10	5	1		1
University of Iowa	43	25	8	7	1		2
KANSAS							
Kansas State University	24	18	5	1			
University of Kansas	30	21	7	2			
KENTUCKY							
University of Kentucky	22	14	7				1
University of Louisville	8	6	2				
LOUISIANA							
Louisiana Polytechnic Institute	4	2	2				
Louisiana State University	28	19	6	1			2
Louisiana State University/Medical Center	1	1					
Louisiana State University in New Orleans	6	4	2				
Loyola University	1	1					
Tulane University	22	15	4	2	1		
University of Southwestern Louisiana	2						2

NATIONAL SCIENCE FOUNDATION—INSTITUTIONS GRANTED TRAINEESHIPS AND CHOSEN BY FELLOWSHIP AWARDEES, FISCAL YEAR 1971—Continued

UNITED STATES INSTITUTIONS—Continued

	Traineeships			Fellowships			
	Total	Graduate (9 or 12 months) continuation	Graduate Tch. Assts. (summer)	Graduate	Post-doctoral	Senior post-doctoral	Science faculty
MAINE							
University of Maine	8	4	3	1			
MARYLAND							
Agricultural Research Station	1				1		
Carnegie Institute of Washington/Maryland	1				1		
Johns Hopkins University	57	29	3	22	2		1
Langley Research Center (NASA)	1				1		
National Institutes of Health	1				1		
University of Maryland	43	24	13	4			2
MASSACHUSETTS							
Boston College	9	7	2				
Boston University	16	9	5	1	1		
Brandeis University	22	12	2	7	1		
Clark University	13	7	2	3			1
Harvard University	315	33	8	256	16	1	1
Lowell Technical Institute	4	2	2				
Massachusetts Institute of Technology	341	96	8	226	8		3
Northeastern University	21	15	5	1			
Tufts University	12	9	2	1			
University of Massachusetts	28	19	9				
Woods Hole Oceanographic Institute	3			1	2		
Worcester Polytechnic Institute	8	4	2				2
MICHIGAN							
Michigan State University	78	46	13	13	2		4
Michigan Technological University	9	7	2				
University of Detroit	5	4	1				
University of Michigan	174	88	15	68	1		2
Wayne State University	26	18	7	1			
Western Michigan University	8	4	3				1
MINNESOTA							
University of Minnesota	88	54	13	19	1		1
MISSISSIPPI							
Mississippi State University	10	7	2				1
University of Mississippi	11	6	2				3
University of Southern Mississippi	5	2	2				1
MISSOURI							
St. Louis University	11	6	2	2			1
University of Missouri, Columbia	42	27	9	5			1
University of Missouri, Kansas City	5	3	2				
University of Missouri, Rolla	19	13	5				1
Washington University	40	27	5	6			2
MONTANA							
Montana State University	14	10	2	1			1
University of Montana	13	4	3	5			1
NEBRASKA							
Creighton University	1			1			
University of Nebraska	23	13	8	1			1
NEVADA							
University of Nevada	7	4	2	1			
NEW HAMPSHIRE							
Dartmouth College	10	7		0			2
University of New Hampshire	14	11	3				

NATIONAL SCIENCE FOUNDATION—INSTITUTIONS GRANTED TRAINEESHIPS AND CHOSEN BY FELLOWSHIP AWARDEES, FISCAL YEAR 1971—Continued

UNITED STATES INSTITUTIONS—Continued

	Traineeships			Fellowships			
	Total	Graduate (9 or 12 months) continuation	Graduate Tch, Assts, (summer)	Graduate	Post-doctoral	Senior post-doctoral	Science faculty
NEW JERSEY							
Institute for Advanced Study	4				4	1	
Newark College of Engineering	5	4	1				
Princeton University	147	37	4	102	2	1	1
Rutgers, The State University	39	26	9	2		1	1
Seton Hall University	3	1	2				
Stevens Institute of Technology	17	13	3				1
NEW MEXICO							
New Mexico Institute of Medicine and Technology	3	2	1				
New Mexico State University	14	10	3				1
University of New Mexico	21	14	5	1			1
NEW YORK							
Adelphi University	5	3	2				
Albert Einstein College of Medicine	2			1	1		
Alfred University	2	2					
Brookhaven National Laboratory	1						1
City University of New York	33	21	10	2			
Clarkson College of Technology	15	9	2	2			2
Columbia University	98	53	3	34	6		2
Cooper Union	1	1					
Cornell University	151	59	11	74	3		4
Fordham University	11	7	4				
Hofstra University	1		1				
Mount Sinai School of Medicine	1			1			
New School for Social Research	6	4	2				
New York Medical College	5	3	1				1
New York University	63	39	5	10	2		7
Polytechnic Institute of Brooklyn	32	27	3	1			1
Rensselaer Polytech Institute	31	25	5	1			
Rockefeller University	19	1		14	4		
St. Bonaventure University	2	1	1				
St. Johns University	7	4	2	1			
State University of New York:							
College of Forestry at Syracuse University	9	7	2				
Downstate Medical Center	1	1					
SUNY at Albany	8	4	3	1			
SUNY at Binghamton	6	3	2	1			
SUNY at Buffalo	33	23	7	2	1		
SUNY at Stony Brook	20	10	6	1	1		2
Upstate Medical Center	1	1					
Syracuse University	38	30	7				1
Union College and University	1	1					
University of Rochester	37	27	5	4			1
Yeshiva University	9	6	1	1	1		
NORTH CAROLINA							
Duke University	29	18	4	7			
North Carolina State University at Raleigh	43	33	6	1			3
University of North Carolina	45	24	8	7	2		4
Wake Forest University	6	4	2				
NORTH DAKOTA							
North Dakota State University	6	4	2				
University of North Dakota	11	7	3				1
OHIO							
Bowling Green State University	6	4	2				
Case Western Reserve University	53	40	4	9			
Kent State University	12	7	4				1
Miami University	6	2	4				
Ohio State University	78	50	18	7	1		2
Ohio University	14	7	6		1		
University of Akron	5	3	2				
University of Cincinnati	22	14	7				1
University of Dayton	3	1	2				
University of Toledo	7	4	3				

NATIONAL SCIENCE FOUNDATION—INSTITUTIONS GRANTED TRAINEESHIPS AND CHOSEN BY FELLOWSHIP AWARDEES, FISCAL YEAR 1971—Continued

UNITED STATES INSTITUTIONS—Continued

	Traineeships			Fellowships			
	Total	Graduate (9 or 12 months) continuation	Graduate Tch, Assts, (summer)	Graduate	Post-doctoral	Senior post-doctoral	Science faculty
OKLAHOMA							
Oklahoma State University	39	22	7	3			7
University of Oklahoma	26	18	7				1
OREGON							
Oregon Graduate Center	1	1					
Oregon State University	31	20	7	2	1		1
Portland State University	4	2	2				
University of Oregon	32	18	6	6			2
University of Portland	1	1					
PENNSYLVANIA							
Bryn Mawr College	6	4	1	1			
Carnegie-Mellon University	42	33	3	6			
Drexel Institute of Technology	11	7	2	2			
Duquesne University	2	1	1				
Hahnemann Medical College	1	1					
Lehigh University	22	17	4	1			
Pennsylvania State University	76	52	11	9	1		3
Philadelphia College of Pharmacy and Science	2	1	1				
Temple University	16	11	5				
Thomas Jefferson University	2	1	1				
University of Pennsylvania	81	46	5	26	2		2
University of Pittsburgh	39	26	8	5			
Villanova University	4	3	1				
Woman's Medical College	1	1					
RHODE ISLAND							
Brown University	35	25	5	4	1		
Providence College	2	1	1				
University of Rhode Island	12	7	4				1
SOUTH CAROLINA							
Clemson University	19	15	3	1			
Medical University of South Carolina	2	1	1				
University of South Carolina	13	7	6				
SOUTH DAKOTA							
South Dakota School of Mines	3	2	1				
South Dakota State University	6	4	2				
University of South Dakota	6	4	2				
TENNESSEE							
George Peabody College	4	2		1			1
Memphis State University	5	2	3				
Oak Ridge National Laboratory	1						1
University of Tennessee, Knoxville	40	26	8	5			1
University of Tennessee, Memphis	2	1	1				
Vanderbilt University	23	18	3	2			
TEXAS							
Baylor University	5	4	1				
Baylor University, Medical College	4	2	1	1			
North Texas State University	8	4	4				
Rice University	38	22	2	14			
Southern Methodist University	16	10	3	1			2
Texas A & M University	27	18	7	2			
Texas Christian University	5	4	1				
Texas Tech University	13	7	5	1			
Texas Woman's University	2	1	1				
University of Houston	19	11	7	1			
University of Texas, Arlington	3	1	2				
University of Texas, Austin	76	50	12	10	1		3

NATIONAL SCIENCE FOUNDATION—INSTITUTIONS GRANTED TRAINEESHIPS AND CHOSEN BY FELLOWSHIP AWARDEES, FISCAL YEAR 1971—Continued

UNITED STATES INSTITUTIONS—Continued

	Total	Traineeships		Fellowships			
		Graduate (9 or 12 months) continuation	Graduate Tch, Assts, (summer)	Graduate	Post-doctoral	Senior post-doctoral	Science faculty
UTAH							
Brigham Young University	14	7	6				1
University of Utah	36	24	7	5			
Utah State University	17	12	4	1			
VERMONT							
University of Vermont	8	4	3				1
VIRGINIA							
College of William and Mary	7	4	2				1
University of Virginia	20	18	2				
Virginia Commonwealth University	7	2	5				
Virginia Polytechnic Institute	24	17	6	1			
WASHINGTON							
University of Washington	102	53	11	32	1	1	4
Washington State University	23	14	9				
WEST VIRGINIA							
West Virginia University	19	11	6	1			1
WISCONSIN							
Institute of Paper Chemistry	2	2					
Marquette University	9	7	2				
University of Wisconsin, Madison	145	67	14	58	3		3
University of Wisconsin, Milwaukee	16	9	5	2			
WYOMING							
University of Wyoming	13	7	4	2			
Total at U.S. institutions	6,652	3,458	926	1,942	133	9	184
Total choosing foreign institutions	154			27	52	45	30
Grand total	6,806	3,458	926	1,969	185	54	214

FOREIGN INSTITUTIONS

	Total	Graduate	Post-doctoral	Senior post-doctoral	Science faculty
AUSTRALIA					
CSIRO	2		1		1
University of Adelaide	1	1			
W. E. Hall Institution of Medical Research	1		1		
BELGIUM					
Catholic University of Louvain	1		1		
CANADA					
McGill University	2	1	1		
Queen's University, Kingston	1				1
University of Alberta	2	2			
University of British Columbia	4	3			1
University of Waterloo	1				1
COLUMBIA					
University of Valles	1	1			

FOREIGN INSTITUTIONS—Continued

	Total	Graduate	Post-doctoral	Senior post-doctoral	Science faculty
DENMARK					
Aarhus University	1		1		
University of Copenhagen	1		1		
FRANCE					
National Foundation Political Science/ FR	1	1			
Pasteur Institute	1		1		
Saclay Nuclear Research Center	1		1		
University of Aix, Marseille	1			1	
University of Grenoble	1				1
University of Paris	7		1	5	1
University of Strasbourg	1				1
GERMANY					
Baden Institute of Technology, West Germany	1		1		
Institute Contemporary History, Munich	1				1
University of Cologne	1				1
University of Freiburg	1			1	
University at Munich	1			1	
University at Tubingen	2				2
HUNGARY					
University of Forestry and Timber Industries					1
INDIA					
Agra University	1				1
IRELAND					
University of Belfast, Northern Ireland	1				1
ISRAEL					
Hebrew University	1		1		
Tel Aviv University	1		1		
Weizmann Institution of Science	4		3	1	
ITALY					
National Research Council	1		1		
University of Rome	1			1	
JAPAN					
Kyoto University	1			1	
University of Tokyo	1				1
THE NETHERLANDS					
Neatherlands Reactor Center	1		1		
State University of Leyden	3	1		2	
NORWAY					
Norwegian Institution of Water Research	1			1	
NCSIR	1			1	
University of Oslo	1		1		
SCOTLAND					
University of Edinburgh	4	1	1	1	1
SWEDEN					
Royal Caroline Institute of Medicine and Surgery	1		1		
University of Lund	1		1		
University of Stockholm	2		1	1	
University of Uppsala	1		1		

FOREIGN INSTITUTIONS—Continued

	Total	Graduate	Post-doctoral	Senior post-doctoral	Science faculty
SWITZERLAND					
CERN	7		6	1	
Swiss Cancer Research Institution	2		1		1
University of Basel	1		1		
University of Geneva	1		1		
Swiss Federal Institute of Technology	4		1	1	2
THAILAND					
University of Agriculture, Bangkok	1				1
UNITED KINGDOM					
Medical Research Council	2		1	1	
National Institute for Medical Research	1		1		
Royal Institute of Great Britain	1			1	
University of Cambridge	26	7	9	9	1
University of Essex	1		1		
University of London	26	5	5	9	7
University of Oxford	10	3	1	5	1
University of Southampton	1				1
University of Sussex	2		1	1	
University of Warwick	1	1			
Total choosing foreign institutions	154	27	52	45	30

Dr. HUMPHREYS. The senior postdoctorate fellowship—

Senator KENNEDY. What is the difference between a senior and junior?

Dr. HUMPHREYS. The senior is for an established investigator, who wants to take a year away from his research, perhaps for study abroad, and to work in a new field.

These go primarily to the already established scientists, mainly faculty members of large graduate training institutions.

The Science Faculty Fellowships are directed primarily at the teachers and small liberal arts colleges. About two-thirds to three-quarters of these fellowships go to people who do not hold a Ph. D. degree. These are very widely scattered among the faculties of the liberal arts colleges.

Senator KENNEDY. What kind of impact do they have on the small liberal arts college?

Dr. HUMPHREYS. They frequently provide the only means for faculty members to get away from the institution on sabbatical leave and to catch up on recent advances in their fields.

Many of the smaller colleges do not have adequate faculty sabbatical programs as judged by graduate training institution standards.

Senator KENNEDY. How many of those have applied for continued support this year?

Dr. HUMPHREYS. This is a 1-year program.

Senator KENNEDY. I see. Well, what kind of new applications have we had?

Dr. HUMPHREYS. It has been a very popular program. We received 982 applications this year, but the award rate has been about 15 percent. One interesting sidelight is that in the last 2 years, when these fellowships have been offered, none has been subsequently turned

down. In our terminology, the declination rate year after year is zero or almost so.

Senator KENNEDY. What do you mean by 15 percent?

Dr. HUMPHREYS. About 15 percent of the total number of applicants are offered awards; the program's funds are used up at that point.

Senator KENNEDY. Last year?

Dr. HUMPHREYS. Last year and the year before.

Dr. MCELROY. This is an example of when a program gets so small, it is probably best to go to zero, so it is not having the impact it should have in its totality, and that is one of the considerations we gave in these programs.

Senator KENNEDY. I don't suppose its impact on smaller colleges and universities is insignificant.

I understand the burden it puts on you in selecting individuals, and how you expect the greatest return for the dollar.

Would you expect that if you did have the funding, you would have the same numbers of applications for this coming year?

Dr. HUMPHREYS. Yes, sir; at least as many.

Senator KENNEDY. Does it become better known?

Dr. HUMPHREYS. It has been in existence for a number of years, and the rate of increase has been relatively small and there has been an increase in the number of growth of facilities in the smaller institutions.

Senator KENNEDY. How has this varied in the last few years?

Where were you 3 years ago?

Dr. HUMPHREYS. At about the same level, about 200 awards.

Senator KENNEDY. It has been about this the last several years?

Dr. HUMPHREYS. Yes.

Senator KENNEDY. And that program would be cut out?

Dr. HUMPHREYS. Yes.

Senator KENNEDY. Doctor, if we take the high school student program, what numbers are we talking about?

Dr. HUMPHREYS. About 5,000 students per year.

Senator KENNEDY. And that has been the level in the past?

Dr. HUMPHREYS. Yes, generally, but it has been over 6,000 in some years.

The institutions that conduct these collectively receive about 100,000 applications for participation from which about 5,000 are selected.

Senator KENNEDY. That has been a highly popular program.

What have you done about the allocation of resources for the educational equipment program?

What resources are we talking about now for equipment?

Dr. HUMPHREYS. About 4 million.

Senator KENNEDY. And that stimulates about $8 million?

Dr. HUMPHREYS. Yes, at least.

Senator KENNEDY. What is the character of that equipment?

Dr. MCELROY. It is usually equipment used to upgrade laboratories in ways consistent with planned modifications of the courses and curriculums. That is, in the area of chemical, biology, where an institution, particularly the liberal arts colleges, where they have not been able to buy certain types of scientific instructional equipment to implement improvements in their instruction.

It is generally an inexpensive type of equipment, but quite useful in many cases and in others absolutely necessary in upgrading a laboratory instruction.

Senator KENNEDY. Well, as I understand it, you have the equipment for the high school program, the faculty fellowships, the graduate program, and the fellowship program. Is it used in those programs?

Dr. MCELROY. Yes.

Senator KENNEDY. Those are the primary parts of the educational programs which are cut back?

Dr. MCELROY. Yes.

Senator KENNEDY. Are there any others we have missed? Are those the principal areas?

Dr. MCELROY. And the traineeships.

Senator KENNEDY. Where were we last year concerning traineeship?

Dr. MCELROY. Last year the Congress approved and included $9 million for new starts in the traineeship program, and that was withheld.

Senator KENNEDY. You mean that was not expended?

Dr. MCELROY. No; it was not made available to us. It cost us $9 million in our budget.

Senator KENNEDY. That was my memory on that too. You see we find problems like this concerning the earmarking of funds.

I know these problems can escape your control as well as ours but are those the principal parts that would be cut back in the new $622 million budget?

Dr. MCELROY. That is correct, and the other cutback is in the institutional support.

Senator KENNEDY. In the institutional support?

Dr. MCELROY. Yes. We have over the years, as you know, supported various departments of about 100 institutions, about $200 million, over that period of time, and we feel that the program has met its objectives.

It has improved the quality of these institutions, it is these 100 institutions that we are talking about that have gained quality. They turn out about 95 percent of our Ph. D.'s, and we feel the program has met its objectives.

It was a good program, but here again we feel that we did put our resources into support of research projects again.

Senator KENNEDY. This is $200 million over how many years?

Dr. MCELROY. About 6 years.

Senator KENNEDY. Could you tell us what the curve has been in terms of support?

Dr. MCELROY. Could I ask Doctor Levin to comment on that?

Senator KENNEDY. Certainly.

Dr. LEVIN. Mr. Chairman, this program started in 1965 at a level of about $27 million. It rose to about $42 million in 1968, and since then has been tapering off.

This year we spent $20 million.

Senator KENNEDY. Is that fiscal 1971?

Dr. LEVIN. Yes.

Senator KENNEDY. What sort of universities or colleges does that sum go to?

Dr. LEVIN. Well, they are the universities. The universities, not the colleges. The recipients have been among approximately the top 200 as measured on the basis of the numbers of Ph. D.'s they produce in the sciences.

Senator KENNEDY. Do you have a formula for the distribution?

Dr. LEVIN. No. This is not a formula program. Grants are awarded on a competitive basis, based on plans the institution submits for one or more departments they wish to upgrade to a high quality. These plans tell us how the institution intends to upgrade the particular science area, taking into account existing strengths and weaknesses. They tell us how this fits into their plans for the entire institution and how they intend to maintain the improvement when our grant ends. We carefully evaluate the proposed plan to determine if it is feasible and realistic, using our own staff as well as consultants or referees who participate in the site visit that each proposal receives. If, from all this, we decide that the proposed plan is worthy and feasible, and if there is already sufficient strength on which to build, we then award an appropriate grant. The institution is expected to show its own intent by providing a contribution, and they have to show how they will do that from their own, non-Federal sources.

Senator KENNEDY. Is there a matching formula, or is it just based on the ability of the college or a university to participate?

Dr. LEVIN. There is no matching formula. But we expect them to contribute. Sometimes they over-match, sometimes it is slightly under. But we consider their willingness to contribute as one evidence that they are serious about the plan, and intend to go forward with it.

Senator KENNEDY. Would you indicate what kinds of universities received the money last year?

Dr. LEVIN. Yes, I can.

Senator KENNEDY. I would be interested in that.

Dr. LEVIN. I can give you the names of them.

Of the most recent set of grants, for example, one went to the Claremont Graduate Center in California. Others went to the University of Rochester, the University of Massachusetts, the University of Montana, Southern Methodist University. These were the most recent series.

Earlier this year, we gave one to Washington State University, one to the University of Utah, one to Texas Technological University, one to the State University of New York at Albany, Emory University, the University of California at Santa Barbara, and so on.

Senator KENNEDY. Certainly it appears here that what you are attempting to do is upgrade the potential of these three faculties at a number of the schools and universities that heretofore have not had this kind of educational support or recognition. Claremont, the University of Massachusetts, is getting better all the time, but it has not been recognized generally.

Going back to 1965, have you been able to make any observations about the impact of this kind of support in general science areas?

I think it is support of this kind that has made a useful contribution in general areas of science need.

Dr. LEVIN. Yes; the program was started, Mr. Chairman, in part because a committee of the President's Science Advisory Committee issued a report, now known as the Seaborg Report, in which they deter-

mined that at the time there was a need for additional academic centers of excellence in the sciences, and that we, as a matter of national policy, should build up the science capabilities for teaching and research at additional universities so as to at least double the number of high quality centers of scientific training at the Ph. D. level.

There was also the problem of concentration of Federal research support at only a few universities, because these were already of high quality. Therefore, we began to award grants for such purposes. All of the evidence that we have today is that the program has been successful in upgrading those science departments which we have helped, and frequently neighboring science departments, because it creates a sense of aspiration and they also want to become better. All the evidence we have, in terms of success in the national competition for the research grants, in terms of the kind of students that now enter these departments, in terms of the kind of faculty they are able to recruit, all of this sort of evidence suggests that they have indeed improved, and we think the program has been very successful.

Senator KENNEDY. What is the number of applications you have at this time?

Dr. LEVIN. I am not sure I have that number with me.

We can provide it for the record, but I can tell you now that it has been very much larger than we have been able to support.

These have been fairly sizeable grants, and, therefore, we have only been able to award a few each year.

The number of applications has been much greater than the number of grants we could award.

Senator KENNEDY. I would be interested if you would be kind enough to submit that.

Dr. LEVIN. Certainly.

(Material subsequently supplied is as follows:)

SCIENCE DEVELOPMENT PROGRAMS—CUMULATIVE NUMBER OF PROPOSALS RECEIVED AND GRANTS AWARDED

During the 7-year life of the Science Development Programs, we have received 311 formal proposals that, in aggregate, requested $666.5 million. We have awarded a total of 139 grants totaling $226 million. Of these, approximately 23 grants were follow-on supplemental awards to facilitate completion of the 5-year plans originally proposed by the institutions. Thus, during the life of the Program, we were able to honor about one-third of the funding that had been requested. The grants we awarded aided the upgrading of about 260 departments or areas of science, i.e. about 8 percent of the more than 3,000 university science departments engaged in Ph.D. training.

Senator KENNEDY. I would like to have the number of approved requests, your evaluation of unfunded requests, and a discussion of the kinds of applications you would consider favorably.

Is the undergraduate research participation program the same as the high-school student participation program?

Dr. MCELROY. That is different, yes, sir.

Senator KENNEDY. That will be eliminated too?

Dr. MCELROY. Yes.

Senator KENNEDY. Could you tell me just a little bit about that program?

Dr. MCELROY. The undergraduate program has enabled carefully selected undergraduate students to participate in a professor's laboratory and often do quite independent research. The high school student

program has been primarily a summer school program, for high school students and also enables the participants to go to a college or university, to do research in a professor's laboratory under general supervision. Basically, it is almost a modest extension of the graduate traineeship part of the program. We do anticipate, at least at the undergraduate level, that the number of students will continue to be able to work in the research labs by participation in research we will be supporting.

This is a modest amount of money, usually, and if we can increase the size of the research grants, hopefully, we can support some graduate students as well as undergraduate students.

Senator KENNEDY. What is the dimension of this program?

Mr. MCELROY. The high school program was approximately $2 million, and the undergraduate one about $4 million.

Senator KENNEDY. And could you give us again, for the record, the number of applications for that program too?

(The information subsequently supplied follows:)

UNDERGRADUATE RESEARCH PARTICIPATION SUPPORT, FISCAL YEAR 1971

In FY 1971 the URP program supported 399 projects for a total of 3,000 participants. An additional 464 projects for an additional 4,125 participants were judged to be sufficiently meritorious for support had funds been available. Those funded required $4.0 million; those that were meritorious but not supported because of inadequacy of funds totalled $5.3 million.

Dr. MCELROY. Yes. I should emphasize at the undergraduate level, we have not completely eliminated undergraduate support.

We do have this new program, the program of Student-Originated Studies, in which the students themselves initiate the project plan.

They do have a faculty advisor, but it's the students project. It is one of the very successful programs we got underway last year, and we will be expanding that program to the $2.0 million level.

Senator KENNEDY. Could you give us some information on the dimension of that program?

Dr. MCELROY. Usually, it is students that have become extremely interested in some of our major societal problems, pollution programs.

Senator KENNEDY. What kind of support do they get?

Dr. MCELROY. This usually runs on an average of about $10,000 for a project, but often 10 or 15 students participate in the project.

Dr. HUMPHREYS. During fiscal year 1971, we supported 1,100 such students in the program.

Senator KENNEDY. What are the differences with the House on the authorization?

Do you have any kind of strong feeling about whether we should have 1 or 2 years?

Dr. MCELROY. I am in favor of a 2-year authorization myself.

I think it would give us better opportunities for planning. I think it would also help us see the dimension of the program and its problems a little clearer, so I am generally in favor of 2 years.

Senator KENNEDY. Could we get into the RANN program just a bit. Could you tell us a little bit about that program?

Dr. MCELROY. I would be glad to.

Senator KENNEDY. What you are doing? What needs to be done? How are you going to do it?

Dr. McElroy. Could I ask Doctor Eggers to comment on that?

Senator Kennedy. Why do you think the $50 million is so much worse than the $80 million.

Dr. Eggers. Basically, Senator, the program has four major areas to it.

The advanced technology applications area is concerned particularly with exploiting possibilities for bringing new technology into our national activities, in a form that will increase economic productivity, will increase the utilization of existing technologies in areas such as energy resources, earthquake engineering, enzyme technology, urban design technologies, and several other areas.

Our biggest program currently is in energy resource research and analysis, where the emphasis is on new approaches to overall systems which would yield less pollution of the environment, unconventional energy sources, and in other areas in which the application of new technology has high leverage.

With regard to the environmental systems and resources area, there is a strong emphasis on weather modification. One of the earlier programs in that connection was concerned with increasing the snow fall on the Rockies; the thrust of this effort being to thereby, during the spring thaw, increase the runoff of water into the Colorado River, and thus provide more water to Arizona, California, and New Mexico.

The emphasis now is in the area of hail research, the objective being to see what can be done to decrease the severity of hail storms and hence damage to crops, which runs as high as some $200 million a year in the United States.

ENVIRONMENTAL SYSTEMS

Another key activity is in the area of regional environmental systems research. The effort there is to understand the local and regional systems to a degree that will allow us to model the environmental aspects of the system to the point where useful predictive capabilities are developed for decisionmakers. This will provide new knowledge and capabilities that will be useful in terms of siting new powerplants, or handling of various types of waste disposal from new industries. very close involvement with appropriate State, regional, and local user agencies, such as planning boards and commissions is obviously essential.

There are several specific activities of that type, which are ongoing, one, at the present time, is in the Lake Tahoe region of California. That particular research activity is being pursued by a group of scientists from the University of California at Davis. It is also being supported by the Ames Research Center of NASA, using aircraft for overflights to gather vital environmental data.

Other areas where similar research is taking place include the Gallitan Canyon area in Montana. Research there is focused on developing an understanding of the regional environment to the point where the environmental impact of the Big Sky Recreation Development can be monitored. State agencies and the developers will be aided in the decisionmaking process of selecting locations for ski slopes, new highways, and other recreational facilities, that will have a minimum impact on the environment. I believe we can say already that the re-

search carried on there is feeding importantly into the local decision-making process of the developers in that region.

We also have a research project concerned with the ecology of the Chesapeake Bay.

Again, this research is aimed at better modeling of the total environmental system. This activity is at the present time being carried out primarily by a consortium of the University of Maryland, Johns Hopkins, and the Virginia Institute of Marine Sciences.

They are planning at this time the approach to taking measurements in the Chesapeake Bay and the organization and synthesis of the required data base. Particular emphasis is being placed on understanding the local environment. For example, special emphasis will be given to ecological and other environmental studies in the vicinity of the Calvert Cliffs area, where a nuclear reactor development is taking place, and also in the outlet area at the head of the bay, which is an important source of pollution.

The basic thrust is to understand the environment sufficiently to develop a model which provides useful predictive capabilities to assist decisionmakers in how they should locate major facilities and plan for land and water use so that there will be minimum impact on the environment.

In the Social Systems and Human Resources area there are several activities that I think will typify the nature of the research. For example, we have been supporting the development of an urban science and engineering capability at the State University of New York, located at Stony Brook. The group there, under Dr. Robert Nathan, has been working for some time with the Environmental Protection Agency of New York City on such issues as how to improve the sanitation system and the fire department system. Already there is evidence that action taken based on these research findings have resulted in substantial savings to the city in providing those services.

Other examples of the type of research that we are supporting and encouraging to progress further are the development by the Rand Corp. in California, of a research and technical service type activity in the city of San Jose, as well as support for the Los Angeles Technical Services organization. This is a group of technical people which has been pulled together to support the municipal government in Los Angeles with research dealing with its problems.

Our support of this group is in the direction of solving the long-range problems of the city of Los Angeles, as contrasted to some of the short-term problems they have been dealing with up to the present time.

Another example of an effort focus on science and technology capabilities on problems of local communities is in the Boston area, where we are supporting Mr. Kyger in the development of a technology transfer capability. This is a project of the Massachusetts Science and Technology Foundation, to set up an effective reservoir for the scientific and technological knowledge developed in that area, in the university system and research community, and develop an effective coupling of that reservoir of information with the needs of not only the Boston area, but the whole State of Massachusetts.

This is an experiment now getting underway, and we hope it will provide not only direct benefits to Boston and Massachusetts, but also guidance for similar types of capability to develop elsewhere throughout the country.

Finally, I would mention, just to round out our overview of the Rann program, the exploratory research area, which is basically concerned with looking as far into the future as we can with reasonable visibility and spotting emerging problems. These might be in the form of trends that may be leading us down an unattractive road from the standpoint of either reduction in the quality of life, whatever form it may take, or trends that may be ominous in terms of too small a rate of increase in economic productivity in the Nation. One of the key thrusts in the exploratory research and problem assessment area is the examination of potential beneficial new technologies, which if brought into the economy, might produce a major increase of productivity without introducing major new pollution or other threats to the quality of life in whatever form they may be.

As we move into the future, our major concerns then, to sum up the major thrust of the program, are in the advanced technology area—study of the energy resources and analysis, which involves looking at all systems, including approaches as well as novel energy sources and applications which tend to cut down on waste heat. In the environment systems and resources area, the big thrust is in the regional systems analysis—to better understand the total ecology of the system as it evolves, and thereby provide better guidance to decision making, so that the ecology will not be degraded. In the social systems and human resources, the municipal systems, operations, and services—to develop better understanding of the socio-economic, and technical intertwining of those systems, taking all important aspects into consideration for the long-range future. We hope to combine key features of all these in our analysis of regions as total systems.

Dr. McElroy. Mr. Chairman, I should emphasize, as you are well aware, in the past, the Foundation has had primarily through its research division, some of these problem oriented research efforts underway, and we see the need for close management of these problem oriented research efforts. This is the reason we have brought them altogether under one Assistant Director for Research Applications.

We feel the Foundation has the experience over the years of looking at problems and the capability of dealing with universities, nonprofit organizations, and even in some cases, industry, to really look at some of these big problems we can forsee down the road. I think the question you raise, in regard to the 50 versus the 80 million dollars involves recognizing that we are not really dealing here with what we consider to be modest research grants of the order of thirty, forty, fifty thousand dollars each.

These projects are more expensive than single research grants. If we are going to do the job right, literally put millions of dollars into these programs, then even with $80 million we cannot mount a large number of projects, because each of them will cost a lot of money. As we look down the road, our best estimate, if we were just going to do the Chesapeake Bay effort in the right way over the next few years, we will probably invest on the order of $15 million overall on a wide variety of environmental studies there.

Senator Kennedy. The development of a total environmental study of the Chesapeake Bay that would cost how much?

Dr. McElroy. Let me provide some details for the record on that.

(The information subsequently supplied follows:)

Chesapeake Bay Research Program

To provide a comprehensive base of scientific information that will enable sound land use and resource planning and effective national utilization of the Bay to serve the needs of man; to develop a unified system for organizing and interpreting environmental research data; to make such data available to cognizant agencies, industries, and the public; the following types of studies would be made.

Activity - Estimates for Total Program (3-5 Years)	(In Millions of Dollars)
Ecological Measurements	$ 4.0 to $ 6.0
Circulation Models	2.0 to 3.0
Localized Impact Analyses	4.0 to 6.0
Economic Development Model	1.0 to 2.0
Information and Data System	1.0 to 1.5
Total Program Cost Estimate	$12.0 to $16.0

Dr. McElroy. As we study the Chesapeake Bay, we believe the research results will be useful for a whole host of other sites.

The impact of such studies will not be limited just to the Chesapeake Bay. We hope that the model which is developed can be used for a number of estuaries and other regions, such as, the Gulf of Mexico, Long Island Sound, because in principle, if we can understand one estuary in great detail, the knowledge we gain can be applied to other sites.

Also, I want to emphasize, some people have confused the RANN program as being only applied research. Our best estimate is that about 40 percent of this money will be used in support of basic research, because of the lack of knowledge in the appropriate areas.

Senator Kennedy. How much will be applied?

Dr. McElroy. Probably in the order of 60 percent.

Senator Kennedy. How much for the social sciences?

Dr. McElroy. $16 million of the $81 million proposed for RANN is for research in the social sciences. That is approximately 20 percent of the program, sir.

Senator Kennedy. What programs will not be done, if you get the $50 million rather than the $80 million?

Dr. Eggers. Senator, I think we would have to cut back on new starts in the energy resources area, so that some of these technologies would not be explored.

Senator Kennedy. It is terribly important that energy resource development go on.

Dr. Eggers. We consider this to be among our highest priorities.

Senator Kennedy. It is tremendously important.

Dr. Eggers. New starts that we had hoped to develop in the metallurgical area, for the obvious purpose of being able to obtain our raw materials more effectively than we can at the present time will probably have to be postponed if not abandoned. As you know, this extraction metallurgy problem is getting tougher all the time.

We would have to cut back on additional new regional and environmental studies. Perhaps I could add a little bit to the discussion earlier on that point. We hope that these studies will have an impact far beyond Federal actions. Indeed, we are insuring that they be particularly useful to State and local authorities, in their own decisionmaking process and private industry too.

Finally, we would also have to cut back on our municipal systems activity, and in particular, some of the work we are beginning to move ahead with now, in studying ethnic and minority groups.

One example of this is a joint effort between scientists at Stanford University, and a community group in San Francisco, that is trying to raise the area's standard of living.

The neighborhood is predominantly of Latin extraction and they are highly motivated, but they do not fully understand the complexities of their economic development problems. The Stanford University team is assisting them in scientifically evaluating everything from the options in terms of available low-cost housing to possible small business development, and to what kind of training they ought to give their young children to have them better prepared for future jobs. The university scientists in the process develop a large body of community data for further research and analysis.

Senator Kennedy. There is always the question of whether experts

at the universities should tell the various minority groups how to upgrade themselves.

Dr. EGGERS. Yes, sir. The university team does not tell them what to do. The university team responds to their requests. It is a fairly sensitive relationship.

Senator KENNEDY. Is there some kind of joint board in which the minorities participate in the direction of their undertakings?

Dr. EGGERS. Yes. This is a coalition of a number of smaller groups called the Mission Coalition.

Well, those are the sorts of things we would have to cut back.

My feeling in general is that the kinds of moneys we are talking about here are significant, but we are in a learning process now. If we knew how to do these tasks better, I am sure we could spend considerably more money than we are talking about here, and it would be worth every dime we could spend. The real restraint is the rate of progress in learning how to get the job done.

I would say one more thing, and I believe this is of significance. We are finding that the mission agencies, like AEC and NASA, are eager to join with us and support us in this undertaking, and in particular in giving us support with the project management type capabilities they have developed over the years. We will find these very valuable to us as we develop our activities further in the various regions throughout the country. At the same time it is particularly noteworthy that we are working closely with the universities to strengthen their capabilities for handling the RANN programs and in the process there is important opportunity for institutional strengthening and advanced education of students in the role of research assistants.

Senator KENNEDY. Could you submit a note to us on the terms of the grant. I am sure you have that.

I think there was some explanation as to how those $50 or $80 million of resources would be used. I would like to know of some, even with the $80 million budget, which you judge are of value. More important, what would you fund if you get more than the $80 million?

That would help us get some idea as to directions, and to the extent that you can provide us with an indication as to the amount of activity is the social sciences, which I am very much interested in, it would be most helpful.

I know it is an enormously difficult and sticky area, but it is one which really needs great attention. I am really interested in what comments you could make in these areas. It would be very helpful if you could submit that material. In addition, I have other questions from Senator Prouty.

Your response to Senator Prouty's questions will be made part of the record.

I want to thank you very much. We will be in contact with you, as we move through the legislative process. We have to draw heavily from your experience and guidance, and we value it very highly. We are hopeful we will be able to work with you in meeting our Nation's responsibilities in this area.

You have been enormously helpful to me and to the subcommittee as well.

Thank you very much.

At this point I order printed the questions from the subcommittee and from Senator Prouty and answers that are to be received from the National Science Foundation.

(The material subsequently supplied follows:)

NATIONAL SCIENCE FOUNDATION

Answers To Questions From The Special Subcommittee on NSF
Of The Senate Committee on Labor and Public Welfare

Question 1. What activities are being undertaken in the area of marine science? What projects are being developed concerning the coastal areas?

Answer: The Foundation sponsors a broad range of oceanographic research programs, including fundamental studies in oceanography under the Scientific Research Project Support activity, as well as under the Ocean Sediment Coring Program, U.S. Antarctic Research Program, Arctic Research Program, and the International Decade of Ocean Exploration (IDOE).

Research conducted under the above programs includes studies of marine organisms, the origin and structure of ocean basins, chemical and energy interaction between the sea and the atmosphere, the physical processes that keep the seas in motion, and a host of studies related to environmental quality, environmental forecasting, seabed assessment, and global tectonics.

Most of the Foundation's support of oceanographic research is concerned with studies of the deep ocean basins, ocean currents, up-welling, and other investigations which are not specifically related to coastal area research. However, the Foundation is sponsoring, under its program of Research Applied to National Needs (RANN), a number of problem-focused research efforts on bay areas, estuaries, and rivers, such as the Chesapeake Bay, the coastal area of the Gulf of Mexico, and the Mississippi River, which are concerned primarily with environmental quality issues. Typical of these problem-focused projects in the coastal regions are studies related to organic chemistry of estuaries, the flow of effluents from various rivers into the Gulf of Mexico, and the ecology of such bodies as the Chesapeake Bay. These projects will provide a sound basis for coordinating and directing a wise resource management program for the Bay and its elements and for other similar areas. Other coastal research being considered for support under the RANN program in FY 1972 includes studies of New York and Boston Harbors, the Los Angeles Basin, Biscayne Bay, and the Mississippi Delta.

The total NSF involvement in these programs in FY 1970, FY 1971, and FY 1972 is summarized in the following table:

NSF SUPPORT OF MARINE SCIENCE RESEARCH

(IN MILLIONS OF DOLLARS)

	Actual FY 1970	Estimate FY 1971	Estimate FY 1972
Scientific Research Project Support			
Biological Oceanography	$3.6	$4.0	$5.4
Air Sea Interaction	.9	1.7	2.3
Physical Oceanography	2.1	2.5	4.3
Geological Oceanography	3.2	3.4	5.3
Subtotal	9.8	11.6	17.3
National Research Programs			
Ocean Sediment Coring Program	6.6	7.2	8.5
U.S. Antarctic Research Program	3.7	3.5	4.3
Arctic Research Program	-0-	.8	2.6
International Decade of Ocean Exploration	-0-	15.0	20.0
Subtotal	10.3	26.5	35.4
Oceanographic Research Vessels and Facilities			
Ship Operations	7.4	7.8	8.1
Ship Construction/Conversion	-0-	.4	2.8
Specialized Facilities, Equipment and Support Services	.2	-0-	3.4
Subtotal	7.6	8.2	14.3
Other Oceanography Related Activities	2.6	2.7	1.8
Total	30.3	49.0	68.8

Support of Basic Research

Question 1: Dr. McElroy, if the cuts for support of basic research recommended by the House were implemented, where would your priorities be? What programs would be discontinued?

Answer: No changes in the order of priority for emphasis by NSF would be made to meet the House reduction. What would be reduced is the level at which the emphasis would be applied. NSF plans to emphasize and support concerted efforts in the environmental, biological, social, and engineering sciences by providing significant increases for these areas of research in FY 1972; however, at the reduced level, these efforts could not be given the desired emphasis.

Even though the amount of $40 million included for the support of projects being discontinued by mission agencies is the minimum amount required to support only a fraction of the outstanding projects being dropped, NSF would have to reduce the allowance for these projects by as much as $5 million, if the House action were sustained. In this connection, it is important to consider that, of the cumulative total of $100 million in dropouts identified by NSF, it is estimated that, through FY 1972, $75 million in projects would be of such high priority as to merit NSF support. Thus far, NSF has been provided less than $10 million to meet these requirements.

Research programs as such would not be discontinued. However, individual research projects which would have been funded at the NSF proposed budget level would either not be funded or would be funded at a significantly lower level than proposed at the reduced level. NSF would also be forced to reduce and, in some cases, to discontinue the support of some established investigators in order to meet increasing demands for support of new investigators entering the various science disciplines. The determination of specific research projects to be reduced or discontinued cannot be made at this time, since the process of grant awards is based on the receipt of proposals, which are judged competitively on their merits and financed within the availability of funds.

Support of Basic Research cont'd.

Question 2: Would you mind giving us some examples of programs being discontinued by other agencies which NSF is picking up?

Answer: The following is a representative listing of research programs being discontinued by other agencies for which NSF is providing support. The examples in this listing represent projects for which grants have been awarded by NSF during the first 10-months of FY 1971.

-- $300,000 for the support of the operations of the 130-foot telescope at the Owens Valley (California) Radio Astronomy Observatory, formerly funded by DOD (Navy).

-- $154,000 for a Marine Applied Mechanics Program, at the Massachusetts Institute of Technology, formerly funded by DOD (Navy).

-- $166,000 for Interplanetary and Magnetospheric Studies, formerly funded by DOD (USAF), conducted by scientists at the University of Chicago.

-- $580,000 for support of the operation of the Haystack Observatory Facility, in Massachusetts, formerly funded by DOD (USAF), which is managed by a consortia of northeastern universities.

-- $40,000 for research studies at the Carnegie-Mellon University, on Molecular Orbital Theory of Organic Chemistry, formerly funded by HEW (NIH).

-- $53,000 for low temperature physics research, at the University of Michigan, formerly funded by AEC.

-- $66,500 for research on Metal Nitrene Chemistry and Metal Complexes of Molecular Nitrogen, formerly funded by AEC, at Northwestern University.

-- $79,800 for research in the conversion of various forms of energy by unconventional techniques at the University of Pennsylvania, which was previously funded by AEC.

-- $196,800 for theoretical chemistry, formerly funded by NASA, at the University of Wisconsin.

Support of Basic Research cont'd.

Question 3: What would be the implications of not picking up support for these programs? How important are they? Would other agencies take up the slack?

Answer: The fundamental research programs being dropped by DOD, AEC, NASA, and other mission agencies, in many instances, represent investigations at the cutting edge of the science. The skilled research teams working on these projects have been developed over a number of years and represe-t some of the finest expertise in the country for conducting highly advanced research studies in the basic sciences. These research teams are important National assets which are vital to the continued health of U.S. science. Moreover, research projects including those formerly funded by other agencies, are selected for support by NSF only after a vigorous competitive review has clearly established their scientific merit and has shown that they are of importance to the advancement of knowledge in the particular area of science with which they are concerned. Because of the very fundamental nature of these programs, it is highly unlikely that their support would be picked up by any Federal agency other than NSF, despite their scientific importance. Indeed, the experience of the past 18 months indicates that the mission agencies of the Federal government are making a concentrated and determined effort to channel increasing amounts of non-mission related research to NSF.

Question 4: Much of the NSF budget for Science Project support is for so-called "dropout" projects. Do you feel the proposed budget for these projects is adequate? Are any worthwhile projects not being pushed up because of budgetary constraints?

Answer: As was indicated in our response to Question 1 above, the Foundation believes that the amount of $40 million provided in the FY 1972 budget to help meet the dropout problem is the minimum that should be provided for research in this category if NSF is to meet its objective of sustaining U.S. scientific strength across the broad spectrum of the sciences. Even the amount of $40 million requested by NSF will meet only a fraction of the highly meritorious research projects that are being dropped by other agencies and that experience indicates would quality for NSF support under the most rigorous competitive review criteria.

Support of Basic Research cont'd.
Question 4 cont'd.

The NSF budget, as presented to Congress, is constrained when measured by the total research and science education support requirements of the agency and, consequently, support levels for research and other activities represent a balanced effort within the proposed budgetary level. For example, as pointed out in the response to question #1 above, NSF will be able to support only $50 million of the estimated $75 million in high priority projects that will have been dropped through FY 1972 even if the full amount of the NSF budget for this purpose is allowed.

QUESTIONS -- RESEARCH APPLIED TO NATIONAL NEEDS

Question 1: Dr. McElroy, how has the RANN program, or its predecessors, brought scientists from various disciplines together to work out problems crossing interdisciplinary lines? What has resulted from this approach?

Answer: The bulk of the Foundation's problem focused research efforts which are now a part of Research Applied to National Needs (RANN) are largely interdisciplinary in character. The conduct of this type of research often requires the combined talents of physical, biological, and social scientists, as well as technologists and lawyers. Following are some examples of how Foundation sponsored problem-oriented research promotes the development and use of interdisciplinary research teams, as well as some of the results of this approach:

Weather Modification: Weather Modification research includes hail suppression, storm modification, fog dispersion, and snow and rain augmentation projects. Since weather can have a large impact on the socio-economic conditions of the nation, weather modification research requires the skills of economists, political scientists and others from the law and the social sciences, as well as atmospheric scientists, physicists and chemists. The Foundation's FY 1972 budget includes funding for the National Hail Research Experiment which will bring together a large interdisciplinary team of scientists and engineers to determine the feasibility and overall effects of modifying hailstorm to reduce hail damage. This project will involve the cooperative efforts of some six Federal agencies, and seven universities.

Research results to date in the snow augmentation project have demonstrated the feasibility of creating over $100 million dollars worth of additional water and electricity for the southwestern U.S. and the capability has also been demonstrated to disperse cold fog.

Earthquake Engineering: This research requires the skills of earth scientists studying seismic risk and engineers developing economically feasible earthquake resistant engineering design concepts for buildings, bridges, dams and other physical structures. The skills of social scientists are required to evaluate the social hazards and appropriate economic investment in structural reinforcement for specific seismic risk areas. Research results include improved ability to measure seismic risk and improved building and other structural designs. Important ground motion data was obtained during the February 9, 1971 severe earthquake in the Los Angeles basin using instruments installed as a part of the NSF Earthquake Engineering Program, and the consequences of earthquakes of the type not above are now under intensive study.

Answer to Question 1 on RANN continued

Enzyme Technology: This research requires the skills of chemists and biologists combined with people knowledgeable about industrial processes, economists and engineers. The Enzyme Technology program included in the FY 1972 budget will provide the support necessary to bring cohesive interdisciplinary teams together to explore the industrial potential of enzymes and to learn how to develop synthetic enzymes designed to perform specific industrial processes including the recycling of waste productivity.

Development of Interdisciplinary and Problem-Focused Research Capabilities: Interdisciplinary groups have been formed in many universities and in national laboratories which are focusing their research upon significant national problems. NSF support has been of critical importance in the development of these interdisciplinary research teams. New institutional arrangements, such as university consortia and joint university-industry collaboration are encouraged.

In recent weeks NSF has awarded grants to seven institutions totalling almost $12.0 million to further develop their interdisciplinary problem-focused research capabilities. These grants have included support for: Environmental Quality Laboratory - California Institute of Technology; Interdisciplinary Processing Research Institute - Carnegie-Mellon; Center for Advanced Study in the Behavioral Sciences, Stanford, California; School of Criminal Justice - State University of New York at Albany; Center for Research in Energy Conversion and Power - University of Pennsylvania; Institute for Environmental Studies - University of Wisconsin (Madison); Institute for Social Research - University of Michigan.

The NSF staff actively participates with the scientists from various disciplines, assisting them in preparing new and imaginative research strategies designed around chosen societal problems, rather than based upon the methods and techniques of a single existing scientific discipline.

The program of Interdisciplinary Research Relevant to Problems of Our Society (IRPOS) which was merged into RANN supported a number of projects which have already produced significant results. IRPOS helped initiate and support the MIT Study of Critical Environmental Problems (SCEP) which developed a report on Man's Impact on the Global Environment which has been widely cited and used by conservation groups and other Federal agencies. Another important report resulting from interdisciplinary research supported by IRPOS at Oak Ridge National Laboratory is entitled Mercury In the Environment: The Human Element. Other interdisciplinary research efforts have produced significant information useful in understanding problems of the Chesapeake Bay, in fire fighting, in New York City's sanitation problems, in the Tennessee Valley, and elsewhere.

Question 2: How are priorities established within the RANN program? How does one identify projects which will benefit from an interdisciplinary approach?

Answer: In RANN, specific needs of the Nation provide the basis for determining research priorities. Research is supported which has the highest potential for contributing information needed to resolve important societal and environmental problems.

The following specific criteria are utilized in selecting major coordinated research efforts for inclusion in RANN, and for determining the appropriate level of support.

-- Importance: Where the significance and urgency of the problem area or the potential consequences for the Nation are great;

-- Payoff: Where domestic, economic, and social benefits to be realized are significantly higher than the anticipated research and implementation costs, or where the potential to strengthen the United States position internationally exists;

-- Leverage: Where science and technology can have a unique and substantial impact on the problem;

-- Readiness: Where the effort is timely and scientifically ready and the skilled manpower is available;

-- Capability: Where Federal, academic, and industrial capabilities exist to mount a successful research program;

-- Need for Federal Action: Where the research is not being conducted by private industry because the immediate incentive is not sufficient, or the market is fragmented.

-- Unique Position of NSF: Where the NSF can most effectively serve the research needs of the Government.

The RANN approach is to focus research on a selected societal problem, utilizing either disciplinary or interdisciplinary research, as required, to obtain the information needed to facilitate a solution of the problem.

RANN program staff, augmented by consultants and appropriate external analyses, including inputs from various interagency committees, identify problems to be addressed and the relative priorities of each.

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Question 3. How much emphasis is being given to the social sciences? What kinds of basic social science research is being conducted at NSF?

Answer: The social sciences are among the basic disciplines being utilized in the RANN program. Since all the programs in RANN are problem-oriented and most are interdisciplinary, they all involve some social science, especially economics.

The principal social science research concentration in RANN is under Social Systems and Human Resources. The emphasis NSF places on social sciences in RANN is demonstrated by the 146% increase proposed in this area for FY 1972 (from $6.5 million to $16.0 million). Much of this program is fundamental research with the objective of reaching a better understanding of the changing structure of our society and its human resources. A major focus is to provide a strengthened capacity for the use of social data and social research in the development, evaluation and management of governmental programs at all levels. Efforts include work on social indicators, urban systems modeling, extensive and systematic analyses of social, economic and demographic data to provide baselines, and to develop more useful and precise scientific tools for evaluation and design of major social programs. Research on the criminal justice system is designed to illuminate key issues for improving the equity and efficiency of dealing with offenders, victims, and the innocent.

In the program Environmental Systems and Resources, attitude studies and resource economics as related to the environment are utilized. In the Advanced Technology Application Program, economic feasibility, economic productivity, human behavior relating to urban systems, and the societal implications of technology oriented problem solutions are being studied. Inherent in the Exploratory Research and Problem Assessment Program are studies using the principles and practices of the social sciences as well as the performance of some fundamental social science research in methods of problem assessment.

Research in the Social Sciences is also supported under the Scientific Research Project Support. The major thrusts are toward (1) contributing to the cumulative increases in scientific knowledge about how human beings interact, and (2) strengthening the methodological and theoretical bases of the social sciences. This knowledge will also contribute to social problems by adding to our fundamental understanding of man and his society, insuring that in the future our efforts to alleviate new and current problems will be better informed.

There are not one but many social sciences. The Foundation's fundamental research program includes anthropology, economics, geography, sociology and social psychology, political science, history and philosophy of science, special projects such as law-related research and social indicators.

Answer to Question 3: Cont'd.

The programs in RANN complement and make use of the results of fundamental social science research efforts in the Scientific Research Project Support program. The firm conviction that the social sciences must be emphasized in NSF is further demonstrated by the 58% increase in this Social Sciences program, from $17.4 million to the FY 1972 level of $27.5 million.

Question 4: How are the social sciences being used to determine priorities within the RANN program?

Answer: As explained in the answer to question 2, priorities within RANN are based upon specific criteria relating to the potential of the research to provide information needed to solve societal and environmental problems. Research supported in the Social Science and Human Resources Division of RANN will supply social data that will be used in evaluating the severity of national problems, and the feasibility of specific research approaches. These data will be useful, for example, in: evaluating the potential of methods to improve public services; anticipating the regional environmental consequences of shifting population densities; and in assessing the Nation's energy and pollution problems.

Achieving economic and social benefit with new technology applications is also a principal goal of RANN and estimates of these benefits rely in good part upon staff analyses in using economic and social data.

Cutbacks in Educational Programs

Question 1: What effect will the cutbacks in educational programs proposed in FY 1972 NSF budget have upon the quality of science education in four-year colleges? For example, what effect would the elimination of Science Faculty Fellowships have on the quality of teaching at such institutions?

Answer: NSF believes that the discontinuation in FY 1972 of certain of its science education programs which benefit four-year colleges will have little detrimental impact on the quality of science education at these institutions.

Improving the quality of science education has been and continues to be an important program objective of NSF. FY 1972 is viewed as a year of transition in which is replacing those Science Education Support programs that have only a minimal effect on the science education enterprise in terms of the number of teachers and students reached for the dollars expended with new initiatives that will concentrate the limited science education resources of the Foundation on course curriculum improvement, experimental teacher training short courses, and other science training mechanisms which, we believe, will provide a basis for new and vigorous science education programs in future years. New initiatives planned for science education, which will be in their embryonic stages in FY 1972, are expected to provide for more significant improvement in the quality of science education in the future than those programs which have been terminated.

The Science Faculty Fellowship program has provided support for about 200 participants per year and was highly beneficial those whom it reached. However, the training received by this limited number of participants had only a minimal impact on the more than 8,000 science departments at the 800 or so four-year colleges in the U.S. offering undergraduate education in the sciences.

The other major science education program terminated by NSF in FY 1972 which had an impact on science education at the four-year colleges is the Undergraduate Research Participation program. This program, which was funded in FY 1971 at a level of $4 million, provided support for

about 3,000 students per year, to participate in research projects. A principal goal of this program was to demonstrate to the colleges both the feasibility and the advisability of incorporating research participation into their science education curriculum for undergraduate students. This program, which has been supported by the Foundation since 1959, has been significantly successful in changing the character of undergraduate instruction. Indeed, since a large percentage of four-year colleges offering science programs have adopted the undergraduate research participation concept, largely as a result of this program, it is now believed that further special Federal incentives, to encourage additional institutions to adopt this approach, are not necessary.

In considering the impact of NSF programs on science education at four-year colleges, it is important to note that NSF is proposing to double its program of Student Originated Studies, which is providing opportunities for outstanding young science students to propose, develop, and implement, on their own initiative, imaginative research approaches to some of the important social and environmental problems which are of significant concern to society. NSF believes this and other new initiatives for science teacher training and course curriculum improvement, together with new research opportunities for science students that will be made possible by expanding research programs in FY 1972, will more than offset any detrimental effect that might accrue because of the termination of the Undergraduate Research Participation and other science education activities that have previously impacted on science education programs at four-year colleges.

Question 2: Dr. McElroy, many authorities in the field of science education, such as Dr. Philip Handler, feel that no absolute shortage of scientists exists, but rather than the problem is one of reallocation of manpower. What is your response to that assertion? Assuming it to be true, what is the wisdom of eliminating programs such as the Student Science Training Program, which focuses on bright high school students?

Cutbacks in Educational Programs cont'd.
Question 2 cont'd.

Answer: It is the Administration's position that an adequate manpower supply exists in almost every field of science and engineering to meet Federal R&D program needs for the foreseeable future. Current economic and manpower requirement estimates also indicate that sufficient numbers of new highly trained scientists and engineers will be entering the job market to meet the requirements of industry, educational institutions, and government for at least the next several years.

Current problems of oversupply in defense and aerospace industries involve, on close examination, mainly non-Ph.D. scientists and engineers who have worked, over some years, on a single intensive technological aspect of a particular space or defense-related project. Completion or cancellation of these projects left these people in a particularly poor position to find new employment in an austere market.

Very preliminary information on the employment situation for scientists and engineers, as appraised of the College Placement Council, the Office of Education, and the Department of Labor, indicates that the problem, today, is much more complex than one of reallocation of manpower. Indeed, at the present time, there appears to be an oversupply, of from one to three percent, in certain fields for even Ph.D. level scientists and engineers. Therefore, NSF believes that, when all of the complexities are taken into consideration, it would not be in the national interest for the Federal Government to provide special Federal incentives at this time to encourage increased numbers of young people to pursue careers in science and engineering, such as those provided by the Student Science Training Program.

It would be a mistake, however, for NSF to discontinue all programs aimed at encouraging young people to pursue careers in science and engineering. There must be a base support program sufficient to encourage outstanding young men and women who wish to pursue careers in science and engineering but low enough to prevent an oversupply. Therefore, NSF is continuing to maintain a viable program of graduate fellowships based on a National competition. We believe that this program, when coupled with the increased opportunities for young people to participate in productive research under our expanded research programs, will help provide the base of support required to insure at least a cadre of skilled scientific professionals over the long term.

Cutbacks in Educational Programs

Question 3: Dr. McElroy, you state in your testimony that educational program revisions within the FY 1972 budget were made with an eye toward preserving quality in educational programs; how can you justify elimination of refresher courses for secondary teachers within that context?

Answer: Within the FY 1972 budget, the Foundation programs are aimed at achieving greater quality with fewer dollars. Therefore, in our programs for secondary school teachers, we are emphasizing projects that are connected with the implementation of new or updated course material which has been developed in recent years. The Foundation believes that, by providing support for the improvement of courses and curriculum for the training of new teachers before they enter on duty at academic institutions and by continually exposing them to advances in science and engineering through various types of institutes, an optimum awareness is achieved. In other words, institutes would be used as a mechanism for extending the teachers' knowledge, rather than reteaching old course material. Although some refresher and other basic courses will still be required, emphasis will be given to efforts to extend and improve science teaching capability.

Reprogramming

Question 1: Dr. McElroy, the House has recommended a line item budget for FY 1972? How much reprogramming of funds has gone on in NSF in recent years?

Answer: NSF reprogramming actions due to changes in program priorities and other programmatic consideration have averaged less than one percent a year during the past five years. The major changes from amounts budgeted by NSF for various programs have been those required by Congressional appropriation actions and by Foundation decisions to regroup and unify program activities in order to achieve more effective management by the Foundation staff. For example although the reprogramming actions reported to NSF's cognizant Congressional committees in FY 1971 totaled $98.3 million, almost all of these reprogrammings resulted from actions by the Congress on the Foundation's appropriation requests, apportionment actions taken by the Administration, or NSF realignments of existing programs to achieve more effective management.

The reprogramming actions in FY 1971, which have been by far the most significant in recent years, are summarized in the attached table. It is important to recognize that all programs that were merged into RANN in FY 1971 had been authorized and approved by Congressional action on the Foundation's FY 1971 authorization and appropriation requests. The $34 million reprogrammed to RANN represented the combined total of the program of Interdisciplinary Research Relevant to Problems of Our Society (IRPOS), Earthquake Engineering, Enzyme Engineering, Weather Modification, and interdisciplinary institutional development projects, all of which are being continued under RANN substantially as presented to and approved by the Congress for FY 1971. Most of the programs merged into RANN were approved by Congress under the major program activity of National and Special Research Programs, which now includes RANN. The only reprogramming between major activities to establish the RANN program was the transfer of $12 million from Institutional Support for Science for the development of interdisciplinary research capability at academic institutions and about $3.9 million from Scientific Research Project Support for specifically identified problem-focused research projects, which were transferred in total to the RANN program.

Reprogramming cont'd.
Question 1 cont'd.

The remainder of the reprogramming actions in FY 1971 were due to Congressional actions on the NSF appropriation request, Administration apportionment actions, and reorganization of the Executive Branch as indicated in the attached table.

It is NSF policy to keep the cognizant committees of Congress fully informed. It is believed that this procedure has benefitted science in the past and that it provides a sound basis for future handling of NSF reprogramming actions.

Summary of Reprogramming Actions of FY 1971

(In Millions of Dollars)

1. Executive Reorganization	
a. Transfer of National Sea Grant Program to NOAA	$7.1
2. Congressional Action	
a. Appropriation contained minimum "ceiling" of $23.3 million for Summer Institutes (NSF budgeted only $15.4 million). Reprogramming necessary	7.9
b. $9.5 million appropriated for first year traineeships (NSF Budgeted -0-) Reprogramming necessary	9.5
c. Pay Raise to be absorbed	1.1
Subtotal	18.5
3. Management Changes	
Oceanographic Research Facilities and Operations (combined several programs for better management)	8.2
Research Applied to National Needs (Regrouped Weather Modification, Earthquake Engineering, IRPOS and other Problem-Oriented Efforts)	34.0
Subtotal	42.2
4. Apportionment Actions	
OMB placed $9.5 million for new traineeships in reserve	9.5
Decision made to phase out Science Development Program ($20.0 million retained for prior commitments.)	21.0
Total	30.5
Total	98.3

Reprogramming cont'd.

Question 2: Are changing conditions in science rapid enough to make annual Congressional review of program categories unfeasible?

Answer: Probably no other area of human endeavor is subject to such continual, rapid, and drastic change as are science and technology. This is particularly true in the area of research, where new knowledge obtained in one field may have a chain reaction influencing the research activities in many related areas of science. As a consequence, it is essential that NSF retain its flexibility to pursue the scientific challenges of new research discoveries and opportunities promptly, whenever and wherever they develop. For example, in recent years, NSF has found it necessary to implement, during the course of the fiscal year, a number of special research initiatives designed to capitalize on unique and promising research opportunities. Such was the case, in FY 1971, when NSF found it necessary to bring its problem-oriented research efforts together under a separate program category entitled, Research Applied to National Needs. Similarly, in recent years, NSF has changed the program substructure of its research support activities in such areas as biology, astronomy, chemistry, and engineering to meet the requirements of newly emerging areas of research specialization in these fields. For these reasons, NSF believes that the vital interests of U.S. science would be best served by continuing to allow the Foundation the degree of flexibility that it has had since its inception, to modify and change its program categories as the continually changing needs of science dictate. NSF believes that, by continuing to keep the cognizant Committees of the Congress informed on a current basis, regarding reprogramming actions and changes in program categories, as it has in the past, the Foundation can satisfy Congressional requirements to oversee reprogramming activites.

As we have indicated in the testimony the Foundation would be in favor of biannual authorization of its programs providing that the degree of flexibility in reprogramming discussed above is available to NSF as it has been in the past.

(The questions submitted by Senator Prouty and the NSF responses follow:)

Question 1. In its report on H.R. 7960, the House Committee on Science and Astronautics endorsed the RANN concept but raised questions as to the possible duplication of research efforts in various agencies of government. What inter-agency coordination is there to insure that there is no duplication of our federal research efforts?

Answer: It should be emphasized that the Foundation will not displace or act as a substitute for agencies of Government which are effectively supporting research for their own needs. However, the Foundation can and does complement the research capabilities of the other agencies by addressing the long range requirements of the Nation when reviewed from the perspective of current national needs.

Close working relationships have been established with the mission-oriented agencies through interagency task forces and through a committee of the Federal Council for Science and Technology to aid the Foundation in coordinating its activities with other branches of the Federal Government. A committee of the Federal Council chaired by Dr. Edward David, the President's Science Advisor, with members from the other agencies affected by NSF's program of problem-oriented research, will be responsible for overall Federal coordination. Subcommittees are being created to provide more detailed coordination for each major objective of the RANN program. Further, NSF has identified, for each present and currently planned RANN program effort, related research efforts underway by other Federal agencies and has also documented the specific coordination arrangements with each such agency for each separate RANN effort.

It is our expectation that each program in RANN will lead to useful applications which may be implemented by other public and private agencies. Some RANN programs may initially be developed as cooperative efforts, utilizing the expertise of each agency to carry the project through proof of feasibility or proof-of-concept demonstrations. The Foundation is also providing for the participation of other interested Federal agencies in the prosecution of RANN sponsored research so that the results of these problem-focused efforts can be picked up and merged into the action programs of appropriate mission agencies.

Thus, the Foundation intends to act as a seed agency and to retain its capacity to seek new ideas and allocate funds to new areas.

Question 2. While it is apparent that our nation has an overage of Ph.D.s quantitatively, is it not true that there exist shortages of Ph.D.s in several important disciplines?

Answer: The Administration's position is that an adequate manpower supply exists in almost every field of science and engineering to meet Federal R&D program needs for the foreseeable future. At the present time, there appears to be an oversupply of from one to three percent, in certain fields, for even Ph.D. level scientists and engineers. Current economic and manpower requirement estimates also indicate that sufficient numbers of new highly trained scientists and engineers will be entering the job market to meet the requirements of government, educational institutions, and industry for at least the next several years.

On the basis of information available to NSF at this time, there do not appear to be any shortages of Ph.D.s in any of the important science disciplines.

Question 3. The cutbacks in defense and aerospace research and production have left many brilliant scientists out of work at a time when we need to marshal all our technological forces to save our environment and cities. In your opinion, how difficult is it to channel the creative energies of these unemployed scientists into new fields?

Answer: In theory, it should not be difficult to channel the creative energy of unemployed scientists into new fields. However, there are many practical considerations which do make it difficult and there are probably as many opinions pro and con as to the difficulties involved.

The single most important problem relates to the availability of jobs. Unless there are job opportunities, the interest the unemployed scientist has cannot be put to use.

Secondly, the ability of the scientist or probably more appropriately in the aerospace/defense industry, the engineer, to be employed productively is highly dependent upon the currency of his skills. An aeronautical engineer has been trained academically for at least four years and has probably a few years experience before he became responsible for a project.

To put an aeronautical engineer into sewage disposal, a field usually in the province of civil, chemical and mechanical engineers, is difficult without some retraining, assuming there was a demand for sewage disposal engineers which could not be met from the availability of the proper engineering skills.

Question 3 cont'd.

Third, there is the problem of limitation of skills. The current knowledge of the unemployed scientist may be limited in scope to those special areas in which he was working and be out of date in ancillary fields which are of interest to the non-defense/aerospace industries. He may no longer be as versatile as he was. Here the average age of the unemployed is a crucial factor.

Fourth, although past studies have implied a relative ease of transition there are many hesitations on the part of the non-defense/aerospace industry to hire the highly specialized skills of the defense/aerospace industry.

All these and other factors make the transition difficult and may require on-the-job training and other types of programs that can facilitate the movement of these people.

Question 4: Dr. McElroy, in its report on H.R. 7960, the House Committee on Science and Astronautics raised some seemingly valid points on the management and utilization of scientific facilities and equipment. Has the Foundation considered the possibility of having the Arecibo Observatory or the Haystack Observatory run by university consortia instead of individual universities? Also what steps do you feel the Foundation could take to identify and assign surplus federal equipment for educational institutions?

Answer: During recent months the Foundation has conducted an intensive review of the management and operation of the Arecibo Observatory including the alternatives for providing for effective management of the Observatory facility. As a result of this review, Cornell University, the prime contractor, has developed a management plan for the Observatory which provides for the organization and management of the Observatory as a National Research Center. One of the most far-reaching changes under the new management plan developed by Cornell, with inputs by NSF, is that the Arecibo Observatory will be given an independent status within the organizational structure of Cornell University. The new management arrangement for the Observatory will be patterned after the time-tested organizational structure used by the National Radio Astronomy Observatory (NRAO).

Question 4 cont'd.

Results of the Foundation's evaluation of the alternative plans for operating and managing the Arecibo Observatory indicated that the most effective alternative would be to have Cornell University continue as the prime contractor for the Observatory, on the condition that the organization and management of the Observatory be changed significantly so as to guarantee that the facilities would be operated as a national center.

The Haystack Observatory is already managed by a consortia of universities which constitute the Northeast Radio Observatory Corporation (NEROC) and is available for use by scientists from institutions throughout the nation.

With respect to the question concerning surplus Federal equipment, the Foundation has, for a number of years, carried out an aggressive program for identifying such equipment and making it available to educational and other non-profit institutions participating in Foundation programs. For example, during May 1971, more than $17 million worth of such equipment was made available to academic institutions through NSF efforts.

With regard to the assignment of surplus Federal equipment to educational institutions, during the last 17 months, for example, under the College Science Improvement Program (COSIP), the Foundation has aided its grantees in acquiring about $20 million worth of surplus equipment (acquisition cost). An example is $1/4 million surplus Minute-Man computer which is used to position and stabilize the research vessel VENTUNA which is used cooperatively by a group of West Coast universities for oceanographic research in connection with a COSIP project.

Question 5. I notice that House Bill H.R. 7960, covering the NSF authorization for FY 1972, proposes to reduce your Scientific Research Project Support program by $11.7 million below the amount you requested for FY 1972. What will this mean to you in terms of program emphasis, and what impact do you think this reduction will have on our colleges and universities?

Answer: No changes in the order of priority for emphasis by NSF would be made to meet the House reduction of $11.7 million. What would be reduced is the level at which the emphasis would be applied. NSF plans to emphasize and support concerted efforts in the environmental, biological, social, and engineering sciences by providing significant increases

Question 5 cont'd.

for these areas of research in FY 1972; however, at the reduced level, these efforts could not be given the desired emphasis and would have to be cut by several millions of dollars.

Even though the amount of $40 million included for the support of projects being discontinued by mission agencies is the minimum amount required to support only a fraction of the outstanding projects being dropped, NSF would have to reduce the allowance for these projects by as much as $5 million, if the House action were sustained. In this connection, it is important to consider that, of the cumulative total of $100 million in dropouts identified by NSF, it is estimated that, through FY 1972, $75 million in projects would be of such high priority as to merit NSF support. Thus far, NSF has been provided less than $10 million to meet these requirements.

Research programs as such would not be discontinued. However, individual research projects which would have been funded at the NSF proposed budget level would either not be funded or would be funded at a significantly lower level than proposed at the reduced level. NSF would also be forced to reduce and, in some cases, to discontinue the support of some established investigators in order to meet increasing demands for support of new investigators entering the various science disciplines. The determination of specific research projects to be reduced or discontinued cannot be made at this time, since the process of grant awards is based on the receipt of proposals, which are judged competitively on their merits and financed within the availability of funds.

This reduction would further reduce support available for important research at colleges and universities. This, coupled with disruptions caused by shifts to research projects that are directly mission related by other Federal agencies, would impair the fundamental science research efforts at these institutions. It would also tend to aggravate an already tight job market for the existing population of highly trained research scientists and engineers as well as technicians and other support personnel.

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Question 6. I also found, in the Committee report accompanying H.R. 7960 that concern was expressed about your program of Research Applied to National Needs, or RANN. I note that the House cut your request for the RANN program by $30.6 million and placed a specific limitation of $50.4 million on this program. How do you view this action? Does this pose a serious problem for you in getting on with some of the environmental and other problem-focused studies? Also, what could you do if more than $81.0 million was provided for RANN?

Answer: I believe that the action of the House Committee, in reducing the RANN program by $30.6 million, will deal a serious blow to our efforts to couple the scientific capabilities of this nation to the needs of society, particularly in the environmental areas. As the members of this Committee are aware, the RANN program represents the Foundation's major effort to bring together the diverse scientific talents and resources required to find ways to deal with problems of major concern to society.

Specifically, the reduction of $30.6 million would greatly reduce our ability to expand our program of Earthquake Engineering as required; to support research dealing with various aspects of the Nation's future energy requirements; and to add additional environment systems studies, such as those planned for the Chesapeake Bay and proposed for the Gulf Coast region. Additionally, as I mentioned in my formal statement before the Subcommittee, we have merged into the RANN program our Institutional Development programs designed to give institutions the ability to conduct interdisciplinary research focused on specific issues of national concern. If the House action is sustained, the Foundation will not be able to provide the level of support required to develop the capability of the Nation's academic institutions to handle interdisciplinary, problem-focused research efforts. The reduction would, I believe, deal the entire RANN effort irreparable damage by stifling the logical development and momentum of the program. It would, likely, be interpreted by the scientific community as an indication that NSF cannot be expected to assume an active role in making science resources available in a meaningful way for efforts aimed specifically at improving the quality of our environment and helping to solve societal problems.

Question 7. I notice that the House Bill proposes to restore your Institutional Development program to essentially its FY 1971 level by making cuts in your science research programs and your program of RANN. In terms of national priorities, Dr. McElroy, do you believe that the action proposed by the House can be sustained without significant damage to your research efforts in FY 1972? What actions would you have to take if the House action were sustained?

Answer: Any action that would reduce the amount for our science research programs, including RANN, below the level proposed by the NSF budget would, I believe, seriously damage the Foundation's ability to achieve its principal objectives of sustaining U.S. strength in the broad areas of science and would also greatly reduce the ability of NSF to make progress in coupling the nation's research capabilities to the needs of society. Within the constraints of a $622 million budget, the first priority must be given to research support, both fundamental and problem-oriented, if the nation is to realize an effective return on its cumulative investment in the development of science resources over the past several years. If the House action were sustained, NSF would be placed in the position of having to provide major support to programs designed to stimulate additional numbers of students to pursue careers in science and to programs aimed at developing science capabilities in additional institutions, at a time when, in our carefully considered judgment, top priority should be given to the support of programs that provide support for the existing population of highly qualified researchers and to institutions that are now able to conduct research investigations at the forefront of science.

Question 8. The Student Science Training Program--that is, the program aimed at outstanding high school students-- and the Undergraduate Research Participation Program have both been very popular and quite successful. The House Bill would restore these programs to their FY 1971 levels, even though your budget proposes to discontinue them in FY 1972. Would you give us your view as to the relative priorities of these two programs in comparison to the other programs you have proposed for FY 1972? Will the cut backs in these areas impair our ability to train additional scientists and engineers?

Answer: Both the Student Science Training Program and the Undergraduate Research Participation Program have been highly successful. However, the information available

Question 8 (cont'd.)

to the Foundation indicates that a sufficient number of young people are enrolled in education programs that the science and engineering professional requirements of the nation will be amply met for at least for the next several years and that, therefore, no special incentives are required at this time, to encourage additional young people to enter this field. With respect to the Undergraduate Research Participation Program, it is important to note that NSF initiated this program in FY 1959 to demonstrate to the colleges both the feasibility and the advisability of incorporating research into their science curriculum for undergraduate students. This program has been significantly successful in changing the character of undergraduate instruction. Indeed, since a large percentage of four-year colleges offering science programs have adopted the undergraduate research participation concept, largely as a result of this program, we believe that further special Federal incentives to encourage additional institutions to adopt this approach are not now necessary.

In FY 1972, NSF proposes to concentrate its limited resources for science education on course curriculum improvement, innovative teacher institutes, and other in-service training programs that are directed at improving the ability of academic institutions to make arrangements for their own teacher training programs.

NSF is also proposing to double its program of Student Originated Studies, which is providing opportunities for outstanding young science students to propose, develop, and implement, on their own initiative, imaginative research approaches to some of the important social and environmental problems which are of significant concern to society. NSF believes that this and other new initiatives for science teacher training and course curriculum improvement, together with new research opportunities that will be made possible by expanding research programs in FY 1972, will more than offset any detrimental effects that might result from the termination of the Undergraduate Research Participation and other "limited impact" education programs in FY 1972.

Question 9. I notice that H.R. 7960 contains some very restrictive language regarding the reprogramming of funds by the Foundation. Would you give us your views on the effects of this language, as well as your recommendations as to how the matter of reprogramming can best be handled?

Answer: H.R. 7960 would authorize the appropriation of funds under the NSF Salaries and Expenses Appropriation under twelve separate program categories and would place tight restrictions on the reprogramming of funds between categories. It would also establish a floor of support for certain science education programs. Most importantly, it would provide a rigid limit on the amount of funds that can be allocated to the program of Research Applied to National Needs (RANN), which would prevent the Administration and the Congress from approving reprogramming of funds into RANN without additional legislation.

Such restrictions would seriously hamper the Foundation's ability to adjust its programs to meet changing conditions or to take advantage of special research opportunities. This is particularly true of the firm limitation on the RANN program which, as you know, includes such program activities as Earthquake Engineering, Weather Modification, and other important problem-focused efforts, where program flexibility is especially essential if the Foundation is to respond to recognized national needs.

Regarding the proposal to authorize NSF funds by twelve separate program activities, I should point out that it is NSF policy to keep the cognizant committees of Congress fully informed on reprogramming actions which involve transfers of funds between major program activities.

I believe that it is essential that the maximum amount of flexibility be permitted NSF in adjusting its programs to meet changing conditions. Therefore, I recommend that the Foundation's authorization for the Salaries and Expenses Appropriation, be provided in a single item, with the understanding that the Foundation continue to keep the cognizant committees of the Congress fully informed of reprogramming actions which transfer funds between major program categories.

Because of the serious effects that the restrictions posed by the House would have upon the Foundation's ability to manage its program activities effectively, I strongly urge that the NSF FY 1972 Authorization request be approved as submitted.

STATEMENT OF DR. ROBERT W. FULLER, PRESIDENT OF OBERLIN COLLEGE, OBERLIN, OHIO

Senator KENNEDY. Our next witness is Dr. Robert W. Fuller, president of Oberlin College.

Dr. Fuller received his Ph. D. in physics from Princeton University in 1961, taught for several years, became dean of the faculty and college professor at Trinity College in 1968, and became president of Oberlin in 1970.

He has written several articles and one book entitled "Mathematics of Classical and Quantum Physics"; in addition to all this, he is serving as a consultant to the Battelle Memorial Institute in the area of inner city education and international education; to the Commission on Science Education of the American Association for the Advancement of Science; and is a national humanities faculty member of the National Endowment for the Humanities.

Dr. Fuller, I certainly appreciate your coming today and am looking forward to hearing your testimony.

Dr. FULLER. Thank you very much, Mr. Chairman.

Mr. Chairman and members of the subcommittee:

On behalf of the Associated Colleges of the Midwest and the Great Lakes Colleges Association, two academic consortia composed of 24 liberal arts colleges [1] in 8 States, I thank you for this opportunity to testify on S. 1168, the National Science Foundation authorization for fiscal year 1972.

Perhaps the views that I express this afternoon will be clearer if I indicate something of my background. I have taught physics to undergraduate and graduate students, and I have taught science to deprived high school students who were perilously close not only to dropping out of school, but also out of society. I have been dean of the faculty of a liberal arts college and I am now president of Oberlin College. I have served on the AAAS Commission on Science Education and am a member of the board of directors of the Great Lakes Colleges Association.

Although I speak today on behalf of the 24 colleges of ACM and GLCA, I shall express the concerns of many other colleges, faculty, scientists, and students across the land. We have heard from many individual colleges in the South, the far West and our own Midwest as well as from the following groups: the American Association of State Colleges and Universities with 277 members; the Twelve College Exchange in New England [2] and the East Central College Consortium.[3] They have expressed their interest in being associated with us in support of the precollege and undergraduate education programs of the National Science Foundation.

The enabling act, Public Law 507, states specifically the NSF function; "to develop and encourage the pursuit of a national policy for the promotion of basic research and education in the sciences." NSF's imaginative approach toward the fulfillment of this func-

[1] Associated Colleges of the Midwest: Beloit, Carleton, Coe, Colorado, Cornell (Iowa), Grinnell, Knox, Lawrence, Macalester, Monmouth, Ripon, and St. Olaf.
Great Lakes Colleges Association: Albion, Antioch, Denison, DePauw, Earlham, Hope, Kalamazoo, Kenyon, Oberlin, Ohio Wesleyan, Wabash, and Wooster.

[2] Twelve College Exchange: Amherst, Bowdoin, Connecticut, Dartmouth, Mount Holyoke, Smith, Trinity, Vassar, Wellesley, Wesleyan, Wheaton, and Williams.

[3] East Central College Consortium: Bethany, Heidelberg, Hiram, Marietta, Mount Union, Muskingum, and Westminster.

tion has had an enormously positive impact on hundreds of colleges. Although sound undergraduate colleges have long contributed richly to the production of quality scientists, they have been aided more recently by the establishment of NSF programs in science education that have made it possible for them to link research and teaching—a prime mission of undergraduate education—to stimulate and retain faculty and to provide them opportunities for periodic self-renewal, to obtain resources necessary for modern science, to bring a comprehension of science to the nonscience major, and to help strengthen and vitalize science education in the secondary and elementary schools.

Now let us direct our attention to the National Science Foundation authorizations as introduced in S. 1168. In these times, when we so clearly need a broad range of scientific practitioners and a citizenry educated in the social and natural sciences, it is most appropriate that we continue and intensify our "* * * pursuit of a national policy for the promotion of basic research and education in the sciences."

Unfortunately, although the NSF budget request for fiscal 1972 recognized the need for an increase in the funds for research, it proposed a decrease of more than 34 percent for the support of education and institutional grants.

It is gratifying to us that the House Committee on Science and Astronautics seemed to share our concern. They have recommended that the NSF science education program authorizations be restored to a level of $99.3 million. We are even more encouraged that this subcommittee, as evidenced by the bill, S. 1968, introduced by the chairman and four of its members, has already recognized the inequities of the original NSF request for fiscal 1972 and increased the education programs authorizations.

We believe that undergraduate education at a university would not be affected significantly by a reduction of direct support for education programs because the expanded research activity there would provide compensatory spinoffs. Ideally, the faculty teaches undergraduates as well as graduates and both may share the facilities and equipment. The diminution of direct support of undergraduate science education will have a far greater impact on the programs at 4-year colleges, where teaching, rather than research, is emphasized. With the aid of NSF, these institutions have been able to maintain and improve their historically strong records of training future scientists of quality. The reduction of this capacity will weaken our national science program.

Our deep concern is the apparent reallocation of priorities in the 1972 budget. Be assured our primary concern is not with the individual fiscal positions of our member institutions. Our fiscal situation is deeply complex and NSF programs will not solve these problems. We do not want to base our case today on your helping us bail ourselves out of our fiscal problems. We will survive although our science programs will not be as good without this kind of support.

The proposed fiscal year 1972 budget would eliminate science faculty fellowships. This program offers an opportunity for college faculty to enhance their effectiveness as teachers by providing them with stipends during leaves of absence which are devoted to self-renewal through further education and study. This particular program is of special importance to faculty at 4-year colleges such as ours because we are

not connected with graduate operations where they have continuing opportunities to do research and to keep themselves alive scientifically through such activity. It is terribly important that every 5 or 6 years a faculty member at a liberal arts college which does not have a graduate operation take off a year and spend it in a major graduate center to renew himself and continue his education.

Otherwise, the chances for scientific obsolescence are much greater.

A study of grantees from our 24 colleges shows the program has proved to be an economical use of Government funds and provides a unique means of keeping good faculty members at the cutting edge of their disciplines. (See appendix I.)

(The information referred to follows:)

Appendix I

THE SCIENCE FACULTY FELLOWSHIP PROGRAM OF THE NATIONAL SCIENCE FOUNDATION: AN EVALUATION

(Prepared by the Washington Office of the Associated Colleges of the Midwest—May, 1971)

Questionnaires were sent to 44 Science Faculty Fellowship recipients of the Associated Colleges of the Midwest and the Great Lakes Colleges Association colleges. Fifty-two faculty members had received Fellowships from 1966 through 1970. Four were no longer with the colleges. Four additional grantees were out of the country. Of the 39 recipients who responded, one did not complete the questionnaire because he had not accepted the Fellowship. The remaining 38 (86 per cent) returned the questionnaires, 33 of them Post-Doctoral Fellows and five Pre-Doctoral Fellows.

Conclusions drawn from the questionnaires were these:

1. The NSF Science Faculty Fellowship program is the outstanding source of outside support for the continuing education of our college science teachers. 60% of the ACM–GLCA recipients would not have pursued the same program without NSF support. Most would have continued to stay on their campuses teaching.

Comments

"This program is absolutely essential for faculty at the smaller colleges who face limited sources of subsidization relative to faculty at the universities. This grant will enable me to do work to improve my teachiing and the quality of social science instruction at Beloit which I simply would not be able to do without the grant."

"I know of no other source of support than the Science Faculty Fellowship for the type of year I am benefitting from at Yale now. The program definitely should be continued."

"To lose this program may well tip the balance irrevocably in favor of university science, even at the undergraduate level."

"Loss of the Science Faculty Fellowship program will indeed be a disastrous blow to the small college."

2. The Science Faculty Fellowship program is an economical use of government funds, often attracting matching money. It enables college faculty to pursue better programs of up-grading than they could otherwise follow by supplementing colleges. 66% of ACM–GLCA recipients requested matching NSF support, usually 50% of the total cost.

3. Student research in past Fellows' departments has increased since their return—even though student research regularly occurs on most ACM–GLCA campuses during both summer and academic year. Most Science Faculty Fellows were supervising student research when they applied for the Fellowship.

Most Fellows were supervising student research when they submitted their Science Faculty Fellowship application—73% during academic year; 60.5% during summer. 23% of the past Fellows reported student research has increased in their departments.

4. The Science Faculty Fellows were in nearly all cases conducting their own research when they applied to NSF, frequently full-time during the summer. Past Fellows continue to do so. All but two acknowledge "a significance influence" in the direction or extent of their research by virtue of their Fellowship experience.

Twenty past Fellows (91 per cent) found the Science Faculty.

Fellowship had a significant influence on their research.

Those who elaborated cited a new direction (41 per cent) or extended knowledge in their field (36 per cent).

Comments

". . . [A] decisive [influence] . . . As a result my own research capability increased in many different ways."

". . . [T]he fellowship year greatly expanded my outlook and approach to the area."

"I have completely changed directions. The fellowship allowed me to reach research competence in a field in which I had only an amateur's knowledge before."

5. Many of the respondents (63 per cent) felt their departments required more expertise for a better program (although most felt their departments were already adequate). The need to improve their departments was a factor in their applying for the Fellowship.

Past Fellows in significant numbers noted course changes as a result of their Fellowship: 64% felt qualified to teach different courses; 45.5% of the Fellows' departments added a course or courses; 23% of the Fellows' departments plan to add a course or courses; 18% emphasized by comments that they were able to teach in new areas. *All but one* changed the content of his course offerings.

The impact of the Fellowship experience went beyond the Fellows' own departments. Half of the past Fellows (50 per cent) participated in new course design or offerings on an interdisciplinary or multidisciplinary basis.

Comments

"Fresh ideas, fresh outlook, new directions."

"The college began to develop environmental programs after my return, based largely on my experience."

"My course for non-majors has benefitted tremendously, and I am able to offer independent work to majors now in a new and exciting field."

"I felt I benefitted greatly from my Fellowship experience. I now teach quantum chemistry and statistical thermodynamics with greater confidence and quality."

6. The science community tends to give its greatest emphasis and support to researchers. Yet teachers of science find a new dimension in their advanced studies by virtue of their teaching experience, according to 65 per cent of our ACM–GLCA respondents.

Comments

". . . I look upon both areas, teaching and research, as complementary. The Science Faculty Fellowship is a magnificent opportunity to enhance my capacities in both areas."

"Not only did I feel better about myself but the staff at [the University] have a different opinion about what goes on at good small schools."

"I kept looking for topics suitable for undergraduate research. Conversation with faculty often turned to undergraduate curriculum and course content."

7. Past Fellows were asked, "Did the Science Faculty Fellowship experience improve your effectiveness as a teacher?" All but one of the past Fellows answered yes, citing increased confidence in teaching (54.5 per cent), increased confidence in research (32 per cent), and/or acquisition of new skills (41 per cent).

Comments

"Absolutely. Improved teaching techniques, more insight into the course material, better understanding of student problems . . ."

"When one is employed at an institution where teaching is emphasized and where one is in a small department with minimal contact with other researchers, a year of leave is like an oasis."

"The experience of 'being a graduate student' again in a first rate department with first rate students was very educational in terms of expanding horizons about what is possible in mathematical education."

"Yes. Greater competence and confidence."

"Please emphasize that the NSF faculty fellowships have meant all the difference in the world between continued growth and improvement, on the one hand, and stagnation, on the other, for many faculty fellows."

"Definitely yes. It was one of the most valuable experiences of my life."

Member colleges of the consortia are:

Associated Colleges of the Midwest
- Beloit
- Carleton
- Coe
- Colorado
- Cornell (Iowa)
- Grinnell
- Knox
- Lawrence
- Macalester
- Monmouth
- Ripon
- St. Olaf

Great Lakes Colleges Association
- Albion
- Antioch
- Denison
- DePauw
- Earlham
- Hope
- Kalamazoo
- Kenyon
- Oberlin
- Ohio Wesleyan
- Wabash
- College of Wooster

Dr. FULLER. The House Committee on Science and Astronautics in its report recommended reinstatement of this program at $2 million. We urge its restoration to $4.2 million, the fiscal 1966 level.

The NSF budget request for fiscal 1972 would also eliminate the undergraduate research participation (URP) program. This program encourages institutions to provide opportunities for able undergraduates to do essentially independent research under the guidance of competent research advisers. This is one of the most important programs to ACM and GLCA students and faculty and to their colleagues at other liberal arts colleges. Studies within NSF itself and outside [4] confirm the impact of this program in its support and encouragement of quality, keeping the ablest students in the field and enriching their undergraduate experience.

It also can serve to discourage the less able.

The requested fiscal year 1972 budget proposes to eliminate the instructional scientific equipment program (ISEP), which is suspended during the current year.

Under ISEP, an institution could apply for up to half of the cost of scientific equipment for improving instruction and advancing faculty-student research. These grants forced institutions to examine carefully their commitment to science education by requiring the investment of institutional funds. For example, in 1968, 15 GLCA and ACM institutions received ISEP grants totaling $186,000. These colleges expended from their own funds at least a matching amount to buy this equipment. The result was the introduction of nearly $400,000 in new equipment on the 15 campuses in 1 year.

The proposed fiscal year 1972 budget would eliminate the student science training program (SSTP). Through this program, carefully selected secondary school students are given opportunities to associate closely with scientists active in education and research, and thus to clarify their own conceptions of a career in science, while adding to their knowledge of science. The program provides opportunities beyond the research of high schools and represents the best kind of coun-

[4] Astin, Alexander W., "Preliminary Evaluation of the Undergraduate Research Participation Program of the National Science Foundation," *Journal of Educational Research*, January, 1969.

seling, enabling capable students to test their science interests in a situation where academic and intellectual demands are similar to those of a college.

It is our strong conviction that it is essential to the continued good health of undergraduate science education that the programs described above (Science Faculty Fellowships, URP, ISEP, SSTP) be reinstated in the authorizing legislation for fiscal year 1972.

Let us now turn to several other pregraduate programs for which funding has been requested for fiscal year 1972—but for which proposed funding levels are reduced or inadequate.

Perhaps the most important of these is COSIP (College Science Improvement Program), which grew out of a 1967 NSF Special Project. COSIP grants are awarded to accelerate development of social and natural science, mathematics, and engineering capabilities of predominantly undergraduate institutions. During fiscal year 1969 expenditures for the three subprograms under COSIP were as follows:

	Million
A (primarily four-year institutions)	$5.95
B (inter-institutional)	.83
C (two-year institutions)	1.98
Total	8.76

The proposed fiscal 1972 budget contains a total of $4 million for the above programs—$3 million for subprograms A and B combined, and $1 million for subprogram C. In addition, there would be a new special category, funded in the amount of $5 million, for black colleges. COSIP has had a continuing experience of receiving more good proposals than it can support. The proposed level of funding would further reduce the chances of support for good projects. We urge minimum support for COSIP at $14 million, including $5 million for black colleges and $9 million for the other three subprograms.

Other educational programs that are inadequately funded in the fiscal 1972 budget include:

Teacher institutes.—A 1968 survey in Illinois showed that fewer than one half of those teaching psyhics in Illinois high schools could be considered qualified. The NSF Teacher Institutes were designed to serve such teachers. Secondary school teachers, like college teachers, will always need opportunities to keep up with the constantly expanding horizons of science.

Precollege course curriculum.—The North Central Association in 1967 noted that 72 percent of the accredited high schools in 50 States were using NSF funded curriculum developments in 7 out of 8 major innovative curricula.

Special projects.—These programs recognize the new, not readily categorized, pilot ideas in precollege and undergraduate education. From a grant of this type, COSIP was launched.

Institutional grants.—NSF makes formula grants based on total amounts awarded through specific research grants to strengthen and balance programs of scientific research and education in colleges and universities. The grants may be used, at the discretion of the institution, for scientific research or education. While we may question the

details of the formula used in the determination of the grants, we endorse the concept of this type of award. The grants are small (usually $10,000 or less annually at each of our institutions), but their impact on our science programs has been impressive.

It is difficult to understand why the programs of science education have been singled out for less favorable treatment in the requested fiscal 1972 budget than research-oriented programs. We can suggest a couple of possible reasons behind this clear withdrawal of support for science education and then discuss these propositions frankly.

1. The National Science Foundation and the Office of Management and Budget may be unduly influenced by the projections of an oversupply of scientific manpower. Although there is now a problem in this area, the predictions for the future are questionable. Some experts predict excesses in the future, while others foresee severe shortages.[5]

This matter needs to be carefully researched. I want to emphasize, however, that the issues that we are addressing here today affect primarily the quality of those scientists who are trained rather than their number. The Research Corporation has sponsored a study of 16,000 recent science graduates that shows [6] that over 90 percent of them had decided to enter the sciences before they enrolled in college.

Our concern is for the quality and breadth of education after this choice is made and for the quality of science education given to those who elect to study the humanities. In both cases, strong, dynamic precollege and undergraduate programs in the natural and social sciences are required. We are alarmed that NSF, while undertaking some worthy efforts to upgrade science education across the board by means of institutional grants and programs for technicians and disadvantaged students, is abandoning its traditional support of excellence in science education. All but one of the programs to be dropped or cut back are characterized by their goal to improve the quality of education.

In his testimony before the Senate Appropriations Subcommittee on May 24, NSF Director McElroy listed the Foundation's four criteria for judging education programs. Three were concerned with the quantitative elements of time, numbers, and cost. The other was "societal need" based on factual data. He cited as data used "manpower analysis and policy studies"—an essentially quantitative consideration. Nowhere did he mention quality as a criterion.

2. NSF and OMB may have concluded that NSF should concern itself only with science at its "higher levels," that it should support sophisticated research but let pregraduate science education be funded elsewhere.

My colleague, Dean Lewis Salter of Knox College, testified in some detail on this matter last fall before the House Subcommittee on Science, Research, and Development. He argued, first, that there is an intimate connection between teaching and research that is crucial in the training of scientists, and, second, that there is an essential con-

[5] Brode, Wallace R., "Predictions for Future Scientific and Engineering Manpower Supply and Demand, Based on a Saturation Model," November 1970.
[6] Snelling and Boruch, Journal of Chemical Education, vol. 47, p. 36, 1970.

tinuity to science education starting in the elementary grades. We need the assurance that the very best scientific counsel and wisdom continue to be reflected in policy decisions affecting all levels of science education. For this, we look to the National Science Foundation with its system of peer panel judgments and its close working relationship with the best of the scientific community.

Finally, I want to speak of the new mood on campus. Our undergraduates are full of a new idealism. They are possessed with a willingness—and the energy—to identify and solve man's problems. Our science faculties are eager to provide leadership to this idealistic group. Our kind of education is not the only kind there is, but it has strength very special to it. Our institutions are going to continue to do first-class undergraduate science. We are going to continue to innovate in the comprehesion of science's methods, its still untapped potential, and, equally important, its limitations. We are going to work to develop courses which will accommodate and foster humaneness within a necessarily technological society.

Yet in our own way we feel a right to be an integral part of the effort to shape and implement a national science policy. We do not feel that education should be separated from research. And that is precisely what the requested NSF budget would do. Finally, our sense of frustration stems not only from our apparently being excluded from the national science effort, but also from our belief that the effort needs us. We have much to give; we want to give the best.

I ask the subcommittee's indulgence to make two general recommendations, one concerned with funding, the other with the role of undergraduate colleges in the formulation of national science policy.

Almost all of the programs in science education are currently funded at less than the amounts thought reasonable a few years ago. We therefore ask this subcommittee to recommend the reinstatement of the extremely important programs in pregraduate education that we have been discussing and to authorize a realistic budget for all pregraduate education programs which recognizes the continuing needs of science education.

We appreciate the concern already displayed by members of this subcommittee as evidenced by S. 1968. However, we respectfully point out to you that the fiscal 1971 support, cited by the chairman when he introduced the bill, represented a decrease from previous levels of support for every pregraduate education program but one. We hope this committee will consider raising the ceiling for support of NSF precollege and undergraduate education programs to $141.9 million, based on the previous highs for the individual programs.

(See Appendix II for 1971 expenditures, 1972 requests, and previous high funding levels.)

(The information referred to follows:)

APPENDIX II—NATIONAL SCIENCE FOUNDATION BUDGET, FY 1972 (IN MILLIONS OF DOLLARS)

	Fiscal year 1971 [1]	NSF projected fiscal year 1972	House recommendation [2] fiscal year 1972	High	(year)
Precollege education in science (totals)	40.0	33.2	37.2	52.1	(1966)
Student science Training program special supplemental activities.	2.0	0	2.0	2.4	(1964)
College science and curriculum development	11.2	9.9	9.9	17.1	(1968)
Course content improvement	5.5	5.0	.....	13.5	(1958)
Cooperative college-school science	4.9	4.9	.....	5.6	(1969)
Special projects	.4	0	.....	.5	(1968–69)
Institutes (totals)	26.8	[3] 23.3	25.3	36.9	(1970)
Summer	23.1	11.3	.....	24.3	(1965)
Academic year	2.7	2.8	.....	11.2	(1965)
In-service	3.3	3.5	.....	4.45	(1970)
Systems grants	.35	.7	.....	.....	.....
Undergraduate education in science (totals)	23.3	22.2	27.7	31.6	(1968)
Undergraduate research participation	4.0	0	4.0	6.87	(1968)
Student-originated studies	1.0	2.0	2.0	2.0	(1972)
College teacher program	5.0	[3] 3.5	5.0	5.5	(1968)
Science curriculum improvement	9.3	7.7	7.7	14.89	(1966)
Science course improvement	3.6	3.7	3.7	6.8	(1967)
Preservice teacher education	2.0	1.5	1.5	2.0	(1971)
Technical training	3.0	2.5	2.5	.....	.....
Special projects	.75	0	0	1.36	(1964)
Instructional scientific equipment	0	0	0	8.9	(1968)
College science improvement	4.0	4.0	4.0	9.62	(1968)
Special COSIP-black and management	0	5.0	5.0	.....	.....
Totals for undergraduate and precollege programs	63.35	55.4	64.9	141.9	
Graduate education in science (totals)	37.3	21.9	34.4	54.7	(1968)
Science faculty fellowships	3.0	0	2.0	4.16	(1966)
Institutional grants (totals)	34.5	12.0	28.8	44.7	(1970)
Institutional grants (undergraduate)	14.5	12.0	.....	14.5	(1969–70)

[1] S. 1968, the "National Science Foundation Authorization Act of 1972" introduced by Senator Kennedy, "completely restores educational funds to 1972 levels."

[2] These figures represent the recommendations made in the Report of the House Committee on Science and Astronautics of May 17, 1971. Figures underlined are amounts actually included in H.R. 7960, authorizing appropriations for the National Science Foundation for fiscal year 1972.

[3] Stipends to be increased, full indirect costs to be provided; therefore number of participants reduced by about 22 percent.

Dr. FULLER. We urge that you consider earmarking funds for certain programs and setting boundaries on the transferral of funds. We turn to Congress because we believe these programs will be whittled away otherwise. Already we hear rumors that new funds for the undergraduate research participation program may be diverted to student originated studies. We have no objections to the SOS program although it is new and relatively untested. We do not feel it is a substitute for the undergraduate research participation program, which has been tried and proved to be of great value to students, to faculty, and to college curriculum design. We also hear rumors that the science faculty fellowships may be diverted from an individual to an institutional base. Individual proposals competitively submitted are more likely to yield high quality and therefore prove to be a better use of money than institutional grants parceled out on a broader basis. This program should serve the individual teacher's need when it arises—not seek to be another form of institutional grant.

In appendix III we present a history of the composition of the National Science Board (NSB).

(The information referred to follows:)

APPENDIX III—NATIONAL SCIENCE BOARD MEMBERS, 1950–1972

	Number	Percentage
National Science Board members, past and present:		
B.A. and M.A. degree-granting institutions (C)[1]	5	5.7
Ph. D. degree-granting institutions (U)	58	66.6
Nondegree granting organizations (ND)	24	27.6
Total	87	
National Science Board members, present:		
B.A. and M.A. degree-granting institutions (C)	0	0
Ph. D. degree-granting institutions (U)	16	64
Nondegree granting organizations (ND)	9	36
Total	25	

[1] These institutions were Carleton, Defiance, Spring Hill, Texas Southern, and West Virginia State.

NATIONAL SCIENCE BOARD MEMBERS, 1950–1972*

This National Science Board roster lists every member since its inception in 1950, together with his *last* affiliation while on the NSB. [Present NSB members' names are italicized.]

	Name and affiliation
U	1. Aberle, Dr. Sophie D., University of New Mexico.
U	2. Adams, Dr. Roger, University of Illinois.
U	3. Barnes, Dr. Robert P., Howard University.
U	4. *Bing*, Dr. R. H., University of Wisconsin.
U	5. Bronk, Dr. Detlev W., Rockefeller University.
U	6. *Brooks*, Dr. Harvey, Harvard University.
U	7. Bunting, Dr. Mary I., Radcliffe College.
ND	8. Baker, Dr. W. O., Bell Telephone Laboratories.
ND	9. Barnard, Dr. Chester,[1] Rockefeller Foundation.
U	10. *Carter*, Dr. H. E., University of Illinois.
ND	11. *Charpie*, Dr. Robert A., Cabot Corporation.
U	12. Clement, Dr. Rufus E.,[1] Atlanta University.
U	13. Conant, Dr. James B., Harvard University.
ND	14. *Cooke*, Dr. Lloyd M., Union Carbide.
U	15. Cori, Dr. Gerty T.,[1] Washington University.
C	16. Davis, Dr. John W., West Virginia State.
U	17. *Dicke*, Dr. Robert II, Princeton University.
ND	18. Dollard, Mr. Charles, Carnegie Corporation.
U	19. DuBridge, Dr. Lee A., California Institute of Technology.
U	20. Elvehjem, Dr. Conrad A.,[1] University of Wisconsin.
U	21. Erying, Dr. Henry, University of Utah.
U	22. *Fowler*, Dr. William A., California Institute of Technology.
U	23. Fred, Dr. Edwin B., University of Wisconsin.
ND	24. *Gates*, Dr. David M., Missouri Botanical Garden.
U	25. Glennan, Dr. T. Keith, Case University.
U	26. Goldsmith, Dr. Julian R., University of Chicago.
C	27. Gould, Dr. Laurence M., Carleton College.
U	28. Gross, Dr. Paul M., Duke University.
U	29. *Hackerman*, Dr. Norman, William Marsh Rice University.
U	30. Hagerty, Dr. William W., Drexel Institute of Technology.
ND	31. *Handler*, Dr. Philip, National Academy of Sciences.
U	32. Hardin, Dr. Clifford M., University of Nebraska.
ND	33. Haworth, Dr. Leland J.,[2] National Science Foundation.
U	34. Hesburgh, The Very Reverend Theodore M., C.S.C., University of Notre Dame.
U	35. Houston, Dr. William W.,[1] Rice University.
U	36. Humphrey, Dr. George D., University of Wyoming.
U	37. Hyman, Dr. O. W., University of Tennessee.
U	38. *Heyns*, Dr. Roger W., University of California/Berkeley.
ND	39. *Jones*, Dr. Charles F., Humble Oil and Refining Company.
U	40. *Jones*, Dr. Thomas F., Jr., University of South Carolina.
U	41. Loeb, Dr. Robert F., Columbia University.
U	42. Macelwane, The Reverend James B., S.J.,[1] St. Louis University.

*C, U, ND explanation shown in Appendix III, in table above.

U	43.	*March*, Dr. James G., Copenhagen School of Economics and Social Science.
U	44.	McBride, Dr. Katherine E., Bryn Mawr.
C	45.	McCanan, Dr. Kevin, Defiance College.
ND	46.	*McElroy*, Dr. W. D.,[2] National Science Foundation.
ND	47.	McLaughlin, Dr. Donald H., Homestake Mining Company.
U	48.	McShane, Dr. Edward J., University of Virginia.
ND	49.	Merck, Mr. George W.,[1] Merck and Company, Inc.
U	50.	Middlebush, Dr. Frederick, University of Missouri.
U	51.	Moreland, Mr. Edward L.,[1] Massachusetts Institute of Technology.
U	52.	*Morison*, Dr. Robert S., Cornell University.
U	53.	Morris, Dr. Joseph C., Tulane University.
ND	54.	Morse, Dr. Marston, Institute for Advanced Study.
U	55.	*Murray*, Dr. Grover E., Texas Technological College.
C	56.	Nabrit, Dr. Samuel M., Texas Southern University.
U	57.	O'Brien, Dean Morrough P., University of California/Berkeley.
ND	58.	Picker, Mr. Harvey, Picker Corporation.
ND	59.	*Piore*, Dr. E. R., International Business Machines Corporation.
U	60.	Potter, Dr. Andrey A., Purdue University.
U	61.	*Press*, Dr. Frank, Massachusetts Institute of Technology.
U	62.	Rees, Dr. Mina S., City University of New York.
U	63.	Reyniers, Prof. James A.,[1] Notre Dame University.
U	64.	*Reynolds*, Dr. Joseph M., Louisiana State University.
U	65.	Rubey, Dr. William W., University of California/Los Angeles.
U	66.	Russell, Dr. Jane A.,[1] Emory University.
U	67.	Seaborg, Dr. Glenn T.,[3] University of California/Berkeley.
U	68.	Sears, Dr. Paul B., Yale University.
U	69.	*Smith* Dr. Frederick E., Harvard University.
ND	70.	Snyder, Mr. John I., Jr.,[1] U.S. Industries, Inc.
ND	71.	*Spilhaus*, Dr. Athelstan F., Smithsonian Institution.
U	72.	Stakman, Dr. E. C., University of Minnesota.
ND	73.	Stevenson, Dr. Earl P., Arthur D. Little, Inc.
U	74.	Stever, Dr. H. Guyford, Carnegie-Mellon University.
U	75.	Stratton, Julius A., Massachusetts Institute of Technology.
ND	76.	*Sullivan*, Mr. Richard II, Carnegie Corporation.
U	77.	Tatum, Dr. Edward L., Rockefeller University.
U	78.	*Thieme*, Dr. F. P., University of Colorado.
ND	79.	Tyler, Dr. Ralph W., Center for Advanced Study in the Behavioral Sciences.
ND	80.	Volwiler, Dr. Ernest II, Abbott Laboratories.
U	81.	Walker, Dr. Eric A., Pennsylvania State University.
ND	82.	Waterman, Dr. Allan T.,[1 2] National Science Foundation.
ND	83.	Weaver, Dr. Warren, Alfred P. Sloan Foundation.
U	84.	Whitaker, Dr. Douglas M., Rockefeller University.
U	85.	Willey, Dr. Malcolm M., University of Minnesota.
ND	86.	Wilson, Dr. Charles, General Electric Company.
C	87.	Yancey, The Reverend Patrick H., S.J., Spring Hill College.

[1] Deceased.
[2] Ex-officio.
[3] Dr. Seaborg resigned from NSB when he became Chairman, Atomic Energy Board.

Sources: National Science Foundation; Who's Who in America; American Men of Science; American Universities and Colleges.

Dr. FULLER. We have long been concerned over the minimal representation—historically about 6 percent—on the NSB of those from institutions which are primarily concerned with undergraduate education in science. We are particularly alarmed to note that there are currently no representatives from these institutions among the 24 members of the Board.

We therefore urge the adoption of legislation that would require that the National Science Board at all times have some members currently representing undergraduate educational institutions.

I am grateful for the opportunity of talking with you about these

matters. We think they are vital to the quality of our national life; now and a generation from now. We are confident you share our concern.

Senator KENNEDY. Thank you for your fine statement. If, as you have stated, these institutional programs have succeeded in upgrading the quality of curricula in colleges such as Oberlin, why should the programs have to continue? Why is it necessary to continue to pour millions of dollars into this kind of a program, if Oberlin is doing its thing now and have been able to upgrade its standards, as have many schools?

Dr. FULLER. I really have to hit the programs one by one, the undergraduate programs and the science faculty fellowships. Each one in its way keeps the scientists at the cutting edges of their disciplines and renews them periodically in ways that are essential to remaining first class. It is a small amount of money in the total NSF budget, but it is of critical importance to staying alive profesionally.

The disciplines have been developing at furious rates. The danger to these colleges, I think, is due partly to their isolation and their smallness. These NSF programs make possible faculty sabbaticals and undergraduate involvement in research over the summer by paying students enough so they do not have to get summer jobs. It is these facts that make the difference. If you take away those programs, the colleges cannot fund them on their own.

Senator KENNEDY. Do you get some resources now from the Foundation?

Dr. FULLER. Yes.

Senator KENNEDY. Of what magnitude approximately in terms of all of these various programs?

Dr. FULLER. In terms of the NSF precollege and undergraduate education programs and the institution grants program, Oberlin received in fiscal 1968 a total of $351,400, which included a COSIP grant of $203,700 to be spent over 3 years; in fiscal 1969 we received $182,200, and in fiscal 1970, $43,200.

Senator KENNEDY. What will be the impact in cutting out some of these programs?

Dr. FULLER. I think some of the best faculty, fearing isolation and knowing they cannot fund sabbaticals, will take the first chance they can get to go to a large university, where they will find the stimulation they lack on small computers.

Senator KENNEDY. In your understanding, would the greatest impact be on some of these smaller colleges and, perhaps, rural universities?

Dr. FULLER. Yes: I think a very great impact will be felt by them. Faculties at schools like Oberlin are good enough to go to university centers if they want to. The college may not choose to send them because they are needed for teaching, and yet the college recognizes the need for research. In the early fifties the faculties were falling asleep and not staying current. Programs like the science faculty fellowships and COSIP have made it possible for them to stay current.

Senator KENNEDY. How do you see the relationship between research and education?

Dr. FULLER. I see a crucial relationship in the sciences and education and in research. Five years out of graduate school you begin to dry up and become less effective as a teacher. Ten years out of graduate school without stimulation and you are really pretty much restricted to teaching introductory courses.

Senator KENNEDY. In supporting the judgment made by the Foundation regarding support of researchers who have just graduated, rather than support of undergraduate programs, you are making their case for them. I am interested in what you feel the implications of this would be over time on both undergraduates and on these faculties if we attempt to dry up these educational programs at the colleges.

Dr. FULLER. Over a period of time, a faculty will become less versed in their field and will become less good as teachers. Over a fairly brief interval this happens if they have no opportunities for self-renewal through science faculty fellowship programs, and if they are unable to have decent equipment, which allows them to do research on site.

It is terribly important to the kinds of small colleges, scattered over the midwest and west. Perhaps more important for a college which borders a great university, because then the faculty can run across the street and use the equipment.

I have spoken in answer to your questions about a number of issues here in my statement.

Mr. Chairman, in introducing this legislation, you remarked that it is not so much a question of oversupply of Ph.D.s as maldistribution. What we are talking about is not an attempt to increase the supply further. It is to maintain the quality in those that are produced. This small amount of money that is being cut out of the total in the NSF budget is critical to quality centers for now and 20 years from now. This is the kind of thing that makes first-class teaching across the whole country. It is not just that we are in favor of research now but we are equally concerned about good research later, and good research later depends on good education now. That in a sense is the essence of our argument, why we feel it is shortsighted to eliminate these educational programs.

You covered almost all of these matters in your questions to the NSF speakers. Many programs have been eliminated in the next year's budget, and we would like very much to see them stay at reasonable levels.

One thing I would like to endorse is the NSF proposal to include in a new concept category, $5 million for black colleges. I have had occasion to work closely with some black colleges, and I think that is an excellent idea. I would hope the same kind of program could be continued for some other colleges too.

Senator KENNEDY. You talked about a new sense of idealism among young people.

Could you elaborate on this a little bit?

Dr. FULLER. All this year campuses have been much quieter than they were in the past. I think it is a time of introversion and collecting of energies on the part of undergraduates. They are looking for new outlets, especially in the social sciences. These very programs we have been discussing will be crucial to maintaining good programs in both the social and natural sciences.

The students are eager to turn their energies to constructive channels. I think it would be quite a slap in the face of the faculties, who are anxious to guide them, if suddenly the support were withdrawn at the very time students seem to be turning back toward constructive, laborious solutions to these intangible problems. The students have realized there are no quick solutions. They are now ready to do the hard, difficult analysis of these problems, and for that, we need the kind of support the NSF education programs offer.

Senator KENNEDY. You think this is the field of the sciences as well?

Dr. FULLER. The sciences worry me a bit.

Take the example of the national debate on the SST. Without commenting on the merits of the argument or the merits of the outcome, I think the quality of the argument left a great deal to be desired. This is great danger in reaching the right conclusion for the wrong reasons—or perhaps reaching the right conclusion with an inadequate discussion. This, I admit, occurred on campuses as well as elsewhere.

It worries me that one can generalize from a decision like that, to oppose other forms of technology and science. The tendency to do this exists. It could be extremely dangerous nationally in the aftermath of an event like the SST national debate, one has to be very careful not to throw the baby out with the bath water.

Senator KENNEDY. Of course, if they see the opportunity to resolve some of the problems in terms of research, to see science as a tool to help meet many of the social problems that exist, I would think there would be something here that is attractive to them there.

Dr. FULLER. Very much so. When you used science before, I guess I jumped instinctively to think of the physical sciences. We are talking about natural and social sciences, as well. Student interest in the social sciences is higher than ever.

Personally, I would like to see greater emphasis on the social sciences and on NSF involvement in that area.

Senator KENNEDY. What we are talking about is really a few thousand dollars in terms of these various education programs. Maybe at a college such as yours, it might reach a hundred thousand dollar figure.

Does this really have an impact in terms of your budget?

Is Oberlin's budget sufficiently tight so that the withdrawal of this kind of support would have an impact?

Dr. FULLER. We cannot pick up that money in terms of funding for sabbaticals, or paying students for summer work, as in the URP program. The impact is more on the quality of our product, because we just cannot pick it up.

Senator KENNEDY. It reaches more the question of quality?

Dr. FULLER. Much more that question.

Senator KENNEDY. It is really a program that has been proven over a period of time?

Dr. FULLER. It is very hard for us to understand why suddenly this is being withdrawn.

Senator KENNEDY. Is it basically a shortsighted approach, would you think, in terms of the total?

Dr. FULLER. Shortsighted in terms of the nature of the needs, even for research. We want to take a very small fraction of the NSF total budget and think of it as producing good research later.

Senator KENNEDY. Well, thank you very much. It is very, very helpful to have your statement. I am hopeful we can stay in touch.

I also hope that we hear from the various member colleges that you represent, here on this subcommittee, and also through their senators and congressmen.

Some of us are going to attempt to try to see that those educational funds are restored, and whatever you can do in terms of indicating the value of that recommendation, would obviously be very helpful to us, because I agree with you, and I think that the record in terms of response this morning on these questions indicates that the quality of these programs will suffer.

Dr. FULLER. It was strange to hear the panel make many statements which sounded to me as if they themselves supported these programs.

Senator KENNEDY. I think this is not too strange. I believe they are very candid and responsive to these questions. I think that was very, very helpful and we will be staying in touch with you. I want to thank you very much.

You follow this very closely for we will spend time at it. You have spent a good deal of time and we thank you for coming.

STATEMENT OF DR. HARRISON SHULL, DEAN OF THE GRADUATE SCHOOL, INDIANA UNIVERSITY

Senator KENNEDY. Our last witness this morning is Dr. Harrison Shull, Dean of the Graduate School of the University of Indiana at Bloomington.

Dr. Shull received his Ph. D. in physical chemistry from the University of California at Berkeley, later joined Indiana University, and at present is a research professor of chemistry as well as dean of the graduate school there.

Dr. Shull has published numerous scientific papers; his awards include the Gilbert N. Lewis Lecture Award from the University of California at Berkeley in 1969, and he was a Dreyfus lecturer for the University of Kansas in 1970.

At the present time, he performs various professional services as consulting editor of the Allyn and Bacon Chemistry Series; as a member of the editorial board of the International Journal of Quantum Chemistry; as a member of the advisory committee of the office of scientific personnel of the National Research Council; and as a member of both the Council and the Committee on Science and Public Policy of the National Academy of Sciences.

Dr. Shull, I want to extend a warm welcome to you; I am glad you were able to testify before us today.

Dr. SHULL. Mr. Chairman and members of the subcommittee:

I am happy to have this opportunity to present my views on the NSF budget for fiscal year 1972.

As a scientist-education-administrator, I have genuine concern both for the continued progress of basic scientific research in the United States and for the survival of a quality program of higher education for today's young people.

Last August I presented a statement on "national science policy" before the House Subcommittee on Science, Research, and Development.

A considerable portion of that statement was concerned with appropriate Federal policies for manpower and for institutional support.

These are policy issues on which the present authorization hearings for the NSF bear heavily.

I called particularly for: (1) Stability in funding of basic scientific research; (2) maintenance of research-oriented high quality graduate institutions in sufficient numbers throughout the United States; (3) continuance of traineeships granted through institutions of excellence in numbers appropriate for sound manpower planning as a major mechanism of graduate student support; (4) continuance of the project grant system as the major mechanism for support of basic research; and (5) continuance of mission-oriented agency support for basic unclassified research.

The public record of that hearing contains further details on these points.

Let me begin today by affirming my own sincere personal confidence in the work of the Director of the NSF, Dr. William D. McElroy.

I have known him for many years—in fact, he was my instructor in elementary biology when he himself was a graduate assistant—and we have had a continuing friendly relationship.

I have high admiration for his dynamic and effective leadership.

He is dedicated to the importance of basic scientific research in the national enterprise.

He has supplied an imaginative vision of a strengthened role of the NSF in the Nation's service.

If science and technology seem to have been the cause of, and scapegoat for, many of our Nation's problems, nevertheless it is only with the help of science and technology that we can reach practicable solutions to them. Public lack of understanding of scientific research must be attacked head-on.

The political attacks on science must not be allowed to obscure the critical role further scientific developments must play in mankind's survival on earth with an adequate quality of life for all.

Dr. McElroy has been moving the NSF to a position where it can play a more important role in the development of new knowledge and in its use for the Nation and for all people.

SCIENTIFIC RESEARCH PROJECT SUPPORT

I applaud the decision of the Foundation to seek a substantial increase in funds for basic scientific project research. It is urgent, in my judgment, for the Congress to authorize and to appropriate the full amount requested for this function.

Although the requested increase is substantial in this agency's budget, I emphasize that the increase is not sufficient to compensate for decreases in Federal funding for the same function which have already occurred and are still occurring in fiscal 1971 in the various mission-oriented agencies.

Many research programs have been severely disrupted, and some have suffered irreparable damage. It is not in the national interest to extend this damage.

The project grant system with its built-in peer review and quality control should continue to be the cornerstone of university research support. It has been a distinctive feature of science support in the United States in the past two decades. It has provided success in en-

couraging innovative creativity and individual initiative, especially for the young scientist.

I believe it is a significant element in the increasing success of American basic research relative to the rest of the world in this period.

This kind of support should be maintained at a level proportionate to the size of the research scientist population and to the cost of doing basic scientific research. Just to continue the present level of Federal effort would require even larger appropriations than requested when inflationary cost increases are taken into account.

I urge that the full sum of $257.8 million requested for this function be authorized.

INSTITUTIONAL SUPPORT PROGRAMS

We are all aware of the enormous burden placed upon educational institutions to accommodate the wave of postwar births. The public and private purse opened wide to build new elementary schools, junior high schools, and then high schools.

There was an initial generous response to college development, but just as the wave has hit full force on the graduate schools, the most expensive and yet the most rewarding part of the educational system, funding has met increasing resistance as a result of the overall tax and philanthropic burden upon society.

Superimposed on the increasing needs generated by pure numbers of students have been the additional demands placed upon our higher education and basic research capabilities following sputnik. The Nation's universities responded massively to these challenges.

In the decade from 1958 to 1968, graduate enrollment increased 146 percent, the number of earned doctorates increased by 178 percent, accomplished by an increase in instructional staff of 94 percent and in total expenditures of about 180 percent measured in constant dollars.

Impressive as these numerical grains may be, the crucial aspect of the change, however, has been the intangible increase in the quality of the scientific programs.

The National Science Foundation has contributed significantly to the quality of science education at every level. Elementary science programs, secondary school and college teacher institutes, the college science improvement program, among others, have encouraged curricular improvement and development.

Departmental and institutional science development awards, capital support for computing facilities and other new sophisticated equipment, and direct institutional formula grants have strengthened the material resources of our schools and thereby qualitatively improved the educational programs. But this program of quality improvement has not completed its task.

I believe that when Doctor McElroy reports that the institutional science development programs "have generally achieved their objective," he means the objective of being able to handle larger numbers of students. I agree with that conclusion. But we have not met the objective of providing sufficient quality at a sufficient number of institutions geographically broadly distributed throughout the United States.

Departmental and institutional science development grants aimed at improvement of program quality rather than program quantity are still vitally needed. Science does not stand still. Quality today does not guarantee quality tomorrow. The nearby complete demise of institutionl support programs almost certainly insures that we will be faced in a few years with the necessity for another surge in institutional development.

It is not effective, wise, nor efficient to turn on, off, and on again institutional support. Such abrupt changes exacerbate the financial instability of many of our major institutions. I feel, therefore, that the sharp decrease in institutional support programs requested for fiscal 1972, is a major flaw.

I urge the Congress to authorize and appropriate, and the administration to spend, at least as much for this function as the estimated obligations of $34.5 million for fiscal 1971. Even that sum is a severe reduction from the $55.5 million approved by the Congress for this function in the present year.

STUDENT DEVELOPMENT PROGRAMS

Much national publicity has appeared concerning the oversupply of Ph. D.'s, the inadequacy and the narrowness of their training, and the possibilities of severe unemployment in that group. I do not share these glum predictions.

The Ph. D. degree program has been and still is a fantastically successful one. It is primarily through this program that American scientists have gained the knowledge, independence, and self-confidence with carries their capabilities beyond their counterparts in other nations, even when we manifestly do not do so well as earlier educational levels.

I was delighted to learn, Senator, your bill includes the full $34.5 million for the institutional support program.

Senator KENNEDY. Does this effectively cut back $55.5 million to $34.5 million, then going down virtually to zero. Are you prepared to say what the impact of that will be an educational institutions?

Is that a significant amount in terms of institutional support now?

Dr. SHULL. In my opinion it is a very significant factor in institutional development.

The nature of educational institutions is such that when you build in a program of quality improvement, you hire faculty, you build buildings, you acquire equipment, you gear up for the entire process, and about the time you are ready to utilize effectively the continuing support drops out. It is just not an effective way of handling the enterprise.

The whole business of institutional support and student support are very closely tied together in major institutions, because student support is a form of institutional support.

The drop in the number of fellowships for graduate students is having a very deleterious effect on the students' education itself, in that the best institutions in the country are cutting the number of students they will accept, because they do not have support for them. That is the fundamental reason for cutting back. Those

students are then going to poorer educational institutions that are less well qualified to handle them.

The evidence is very clear that the best institutions are dropping in student enrollments thus receiving less tuition than they would otherwise obtain. As a result many students are going to less qualified institutions where they will obtain less effective education. The research oriented degree is not solely an exercise in training for a specific narrow subdiscipline. More importantly it is a case-study approach to the education of an individual in the creative definition of problems which need solution, and in the creative discovery of solutions to those problems.

It is true that recent Ph. D. graduates rather uniformly have had expectations for employment within the degree specialty, but it has not long been this way, and the current expectations of new students entering these programs are already markedly broader in scope.

Many are choosing interdisciplinary research topics dealing with environmental problems, problems of our cities, or problems of educating our low-income people. Many are broadening their programs in traditional areas by taking appropriate outside minors.

Society badly needs more of these Ph. D. problem-solvers. I do not doubt that they will find their way into wide varieties of creative roles in solving society's technological problems, in Government, in international diplomacy, and even in politics.

Here I would add, I think it is disturbing how few scientists there are in the legislatures in our States and in our Federal Congress. The quality of the education of these graduates has been vastly improved by the use of fellowship, traineeship, and research assistantship support.

This has enabled the best students to devote full attention to their studies rather than part-time study distracted by the necessity to eke out a living by work totally nonproductive, if not counterproductive, to their studies. The quality of the educational institutions has been increased by providing them the means to attract appreciably better students.

It is important that each of our best universities throughout the United States, has sufficient numbers of the most talented students to set the tone, to identify an expected level of excellence for other students to strive toward, and to serve as informal instructors through peer group interaction among students. At the graduate level, such peer group interaction makes a major contribution to educational process.

It appears to be current policy systematically to eliminate direct graduate student support in every agency, not in the National Science Foundation alone.

I have heard that a rationale has been developed for the shift from direct student support to loan support.

It is the belief that the contribution to society of providing an individual with a higher eduction is no more than the increased lifetime income received by the individual as a result of his education. Since it is the individual who benefits, the rationale goes, then the individual should pay for his education from his future earnings. I believe that this rationale is demonstrably fallacious.

I have examined data on the average earnings of Ph. D. and non Ph. D. chemists of comparable ages and abilities.

The fact is that the average Ph. D. chemist never recovers the loss in income he suffered for many years while he did his graduate work at essentially poverty income levels.

Society receives the benefits of this individual's problem-solving capabilities without contributing any additional lifetime income to that individual. It is not the doctor's degree itself which conveys additional earning power; rather it is the individual's own abilities and motivations. If the primary goal of a chemist with a bachelor's degree is higher lifetime income, he should be advised not to go to graduate school.

For maintenance of quality doctorate programs, we need mechanisms for encouraging the most able students to distribute themselves among the most qualified departments in a given field in a reasonable way.

The traineeship programs of the NSF, as well as those of the NIH and of NASA were important innovations which accomplished this major function.

In my statement on "National Science Policy" I gave reasons for believing that 100 quality research-oriented graduate institutions is approximately the right number for the United States at the present time. It is just as unwise to concentrate the best students among only four or five highly publicized prestige institutions as it is to distribute them over many hundred smaller programs not qualified to handle them.

The national fellowship program of the NSF, as it is currently administered, concentrates its fellowship winners in only a few schools. This program has its merits, but it would be most unwise to operate with such a fellowship support program alone, as the fiscal year 1972 NSF budget originally proposed.

I feel strongly that traineeship support deserves the highest priority.

At whatever level the Congress sets the funding of direct student support through the NSF, I urge that a major proportion be applied to traineeships.

The NSF request for graduate student support for 1972 was at a reduced level of $20.0 million. I was pleased to note that the House Committee has recommended an authorization of $29.0 million, approximately at the fiscal 1971 program level.

I would urge a return in this program on a continuing basis to the fiscal 1970 level of about $37.6 million.

The additional funds will not only provide students with better educations as they pursue full-time study but will also provide flexible support to the institutions which desperately need the funds.

RESEARCH APPLIED TO NATIONAL NEEDS (RANN)

I support Dr. McElroy's enthusiasm for the RANN projects as a new experiment in encouraging scientists whose primary interest is in basic research to band together in group efforts to apply their individual capabilities to important recognized unsolved national problems.

I have no doubt that basic scientists can contribute significantly to the solution of current problems of society, and it is appropriate, I believe, for the National Science Foundation to undertake a program of this kind.

I have not done enough detailed study of the proposed expenditures for RANN to be able to form a judgment on the requested funding level for fiscal 1972.

I do have some concern that the very sharp increase in funds requested this year forecasts additional such increases in subsequent years at the expense of further inroads into the general basic science research support, institutional support, and science education support.

The latter support functions of the National Science Foundation must not be allowed to become minority interests.

Let me conclude my statement with remarks on some other programs with which I have personal acquaintance.

The request for funds for Specialized Research Facilities and Equipment was, in my opinion, much too low.

Even the additional sums assigned to this line by the House committee are really insufficient. There are continuing developments of new capabilities in scientific equipment, and present equipment is often outdated by more sophisticated alternatives.

Universities are financially less able to contribute as significantly to replacement and expansion of equipment needs. We must continue to make available modern equipment and facilities for university education and for basic research.

I strongly support the action of the House committee in restoring funds to the undergraduate research participation program.

This program has been directed at improving the quality of the education of our most promising undergradautes at a critical point in their careers. It is highly worthwhile.

Within the planning and policy studies area, I wish to call attention to the discontinuation of the National Register of Scientific and Technical Personnel in its present form.

Although the Register never did live up to the expectations of its usefulness as a locator of specialists in times of national emergency, nevertheless it has collected a unique data file which has been invaluable in recent manpower studies.

I strongly urge that sufficient funds be provided the Register or some other office to insure the safekeeping and availability of these data files.

Continuing studies of our human resources are urgently needed, and these files form an invaluable source of historical data.

Finally I believe that the sums requested for computing activities in education and research need to be increased.

Computer Science is a developing discipline, still in its infancy.

Computers are ubiquitous in society and are destined to become more so.

The NSF has a recognized expertise in program management in this area, and the funds requested for this program for computer innovation in education and computer applications in research barely allow scratching the surface of the potentialities.

The societal pay-off of additional funds in this particular area would be especially high.

CONCLUDING REMARKS

Let me express again my thanks for this opportunity to be with you. I have not had sufficient time to go into detail about these and other programs, but I shall be happy to answer questions about them.

In summary:

1. I support the full request for scientific research project support to maintain the health of basic research in the United States in the face of cuts in support by other agencies.

2. I believe the institutional support program should be maintained at budget levels of prior years to maintain the quality of science programs now being eroded by financial problems of our universities.

3. Direct student support should be continued in the form of traineeships granted through institutions with a broad geographic distribution.

4. The NSF should be encouraged to continue with the exciting RANN program, although care should be exercised that it does not grow to be the dominant part of the agency.

5. I believe special attention should be given to specialized research facilities and equipment, the undergraduate research participation program, and the computing activities in education and research program. These highly worthwhile programs were underfunded in the original request.

6. Special means should be included to maintain and make available for use the data file of the national register, even if that program is discontinued.

Mr. Chairman, this concludes my statement.

Senator KENNEDY. What you are saying about the RANN concept is that its purpose and thrust is certainly one which should be supported. But if we are going to support it at the expense of some other educational programs, I think we ought to take a lot sharper look at it, don't you agree?

Dr. SHULL. That is the kind of thing that I am saying.

My own personal highest priorities for the NSF are basic science research and science education support.

We do have mission agencies. The importance of RANN to me is the creation of the interface between the basic science research capabilities and these other agencies.

My concern really is with reference to the Chesapeake Bay cost figures, these can very quickly balloon into a sizable program, where the educational support is only a small part of the total, and I think this would be a very unfortunate development.

I would hope that if such a development balloons, that another agency, apart from the NSF itself is found to operate it.

Senator KENNEDY. I suppose most of your concern is about the current trend toward cutting down educational programs and seeing a rather large expansion in terms of the RANN type of program. Does that make you concerned for education in the future?

Dr. SHULL. Exactly.

Senator KENNEDY. You want us to be very much aware of what the impact is in terms of education?

Dr. SHULL. Exactly.

Senator KENNEDY. Or is it basic research?

Dr. SHULL. Yes, it is the trend in the two directions, as you mentioned.

Senator KENNEDY. They really should not be exclusive of each other. Don't you think they ought to be really working in harmony together?

Dr. SHULL. There is no reason why they cannot.

Senator KENNEDY. Other than financially?

Dr. SHULL. As Dr. McElroy pointed out, there will be a real attempt to keep significant portions of the RANN project supporting basic scientific research.

There is no particular reason in many of these programs, that graduate students, why they cannot work on these programs.

My own research is associated very heavily with computing activities, and I cannot help but remark as I have remarked in my statement, that I find it astonishing that as important and basic an instrument as a computer, it has such a really small piece of this budget.

It is a fantastically important thing in education and in society, and I would hope you might ask for some funds or do something about that.

Senator KENNEDY. That is a very helpful commentary. I think you have drawn for us this morning the importance of the relationship between education and research, which is put in rather sharp profile in terms of the budget. I think you have reinforced my own feeling of the importance of the continuation of educational programs, which I am sure there are examples of deficiencies, but generally these programs have been widely accepted and applauded, and have played a rather extraordinarily useful contribution to our society from the very beginning.

It seems to me that the importance of these programs is that many of the smaller schools and colleges take part. This is very worthwhile, so I think your comments have been rather specific, and impressive, and I want to thank you very much for taking the time to be with us.

We are going to carefully consider your suggestions and try to follow them. We are going to see if we can provide some increases in the education area, and I hope we gain some support, as we move along.

I want to thank you very much for coming here today.

Dr. SHULL. Thank you for the opportunity.

Senator KENNEDY. That concludes our morning's hearing.

At this point I order printed all statements of those who could not attend the hearing and other pertinent material submitted for the record.

(The material referred to follows:)

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APPENDIX A

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MO	71	WASH UNIV	C DAVIDSON	ENGINEERING		HUD	$ 100,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GK26613	$98,700		71

			NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71	HUD	1	0	98,700

YEAR	STATUS	NUMBER	NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71	G	1	0	98,700

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	STANFORD UNIV	S FEFERMAN	MATHEMATICS	THE STUDY OF PROOFS AND ORDINALS	DOD/ARMY	$ 18,500 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 13,000	GP13335	$23,500	12	71			
CA	71	STANFORD UNIV	R OSSERMAN	MATHEMATICS	DIFFERENTIAL GEOMETRY AND ASSOCIATED PARTIAL DIFFERENTIAL EQUATIONS	DOD/ARMY	$ 15,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 0	GP27533	$14,500	12	71			
CA	71	STANFORD UNIV	H L ROYDEN	MATHEMATICS	RESEARCH IN THEORY OF RIEMANN SURFACES	DOD/ARMY	$ 22,800 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 31,000	GP25084	$37,100	12	71			
CA	70	U OF CAL-IRVINE	BUNKER	CHEMISTRY	THEORETICAL STUDY OF BIMOLECULAR REACTIONS	DOD/ARMY	$ 19,100 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 70,300	GP16650	$91,700	24	71			
CA	70	U OF CAL-SAN DIEGO	TRAYLOR	CHEMISTRY	CORRELATION OF BAND LENGTHS WITH ORBITAL HYRIDIZATION	DOD/ARMY	$ 20,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 0	GP27361	$40,000	24	71			
IL	71	U OF ILL SYS OFF	T ITOH	ENGINEERING	DISPERSION CHARACTERISTICS OF MICROSTRIP AND SLOTTED LINES	DOD/ARMY	$ 20,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 0	GK25074	$20,200	12	71			

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IL	71	NORTHWESTRN U	M MAHOWALD	MATHEMATICS	RESEARCH IN ALGEBRAIC TOPOLOGY	DOD/ARMY	$ 28,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 10,000	GP25335	$80,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IL	70	U OF CHICAGO	ABELLA	PHYSICS	APPLICATION OF PHOTON ECHO RESONANCE	DOD/ARMY	$ 22,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP018622	$45,400	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IL	71	U OF CHICAGO	I KAPLANSKY	MATHEMATICS	INVESTIGATIONS IN MATHEMATICS	DOD/ARMY	$ 9,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 73,700	GP20864	$77,700	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IN	70	U OF NOTRE DAME	ELIEL	CHEMISTRY	CHEMICAL RESEARCH	DOD/ARMY	$ 20,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP24910	$50,000	14	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MD	70	U OF MD	DORFMAN	PHYSICS	RESEARCH IN STATISTICAL PHYSICS	DOD/ARMY	$ 30,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP1P1676	$10,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MO	70	WASH UNIV	NORBERG	PHYSICS	PULSED MAGNETIC RESONANCE & OTHER STUDIES AT LOW TEMPERATURE	DOD/ARMY	$ 34,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP24572	$75,000	24	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NC	71	U OF N C SYS OFF	I M CHAKRAVARTI	MATHEMATICS	PROBLEMS OF SEARCH THEORY, CODING AND INFORMATION PROCESSING, FINITE GEOMETRY, AND STATISTICAL DESIGN	DOD/ARMY	$ 35,000 0
		NSF SUPPORT PREV SPT: $ 0 GRANT NO: GP19568 AMOUNT: $21,000 DUR: 12 FY: 71					
NJ	71	PRINCETON UNIV	I GLASSMAN	ENGINEERING	A PROBLEM IN FIRE SAFETYO FLAME SPREADING ACROSS LIQUID FUELS	DOD/ARMY	$ 227,000 0
		NSF SUPPORT PREV SPT: $ 0 GRANT NO: GK27649 AMOUNT: $55,800 DUR: 12 FY: 71					
NJ	71	PRINCETON UNIV	J J KOHN D C SPENCER	MATHEMATICS	PARTIAL DIFFERENTIAL EQUATIONS	DOD/ARMY	$ 36,000 0
		NSF SUPPORT PREV SPT: $ 0 GRANT NO: GP24943 AMOUNT: $51,700 DUR: 12 FY: 71					
NJ	71	PRINCETON UNIV	DWORK SHIMURA	MATHEMATICS	ANALETIC & ALGEBRAIC METHODS IN GEOMETRY & NUMBER THEORY	DOD/ARMY	$ 29,000 0
		NSF SUPPORT PREV SPT: $ 0 GRANT NO: GP1P1429 AMOUNT: $85,000 DUR: 12 FY: 71			*ALSO WITH WASHNITZER		
NY	70	POLYTECHNIC INST OF BKLYN	T TAMIR	ENGINEERING	DIFFRACTION OF BEAM WAVES	DOD/ARMY	$ 16,000 0
		NSF SUPPORT PREV SPT: $ 0 GRANT NO: GK23875 AMOUNT: $32,000 DUR: 24 FY: 71					
OR	71	UNIV OF OREGON - EUGENE	R FITZGERALD	BIOLOGICAL SCS.	PSYCHOPHYSIOLOGY OF HEART-RATE CONDITIONING	DOD/ARMY	$ 56,000 0
		NSF SUPPORT PREV SPT: $ 0 GRANT NO: GB28222 AMOUNT: $36,000 DUR: 24 FY: 71					

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
PA	70	UNIV OF PA	CAVA	CHEMISTRY	CHEMICAL RESEARCH	DOD/ARMY	$ 18,800 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 32,900	GP24057	$35,400	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
PA	70	UNIV OF PA	C T YANG	MATHEMATICS	TRANSFORMATION GROUPS	DOD/ARMY	$ 15,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP1P282	$10,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
TX	71	U OF TEXAS S O	H G SPERLING	BIOLOGICAL SCS.	LONG-TERM EFFECTS OF INTENSE SPECTRAL LIGHT EXPOSURE ON PRIMATES	DOD/ARMY	$ 50,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB27561X	$40,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
WI	71	U OF WISC SYS OFF	C R STEARNS	ATMOS. SCIENCES	TURBULENT STRUCTURE ABOVE ROUGH SURFACES	DOD/ARMY	$ 52,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA27204	$105,000	24	71

			NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71	ARMY	22	230,900	1,037,000

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	70	CAL INST OF TECH	G J STANLEY	ASTRONOMY	RESEARCH & OPERATING EXPENSES FOR 130-FT. TELESCOPE AT OWENS VALLEY RADIO ASTRONOMY OBSERVATORY	DOD/NAVY	$ 425,000 295,000

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP5225	$300,000	12	71

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RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	CAL INST OF TECH	H LOWENSTAM	OCEANOGRAPHY	STUDIES OF NON-CARBONATE MINERALS PRECIPITATED BY MARINE ORGANISMS AND THEIR POSSIBLE EVOLUTIONARY AND SEDIMENTARY SIGNIFICANCE	DOD/NAVY	$ 120,670 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 99,400	GA26131	$52,700	12	71			
CA	71	STANFORD UNIV	HARRISON	PHYSICS	QUANTUM THEORY OF METALS	DOD/NAVY	$ 15,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 32,500	GP25945	$95,500	24	71			
CA	71	STANFORD UNIV	R NORTH	SOCIAL SCIENCES	POLITICAL SCIENCE	DOD/NAVY	$ 24,200 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 0	GS3125	$70,900	24	71			
CA	71	U OF CAL SYS OFF	WEAVER	ASTRONOMY	RADIO ASTRONOMICAL STUDIES	DOD/NAVY	$ 42,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 379,000	GP024611	$300,000	12	71			
CA	70	U OF CAL SYS OFF	T J CHOW	OCEANOGRAPHY	THE DETECTION AND GEOCHEMISTRY OF TRACE ELEMENTS IN THE OCEAN (LEAD POLLUTANTS IN NEAR SHORE MARINE ENVIRONMENTS)	DOD/NAVY	$ 47,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 0	GA26301	$45,000	12	71			
CA	71	U OF CAL-LOS ANGELES	C YEH	ENGINEERING	MOVING CHARGED PARTICLES IN OMPLEX MATERIAL MEDIA	C DOD/NAVY	$ 20,000 10,000
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 0	GP1K1482	$50,000	24	71			

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	U OF CAL-SAN DIEGO	T J CHOW	OCEANOGRAPHY	LEAD POLLUTANTS IN NEAR SHORE MARINE ENVIRONMENTS	DOD/NAVY	$ 47,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA026301	$45,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	70	CITY OF HOPE MEDICAL CTR	J S KITTREDGE	BIOLOGICAL SCS.	BIOCHEMICAL INVESTIGATION OF CHEMORECEPTION IN MARINE INVERTEBRATES	DOD/NAVY	$ 36,400 17,000

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB27703	$39,300	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
FL	71	FLA ST UNIV	P J GIERASCH	ATMOS. SCIENCES	DYNAMICS OF PLANETARY ATMOSPHERES	DOD/NAVY	$ 15,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA17727	$64,900	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IL	71	U OF ILL SYS OFF	SWENSON	ASTRONOMY	OPERATION OF VERMILLION RIVER OBSERVATORY	DOD/NAVY	$ 120,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 160,000	GP020108	$140,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IL	70	U OF CHICAGO	CHANDRASEKHAR	PHYSICS	RESEARCH IN GENERAL RELATIVITY	DOD/NAVY	$ 60,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP28342	$57,100	15	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IN	70	INDIANA UNIV SYSTEMS OFF	R D BENT	PHYSICS	NUCLEAR STRUCTURE AND NUCLEAR PROCESSES	DOD/NAVY	$ 110,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 479,100	GP28181	$610,610	12	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MA	71	HARVARD UNIV	G ANDERSON G F CARRIER	MATHEMATICS	NUMERICAL SYNTHESIS PROJECT	DOD/NAVY	$ 35,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP26170	$25,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MA	70	MASS INST TECH	KEIL	ENGINEERING	MARINE APPLIED MECHANICS	DOD/NAVY DOC	$1,200,000 600,000 200,000

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GK20189	$154,300	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MD	71	JOHNS HOPKINS UNIV	S CORRSIN	ENGINEERING		DOD/NAVY	$ 50,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GK28084X	$45,400		71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MI	70	U OF MICH	HADDOCK	ASTRONOMY	RADIO ASTRONOMY	DOD/NAVY	$ 40,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 120,000	GP21349	$132,500	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MS	71	MASS INST TECH	A H KEIL	ENGINEERING		DOD/NAVY	$ 78,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GK20189X	$77,900		71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NC	71	DUKE UNIV	H G ROBINSON	PHYSICS	HIGH RESOLUTION SPECTRO-SCOPY WITH STORED STATE-	DOD/NAVY	$ 18,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 11,500	GP27207	$44,800	24	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NM	71	N M INST OF MINING & TECH	G W GROSS	ATMOS. SCIENCES		DOD/NAVY	$ 15,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 0	GA23168	$29,200	24	71			
NY	71	COLUMBIA U	R NOVICK	PHYSICS	METASTABLE ATOMIZING ATOMIC STATES AND THE METASTABLE HELIUM ION	DOD/NAVY	$ 25,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 0	GP13479	$48,000	24	71			
NY	71	CORNELL U	J KIEFER	MATHEMATICS	MATHEMATICAL STATISTICS	DOD/NAVY	$ 41,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 28,800	GP24438	$57,700	12	71			
NY	71	N Y UNIV	E L REISS	MATHEMATICS	NUMERICAL STUDIES OF NON-LINEAR ELASTIC AND HYDRO-DYNAMIC STABILITY PROBLEMS	DOD/NAVY	$ 11,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 0	GP27223	$20,200	12	71			
NY	71	N Y UNIV	Y Y CHAO	OCEANOGRAPHY	THEORETICAL & EXPERIMENTAL STUDY OF GRAVITY WAVE BEHAVIOR IN THE VICINITY OF A CUSPED CAUSTIC	DOD/NAVY	$ 15,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 0	GA26629	$14,900	12	71			
NY	71	ST UNIV AT STONY BROOK	M RILEY	BIOLOGICAL SCS.	PHYSIOLOGICAL INTERACTIONS OF NUCLEIC ACIDS	DOD/NAVY	$ 35,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 0	GB22781	$50,000	24	71			

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	HASKINS LABORATORIES INC	L PROVASOLI	OCEANOGRAPHY	NUTRITIONAL RELATIONSHIPS AMONG ORGANISMS SELECTED ATOMS	DOD/NAVY	$ 24,000 0
		NSF SUPPORT					
		PREV SPT / GRANT NO / AMOUNT / DUR / FY					
		$ 39,300 / GB19143 / $89,600 / 12 / 71					
OR	71	OREGON ST UNIV	G BODVARSSON	OCEANOGRAPHY	STUDY OF THE DYNAMICS OF DEEP-SEA CURRENTS IN COASTAL REGIONS IN THE NORTHEAST PACIFIC	DOD/NAVY	$ 12,000 0
		NSF SUPPORT					
		PREV SPT / GRANT NO / AMOUNT / DUR / FY					
		$ 0 / GA18129 / $13,500 / 12 / 71					
PA	71	LEHIGH UNIV	L TALL	ENGINEERING		DOD/NAVY	$ 50,000 0
		NSF SUPPORT					
		PREV SPT / GRANT NO / AMOUNT / DUR / FY					
		$ 0 / GK28049X / $48,800 / / 71					
PA	71	UNIV OF PA	H R CALLEN	PHYSICS	STATISTICAL MECHANICS AND THEORY OF SOLIDS	DOD/NAVY	$ 15,000 0
		NSF SUPPORT					
		PREV SPT / GRANT NO / AMOUNT / DUR / FY					
		$ 16,800 / GP26166 / $35,000 / 24 / 71					
RI	70	UNIV OF R I	PILSON	OCEANOGRAPHY	DISTRIBUTION OF TRACE ELEMENTS IN SEA WATER	DOD/NAVY	$ 65,000 0
		NSF SUPPORT					
		PREV SPT / GRANT NO / AMOUNT / DUR / FY					
		$ 0 / GA23414 / $16,800 / 12 / 71					
WA	71	U OF WASH	R U MERILL	EARTH SCIENCES	PHYSICAL-CHEMICAL CHANGES, MULTIDOMAIN REMANENCES AND PALEMAGNETIC INTENSITIES	DOD/NAVY	$ 20,000 0
		NSF SUPPORT					
		PREV SPT / GRANT NO / AMOUNT / DUR / FY					
		$ 0 / GA27570 / $20,000 / 12 / 71					

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
WA	70	U OF WASH	RICHARDS	CHEMISTRY	CHEMICAL STUDIES OF THE OCEANIC ENVIRONMENT	DOD/NAVY	$ 141,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA24875	$152,200	24	71

		NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71 NAVY	32	1,366,400	2,946,810

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	CAL INST OF TECH	N W TSCHOEGL	ENGINEERING	THE PRESSURE DEPENDENCE OF THE GLASS TRANSITION TEMPERATURE & MECHANICAL PROPERTIES OF POLYMERS	DOD/USAF	$ 153,300 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GK22672	$65,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	STANFORD UNIV	R R HELLIWELL	ATMOS. SCIENCES	MAGNETOSPHERE-IONOSPHERE-TROSPHERE INTERACTIONS	DOD/USAF	$ 65,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA28042	$125,400	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	STANFORD UNIV	M H PROTTER	MATHEMATICS	PARTIAL DIFFERENTIAL EQUATIONS	DOD/USAF	$ 20,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP29009	$12,500	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	STANFORD UNIV	P COHEN R PHILLIPS	MATHEMATICS	FUNCTIONAL ANALYSIS	DOD/USAF	$ 44,000 22,000

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 22,500	GP28122	$30,000	12	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	U OF CAL-BERKELEY	DESOER-KUH	ENGINEERING	SYSTEM THEORY RESEARCH	DOD/USAF	$ 20,000
							0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	G1K10656	$20,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	U OF CAL-LOS ANGELES	L H ALLER	ASTRONOMY	ABUNDANCE OF ELEMENTS IN STARS & GASEOUS NEBULAE	DOD/USAF	$ 25,000
							0
						NASA	50,000

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP23460	$20,300	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	U OF CAL-LOS ANGELES	MAL KNOPOFF	ENGINEERING	ELASTIC WAVES IN COMPOSITES	DOD/USAF	$ 36,000
							0
						AEC	36,000

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GK18775	$72,400	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	70	U OF CAL-LOS ANGELES	CLARK	PHYSICS	EXPERIMENTAL STUDIES OF LIQUID RYSTALS, MAGNETIC IMPURITIES IN INSB AND CONCENTRATION FLUCTUATION IN LIQUID ALLOYS	C DOD/USAF	$ 47,000
							0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP1P1482	$52,200	17	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	U OF CAL-SAN DIEGO	MASEK	PHYSICS	COSMIC RAY MUON ZENITH ANGLE EXPERIMENT	DOD/USAF	$ 180,000
							0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP26220	$31,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	U OF CAL-SAN DIEGO	FUNG	ENGINEERING	CARDIO-PULMONARY DYNAMICS	DOD/USAF	$ 7,000
							0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP1K0028	$70,000	36	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	U OF CAL-SANTA CRUZ	H WIDEM	MATHEMATICS	ANALYSIS	DOD/USAF	$ 34,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP24181	$10,100	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CO	71	U OF COLO	H HERMES	MATHEMATICS	CONTROL TECHNIQUES APPLICABLE IN AEROSPACE ENERGY MANAGEMENT	DOD/USAF	$ 16,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP27957	$13,800	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CO	71	U OF DENVER	D G MURCRAY	ATMOS. SCIENCES	DISTRIBUTION OF NITRIC ACID IN THE STRATOSPHERE	DOD/USAF	$ 47,600 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA26228	$138,800	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CT	70	YALE UNIV	BERSON	CHEMISTRY	CHEMICAL RESEARCH	DOD/USAF	$ 65,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 26,200	GP11017X	$37,900	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
FL	71	FLA ST UNIV	R H DAVIS	PHYSICS	NUCLEAR REACTIONS AND SPECTROSCOPY	DOD/USAF	$ 425,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP25974	$390,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
FL	71	U OF FLA	E B KRAUS	ATMOS. SCIENCES	INTERACTING TROPICAL ATMOSPHERIC AND OCEAN MODEL	DOD/USAF	$ 20,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA26373	$22,000	12	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
FL	70	U OF FLA	BATTISTE	CHEMISTRY	CHEMICAL RESEARCH	DOD/USAF	$ 28,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 11,000	GP27411	$43,200	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
FL	71	U OF MIAMI	HIRSCHBERG	ATMOS. SCIENCES	AURORAL AND AIR-GLOW EMISSION LINE STUDY USING A 50-CHANNEL FABRY PEROT	DOD/USAF	$ 47,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA28370	$19,900	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
HI	71	U OF HAWAII	S LIN E J WELDIN	ENGINEERING	PROBLEMS IN ERROR CORRECTING CODES	DOD/USAF NASA	$ 20,000 0 30,000

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 15,000	GK25128	$50,200	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IA	71	IOWA ST U OF SCIENCE&TECH	O KEMPTHORNE G LYSKIND	MATHEMATICS	LINEAR MODELS AND ANALYSIS OF VARIANCE RESEARCH PROCEDURES	DOD/USAF	$ 19,900 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP24614	$39,100	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
6IL	71	U OF ILL SYS OFF	D PINES	PHYSICS	ASTROPHYSICAL APPLICATIONS OF MICROSCOPIC MANY-BODY THEORY	DOD/USAF	$ 45,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP25855	$89,700	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IL	71	NORTHWESTRN U	L M BROWN	PHYSICS	THEORY OF FUNDAMENTAL PARTICLES	DOD/USAF	$ 145,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP025203	$70,000	12	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IL	70	NORTHWESTRN U	SCHLAG	CHEMISTRY	VIBRATIONALLY EXCITED MOLECULES	DOD/USAF	$ 43,831 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP29579X	$35,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IL	70	U OF CHICAGO	N R LEBOVITZ	MATHEMATICS	STRUCTURAL STABILITY OF ROTATING FLUID SYSTEMS	DOD/USAF	$ 17,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP22584	$16,300	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IL	71	U OF CHICAGO	J A SIMPSON	ATMOS. SCIENCES	SOLA, INTERPLANETARY AND MAGNETOSPHERIC STUDIES WITH ENERGETIC PARTICLES	DOD/USAF	$ 166,500 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP1A0092	$165,800	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IN	70	U OF NOTRE DAME	ELIEL	CHEMISTRY	CHEMICAL RESEARCH	DOD/USAF	$ 24,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 24,000	GP24910	$50,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IN	70	INDIANA UNIV SYSTEMS OFF	BONHAM	MATHEMATICS	CHEMICAL RESEARCH	DOD/USAF	$ 73,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 30,000	GP08715	$63,200	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IN	71	INDIANA UNIV SYSTEMS OFF	H SHULL	CHEMISTRY	QUANTUM CHEMISTRY PROGRAM EXCHANGE	DOD/USAF	$ 25,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GJ27321	$81,800	36	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MA	71	BOSTON COL	D LINEHAN	EARTH SCIENCES	STUDY OF ELECTRICAL CONDUCTIVITY IN THE MANTLE	DOD/USAF	$ 12,400 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA27728	$4,500	05	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MA	71	BRANDEIS UNIV	R S PALAIS	MATHEMATICS	GLOBAL NONLINEAR ANALYSIS	DOD/USAF	$ 20,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP28376	$25,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MA	70	MASS INST TECH	I SEGAL	MATHEMATICS	GLOBAL ANALYSIS	DOD/USAF	$ 59,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 84,900	GP22822	$44,700	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MA	70	WOODS HOLE OCEAN INST	VON HERZEN	OCEANOGRAPHY	OCEAN-BOTTOM GEOTHERMAL MEASUREMENTS AS THEY RELATE TO DEEP-OCEAN CIRCULATION, SEDIMENTARY PROCESSES, AND THE TECTONIC/VOLCANIC ACTIVITY ON THE SEA FLOOR	DOD/USAF	$ 85,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA28504	$24,700	06	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
*MA	71	NORTHEAST RADIO OBS CORP	SEBRING	ASTRONOMY	HAYSTACK OBSERVATORY FACILITY	DOD/USAF	$1,300,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 198,500	GP25865	$580,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MD	71	JOHNS HOPKINS UNIV	P HARTMAN	MATHEMATICS	COMPLEX ANALYSIS	DOD/USAF	$ 18,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP11919	$33,000	12	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MD	71	U OF MD	G YODH	PHYSICS	STRONG INTERACTIONS FROM 100 GEV TO 5,000 GEV	DOD/USAF	$ 193,175 0
	PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY				
	$ 0	GP25305	$123,100 12 71				
MN	71	U OF MINN	J OVEREND	CHEMISTRY	INFRARED SPECTROSCOPY OF POLY-ATOMIC MOLECULAR AND STRUCTURE OF VIBRATIONAL STATES	DOD/USAF	$ 76,500 10,000
	PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY				
	$ 0	GP24259	$52,300 24 71				
MN	71	U OF MINN	I M KOLTHOFF	CHEMISTRY	ACID-BASE EQUILIBRIA IN APROTIC SOLVENTS	DOD/USAF	$ 22,000 0
	PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY				
	$ 0	GP20605	$35,710 24 71				
NJ	71	PRINCETON UNIV	L SPITZNER	ASTRONOMY	THEORETICAL ASTROPHYSICS	DOD/USAF	$ 75,000 0
	PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY				
	$ 50,000	GP23580	$100,000 12 71				
NJ	71	PRINCETON UNIV	E STEIN	MATHEMATICS	ANALYSIS AND RELATED TOPICS	DOD/USAF	$ 55,000 0
	PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY				
	$ 0	GP22926	$60,700 12 71				
NJ	71	PRINCETON UNIV	MISLOW	CHEMISTRY	STRUCTURE AND MECHANISM IN ORGANOMETALLOID CHEMISTRY	DOD/USAF	$ 93,000 0
	PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY				
	$ 0	GP22542	$90,900 12 71				

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NJ	71	PRINCETON UNIV	BOGDONOFF	ENGINEERING	LOW DENSITY GAS FLOWS	DOD/USAF	$ 45,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP1K1405	$14,900	04	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NJ	71	PRINCETON UNIV	S BOGDANOFF	ENGINEERING		DOD/USAF	$ 15,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GK4392	$14,900		71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	CORNELL U	E E SALPETER	ASTRONOMY	THEORETICAL STUDIES IN CENTER FOR RADIO-ASTROPHYSICS	DOD/USAF	$ 93,000 0
					PHYSICS AND SPACE RESEARCH	DOD/NAVY	50,000

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 60,000	GP26068	$100,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	CORNELL U	K GREISEN	ASTRONOMY	COSMIC GAMMA RAY TELESCOPE BALLOON FLIGHTS	DOD/USAF	$ 55,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP26387	$29,800	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	70	ST UNIV AT BUFFALO	PADWA	CHEMISTRY	CHEMICAL RESEARCH	DOD/USAF	$ 15,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 18,000	GP24449	$34,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	YESHIVA UNIV	M DAVIS	MATHEMATICS	DIOPHANTINE EQUATIONS AND MATHEMATICAL LOGIC	DOD/USAF	$ 14,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP24615	$14,300	12	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	YESHIVA UNIV	L EHRENPREIS	MATHEMATICS	FOURIER ANALYSIS AND LIE GROUPS	DOD/USAF	$ 27,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP28499	$46,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	INST OF ELECT EGNRS	D G FINK	ENGINEERING		DOD/USAF	$ 7,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GK28199	$6,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
OH	70	CASE WESTERN RESERVE UNIV	CARLSON	CHEMISTRY	CHEMICAL RESEARCH	DOD/USAF	$ 17,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 32,000	GP28429	$38,300	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
OH	71	OHIO ST UNIV	R B MCGHEE	ENGINEERING	LEGGED LOCOMOTION IN ANIMALS AND MACHINES	DOD/USAF	$ 10,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GK25292	$57,100	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
*PA	70	PA ST UNIV	HORROCKS	CHEMISTRY	CHEMICAL RESEARCH	DOD/USAF	$ 25,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 49,300	GP26149	$44,600	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
PA	70	UNIV OF PITTSBURGH	A I JANIS E T NEWMAN	PHYSICS	RADIATION & SINGULARITIES IN GRAVITATIONAL THEORY	DOD/USAF	$ 30,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP22789	$29,900	12	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
PA	71	UNIV OF PITTSBURGH	I J LOWE	PHYSICS	TRANSIENT NUCLEAR MAGNETIC RESONANCE STUDY OF SOLIDS	DOD/USAF	$ 83,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP28028	$60,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
TX	71	UNIV OF TEXAS AT DALLAS	ROBINSON	PHYSICS		DOD/USAF	$ 28,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP1P1622	$34,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
TX	71	RICE UNIV	A MIELE M Y HUANG	MATHEMATICS	COMPUTER ALGORITHMS FOR OPTIMIZATION THEORY	DOD/USAF	$ 21,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP27271	$23,500	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
TX	71	RICE UNIV	R C HAYMES	ASTRONOMY	LOW ENERGY GAMMA RADIATION FROM CELESTIAL SOURCES	DOD/USAF	$ 120,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 18,800	GP25226	$64,600	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
TX	70	TEXAS A & M U SYS OFF	TSUTSUI	CHEMISTRY	CHEMICAL RESEARCH	DOD/USAF	$ 14,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 35,400	GP12067	$24,800	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
TX	70	TEXAS TECH UNIVERSITY	H SHINE	CHEMISTRY	NEW REACTIVE INTERMEDIATES (CATION-ION RADICAL CHEMISTRY)	DOD/USAF	$ 37,800 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP25989X	$50,000	24	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
UT	71	U OF UTAH	FUTRELL	CHEMISTRY	CHEMICAL IONIZATION MASS SPECTROSCOPY	DOD/USAF	$ 60,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP024257	$108,300	36	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
WA	71	U OF WASH	FORNEY	ENGINEERING	APPLICATION OF PICOSECOND HOLOGRAPHY TO PHOTOELASTICITY	DOD/USAF	$ 51,400 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GK22676	$51,400	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
WI	70	U OF WISC SYS OFF	GOERING	CHEMISTRY	CHEMICAL RESEARCH	DOD/USAF	$ 25,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 29,100	GP21116X	$29,000	12	71

		NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71 USAF	61	704,700	3,885,610

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
AK	71	U OF ALAS	H F BATES	ATMOS. SCIENCES	INCOHERENT SCATTER STUDIES IN THE AURORAL ZONE	DOD/DASA	$ 312,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA276404	$161,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
RI	71	BROWN UNIV	J DUFFY	ENGINEERING		DOD/DASA	$ 35,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GK26002X	$33,800		71

		NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71	2	0	194,800

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RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	U OF CAL-SAN DIEGO	Y C FUNG	ENGINEERING		DOD/ARPA	$ 70,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GK27647	$70,000		71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	U OF CAL-SAN DIEGO	J C CHEN	PHYSICS	THEORETICAL RESEARCH ON SEVERAL PARTICLE DYNAMICS	DOD/ARPA	$ 25,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP20459	$28,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	N Y UNIV	N B LIPPMAN	ATMOS. SCIENCES	CALCULATION OF RESONANT REACTION IN THE UPPER ATMOSPHERE	DOD/ARPA	$ 21,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA28728	$21,100	15	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
RI	71	BROWN UNIV	R TANNER	ENGINEERING		DOD/ARPA	$ 40,800 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GK24746	$40,800		71

		NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71 ARPA	4	0	159,900

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IL	71	UNIV OF ILLINOIS-URBANA	C TAYLOR	ENGINEERING		DOD	$ 78,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GK25076	$77,700		71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
OR	71	OREGON ST UNIV	H D BRUNK D A PIERCE	MATHEMATICS	BAYESIAN ESTIMATION OF MULTI-VARIATE DENSITIES FOR USE IN CLASSIFICATION WITH APPLICATION TO DIAGNOSIS OF DISEASE	DOD	$ 21,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP24612	$21,400	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
WA	71	U OF WASH	M P FOURNEY	ENGINEERING		DOD	$ 52,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 51,800	GK22676	$		71

		NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71 DOD-WIDE FUNDS	3	51,800	99,100

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
*CA	71	STANFORD UNIV	STURROCK	ASTRONOMY	ASTROPHYSICS	DOD/JT.S	$ 90,000 0
						NASA	105,000 75,000

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP2340	$40,000	12	71

* USAF $50,000 & USN $40,000

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MO	71	U OF MO ROLLA	G K PATTERSON J L ZAKIN	ENGINEERING	SYMPOSIUM ON TURBULENCE IN IQUIDS	L DOD/JT.S	$ 7,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GK27529	$4,000	12	71

		NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71 DOD-JOINT SERVICES	2	0	44,000

YEAR	STATUS	NUMBER	NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71	G	126	2,353,800	8,367,220

DOD

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
KS	71	KANS ST UNIV	D W SETSER	CHEMISTRY	ENERGY REDISTRIBUTION IN ELEMENTARY UNIMOLECULAR BIOMOLECULAR REACTIONS	HEWUSPHS	$ 55,000 / 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP27536X	$55,100		71

	NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71 HEW-USPHS 1	0	55,100

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	STANFORD UNIV	MOSHER	CHEMISTRY	CHEMISTRY RESEARCH	HEW/NIH	$ 32,700 / 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 36,600	GP27448	$38,500	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	70	U OF CAL SYS OFF	GREEN	BIOLOGICAL SCS.	FUNCTIONAL BETWEEN VIRAL NUCLEIC ACIDS AND PROTEINS	HEW/NIH	$ 35,000 / 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB23427	$33,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	70	U OF CAL-BERKELEY	D I ARNON	BIOLOGICAL SCS.	BIO. ENERGETIC AND SYNTHETIC MECHANICS IN PHOTOSYNTHESIS	HEW/NIH	$ 54,158 / 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 24,400	GB23796	$91,000	18	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	U OF CAL-BERKELEY	R B PARK	BIOLOGICAL SCS.	CHLOROPLAST MEMBRANE DIFFERENTIATION	HEW/NIH	$ 25,520 / 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB25579	$30,000	12	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	70	U OF CAL-DAVIS	MUSKER	CHEMISTRY	CHEMICAL RESEARCH	HEW/NIH	$ 27,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 18,000	GP20523	$33,600	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	U OF CAL-LOS ANGELES	M W KONRAD	BIOLOGICAL SCS.	CONTROL OF RNA SYNTHESIS BY THE BACTERIAL VIRUS LAMBDA	HEW/NIH	$ 19,800 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB28127	$50,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CO	71	U OF COLO	W F BATTIG	BIOLOGICAL SCS.	DIFFERENCES BETWEEN AND WITHIN INDIVIDUALS IN VERBAL LEARNING PROCESSES	HEW/NIH	$ 26,500 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB25433	$50,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CO	71	U OF COLO	M L MORSE	BIOLOGICAL SCS.	GENETIC STUDY OF METABOLIC REGULATION	HEW/NIH	$ 17,700 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB24844	$51,100	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CO	70	U OF COLO	CRISTOL	CHEMISTRY	CHEMICAL RESEARCH	HEW/NIH	$ 35,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 29,400	GP8923X	$41,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CT	70	U OF CONN	F D VASINGTON	BIOLOGICAL SCS.	ENZYMES SPECIFIED IN HISTIDINE B GENE	HEW/NIH	$ 40,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB15137	$45,000	24	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CT	71	YALE UNIV	G L SCHMIR	CHEMISTRY	MECHANISM OF ACYL AND PHOSPHORYL TRANSFER REACTIONS	HEW/NIH	$ 17,900 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP27619	$40,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
DC	71	CATHOLIC UNIV OF AMERICA	TIMMINS	CHEMISTRY	CHEMICAL RESEARCH	HEW/NIH	$ 17,800 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 13,500	GP24534	$31,600	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
FL	71	U OF FLA	E GABBAY	BIOLOGICAL SCS.	STRUCTURE OF NUCLEIC ACIDS	HEW/NIH	$ 20,009 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB016044	$40,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
FL	71	U OF MIAMI	J E GEISLER	ATMOS. SCIENCES	NUMERICAL MODEL OF THE SEA-BREEZE CIRCULATION	HEW/NIH	$ 33,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA26452	$32,600	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
FL	71	U OF MIAMI	J M PROSPERO	ATMOS. SCIENCES	CONTINENTAL AEROSOLS IN THE MARINE ATMOSPHERE	HEW/NIH	$ 60,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA25916	$126,400	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
GA	71	U OF GA	W J PAYNE	OCEANOGRAPHY	NITRATE RESPIRATION IN MARINE BACTERIA	HEW/NIH	$ 8,258 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 30,000	GB23347	$34,400	24	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IA	70	IOWA ST U OF SCIENCE&TECH	CHAPMAN	CHEMISTRY	CHEMICAL RESEARCH	HEW/NIH	$ 36,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP28152X	$47,400	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IL	71	U OF ILL SYS OFF	REICHMANN	BIOLOGICAL SCS.	VIRUS MANIPULATION IN PLANTS	HEW/NIH	$ 91,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB29477X	$25,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IL	71	U OF ILL SYS OFF	COATES	CHEMISTRY		HEW/NIH	$ 20,800 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP28172	$35,500	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IL	71	U OF ILL SYS OFF	D C NANNEY	BIOLOGICAL SCS.	CILIATE GENETICS	HEW/NIH	$ 38,300 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB23910	$60,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IL	71	U OF ILL SYS OFF	L L CAMPBELL	BIOLOGICAL SCS.	MOLECULAR BASIS OF THERMO-PHILY	HEW/NIH	$ 26,700 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB023923	$225,800	60	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IL	70	U OF ILL SYS OFF	HANLON	BIOLOGICAL SCS.	INTERACTION OF NUCLEIC ACIDS	HEW/NIH	$ 16,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB24550	$37,000	24	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IL	71	LOYOLA UNIV	L MARCUS	BIOLOGICAL SCS.	PROTEIN BIOSYNTHESIS IN A CELL-TREE YEAST SYSTEM	HEW/NIH	$ 36,431 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY					
$ 0	GB17811	$20,000 24 71					
IN	71	PURDUE UNIV	H C BROWN	CHEMISTRY	NEW CHEMISTRY OF ORGANOBORONS	HEW/NIH	$ 31,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY					
$ 0	GP27742X	$30,800 12 71					
MA	70	BOSTON UNIV	R A LAURSEN	BIOLOGICAL SCS.	STRUCTURE AND MECHANISM OF ACTION OF ENZYMES	HEW/NIH	$ 20,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY					
$ 0	GB27607	$25,000 12 71					
MA	71	MARINE BIOLOGICAL LAB	L G BARTH L C BARTH	BIOLOGICAL SCS.	CELLULAR DIFFERENTIATION	HEW/NIH	$ 36,831 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY					
$ 0	GB23026	$50,000 24 71					
MA	71	WOODS HOLE OCEAN INST	D BUMPUS	OCEANOGRAPHY	CIRCULATION IN THE CONTINENTAL SHELF OF THE EAST COAST OF THE U.S.	HEW/NIH	$ 39,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY					
$ 0	GA27328	$39,000 12 71					
MA	70	BIO-RESEARCH INST INC	LEHRER	BIOLOGICAL SCS.	FLORESCENCE PERTURBATION AND LORESCENCE POLARIZATION STUDIES OF PROTEIN CONFORMATION	F HEW/NIH	$ 34,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY					
$ 0	GB24316	$30,000 24 71					

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MD	70	JOHNS HOPKINS UNIV	C R HACKENBROCK	BIOLOGICAL SCS.	ULTRASTRUCTURE CHANGES IN MITACHONDRIA	HEW/NIH	$ 44,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB018085	$40,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MI	71	U OF MICH	R ZAND	BIOLOGICAL SCS.	BIOPHYSICAL STUDIES OF CYCLIC AND BICYCLIC AMINO ACIDS	HEW/NIH	$ 30,800 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB21435	$18,700	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MI	71	U OF MICH	J RANCK	BIOLOGICAL SCS.	SINGLE NEURONS IN HIPPO-CAMPUS	HEW/NIH	$ 18,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB261844	$38,002	40	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MO	71	WASH UNIV	D LIPKIN	BIOLOGICAL SCS.	CHEMISTRY OF NUCLEIC ACIDS AND RELATED SUBSTANCES	HEW/NIH	$ 38,700 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 8,000	GB23358	$40,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MO	70	WASH UNIV	D SCHLESSINGER	BIOLOGICAL SCS.	COMPARISON OF E COLI RIBO-SONES	HEW/NIH	$ 41,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB23052	$80,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MT	71	MONT ST UNIV	CAUGHLAN	CHEMISTRY	STRUCTURE OF ORGANIC COMPOUNDS OF TRANSITION METALS	HEW/NIH	$ 51,200 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 31,200	GP025261	$75,400	24	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NC	70	DUKE UNIV	LYNN	BIOLOGICAL SCS.	MECHANISMS OF ENERGY CONSERVATION IN CHLOROPLAST	HEW/NIH	$ 24,600 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB17440	$28,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NC	70	DUKE UNIV	W CULBERTSON C CULBERTSON	BIOLOGICAL SCS.	CHEMISTRY OF THE PHARMELIACEAE	HEW/NIH	$ 17,700 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB025346	$29,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NC	71	DUKE UNIV	M J MOSES	BIOLOGICAL SCS.	CHROMOSONE DIFFERENTIATION DURING SPERMATOGENESIS	HEW/NIH	$ 41,902 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB27582	$38,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NH	70	UNIV OF N H DURHAM	ANDERSEN	CHEMISTRY	CHEMICAL RESEARCH	HEW/NIH	$ 13,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 13,000	GP23637	$36,510	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	BROOKLYN COL	R GUTTMAN	BIOLOGICAL SCS.	THE EXCITATION PROCESS IN NERVE	HEW/NIH	$ 5,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB28527	$7,200	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	COLUMBIA U	W LOEWENSTEIN	BIOLOGICAL SCS.	ANALYSIS OF RECEPTOR MECHANISMS	HEW/NIH	$ 26,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB27482X	$40,000	24	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	COLUMBIA U	S TANNEBAUM	BIOLOGICAL SCS.	STRUCTURE-FUNCTION, BIO-CHEMISTRY OF SELECTED ANTIGENS AND ANTIBODIES	HEW/NIH	$ 29,200 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB27500	$10,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	CORNELL U	U NEISSER G WILCOX	BIOLOGICAL SCS.	AUDITORY PERCEPTION OF TEMPORAL ORDER	HEW/NIH	$ 13,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB28712	$54,900	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	CORNELL U	FREED	CHEMISTRY	MOLECULAR RELAXATION IN THE LIQUID PHASE BY ESR SPECTROSCOPY	HEW/NIH	$ 21,500 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP013780	$40,400	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	70	CORNELL U	J MEINWALD	CHEMISTRY	PHOTOCHEMISTRY AND HIGHLY STRAINED BRIDGED SYSTEMS	HEW/NIH	$ 39,300 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 36,100	GP28147	$47,200	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	70	CORNELL U	D USHER	BIOLOGICAL SCS.	ENZYME MODELS AND THE MECHANISM OF RIBO-NUCLEASE ACTION	HEW/NIH	$ 19,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB25933	$25,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
*NY	70	CORNELL U-MEDICAL COL	D BENNETT	BIOLOGICAL SCS.	MAINTENANCE OF MOUSE COLONY CARRYING MUTANT T-ALLELES	HEW/NIH	$ 18,500 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB27259	$25,600	24	71
	GB27364	29,000	24	71

*TWO GRANTS FOR SAME PROJECT

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	N Y UNIV	R SHAPIRO	CHEMISTRY	CHEMICAL MODIFICATIONS OF NUCLEIC ACIDS	HEW/NIH	$ 32,700 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP27366	$46,400	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	N Y UNIV-SCH OF MEDICINE	E R JOHN	BIOLOGICAL SCS.	ANALYSIS OF CR MECHANISMS BY BRAIN STIMULATION	HEW/NIH	$ 200,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB27559X	$70,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	ST UNIV AT STONY BROOK	R SOKAL	BIOLOGICAL SCS.	MULTIVARIATE GEOGRAPHIC VARIATION	HEW/NIH	$ 21,400 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB20501	$45,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	ST UNIV AT STONY BROOK	F J ROHLF	BIOLOGICAL SCS.	ANALYSIS AND REPRESENTATION OF STRUCTURES IN TAXONOMIC DATA	HEW/NIH	$ 79,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB20496	$35,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	SYRACUSE UNIV	D S DITTMER	CHEMISTRY	SMALL-RING SULFUR COMPOUND	HEW/NIH	$ 28,100 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 22,000	GP20729	$80,800	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	70	MT SINAI SCH OF MEDICINE	D BEATTIE	BIOLOGICAL SCS.	MITROCHONDRIAL BIOGNOSIS IN YEAST	HEW/NIH	$ 24,776 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB23357	$36,000	24	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	70	HEALTH RESEARCH INC	F MOLEY	BIOLOGICAL SCS.	REGULATORY REACTIONS INVOLVED IN THYMEOYLATE BIOSYNTHESIS	HEW/NIH	$ 20,700 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB27598	$10,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	PUBLIC HEALTH RES INST	F ADLER M FISHMAN	BIOLOGICAL SCS.	PHAGOCYTOSIS AND ANTIBODY FORMATION IN VITRO	HEW/NIH	$ 70,195 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB29017X	$60,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
OH	71	CASE WESTERN RESERVE UNIV	KUWANA	CHEMISTRY	OPTICALLY TRANSPARENT ELECTRODES	HEW/NIH	$ 17,700 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP024536	$78,100	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
OH	70	OHIO ST UNIV	NEWMAN	CHEMISTRY	CHEMICAL RESEARCH	HEW/NIH	$ 32,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 35,400	GP12445X	$34,600	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
OH	70	OHIO ST UNIV	PAQUETTE	CHEMISTRY	CHEMICAL RESEARCH	HEW/NIH	$ 29,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 66,300	GP18165	$74,300	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
OR	70	OREGON ST UNIV	W D LOOMIS	BIOLOGICAL SCS.	BIOSYNTHESIS AND METABOLISM OF TERPENES	HEW/NIH	$ 24,300 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB25593	$46,000	24	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
PA	71	CARNEGIE MELLON UNIV	L E ALEXANDER	CHEMISTRY	STRUCTURAL STUDIES OF CHLOROPHYLL-RELATED COMPOUNDS	HEW/NIH	$ 25,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP24919	$34,900	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
PA	71	CARNEGIE MELLON UNIV	J A POPLE	CHEMISTRY	MOLECULAR ORBITAL THEORY OF ORGANIC CHEMISTRY	HEW/NIH	$ 40,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 75,200	GP25617	$120,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
PA	71	UNIV OF PA	J NACHMIAS	BIOLOGICAL SCS.	MECHANISMS OF SPECIAL INTERACTION IN HUMAN VISION	HEW/NIH	$ 6,500 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB24100X	$44,900	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
RI	71	BROWN UNIV	A M SCHRIER	BIOLOGICAL SCS.	DISCRIMINATE LEARNING IN PRIMATES	HEW/NIH	$ 20,765 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB18953X	$10,800	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
TX	71	BAYLOR UNIV	M DOLE	CHEMISTRY	THE MOBILITIES AND CHARGE STATES OF GASEOUS MACROIONS	HEW/NIH	$ 21,300 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP27672	$73,700	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
TX	71	U OF TEXAS S O	G B BARRIE	K BIOLOGICAL SCS.	STRUCTURE AND PROPERTIES OF SEA CUCUMBER HEMOGLOBINS	HEW/NIH	$ 46,100 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB27312	$40,000	24	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
TX	70	U OF TEXAS S O	A RIGGS	BIOLOGICAL SCS.	BIOCHEMISTRY OF HEMOGLOBIN	HEW/NIH	$ 23,800 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB27937X	$30,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
VA	71	U OF VA	BRILL	BIOLOGICAL SCS.	ENERGY LEVELS OF BIOLOGICALLY-ACTIVE MAGNETIC CENTERS	HEW/NIH	$ 30,800 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB24587	$30,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
VA	71	U OF VA	J HAHN	BIOLOGICAL SCS.	PERIPHERAL NEURAL CODING OF CUTANEOUS STIMULI COMPLEXES	HEW/NIH	$ 21,800 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB27594	$34,500	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
WI	71	U OF WISC SYS OFF	ZIMMERMAN	CHEMISTRY		HEW/NIH	$ 53,400 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 30,500	GP6757	$31,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
WI	71	U OF WISC SYS OFF	R M WARREN	BIOLOGICAL SCS.	PERCEPTION OF TEMPORAL ORDER	HEW/NIH DOD/ARMY	$ 61,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB26459	$20,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
WI	71	U OF WISC SYS OFF	DAHL	CHEMISTRY	STRUCTURAL SYSTEMATICS IN ORGANOMETALLIC COMPLEXES	HEW/NIH	$ 62,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 61,100	GP19175	$61,100	12	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
WI	71	U OF WISC SYS OFF	P NEY	MATHEMATICS	BRANCHING PROCESSES AND POPULATION GROWTH AND MOVEMENT	HEW/NIH	$ 16,700 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP27286	$28,700	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
WI	71	U OF WISC SYS OFF	J P HAILMAN	BIOLOGICAL SCS.	BEHAVIORAL AND PHYSIOLOGICAL ASPECTS OF ANURAN PHOTOXIS AND COLOR VISION	HEW/NIH	$ 20,700 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB28824	$50,000	24	71

		NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71 HEW-NIH	72	530,700	3,322,412

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
*GA	71	EMORY UNIV	R DAVENPORT C N ROGERS	BIOLOGICAL SCS.	CROSS-MODALP PERCEPTUAL INTEGRATION IN PRIMATES	HEWNICHD	$ 36,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB28639	$40,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
GA	71	EMORY UNIV	M D ZEILER	BIOLOGICAL SCS.	AN ANALYSIS OF SEQUENTIAL BEHAVIOR	HEWNICHD	$ 28,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB25959	$40,000	24	71

		NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71 HEW-NICHD	2	0	80,000

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	U OF CAL-LOS ANGELES	W R ADEY	BIOLOGICAL SCS.	CEREBRAL INTERCELLULAR AND CELL SURFACE MACROMOLECULES	HEW/NIMH	$ 40,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB27740X	$30,500	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	U OF CAL-LOS ANGELES	J P HOUSTON	BIOLOGICAL SCS.	THE GENERALITY OF INTERFERENCE THEORY	HEW/NIMH	$ 18,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP1B0861	$73,800	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MI	71	U OF MICH	J D ABERBACK J L WALKER	SOCIAL SCIENCES	LONGITUDINAL DETROIT COMMUNITY STUDY	HEW/NIMH	$ 23,500 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GS03313	$87,700	20	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NC	71	DUKE UNIV	J BROHM	SOCIAL SCIENCES	PSYCHOLOGICAL CONSEQUENCES OF LOSS OF FREEDOM	HEW/NIMH	$ 61,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GS3205	$60,700	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	ST UNIV OF N Y SYSTEM OFF	J L FULLER	BIOLOGICAL SCS.	RECIPROCAL RELATIONS BETWEEN BEHAVIORAL AND NEUROLOGICAL SELECTION IN MICE	HEW/NIMH	$ 144,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB24827	$17,300	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
OK	71	UNIV OF OKLA	R F WEISS	SOCIAL SCIENCES	THE REINFORCING ASPECTS OF ALTRUISM	HEW/NIMH	$ 78,100 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP1S0118	$78,100	24	71

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RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
				NSF PREVIOUS SUPPORT	GRANT AMOUNTS		
	71 HEW-NIMH	6		0	348,100		
CA	71	U OF CAL-SANTA BARBARA	A MALECOT	BIOLOGICAL SCS.	MEASUREMENT OF SEL. ARTICULA. EVENTS OF SPEECH & ACOUSTIC CORRELATIONS	HEW/OE	$ 100,000 0
	PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY				
	$ 0	GB28639	$90,000 24 71				
NY	71	CORNELL U	H GINSBERG	SOCIAL SCIENCES	COMPUTER RESEARCH IN EDUCATION	HEW/OE	$ 18,300 0
	PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY				
	$ 0	GS3261	$19,600 12 71				
WI	71	U OF WISC SYS OFF	S BECK	BIOLOGICAL SCS.	INSECT-PLANT INTERACTIONS	HEW/OE	$ 15,000 0
	PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY				
	$ 0	GB25038	$15,000 12 71				
				NSF PREVIOUS SUPPORT	GRANT AMOUNTS		
	71 HEW-OE	3		0	124,600		
	YEAR	STATUS NUMBER		NSF PREVIOUS SUPPORT	GRANT AMOUNTS		
	71	G 84		530,700	3,930,212		
	HEW						

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
AZ	71	U OF ARIZ	L S FORESTER	CHEMISTRY	RELAXATION OF EXCITED STATES (THE LUMINESCENCE OF METAL COMPLEXES)	AEC	$ 26,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP20120	$39,200	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	STANFORD UNIV	F W CRAWFORD	ATMOS. SCIENCES	VERY LONG DELAYED RADIO ECHOES	AEC	$ 120,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA28819	$68,800	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	U OF SOUTHERN CAL	A W ADAMSON	CHEMISTRY	PHOTOCHEMISTRY OF COORDINATION COMPOUNDS	AEC	$ 20,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 12,700	GP27984X	$25,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CO	70	U OF COLO	KING	CHEMISTRY	CHEMICAL RESEARCH	AEC	$ 9,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 26,800	GP7185X	$44,500	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
FL	70	FLA ST UNIV	LINDER	CHEMISTRY	CHEMICAL RESEARCH	AEC	$ 15,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP22531	$47,200	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IL	70	U OF ILL SYS OFF	DRAGO	CHEMISTRY	CHEMICAL RESEARCH	AEC	$ 10,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 34,800	GP25554	$36,200	12	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
IL	71	NORTHWESTRN U	F BASOLO	CHEMISTRY	METAL NITRENE CHEMISTRY AND METAL COMPLEXES OF MOLECULAR NITROGEN	AEC	$ 66,500 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 40,500	GP27626X	$66,500	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MA	71	MASS INST TECH	F A COTTON	CHEMISTRY	METAL-TO-METAL BONDING (THERMO-DYNAMIC SPECTRAL AND STRUCTURAL STUDIES OF COMPLEX IONS)	AEC	$ 42,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP24264	$59,900	19	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MI	71	U OF MICH	T M SANDERS JR	PHYSICS	LOW TEMP. PHYSICS-MOSTLY LIQUID HELIUM	AEC	$ 90,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP28327	$53,000	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
OH	71	OHIO ST UNIV	K N RAO NIELSEN	PHYSICS	PROBLEMS IN MOLECULAR STRUCTURE EMPLOYING INFRARED TECHNIQUES & THEORY	AEC	$ 30,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 27,000	GP28298	$57,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
PA	71	PA ST UNIV	BARSCH ET AL	ENGINEERING	HIGH PRESSURE MATERIALS	AEC	$ 40,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GK1819	$317,500	24	71

*INVOLVES A LARGER NUMBER OF FACULTY

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
TX	70	TEXAS A & M U SYS OFF	E A MIERS	CHEMISTRY	CHEMISTRY OF THE METALLOIDS OF GROUP VA AND VIA	AEC	$ 12,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP27588	$58,900	24	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
WI	71	U OF WISC-MADISON-MED SCH A	MEHLER	BIOLOGICAL SCS.	THE MECHANISM OF ACTION OF ENZYMES	AEC	$ 17,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB27440	$20,000	12	71

			NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71	AEC	13	141,800	893,700

YEAR	STATUS	NUMBER	NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71	G	13	141,800	893,700

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
AZ	71	U OF ARIZ	C Y FAN	PHYSICS	THE STRUCTURE OF INTERPLANETARY MAGNETIC FIELDS AND ITS HISTORY BACK TO 7000 B.C.	NASA	$ 50,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 0	GA022840	$96,100	24	71			
CA	71	STANFORD UNIV	A V DA ROSA	ATMOS. SCIENCES	POLAR STORM RELATED TRAVELING IONOSPHERIC DISTURBANCES	NASA	$ 77,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 0	GA28477	$40,500	12	71			
CA	71	STANFORD UNIV	J W HILL	BIOLOGICAL SCS.	TACTILE PERCEPTION OF DYNAMIC SPATIAL PATTERNS	NASA	$ 40,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY		HEW/NIH	67,000
$ 0	GB28032	$46,800	18	71			
CA	71	U OF SOUTHERN CAL	V WEINGARTEN	ENGINEERING		NASA	$ 17,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 0	GK25196X	$16,400		71			
CT	71	YALE UNIV	CLEMENU	ASTRONOMY	ASTROMETRY	NASA	$ 35,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 0	GP21201	$52,500	12	71			
DC	71	CATHOLIC UNIV OF AMERICA	Y C WHANG	ATMOS. SCIENCES	MAGNETOHYDRODYNAMIC STRUCTURE OF THE SOLAR WIND	NASA	$ 28,000 0
PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY			
$ 0	GA29057X	$25,800	24	71			

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MA	71	MASS INST TECH	MORRISON	ASTRONOMY	THEORETICAL ASTROPHYSICS AND COSMOLOGY	NASA	$ 36,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 15,000	GP25219	$19,500	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MA	70	MASS INST TECH	JAVAN	PHYSICS	INVESTIGATION OF ATOMICS & MOLECULAR PROCESSES WITH MODERN PRECISION SPECTROSCOPIC TECHNIQUES	NASA	$ 54,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GP015121	$100,000	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MA	71	WOODS HOLE OCEAN INST	R BACKUS	OCEANOGRAPHY	ORIGIN AND DISTRIBUTION OF ORGANIC MATTER IN THE DEEP SEA	NASA	$ 75,000 37,500

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GB24382	$37,500	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MI	70	MICH ST UNIV	C H BRUBAKER JR	CHEMISTRY	EFFECTS OF POLYFUNCTIONAL ANOINS ON ELECTRONIC-TRANSFER BETWEEN METAL IONS IN SOLUTION	NASA	$ 18,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 29,900	GP17422X	$31,900	12	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
MI	71	U OF MICH	F J BEUTLER	ENGINEERING	THEORY AND APPLICATIONS OF STATIONARY POINT PROCESSES	NASA	$ 40,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GK20385	$56,800	24	71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
NY	71	COLUMBIA U	E S YANG	ENGINEERING	SEMICONDUCTOR FIELD-EFFECT DEVICES	NASA	$ 75,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 19,000	GK18772	$46,600	24	71

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
PA	70	UNIV OF PA	M ALTMAN	ENGINEERING	RESEARCH IN THE CONVERSION OF VARIOUS FORMS OF ENERGY BY UNCONVENTIONAL TECHNIQUES	NASA	$ 83,000 0
	PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY				
	$ 0	GK026623	$79,800 71				
TX	71	RICE UNIV	F M MICHEL	ATMOS. SCIENCES	THEORETICAL STUDY OF THE INTERACTION OF THE SOLAR WIND WITH PLANETARY ATMOSPHERES.	NASA	$ 53,000 0
	PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY				
	$ 0	GP1A0003	$50,900 12 71				
TX	71	RICE UNIV	C S BURRUS T S PARKS	ENGINEERING	DIGITAL SIGNAL REPRESENTATION AND FILTERING	NASA	$ 10,000 0
	PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY				
	$ 9,300	GK23697	$86,300 24 71				
TX	71	SOUTHERN METHODIST UNIV	W G WYATT	ENGINEERING	FORCED FLOW IN WICK BOILING	NASA	$ 19,000 0
	PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY				
	$ 0	GK25745	$18,900 12 71				
WI	71	U OF WISC SYS OFF	V E SUOMI	ATMOS. SCIENCES	SERIES OF ATS-III IMAGE-ENHANCED, PRECISION DISPLAY PICTURES FOR THE BOMEX PERIOD	NASA	$ 13,000 0
	PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY				
	$ 0	GA24641	$44,300 12 71				
WI	71	U OF WISC SYS OFF	HIRSCHFELDER	CHEMISTRY	THEORETICAL CHEMISTRY	NASA	$ 400,000 0
	PREV SPT	NSF SUPPORT GRANT NO	AMOUNT DUR FY				
	$ 130,000	GP12832A	$196,800 12 71				

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
			NSF PREVIOUS SUPPORT	GRANT AMOUNTS		
71	NASA 18		203,200	1,047,400		

YEAR	STATUS	NUMBER	NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71	G	18	203,200	1,047,400

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
SD	71	S D SCH OF MINES AND TECH	H D ORVILLE	ATMOS. SCIENCES	NUMERICAL SIMULATION OF LOCAL-SCALE CIRCULATIONS	DOI	$ 30,000
							0
						DOD	89,000

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA24647	$170,300	24	71

		NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71 DOI-DEPT. FUNDS	1	0	170,300

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	U OF CAL-SAN DIEGO	W H THOMAS	OCEANOGRAPHY	DISTRIBUTION OF PHYTO-PLANKTON NUTRIENTS IN THE EASTERN TROPICAL PACIFIC	DOI/BCF	$ 16,800
							0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA27320	$20,400	12	71

		NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71 DOI/BCF	1	0	20,400

YEAR	STATUS	NUMBER	NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71	G	2	0	190,700

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RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
CA	71	U OF CAL-BERKELEY	G M CORCOS	OCEANOGRAPHY	DYNAMICS OF THE THERMO-CLINE INTERNAL WAVES AND TURBULENCE	DOC/ESSA	$ 19,425 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA16490	$22,400	12	71

		NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71	DOC/ESSA 1	0	22,400

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
TX	71	UNIV OF ST THOMAS	J L GOLDMAN	ENGINEERING		DOC/NOAA	$ 36,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GK27741	$36,000		71

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
UT	71	UTAH ST UNIV	D J BAKER A M DESPAIN	ATMOS. SCIENCES	AERONOMY STUDIES USING THE FIELD-WIDENED INTERFER-OMETER	DOC/NOAA	$ 73,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA23490	$48,300	24	71

*ALSO WITH V L PETERSON

ST	DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
UT	71	UTAH ST UNIV	L R MEGILL	ATMOS. SCIENCES	MESOPHERIC TRACE CONSTITU-ENTS WITH ROCKET PROBES	DOC/NOAA DOD/USAF	$ 82,000 0

PREV SPT	NSF SUPPORT GRANT NO	AMOUNT	DUR	FY
$ 0	GA25898	$51,200	12	71

		NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71	DOC/NOAA 3	0	135,500

YEAR	STATUS	NUMBER	NSF PREVIOUS SUPPORT	GRANT AMOUNTS
71	G	4	0	157,900

DOC

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES - NSF GRANTS/PROPOSALS

ST DROP FY	INSTITUTION	PRINCIPAL INVESTIGATORS	FIELD OF SCIENCE	PROJECT DESCRIPTION	AGENCIES	PREV/CURR SUPPORT
YEAR	TOTAL NUMBER		NSF PREVIOUS SUPPORT	GRANT AMOUNTS		
71	248		3,229,500	14,685,832 - 3,229,500 11,456,332		

APPENDIX B

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Alas.	Alaska, University of	Bates, H. F.	Atmos. Sci.	Incoherent Scatter Studies in the Auroral Zone	DOD/ DASA	$312,000	-0-
Alas.	Alaska, University of	Stanley	Atmos. Sci.	Investigation of the Ionosphere in the Vicinity of the Mid-Latitude Trough	DOD/ DASA	40,000	-0-
				State Subtotal		**$352,000**	**-0-**

GRANTEES NOTIFIED DURING FY 1971 THAT THEIR FUNDING WOULD BE TERMINATED OR SIGNIFICANTLY REDUCED AT END OF GRANT PERIOD (ENDING DATE WILL OCCUR IN FY 1971 OR FIRST PART OF FY 1972).

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support: Agency	Previous Annual Amount	Current Annual Amount
Ariz.	University of Ariz. Tucson, Arizona	Fan, C. Y.	Physics	The Structure of Interplanetary Magnetic Fields and Its History Back to 7000 B.C.	NASA	50,000	-0-
Ariz.	University of Ariz.	L.S. Forester	Chemistry	Relaxation of Excited States (The Luminescence of Metal Complexes)	AEC	$26,000	-0-
Ariz.	Arizona State Univ.	Sutton, D.	Bio. Sci.	Inert Gas Narcosis in Hyperbaric Environment Containing Low Levels of Oxygen	DOD/	65,000	-0-
Ariz.	Arizona State Univ.	Pettit	Chemistry	Chemistry Research	HEW/NIH	47,800	-0-
				State Subtotal		$235,800	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Cal.	California Inst. of Technology	Lowenstamm	Oceanography	Studies of non-carbonate minerals precipitated by marine organisms and their possible evolutionary and sedimentary significance	DOD/Navy	120,670	-0-
Cal.	California Inst. of Technology	Stanley, G.J.	Astronomy	Research & operating expenses for 130-Ft. Telescope at Owens Valley Radio Astronomy Observatory	DOD/Navy	$425,000	$295,000
Cal.	California Inst. of Technology	Liepmann, H.W.	Engineering	Heat Flow in Helium II	DOD/Jt. Services	30,000	
Cal.	California, Univ. of	Weaver	Astronomy	Radio Astronomical Studies	DOD/Navy	42,000	-0-
Cal.	California, Univ. of	Nobel, P.S.	Bio. Sci.	Chloroplast Membraines: Passive and Active Features	HEW/NIH	19,000	-0-
Cal.	California, Univ. of (Berkeley)	Desoer-Kuh	Engineering	System Theory Research	DOD/USAF	20,000	
Cal.	California, Univ. of (Berkeley)	Talbot & Berger	Engineering	Flow Through Heart Valves and Large Vessels	DOD/USAF and NASA	33,000 33,000	-0- -0-
Cal.	California, Univ. of (Berkeley)	Knight	Physics	Magnetic Resonance	DOD/Navy	21,000	-0-
Cal.	California, Univ. of (Berkeley)	Corcos, G.M.	Oceanography	Dynamics of the Thermocline; Internal waves and Turbulence	DOC/ESSA	19,425	-0-
Cal	California, Univ. of (Berkeley)	Alonso, W.	Social Science	City & Regional Planning	DOC/EDA	238,056	-0-
Cal.	California, Univ. of (Berkeley)	Park, R. B.	Bio. Sci.	Chloroplast Membrane Differentiation	HEW/NIH	25,520	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Cal.	Southern California, Univ. of	Muntz	Engineering	Measurements of Molecular Velocity Distribution Functions in Gas Flow	DOD/USAF & NASA	47,500 47,500	-0- -0-
Cal.	Southern California, Univ. of	Adamson, A.W.	Chemistry	Photochemistry of Coordination Compounds	AEC	20,000	-0-
Cal.	California, Univ. of (Scripps Institution of Oceanography)	Boden, B. P.	Oceanography	Vertical Migrations of Sonic-scattering Lays Fauna	DOD/NAVY	19,882	-0-
Cal.	California, Univ. of (Scripps Institution of Oceanography)	Blackburn, M.	Oceanography	Micronekton of the Eastern Tropical Pacific: Ecology of the Principal Crustacean	DOI	95,000	-0-
Cal.	Stanford University	Helliwell, R.R.	Atmos. Sci.	Magnetosphere-Ionosphere-Trosphere Interactions	DOD/USAF	65,000	-0-
Cal.	Stanford University	Bracewell	Astronomy	Radio Astronomy Research	DOD/USAF	291,000	-0-
Cal.	Stanford University	Kline & Reynolds	Engineering	Fundamental Studies on Turbulent Shear Flows	DOD/USAF	57,000	-0-
Cal.	Stanford University	Walecka	Physics	Studies in Theoretical Physics	DOD/USAF	250,000	-0-
Cal.	Stanford University	Schwartz	Physics	High Energy Physics	DOD/USAF	80,000	-0-
Cal.	California, Univ. of (Scripps Inst of Oceanography)	Tsuchiya	Oceanography	The North & South Equatorial Counter Currents in the Eastern Tropical Pacific	DOC/NOAA	60,000	-0-

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Cal.	California, Univ. of (Berkeley)	Arnon, D. I.	Biological Sci.	Bio. energetic and synthetic mechanics in photosynthesis	HEW/NIH	$54,158	-0-
Cal.	California, Univ. of (L.A.)	Mal - Knopoff	Engineering	Elastic Waves in Composites	DOD/USAF & AEC	36,000 36,000	-0- -0-
Cal.	California, Univ. of (L.A.)	Aller, L. H.	Astronomy	Abundance of Elements in Stars & Gaseous Nebulae	DOD/USAF NASA	25,000 50,000	-0- -0-
Cal.	California, Univ. of (L.A.)	Orbach	Physics		DOD/Navy	30,000	-0-
Cal.	California, Univ. of (L.A.)	Konrad, M.W.	Bio. Sci.	Control of RNA Synthesis by the Bacterial Virus Lambda	HEW/ NIH	19,800	-0-
Cal.	California, Univ. of (L.A.)	Adey, W. R.	Bio. Sci.	Cerebral Intercellular and Cell Surface Macromolecules	HEW/ NIMH	40,000	-0-
Cal.	California, Univ. of (L.A.)	Houston, J. P.	Bio. Sci.	The Generality of Interference Theory	HEW/ NIMH	18,000	-0-
Cal.	California, Univ. of (S.D.)	Fung	Engineering	Cardio-Pulmonary Dynamics	DOD/USAF	213,000	-0-
Cal.	California, Univ. of (S.D.)	Masek	Physics	Cosmic Ray Muon Zenith Angle Experiment	DOD/USAF	180,000	-0-
Cal.	California, Univ. of (S.D.)	Chow, T. J.	Oceanography	Lead Pollutants in Near Shore Marine Environments	DOD/NAVF	47,000	-0-
Cal.	California, Univ. of School of Medicine (S.F.)	Alberts, W.W. Feinstein, B. Libet, B.	Bio. Sci.	Cerebral Processes in Conscious Sensation in Man	HEW/NIH	56,000	-0-
Cal.	California, Inst. of Technology	Tschoegl, N.W.	Engineering	The Pressure Dependence of the Glass Transition Temperature & Mechanical Properties of Polymers	DOD/USAF	153,300	-0-

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RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Cal.	California, Univ. of (S.D.)	Chen, C.C.Y.	Physics	Theoretical Research on Several Particle Dynamics	DOD/ARPA	$25,000	-0-
Cal.	California, Univ. of (S.D.)	Penner, S.S.& Olfe, D. B.	Atmos. Sci.	Quantitative Spectroscopic Studies Relating to Global Monitoring of Airborne Pollutants	DOD/ARPA	36,000	-0-
Cal.	California, Univ. of (S.D.)	Gibson, C. H.	Atmos. Sci.	Open Ocean Air-Sea Interaction Studies from FLIP	DOD	100,000	-0-
Cal.	California, Univ. of (S.D.)	Thomas, W. H.	Oceanography	Distribution of phytoplankton nutrients in the eastern Tropical Pacific	DOI/BCF	16,800	-0-
Cal.	California, Univ. of (S.B.)	Gottsdanke, R.	Bio. Sci.	The Separation and Combination of Acts	HEW/NIMH	34,000	-0-
Cal.	California, Univ. of (S.B.)	Cotton, J.	Bio. Sci.	Hypotheses Processing and Dimensional Definition in Concept Identification Experiments	HEW/USPHS	3,160	-0-
Cal.	California, Univ. of (L.A.)	Brazier, M.	Bio. Sci.	Measures of Brain Function and Metabolism	DOD/Navy & HEW/NIH	75,000 75,000	-0-
Cal.	California, Univ. of (S.D.)	Clark	Chemistry	Chemical Research	HEW/NIH	27,000	-0-
Cal.	California, Univ. of (S.B.)	Davenport	Bio. Sci.	Studies in the Behavior of Plankters	DOD/NAVY	12,000	-0-
Cal.	California, Univ. of (S.B.)	Malecot, A.	Bio. Sci.	Measurement of Sel. Articula. Events of Speech &Acoustic Correlations	HEW/OE	100,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Cal.	Stanford Res. Inst.	Wise, H.	Atmos. Sci.	Transport Coefficients of Atmospheric Species in the Earth's Atmosphere	DOD/NAVY	$35,000	-0-
Cal.	Stanford Res. Inst.	Hill, J.W.	Bio. Sci.	Tactile Perception of Dynamic Spatial Patterns	NASA HEW/NIH	40,000 67,000	-0- -0-
Cal.	Langley-Porter Neuro-psychiatric Inst.	Ellman, G.L. Galin, D.	Bio. Sci.	Histochemical Studies of the Stimulated Central Nervous System	HEW/NIH	15,300	-0-
Cal.	San Francisco State Univ.	Ramsey	Chemistry	Chemical Research	HEW/NIH	13,300	-0-
Cal.	Southern Calif., University of	Schnepp	Chemistry	Chemical Research	HEW/NIH	44,100	-0-
Cal.	California Institute of Technology	Epstein, S.	Chemistry	Geochemical Studies with Stable and Radioactive Species	AEC	160,000	-0-
Cal.	California, Univ. of	Garner	Chemistry	Chemical Research	AEC	49,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Cal.	Stanford University	Ossermar, R.	Mathematics	Differential Geometry and Associated Partial Differential Equations	DOD/ARMY	$15,000	-0-
Cal.	Stanford University	Harrison	Physics	Quantum Theory of Metals	DOD/NAVY	$15,000	-0-
Cal.	Stanford University	Geballe Bachmann	Physics	Metal Borides & Related Compounds	DOD/NAVY	35,000	-0-
Cal.	Stanford University	Royden, H.L.	Mathematics	Research in Theory of Riemann Surfaces	DOD/ARMY	22,800	-0-
Cal.	Stanford University	Siegman, A.E.	Engineering	Ultra-Short Light Pulse Generation and Optical Parametric Oscillator Mode-Locking	DOD/ Jt. Svcs	147,000	-0-
Cal.	Stanford University	Kino, G. S.	Engineering	Studies of Acoustic Wave Phenomena	DOD & NASA	172,000	-0-
Cal.	Stanford University	Devoto, R.S.& Bershader, D.	Engineering	Experimental and Theoretical Studies of Heat and Electric Transport in Low Temperature Non-Equilibrium Gases	DOD & Jt. Svcs.	60,000	-0-
Cal.	Stanford University	da Rosa, A. V.	Atmos. Sci.	Polar Storm Related Traveling Ionospheric Disturbances	NASA	77,000	-0-
Cal.	Stanford University	Cann	Bio. Sci.	Genetic Studies in the Lake Atitlan Basion, Guatemala	HEW/NIH	78,000	-0-
Cal.	Stanford University	Crawford, F.W.	Atmos. Sci.	Very Long Delayed Radio Echoes	AEC	120,000	-0-
Cal.	Stanford University	Sturrock	Astronomy	Astrophysics	DOD/USAF	50,000	-0-
					DOD/NAVY	40,000	-0-
					NASA	105,000	75,000

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Cal.	California, Univ. of (S.D.)	Warschawski, S.	Mathematics	Conformal Mapping	DOD/USAF	37,000	-0-
Cal.	California, Univ. of (S.C.)	Widem, H.	Mathematics	Analysis	DOD/USAF	34,000	-0-
Cal.	California, Univ. of (Riverside)	Tucker, H.G.	Mathematics	Infinitely Divisible Distributions	DOD/USAF	16,000	-0-
Cal.	California, Univ. of (S.D.)	Urey, H.C. Marti, K.	Chemistry	The Distribution and Origin of the Elements and Their Isotopes in Nature	AEC	40,000	-0-
Cal.	Stanford University		Mathematics	Partial Differential Equations	DOD/USAF	20,000	-0-
Cal.	Stanford University	Phillips, R. Cohen, P.	Mathematics	Functional Analysis	DOD/USAF	44,000	22,000
Cal.	Stanford University	Taube	Chemistry	Chemistry Research	AEC	32,000	-0-
Cal.	Stanford University	Cubicciotti, D.	Chemistry	A Fundamental Study of Fused Salts and Metal-Salt Systems	AEC	65,000	-0-
Cal.	Stanford University	Mosher	Chemistry	Chemistry Research	HEW/NIH	32,700	-0-
Cal.	Stanford University	Nova, R.	Social Sci.	Political Science	DOD/NAVY	24,200	-0-
				State Subtotal		$5,227,171	$392,000

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Colo.	Colorado, Univ. of	Erdelyi, E.A.	Engineering	Reactances of Saturated Large Water-Cooled Turboalternators	DOD/ARMY	55,000	-0-
Colo.	Colorado, Univ. of	Morse, M. L.	Bio. Sci.	Genetic Study of Metabolic Regulation	HEW/NIH	17,700	-0-
Colo.	Colorado, Univ. of	Battig, W. F.	Bio. Sci.	Differences Between and Within Individuals in Verbal Learning Processes	HEW/NIH	26,500	-0-
Colo.	Colorado, Univ. of	Reite, M. L.	Bio. Sci.	Distorted Sensory Feedback and Rapid Eye Movement Sleep	HEW/NIMH	4,960	-0-
Colo.	Colorado, Univ. of	Pettijohn, D.E.	Bio. Sci.	Factors which Organize DNA Packing in the Cell	HEW/NIH	14,900	-0-
Colo.	Denver, Univ. of	Murcray, D.G.	Atmos. Sci.	Distribution of Nitric Acid in the Stratosphere	DOD/USAF	47,600	-0-
Colo.	Colorado, Univ. of	Hermes, H.	Mathematics	Control Techniques Applicable in Aerospace Energy Management	DOD/USAF	16,000	-0-
Colo.	Colorado, Univ. of	Mizuschima	Chemistry	Chemistry Research	HEW/NIH	30,100	-0-
				State Subtotal		$212,760	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual	Current Annual
Conn.	Yale University	Wolf	Physics	Studies of Ideal Magnetic Crystals	AEC	$112,000	-0-
Conn.	Yale University	Schmir, G.L.	Chemistry	Mechanism of Acyl and Phosphoryl Transfer Reactions	HEW/NIH	17,900	-0-
Conn.	Yale University	Biber, M. & Roth, R.	Bio. Sci.	Monoamine Neurohumors: Isolation of Functional Pools	HEW/NIMH	62,600	-0-
Conn.	Haskins Labs	Provasoli, L.	Oceanography	Nutritional relationships among organisms	DOD/ NAVY	24,000	-0-
Conn.	Yale University (School of Medicine)	Magee	Bio. Sci.	Cellular Control Mechanisms in Yeast	HEW/NIH	19,800	-0-
Conn.	Connecticut, University of	Zarrow, M. Danenberg, V.	Bio. Sci.	Physiological and Hormonal Determinants of Maternal Behavior	HEW/NIH	150,000	-0-
Conn.	Yale University	Delgado, J.	Bio. Sci.	Transdermal Communication with the Brain	DOD/USAF	150,000	-0-
Conn.	Connecticut, University of	Northrop, R.	Bio. Sci.	An Investigation of the Role of Spatial Filtering in Visual Information Processing in Insects	DOD/USAF	150,000	-0-
Conn.	Connecticut, Univ. of	Babbit	Chemistry	Chemical Research	HEW/NIH	16,000	-0-
Conn.	Yale University	Cassidy	Chemistry	Chemical Research	HEW/NIH	38,700	-0-
Conn.	Yale University	Wagner, C.N.J.	Chemistry	X-Ray Study of the Structure of Liquid Metals and Alloys	AEC	28,426	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Conn.	Yale University	Hedland, G.A.	Mathematics	Mathematical Analysis of Dynamical Systems	DOD/ARMY	24,000	-0-
Conn.	Yale University	Hoffleit	Astronomy	Proper Motions	DOD/ARMY	55,000	-0-
Conn.	Yale University	Clemenu	Astronomy	Astrometry .	NASA	35,000	-0-
				State Subtotal		$883,426	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Dela.	Delaware, Univ. of	Murray, R. B.	Chemistry	Radiation-Induced Defects in Alkali Halides, and Their Role in Recombination Processes	AEC	35,315	-0-
Dela.	Delaware, Univ. of	Schweitzer	Chemistry	Chemical Research	HEW/NIH	28,400	-0-
				State Subtotal		$63,715	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Fla.	Florida State Univ.	Davis, R. H.	Physics	Nuclear Reactions and Spectroscopy	DOD/USAF	$425,000	-0-
Fla.	Florida State Univ.	Gierasch, P.J.	Atmos. Sci.	Dynamics of Planetary Atmospheres	DOD/Navy	15,000	-0-
Fla.	Miami, Univ. of	Geisler, J.E.	Atmos. Sci.	Numerical Model of the Sea-Breeze Circulation	HEW	33,000	-0-
Fla.	Miami, Univ. of	Kraus, E.B.	Atmos. Sci.	Interacting Tropical Atmosphere and Ocean Model	DOD/USAF	24,000	-0-
Fla.	Miami, Univ. of	Prospero, J.M.	Atmos. Sci.	Continental Aerosols in the Marine Atmosphere	HEW	60,000	-0-
Fla.	Miami, Univ. of	Lhermitte R.M.	Atmos. Sci.	Dual Doppler Radar Probing of Three-Dimensional Wind Fields with Application to the Study of Convective Storm Circulation & Boundary Layer Processes	DOC/ NOAA	161,000	-0-
Fla.	Florida, Univ. of	Gabbay, E.	Bio. Sci.	Structure of Nucleic Acids	HEW/ NIH	20,009	-0-
Fla.	Florida, Univ. of	Kraus, E.B.	Atmos. Sci.	Interacting Tropical Atmospheric and Ocean Model	DOD/ USAF	20,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Fla.	Miami, Univ. of	Hirschberg	Atmos. Sci.	Auroral and Air-Glow Emission Line Study Using A 50-Channel Fabry Perot	DOD/ USAF	47,000	-0-
Fla.	Florida, Univ. of	Dawson, W.	Bio. Sci.	Origins of the Fast Retinal Potentials	DOD/Army	30,000	-0-
Fla.	Florida State Univ.	Pfeffer Fowlish, W.	Atmos. Sci.	Annulus Assembly for Lab. Met. Dynamic Studies	DOD/ Navy	100,000	-0-
Fla.	Florida State Univ.	Schwartz	Chemistry	Chemical Research	HEW/ NIH	21,800	-0-
Fla.	Florida State Univ.	Rhodes	Chemistry	Chemical Research	HEW/ NIH	29,000	-0-
Fla.	Florida, Univ. of	Person	Chemistry	Chemical Research	HEW/ NIH	48,200	-0-
Fla.	Florida State Univ.	Davis, R.H.	Physics	Nuclear Reactions and Spectroscopy	DOD/ USAF	425,000	-0-
				State Subtotal		1,459,009	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support: Agency	Previous Annual Amount	Current Annual Amount
Ga.	Georgia, Univ. of	Payne, W.J.	Oceanography	Nitrate respiration in marine bacteria	DOD/ Navy	8,258	-0-
Ga.	Emory University	Davenport, R. Rogers, C.N.	Bio. Sci.	Cross-Modal Perceptual Integration in Primates	HEW/NICHD (Primate Res. Inst.)	36,000	-0-
Ga.	Yerkes Regional Primate Center	Manocha, S.	Bio. Sci.	Histochemistry and Histopathology of Protein Malnutrition in Primates	HEW/NIH	30,000	-0-
Ga.	Georgia, Univ. of	Janzen	Chemistry	Chemical Research	DOD/USAF	27,000	-0-
Ga.	Georgia, Univ. of	Johnston, F.J.	Chemistry	Studies in Colloid Kinetics and Radiation Chemistry	AEC	12,000	-0-
Ga.	Emory Univ.	Zeiler, M.D.	Bio. Sci.	An Analysis of Sequential Behavior	HEW/NICHD	28,000	-0-
				State Subtotal		$141,258	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ha.	Hawaii, Univ. of	Lin, S. and Weldin, E.J.	Engineering	Problems in Error Correcting Codes	DOD/USAF	$20,000	
					NASA	30,000	-0-
Ha.	Hawaii, Univ. of	Mandel	Bio. Sci.	Comparative Molecular Biology of Cali Temperate Phases	HEW/ NIH	18,500	-0-
				State Subtotal		$68,500	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ill.	Chicago, Univ. of	Simpson, J.A.	Atmos. Sci.	Solar, Interplanetary and	DOD/ USAF	166,500	-0-
Ill.	Illinois, Univ. of	Pines, D.	Physics	Astrophysical Applications of Microscopic Many-Body Theory	DOD/ USAF	45,000	-0-
Ill.	Illinois, Univ. of	Swenson	Astronomy	Operation of Vermillion River Observatory	DOD/ Navy	120,000	-0-
Ill.	Illinois, Univ. of	Cataneo, R.	Atmos. Sci.	Evaluation of Raindrop Measuring Techniques	DOD/ Army	75,000	-0-
Ill.	Illinois, Univ. of	Itoh, T.	Engineering	Dispersion Characteristics of Microstrip and Slotted Lines	DOD/ Army	20,000	-0-
Ill.	Illinois, Univ. of	Sechrist, C.F.	Atmos. Sci.	Investigation of Meteorological and Energetic Particle Influences on the Lowest Ionosphere	NASA	19,400	-0-
Ill.	Illinois Univ. of	Campbell, L.L.	Bio. Sci.	Molecular Basis of Thermophily	HEW/ NIH	26,700	-0-
Ill.	Illinois, Univ. of	Nanney, D.C.	Bio. Sci.	Ciliate Genetics	HEW/ NIH	38,300	-0-
Ill.	Illinois, Univ. of	Reichmann	Bio. Sci.	Virus Manipulation in Plants	HEW/ NIH	91,000	-0-
Ill.	Loyola Univ.	Marcus, L.	Bio. Sci.	Protein Biosynthesis in a Cell-Tree Yeast System	HEW/ NIH	36,431	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ill.	Chicago, Univ. of	Van, Allena	Astronomy	Astronometry	DOD/ Navy	$ 20,000	-0-
Ill.	Northwestern Univ.	Siegert	Physics	Statistical Mechanics	DOD/ Navy	15,000	-0-
Ill.	Northwestern Univ.	Walker	Physics		DOD/ Army	32,000	-0-
Ill.	Northwestern Univ.	Basolo, F.	Chemistry	Metal Nitrene Chemistry and Metal Complexes of Molecular Nitrogen	AEC	66,500	-0-
Ill.	Illinois, Univ. of	Rubel, L.	Mathematics	Complex Analysis	DOD/ USAF	20,000	-0-
Ill.	Illinois, Univ. of	Coates	Chemistry	Chemistry Research	HEW/ NIH	20,800	-0-
Ill.	Chicago, Univ. of	Douglas, J., Jr.	Mathematics	Numerical Solution of Partial Differential Equations	DOD/ USAF	21,000	-0-
Ill.	Illinois Institute of Technology	Miller	Chemistry	Chemical Research	HEW/ NIH	45,000	-0-
Ill.	Illinois, Univ. of	Paul	Chemistry	Chemical Research	HEW/ NIH	52,900	-0-
Ill.	Illinois, Univ. of	Haight	Chemistry	Chemical Research	HEW/ NIH	65,500	-0-
Ill.	Illinois, Univ. of	Nystrom, R.F.	Chemistry	Preparation of Carbon-14 and Tritium Labeled Compounds by Hydroboration & Tritioboration Procedures	AEC	17,821	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ill.	Northwestern Univ.	Hines, R.L.	Chemistry	Radiation Effects of Ion Bombardment	AEC	32,363	-0-
Ill.	Northwestern Univ.	Mura, T.	Chemistry	Analytical Study on Dislocations in Thin Films	AEC	28,013	-0-
Ill.	Northwestern Univ.	Bordwell	Chemistry	Chemical Research	HEW/ NIH	37,200	-0-
Ill.	Northwestern Univ.	Veis	Chemistry	Chemical Research	HEW/ NIH	23,800	-0-
Ill.	Northern Illinois Univ.	McAllister, W. McAllister, D.	Bio. Sci.	Conditioned Fear and Its Effects on Behavior	HEW/ NIH	26,000	-0-
Ill.	Field Museum	Hershkowitz, P.	Bio. Sci.	Monograph of New World Primates	HEW/ NIH	60,000	-0-
Ill.	Illinois, Univ. of	Cowser	Engineering		HEW/ NIH	68,000	-0-
				State Subtotal		1,290,228	-0-

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ind.	Indiana University	Guthrie	Biological Sci.	Metabolism of T4 Bacterio-Phage Messenger RNA	NIH	$24,500	-0-
Ind.	Indiana, Univ. of		Computer		DOD/USAF	30,000	-0-
Ind.	Purdue University	Shen	Physics	Theoretical Astrophysics	NASA	20,000	-0-
Ind.	Purdue University	Brown, H.C.	Chemistry	New Chemistry of Organoborons	HEW/NIH	40,000	-0-
Ind.	Indiana University	Shull, H.	Chemistry	Quantum Chemistry Program Exchange	DOD/USAF	25,000	-0-
Ind.	Indiana University	Schaap, W.B.	Chemistry	Electrochemical Research in Amine Solvents	AEC	39,000	-0-
Ind.	Notre Dame Univ.	Pasto	Chemistry	Chemical Research	HEW/NIH	19,300	-
Ind.	Purdue University		Mathematics	Analysis and Probability	DOD/USAF	17,000	
Ind.	Purdue University	Gupta, S.S.	Mathematics	Multiple Decision Rules and Multivariate Distribution Theory	DOD/ USAF	21,000	-0-
Ind.	Purdue University	Gupta, S.S.	Mathematics	Multiple Decision Theory, Stopping Rules, and Non-parametric Inference	DOD/ Navy	25,000	10,000
Ind.	Purdue University	Whistler	Chemistry	Chemical Research	HEW/NIH	50,200	-
Ind.	Purdue University	Floss	Bio. Sci.		HEW/NIH	45,900	-0-
				State Subtotal		356,900	10,000

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RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ia.	Iowa State Univ.	Kempthorne, O. & Zyskind, G.	Mathematics	Linear Models and Analysis of Variance Research Procedures	DOD/ USAF	19,900	-0-
Ia.	Grinnell College	Hermann, E.A.	Mathematics	Singular Integral Operators	DOD/ USAF	11,000	
Ia.	Dordt College	Maatman, R.	Chemistry	Interactions of Aqueous and Monaqueous Ions with Oxide Surfaces	AEC	8,000	-0-
Ia.	Iowa State Univ.	Trahanovsky	Chemistry	Chemical Research	HEW/NIH	14,000	-0-
				State Subtotal		52,900	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Kas.	Kansas State Univ.	Setser, D.W.	Chemistry	Energy Redistribution in Elementary Unimolecular Biomolecular Reactions	HEW/NAPCA	$55,000	-0-
				State Subtotal		55,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ky.	Kentucky, Univ. of	Reucroft, P.J.	Engineering	Characterization of Factors Influencing Energy Storage, Conversion and Detection Processed in Organic Solids	DOD/USAF	99,000	-0-
Ky.	Kentucky, Univ. of	Gossick, B. R.	Chemistry	Radiation Effects on Germanium	AEC	6,809	-0-
				State Subtotal		105,809	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
La.	Louisiana State Univ. (New Orleans)	Griffin	Chemistry	Chemical Research	HEW/NIH	31,000	-0-
La.	Tulane University	Weigang	Chemistry	Chemical Research	HEW/NIH	47,000	-0-
				State Subtotal		78,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Maine	Maine, Univ. of	Zieminski	Engineering	Mass Transfer to Electrolyte Solutions	DOI/ OSW	72,800	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Md.	Johns Hopkins Univ.	Katz, I.	Atmos. Sci.	Radar Study of the Dynamics of the Atmosphere at Intermediate Scales	DOD/ USAF	42,200	-0-
Md.	Johns Hopkins Univ.	Zmuda, A.J.	Atmos. Sci.	Transverse Magnetic Disturbances and Field-Aligned Currents in the Auroral Oval	DOD/ Navy	30,000	-0-
Md.	Maryland, Univ. of	Burgers, J.M.	Engineering	Investigations on Statistical Properties Connected With Solutions of the Non-Linear Diffusion of Heat Flow Equation	DOD/ USAF	14,000	-0-
Md.	Maryland, Univ. of	Yodh, G.	Physics	Strong Interactions From 100 GeV to 5,000 GeV	DOD/ USAF	193,175	-0-
Md.	Maryland, Univ. of	Prange	Physics	Conduction Electrons and Magnetism	DOD/ USAF	66,000	-0-
Md.	Johns Hopkins Univ.	Hackenbrock, C.R.	Bio. Sci.	Ultrastructure Changes in Mitachondria	HEW/ NIH	44,000	-0-
Md.	Eye Research Fdn.	Cavonius, C. Chapman, R.	Bio. Sci.	Experimental Modification of Visual Receptive Fields	DOD/USAF DOD/ARMY	25,000 25,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Md.	Friends of Psychiatric Research	Clark, W.	Bio. Sci.	Histamine and Brain Function	VA	100,000	-0-
Md.	Johns Hopkins Univ.	Hartman, P.	Mathematics	Complex Analysis	DOD/USAF	18,000	-0-
Md.	Johns Hopkins Univ.	Nickon	Chemistry	Chemical Research	HEW/NIH	51,700	-0-
Md.	Johns Hopkins Univ.	Meyer, J.P.	Mathematics	Cohomology Operations and Postnikov Systems	DOD/ARMY	12,200	-0-
Md.	Maryland, Univ. of	Asimov,R.M.	Chemistry	An Investigation of Solid Solution Hardening in Metallic Solid Solution Alloys	AEC	26,610	-0-
Md.	Maryland, Univ. of	Zenker	Chemistry	Chemical Research	HEW/NIH	23,100	-0-
				State Subtotal		670,985	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Mass.	Harvard University	Coleman	Physics	Theoretical Physics	DOD/USAF	$140,000	-0-
Mass.	Harvard University	Bainbridge	Physics	Alterations of the Transition Rates of Radioactive Substances	DOD/NAVY	62,000	-0-
Mass.	Harvard University	Anderson, G. & Carrier, G.F.	Mathematics	Numerical Synthesis Project	DOD/NAVY	35,000	-0-
Mass.	Harvard University	Coleman	Physics	Theoretical Physics	DOD/NAVY	43,000	-0-
Mass.	Mass. Inst. of Tech. (NEROC)	Sebring	Astronomy	Haystack Observatory Facility	DOD/USAF NASA	1,300,000	-0-
Mass.	Mass. Inst. of Tech.	Keil	Engineering	Marine Applied Mechanics	DOD/NAVY DOC	1,200,000 200,000	600,000 -0-
Mass.	Mass. Inst. of Tech.	Von Hippel, A.	Bio. Sci.	The Molecular Basis of Cryobiology	DOD/USAF DOD/NAVY	30,000 140,000	-0- -0-
Mass.	Mass. Inst. of Tech.	Appleton	Engineering	Energy Transfer & Chemical Reaction Rates in Rapidly Codes Gases	NASA	80,500	-0-
Mass.	Mass. Inst. of Tech.	Morrison	Astronomy	Theoretical Astrophysics and Cosmology	NASA	36,000	-0-
Mass.	Mass. Inst. of Tech.	Cotton, F.A.	Chemistry	Metal-to-Metal Bonding (Thermo-dynamic Spectral and Structural Studies of Complex Ions)	AEC	42,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Mass.	Tufts University	Rolicka, M.	Bio. Sci.	Fractionation and Characterization of Antimucopeptide Antibodies	HEW/NIH	29,300	-0-
Mass.	Harvard Univ.	Liller, W.	Astronomy	Planetary Nebula	DOD/NAVY DOD/USAF	121,000 5,000	-0- -0-
Mass.	Harvard Univ.		*Physics	Cambridge Electron Accelerator	AEC	1,400,000	-0-
Mass.	Woods Hole Oceanographic Institute	Bumpus, D.	Oceanography	Circulation in the Continental Shelf of the East Coast of the U.S.	HEW/NIH	39,000	-0-
Mass.	Woods Hole Oceanographic Institute	Backus, R.	Oceanography	Origin and distribution of organic matter in the deep sea	NASA	75,000	37,500
Mass.	Marine Biological Laboratory	Barth, L.G. Barth, L.C.	Bio. Sci.	Cellular Differentiation	HEW/NIH	36,831	-0-
Mass.	Boston Univ.	Hoffman	Chemistry	Chemical Research	HEW/NIH	17,700	-0-
Mass.	Brandeis Univ.	Palais, R.	Mathematics	Global Nonlinear Analysis	DOD/USAF	20,000	-0-
Mass.	Brandeis Univ.	Rossi, H.	Mathematics	Algebraic, Analytic, & Differentiable Structures	DOD/Army	29,000	-0-
Mass.	Brandeis Univ.	Rosenblum	Chemistry	Chemical Research	HEW/NIH	36,400	-0-
Mass.	Clark University	Wen	Chemistry	Chemical Research	HEW/NIH	31,000	-0-

* Amt. shown is amount of support reduction, not total support

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RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Mass.	Franklin Institue	Meakin, J.B. London, G.J.	Chemistry	Studies of Crystal Perfection--Tantalum Silicide and Beryllium	AEC	48,797	-0-
Mass.	Harvard Univ.	Ahlfors, L.	Mathematics	Quasi-Conformal Mapping	DOD/ USAF	12,000	-0-
Mass.	Harvard Univ.		Mathematics	Fluid Dynamics	DOD/ NAVY	35,000	-0-
Mass.	Massachusetts Institute of Technology		Mathematics	Systems of Differential Equations	DOD/ ARMY	15,000	-0-
Mass.	Mass. Institute of Technology	Aki, K.	Physics	Measurement of Stress in Place	AEC	31,000	-0-
Mass.	Mt. Holyoke College	Williamson	Chemistry	Chemical Research	HEW/NIH	44,900	-0-
Mass.	Tufts Univ.	Maulner	Chemistry	Chemical Research	HEW/NIH	25,300	-0-
Mass.	Tufts Univ.	Urry, G.W.	Chemistry	Covalently Bonded Compounds of the Light Elements	AEC	25,000	-0-
Mass.	Mass. Institute of Tech.	Schmitt, F.	Bio. Sci.	Neurosciences Research Program	HEW/NIH NASA	500,000	100,000
Mass.	Boston College	Linehan, D.	Earth Sci.	Study of Electrical Conductivity in the Mantle	DOD/ USAF	12,400	-0-
			State Subtotal			$5,893,128	$737,500

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Mich.	Michigan, Univ. of	Simmons	Engineering	Infrared Spectroscopic Study of the Reactions of Hydrogen and Deuterium with Fluorine & their application to continuous wave HF and DF Lazers	USAF/DOD	86,000	-0-
Mich.	Michigan, Univ. of	Nicholls	Engineering	Hydrogen Fluoride Tracer Molecule Spectroscopy Applied to Turbulent Mixing and Combustion	USAF/DOD	49,000	-0-
Mich.	Michigan, Univ. of	Aberback, J.D.& Walker, J.L.	Soc. Sci.	Longitudinal Detroit Community Study	HEW/NIMH	23,500	-0-
Mich.	Michigan, Univ. of	Hazen	Physics	Participation in a Search with the Leads Cloud Chamber	USAF/DOD	$45,000	
Mich.	Michigan, Univ. of	Hecht	Physics	Nuclear Structure Theory	NAVY/DOD	48,000	-0-
Mich.	Michigan, Univ. of	Beutler, F.J.	Engineering	Theory and Applications of Stationary Point Processes	NASA	40,000	-0-
Mich.	Michigan, Univ. of	Sanders,T.M.,Jr.	Physics	Low Temp. Physics-Mostly Liquid Helium	AEC	90,000	-0-
Mich.	Michigan, Univ. of	Davis, R.	Bio. Sci.	Psychophysiological Studies of Memory and Catalepsy	HEW/NIMH	20,400	-0-
Mich.	Michigan, Univ. of	Siegel, L.	Bio. Sci.	Structure Function Malic Dehydrogenase	HEW/NIH	13,300	-0-
Mich.	Michigan, Univ. of	Melton, A.	Bio. Sci.	Learning and Human Performance	ARPA/DOD	200,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Mich.	Michigan State Univ.	Gordus, A. A.	Chemistry	Radio Chemical Studies	AEC	30,000	-0-
Mich.	Michigan Technological University	Leifer, L.	Chemistry	Fundamental Studies of Concentrated Electrolyte Solutions	AEC	19,000	-0-
Mich.	Michigan, Univ. of	Ranck, J.	Bio. Sci.	Single Neurons in Hippocampus	HEW/ NIMDS	18,000	-0-
Mich.	Michigan, Univ. of	Williams	Bio. Sci.	Pyridine NucleotideDisulfide Oxcreductosis	HEW/ NIAMD	30,500	-0-
Mich.	Michigan, Univ. of	Zand, R.	Bio. Sci.	Biophysical Studies of Cyclic and Bicyclic Amino Acids	HEW/ MAND	30,800	-0-
				STATE SUBTOTAL		743,500	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual	Current Annual
Minn.	Minnesota, Univ. of	Overend, J.	Chemistry	Infrared Spectroscopy of Polyatomic Molecular and Structure of Vibrational States	DOD/ USAF	$76,500	10,000
Minn.	Minnesota, Univ. of	Kolthoff, I.M.	Chemistry	Acid-Base Equilibria in Aprotic Solvents	DOD/ USAF	22,000	-0-
Minn.	Minnesota, Univ. of	Paulus, E.J.	Atmos. Sci.	Climatology of Particle Size Spectra	HEW	80,000	-0-
Minn.	Minnesota, Univ. of	Nichol	Chemistry	Chemical Research	HEW/NIH	18,300	-0-
				State Subtotal		$196,800	$10,000

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Mo.	Midwest Research Institute	Luke, Y.	Mathematics	Perturbation Theory	DOD/ USAF	40,000	-0-
Mo.	Missouri, Univ. of	Brunk, H. D.	Mathematics	Isotonic Regression	DOD/ USAF	10,000	-0-
Mo.	Missouri, Univ. of (Rolla)	Goden	Chemistry	Nuclear Radiation Effects on Silicon P-N Junctions	AEC	32,423	-0-
Mo.	Washington Univ.	Reeder, P.L.	Chemistry	Delayed-Particle Spectroscopy	AEC	54,600	-0-
Mo.	Washington Univ.	Lipkin, D.	Bio. Sci.	Chemistry of Nucleic Acids and Related Substances	HEW/ NIH	38,700	-0-
				State Subtotal		$175,723	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Mont.	Montana State Univ.	Caughlan	Chemistry	Chemical Research	HEW/NIH	51,200	-0-
				State Subtotal		51,200	-0-

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Nebr.	Nebraska, Univ. of	Cromwell	Chemistry	Chemical Research	HEW/NIH	$39,500	-0-
				State Subtotal		39,500	-0-

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RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Nev.	Desert Research Institute	Telford, J.W.	Atmos. Sci.	Airborne Investigations of the Structure of Atmospheric Convection and Boundary Layer Transfers	DOD/	209,000	-0-
Nev.	Univ. of Nevada	Winterberg, F.	Engineering	Engineering Feasibility and System Analysis Studies in a Pulsed Thermonuclear Microbomb Rocket Propulsion System	NASA	41,000	-0-
				State Subtotal		250,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.H.	Dartmouth College	Laaspere, T. Kan, J.R.	Atmos. Sci.	For the Development of a Unifying Theory of Electrojet Instabilities in the Earth's Ionosphere	NASA	32,000	-0-
N.H.	New Hampshire, Univ. of	Clark, R.R.	Atmos. Sci.	Two Parameter Ground-Based Probing of the Ionosphere	DOD/ USAF	42,000	-0-
N.H.	New Hampshire, Univ. of	Frost, A.D.	Atmos. Sci.	Investigation of the Radio Frequency Modulation Spectrum of Starlight Using a Dual Channel Correlation Detector System	DOD/ USAF	45,000	-0-
N.H.	Dartmouth College	Spencer	Chemistry	Chemical Research	HEW/NIH	29,900	-0-
N.H.	New Hampshire, Univ. of	Andersen	Chemistry	Chemical Research	HEW/NIH	13,000	-0-
N.H.	New Hampshire, Univ. of	Lyle	Chemistry	Chemical Research	HEW/NIH	24,000	-0-
				State Subtotal		185,900	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.J.	Princeton Univ.	Mislow	Chemistry	Structure and Mechanism in Organometalloid Chemistry	DOD/ USAF	93,000	-0-
N.J.	Princeton Univ.	Hopfield	Physics		DOD/ USAF	30,000	-0-
N.J.	Princeton Univ.	Goldberger	Physics	Theoretical Physics	DOD/ USAF	262,000	-0-
N.J.	Princeton Univ.	Spitzner, L.	Astronomy	Theoretical Astrophysics	DOD/ USAF	75,000	-0-
N.J.	Princeton Univ.	Bogdonoff	Engineering	Further Studies of High Mach Number Density Flow	DOD/ USAF	274,000	-0-
N.J.	Princeton Univ.	Bogdonoff	Engineering	Low Density Gas Flows	DOD/ USAF	15,000	-0-
N.J.	Princeton Univ.	Glassman, I.	Engineering	A Problem in Fire Safety: Flame Spreading Across Liquid Fuels	DOD/ Army	227,000	-0-
N.J.	Rutgers Univ.	Avers, C.	Bio. Sci.	Mitochondrial Heredity in Saccharomyces	HEW/ NIH	27,000	-0-
N.J.	Rutgers Univ.	Kling, A.	Bio. Sci.	CNS Regulation of Social Affective and Cognitive Behavior in Subhuman Primates	HEW/ NIH	80,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.J.	Institute for Advanced Study	Solberg, A.	Mathematics	Mathematical Analysis	DOD/ USAF	93,000	-0-
N.J.	Princeton Univ.	Olmgren, F.J. Griffith, P.	Mathematics	Abstract Analysis	DOD/ USAF	60,000	-0-
N.J.	Princeton Univ.	Stein, E.	Mathematics	Analysis and Related Topics	DOD/ USAF	55,000	-0-
N.J.	Princeton Univ.	Hunt, G.	Mathematics	Probability and Differential Equations	DOD/ Army	33,000	-0-
N.J.	Princeton Univ.	McClure	Chemistry	Chemical Research	HEW/ NIH	51,200	-0-
N.J.	Rutgers Univ.	Strauss	Chemistry	Chemical Research	HEW/ NIH	33,200	-0-
N.J.	Rutgers Univ.	Gerber	Chemistry	Chemical Research	HEW/ NIH	36,900	-0-
N.J.	Rutgers Univ.	Sauers	Chemistry	Chemical Research	HEW/ NIH	20,900	-0-
N.J.	Stevens Institute of Technology	Rogers, K.C. Motz, R.	Physics	Investigation in Plasma Dynamics	AEC	69,628	-0-
N.J.	Princeton Univ.	Allen	Chemistry	Chemical Research	AEC	27,000	-0-
				State Subtotal		1,562,828	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.M.	New Mexico Institute of Mining and Tech.	Gross, G.W.	Atmos. Sci.	Dielectric Dispersion and Electrical Conductivity of Ammonium Compounds in Ice	DOD/ NAVY	15,000	-0-
N.M.	New Mexico State University	Lwowski	Chemistry	Chemical Research	HEW/NIH	34,200	-0-
				State Subtotal		49,200	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.Y.	Columbia University	Prendergast & Woltjer	Astronomy	Galactic Structure	DOD/ USAF	$60,000	$30,000
N.Y.	Columbia University	Novick, R.	Physics	Metastable Atomizing Atomic States and the Metastable Helium Ion	DOD/ NAVY	25,000	-0-
N.Y.	Columbia University (College of Physicians and Surgeons)	Kabat, E.	Bio. Sci.	Immunochemical Studies on Polysaccharides	DOD/ NAVY	11,000	-0-
N.Y.	Columbia University	Yang, E.S.	Engineering	Semiconductor field-Effect Devices	NASA	75,000	-0-
N.Y.	Columbia University	Wu, C. S.	Physics	Nuclear Physics	AEC	100,000	-0-
N.Y.	Columbia University	Loewenstein,W.	Bio. Sci.	Analysis of Receptor Mechanisms	HEW/NIH	26,000	-0-
N.Y.	Columbia University	Tannebaum, S.	Bio. Sci.	Structure-Function, Bio-chemistry of Selected Antigens and Antibodies	HEW/NIH	29,200	-0-
N.Y.	Cornell University	Salpeter,E.E.	Astronomy	Theoretical Studies in Center for Radio-Astrophysics Physics and Space Research	DOD/ USAF DOD/NAVY	93,000 50,000	-0- -0-
N.Y.	Cornell University	Nation, J.A.	Engineering	New High Power Pulsed Microwave Generators	DOD/ NAVY	80,000	-0-
N.Y.	Cornell University	Auer, P. L. & Morse, D.L	Atmos. Sci.	Laboratory Simulation of the Solar Wind-Geomagnetic	DOD/ NAVY	80,000	-0-
N.Y.	Cornell University	Ginsberg, H.	Social Sci.	Computer Research in Education	HEW/OE	18,300	-0-
N.Y.	Cornell University	Greisen, K.	Astronomy	Cosmic Gamma Ray Telescope Balloon Flights	DOD/ USAF	55,000	-0-

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RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.Y.	Cornell University	Kiefer, J.	Mathematics	Mathematical Statistics	DOD/ NAVY	41,000	-0-
N.Y.	Cornell University	Fried, J.H.	Chemistry	Molecular Relaxation in the Liquid Phase by ESR Spectroscopy	HEW/NIH	36,500	-0-
N.Y.	Cornell University	Neisser, U.& Wilcox, T.	Bio.Sci.	Auditory Perception of Temporal Order	HEW/NIH	13,000	-0-
N.Y.	Cornell University (Medical College)	Bennett,D.	Bio. Sci.	Maintenance of Mouse Colony Carrying Mutant T-Alleles	HEW/NIH	18,500	-0-
N.Y.	New York City Univ. (City College)	Segal, S.	Bio. Sci.	Processing of Mental Imagery by Perceptual and Attentional Analyzers	DOD/ USAF	30,000	-0-
N.Y.	New York, City Univ. (Brooklyn College)	Guttman, R.	Bio. Sci.	The Excitation Process in Nerve	HEW/NIH	5,000	-0-
N.Y.	New York, State Univ. (Stony Brook)	Rohlf,F.J.	Bio. Sci.	Analysis and Representation of Structures in Taxonomic Data	HEW/NIH	79,000	-0-
N.Y.	New York, State Univ. (Stony Brook)	Sokal, R.	Bio. Sci.	Multivariate Geographic Variation	HEW/NIH	21,400	-0-
N.Y.	New York, State Univ.	Fuller, J.L.	Bio. Sci.	Reciprocal Relations Between Behavioral and Neurological Selection in Mice	HEW/NIMH	144,000	-0-
N.Y.	New York, State Univ. (Stony Brook)	Riley, M.	Bio. Sci.	Physiological Interactions of Nucleic Acids	HEW/NIH	35,000	-0-

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RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.Y.	Fordham University	Cefola, M.	Chemistry	Kinetics and Structural Studies of Chelates	AEC	25,000	-0-
N.Y.	Long Island Univ.	Barker, J.J.	Chemistry	Particle-to-Fluid Heat Transfer Coefficients in Fluidized Beds by Means of a Microelectronic Device	AEC	21,505	-0-
N.Y.	Kettering, C. F. Research Lab.	Ke	Chemistry	Chemical Research	HEW/NIH	36,700	-0-
N.Y.	New York Botanical Gardens	McMorris	Chemistry	Chemical Research	HEW/NIH	74,600	-0-
N.Y.	New York University	Lippman, N.B.A.	Atmos. Sci.	Calculation of Resonant Reaction in the Upper Atmosphere	DOD/ARPA	21,000	-0-
N.Y.	New York State Univ.	Schwartz	Chemistry	Chemical Research	HEW/NIH	23,400	-0-
N.Y.	New York State Univ. Univ. of(Stoney Brook)	Porter	Chemistry	Chemical Research	HEW/NIH	25,000	-0-
N.Y.	Rensselaer Polytechnic Institute	Brown	Chemistry	Theoretical Research on Electron Behavior in Crystals	AEC	29,999	-0-
N.Y.	Rensselaer Polytechnic Institute	Strong	Chemistry	Chemical Research	HEW/NIH	41,900	-0-
N.Y.	Rensselaer Polytechnic Institute	Tiersten	Engineering	Electromagnetic Effects in Conducting and Non-Conducting Solid Continua	DOD/NAVY	23,400	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.Y.	New York University	Reiss, E. L.	Mathematics	Numerical Studies of Non-linear Elastic and Hydro-dynamic Stability Problems	DOD/ NAVY	11,000	-0-
N.Y.	New York University	Chao, T.Y.	Oceanography	Theoretical & Experimental Study of Gravity Wave Behavior in the Vicinity of a Cusped Caustic	DOD/ NAVY	15,000	-0-
N.Y.	New York University	Shapiro, R.	Chemistry	Chemical Modifications of Nucleic Acids	HEW/NIH	$32,700	-0-
N.Y.	New York University Medical Center	John, E. R.	Bio. Sci.	Analysis of CR Mechanisms by Brain Stimulation	HEW/NIH	200,000	-0-
N.Y.	Public Health Res. Inst. of the City of New York	Adler, F. & Fishman, M.	Bio.Sci.	Phagocytosis and Antibody Formation in Vitro	HEW/NIH	70,195	-0-
N.Y.	Rochester, Univ. of	Purser	Physics		DOD/ USAF	60,000	-0-
N.Y.	Yeshiva University	Davis, M.	Mathematics	Diophantine Equations and Mathematical Logic	DOD/ USAF	14,000	-0-
N.Y.	Yeshiva University	Susskind	Physics	Elementary Particle Physics	DOD/ USAF	20,000	-0-
N.Y.	Yeshiva University	Komar, A.	Physics	General Relativity	DOD/ USAF	91,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.Y.	New York State, Univ. of(Buffalo)	Hall, J. G.	Engineering	Research on Unsteady Boundary Layer Flows With Heat Transfer Generated in A subsonic Expansion Tube	DOD/ Jt. Svcs.	45,000	-0-
					NASA	45,000	-0-
N.Y.	Brooklyn, Polytech. Institute of	Oppenheimer, A.	Physics	Bremmstrahlung Radiation in High Temperature Plasmas	AEC	17,000	-0-
N.Y.	Columbia University	Kerr, P. F.	Chemistry	Origin of Plateau Uranium Ores: With Emphasis on Mineralization and Alteration	AEC	32,000	-0-
N.Y.	Cornell University	Gross, L.	Mathematics		DOD/ USAF	18,000	-0-
N.Y.	Cornell University	Fitchen, D.B.	Chemistry	Electronic Properties of Defects in Ionic Crystals	AEC	2,000	-0-
N.Y.	Cornell University	Nelkin, M.S.	Chemistry	The Theory of Slow Neutron Inelastic Scattering by Liquids	AEC	39,380	-0-
N.Y.	Cornell University	Freed	Chemistry	Chemical Research	HEW/NIH	21,500	-0-
N.Y.	New York University	Webster, D.	Bio. Sci.	Hearing in Heteromyid Rodents	HEW/NIH	20,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.Y.	Rochester, Univ. of	Lubin, M. J.	Physics	An Experimental Investigation of Laser Plasma Injection in a Toroidal Multipole	AEC	60,096	-0-
N.Y.	Rockefeller Univ.	Mauzerall	Chemistry	Chemical Research	HEW/NIH	67,100	-0-
N.Y.	St. John's Univ.	Kovacs	Chemistry	Chemical Research	HEW/NIH	30,700	-0-
N.Y.	Syracuse Univ.	Sage	Chemistry	Chemical Research	HEW/NIH	35,600	-0-
N.Y.	Syracuse Univ.	Dittmer, D. S.	Chemistry	Chemical Research	HEW/NIH	28,100	-0-
N.Y.	Yeshiva Univ.	Davis, M.	Mathematics	Foundationsand Number Theory	USAF	14,000	-0-
N.Y.	Yeshiva Univ.	Ehrenpreis, L.	Mathematics	Mathematical Analysis	DOD/ USAF	27,000	-0-
				State Subtotal		2,464,775	30,000

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support: Agency	Previous Annual Amount	Current Annual Amount
N.C.	Duke University	Robinson, H.G.	Physics	High Resolution Spectroscopy with Stored State-Selected Atoms	DOD/NAVY	$18,000	-0-
N.C.	Duke University	Culbertson,W.& Culbertson,C.	Bio. Sci.	Chemistry of the Pharmeliaceae	HEW/NIH	17,700	-0-
N.C.	Duke University	Brohm, J.	Soc. Sci.	Psychological Consequences of Loss of Freedom	HEW/NIMH	61,000	-0-
N.C.	North Carolina State University	Hanson	Bio. Sci.	Alternatives Available for Juvenile Maize Plants for Growth	HEW/NIH	18,000	-0-
N.C.	North Carolina, University	Chakravarti, I.M.	Mathematics	Problems of Search Theory, Coding and Information Processing, Finite Geometry, and Statistical Design	DOD/ARMY	35,000	-0-
N.C.	Duke University	Culbenson	Chemistry	Chemical Research	HEW/NIH	19,700	-0-
N.C.	North Carolina State University	Levine	Chemistry	Chemical Research	HEW/NIH	26,300	-0-
N.C.	Duke University	Moses, M.J.	Biology	Chromosone Differentiation During Spermatogenesis	HEW/NIH	41,902	-0-
				State Subtotal		237,602	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ohio	Case Western Reserve	Willard	Physics		AEC	$100,000	-0-
Ohio	Ohio State University	McGhee, R.B.	Engineering	Legged Locomotion in Animals and Machines	DOD/USAF	10,000	-0-
Ohio	Case Western Reserve University	Yeager	Chemistry	Chemical Research	DOD/Navy	25,000	-0-
Ohio	Case Western Reserve University	Abrahamson, E.W.	Chemistry	Primary Processes in Radiation Chemistry	AEC	20,000	-0-
Ohio	Case Western Reserve University	Angus	Chemistry	Chemical Research	HEW/NIH	47,000	-0-
Ohio	Case Western Reserve University	Kuwana	Chemistry	Chemical Research	HEW/NIH	17,700	-0-
Ohio	Ohio State University	Fraenkel	Chemistry	Chemical Research	HEW/NIH	30,800	-0-
Ohio	Ohio State University	Rao, K.N.	Physics	Problems in Molecular Structure	AEC	30,000	-0-
			State Subtotal			$280,500	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Okla.	Oklahoma State University	St.Johns, R.M.	Atmos. Sci.	Measurement of Optical Excitation Cross-Sections of Electron-Atom Collisions in Atmospheric Gases, Hydrogen and Metal Vapors	DOD /USAF	31,600	-0-
Okla.	Oklahoma State University	Shanmugam, K.	Atmos. Sci.	Spot Meteorological Forecasts Based on Computer Decisions	DOD	97,000	-0-
Okla.	Oklahoma State University	Weber, R.	Bio. Sci.	Visual and Verbal Imagery	HEW/OE	20,000	-0-
Okla.	Oklahoma, Univ. of	Weiss, R. F.	Soc. Sci.	The Reinforcing Aspects of Altruism	HEW/NIMH	78,100	-0-
Okla.	Oklahoma State Univ.	Berlin	Chemistry	Chemical Research	HEW/NIH	25,800	-0-
				State Subtotal		252,500	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ore.	Oregon State Univ.	Brunk, H. D. Pierce, D.A.	Mathematics	Bayesian Estimation of Multivariate Densities for Use in Classification With Application to Diagnosis of Disease	DOD/	$21,000	-0-
Ore.	Oregon State Univ.	Bodvarsson, G.	Oceanography	Study of the Dynamics of Deep-Sea Currents in Coastal Regions in the Northeast Pacific	DOD/ NAVY	$12,000	-0-
Ore.	Oregon State Univ.	Loomis, W.D.	Bio. Sci.	Biosynthesis and Metabolism of Terpenes	HEW/NIH	24,300	-0-
Ore.	Oregon, Univ. of	Fitzgerald, R.	Bio. Sci.	Psychophysiology of Heart-Rate Conditioning	DOD/ ARMY	166,000	-0-
Ore.	Oregon, Univ. of	Marvell	Chemistry	Chemical Research	HEW/NIH	16,800	-0-
Ore.	Oregon, Univ. of	Noyes	Chemistry	Chemical Research	HEW/NIH	32,000	-0-
Ore.	Oregon, Univ. of	Attneave, F.	Bio. Sci.	Studies of Spatial Presentation	DOD/ ARPA	20,000	-0-
					State Subtotal	292,100	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Pa.	Bartol Research Fdn of the Franklin Inst.	Metzger	Physics	Nuclear Structure Studies Using Photons	AEC	$90,000	-0-
Pa.	Carnegie Mellon Univ.	Alexander, L.E.	Chemistry	Structural Studies of Chlorophyll-Related Compounds	HEW/NIH	25,000	-0-
Pa.	Carnegie Mellon Univ.	Pople, J.A.	Chemistry	Molecular Orbital Theory of Organic Chemistry	HEW/NIH	40,000	-0-
Pa.	Haverford College	Santer, M.	Bio. Sci.	Primary Structure Analysis of Ribosomes	HEW/NIH	44,600	-0-
Pa.	Pennsylvania, Medical College of	Goldman, D.E.	Bio. Sci.	Chemical Characterization of Axon Membranes	HEW/NIH	59,100	-0-
Pa.	Pennsylvania State University	Pazur, J.	Bio. Sci.	Reaction on Mechanisms for Some Enzymes of Carbohydrate Metabolism	HEW/NIH	25,000	-0-
Pa.	Pennsylvania, University of	Blough, H.A.	Bio. Sci.	Artificial Lipoprotein Membranes: A unique method to Study Virus Absorption	DOD	20,000	-0-
Pa.	Pennsylvania, University of	Nachmias, J.	Bio. Sci.	Mechanisms of Special Interaction in Human Vision	HEW/NIH	6,500	-0-
Pa.	Thomas Jefferson University	Kalf, G.	Bio. Sci.	Isolation of an Inner Membrane DNA-Nascent-RNA Complex from Rat Liver Mitachondria	HEW/NIH	25,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Pa.	Pennsylvania Medical College of	Goldman, D.	Bio. Sci.	Theoretical-Experimental Correlations for Voltage-Clamped Axon Membrane	DOD/Navy	40,000	-0-
Pa.	Pennsylvania, Univ.of	Scandura	Bio. Sci.	Assessing Behavioral Potential	HEW/OE	20,000	-0-
Pa.	Carnegie Mellon Univ.	Southwick	Chemistry	Chemical Research	HEW/NIH	38,400	-0-
Pa.	Carnegie Mellon Univ.	Fateley	Chemistry	Chemical Research	HEW/NIH	25,200	-0-
Pa.	Pennsylvania, Univ. of	Callen, H.R.	Physics	Statistical Mechanics and Theory of Solids	DOD/Navy	15,000	-0-
Pa.	Drexel Institute of Technology	Longo	Chemistry	Chemical Research	HEW/NIH	46,200	-0-
Pa.	Lehigh University	Krauss, G.	Chemistry	Strength and Structure in Cyclically Transformed Fe-Ni-C Alloys	AEC	18,021	-0-
Pa.	Pennsylvania State University	Ruba, E.	Chemistry	Transformations in AB_2 Intermetallic Compounds	AEC	11,000	-0-
Pa.	Pennsylvania State University	Allcock	Chemistry	Chemical Research	HEW/NIH	22,600	-0-
Pa.	Pennsylvania, Univ. of	Yang, C.T.	Mathematics	Transformation Groups	DOD/Army	15,000	-0-
Pa.	Pennsylvania, Univ. of	Faul, H.	Physics	Applications of Spontaneous Fission of ^{238}U in the Study of Natural Crystals in Glasses	AEC	25,000	-0-
Pa.	Pennsylvania, Univ. of	Thornton	Chemistry	Chemical Research	HEW/NIH	29,900	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Pa.	Pennsylvania, Univ.of	Roberts	Chemistry	Chemical Research	HEW/NIH	22,200	-0-
Pa.	Pittsburgh, Univ. of	Cohen	Chemistry	Chemical Research	HEW/NIH	20,200	-0-
Pa.	Pittsburgh, Univ. of	Lowe, I. J.	Physics	Transient Nuclear Magnetic Resonance Study of Solids	DOD/USAF	83,000	-0-
				State Subtotal		766,921	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
R.I.	Brown University	Clarke, J. H.	Engineering	Nonequilibrium Phenomena in Strong Ionizing Shock Waves	DOD/Navy	43,000	-0-
R.I.	Brown University	Dobbins, R. A.	Atmos. Sci.	Nucleation Rate Measurements	DOD/Navy	64,000	-0-
R.I.	Brown University	Peck	Physics	Chemical Research	AEC	$40,000	-0-
R.I.	Brown University	Schrier, A.M.	Bio. Sci.	Discriminate Learning in Primates	HEW/NIH	20,765	-0-
R.I.	Brown University	Spurlock	Chemistry	Chemical Research	HEW/NIH	21,300	-0-
R.I.	Rhode Island, Univ. of	Desjardins, J.S. Malik, S.S.	Chemistry	Measurement of Frequency Spectra of Normal Modes by Means of Inelastic Neutron Scattering From Oriented Single Crystals	AEC	15,875	-0-
				State Subtotal		204,940	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
S.C.	South Carolina, Medical College of	Zemp, J.	Bio. Sci.	Folic Acid Deficiency and Brain Development	HEW/NIMH	$35,200	-0-
				State Subtotal		35,200	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
S.D.	South Dakota School of Mines & Technology	Orville, H.D.	Atmos. Sci.	Numerical Simulation of Local-Scale Circulations -	DOI	$30,000	-0-
					DOD	89,000	-0-
S.D.	South Dakota School of Mines & Technology	Schleusener, R.A.	Atmos. Sci.	.	DOD/Navy	150,000	-0-
				State Subtotal		269,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Tenn.	Tennessee, University of (Space Institute)	Koester	Engineering	The Aerodynamics of Air Cushion Vehicles with Emphasis on Energy Recovery	DOD/USAF	$100,000	-0-
Tenn.	Vanderbilt Univ.	Nunnally, J.	Bio. Sci.	Learning of Incentive Values in Children	HEW/NIH	30,000	-0-
Tenn.	Vanderbilt Univ.	Nunnally, J.	Bio. Sci.	Exploratory Behavior and Learning in Children	HEW/NIH	30,000	-0-
Tenn.	Vanderbilt Univ.	Ward, J.	Bio. Sci.	Neuroanatomical Correlations with Behavior	HEW/NIH	24,000	-0-
Tenn.	Fisk University	Penner	Chemistry	Chemical Research	HEW/NIH	12,900	-0-
Tenn.	Memphis State Univ.	Robinson	Chemistry	Chemical Research	HEW/NIH	13,800	-0-
Tenn.	Vanderbilt Univ.	Joesten	Chemistry	Chemical Research	HEW/NIH	38,000	-0-
				State Subtotal		248,700	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Tex.	Baylor University	Dole, M.	Chemistry	The Mobilities and Charge States of Gaseous Macroions	HEW/ NIH	$21,300	-0-
Tex.	Rice University	Miele, A. Huang, M.Y.	Mathematics	Computer Algorithms for Optimization Theory	DOD/USAF	21,000	-0-
Tex.	Rice University	Haymes, R.C.	Astronomy	Low Energy Gamma Radiation from Celestial Sources	DOD/USAF	120,000	-0-
Tex.	Rice University	Michel, F. M.	Atmos. Sci.	Theoretical Study of the Interaction of the Solar Wind with Planetary Atmospheres.	NASA	53,000	-0-
Tex.	Rice University	Burrus, C.S. Parks, T.S.	Engineering	Digital Signal Representation and Filtering	NASA	10,000	-0-
Tex.	Southern Methodist University	Wyatt, W.G.	Engineering	Forced Flow in Wick Boiling	NASA	19,000	-0-
Tex.	Texas A&M Univ.	Duller, N. M.	Physics	Cosmic Ray Muon Investigation	DOD/ USAF	76,000	-0-
Tex.	Texas A&M Univ.	Nuttell	Physics		DOD/USAF	70,000	-0-
Tex.	Texas A&M Univ.	Plass, G. N. Kattawar, G.W.	Atmos. Sci.	Reflected and Transmitted Radiance and Polarization in Realistic Model Atmospheres	DOD/USAF NASA	19,000 19,000	-0- -0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Tex.	Texas A&M Univ.	Brundidge, K.C.	Atmos. Sci.	Numerical Simulation of Deep Convection Clouds and Clear Air Turbulence	DOD/	34,200	-0-
Tex.	Texas A&M Univ.	Klemm, W.	Bio. Sci.	Unusual Erratic Bursts of Multiple Unit Activity in the Hippocampus	HEW/NIMH	18,000	-0-
Tex.	Texas, Univ. of	Robinson	Physics		DOD/USAF	$28,000	-0-
Tex.	Texas, Univ. of	Sperling, H.G.	Bio. Sci.	Long-Term Effects of Intense Spectral Light Exposure on Primates	DOD/ARMY	50,000	-0-
Tex.	Texas, Univ. of	Koenig, V.L.	Bio. Sci.	Comparative Study of the Soluble Proteins of the Crystalline Lens	HEW/NIH	16,000	-0-
Tex.	Texas, Univ. of	McClure, J.P.	Atmos. Sci.	Analysis of Incoherent Scatter Data Obtained at the Jicamarca Radar Observatory	DOC/NOAA	48,000	-0-
Tex.	Texas, Univ. of	Barrie, K.G.	Bio. Sci.	Structures and Properties of Hemoglobins	HEW/NIH	16,000	-0-
Tex.	Texas, Univ. of	McCain, G.	Bio. Sci.	Reward Magnitude and In-strument Responses	DOD/USAF	44,000	-0-
Tex.	Texas, Univ. of	Kitto, G. B.	Bio. Sci.	Structure and Properties of Sea Cucumber Hemoglobins	HEW/NIH	46,100	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount+	Current Annual Amount+
Tex.	Texas A&M Univ.	Martell, A.E.	Chemistry	Chelation and Olation Reactions of Metal Ions in Aqueous Solution	AEC	22,000	-0-
Tex.	Texas, Univ. of	Lorentz, G. O.	Mathematics	Approximation Theory	DOD/ USAF	18,000	-0-
Tex.	Texas, Univ. of	Matsen	Chemistry	Chemical Research	NASA	50,000	-0-
Tex.	Texas Christian University	Raeuchle, R.F.	Chemistry	Structural Studies of Amorphous Aluminum Oxide	AEC	20,319	-0-
Tex.	Houston, Univ. of	Haas, G. M. Eisner, M.	Physics	Investigation of Ion Heating by Modulated Electron Beams	AEC	20,000	-0-
				State Subtotal		858,919	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Utah	Utah State University	Fletcher, J.E.	Atmos. Sci.	Investigation of the Cellular Nature of Snow Storms Along the Wasatch Front	DOI	$ 43,000	-0-
Utah	Utah State University	Peterson, V.L.	Atmos. Sci.	Theoretical Investigation of the Energetics of Infrared Auroras	DOC/ NOAA	28,000	-0-
Utah	Utah State University	Baker, D.J. Despain, A.M. Peterson, V.L.	Atmos. Sci.	Aeronomy Studies Using the Field-Widened Interferometer	DOC/ NOAA	73,000	-0-
Utah	Utah State University	Megill, L.R.	Atmos. Sci.	Mesopheric Trace Constituents with Rocket Probes	DOC/NOAA DOD/USAF	82,000	-0-
Utah	Utah, University of	Luty	Physics		USAF	$50,000	-0-
Utah	Brigham Young Univ.	Izatt	Chemistry	Chemical Research	HEW/NIH	45,200	-0-
Utah	Utah, University of	Taylor, J.L.	Mathematics	Measure Algebras	DOD/USAF	16,000	-0-
Utah	Utah, University of	Futrell	Chemistry	Chemical Research	DOD/USAF	60,000	-0-
Utah	Utah, University of	Eyring	Chemistry	Chemical Research	DOD/Army	43,000	-0-
Utah	Utah, University of	Eyring	Chemistry	Chemical Research	AEC	23,000	-0-
			State Subtotal			$463,200	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Vt.	Vermont, Univ. of	Howell, D.C.	Bio. Sci.	Subjective Probability Estimation in a Simple Decision Task	DOD	$35,000	-0-
			State Subtotal			$35,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Va.	Virginia, Univ. of	McAlpine	Engineering	A Study of Discrete Time Systems	DOD	$65,500	-0-
Va.	Virginia, Univ. of	Fisher, S.S.	Engineering	Determination of Gas-Surface Interaction Potentials and Surface-Phonon Spectra Through Observation of Quantum Effects in Atomic & Molecular Beam Scattering from Crystals	NASA	50,000	
Va.	Virginia, Univ. of	Bauerle	Bio. Sci.	Mechanism of Gene Expression and Its Regulation	HEW/NIH	47,800	-0-
Va.	Virginia, Univ. of	Hahn, J.	Bio. Sci.	Peripheral Neural Coding of Cutaneous Stimuli Complexes	HEW/NIH	21,800	-0-
Va.	Virginia, Univ. of	Kretsinger,R.	Bio. Sci.	Comparison of Protein Tertiary Structure	HEW/NIH	25,000	-0-
Va.	Virginia, Univ. of	Bloor*	Chemistry	Chemical Research	DOD/ USAF	18,000	-0-
Va.	Virginia, Univ. of	Sundberg	Chemistry	Chemical Research	HEW/NIH	35,800	-0-
Va.	Virginia, Univ. of	Martin	Chemistry	Chemical Research	HEW/NIH	27,000	-0-
Va.	Virginia, Univ. of	Wolfe	Chemistry	Chemical Research	HEW/NIH	25,800	-0-
Va.	Virginia, Univ. of	Brill	Bio. Sci.	Energy Levels of Biologically-Active Magnetic Centers	HEW/NIH	30,800	-0-
			State Subtotal			$347,500	-0-

*Bloor - Moved to University of Tennessee

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Wash.	Washington, Univ. of	Forney	Engineering	Application of Picosecond Holography to Photoelasticity	DOD/USAF	$51,400	-0-
Wash.	Washington, Univ. of	Merill,R.U.	Earth Sci.	Physical-chemical changes, multidomain remanences and palemagnetic intensities	DOD/NAVY	20,000	-0-
Wash.	Washington, Univ. of	Stout	Chemistry	Chemical Research	HEW/NIH	43,500	-0-
Wash.	Washington, Univ. of	Milne	Chemistry	Chemical Research	HEW/NIH	16,300	-0-
Wash.	Washington, Univ. of	Kobayashi	Engineering	Mechanics of Corneal Tissues	HEW/NIH	50,000	-0-
			State Subtotal			$181,200	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Wis.	Wisconsin, Univ. of	Stearns, C.R.	Atmos. Sci.	Turbulent Structure Above Rough Surfaces	DOD/ARMY	52,000	-0-
Wis.	Wisconsin, Univ. of	Bergdoll,M.	Bio. Sci.	Immunological, Biochemical and Toxic Properties of the Enterotoxins	DOD	$40,000	-0-
Wis.	Wisconsin, Univ. of	Suomi, V. E.	Atmos. Sci.	Series of ATS-III Image-Enhanced, Precision Display Pictures for the Bomex Period	NASA	13,000	-0-
Wis.	Wisconsin, Univ. of		Bio. Sci.		HEW/NIH	29,000	-0-
Wis.	Wisconsin, Univ. of	Yuill,T.W.	Bio. Sci.	Some Ecological Effects of Perturbation of Tropical Forests	DOD/USAF	90,000	-0-
Wis.	Wisconsin, Univ. of	Hailman, J.P.	Bio. Sci.	Behavioral and Physiological Aspects of Anuran Photexis and Color Vision	HEW/NIH	20,700	-0-
Wis.	Wisconsin, Univ. of	Warren, R.M.	Bio. Sci.	Perception of Temporal Order	HEW/NIH DOD/ARMY	61,000	-0-
Wis.	Wisconsin, Univ. of	Ney, P.	Mathematics	Branching Processes and Population Growth and Movement	HEW/NIH	16,700	-0-
Wis.	Marquette Univ.	Cremer	Chemistry		HEW/NIH	22,800	-0-
Wis.	Medical College of Wisconsin	Mehler, A.	Bio. Sci.	The Mechanism of Action of Enzymes	AEC	17,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Wis.	Wisconsin, Univ. of	Basu, A.P.	Mathematics	Life Testing and Reliability	DOD/USAF	17,000	-0-
Wis.	Wisconsin, Univ. of	Hirschfelder	Chemistry	Chemical Research	NASA	400,000	-0-
Wis.	Wisconsin, Univ. of	Scharer, J.E. Beyer, T.B.	Physics	Cyclotron Wave Plasma Experiment	AEC	8,000	-0-
Wis.	Wisconsin, Univ. of	Brandt, W.W.	Chemistry	Diffusion in Zeolites and Glasses	AEC	8,000	-0-
Wis.	Wisconsin, Univ. of	Dodd, R.A.	Chemistry	Creep Mechanisms in B.C.C. Crystals	AEC	27,100	-0-
Wis.	Wisconsin, Univ. of	Dahl	Chemistry	Chemical Research	HEW/NIH	62,000	-0-
Wis.	Wisconsin, Univ. of	Yu	Chemistry	Chemical Research	HEW/NIH	23,500	-0-
Wis.	Wisconsin, Univ. of	Zimmerman	Chemistry	Chemical Research	HEW/NIH	53,400	-0-
Wis.	Wisconsin, Univ. of		Mathematics	Probability and Renewal Theory	HEW/NIH	35,000	-0-
Wis.	Wisconsin, Univ. of	Beck, S.	Bio. Sci.	Insect-Plant Interactions	HEW/NIH	15,000	-0-
			State Subtotal			1,011,200	-0-

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RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual	Current Annual
Wyo.	Wyoming, Univ. of	Simon, W.G. Eldridge, H.B.	Physics	Nuclear Physics Studies	AEC	41,000	-0-
			State Subtotal			41,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
D.C.	Catholic University of America	Whang, Y.C.	Atmos. Sci.	Magnetohydrodynamic Structure of the Solar Wind	NASA	28,000	-0-
D.C.	Georgetown Univ.	Kumar, S.	Bio. Sci.	Comparative Properties of the Fatty Acid Synthetase from Mammalian Tissues	HEW/NIH	19,000	-0-
D.C.	Georgetown Univ.	Jorna, S. McClure, J.A.	Atmos. Sci.	Some Effects of the Atmosphere on the Propagation of a Laser Beam	DOD/USAF	20,000	-0-
D.C.	Catholic University of America	Eisch, J.	Chemistry	Chemical Research	HEW/NIH DOD/Army	16,600 17,500	-0-
D.C.	Catholic University of America	Timmins	Chemistry	Chemical Research	HEW/NIH	17,800	-0-
			State Subtotal			118,900	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Unk.	Unidentified			12 Projects	NASA	180,000	-0-
			Subtotal			180,000	-0-
				Subtotal All Projects (First Half of 1971)		28,000,000	(Rounded)
				Subtotal All Projects 1970 Listing		30,000,000	Rounded)
				Preliminary Data on Projects Identified During Last Half of 1971 by Agency:			
				DOD		23,000,000	
				HEW		1,000,000	
				AEC		16,000,000	
				NASA		1,000,000	
						41,000,000	
				TOTAL		99,000,000	

APPENDIX C

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ala.	Alabama A&M Univ.	George, M.C.	Eng.	Development of a Computer Code	NASA	22,716	
Ala.	Alabama, Univ. of	McKibbin, J.	Biological Sciences	Biosynthesis of the Glycolipids of Dog Intestine Mucosa	HEW/ NIH	20,000	-0-
Ala.	Oakwood, College	Cooper, E.A.	Biological Sciences	Synthesis of Ninhydrin Analogs	NASA	24,829	
Ala.	Talladega Univ.	George, A.	Physics	Insullators and Semi-Conductors	NASA	18,658	
Ala.	Tuskegee Institute	Erdey, R. A.	Computer	Develop Software Amtran 1620 Computer	NASA	24,501	
Ala.	Tuskegee Institute	Reames, F. M.	Physics	Growing of Insulating Magnetic Crystals	NASA	23,750	____
				State Subtotal		134,454	-0-

GRANTEES NOTIFIED DURING FY 1970 THAT THEIR FUNDING WOULD BE TERMINATED OR SIGNIFICANTLY REDUCED AT END OF GRANT PERIOD (ENDING DATE WILL OCCUR IN FY 1970, IN FY 1971, OR FIRST PART OF FY 1972).

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Alas.	Alaska, Univ. of	Peyton, Leonard	Biological Sciences	Geographic Organization of Migratory Fox Sparrows Nesting in Arctic and Subarctic Alaska	HEW/ NIH	15,000	-0-
			State Subtotal			15,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ariz.	Arizona St. Univ.		Eng	Heat and Charge Flow Through Oxide Insulations	Navy/ DOD	23,000	
Ariz.	Arizona St. Univ.		Physics	Classical and Quantum Electron Theory	Navy/ DOD	15,000	
Ariz.	Arizona, Univ. of		Physics	Physical Properties of Solids at High Pressures	USAF/ DOD	49,000	
Ariz.	Arizona, Univ. of	Weaver, A.B.	Multi	Multidisciplinary Research in Space Science and Technology	NASA	67,000	
Ariz.	Arizona, Univ. of	Quintas, F.	Chemistry	An Investigation of Steric and AEC Synergic Effects in Metal Chelates	AEC	12,000	-0-
Ariz.	Arizona, Univ. of		Chemistry	Development and Testing of Organic Reagents	AEC	16,000	
Ariz.	Arizona, Univ. of		Physics	To Measure Lamb Shift in Hydrogen-Like Atoms	AEC	30,000	
				State Subtotal		212,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ark.	Arkansas, Univ. of	Howick	Chemistry	Chemical Research	AEC	7,000	-0-
				State Subtotal		7,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Cal.	California Institute of Technology		Astronomy	Stellar Composition and Nuclear Processes	DOD USAF	75,000	-0-
Cal.	California Institute of Technology	Cohen, M.H.	Astronomy	High Resolution Studies of Discrete Radio Sources	DOD/ USAF	35,000	-0-
Cal.	California Institute of Technology	Robinson, G.W.	Chemistry	Chemical Research	DOD/ USAF	35,000	-0-
Cal.	California Institute of Technology		Physics	Nuclear and Electromagnetic Interactions with Matter	DOD/ Navy	75,000	-0-
Cal.	California Institute of Technology		Biological Sciences	Comparative Physiological Studies	DOD/ Navy	25,000	-0-
Cal.	California Institute of Technology		Oceanography	Pressure Effects on Marine Organisms	DOD/ Navy	25,000	-0-
Cal.	California Institute of Technology	Leighton, R.B.	Multi	Research in Physics and Astronomy	NASA	200,000	-0-
Cal.	California, Univ. of		Physics	Electronic Structure of Metals	DOD/ USAF	52,000	-0-
Cal.	Calif., Univ. of Berkeley	Streitwieser	Chemistry	Chemical Research	DOD/ USAF	30,000	-0-
Cal.	California, Univ. of Berkeley	Jury, Elihu	Mathematics	Bio-Control Systems	DOD/ USAF	24,000	-0-
Cal.	California Institute of Technology		Chemistry	Chemical Research	DOD/ USAF	200,000	-0-
Cal.	California Institute of Technology	Stanley, G.J.	Astronomy	Radio Star Interferometry (Owens Valley Observatory)	DOD/ Navy	425,000	

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Cal.	California, Univ. of	Rhodes, John	Mathematics	Contributions of Automata and Computing Theory to Information Processing Systems	DOD/USAF	12,000	-0-
Cal.	California, Univ. of		Mathematics	Application of Continuous and Discrete Time Stochastic Processes to Problems of Logistics and Research	DOD/USAF	15,000	
Cal.	California, Univ. of		Bio. Sci.	Continuum Mechanics of Biomedical Systems	DOD/USAF	52,000	
Cal.	California, Univ. of		Atmos. Sci.	Energetics of Aerospace Radiation Phenomena Investigated by Angular Intensity	DOD/USAF	21,000	
Cal.	California, Univ. of (Santa Cruz)	Berger, R.J.	Bio. Sci.	Rapid Eye Movement Sleep, Oculomotor Behavior and Binocular Vision	DOD/USAF NASA	20,000 15,000	-0-
Cal.	California, Univ. of (Los Angeles)	Clark	Physics		DOD/USAF	47,000	-0-
Cal.	California, Univ. of (Santa Clara)	Scuh	Physics		DOD/Navy	21,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Cal.	California, Univ. of		Engineering	Hydrologic Optics	DOD/Navy	16,000	
Cal.	California, Univ. of		Physics	Theory of Electronic Behavior in Solids Relating to Electrical, Optical and Magnetic Properties	DOD/Navy	47,000	
Cal.	California, Univ. of		Atmos. Sci.	Magnetic Fields as Related to Ionospheric and Magnetospheric Disturbances	DOD/Navy	80,000	
Cal.	California, Univ. of (Santa Barbara)	Offen	Engineering	Effects of Pressure and Temperature on Fluorescence of Materials	DOD/ Navy	29,000	-0-
Cal.	California, Univ. of		Physics	Magnetic and Superconducting Properties of Materials	DOD/ Navy	30,000	
Cal.	California, Univ. of		Soc. Sci.	Investigation of Pilot's Ability to control Navy Aircraft	DOD/ Navy	18,000	
Cal.	California, Univ. of			Astronomy	DOD/ USAF	200,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Cal.	California, Univ. of		Engineering	Systems or Dimensional Analysis of the R & D Process	DOD/ Navy	3,000	
Cal.	California, Univ. of		Engineering	Information Systems	DOD/Navy	3,000	
Cal.	California, Univ. of (Los Angeles)		Bio. Sci.	Nerve Cell Function Basic to Regenerating Nerve in Wounded Naval Personnel	DOD/ Navy	8,000	
Cal.	California, Univ. of - School of Medicine		Bio. Sci.	Computer Analysis of Nervous System Activities as Related to Fatigue	DOD/ Navy	26,000	
Cal.	California, Univ. of (Irvine)	Bunker	Chemistry	Theoretical Study of Bimolecular Reactions	DOD/Army	19,100	-0-
Cal.	California, Univ. of (Los Angeles)	Winstein	Chemistry	Chemical Research	DOD/Army	15,000	-0-
Cal.	California, Univ. of (San Diego)	Traylor	Chemistry	Correlation of Band Lengths With Orbital Hyridization	DOD/Army	20,000	-0-
Cal.	California, Univ. of		Mathematics	Research in the Theory of Riemannian Spaces	DOD/Army	90,000	
Cal.	California, Univ. of	Libby,W.F.	Multi.	Interdisciplinary Space-Oriented Research in the Physical, Biological, and Engineering Sciences	NASA	300,000	
Cal.	California, Univ. of (Los Angeles)	Ray, Dan S.	Bio. Sci.	Replication of Bacteriophage M-13	NIH	24,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Cal.	Southern California, University of	Neustadt, L.	Engineering	Optimal Control Theory for Systems Utilizing Operator Equations	DOD/USAF	30,000	20,000
Cal.	California, Univ. of	Chow, T. J.	Oceanography	The Detection and Geochemistry of Trace Elements in the Ocean (Lead Pollutents in Near Shore Marine Environments)	DOD/ Navy	47,000	
Cal.	Oakland University		Engineering	Mathematical Description of Visual and Auditory Perception in Navy Display Technology	DOD/ Navy	13,000	

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Cal.	California, Univ. of (Davis)	Musker	Chemistry	Chemical Research	HEW/NIH	27,000	-0-
Cal.	California, Univ. of (San Diego)	Linck	Chemistry	Chemical Research	HEW/NIH	21,000	-0-
Cal.	California, Univ. of (La Jolla)	Green	Bio Sci.	Functional Between Viral Nucleic Acids and Proteins	HEW/NIH	35,000	
Cal.	California, Univ of				HEW/NIH	28,000	
Cal.	City of Hope Medical Center	Kittredge, J.S.	Bio. Sci.	Biochemical Investigations of Chemoreception in Marine Invertebrates	DOD/Navy	36,400	17,000
Cal.	Institute of Medical Sciences		Bio. Sci.	Biochemical Aspects of Atrophy of Tissue As A Result of Lack of Use, With Particular Emphasis on Visual Structures	DOD/ Navy	18,800	
Cal.	Scripps Institution of Oceanography		Oceanography	Photosynthetic Radiation Measurements at Varying Depths in the Ocean	DOD/ Navy	16,000	
Cal.	Southern California, University of		Physics	Electron Probe Analysis of Semiconductors	DOD/USAF	38,000	
Cal.	Southern California, University of	Kroger	Chemistry	Chemical Research	DOD/USAF	50,000	
Cal.	Southern California, University of		Oceanography	Chemical and Pharmacological Characteristics of Toxin Associated with Red Tide	DOD/Navy	24,600	

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Cal.	Southern California, University of	Biel, W.C.	Multi.	Multidisciplinary Research	NASA	200,000	
Cal.	Southern California, University of	Mars, D.	Multi.	Multidisciplinary Research in the Management of Large Scale Public Programs	NASA	67,000	
Cal.	Stanford University	Flory	Chemistry	Physical and Mechanical Properties of Macromolecules	DOD/ USAF	115,000	-0-
Cal.	Stanford University		Engineering	Heterogeneous Nucleation in Vapor Deposition	DOD/ USAF	45,000	
Cal.	Stanford University		Bio. Sci.	Analysis of Macromolecules Using Scattering of Laser Radiation	DOD/Navy	15,000	
Cal.	Stanford University		Engineering	Reliability of Multistage Selection Technique in Automata and Machines	DOD/Navy	19,000	
Cal.	Stanford University		Bio. Sci.	Biochemics Studies of Detached Retina, Vestibular Apparatus (Inner Ear) and Other Body Components	DOD/ Navy	20,000	

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support: Agency	Previous Annual Amount	Current Annual Amount
Cal.	Stanford University	Feferman, S.	Mathematics	The Study of Proofs and Ordinals	DOD/Army	18,500	-0-
Cal.	Stanford University		Physics	Experiments On Quantum Fluids- Super Conductors	DOD/ Army	28,000	
Cal.	Stanford University	Djerassi	Chemistry	Chemical Research	HEW/NIH	56,000	-0-
Cal.	Stanford University		Chemistry	Chemical Research	HEW/NIH	37,000	-0-
Cal.	Stanford University	Wessells, N.K.	Bio. Sci.	Mechanisms of Organ Morpho- genesis	HEW/NIH	37,000	-0-
Cal.	Stanford Research Institute	Pinneo, L.	Bio. Sci.	Control of Purposive Movement Through Sequenced Eledtrical Stimulation of Brain Sites	DOD/ Navy	100,000	
Cal.	Stanford Research Institute	Schusterman,R.	Bio. Sci.	Determinants and Control of Underwater In A Pinniped	DOD/ Navy	35,000	
				State Subtotal		3,509,400	37,000

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Colo.	Colorado St. Univ.	Marschner, B.W.	Eng.	Biology and Engineering of Space and Planetary Life Systems	NASA	35,000	
Colo.	Colorado, Univ. of		Atmos.	Physics of the Solar Corona as Related to the Navy Environment	DOD /Navy	11,500	
Colo.	Colorado, Univ. of	Cristol	Chemistry	Chemical Research	HEW/NIH	35,000	-0-
Colo.	Colorado, Univ. of	King	Chemistry	Chemical Research	AEC	9,000	-0-
Colo.	Colorado, Univ. of	Walton	Chemistry	Chemical Research	AEC	13,000	-0-
Colo.	Colorado, Univ. of		Physics	High Energy Phenomena, Energetics of Sub-Nuclear Systems and Particle Dynamics	DOD/USAF	128,000	
Colo.	Denver, Univ. of	Ezra, A.A.	Engineering	The Exploitation of Unused NASA Patents	NASA	100,000	-0-
Colo.	Denver, Univ. of	Blackledge, J.	Engineering	Extending the Universities' Role in the Exploitation of Aerospace Technology	NASA	100,000	
Colo.	Denver, Univ. of		Physics	Support of Balloon-Borne Spectroscopy and Radiation Damage Studies	DOD/USAF	170,000	

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Colo.	Denver, Univ. of		Physics	Support of Balloon-Borne Spectroscopy and Radiation Damage Studies	DOD/USAF	170,000	-0-
				State Subtotal		601,500	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

Fiscal

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Conn	Connecticut, Univ. of		Physics	Electrical and Thermal Properties of Impure, Single Crystals	DOD/USAF	25,000	
Conn	Connecticut, Univ. of		Physics	Research and Facilities to Produce a Comprehensive Book on X-Ray Spectroscopy and X-Ray Physics	DOD/USAF	30,000	
Conn	Connecticut, Univ. of	Vasington, F.D.	Bio. Sci.	Enzymes Specified in Histidine B Gene	HEW/NIH	40,000	
Conn	Connecticut, Univ. of	Werbuff, S.	Bio. Sci.	Behavioral Effects of Nutrition Deficencies in Mice.	HEW/NIH	35,000	
Conn	Wesleyan University		Physics	Mossbauer Effect in the Study of Solids	DOD/USAF	30,000	
Conn	Wesleyan University		Astronomy	Establishing Reference System of Galaxies for Determining Fundamental Star Positions	DOD/Navy	5,000	-0-
Conn	Yale University	Clemence, G.	Mathematics	Celestial Mechanics	DOD/USAF	37,000	-0-
Conn	Yale University	Rickart, C.E.	Mathematics	Mathematics (Gibbs Instructorship)	DOD/USAF	17,000	-0-
Conn	Yale University	Berson	Chemistry	Chemical Research	DOD/USAF	65,000	-0-
Conn	Yale University		Earth Sci.	Earthquake Sources	DOD/USAF	16,000	
Conn	Yale University		Physics	Atomic Scattering of Electrons	DOD/Navy	20,000	
Conn	Yale University		Bio. Sci.	Neurological Mechanisms Underlying Physiological Changes	DOD/Navy	23,000	

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support: Agency	Previous Annual Amount	Current Annual Amount
Conn	Yale University		Physics	Positronium	ARPA	90,000	-0-
Conn	Yale University	McBride	Chemistry	Chemical Research	HEW/NIH	19,000	-0-
Conn	Yale University	Wasserman	Chemistry	Chemical Research	HEW/NIH	47,000	-0-
Conn	Connecticut, Univ. of	Reynolds	Physics		DOD/USAF	40,000	-0-
Conn	Yale University	Hughes	Physics		DOD/USAF	45,000	-0-
				State Subtotal		584,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Dela.	Delaware St. Univ.	Gilchrist,Jason	Physics	Specific Heat Platinum	NASA	9,061	-0-
			State Subtotal			9,061	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Fla.	Fla. State Univ.		Oceans	Spectroreflectivity Determination of Sonic Scattering Layer Occurrence	DOD/Navy	36,000	
Fla.	Fla. State Univ.	Linder	Chemistry	Chemical Research	AEC	15,000	-0-
Fla.	Fla.,Univ. of		Physics	Meson Theoretical Potentials for Nuclear	DOD/USAF	39,000	
Fla.	Fla., Univ. of	Butler	Chemistry	Chemical Research	DOD/USAF	33,000	-0-
Fla.	Fla., Univ. of	Battiste	Chemistry	Chemical Research	DOD/USAF	28,000	-0
Fla.	Fla., Univ. of	Schmid	Chemistry	Chemical Research	DOD/USAF	10,000	-0-
Fla.	Fla., Univ. of	Grinter, L.E.	Multi	Research in Space-Related Sciences	NASA	75,000	
Fla.	Fla., Univ. of		Bio. Sci.	Environmental Stimuli: Utilized in Navigation	DOD/Navy	35,000	
Fla.	Fla., Univ. of	McKerns	Bio. Sci.		HEW/NIH	31,000	
Fla.,	Fla., Univ. of	Chen, Kwan Yu	Astronomy	Photoelectric Photometry of Selected Eclipsing Binary	NASA	6,000	-0-
Fla.	Miami, Univ. of	Curtiss, J.	Mathematics	Interpolation Theory	DOD/USAF	19,000	-0-
Fla.	Miami, Univ. of	McKnight, J.	Mathematics	Automata Theory	DOD/USAF	19,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Fla.	Miami, Univ. of		Physics	Relativistic Plasma Physics	DOD/USAF	28,000	-0-
Fla.	Miami, Univ. of		Oceano	Role of Wind-Borne Continental Dust in Ocean Sedimentation Processes	DOD/Navy	43,000	
Fla.	Miami, Univ. of		Oceano	Determination of the Equation of State, Viscosity and compressibility of Sea Water	DOD/Navy	68,000	
Fla.	Miami, Univ. of	Man, E.H.	Multi	Multidisciplinary Research in Space Sciences	NASA	150,000	
Fla.	Miami, Univ. of	Fisher, D.E.	Earth Sci.	Neutron Activation Analysis Studies in Iron Meteorites	AEC	24,000	-0-
Fla.	Florida State U.		Physics	Nuclear Accelerator Lab.	DOD/USAF	324,000	
				State Subtotal		$983,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ga.	Emory University	Johnson	Chemistry	Compounds of Niobium	DOD/USAF	20,400	-0-
Ga.	Georgia Institute of Technology		Eng.	Properties of Dielectrics Subjected to Electro-magnetic Radiation with Wavelength in the Sub-millimeter (Far Infrared) Range	DOD/Navy	13,000	
Ga.	Georgia Institute of Technology	Crawford, V.	Multi	Multidisciplinary Research in Space Science & Technology	NASA	150,000	
Ga.	Georgia, Univ. of	King	Chemistry	Coordination Compounds of Transition Metals	DOD/USAF HEW/NIH	48,800 48,000	-0- -0-
Ga.	Georgia, Univ. of		Physics	EPR Spectrometry	DOD/USAF	26,600	
Ga.	Georgia, University	Taylor, R.	Bio. Sci.	The Integration of Antennal Sensory Input by the Antennal Neuropiles in the Crayfish	DOD/USAF HEW	25,000	-0-
				State Subtotal		331,800	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ha	Bernice P. Bishop Museum		Oceano	Dispersal of Oceanic Air-Borne Insects	DOD/Navy	39,000	
Ha	Hawaii, Univ. of		Social Sci.	How Navy Men Develop Their Attitudes Toward Re-enlistment	DOD/Navy	42,600	
Ha	Hawaii, Univ. of		Astronomy	Measurement of Celestial Radianu Background Sources	DOD/USAF	21,000	
Ha	Hawaii, Univ. of	Fawd, R.M.	Engineering		DOD/Navy	25,000	
				State Subtotal		127,600	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ill.	Chicago, Univ. of	Lebovitz, N.R.	Mathematics	Structural Stability of Rotating Fluid Systems	USAF DOD	17,000	-0-
Ill.	Chicago, Univ. of		Physics	Studies of Meson-Baryon Interactions	USAF DOD	26,000	
Ill.	Chicago, Univ. of	Nachtrieb	Physics	Magnetic and Optical Properties of High Temperature Liquid and Solid Systems	USAF DOD	46,316	
Ill.	Chicago, Univ. of	Ast	Astronomy	Solar Flare Phenomena and Electromagnetic and Particle Environment of Space Radiation Hazards	DOD/ USAF	140,000	
Ill.	Chicago, Univ. of		Atmos. Sci.	Statistical Mechanics of Complex Systems	Navy DOD	15,000	
Ill.	Chicago, Univ. of		Physics	Gravitational Radiation and Dynamics of Fluid Systems	Navy DOD	40,000	-0-
Ill.	Chicago, Univ. of	Stout	Physics	Ferromagnetic and Antiferromagnetic Materials at Low Temperatures	Navy DOD	20,000	-0-
Ill.	Chicago, Univ. of	Chandrasekhar	Physics		Navy DOD	60,000	-0-
Ill.	Chicago, Univ. of	Abella	Physics		Army DOD	22,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ill.	Chicago, Univ. of		Physics	Theory of Properties and Structure of Crystals, Glasses, Liquids, and Organic Materials	DOD/Navy	29,000	
Ill.	Chicago, Univ. of	Yang	Chemistry	Chemical Research	AEC	27,000	-0-
Ill.	Chicago, Univ. of	Kaplansky, I.	Mathematics	Investigations in Mathematics	DOD/Army	9,000	-0-
Ill.	Chicago, Univ. of	Chiang, K.S.	Bio. Sci.	Molecular Mechanism of Non-Mendelian Inheritance	HEW/NIH	26,000	-0-
Ill.	Chicago, Univ. of	Haselkorn, R.	Bio. Sci.	Blue-Green Algae: Mutants and Transduction	HEW/NIH	60,000	36,485
Ill.	Illinois, Univ. of		Physics	Theory of Solids and Condensed Matter	DOD/USAF	65,000	
Ill.	Illinois, Univ. of		Physics	Defects in CsCl Ordered Alloys	DOD/USAF	32,000	
Ill.	Illinois, Univ. of	Mittra, R.	Engineering	Modified Wiener-Hopf Equation Applied to Boundary Value Problems	DOD/USAF	17,000	-0-
Ill.	Illinois, Univ. of	Snyder	Chemistry	Chemical Research	DOD/Army	14,300	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support: Agency	Previous Annual Amount	Current Annual Amount
Ill.	Illinois, Univ. of	Yankwich	Chemistry	Isotope Effects and Chemical Kinectics	AEC	29,000	-0-
Ill.	Illinois, Univ. of	Drago	Chemistry	Chemical Research	AEC	10,000	-0-
Ill.	Illinois, Univ. of	Hanlon	Bio. Sci.	Interaction of Nucleic Acids	HEW/NIH	16,000	
Ill.	Northwestern Univ.	Schlag	Chemistry	Vibrationally Excited Molecules	DOD/USAF	43,831	-0-
Ill.	Northwestern Univ.	Burwell	Chemistry	Chemical Research	DOD/USAF	14,000	-0-
Ill.	Northwestern Univ.	Mahowald, M.	Mathematics	Research in Algebraic Topology	DOD/Army	28,000	-0-
Ill.	Northwestern Univ.	Epstein, M.	Engineering	Transduction Techniques for Acoustic Surface-Wave Devices	Jt.Svs. DOD	16,000	-0-
Ill.	Northwestern Univ.		Chemistry	Use of C-14 and Tritium in the Study of Catalyzed Reactions of Hydrocarbons and Alcohols	AEC	36,000	-0-
Ill.	Northwestern Univ.	Brown, L.M.	Physics	Theory of Fundamental Particles	DOD/USAF	145,000	-0-
Ill.	Northwestern Univ.	Brown, F.	Bio. Sci.	Influence of Weak Extra-Photic Electromagnetic Fields on Organismic Responses to Light	NASA DOD/??	50,000	
				State Subtotal		$1,053,447	36,485

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ind.	Indiana Univ.	Springer, G.	Mathematics	Mathematical Analysis (Hlavaty Instructorships)	DOD/USAF	10,000	-0-
Ind.	Indiana Univ.	Bonham	Chemistry	Chemical Research	DOD/USAF	73,000	-0-
Ind.	Indiana Univ.	Seifert	Chemistry	Chemical Research	AEC	5,000	-0-
Ind.	Indiana Univ.	Bair	Chemistry	Chemical Research	DOD/USAF	25,000	-0-
Ind.	Notre Dame, Univ. of	Eliel	Chemistry	Chemical Research	DOD/USAF	24,000	-0-
Ind.	Purdue Univ.	Andrews, F.N.	Multi	Multidisciplinary Research in Space Science and Engineering	NASA	133,000	
Ind.	Purdue Univ.	Mullen, J. G.	Chemistry	Mossbauer Studies of the Properties of Solids	AEC	32,000	-0-
Ind.	Indiana Univ.	Bent, R. D.	Physics	Nuclear Structure and Nuclear Processes	DOD/Navy	110,000	-0-
Ind.	Purdue Univ.		Chemistry	Chemical Research	DOD/Army	16,500	-0-
Ind.	Purdue Univ.	Mueller	Chemistry	Chemical Research	Interior	30,000	-0-
Ind.	Purdue Univ.	Sorkin, Robt.	Biological Sciences	Studies of Auditory Signal Processing	HEW/NIH	5,000	-0-
				State Subtotal		463,500	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Iowa	Iowa State Univ. of Science & Tech.		Bio. Sci.	AF Rabies Problems: Research on Better Prevention in S.E. Asia and Other Epidemic Areas	DOD/ USAF	29,000	
Iowa	Iowa, Univ. of	Gordon	Chemistry	Chemical Research	Interior	30,000	-0-
Iowa	State Univ. of Iowa	Doyle	Chemistry	Chemical Research	DOD/ USAF	9,000	-0-
Iowa	Iowa State Univ.	Schuster, D.	Bio. Sci.	Training Operantly of Problem Drivers While Under Stress	HEW	50,000	-0-
			State Subtotal			118,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ky.	Kentucky, Univ. of	Dawson	Chemistry	Chemical Research	AEC	10,000	-0-
Ky.	Kentucky, Univ. of	Sands	Chemistry	Chemical Research	AEC	30,000	-0-
Ky.	Louisville, Univ. of	Lawill, T.	Bio. Sci.	Visual Science Research	HEW/NIH	30,000	
Ky.	Louisville, Univ. of	Dillon, J.A.Jr.	Multi.	Basic Research in Physical Engineering and Life Science	NASA	44,000	
Ky.	Murray State Univ.		Physics	Properties of Nuclear Induced Highly Ionized Particles Including Atomic Spectra Charge States and Stopping Power	DOD/, Navy	30,000	
Ky.	Louisville, Univ. of	Thurmond, J.	Bio. Sci.	Behavioral Effects of Stressful Environments	DOD/ Army	97,100	-0-
			State Subtotal			241,100	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
La.	Louisiana State Univ. in New Orleans	Griffin	Chemistry	Chemical Research	DOD/ Army	18,000	-0-
La.	Louisiana State Univ. in New Orleans	Stocker	Chemistry	Chemical Research	AEC	11,000	-0-
La.	Louisiana State Univ.	Callaway	Physics	Atomic Scattering Theory	DOD/ Navy	17,000	-0-
				State Subtotal		46,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Me.	Maine, Univ. of	Freeman, S.L.	Multi.	Interdisciplinary Studies in Space-Related Science and Technology	NASA	$30,000	- 0 -
			State Subtotal			$30,000	- 0 -

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Md.	Bowie St. Univ.	Tornabene, Hugh	Physics	Cosmic Ray Physics	NASA	24,684	
Md.	Johns Hopkins Univ.		Biology	Bioacoustic Behavior of Pinnipeds (Seal and Sea Lions)	DOD/Navy	37,000	
Md.	Johns Hopkins Univ.	Everett	Chemistry	Study of Catalytic Surfaces and the Mechanisms of Catalytic Reactions	AEC	21,000	-0-
Md.	Johns Hopkins Univ.		Physics	Spectra of Doubly and Triply Ionized Rare Earths	DOD/USAF	30,000	
Md.	Johns Hopkins Univ.	Koski	Chemistry	Chemical Research	DOD/USAF	39,000	-0-
Md.	Johns Hopkins Univ.		Engineering	USAF Flight Safety Research Studies of the Bird/Aircraft Collision Problem	DOD/USAF	35,000	
Md.	Maryland, Univ. of	Atkinson	Chemistry	Chemical Research	Interior	30,000	-0-
Md.	Maryland, Univ. of	Rheinholdt, W.C.	Multi	Multidisciplinary Research on the Application of High Speed Computers to Space-Related Problems	NASA	230,000	
Md.	Maryland, Univ. of		Physics	Properties of Liquids and Liquid Crystals	DOD/Navy	17,000	

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Md.	Maryland, Univ. of	Alkinson	Chemistry	Chemical Equalibria in Sea Water and Their Effect on Acoustic Properties	DOD/Navy	35,000	-0-
Md.	Maryland, Univ. of		Engineering	Low Noise Detectors	DOD/Navy	25,000	
Md.	Maryland, Univ. of		Physics	Electromagnetic and Critical Phenomena in Solids	DOD/USAF	66,000	
Md.	Maryland, Univ. of	Grim	Chemistry	Chemical Research	DOD/USAF	21,000	-0-
Md.	Maryland, Univ. of		Mathematics	Statistical Aspects of Complex Systems	DOD/Navy	16,300	
Md.	Maryland, Univ. of		Engineering	An Optical Interferometric Method to Eliminate the Atmospheric Degradation of Resolution	DOD/USAF	25,000	
Md.	Maryland, Univ. of		Physics	Anomalously Large Scattering of Light by Fluids Near the Critical Point	DOD/Navy	35,000	
Md.	Maryland, Univ. of	Dorfman	Physics		DOD/Army	30,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Md.	Maryland, Univ. of	Tietelbaum, H.	Biological Sciences	Interhemispheric Transfer and Neural Equivalence	HEW/NIH	23,000	-0
Md.	Maryland, Univ. of		Atmospheric Sciences	Aerospace Radiation Interaction Investigations Using Energy Absorption Calorimeter	DOD/USAF	193,000	
Md.	Maryland, Univ. of	Kellogg, B.	Mathematics	Numerical Solution of Partial Differential Equations	DOD/USAF DOD/Navy	15,000 15,000	-0
Md.	Morgan State Univ.	Collagan, R.B.	Astronomy	Programmed Course in Astronomy	NASA	16,165	
Md.	Morgan State Univ.	Silversmith, M.F.	Chemistry	Photochromism	NASA	6,407	-0
				State Subtotal		985,556	-0

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Mass	Boston College	deBethune	Chemistry	Chemical Research	DOI	$ 30,000	-0-
Mass	Boston Research Institute	Lehrer	Biological Sciences		NIH	34,000	
Mass	Boston University	Roman	Physics	High Energy Phenomena, Particle Dynamics, and Conservation Laws	DOD/USAF	36,000	
Mass	Clark University	Brenner	Chemistry	Chemical Research	AEC	22,000	-0-
Mass	Harvard University	Gougoutas	Chemistry	Chemical Research	DOD/USAF	53,000	-0-
Mass	Harvard University	Kistiakowsky	Chemistry	Gas Reaction Kinetics of Chemical Propulsion	DOD/Navy	23,000	-0-
Mass	Harvard University		Physics	Study of Nuclear Properties in the Superconducting State Using Mass Spectrometer, Using NMR	DOD/Navy	111,000	
Mass	Harvard University		Physics	Nuclear and Electromagnetic Interactions as Related to Prediction of Radiation Effects and Shielding	DOD/Navy	43,000	
Mass	Harvard University	Carrier	Atmospheric Sciences	Ocean Wave Propagation and Meteorological Phenomena Such As The Dynamics of Hurricanes	DOD/Navy	23,000	
Mass	Harvard University		Biological Sciences	Mechanism and Utility of Bioluminescence	DOD/Navy	29,000	

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Mass	Harvard University	Levine, R.P.	Biology	Genetic Control of Chloroplast Structure and Function in Chlamydomonas Reinhardi	HEW/NIH	24,000	-0-
Mass	Massachusetts Inst. of Technology	Seyferth	Chemistry	Reactive Intermediates	DOD/USAF	39,000	-0-
Mass	Massachusetts Inst. of Technology	House	Chemistry	Use of Organometallic Reagents in the Synthesis of Structurally Specific Organic Materials	DOD/USAF	36,000	-0-
Mass	Massachusetts Inst. of Technology	Ray	Mathematics	Algebra, Analysis and Topology (Moore Instructorships)	DOD/USAF	38,000	-0-
Mass	Massachusetts Inst. of Technology	Segal, I.	Mathematics	Global Analysis	DOD/USAF	59,000	-0-
Mass	Massachusetts Inst. of Technology		Physics	Investigation of Atomic and Molecular Processes	DOD/USAF	54,000	
Mass	Massachusetts Inst. of Technology		Physics	National Magnet Laboratory (Reduction in support level)	DOD/USAF	450,000	
Mass	Massachusetts Inst. of Technology (NEROC)	Sebring	Astronomy	"Haystack" Observatory	DOD/USAF	1,500,000	
Mass	Massachusetts Inst. of Technology		Biological Sciences	Peristalitic Pumps and Associated Fluid Flows in Abnormal Environments	DOD/Navy	5,0[illegible]	
Mass	Massachusetts Inst. of Technology		Physics	Intermolecular Forces	DOD/Navy	24,3[illegible]	

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Mass	Massachusetts Inst. of Technology		Bio. Sci.	Control of Dental Caries by Dietary Means	DOD/Navy	20,000	
Mass	Massachusetts Inst. of Technology	Seyferth	Chemistry	Chemical Research	DOD/Army	23,000	-0-
Mass	Massachusetts Inst. of Technology	Whitehead, G.W.	Mathematics	Homotopy Theory and Differential Topology	DOD/Army	35,000	-0-
Mass	Massachusetts Inst. of Technology	Sacks, G.E.	Mathematics	Recursion Theory and Its Generalizations - Computability	DOD/Army	11,000	-0-
Mass	Massachusetts Inst. of Technology		Chemistry	Thermodynamic, Spectral, and Structural Studies of Complex Ions	AEC	42,000	-0-
Mass	Massachusetts Inst. of Technology	Schiller, P.H.	Bio. Sci.	Neuropsychological Studies of Visuo-Motor Control	HEW/NIH	30,000	-0-
Mass	Massachusetts Inst. of Technology	Brown, G.	Bio. Sci.	Metabolic Significance of the Enzymatic Methylation of Nucleic Acids	HEW/NIH	23,000	
Mass	Massachusetts, University of		Chemistry	Inorganic Coordination Compounds	DOD/USAF	10,000	-0-
Mass	Massachusetts, University of		Physics	Basic Theory of Binding Forces and the Properties of Simple Solids and Liquids	DOD/Navy	13,000	

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Mass	Tufts University	Haas	Chemistry	Chemical Research	DOD/USAF	21,000	-0-
Mass	Tufts University	Kaczmarczyk	Chemistry	Chemical Research	DOD/USAF	12,000	-0-
Mass	Tufts University		Astronomy	Balloon-Borne Infrared Measurements	DOD/USAF	306,000	-0-
Mass	Woods Hole Oceanographic Institution		Oceanography	Ocean Sound Propagation	DOD/Navy	24,000	-0-
Mass	Woods Hole Oceanographic Institution	Von Herzen	Oceanography	Ocean-Bottom Geothermal Measurements As They Relate to Deep-Ocean Circulation, Sedimentary Processes, and the Tectonic/Volcanic Activity on the Sea Floor	DOD/Navy	85,000	-0-
Mass	Woods Hole Oceanographic Institution	Carey, F.	Bio. Sci.	Ecology of Warm-Bodied Fishes	HEW/NIH	23,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Mass.	Harvard University	Pound, R. V.	Physics	Resonance and Radiation Physics	Navy DOD	$54,000	
Mass.	Boston University	Siegel	Physics		USAF DOD	25,000	-0-
Mass.	Boston University	Laursen,R.A.	Bio. Sci.	Structure and Mechanism of Action of Enzymes	HEW/NIH	20,000	-0-
Mass.	Mass. Inst. of Tech.	Javan	Physics		NASA	54,000	-0-
Mass.	Massachusetts, Univ. of	Mullin	Physics		Navy DOD	13,000	-0-
				State Subtotal		$3,477,300	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Mich.	Michigan St. Univ.	Carlson, G.H.	Physics	Study of Interactions Between f-Shell Transition Ions in Non-Metallic Crystals	AEC	30,000	-0-
Mich.	Michigan St. Univ.	Brubaker, C.H.Jr.	Chemistry	Effects of Polyfunctional Anoins on Electronic-Transfer Between Metal Ions in Solution	AEC	18,000	-0-
Mich.	Michigan St. Univ.	Leroi	Physics	Raman Effects from Molecules and Crystals	DOD/Navy	50,000	
Mich.	Michigan St. Univ.		Engineering	Nuclear and Electromagnetic Interaction Studies Using Group Theory Needs	DOD/Navy	47,500	
Mich.	Michigan, Univ. of		Astronomy	Radio Pulses from Cosmic Ray Showers	DOD/USAF	36,000	
Mich.	Michigan, Univ. of		Physics	Theory of Weak Interactions and Electrodynamics	DOD/USAF	22,000	
Mich.	Michigan, Univ. of		Astronomy	Radio Astronomy Observations and Instrumentation		20,000	
Mich.	Michigan, Univ. of	Rulfs	Chemistry	Chemical Research	AEC	12,000	-0-
Mich.	Michigan, Univ. of		Engineering	Stability and Second Flows in Stratified Fluids	DOD/Army	18,000	

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Mich.	Wayne State Univ.	Livingston, H.K.	Chemistry	Controlled Polymerization of Absorbed Monolayers	AEC	18,000	-0-
Mich.	Wayne State Univ.	Linn	Chemistry	Luminescence of Organic Molecules	DOD/Army	12,000	-0-
Mich.	Wayne State Univ.	Jasper	Chemistry	Chemical Research	AEC	10,000	-0-
Mich.	Wayne State Univ.	Raban	Chemistry	Chemical Research	NIH	14,000	-0-
Mich.	Wayne State Univ.	Gayer	Chemistry	Chemical Research	AEC	10,000	-0-
Mich.	Michigan, Univ. of	Haddock	Astronomy	Radio Astronomy	DOD/Navy	40,000	-0-
Mich.	Michigan, Central University	Rayne	Physics		DOD/USAF	40,000	-0-
Mich.	Michigan, Central University	Berger	Physics		DOD/Army	21,000	-0-
				State Subtotals		418,500	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Minn	Minnesota, Univ. of	Hexter	Chemistry	Chemical Research	DOD/USAF	$ 35,000	-0-
Minn	Minnesota, Univ. of	Winkler	Atmos.Sci.	Primary Cosmic Radiation: Its Interactions With the Ionosphere; Its Effects on Communications and on Space Vehicles and Instruments	DOD/ Navy	138,000	-0-
Minn	Minnesota, Univ. of		Astronomy	Proper Motions for Increasing Accuracy of Stellar Positions	DOD/ Navy	12,000	-0-
Minn	Minnesota, Univ. of		Chemistry	Chemical Research	DOD/ Army	15,000	-0-
Minn	Minnesota, Univ. of		Chemistry	Vibrational Spectroscopy	DOD/ Army	19,100	-0-
Minn	Minnesota, Univ. of	Cahill, L.	Multi	Multidisciplinary Research in Space Science and Technology	NASA	135,000	
Minn	Minnesota, Univ. of		Physics	Effect of Short-Range Order on Mechanical Properties of Alloys	AEC	20,000	
				State Subtotal		374,100	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Mo.	Missouri, Univ. of	Shiffman, R.	Multi	Multidisciplinary Space-Related Research	NASA	65,000	
Mo.	Missouri, Univ. of at Kansas City	Cheng	Chemistry	Chemical Research	DOI	30,000	-0-
Mo.	Washington Univ.	Pake, G.E.	Multi	Multidisciplinary Research in Space Sciences	NASA	130,000	
Mo.	Washington Univ.	Morgan, R.	ENG	Application of Satellite Communications to Educational Development	NASA	100,000	
Mo.	Washington Univ.	Schlessinger,D.	Bio. Sci.	Comparison of E Coli Ribosones	HEW/NIH	41,000	
Mo.	Washington Univ.	Geller, D.	Biological Sciences	Mechanisms of the Photophosphorylation Reaction in Biological Systems	HEW/NIH	20,000	-0-
Mo.	Washington Univ.	Kennell, D.E.	Biological Sciences	Gene Expression of Bacteria and Bacteria Viruses	HEW/NIH	18,000	-0-
Mo.	Washington Univ.	Norborg	Physics		DOD/Army	34,000	-0-
					State Subtotal	438,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Mont.	Montana St. Univ.	Dayton, I.E.	Multi.	Research in Space Sciences and Engineering	NASA	$67,000	- 0 -
			State Subtotal			$67,000	- 0 -

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.H.	Dartmouth College		Eng.	Hydromagnetic Wave Particle Beam Interactions	DOD/ USAF	$33,000	-0-
				State Subtotal		$33,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.J.	Princeton University		Social Science	Investigation of Skilled Muscular Response Learning of Naval Tasks	DOD/Navy	24,000	
N.J.	Princeton University	Dicke	Physics	Gravitation, Solar Radiometry, Thermal Radiation, and Communications	DOD/ Navy	60,000	-0-
N.J.	Princeton University (Now at Penna.StateU.)	Horrocks	Chemistry	Chemical Research	DOD/USAF	25,000	
N.J.	Princeton University	Eckstein	Social Sciences	The Social Bases of Governmental Performance	DOD/ ARPA	150,000	-0-
N.J.	Princeton University		Social Science	Identification of Factors Which Make Navy Organization Resist Change	DOD/ Navy	24,000	
N.J.	Princeton University	Newton, W.A.	Biological Sciences	Mechanism and Control of Gene Expression	HEW/NIH	30,000	-0-
N.J.	Princeton University	Kohn, J.J. & Spencer, D.C.	Mathematics	Partial Differential Equations	DOD/ Army	36,000	-0-
N.J.	Princeton University	Dwork	Mathematics	Finite Fields - Differential Equations	DOD/ Army	29,000	-0-
N.J.	Rutgers University	Horton	Physics		DOD/ USAF	30,000	-0-
N.J.	Rutgers University	Chen,T.A.	Biological Sciences	Nematode Vectors of Soil Borne Viruses	HEW/NIH	44,000	-0-
N.J.	Princeton Univ.	White, M.G.	Physics	Penn-Princeton Accelerator	AEC	1,200,000	-0-
				State Subtotal		1,652,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.M.	Holloman AFB		Bio. Sci.	Primate Center	DOD/USAF	1,000,000	
N.M.	N. Mexico St. Univ.	Momagle, J.	Multi.	Multidisciplinary Research in Space Science and Engineering	NASA	30,000	
N.M.	N. Mexico St. Univ.	Kahn	Chemistry	Chemical Research	AEC	8,000	-0-
N.M.	N. Mexico, Univ. of	Rosenthal, A.H.	Social Science	Program for Advanced Study in Public Science Policy and Administration	NASA	150,000	
				State Subtotal		1,188,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support			
					Agency	Previous Annual Amount	Current Annual Amount	D O F
N.Y.	Albany Medical College of Union University		Bio. Sci.	A.F. Personnel Non-Effectiveness Due to Viral Disorders	DOD/USAF	$ 20,000		
N.Y.	American Museum of Natural History		Oceanography	Functional Significance of Underwater Sound Production in Coastal Fishes	DOD/Navy	14,000		
N.Y.	Brooklyn, Polytech. Institute of	Cassedy, E.S.	Engineering	Parametric Interaction of Light Waves and Lattice Vibrations	DOD/USAF	25,000	-0-	
N.Y.	Brooklyn, Polytech. Institute of		Physics	Quantum Theory of Coherent Laser Light and Non-Linear Optics	DOD/Navy	20,000		
N.Y.	Brooklyn, Polytech. Institute of	Steigman	Chemistry	Chemical Research	AEC	26,000	-0-	
N.Y.	Clarkson College of Technology	Estrin	Chemistry	Chemical Research	AEC	2,000	-0-	
N.Y.	Columbia University		Astronomy	Magnetic Fields in Stars and Galaxies	DOD/USAF	56,000	-0-	
N.Y.	Columbia University		Bio. Sciences	Production and Use of Antibodies Specific For Nucleic Acids in Control of Life Processes	DOD/Navy	21,000		
N.Y.	Columbia University	Be, A.W.H.	Oceanography	Studies of Pteropoda and Zooplankton Standing Stock in the South Atlantic	DOD/Navy	56,000	-0-	
N.Y.	Brookdales Hospital Center, Brooklyn, N.Y.	Valentine, J.	Social Sci.	Anthropology	HEW/NIH	106,000	-0-	

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.Y.	Fordham University	Gentile	Chemistry	Chemical Research	AEC	20,000	-0-
N.Y.	New York, City Univ. of (Mt. Sinai)	Beattie, D.	Bio. Sci.	Mitrochondrial Biognosis in Yeast	HEW/NIH	24,776	
N.Y.	New York, City Univ. of		Chemistry	Ion Exchange Resins	AEC	17,000	
N.Y.	New York, City College Research Foundation		ENG	Kondo Effect in Dilute Alloys Useful For Improved Electronic and Magnetic Solid State Components	DOD/ USAF	63,000	
N.Y.	New York, State University of	Goldfarb	Chemistry	Chemical Research	DOD/ USAF	31,000	-0-
N.Y.	New York, State University of		Physics	Axiomatic Quantum Field Theory and Scattering of Elementary Particles	DOD/ USAF	26,000	
N.Y.	New York, State Univ. of (Buffalo)	Padwa	Chemistry	Chemical Research	DOD/ USAF	15,000	-0-
N.Y.	New York, State University of		Physics	Description of Stellar Plasmas for Application to High Temperature Plasma Systems	DOD/ Navy	16,000	
N.Y.	New York, State Univ. of (Buffalo)	Tufariello	Chemistry	Chemical Research	DOD/ Army	18,000	-0-
N.Y.	New York, State Univ. of (Buffalo)	Harris	Chemistry	Chemical Research	AEC	5,000	-0-
N.Y.	New York, State Univ. of (Buffalo)	Collins	Chemistry	Chemical Research	AEC	8,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.Y.	Columbia University	Srinivasan	Bio. Sci.		HEW/NIH	37,000	
N.Y.	Columbia University	Turro	Chemistry	Chemical Research	HEW/NIH	43,000	-0-
N.Y.	Cornell University		Astronomy	Pulsars	DOD/USAF	193,000	
N.Y.	Cornell University		Atmos. Sci.	Effects of High Altitude Nuclear Detonations and Natural Occurring Radiations on Naval Communication Systems	DOD/Navy	50,000	-0-
N.Y.	Cornell University		Chemistry	Chemical Research	DOD/Army	18,000	-0-
N.Y.	Cornell University	Petengill, G.	Astronomy	Arecibo Observatory (Reduction of Support)	DOD/ARPA	300,000	-0-
N.Y.	Cornell University		ENG.	Radiation Damage Studies Using the Cornell 3.0 MeV Dynamitron Accelerator	AEC	21,000	
N.Y.	Cornell University	Plane	Chemistry	Chemical Research	DOI	30,000	-0-
N.Y.	Cornell University	Widom	Chemistry	Chemical Research	DOI	30,000	-0-
N.Y.	Cornell University	Ross, A.F.	Biology	Induced Resistance and Virus Localization in Hypersensitive Plant Hosts	HEW/NIH	47,000	-0-
N.Y.	Cornell University	Meinwald, J.	Chemistry	Photochemistry and Highly Strained Bridged Systems	HEW/NIH	39,300	-0-
N.Y.	American Museum	Tavolga, W.	Bio. Sci.	Sensory Capacities in Fishes	DOD/Navy	10,000	-0-
N.Y.	Health Research, Inc.	Moley, F.	Bio. Sci.	Regulatory Reactions Involved in Thymedylate Biosynthesis	HEW/NIH	20,700	-0-

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.Y.	New York, State Univ. of (Buffalo)	Cadenhead	Chemistry	Chemisorption Studies of metal Alloy-Gaseous Interflows	AEC	12,000	-0-
N.Y.	New York, State Univ. of (Buffalo)	Dannhauser	Chemistry	Chemical Research	DOL	30,000	-0-
N.Y.	New York, State Univ. of (Buffalo)	Lansbury	Chemistry	Chemical Research	HEW/NIH	29,000	
N.Y.	New York, State University of - Research Foundation		Oceanography	Coral Reef Growth and Dynamics	DOD/NAVY	39,000	
N.Y.	New York University	Ghausi, M.S.	Engineering	Active Networks Compatible With Integrated Circuits	DOD/USAF	25,000	-0-
N.Y.	New York University		Physics	Atomic Scattering in Quantum Magnetometers	DOD/NAVY	22,000	
N.Y.	New York University	Ragazzini,J	Engineering	Space-Related Research in Areas of Fluid and Solid Mechanics	NASA	65,000	
N.Y.	New York University Medical Center		Bio. Sciences	Blood Groups and Immunological Factors in Primates	DOD/ USAF	20,000	
N.Y.	Public Health Svs., City of New York	Dabnau, D.	Bio. Sciences	Gene Conversion in Bacillus Species	HEW/NIH	28,000	-0-
N.Y.	Public Health Svs., City of New York	Oishi, M.	Bio. Sci.	Molecular Events, Gene Function and DNA Replication in Microorganisms	HEW/NIH	26,000	-0-
N.Y.	New York, State Univ. of (Buffalo)	Holland, E.P.	Social Sci.	Research in Psychology	DOD/ NAVY	61,928	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.Y.	Rensselaer Polytech. Institute	Fleishman, B.	Mathematics	Non-Linear Control	DOD/USAF	19,000	-0-
N.Y.	Rensselaer Polytech. Institute	Janz	Chemistry	Chemical Research	DOI	30,000	
N.Y.	Rochester, Univ. of	Montroll	Physics	Modelling Complex Systems	DOD/USAF	171,000	
N.Y.	Rochester, Univ. of		Physics	Magnetic Interactions in Metallic Systems	DOD/USAF	30,000	
N.Y.	Rochester, Univ. of		Physics	Investigation of Nuclear Models and Neutron Cross-Sections by Time of Flight Techniques	DOD/ USAF	41,000	
N.Y.	Rochester, Univ. of	Buff	Chemistry	Chemical Research	DOI	30,000	-0-
N.Y.	Rochester, Univ. of	Buff	Chemistry	Statistical Mechanics of Polymers and Large Chain Molecules	DOD/Navy	30,000	-0-
N.Y.	Syracuse University	Goldberg, J.N. & Bergman, P.G.	Physics	General Relativity	DOD/USAF	65,000	-0-
N.Y.	Syracuse University		Physics	Irreversible Processes	DOD/USAF	35,000	
N.Y.	Syracuse University	Honey, J.C.	Social Sci.	Multidisciplinary Studies in Organization and Public Policy	NASA	200,000	
N.Y.	Syracuse University	Wirth	Chemistry	Chemical Research	DOI	30,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.Y.	Yeshiva University		Astronomy	Astrophysical Research	DOD/USAF	100,000	-0-
N.Y.	Yeshiva University		Chemistry	Chemical Research	DOD/USAF	18,000	
N.Y.	Yeshiva University, Albert Einstein College of Medicine	Lev. M.	Bio. Sci.	Vitamin K Metabolism in K-Requiring Bacterium	HEW/NIH	25,000	-0-
N.Y.	Cornell University	Rosenblatt, F.	Bio. Sci.	Studies of Memory Physiology	DOD/NAVY	100,000	-0-
N.Y.	Cornell University	Bethe	Physics	Theoretical Nuclear and Elementary Particle Physics	DOD/NAVY	250,000	-0-
N.Y.	Cornell University	Usher, D.	Bio. Sci.	Enzyme Models and the Mechanism of Ribonuclease Action	HEW/NIH	19,000	-0-
N.Y.	Rochester, Univ. of	Dexter/Knox	Physics		DOD/USAF	263,000	-0-
N.Y.	Rochester, Univ. of	Parks	Physics		DOD/USAF	35,000	-0-
N.Y.	Syracuse University	Harth, E.	Bio. Sci.	Experimental and Theoretical Aspects of Neural Systems	DOD/USAF NAVY	55,000	-0-
N.Y.	Brooklyn Polytechnic Institute of	Tamir, T.	Engineering	Diffraction of Beam Waves	DOD/Army	16,000	-0-
N.Y.	Rensselaer Polytechnic Institute	Noon, J.H.	Engineering	Electron Energy Loss Processes in Molecular Gas Plasma	DOD/Army NASA AEC	90,000	-0-
				State Subtotal		3,438,704	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.C.	Duke University	Burlack, J.A.	Mathematics	Partial Differential Equations	DOD/USAF	27,000	-0-
N.C.	Duke University	Chaddock, J.B.	Engineering	Multidisciplinary Research in the Application of Aerospace Technology to High Speed Ground Transportation	NASA	100,000	
N.C.	Duke University		Engineering	Thermal and Magnetic Properties of Electronic Insulators at Low Temperatures	DOD/NAVY	22,000	
N.C.	Duke University	Krigbaum	Chemistry	Chemical Research	DOD/ARMY	15,000	-0-
N.C.	Duke University	Erickson, R.P.	Biological Sciences	Neural Code for Taste	HEW/NIH	19,000	-0-
N.C.	Duke University		Engineering	Centimeter, Millimeter and Submillimeter Waves	DOD/USAF	137,000	
N.C.	Duke University	Quinn	Chemistry	Chemical Research	HEW/NIH	31,000	-0-
N.C.	Duke University	Staddon, J.E.	Biological Sciences	Temporal Discrimination and Stimulus Control	HEW/NIH	23,000	-0-
N.C.	Duke University	Strobel	Chemistry	Chemical Research	AEC	10,000	-0-
N.C.	Duke University	Lynn	Bio. Sci.	Mechanisms of Energy Conservation in Chloroplast	HEW/NIH	24,600	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
N.C.	Duke University		Physics	Solid State Studies with Microwaves	DOD/Army	36,000	
N.C.	Research Triangle Institute		Chemistry	Chemical Research	DOD/Army	15,000	-0-
N.C.	N. Carolina State University	Gardner	Chemistry	Chemical Research	AEC	17,000	-0-
N.C.	N. Carolina State University		Physics	Beam Dynamics in Pinches	DOD/Army	5,000	
N.C.	N. Carolina, Univ. of	Faust, R.G.	Multi	Sciences in Interaction: A Research Program in Life, Physical and Social Sciences	NASA	250,000	
N.C.	N. Carolina, Univ. of		Mathematics	Combinatorial Mathematics and Applications	DOD/ USAF	44,000	-0-
N.C.	N. Carolina, Univ. of	Glassman, E.	Biological Sciences	Molecular Basis of Behavior	HEW/NIH	50,000	-0-
				State Subtotal		825,600	-0-
				Agency Subtotals:			

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ohio	Case Western Reserve University	Carlson	Chemistry	Chemical Research	DOD/USAF	17,000	-0-
Ohio	Case Western Reserve University	Whitman	Chemistry	Chemical Research	DOD/USAF	17,000	-0-
Ohio	Case Western Reserve University		Engineering	Mechanical Properties of Refractory Alloys	DOD/USAF	25,000	
Ohio	Case Western Reserve University		Astronomy	Search of the Southern Milky Way for Objects with Unusual Properties or Energetic Radiation that Create Conditions Under Which the Navy Operates	DOD/Navy	13,600	-0-
Ohio	Case Western Reserve University		Bio. Sci.	Lympyatics Absorption and Distribution of Drugs	DOD/USAF	15,000	
Ohio	Cleveland State Univ.		Physics	Electron Dynamics and Gyroscopic Motion	DOD/ Navy	30,000	
Ohio	Dayton, Univ. of		Bio. Sci.	Biochemistry and Biophysics of Muscle Contractions as an Irreversible Thermodynamic Mechanochemical Conversion	DOD/ Navy	18,800	
Ohio	Ohio State Univ.		Physics	Transport Phenomena in Metals at Low Temperature	DOD/ USAF	29,000	

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ohio	Ohio State Univ.		Chemistry	Infrared Spectroscopy and Symposium	DOD/Navy	10,900	
Ohio	Ohio State Univ.		Chemistry	Chemical Research	DOD/Army	19,000	
Ohio	Ohio State Univ.		Oceanography	Reef Formation by Calcareous Algae	DOD/Navy	14,000	
Ohio	Ohio State Univ.	Paquette	Chemistry	Chemical Research	HEW/NIH	29,000	-0-
Ohio	Ohio State Univ.	Newman	Chemistry	Chemical Research	HEW/NIH	32,000	-0-
				State Subtotal		270,300	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Okla.	Oklahoma State Univ.	Haneman, V.S., Jr.	Multi.	Multidisciplinary Research	NASA	25,000	
Okla.	Oklahoma, Univ. of	Riggs, C.D.	Multi.	Multidisciplinary Research in Space Science and Engineering	NASA	67,000	
Okla.	Oklahoma, Univ. of	Canfield	Chemistry	Chemical Research	DOD/USAF	24,000	-0-
				State Subtotal		116,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Ore	Oregon State Univ.		Math.	Mathematical Theory of Perception With Implications for Display Technology	DOD/ Navy	$ 13,000	
Ore	Oregon State Univ.	Madison, V.A.	Physics	Low Energy Nuclear Research	AEC	38,000	
Ore	Oregon, Univ. of	Park, K	Physics	Two Photon Spectroscopy	DOD/Army	7,000	-0-
Ore	Oregon, Univ. of	Baldwin	Chemistry	Chemical Research	HEW/ NIH	40,000	-0-
Ore	Reed College	Scott	Chemistry	Chemical Research	AEC	5,000	-0-
Ore	Oregon State Univ.	Kemp	Physics		DOD/USAF	30,000	-0-
				State Subtotal		133,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Pa.	Carnegie Mellon Univ.		Physics	Application of the Mossbauer Effect to the Study of Metallic Solid Solutions	AEC	30,000	
Pa.	Carnegie Mellon Univ.	Evans	Chemistry	Chemical Research	DOI	30,000	-0-
Pa.	Carnegie Mellon Univ.	Kay	Chemistry	Chemical Research	DOI	30,000	-0-
Pa.	Drexel Univ.	Dieter, G.E.	Multi.	Multidisciplinary Research in Composite Materials and Plasma Engineering	NASA	100,000	
Pa.	Drexel Univ.		Soc. Sci.	Research and Graduate Education in the Application of Technology to Social Problems Solution	NASA	117,000	
Pa.	Institute of Pa. Hospital		Soc. Sci.	Ways for Captured Personnel to Resist Brainwashing	DOD/Navy	39,000	
Pa.	Lehigh Univ.	Herkel	Bio. Sci.	Enzyme Production by Marine Bacteria	DOD/Navy	23,000	
Pa.	Pa. State Univ.	Hisatsane	Chemistry	Chemical Research	DOD/USAF	18,000	
Pa.	Pa. State Univ.	Ebaugh, P.	Multi.	Multidisciplinary Space-Related Research	NASA	200,000	

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support			
					Agency	Previous Annual Amount	Current Annual Amount	[illegible]
Pa.	Pa. State Univ.	Jordan	Chemistry	Chemical Research	AEC	32,000	-0-	
Pa.	Pa., Univ. of	Cava	Chemistry	Chemical Research	DOD/Army	18,800	-0-	
Pa.	Pa., Univ. of	Altman, M.	Engineering	Research in the Conversion of Various Forms of Energy by Unconventional Techniques	NASA	83,000		
Pa.	Pa., Univ. of	George, Philip	Biological Sciences	Solvation Effects in Ester and Anhydride Reactions	HEW/NIH	84,000	-0-	
Pa.	Pa., Univ. of	Bockris	Chemistry	Chemical Research	AEC	57,000	-0-	
Pa.	Pa., Univ. of		Bio. Sci.	Diseases Important to USAF Project Barebase Operations; Immuno Chemical Studies of Human Hydatiditis	DOD/USAF	12,000		
Pa.	Pittsburgh, Univ. of	Hoelscher, H.E.	Multi.	Multidisciplinary Research on the Management of Systems	NASA	130,000		
Pa.	Pittsburgh, Univ. of	Davy, T.	Soc. Sci.	Studies in the Management and Administration of R&D Programs	NASA	50,000		

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Pa.	Pittsburgh, Univ. of		Physics	General Relativity	DOD/USAF	30,000	-0-
Pa.	Temple Univ.		Mathematics	Mathematical Device for Information Management	DOD/USAF	6,000	
Pa.	Temple Univ.		Physics	General Relativity	DOD/USAF	25,000	-0-
Pa.	Temple Univ.		Physics	Relativistic Interacting Particles	DOD/USAF	6,000	
Pa.	Pittsburgh, Univ. of	Janis, A.I. Newman,E.T.	Physics	Radiation & Singularities in Gravitational Theory	DOD/USAF	30,000	-0-
				State Subtotal		1,150,800	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
R.I.	Brown Univ.		Bio. Sci.		HEW/NIH	35,000	-0-
R.I.	Brown Univ.	Edwards	Chemistry	Molecules Containing Vic Non-Bonded Electron Pairs	DOD/USAF	49,700	-0-
R.I.	Brown Univ.	Giletti, B.J.	Multi.	Multidisciplinary Space-Related Research	NASA	33,000	-0-
R.I.	Rhode Island, Univ. of		Engineering	Acoustics of Molton Metals and Impurity Detection	DOD/NAVY	20,000	-0-
R.I.	Rhode Island, Univ. of	Pilson	Oceanography	Distribution of Trace Elements in Sea Water	DOD/NAVY	65,000	-0-
R.I.	Rhode Island, Univ. of	Schilling	Oceanography	The Petrology of Submarine Volcanics and the Factors Which Control Their Distribution, Origin, and Activity	DOD/NAVY	105,000	-0-
R.I.	Rhode Island, Univ. of	Lambert, R.B. and Stern, M.E.	Oceanography	Studies of Vertical Mixing Processes in the Ocean	DOD/NAVY	50,000	-0
				State Subtotal		357,700	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
S.C.	Clemson Univ.	Stillwell Skove	Physics	The Effect of Elastic Strain on Several Crystals Properties	DOD/USAF	34,000	-0-
S.C.	S. Carolina, Univ. of	Bly	Chemistry	Chemical Research	DOD/USAF	14,000	-0-
S.C.	S. Carolina, Univ. of	Avignone, F.T.	Physics	Antineutrino Absorption Cross Section Measurement	AEC	25,000	-0-
S.C.	S. Carolina, Univ. of	Amma	Chemistry	Chemical Research	HEW/NIH	39,000	-0-
S.C.	S. Carolina, Univ. of	Bonner	Chemistry	Chemical Research	AEC	11,000	-0-
				State Subtotal		123,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Tenn.	Tennessee, Univ. of	Fletcher	Chemistry	Chemical Research	DOD/USAF	25,000	-0-
Tenn.	Vanderbilt Univ.	Wert, J.J.	Chemistry	Deformation Studies of Super-Lattice Structures	AEC	36,000	-0-
Tenn.	Vanderbilt Univ.	Hurwitz, L.	Biological Sciences	Drug Action on Isolated Smooth Muscle	HEW/NIH	23,000	-0-
Tenn.	Vanderbilt Univ.	Inagami, T.	Bio. Sci.	Role of Specificity Sites in Enzyme Catalysis	HEW/NIH	23,745	-0-
				State Subtotal		107,745	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Tex.	Baylor University	Milligan	Chemistry	Chemical Research	Interior	30,000	-0-
Tex.	Bishop College	Huggins	Chemistry	Synthesis of 1, 2-Dimethylecy-clobutadiene	NASA	12,170	-0-
Tex.	Bishop College	Wilson, J.E.	Engineering	Radiolytic Grafting of Monomors to Polymeric Films	NASA	8,989	-0-
Tex.	Prairie View A&M University	Doctor, V.M.	Bio. Sci.	Radiation on the Plasma Dconyribonuciense	NASA	5,700	-0-
Tex.	Prairie View A&M University	Stubblefield, C.T.	Chemistry	Rapid Method of Determining Chloride in Rain Water Solubility of Nickel Phosphate	NASA	5,700	-0-
Tex.	Prairie View A&M University	Nelson, Ivory V.	Chemistry	Analysis of Solid or Liquid Solutions by X-Ray Fluoresence	NASA	10,066	-0-
Tex.	Prairie View A&M University	Kasiraj, J.	Engineering	Safety Analysis of Structures	NASA	15,000	-0-
Tex.	Prairie View A&M University	Dolley, T.P.	Bio. Sci.	Isolating Antimicrobial Agent from Acoras	NASA	14,552	-0-
Tex.	Rice University		Physics	A Theoretical Investigation of the Systematics of Thermo-Nuclear Fusion and Burning	DOD/ USAF	98,000	-0-
Tex.	Baylor University	Freedman, D.	Bio. Sci.	Emotional and Intellectual De-velopment in the Presence of Congenital and Perinatal Sensory Deficits	HEW/ NIMH	28,000	-0-
Tex.	Lamar State College of Tech.	Young, F.	Engineering	Effects of Nucleation Site Geometry by a Simulation Technique	NASA	9,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Tex.	Rice University	Clayton, D.D.	Astronomy	Theoretical Astrophysics	DOD/USAF	40,000	-0-
Tex.	S. Methodist Univ.	Blum, H.A.	Multi	Multidisciplinary Research	NASA	100,000	-0-
Tex.	Texas A&M Univ.	Miers, E.A.	Chemistry	Chemistry of the Metalloids of Group VA and VIA	AEC	12,000	-0-
Tex.	Texas A&M Univ.	Tsutsui	Chemistry	Chemical Research	DOD/USAF	14,000	-0-
Tex.	Texas A&M Univ.	Peguegnat	Oceanography	Deep Ocean Benthos	DOD/Navy	95,000	-0-
Tex.	Texas Christian University		Physics	Spectra in Crystals	DOD/Navy	10,000	-0-
Tex.	Texas S. Univ.	Womak, C.M.	Physics	Interaction of Solar Radiation and Matter	NASA	6,000	-0-
Tex.	Texas S. Univ.	Wilson, F.	Engineering	Determination of Molyhdenum in Titanium Alloys	NASA	10,000	-0-
Tex.	Texas Tech. Univ.	Shine, H.	Chemistry	New Reactive Intermediates (Cation-Ion Radical Chemistry)	DOD/USAF	37,800	-0-
Tex.	Texas, Univ. of	Schild, A.	Physics	General Relativity	DOD/USAF	60,000	-0-
Tex.	Texas, Univ. of	Martin	Chemistry	Stable Aqueous Gold Solutions	DOD/USAF	8,700	-0-
Tex.	Texas, Univ. of	Nowinski, W.V.	Bio. Sci.	Synthesis and Activity of Enzymes in Hypertrophy of Kidney After Uninephrectomy	HEW/NIH	30,000	-0-
Tex.	Texas, Univ. of	Riggs, A.	Bio. Sci.	Biochemistry of Hemoglobin	HEW/NIH	23,300	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support			
					Agency	Previous Annual Amount	Current Annual Amount	D O F
Tex.	Texas, Univ. of	Airth, R.L.	Bio. Sci.	Thiaminase Enzymes in Organisms	HEW/NIH	14,000	-0-	
Tex.	Texas, Univ. of	Vanatta, J.	Bio. Sci.	Potassium Excretion and Its Relationship to Sodium Reabsorption	HEW/NIH	28,000	-0-	
				State Subtotal		726,477	-0-	

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Utah	Utah, Univ. of	Williams	Physics	Plasma Effects in Solids and Low Energy Effects in Super Conductors	DOD/ USAF	40,000	-0-
Utah	Utah, Univ. of	Boyd	Chemistry	Thermochemistry of Organic Molecules	DOD/ Army	17,000	-0-
Utah	Utah, Univ. of	Ohlsen	Physics		AEC	30,000	-0-
Utah	Utah, Univ. of	Cook	Earth Sci.	Unita Basin Seismological Observatory	DOD/ ARPA	50,000	-0-
				State Subtotal		137,000	-0-

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RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Vt.	Putnam Memorial Hospital for Medical Research	Toolan, H.W.	Bio. Sci.	Relationship of Virus Interplay to Cancer Induction	HEW/NIH	52,000	-0-
Vt.	Vermont, Univ. of	Johnstone, D.	Eng.	Research with Particular Emphasis on Materials Science	NASA	100,000	-0-
Vt.	Vermont, Univ. of	Kuehne	Chemistry	Chemistry Research	HEW/NIH	32,000	-0-
				State Subtotal		184,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support: Agency	Previous Annual Amount	Current Annual Amount
Va.	Virginia, Univ. of	Crowell	Chemistry	Chemical Research	DOD/ USAF	18,000	-0-
Va.	Virginia, Univ. of		Physics	Surface Scattering and Other Surface Phenomena	DOD/ USAF	40,000	-0-
Va.	Virginia, Univ. of	Crowell	Chemistry	Chemical Research	DOD/ Army	19,000	-0-
Va.	Virginia Polytechnic Institute	Bull, F.W. & Jacobs, J.A.	Multi.	Multidisciplinary Research	NASA	45,000	-0-
				State Subtotal		122,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support: Agency	Previous Annual Amount	Current Annual Amount
Wash.	Washington St. Univ.		Physics	Flow Mechanisms in Crystals	DOD/ USAF	14,000	-0-
Wash.	Washington, Univ. of	Richards	Chemistry	Chemical Studies of the Oceanic Environment	DOD/ Navy	141,000	-0-
Wash.	Washington, Univ. of	Groman, N.B.	Bio. Sci.	Dual Infection Studies	HEW/NIH	25,000	-0-
				State Subtotal		180,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
W.Va.	W. Virginia, Univ. of	Wilson, M.F.	Eng.	Space-Related Scientific and Engineering Basic Research	NASA	100,000	-0-
				State Subtotal		100,000	-0-

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RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Wisc.	Wisconsin, Univ. of	Goering	Chemistry	Chemical Research	DOD/ USAF	25,000	-0-
Wisc.	Wisconsin, Univ. of		Bio. Sci.	Pathogenesis and Interpedemic Survival of Type A Influenza Virus	DOD/ USAF	10,000	-0-
Wisc.	Wisconsin, Univ. of		Physics	Properties of Atoms and Their Effect as Impurities on the Electrical-Device and Optical-Detectlon Potential of Solids	DOD/ Navy	25,000	-0-
Wisc.	Wisconsin, Univ. of (Milwaukee)	Bagemihl, F.	Mathematics	Theory and Application	DOD/ Army	20,000	-0-
Wisc.	Wisconsin, Univ. of	Nelson	Chemistry	Chemical Research	HEW/NIH	17,000	-0-
Wisc.	Wisconsin, Univ. of	Mossman, H.W.	Bio Sci	Biological Research	HEW/NIH	43,000	-0-
				State Subtotal		140,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
D.C.	Catholic University of America	Cowan	Physics	Basic Research in Cosmic Neutrino Physics	DOD/ USAF	80,000	-0-
D.C.	Federal City College	Wilkins, Homer	Physics	Detectors for Extremely Relativistic Particles	NASA	29,434	-0-
D.C.	Federal City College	Savitz, Maxine	Physics	Phenomena Related to Space Craft Electrochemical Devices	NASA	25,000	-0-
D.C.	Georgetown Univ.		Chemistry	Chemistry of Heteropoly Compounds and Their Relation to Catalysis Properties and the Synthesis of New Materials	DOD/ USAF	59,400	-0-
D.C.	Georgetown Univ.		Bio. Sci.	Pharmacological Responses of Sharks	DOD/ Navy	5,000	-0-
D.C.	George Washington University	Mayo, L.H.	Social Sci.	Multidisciplinary Program of Policy Studies in Science, Technology and Public Admin.	NASA	400,000	-0-
D.C.	Catholic Univ. of America	Lee, K, F.	Engineering	Dispersion Relations of Inhomogenous Plasma and Their Consequences	NASA	19,000	-0-
D.C.	Howard Univ.	Ferguson, G.A.	Physics	Low Energy Activation Analysis	NASA	6,000	-0-
D.C.	American Institute of Research	Myers, T.	Bio. Sci.	The Psychobiology of Monotony	DOD/ Navy	150,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
D.C.	Howard University	Ferguson, G.A.		Low Energy Activation Analysis	NASA	6,000	
D.C.	American Institute of Research	Myers, T.	Bio. Sci.	The Psychobiology of Monotony	Navy	150,000	-0-
				State Subtotal		173,834	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support: Agency	Previous Annual Amount	Current Annual Amount
Unk	Unidentified			13 Projects	DOD/ USAF	370,000	-0-
Unk	Unidentified			27 Projects	DOD/ Army	670,000	-0-
Unk	Unidentified			Other Projects (Apprx.)	AEC	3,000,000	-0-
Unk	Unidentified			Doctoral Dissertation Research Program in Anthropology	HEW/NIH	100,000	-0-
				Subtotal Unk		4,140,000	-0-

RESEARCH SUPPORT DROPPED BY OTHER FEDERAL AGENCIES

State	Institution	Principal Investigator	Field of Science	Project Description	Other Agency Support		
					Agency	Previous Annual Amount	Current Annual Amount
Foreign	Fundacao Servico Especial de Saudi Publi		Bio. Sci.	Epidemiological Studies of Ampari Virus	DOD/ USAF	$ 13,000	-0-
Foreign	San Andres Univ.		Atmos.	Investigation of Aerospace Radiation Phenomena at High Altitude	DOD/ USAF	11,000	-0-
Foreign	Sydney, Univ. of (Australia)		Astronomy	Stellar Intensity Interfermeter	DOD/ USAF	75,000	-0-
Foreign	Weizman Institute of Science		Physics	Basic Research Program to Investigate Magnetically Ordered Materials	DOD/ USAF	15,000	-0-
				Foreign Countries Subtotal		114,000	-0-
				Subtotal, All Projects		30,000,000 (Rounded)	

APPENDIX D

Response to inquiry by the Association of American Colleges

association of
american colleges
1818 R STREET, N.W.
WASHINGTON, D.C. 20009
(202) 265-3137

One Dupont Circle
Suite 770
Washington, D. C. 20036
May 24, 1971

Senator Edward M. Kennedy
Chairman
Special Subcommittee on the
National Science Foundation
Room 4226 New Senate Office
Building
Washington, D. C. 20510

Dear Senator Kennedy:

When the President presented his budget for the National Science Foundation for fiscal 1972 the colleges and universities in this Association reacted with dismay. While the budget did show about $100 million in added funds for the National Science Foundation, there was for reasons difficult to comprehend a cut-back in science education of about $25 million.

To attempt to evaluate the degree of this dismay among our members this office asked them to indicate their concerns to this office. Copies of over 250 responses are attached to this letter.

We would be pleased to have this information included in your authorization hearings when they are scheduled. We would be further pleased if this Association, representing about 1,000 independent colleges and universities, could have an opportunity to testify on the 1972 authorizations.

Thank you for your consideration of this letter, its information, and our request.

Sincerely,

Howard E. Holcomb
Executive Associate for
Federal Relations

Enclosures

COLLEGES AND UNIVERSITIES RESPONDING TO PROPOSED CUTS IN SCIENCE EDUCATION IN THE NATIONAL SCIENCE FOUNDATION BUDGET

Samford University
Birmingham, Alabama
St. Bernard College
St. Bernard, Alabama
Huntingdon College
Montgomery, Alabama
John Brown University
Siloam Springs, Arkansas
Hendrix College
Conway, Arkansas
Arkansas State University
State University, Arkansas
Occidental College
Los Angeles, California
Harvey Mudd College
Claremont, California
Fresno State College
Fresno, California
Pomona College
Claremont, California
University of Redlands
Redlands, California
California State College
Long Beach, California
Scripps College
Claremont, California
San Fernando Valley State College
Northridge, California
University of San Francisco
San Francisco, California
College of Notre Dame
Belmont, California
Fort Lewis College
Durango, Colorado
University of Denver
Denver, Colorado
Saint Joseph College
West Hartford, Connecticut
Wesleyan University
Middletown, Connecticut
Connecticut College
New London, Connecticut
The American University
Washington, D. C.
Lynchburg College
Randolph-Macon Woman's College
Sweet Briar College
Washington, D. C. Office
Stetson University
DeLand, Florida
Florida Memorial College
Miami, Florida
Jacksonville University
Jacksonville, Florida
Florida Institute of Technology
Melbourne, Florida
The College of Idaho
Caldwell, Idaho
DePaul University
Chicago, Illinois
Elmhurst College
Elmhurst, Illinois
Olivet Nazarene College
Kankakee, Illinois
Northwestern University
Evanston, Illinois
Lake Forest College
Lake Forest, Illinois
MacMurray College
Jacksonville, Illinois
Southern Illinois University
Carbondale, Illinois
University of Illinois
Urbana, Illinois
Loyola University of Chicago
Chicago, Illinois
Roosevelt University
Chicago, Illinois
North Central College
Naperville, Illinois
Goshen College
Goshen, Indiana
Earlham College
Richmond, Indiana
Franklin College
Franklin, Indiana
University of Evansville
Evansville, Indiana

62-912 O - 71 - 22

University of Notre Dame
Notre Dame, Indiana
DePauw University
Greencastle, Indiana
St. Ambrose College
Davenport, Iowa
The Iowa Association of Private
Colleges and Universities
Des Moines, Iowa
Morningside College
Sioux City, Iowa
Graceland College
Lamoni, Iowa
Drake University
Des Moines, Iowa
Clarke College
Dubuque, Iowa
Coe College
Cedar Rapids, Iowa
Divine Word College
Epworth, Iowa
Central College
Pella, Iowa
Wartburg College
Waverly, Iowa
Simpson College
Indianola, Iowa
University of Dubuque
Dubuque, Iowa
McPherson College
McPherson, Kansas
Kansas Wesleyan University
Salina, Kansas
Sterling College
Sterling, Kansas
The College of Emporia
Emporia, Kansas
Southwestern College
Winfield, Kansas
Saint Benedict's College
Atchison, Kansas
Fort Hays Kansas State College
Hays, Kansas
Transylvania University
Lexington, Kentucky
Thomas More College
Covington, Kentucky
University of Louisville
Louisville, Kentucky
Xavier University of Louisiana
New Orleans, Louisiana
Colby College
Waterville, Maine
Bowdoin College
Brunswick, Maine
Washington,College
Chestertown, Maryland
Mount Saint Mary's College
Emmitsburg, Maryland
Loyola College
Baltimore, Maryland
Hood College
Frederick, Maryland
Wellesley College
Wellesley, Massachusetts
Smith College
Northampton, Massachusetts
Amherst College
Amherst, Massachusetts
Wheaton College
Norton, Massachusetts
Regis College
Weston, Massachusetts
Simmons College
Boston, Massachusetts
Springfield College
Springfield, Massachusetts
Williams College
Williamstown, Massachusetts
Suffolk University
Boston, Massachusetts
Mount Holyoke College
South Hadley, Massachusetts
Lesley College
Cambridge, Massachusetts
Merrimack College
North Andover, Massachusetts
Nazareth College
Kalamazoo, Michigan
The University of Michigan
Ann Arbor, Michigan
University of Detroit
Detroit, Michigan
Aquinas College
Grand Rapids, Michigan
St. Olaf College
Northfield, Minnesota
College of St. Scholastica
Duluth, Minnesota

College of St. Benedict
St. Joseph, Minnesota
College of St. Thomas
St. Paul, Minnesota
Concordia College
Moorhead, Minnesota
Tarkio College
Tarkio, Missouri
University of Missouri
Kansas City, Missouri
Church of the Nazarene
Kansas City, Missouri
Maryville College of the Sacred Heart
St. Louis, Missouri
The Lindenwood Colleges
St. Charles, Missouri
Blue Mountain College
Blue Mountain, Mississippi
University of Mississippi
University, Mississippi
Tougaloo College
Tougaloo, Mississippi
Carroll College
Helena, Montana
Nebraska Wesleyan University
Lincoln, Nebraska
Creighton University
Omaha, Nebraska
Dartmouth College
Hanover, New Hampshire
Princeton University
Princeton, New Jersey
Rider College
Trenton, New Jersey
Drew University
Madison, New Jersey
Upsala College
East Orange, New Jersey
Vassar College
Poughkeepsie, New York
State University College
Cortland, New York
Yeshiva University
New York, New York
St. Lawrence University
Canton, New York
Roberts Wesleyan College
Rochester, New York
Finch College
New York, New YOrk
Ithaca College
Ithaca, New York
Rosary Hill College
Buffalo, New York
Russell Sage College
Troy, New York
Clarkson College of Technology
Potsdam, New York
Wells College
Aurora, New York
The College of Saint Rose
Albany, New York
Fordham University
Bronx, New York
Hartwick College
Oneonta, New York
Marymount College
Tarrytown, New York
Keuka College
Keuka Park, New York
New York University
New York, New York
Canisuis College
Buffalo, New York
Roswell Park Memorial Institute
Buffalo, New York
University of North Carolina
Chapel Hill, North Carolina
University of North Carolina
Greensboro, North Carolina
St. Andrews Presbyterian College
Laurinburg, North Carolina
Queens College
Charlotte, North Carolina
Livingstone College
Salisbury, North Carolina
Guilford College
Greensboro, North Carolina
The University of North Dakota
Grand Forks, North Dakota
Miami University
Oxford, Ohio
Wilmington College
Wilmington, Ohio
Cleveland State University
Cleveland, Ohio
The Western College
Oxford, Ohio
Rio Grand College
Rio Grand, Ohio

The College of Wooster
Wooster, Ohio
The Defiance College
Defiance, Ohio
Heidelberg College
Tiffin, Ohio
Marietta College
Marietta, Ohio
Findlay College
Findlay, Ohio
Ohio University
Athens, Ohio
Bowling Green State University
Bowling Green, Ohio
Youngstown State University
Youngstown, Ohio
The College of Steubenville
Steubenville, Ohio
Notre Dame College
Cleveland, Ohio
University of Cincinnati
Cincinnati, Ohio
Ursuline College
Cleveland, Ohio
University of Dayton
Dayton, Ohio
The University of Tulsa
Tulsa, O lahoma
Panhandle State College
Goodwell, Oklahoma
Willamette University
Salem, Oregon
Lewis and Clark College
Portland, Oregon
University of Oregon
Eugene, Oregon
Oregon State System of Higher Education
Carvallis, Oregon
Carlow College
Pittsburgh, Pennsylvania
Waynesburg College
Waynesburg, Pennsylvania
Chatham College
Pittsburgh, Pennsylvania
Swarthmore College
Swarthmore, Pennsylvania
Saint Joseph's College
Philadelphia, Pennsylvania
Albright College
Reading, Pennsylvania
Ursinus College
Collegeville, Pennsylvania
Lafayette College
Easton, Pennsylvania
Villanova University
Villanova, Pennsylvania
Lebanon Valley College
Annville, Pennsylvania
Saint Francis College
Loretto, Pennsylvania
Bucknell University
Lewisburg, Pennsylvania
Gettysburg College
Gettysburg, Pennsylvania
Lehigh University
Bethlehem, Pennsylvania
University of Scranton
Scranton, Pennsylvania
Moravian College
Bethlehem, Pennsylvania
Millersville State College
Millersville, Pennsylvania
Westminster College
New Wilmington, Pennsylvania
Wilkes College
Wilkes-Barre, Pennsylvania
West Chester State College
West Chester, Pennsylvania
Cabrini College
Radnor, Pennsylvania
Franklin and Marshall College
Lancaster, Pennsylvania
Juniata College
Huntingdon, Pennsylvana
Wilson College
Chambersburg, Pennsylvania
Providence College
Providence, Rhode Island
Furman University
Greenville, South Carolina
The Citadel
Charleston, South Carolina
South Carolina Coolege Council
Greenville, South Carolina
Huron College
Huron, South Dakota
Memphis State University
Memphis, Tennessee
University of Tennessee
Chattanooga, Tennessee

Southwestern at Memphis
Memphis, Tennessee
St. Mary's University
San Antonio, Texas
Huston-Tillotson College
Austin, Texas
Westminster College
Salt Lake City, Utah
Utah State University
Logan, Utah
Trinity College
Burlington, Vermont
Middlebury College
Middlebury, Vermont
Norwich University
Northfield, Minnesota
Randolph-Macon Woman's College
Lynchburg, Virginia
Pacific Lutheran University
Tacoma, Washington
Fort Wright College
Spokane, Washington
Seattle University
Seattle, Washington
Whitworth College
Spokane, Washington
Wheeling College
Wheeling, West Virginia
West Virginia State College
Institute, West Virginia
Bethany College
Bethany, West Virginia
Morris Harvey College
Charleston, West Virginia
West Virginia Wesleyan College
Buckhannon, West Virginia
The Cardinal Stritch College
Milwaukee, Wisconsin
Northland College
Ashland, Wisconsin
Lakeland College
Sheboygan, Wisconsin
Lawrence University
Appleton, Wisconsin

NSF letters received after April 26:

Regis College
Weston, Massachusetts
Carleton College
Northfield, Minnesota
Berea College
Berea, Kentucky
Tuskegee Institute
Tuskegee Institute, Alabama

University of Miami
Coral Gables, Florida 33124
King College
Bristol, Tennessee
LaGrange College
LaGrange, Georgia
College of the Holy Cross
Worcester, Massachusetts
Colgate University
Clinton, New York
San Francisco State College
San Francisco, California
Calvin College
Grand Rapids, Michigan
Saint Bonaventure University
Saint Bonaventure, New York
University of the Pacific
Stockton, California
Union College
Schenectady, New York

APR 22 1971

Samford University

Birmingham, Alabama 35209

April 20, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Dr. Holcomb:

The proposed cuts in the budget for the National Science Foundation for the fiscal year 1972 seem to me to be tragic. The present entire scientific mood of the public, and particularly of Congress, bodes ill for the fate of the United States. If we are not to tackle the technical aspects of society's problems from a scientific point of view, how in the world are we to attack them effectively?

The relatively small investment which the United States has made in science, and particularly in physics, to date, has paid off manyfold. Let us hope that Congress takes a second look at the situation and increases rather than decreases our scientific capabilities in this country.

Yours truly,

Perry W. Morton Jr.

Perry W. Morton, Jr.
Head,
Department of Physics

PWM:sg
cc: Dr. Ruric E. Wheeler

APR 26 1971

Samford University

Birmingham, Alabama 35209
April 20, 1971

Dr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Dr. Holcomb:

While it is gratifying to see an overall increase in the National Science Foundation for the Fiscal '72, it is also extremely disheartening to see the very core of the science education budget cut.

Although at present we have an oversupply of scientists in certain areas, one should not imagine that the science education budget goes into training new scientists, but rather in increasing the competence and ability of present scientists. In addition, this cut will prevent research being done by faculty and students at institutions where research might not be done otherwise.

Again, let me say how appalled I am at the drastic reductions in Science Education for Undergraduate National Science Foundation Budget Fund '72.

Sincerely yours,

B. O. Hannah
Assistant Professor,
Director, Stockham Cyclotron Lab.
Samford University

BOH:sg

APR 19 1971

Samford University

Birmingham, Alabama 35209

April 16, 1971

Hon. John H. Buchanan, Jr.
House of Representatives
Washington, D. C. 20515

Dear John:

We are deeply concerned about the reduction in NSF Science Education funds from $100 million to $77 million. This program has produced excellent results I know from personal experience. And, even though there is a current excess of trained scientists, this will change in a few years. "The projected need for chemists in 1980 is almost 60% greater than the expected supply; and for engineers it is 40%."*

Secondly, we need to stimulate study in science in the elementary and secondary ages as NSF has helped to do, particularly with the underprivileged. The Science Fair winner from the 6th District in 1967 has been from this group. He went on to win the National Science Fair First Place and is now in graduate school in Bio-chemistry. Thus, the need is demonstrated.

Thank you kindly for your help.

Sincerely yours,

L. S. Hazlegrove, Ph.D
Professor of Chemistry

* Quote from:
FINANCE FACTS,
Nat. Consumer Finance Assoc.
Ed. Services Division
701 Solar Bldg., Wash.,D.C.- January 1971

cc: Dr. Howard E. Holcomb,Exec. Assoc. for Federal Relations
Dr. Ruric E. Wheeler

APR 27 1971

Tuskegee Institute

TUSKEGEE INSTITUTE
ALABAMA, 36088

OFFICE OF THE
VICE PRESIDENT
FOR ACADEMIC AFFAIRS

21 April 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, DC 20009

Dear Mr. Holcomb:

The proposed administration budget for the National Science Foundation for Fiscal '72 which eliminates Undergraduate Research Participation, Science Faculty Fellowship, the Student Science Training Program and the Instructional Scientific Equipment Program is a severe blow to the development of future American scientists. America cannot afford to retrogress in either pure or applied science.

The welfare of the nation is inextricably intertwined with continued progress in science and technology.

A reversal of the decisions which prompted the above action is essential to scientific advancement which is indispensable to the present and future of American society.

Sincerely yours,

Edward L. Jackson
Vice President for
Academic Affairs

ELJ:cwh

DEPARTMENT OF CHEMISTRY
ST. BERNARD COLLEGE
ST. BERNARD, ALABAMA
35139

APR 15 1971

Dr. Howard E.Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street N.W.
Washington,D.C.20009

Dear Dr. Holcomb:

We appreciate your letterconcerning the cuts in science education budget of the National Science Foundation.I think that most educators will agree with you in the fact that the cuts are not in the best interest of national education and development. I am writing to my senators and congressman to ask them to look into this matter.

The proposed budget would eliminate and reduce funding to programs that are of vital impotance to keep our educational programs in the same level of those of majors countries. The programs that are to be cut or eliminated are those that have helped the most in improving science education in the last few years.

I support any efforts that you may take to help restore the programs to their proper status and funding.I have asked several members of the Science Department to write also to their congressaman in this matter.

Yours truly

Prof. Nicolas M.Herrera
Public Relations-Chemistry Dept.

APR 15 1971

HUNTINGDON COLLEGE
MONTGOMERY, ALABAMA 36106

April 13, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R. Street, NW
WAshington, D.C. 20009

Dear Mr. Holcomb:

I am deeply dismayed at the proposed administrative budget reducation of the funds for the National Science Foundation.

These cuts could only bring to a grinding halt the promising programs that touch our scientific activity at the independent liberal arts college. We have started with NSF funding some computer courses that tie in with a number of other nearby colleges and secondary schools. These proposed cuts will, even if applied evenly to all colleges, reduce our efforts at the very time we had begun to gather scientific momentum. Probably in the increased competition for limited funds, the undergraduate college such as ours would be viewed as expendable.

How can this country train scientists and keep moving forward in this century without at least maintaining present levels of expenditure for science at the colleges and universities?

Please convey our most urgent plea for funding to the members of the Congress.

Sincerely,

Allen K. Jackson

Allen K. Jackson
President

APR 19 1971

Arkansas State University
STATE UNIVERSITY, ARKANSAS 72467 ♦ PHONE 935-6250 ♦ JONESBORO

Office of Institutional Research

April 15, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

In regard to the Administration's proposed reduction of the National Science Foundation's budget for the support of science education, Arkansas State University earnestly requests that the House Subcommittee on Science, Research, and Development reconsider this facet of the NSF budget and restore a level of funding no less than that which is operational during Fiscal 1971. Today, universities are in an extraordinarily stringent financial situation, and it is programs such as those fostered by the NSF science education efforts that enable colleges and universities to maintain a viable and efficacious service to their students.

This university has benefited from the various NSF programs, and we are currently in the process of preparing an application for a COSIP grant that would represent a major impact on the growth and development of science education at ASU. Due to the paucity of funds available to the State of Arkansas, it is sine qua non that other sources of monies become available if our colleges and universities are not to regress to a state of irrelevancy and impotency in the societal context. We endorse your effort to persuade the Subcommittee to reassess its national priorities for science education and to authorize funds sufficient to advance the science education mission in institutions of higher education.

A copy of this letter is being forwarded to Congressman Bill Alexander, First Congressional District of Arkansas, whom we regard as a strong supporter of higher education.

Sincerely yours,

Melvyn N. Freed

Melvyn N. Freed
Director of Institutional Research
and Coordinator of Federal Programs

MNF:scc

APR 16 1971

HENDRIX COLLEGE
CONWAY, ARKANSAS 72032

ROY B. SHILLING, JR.
PRESIDENT

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

I trust that you will convey to the chairman of the House Subcommittee on Science, Research and Development the great sense of disappointment which many of us in the undergraduate college feel with regard to the proposed Administration budget for the National Science Foundation which reduces institutional support for service education. Those of us in the undergraduate college very greatly depend upon these funds for the enrichment of quality in our undergraduate programs, and we are much distressed at the possibility that they will be cut out.

I do wish you and others to know of our great concern for these programs and the inestimable value which they have for colleges such as Hendrix.

Sincerely,

Roy B Shilling Jr

RBS/gd



APR 15 1971

JOHN BROWN UNIVERSITY
Training Youth To Live . . . Head - Heart - Hand . . . In The Beautiful Ozarks
SILOAM SPRINGS, ARKANSAS, 72761

April 13, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

EDUCATION CUTBACKS (INFORMATION LETTER OF APRIL 7, 1971)

It is of particular concern to us that the following National Science Foundation programs should not experience budget cuts in the ensuing year. These programs are:

1. Science Faculty Fellowships
2. Instructional Scientific Equipment Program
3. College Science Improvement Program
4. Teacher Institutes
5. Special Projects
6. Institutional Grants

It has been of recurring concern to us over a period of time that programs are carried on just about long enough to get institutions in condition to properly use them, and to be able to evaluate in a valid manner, the good the programs are doing--then funds are cut so that the programs themselves are endangered or completely cut out.

As a small college it is our concern that programs within the realm of the physical sciences continue at their present levels.

Sincerely yours,

John V. Terry, Director
Division of Development

JVT/a

APR 19 1971

UNIVERSITY OF SAN FRANCISCO

INSTITUTE OF CHEMICAL BIOLOGY

April 13, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Dr. Holcomb:

I feel it is a grave error for the National Science Foundation to cut the effort on Science Education. The loss of Undergraduate Research Participation will hurt many schools.

The source of supply for Ph.D.'s is the graduates of small Liberal Arts Colleges. This is shown by U. S. Office of Education statistics. If the science education aspect is neglected, we will run out of future scientists.

Please feel free to use my letter in any way you wish.

Sincerely yours,

A. Furst

Arthur Furst, Ph.D.
Director

AF:tg

HARNEY SCIENCE CENTER
SAN FRANCISCO, CALIFORNIA 94117
415/752·1000 EXT·385

COLLEGE OF NOTRE DAME
Belmont, California 94002 • Telephone (415) 593-7676

APR 21 1971

April 19, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

The proposed cuts in the NSF budget for science will seriously retard the development of colleges.

Please oppose such proposals.

Sincerely,

Sister Rosemarie Julie Gavin

Sister Rosemarie Julie Gavin
Academic Dean

SRG:gs

AIR MAIL

62-912 O - 71 - 23

APR 19 1971

SAN FERNANDO VALLEY STATE COLLEGE
18111 NORDHOFF STREET • NORTHRIDGE, CALIFORNIA 91324

OFFICE OF THE PRESIDENT

April 15, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

Our faculty reacts with extreme disappointment at the proposed Administration budget cuts for the National Science Foundation for Fiscal '72 in regard to science education and institutional support. The Undergraduate Research Participation, Science Faculty Fellowships, the Student Science Training Program, and Instructional Scientific Equipment Program are all worthwhile programs. In view of our own difficulty in obtaining support through the State Legislature for research funds, this reduction and elimination of certain programs in the National Science Foundation budget is most discouraging.

Please convey to the chairman of the House Subcommittee on Science, Research and Development our faculty's concern on this matter.

Yours truly,

James W. Cleary

James W. Cleary
President

JWC:Cm

cc: Dr. Paul Walker
Dr. Lorence G. Collins
Dr. Arnold Court
Dr. Donald Cameron

APR 19 1971

SCRIPPS COLLEGE MEMBER OF THE CLAREMONT COLLEGES CLAREMONT, CALIFORNIA 91711

OFFICE OF THE PRESIDENT

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

I am writing in response to your request of April 7, 1971.

Stating my reactions to proposed cuts in the budget of the National Science Foundation in one paragraph, I would say:

> The elemination of funds for the National Science Foundation to use for Undergraduate Research Participation, Science Faculty Fellowships, the Student Science Training Program, and Instructional Scientific Equipment Program is short-sighted to say the least. To combine these cuts with reduced appropriations for the College Science Improvement Program, Teacher Institutes, Pre-College Course Curriculum, and other special projects to assist undergraduate instruction in science will jeopardize national interests and the advancement of higher education. A highly scientific and technological society cannot maintain adequate training for its people if it depends solely on support for advanced training in science. Graduate education must have a firm foundation in sound undergraduate work.

I hope this will serve your purpose.

Sincerely yours,

Mark H. Curtis

MAY 3 1971

SAN FRANCISCO STATE COLLEGE
1600 HOLLOWAY AVENUE • SAN FRANCISCO, CALIFORNIA 94132

Office of Dean
Educational Services
and Summer Sessions

April 27, 1971

Phone 469-1371

Howard E. Holcomb
Executive Associate
For Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

I read with dismay the proposed administration budget for the NSF Foundation for fiscal 1972. As I understand it, the proposed budget would eliminate a whole series of programs upon which our college is quite dependent, particularly since we are in an austerity period in the State of California.

In particular, we have just developed a new science building and were anticipating opportunities for not only student-science training programs and the development of instructional scientific equipment from the area of the National Science Foundation, but we were also hopefully looking forward to the regeneration of many old programs and the introduction of new programs in the science area.

I sincerely hope that the Association of American Colleges can mobilize its resources to request the House Subcommittee on Science Research and Development to review the fiscal '72 budget for NSF. Anything that our college can do toward this end will most certainly have a high priority, and I look forward to hearing of suggestions.

Sincerely,

Dr. Shepard A. Insel
Dean of Educational Services and
Professor of Psychology

SAI/jh

cc: The Honorable Phillip Burton
House of Representatives
Washington, D. C.

APR 19 1971

CALIFORNIA STATE COLLEGE, LONG BEACH
90801

April 16, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Dr. Holcomb:

A few weeks ago, I spent several hours with officials of the Division of Undergraduate Education in Science of the National Science Foundation during the period when NSF maintained a temporary regional office in Los Angeles. During these visits, the recurrent theme involved serious budget cuts for most NSF programs supporting science education.

Several of these programs have been of great assistance to California State College, Long Beach in the past. They have been specifically designed to assist the large university which emphasizes instruction at the Bachelor's and Master's degree levels. I fully agree with the intent of Congress that the NSF increase its support for basic research. However, anticipated reduction in programs which benefit undergraduate education in science may well do damage to the education of those who will in the future be qualified to do basic research.

Enclosed is a copy of a letter sent by our President, Stephen Horn, to acknowledge our most recent NSF Institutional Grant. The letter emphasizes the importance of this sort of grant to universities such as ours which do not offer the Ph.D. degree and consequently receive minimum State funds in support of research.

Sincerely,

Darwin L. Mayfield

DARWIN L. MAYFIELD
Director of Research

DLM/mf
Enclosure

907

CALIFORNIA STATE COLLEGE AT LONG BEACH
90801

December 15, 1970

Office of the President

Mr. Wilbur W. Bolton, Jr.
Grants Officer
National Science Foundation
Washington, D. C. 20550

GU-3219
Amendment No. 1

Dear Mr. Bolton:

I am most happy to acknowledge the award of $12,085 as an additional Institutional Grant for Science to California State College, Long Beach. During the past five years, the NSF Institutional Grant, though modest in amount, has furnished encouraging and timely assistance for the research of more than 75 faculty members. It has been most helpful as a source of funds for first grants both to beginning faculty members and to those starting on new lines of research.

Institutional grants are particularly important for institutions operating on a line item budget. Though among the largest universities in the country and with a faculty listing a 74.9 per cent attainment of the Ph.D. degree (280 of 374) in the natural and social science and the engineering departments eligible for NSF support, California State College, Long Beach is provided very limited funds in support of research by the State. I would hope that the Institutional Grant Program and related activities, such as the College Science Improvement Program, could be expanded in future years.

You may be assured that the funds will be administered in accordance with the usual practices of the National Science Foundation, including those purposes set forth in Enclosure G-1.

Sincerely yours,

Stephen Horn

SH/mf
cc Dr. Louis Levin, Assistant Director, Institutional Programs
bc Dr. David E. Grey
Mr. Ralph T. Maloney

RECEIVED
DEC 21 1970
Director of Research
California State College
Long Beach

APR 19 1971

UNIVERSITY OF REDLANDS
REDLANDS, CALIFORNIA 92373 • TELEPHONE (714) 793-2121
DIVISION OF SCIENCE AND MATHEMATICS

April 16, 1971

AIR MAIL

Mr. Howard E. Holcomb
1818 R. Street N.W.
Washington, D. C. 20009

Dear Sir:

We are deeply concerned about the proposed budget reductions for 1972 for the National Science Foundation. Funds granted to us by this agency after we submitted carefully constructed proposals have provided a remarkable stimulus to our Department of Chemistry and to our Science Division at University College, University of Redlands.

In Chemistry we have upgraded our staff and equipment in a very significant way through the funds made available by NSF. Specifically we were able to organize and implement undergraduate research as a vital part of our chemistry curriculum. The very fine spectrophotometer and Nuclear Magnetic Resonance spectrometer obtained through "matching money" incentive grants have helped us develop one of the finest undergraduate chemistry programs of any college our size. Two of our chemistry faculty have been supported through Faculty Fellowships at major universities in order to remain abreast of current chemical research and curriculum ideas. An NSF supported conference was held here to share with other college chemistry teachers the results of our molecular spectroscopy curriculum improvements.

We feel it is a serious error to cut back these very fine programs developed by NSF. This organization has continually been aware of the needs for significant program improvement at a small college such as ours, and we urge that their efforts to improve science be supported through adequate budgets.

Sincerely,

J. Leland Hollenberg

J. Leland Hollenberg
Professor of Chemistry

JLH:es

APR 16 1971

POMONA COLLEGE
CLAREMONT, CALIFORNIA

THE PRESIDENT

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

It is with profound regret that I learn that the proposed budget for the National Science Foundation for fiscal 1972 will drastically and profoundly curtail some of the most important assistance undergraduate scientific education has received over the past several years. It is my understanding that the proposed changes in the National Science Foundation budget will eliminate two of the programs which have come to mean so much to Pomona College. I refer to undergraduate research participation and the instructional scientific equipment program. To my mind, one of the most innovative, imaginative and highly productive programs ever offered us by any agency, whether federal or not, is the undergraduate research participation program. Through URP, talented young scientists are given the chance to work through research projects on a master apprentice basis with the supervising faculty member. This program has produced in my own experience at Pomona College and at Southwestern At Memphis, publishable scientific results and it has offered the stimulation of first rate scientific research to highly qualified undergraduates, many of whom are already achieving positions of importance in the nation's scientific effort. I equally regret the loss of the instructional scientific equipment program because through this program colleges like Pomona College have been enabled to purchase equipment not otherwise available to them.

It must be remembered that a disproportionate part of the nation's scientific education occurs in private liberal arts colleges. Any cutback of programs designed to help these colleges is bound in the long run to have a deleterious, if not disastrous, effect on the level of our national scientific and technological expertise.

Yours sincerely,

David Alexander

FRESNO STATE COLLEGE
FRESNO, CALIFORNIA 93726

Office of the President

APR 16 1971

April 13, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

This letter is in reference to the proposed National Science Foundation science education cutback.

For the past several years Fresno State College has received grants from the National Science Foundation for the following: Undergraduate Research Participation, Instructional Scientific Equipment, and Institutional Grants. These funds have enabled the College to improve and enrich undergraduate science programs. State funds have been extremely limited for these special kinds of science activities.

Fresno State College is not in favor of the proposed Administration cuts that would seriously reduce support for science education. The proposed reductions would curtail many science programs for students at our institution. We strongly recommend that these funds be restored.

Sincerely yours,

Norman A. Baxter
President

NAB:ed

HARVEY MUDD COLLEGE, *SCIENCE AND ENGINEERING* | CLAREMONT, CALIFORNIA 91711

APR 16 1971

OFFICE OF THE PRESIDENT

April 14, 1971

Dear Howard,

Here, at Harvey Mudd College, we are clearly unhappy about the proposed budgets for NSF that would eliminate Undergraduate Research Participation and the Instructional Scientific Equipment Program, among others. The URP alone has enabled us to provide research opportunities for undergraduates that give them a sense of the importance and demands of scientific research which is an invaluable part of their education. Some of these undergraduates have gone on to graduate work in professional careers but others have gone on to careers in public service and other professions in which the experiences given to them under the URP have been invaluable. The College itself has been greatly helped as a participant in the College Science Improvement Program and, again, it is not only those who will go into science but also those who will make other careers in the public interest who have benefited from such programs.

Please let us know how we can help restore these vitally needed programs to the NSF budget.

Sincerely yours,

Jacob P. Frankel
Dean of the Faculty

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

MEMBER OF THE CLAREMONT COLLEGES

APR 15 1971

OCCIDENTAL COLLEGE *Office of the President* • LOS ANGELES, CALIFORNIA 90041

April 12, 1971

Mr. Howard E. Holcomb, Executive Associate
for Federal Relations
Association of American Colleges
1818 "R" Street, Northwest
Washington, D. C. 20009

Dear Mr. Holcomb:

Speaking as the President of one of the member institutions of the Association of American Colleges, I hope that you and other staff members of the Association will do everything possible to urge strong congressional support for full funding of the budget of the National Science Foundation.

In reviewing reports of the administration budget for FY 1972, I note that while a significant increase in the overall NSF budget is proposed, the funds actually designated for science education are sharply reduced.

Of critical importance to institutions like Occidental College is the elimination of various programs providing support for students and faculty and for the instructional programs in undergraduate colleges. If these reductions are allowed to stand, I predict that undergraduate institutions will fall even farther behind in their efforts to train people for the scientific professions.

Over the past several years, Occidental College has received support from the National Science Foundation, under several different NSF grant programs, in excess of $500,000. As a result, we have been able to develop one of the finest undergraduate science programs in the country. If this support is substantially reduced in the coming year and following, I fear that we will be forced to curtail sharply our science program. Thus, I strongly urge that the Association of American Colleges, which represents more than 800 undergraduate liberal arts programs across the country, do everything it can to enlist congressional support for maintenance of NSF support of those grant programs which are of special importance to institutions like the one of which I am President.

Very truly yours,

Richard C. Gilman

Richard C. Gilman
President

APR 21 1971

FORT LEWIS COLLEGE

DURANGO, COLORADO

April 16, 1971

Dr. Howard E. Holcomb

Association of American Colleges
1818 R Street N.W.
Washington, D.C. 20009

Dear Dr. Holcomb:

I was appalled to learn of the severe cuts in the budget for the National Science Foundation for the coming fiscal year. This appears to reflect an increasing hostility toward science and technology with a complete disregard of economic and social benefits realized over the past quarter century.

We have fantastic problems in this country, but most of these can be solved only through the use of applied science. It is essential that the nation does not lump all science into the atom bomb, pollution-causing category. I hope the decision about the NSF funds can be reconsidered.

Sincerely,

Merle Harrison

Merle Harrison, Chairman
Chemistry Department
Fort Lewis College
Durango, Colorado 81301

APR 16 1971

COLORADO SEMINARY
UNIVERSITY OF DENVER
UNIVERSITY PARK • DENVER, COLORADO 80210

OFFICE OF GRANTS / 303 • 753-3241

April 13, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

Regarding NSF's Science Education cutbacks, all of the programs eliminated or reduced are important to the University of Denver. We have particular interest in the Teacher Institutes, Instructional Scientific Equipment Program, Institutional Grants, College Science Improvement Program, the Undergraduate Research Participation, and Science Faculty Fellowships. The University has participated to a major extent in each one of these programs and would feel their elimination or reduction to be very harmful to the contribution we may make towards science, particularly in this region.

We appreciate your efforts on our behalf, and wish you the best of success.

Cordially,

P. B. Hendricks
Director

PBH:sh

APR 16 1971

FORT LEWIS COLLEGE

DURANGO, COLORADO

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

Your correspondence concerning the proposed cutbacks in NSF funds is most disturbing. While I deplore the cutbacks in all of the areas as seriously damaging our efforts in science education, we here at Fort Lewis College will be especially hard hit by the cut in the College Science Improvement Program.

For the past six months, we have been working hard on a self-study and the construction of a proposal to be submitted to the College Science Improvement Program. If these funds are cut, the development of our science program will be delayed four or five years.

Believe me, we will much appreciate anything you can do, and if there is any other way in which I can help you, please let me know.

Sincerely yours,

Archie Jones

Archie Jones, Director
School of Arts and Sciences

AJ:mp

APR 20 1971

Saint Joseph College
Chemistry Department
West Hartford, Connecticut

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R St., N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

It has come to my attention that in the administration's proposed budget for the National Science Foundation for Fiscal "72, there is a reduction of about one-fourth in the amount of support for science education. In addition, the administration is also recommending that institutional support for science be reduced by two-thirds. Having been actively involved in N.S.F. programs for the past three years and having seen innumeral results and benefits from the above programs, I wish to be recorded in opposition to the administration's proposed budget cuts and honestly feel that such a lessening of support for these critical programs at this time would be a grave error that would result in an unnecessary slowing down of progress in areas vital to our national growth and fulfillment.

Sincerely,

Harold T. McKone

Harold T. McKone, Ph.D.
Assistant Professor of Chemistry
Saint Joseph College

APR 20 1971

Saint Joseph College
Chemistry Department
West Hartford, Conn. 06117

April 16, 1971

Mr. Harold E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R St., N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

For the past ten years I have been conducting NSF Programs in education in the sciences, both for undergraduates and for secondary school teachers. Nearly fifty undergraduates and a few hundred teachers have benefited by participation in these programs, with results that are far out of proportion to the relatively small investment. A high percent of the best science teachers in surrounding school systems have been associated with us, and we see the advantages which accrue to their students. We also see the benefits in the broader student population of our own institution. Undergraduates have been co-authors with faculty on several departmental publications. They sponsor their own lecture series and manage to attract considerable interest from the students in the humanities. Students plan interdisciplinary seminars with non-science students.

Without the modest assistance of the instructional equipment grants and the institutional grants it would have been impossible to develop the necessary facilities for research participation, and it would also have been impossible for faculty members to devote their summers to these activities. The In-Service Institutes for Teachers realize great returns on minimal investments. Assistance to undergraduates in science also forms a small but significant part of the overall budget for NSF. In fact, without the synergistic combination of small grants it will be very difficult to provide opportunities for students in small colleges to participate with faculty in significant scientific undertakings.

I should like to urge re-evaluation of the budget for NSF to restore a reasonable percent to science education programs. The maintaining of our scientific-technical competence as a nation is at stake, as well as the broad public understanding of our material and energy resources and their relationships in our physical environment.

Sincerely,

Sister M. Clare Markham

Sister M. Clare Markham, Ph.D.
Professor of Chemistry, and
Coordinator of Science Programs

APR 19 1971

CONNECTICUT COLLEGE
NEW LONDON, CONNECTICUT 06320

OFFICE OF THE PRESIDENT

April 13, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

Thank you very much for your statement of April 7th regarding science education cutbacks in the Administration's proposed budget for the National Science Foundation for Fiscal Year 1972.

We are very distressed about these cuts, and would like to see a major effort made to increase the money available to the NSF for science education in all areas. We particularly regret that no increase has been provided for COSIP, for we intend to submit an application for a COSIP grant in 1972. Since the summer of 1969 we have also had an Undergraduate Research Program in Psychology, the aim of which has been to evaluate the role of undergraduate research with an eye to specific changes which would incorporate research into the existing curriculum. With the termination of the Undergraduate Research Program it appears we will not only be unable to complete this very worthwhile project, but we will also be unable to evaluate properly what it has enabled us to accomplish to this point.

Sincerely,

Charles E. Shain
President

CES:jgk

62-912 O - 71 - 24

APR 16 1971

WESLEYAN UNIVERSITY
MIDDLETOWN, CONNECTICUT 06457

The Chancellor

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

It is my understanding that the proposed National Science Foundation budget for Fiscal 1972 shows an increase of $116 million for a total budget of $622 million, but that support for science education is reduced from $100 million to $77 million and institutional support for science is reduced by two-thirds, to $12 million.

I also understand that the proposed budget eliminates Undergraduate Research Participation, Science Faculty Fellowships, the Student Science Training Program, and the Instructional Scientific Equipment Program. I believe that inadequate or reduced funding is being recommended for the College Science Improvement Program, Teacher Institutes, Pre-College Course Curriculum, Special Projects and Institutional Grants.

Since science leadership by the United States can undoubtedly contribute materially to the solution of many domestic problems now facing this country, as well as to the solution of many international problems, it appears that Fiscal 1972 is a particularly inappropriate time to reduce funds for science education. Quality science education is essential in order to maintain this leadership. With the increasing costs of higher education, the National Science Foundation reductions cannot be absorbed by the colleges and universities. I recommend strongly that there be no reductions in the Foundation's budget for science education for Fiscal 1972.

Sincerely yours,

RARosenbaum

Robert A. Rosenbaum

RAR:GP

SAINT JOSEPH COLLEGE
ASYLUM AVENUE
WEST HARTFORD, CONNECTICUT 06117

OFFICE OF THE PRESIDENT

APR 16 1971

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

The proposed reduction in the National Science Foundation budget for support for science education and for institutional support is a matter of great concern to us at Saint Joseph College. Our science programs have been significantly strengthened by the support received from NSF in several areas. Likewise our ability to serve the needs of the community has been enhanced by the Teacher Institutes made possible by NSF.

I hope your efforts on behalf of member colleges will be effective.

Sincerely yours,

Sister Mary Consolata

Sister Mary Consolata
President

SMC/kpb

APR 13 1971

JULIA MILLS JACOBSEN

4416 EDMUNDS STREET, N.W. • WASHINGTON, D.C. 20007 • PHONE (202) FE 8-2515

TO: Mr. Howard Holcomb

DATE: 4/11/71

SUBJECT:

This is in response to your April 7 bulletin. Your brief assessment of the situation was excellent in both of your memos. I know these go to my Presidents routinely byt I have found it effective to underscore some of these and send copies back to them.

I will also see if I can get some of our faculty to wr/ite appropriate letters as individuals to their congressment. I hope this letter is the kind of thing you want. If not I'll be glad to write it over. My base is here in town and I am anxious to support you in every way in your most difficult job.

It might interest you to know that the National Council of University Research Administrators have set up a "Small Institutions Committee" to do something useful for these schools within the framework of NCURA. Virginia Lester Assistant to the President of Skidmore will Chair the committee and Art Switzer of Ursinma and I are also on it. No doubt we will be calling on you for needed guidance before we have any program set up for the National Conference.

Julia Jacobsen

(202) FE. 8-2515

LYNCHBURG COLLEGE
RANDOLPH-MACON WOMAN'S COLLEGE
SWEET BRIAR COLLEGE

COORDINATOR OF
GOVERNMENT RELATIONS

4416 EDMUNDS STREET, N.W.
WASHINGTON, D. C. 20007

April 11, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

I am seriously concerned about the impact the cuts in the National Science Foundation programs in support of undergraduate education will have on my three institutions and all similar schools. In order to provide a balanced program in the liberal arts, we must offer a strong science program. The relative cost of science education is high. The decline in support of science will soon start a trend that will again leave us with a shortage of scientists.

To develop programs in the sciences that meet the needs of our changing society we must constantly review, revise, and seek innovative ways of improving our offerings and see no way of doing this without outside support. The loss of support for Undergraduate Research Participation, Science Faculty Fellowships, The Student Science Training Program, Instructional Scientific Equipment Program, and worst of all the reduced funding for Collge Science Improvement Programs, Teacher Institutes, Pre-College Course Curriculum, Special Projects and Institutional Grants, leaves the undergraduate, private college with few outside resources. The change in policy of the Computing Activities Division ends chances for real development of computer useage.

Most corporate and foundation sources support projects that are so specific that they do little to enhance the general institutional program. With plans under way for extensive development of environmental studies as a consortium we urge you to take any steps you can to reverse the policy of NSF to decrease support of undergraduate education. If we are to continue our program considered high on the list of national priorities we must have more support, not less. It seems inconsistent for NSF to focus most of its attention on Graduate Schools and Basic Research and neglect the undergraduate institutions which must necessarily produce the candidates for graduate work.

Sincerely yours,

Julia M. Jacobsen
(Mrs. Lawrence Jacobsen)

APR 19 1971

THE AMERICAN UNIVERSITY
WASHINGTON, DISTRICT OF COLUMBIA 20016
Office of the Dean of Graduate Studies and Research

April 15, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

This letter is to point out certain flaws in the proposed F.Y. '72 budget for the National Science Foundation. Anything you can do to bring these deficiencies to the attention of appropriate officials will be appreciated.

One problem area is support for science education, the budget for which shows a reduction of nearly 25% from F.Y. '71. Popular notions not withstanding, the disaffection underlying this action does not really stem from misuse of science or from a genuine excess of scientists; it does result directly from a lack of public insight into the nature and inner workings of science and scientists -- insight into a disciplined and rational search for knowledge -- insight that comes only from sound instruction and personal involvement in science. Reduction in science education, therefore, will serve to increase current anti-science attitudes and the resulting non-utilization of scientists. On the other hand, more and better science education will reduce the mystery surrounding, and therefore the fear of, science and open the way to increased demand for scientists and the human benefits that result from their work.

Another problem area is institutional support for science, for which a catastrophic reduction of more than 60% has been proposed. Institutional support can be utilized more effectively and efficiently than specifically designated support, as it can be applied in particularly appropriate manners to the points of greatest need. Social as well as physical sciences are involved, and therefore, universities may adjust their programmatic balance and modify the directions of their development in response to institutional goals, regional needs, and the advancing interests of their faculty and students. The flexibilities inherent in the institutional form of science support enable universities to respond immediately to opportunities for programmatic

and organizational innovations and exciting new and relevant multi-disciplinary combinations. Only through such flexible application of adequate support can the diversity-with-quality be developed that must characterize a responsive system of higher education.

Thank you for your assistance.

Sincerely yours,

Carl B. Palmer

Carl B. Palmer
Director of Research

CBP/vk

FLORIDA INSTITUTE OF TECHNOLOGY
MELBOURNE, FLORIDA
32901
OFFICE OF THE PRESIDENT

APR 19 1971

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

The proposed budget cuts for the National Science Foundation are causing us great concern. The assistance we have received from National Science Foundation has been of outstanding value in the upgrading of our institution. Certainly the grant we received in connection with the Science Improvement program was an outstanding factor in our receiving ECPD accreditation. It has not only been effective in upgrading our laboratories from an educational standpoint but has been a motivating experience in stimulating our entire research program.

If our colleges are to continue to create new knowledge, it is imperative that NSF grants should be increased and not decreased. The grants we have received in connection with research, although small, have had a stimulating effect on our entire research program.

The several grants received in connection with summer programs for teachers and students have been very effective. We would hate to see them discontinue. It would definitely decrease interest in Science education.

Agriculture has greatly benefitted by College research. NSF makes possible many activities that industry feels are not within its purview but nevertheless are important to the general public.

Every effort should be made to acquaint Congress with the importance of NSF and to make available necessary funds for its operation.

Sincerely yours,

Jerome P. Keuper
President

JPK:ewm

APR 19 1971
OFFICE OF THE PRESIDENT



14 April 1971

JACKSONVILLE UNIVERSITY

JACKSONVILLE, FLORIDA 32211

Mr. Howard E. Holcomb
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

It seems to me that the proposed budget cuts for science education in the proposed National Science Foundation budget for Fiscal '72 are not at all wise. If science cuts are to be made, they should not be made at science's educational base, especially at a time when the financing of undergraduate education is in such a crisis period. The Instructional Scientific Equipment Program, the Undergraduate Research Participation Program, and some of the others scheduled for elimination are among the very few ways in which The National Science Foundation now aids undergraduate science education. The Foundation's emphasis has never, it seems to me, placed a reasonable priority on undergraduate science education. The few programs that it does have in this area should be the last cut, not the first.

Sincerely,

Robert H. Spiro

Robert H. Spiro
President

RHS/ef

Florida Memorial College
15800 N. W. Forty-Second Avenue (LeJeune Road)
Miami, Florida 33054

APR 21 1971

OFFICE OF THE DEAN

April 15, 1971

Mr. Howard B. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

Here at Florida Memorial College we regret the cut in the budget of the National Science Foundation by one-fourth. At a time when we should be expanding, for some reason we are cutting back.

It is my hope that the funds will be restored.

With every kind wish, I am

Sincerely yours,

Lester B. Brown

Lester B. Brown
Dean of the College

LBB:m

UNIVERSITY OF MIAMI
CORAL GABLES, FLORIDA 33124

APR 30 1971

OFFICE OF
THE PRESIDENT

April 26, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, Northwest
Washington, D. C. 20009

Dear Mr. Holcomb:

I realize that I am late in writing a paragraph, as you requested, to be placed with others on the desk of the chairman of the House Subcommittee on Science, Research and Development before his committee record closes later this month. Nevertheless, I attach what I had proposed to send you for what it might be worth.

Sincerely yours,

Henry King Stanford

Henry King Stanford
President

cml
attachment

April 26, 1971

The proposed reduction in science education programs in the National Science Foundation Budget for Fiscal 1972 reflects what appears to be a philosophy of abandonment of support for science education programs at the Federal level, perhaps a result of the current reported oversupply of scientific talent. The feeling on this campus is that such a philosophy is short-sighted and will have grave consequences for the quality of the Nation's scientific talent. There is some feeling that there may be an irreparable crippling of our national scientific capability if we continue to discourage support for science education programs. National needs and priorities shift, and the current popular emphasis on research in such areas as pollution and urban problems should not lure us into abandoning the basic Federal responsibility for the support of young people and the institutions which train them. There is general concurrence with the stand taken by Dr. Philip Handler, President of the National Academy of Sciences, who pointed out that a recent study by the National Science Board had emphasized the need to increase educational programs and fellowships, and called the proposal to eliminate training and fellowship programs to zero "an absurdity."

APR 19 1971

STETSON UNIVERSITY
DELAND, FLORIDA 32720

OFFICE OF THE PRESIDENT

April 15, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

The proposed budget of the National Science Foundation will adversely affect Stetson University's ability to maintain a high quality program in the sciences. Stetson, as many other schools, has invested a major portion of its resources since 1957 to strengthening the science departments. The sciences require an inordinate amount of the University budget and it is particularly discouraging at this time of financial stress to see a continuing decrease in support of academic science by the National Science Foundation.

It is my hope that the National Science Foundation budget will be revised with an increased allocation for support of undergraduate programs and institutional grants.

Sincerely,

John E. Johns

John E. Johns
President

JEJ:sn



APR 30 1971

LAGRANGE, GEORGIA 30240 (404) 882-2911

April 26, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

It is indeed disturbing to learn of the proposed reduction for science education which is being recommended by the Administration. This is certainly not the time for reductions in this vital area. I am sure that I speak for many in private higher education when I say that this is a blow to us, and I have a strong feeling that this is also true for the public sector of higher education.

Sincerely yours,

C. Lee Farwell,
Academic Dean

CLH:mm

APR 15 1971

THE COLLEGE OF IDAHO
Caldwell, Idaho 83605

Office of the President

April 13, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, Northwest
Washington, D. C. 20009

Dear Mr. Holcomb:

Thank you for your letter of April 7. We at The College of Idaho are indeed disturbed about the implications of a serious cut back in the budget of the National Science Foundation.

The proposed cuts would take away programs in which we have had great interest and in which we have participated over several years. Much of our instructional scientific equipment came as a result of matching funds from NSF. We have also had undergraduate research funds, workshops under the student science training program and have held more than twenty teacher institutes in the sciences. The loss of opportunity to qualify for these programs in the future would certainly hamper our growing science program at The College of Idaho.

Anything you can do to bring our institutional reaction to the attention of the chairman of the House Subcommittee on Science, Research and Development will be much appreciated.

With appreciation and kind regards.

Cordially,

Warren B. Knox

Warren B. Knox
President

wbk/na

APR 20 1971

DePaul
UNIVERSITY

OFFICE OF THE PRESIDENT
25 EAST JACKSON BOULEVARD
CHICAGO, ILLINOIS 60604

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Howard:

I received your memorandum describing the NSF Science Education cutbacks.

It is with deep and genuine concern I express the view that such cutbacks on Science Education are educationally unsound and fiscally irresponsible for the long run pull of the educational needs of this country.

Science has become a 4 plus 3 dirty word and has become the brunt of doubt and discredit. Technology has got to go, so says the emotional and uninformed vocal minority. In 15 or 20 years from now we shall reap the harvest of what we sow now. Such a fiscal policy as being contemplated is a visible national support of the disillusionment that some people are attempting to create about science and scientists. But in the future when our nation goes looking for the scientists and engineers, the cupboard will be bare.

I ask you to bring this to the attention of the Association with the hope that it will add its voice to those of the many scientists at all levels of education who through their teaching and research are the foundations of the science for tomorrow.

With best wishes, I am

Cordially yours,

John R. Cortelyou, C.M.

(Very Rev.) John R. Cortelyou, C.M.
President

JRC..kms

APR 19 1971

NORTH CENTRAL COLLEGE
NAPERVILLE, ILLINOIS 60540

Office of the Dean of the Faculty

April 15, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

In response to your opinion survey of April 7 on NSF Science Education Cutbacks, I have no hesitation in saying that the proposed cutbacks will seriously affect undergraduate science programs in the smaller private colleges.

1) Elimination of the Undergraduate Research Participation Grants chokes off any real opportunity for us to provide our students with a significant undergraduate research experience. Colleges like North Central simply do not have the operating budgets to pay the student and faculty stipends plus the money needed for small equipment and materials. Our new science center is spacious and rather well equipped so that our students would definitely benefit from the NSF Undergraduate Research Grant Program. We were hoping to qualify for one or more of these grants with the new science facility. Students and faculty in most cases cannot afford to do research during the summer without financial support.

2) We were able to acquire much needed equipment in the biological and physical sciences over the past few years with the help of the Instructional Scientific Equipment Program and the Institutional Grants. Laboratory work planned around good equipment and instruments is essential for the undergraduate sciences today. Loss of these financial aids will weaken our laboratory program.

3) Plans to reduce or eliminate Teacher Institutes seem extremely shortsighted. Faculty growth and enrichment is imperative for us in the sciences today, and it centers on the participation in these institutes and workshops.

Sincerely,

Richard M. Eastman

Richard M. Eastman
Vice-President for
Academic Affairs

RME:cz

62-912 O - 71 - 25

ROOSEVELT
UNIVERSITY
430 SOUTH MICHIGAN AVENUE
CHICAGO, ILLINOIS 60605

TELEPHONE
WABASH 2-3580

APR 19 1971

April 14, 1971

Mr. Edward E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street NW
Washington DC 20009

Dear Mr. Holcomb:

President Weil showed me a copy of your letter of April 7 and asked me to write you. I have just returned from a COSIP Directors' Meeting in Washington and am very much discouraged at the present administration's budget proposals. These would virtually destroy the support of private institutions like Roosevelt University, which are attempting to innovate programs in science pertinent to present day needs of the community.

Our present COSIP grant has enabled us to make greater strides in our science teaching and, while the University is committed to carry on these programs, other areas, such as computer applications, environmental science programs, etc., could not be funded from current budgets without the kind of help given by the COSIP program.

Additionally, teaching institutes needed to upgrade teachers presently employed must be continued if our secondary school education process is not to suffer.

Science education funding, as well as research funding, is vitally important to our whole educational system.

Sincerely,

W. S. Guthmann

Walter S. Guthmann, Chairman
Department of Chemistry
COSIP Director for Roosevelt University

WSG:gg

APR 19 1971

ROOSEVELT UNIVERSITY

430 SOUTH MICHIGAN AVENUE
CHICAGO, ILLINOIS 60605
312 • 341-3500

April 14, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1816 R Street N. W.
Washington, D. C. 20009

Dear Dr. Holcomb:

I am frankly appalled at the proposed Administration Budget for the National Science Foundation for the coming fiscal year. It is ironic, after the years of trying to break the 500 million dollar "ceiling", that we finally find the budget exceeding this magic limit by over 100 million dollars, while at the same time many of the fine science education programs are receiving a reduction by nearly 25%.

I know that many excellent programs in the past involving science at the elementary school level have not received adequate support only because of the wise recognition on the part of N.S.F. that it was a huge program for which adequate funds were simply unavailable. Hence, only programs with a proposed multiplier aspect were even considered.

It appears that many on Capitol Hill are of the opinion that the job is somehow done and that no further support is necessary. Quite the contrary, the problem of making science relevant at the elementary, as well as secondary school levels, will get only worse unless funds are provided.

Let it be clear that this domain does not seem to fall in the interest of the Office of Education who have long held the opinion, it seems, that science education must receive primary support under National Science Foundation.

Sincerely yours,

Robert W. Estin

Robert W. Estin, Professor & Chairman
Department of Physics
ROOSEVELT UNIVERSITY

RWE:rga
cc: Senator Charles Percy
Senator Adlai Stevenson III
Representative Frank Annunzio

APR 19 1971

LOYOLA UNIVERSITY OF CHICAGO

THE GRADUATE SCHOOL

April 16, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Dr. Holcomb:

I am quite concerned about the proposed cuts in the NSF Science Education Budget. I am particularly concerned about the future of the United States in relation to other recently developed countries.

The United States has been in the forefront of the world today, mostly due to the high standards of education, the high levels of technical development, and the scientific capacity to do research, to capitalize on the research and to put into practice all the great advances in science in recent years.

If we continue to cut back science funds, we will have a diminished production of scientists, a diminished number of scientific advances, and the United States Government will lose it's leadership. Since the government, in it's past wisdom, has satisfactorily supported science in this country, we have demonstrated beyond question our skills and capacity for scientific leadership in the world. To yield this leadership in the very near future would be a wrong direction to go and would change the course of progress of the United States in the world today.

I would like to strongly urge the members of Congress to restore funds to the NSF Budget so that it can properly reflect the decisions and aims and goals of this country for the future.

Sincerely yours,

Raymond P. Mariella

Raymond P. Mariella
Dean

RPM:nlc

APR 19 1971

DEPARTMENT OF ASTRONOMY
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
URBANA, ILLINOIS 61801 U.S.A.
TELEPHONE 217-333-3090

April 16, 1971

Dr. Howard E. Holcomb
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Dr. Holcomb:

I want to express my support to you in efforts being made to restore funds to the educational part of the National Science Foundation's budget for next year.

I recently learned that a drastic cut is planned, and earnestly hope that a rider to the appropriations bill will get introduced in the very near future. I speak to you not in vacuo, but as a participant for the past six or seven years in a part of the Student Science Training Program. In particular, I have lectured and "rapped" with high-school students in the Astro-Science Workshop, directed by Professor Jay Burns of Northwestern University and conducted at Chicago's Adler Planetarium. Termination of this phase of NSF's educational effort--and other phases as well--strikes me as false economy of the most extreme kind.

I grant that we have a plethora of Ph.D.'s in physics and astronomy at the present time, just as surely as we had a severe shortage 15 years ago. But we are here concerned with the brightest young potential scientists and leaders in other fields, and these high-school programs have their impact on those who will be entering the marketplace ten years from today, when conditions and national priorities will surely be different than they now.

In my own and my educational colleagues' interactions with prospective science Ph.D.'s, I believe it is our personal task to effect cutbacks in the domain of today's graduate students, perhaps by discouraging the not-quite-so-superbly-qualified 22-year-olds. But it seems disastrous to discourage the potentially most productive 15- and 16-year olds at this very early stage of their development. It is my strong guess that we shall urgently need the best of this young crop a decade from now, and that today is the time that they should be encouraged.

I therefore urge that your prestigious organization continue its efforts in the direction of restoration of educational funds in the hope that some or all of the specific programs--especially the SSTP--may continue into the future.

Very truly yours,

Stanley P. Wyatt Jr.

Stanley P. Wyatt, Jr.
Professor of Astronomy

APR 19 1971

Southern Illinois
University

CARBONDALE, ILLINOIS 62901

College of Liberal Arts and Sciences

April 16, 1971

Dr. Howard E. Holcomb
Executive Associate Federal Relations
Association of American Colleges
1818 R Street N. W.
Washington, D. C. 20009

Dear Dr. Holcomb:

Your memo regarding NSF Education Cutbacks has been turned over to me today by our Chancellor.

Everyone is in charge of economy as long as it doesn't affect him. I cannot argue that some programs might be decreased or eliminated, but to do this to the programs mentioned in your memo is tragic. This is the age of science and our survival depends on science, I believe. Therefore, to cut out these programs may ultimately mean signing our own death certificate.

Sincerely yours,

Elbert H. Hadley
Associate Dean

EHH:djf

APR 19 1971

MacMurray College

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

In the absence of our President who will be out of the city for the next ten days, I wish to express my own personal concern and the concern of my colleagues, regarding the proposed administrative budget for the National Science Foundation for fiscal 1972.

As a college administrator for more than thirty years, I have been concerned with the growing financial difficulties of private education due to the fantastic growth of our public institutions. This competition together with inflation has placed private education in a most difficult position.

I find it most difficult to understand the elimination of undergraduate research participation, science faculty fellowships, the student science training program, and instructional science equipment program together with other deductions that adds to the problems of higher education and private colleges, a reduction in programs and increased difficulty in attracting students.

I have also expressed my concern to my good personal friend and most competent member of the Congress, the Honorable Paul E. Findley.

Sincerely yours,

Clarendon Smith

Clarendon Smith,
Business Manager

CS:TLN

cc President John J. Wittich

APR 19 1971

LAKE FOREST COLLEGE / LAKE FOREST, ILLINOIS

OFFICE OF THE PRESIDENT

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Re: NSF Science Education Cutbacks

Dear Mr. Holcomb:

If the sole effect of the proposed reduction in NSF funds for science education would be to reduce the flux of Ph.D. scientists emerging from our graduate institutions, few people would mourn the loss. But there is still a pressing need for improvement in the quality of science education. Not only do we need to train scientists who are more versatile and flexible and more capable of attacking the complex problems that have arisen, we need to educate the citizens of this nation who, more and more, must make decisions related to science and technology. The cutbacks in funds for science education will unquestionably retard progress in these areas. It should be remembered that this is not the first cut in NSF funds for science education. For several years the allocations have been reduced at a rate of about $20 million per year. Further reductions will seriously cripple our attempts to improve science education.

The programs eliminated in the proposed budget have been particularly helpful to the four-year colleges. For a variety of reasons, the four-year colleges have not gotten many regular research grants from NSF. Consequently, the Undergraduate Research Participation Program has been of enormous value in allowing both students and faculty to have contact with some scholarly pursuits. Similarly, the Science Faculty Fellowship Program has allowed faculty to pursue study and research not commonly available on the small campus. The financial burden of maintaining a good science facility will be even greater without the help provided through the Instructional Scientific Equipment Program.

I hope that in their understandable desire to reap the harvest of research, the administration does not neglect saving the seed of education which will insure for the future well-qualified scientists and an informed citizenry.

Very sincerely

Eugene Hotchkiss III
President

EH:gl

NORTHWESTERN UNIVERSITY
EVANSTON, ILLINOIS 60201

DEPARTMENT OF ASTRONOMY

LINDHEIMER ASTRONOMICAL RESEARCH CENTER

APR 19 1971

14 April 1971

Mr. Howard E. Holcomb
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

I should like to add my voice to those protesting the proposed heavy cuts in the National Science Foundation educational support budget. Such cuts, following upon those of last year, will serve to accelerate the damage being done to higher education by the rapid withdrawal of governmental support. It may be worthwhile to make some changes in the size and objectives of higher education in this country, but this reappraisal is being made much more difficult by ill-timed and imprudently conceived wide fluctuations in governmental policy on financial support. A little gradualism would go a long way toward promoting wise choices for the future.

Sincerely yours,

Jay Burns

Jay Burns
Assoc. Professor

JB/ah

Founded 1907

OLIVET NAZARENE COLLEGE

Education with a Christian Purpose

KANKAKEE, ILLINOIS

APR 16 1971

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

Your notice regarding the proposed budget for the NSF has been referred to me for an answer.

Inasmuch as I represent a small school of less than 2000 I look upon the proposed reduction in NSF budget with some feeling of despair. One reason is because we are trying to strengthen our offerings in science and science education. Young men have come to our faculty who are especially interested in these areas. Unless support is available it means a falling back into routine of offerings that we have been trying to pull away from.

Also, we have reached a point where the students have shown an interest in research and faculty members have developed plans to utilize this interest in the curriculum.

Moreover, some of the programs that are planned for deletion are community related. Our relations with the local schools has taken on a form where there is a good interrelation. Many of our efforts to upgrade science teaching in the pre-college area would have to be discontinued because of lack of funds. The fact that we are the only senior college within a radius of 50 miles makes any retreat on our part a serious matter.

I would suggest that Congress consider reductions in areas other than education. Perhaps the funds considered in the proposal have reflected poor use, but it does require some time and effort to get some programs adequately operative.

Thank you for this privilege.

Cordially yours,

Linford A. Marquart, Coordinator
Federal and State Grants

LAM:rk

elmhurst college
OFFICE OF THE PRESIDENT

ELMHURST, ILLINOIS 60126
TELEPHONE 312-279-4100

APR 19 1971

April 15, 1971

Mr. Howard E. Holcomb
Association of American Colleges
One Dupont Circle - Suite 770
Washington, D. C. 20036

Dear Mr. Holcomb:

Thanks for your memorandum concerning the proposed NSF science education cutbacks. Here is our reaction to these proposed cuts:

> Elmhurst College has benefitted especially from the Instructional Scientific Equipment Program and the Student Science Training Program. We are grateful for this help and naturally we would like to see it continued. The College simply does not have resources of its own to continue with them.

We at Elmhurst are appreciative of your personal efforts in the total area of federal relations. Keep up the good work! We desperately need federal funding to assist us in being a quality school.

Cordially,

Donald C. Kleckner
President

DCK/bz

APR 19 1971

DePauw University
Greencastle, Indiana
46135

Executive Vice President

April 15, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Regulations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

Thank you for your April 7 report on cutbacks in certain elements of the National Science Foundation's aid to education program. Naturally, we are terribly disappointed to see this development. Especially so inasmuch as we presently are moving toward completion of a new science facility on which we embarked about four years ago largely on the basis of significant need for the expansion and improvement of science in this country. The move represents a major effort on the part of DePauw University, and it will, of course, present us with substantially increased operating expenditures as well as substantially increased opportunities for science instruction and research. Our aim now is to promote science aggressively to make sure that the investment can be used to its maximum. The anticipated reduction in NSF support for colleges such as DePauw comes at an extremely awkward time for us, as a consequence!

Yours very truly,

Norman J. Knights

NJK:kv

Dictated by Mr. Knights
but signed in his absence.

University of Notre Dame
Notre Dame, Indiana 46556

APR 19 1971

Office of the President

Cable Address "Dulac"

April 15, 1971

VIA AIR MAIL

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Dr. Holcomb:

This is in reply to your inquiry as to the effect that the proposed reductions in budget for the National Science Foundation for Fiscal Year 72, covering the support of science education, will have on our institutions.

Our feeling is that a thorough review of existing programs for the support of education in science by the National Science Foundation is very much in order, but that it is most unlikely that the best solution is the sudden and arbitrary elimination of all support for four of the programs (Undergraduate Research Participation, Science Faculty Fellowships, Student Science Training Program, and Instructional Scientific Equipment) and inadequate or reduced funding for five programs (College Science Improvement Program, Teacher Institutes, Pre-College Course Curriculum, Special Projects, and Institutional Grants).

We hope very much that the U. S. Congress will review these proposed reductions very carefully and arrange for less drastic action on the support of the more important ones of these programs.

Cordially,

Th Hesburgh, c.s.c.

(Rev.) Theodore M. Hesburgh, CSC
President

TMH/js

Copy to: The Honorable John Brademas

APR 19 1971

University of Evansville
P. O. BOX 329, EVANSVILLE, INDIANA 47704

WALLACE B. GRAVES
PRESIDENT

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

I am writing this letter to you in response to the proposed administration budget for the National Science Foundation for fiscal 1972 and in particular to the reduction in this budget of funds for the support of science education. What I say for federal support of science education is equally applicable, in my judgment, to federal support for other educational disciplines.

The educational community of this nation has to guess about the philosophy of the federal government on involvement in education during the fateful years which lie ahead of us. The prevailing reluctance to face the educational needs of this nation squarely and to respond effectively leads one to choose one or two alternative reasons. One can surmise that the federal government is remaining aloof from this area in order to force educational institutions to reduce their previous levels of operation for reasons which the administration does not specify and along lines which the administration does not indicate. Another conclusion is that the federal government gives to education a lower level of priority than it has in the recent past as a force for constructive development for the nation in the years ahead.

I believe that the time has come for our representatives in Washington to make a commitment to education at all levels that is rational, relevant, and comprehensive. I cannot believe that our representatives in Washington are unmindful of the central and fateful role which education must play in times like these if the American people are to continue to develop their potentialities and to give the kind of leadership the world requires in the last three decades of the twentieth and the opening decades of the twenty-first century. If our institutions of education at

all levels can have the assurance of the proper support both public and private and at all levels, I am sure that it can provide the quality and kinds of educational programs which this nation requires. With all of the pressures which are being exerted on educators in this nation, it is almost too much to ask them to give the kind of leadership and make the kind of decisions which are required without the support of the governments and the peoples of the nation which they serve and benefit.

I appreciate the opportunity to reflect on the current state of federal educational relationships.

Sincerely yours,

Wallace B. Graves

WBG:ed

Franklin College
Franklin, Indiana 46131

VICE-PRESIDENT FOR ACADEMIC AFFAIRS
DEAN OF THE COLLEGE

APR 19 1971

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

The proposed administration budget for the NSF for the fiscal year 1972 contains a reduction of science education support which I feel is extremely unwise.

Having directed National Science Foundation Institutes for secondary teachers for five years, I have seen ample evidence of the value of these institutes to the teachers. The teachers whom we served were poorly prepared for their jobs, but, in general, were tenured faculty members. Restricting the opportunities for these teachers to retool themselves doe not mean they will be replaced by more competent teachers. Due to their tenure, they are a fixed part of the educational system, and without subsidized opportunities to increase their proficiency, they will remain as obstructions to improvement of the secondary school program.

I would strongly urge Congress to restore the $23 million cut from the science education budget.

Sincerely yours,

Richard M. Park

Richard M. Park

RMP/lp

APR 19 1971

EARLHAM COLLEGE
RICHMOND, INDIANA 47374

Dean of Academic Affairs

April 15, 1971

Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, DC 20009

Dear Howard Holcomb:

I write to express serious concern about the proposed budget of the National Science Foundation for Fiscal '72. It seems to me unwise to cut back the funds as proposed in support of science education in undergraduate programs. More and more undergraduates today have a false image of science and, as they say, are "turned off" by science. It is important for the future of our country that we rise to the challenge presented by today's students, and that we correct their stereotypes about science. If we do not, it is clear that graduate education and research in science will suffer markedly within a few years. They will suffer not only in terms of the quantity of students interested in pursuing graduate education in science and research in science, but in the quality of students who pursue that interest.

With a creative undergraduate program and with good teachers, it is clear that the stereotypes of today's students can be changed. It is important for science and for the country that this aim be accomplished. Continuing support of undergraduate science programs in colleges is critically needed to accomplish this aim.

Sincerely yours,

Joe E. Elmore
Dean of Academic Affairs

JEE/pm

62-912 O - 71 - 26

APR 26 1971

EARLHAM COLLEGE
RICHMOND, INDIANA 47374

Professor of English and
Acting Provost

April 22, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street N.W.
Washington, DC 20009

Dear Mr. Holcomb:

I am writing to you to express concern about the proposed Administration budget for the National Science Foundation for the year 1972. The decrease in financial support for science education is alarming in view of the total number of students currently majoring in this area at a time when the general educational level of the population concerning matters relating to science and technology must be high. The proposed cutback seems particularly unjustifiable. Our culture is becoming increasingly dependent on the technological output of scientific inquiry. An adequately informed electorate is crucial to informed decision making. If anything increased support of science education is mandatory in a society such as ours.

The Undergraduate Research Participation program has been particularly helpful to small colleges. This program has enabled small college faculty to work effectively with students in planning and conducting research programs. It is usually not possible for small college faculty members to be competitive with university professors for research funds. In many universities graduate study and research are heavily subsidized at the expense of undergraduate education.

Thank you for your concern in this matter.

Sincerely,
William K. Stephenson
William K. Stephenson
Associate Dean and
Professor of Biology

WKS/mbp

APR 26 1971

EARLHAM COLLEGE
RICHMOND, INDIANA 47374

Professor of English and
Acting Provost

April 22, 1971

Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, DC 20009

Dear Howard Holcomb:

The reason for this communication is my desire to convey my concern about the National Science Foundation's cutback in next year's funds for its undergraduate programs in science education.

We feel that at Earlham College we have a creative undergraduate program in the sciences taught by good teachers who do more than perpetuate the stereotyped teaching of the years not too long ago. In order to encourage the kinds of students who are interested in pursuing this sort of education in science, we are in real need of continuing support. It is our hope that we may go on educating gradually even a higher percentage of our graduates in science than is now the case (27% of our total graduates in 1970, and 26% estimated for the present academic year).

We hope that you will give serious consideration to what this cutback in funds will mean to programs like ours.

Sincerely,

Helen G. Hole

Helen G. Hole
(Mrs.)

HGH/mbp

GOSHEN COLLEGE
GOSHEN, INDIANA 46526

APR 15 1971

Office of the President

April 13, 1971

Mr. Howard E. Holcomb
Association of American Colleges
1818 R Street N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

I have been deeply disturbed by the proposal made by the administration that the total budget for science education in fiscal 1972 be cut by about one-fourth from its present $100,000,000 to $77,000,000. I understand that institutional support for science is also being recommended for a cut in budget. In view of the strong administration support which was given to the proposed SST program, I have great difficulty in believing that funds are not actually available to give better support to science education. I hope that you will do everything you can to convince members of Congress to take a critical look at the administration proposal and if at all possible, restore at least the amount contained in the fiscal 1971 budget and better still to increase it. Economies in science education will have profound effects in the years to come.

Sincerely yours,

Carl Kreider

Carl Kreider
Acting President

CK:ns

APR 26 1971

DRAKE UNIVERSITY
DES MOINES, IOWA 50311

OFFICE OF THE PRESIDENT

April 21, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

Your letter of April seventh raises some serious problems concerning financing undergraduate science education. It is important that we have excellent research if we are to maintain the leadership of the United States in the fields of science. It is equally important that we have an excellently trained lay population in science if we are to communicate adequately the knowledge that may save society from destruction. This involves, not only aid for the preparation of non-scientists, but also preparation for the future professional. This must be done in all undergraduate education. The smaller institution is as important, if not more important, than the institutions where the focus is upon research in the preparation of our citizenry.

I would encourage especially the College Science Improvement Program, Instructional Scientific Equipment Program, Institutional Grants and an expansion of special projects with focus upon ways and means for improving science education and, at the same time, increasing the productivity of the teaching staff.

The spiraling costs of undergraduate education demands aid from the federal government if we are to cope with the problems of modern society and if man can develop adequate controls of his environment.

Sincerely,

Paul F. Sharp

CLARKE COLLEGE

DUBUQUE, IOWA 52001

COMPUTER SCIENCES DEPARTMENT

PHONE 319-588-6391

APR 21 1971

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

We are dismayed that the budget of the National Science Foundation although increased for this year will, at the same time, contain a decrease in support for science education. As a four time director of a summer institute for teachers sponsored by NSF I have first hand information and experience with the value of this program and many others to the teachers of science. At that there are more teachers in need of this kind of help than has been previously supported. I have just completed the selection of 30 candidates from 400 who would have liked to attend and could have benefitted from a summer institute.

The student participation in research is the best kind of training for the future scientist and the best pedogagical approach to learning. It ought to be supported more rather than less.

Finally, many small colleges like ourselves have benefitted very much in the past by relatively small grants which nevertheless were used very efficiently by the recipients who put up funds of their own, after careful considerations, to develop good programs for our students. The loss of this support may mean the postponement or total elimination of this progress.

I hope you will do all you can to persuade those who can change this picture to do so.

Sincerely,

Sister Mary K. Keller.

Sister Mary Kenneth Keller
Chairman, and Director of NSF Summer Institute

SMK:em

Grace Land College
Lamoni, Iowa 50140

APR 26 1971

April 19, 1971

Mr. John Kyl
Congressman from Iowa
Congressional Office Building
Washington, D. C. 20003

Dear Congressman Kyl:

I am writing in regard to HR 4743. I am a college teacher of mathematics. Between the years of 1948 and 1957 I simply could not find the money for summer school to improve or to keep abreast of changes. In 1957 I secured a NSF Summer Institute stipend at the University of Kansas. In several other following summers I was again the recipient of such aid. It made almost a total change in my teaching to this day.

I hope that in any change of appropriations for NSF scholarships your criteria will not be - "the science area has ridden this wagon for quite a while - now let's give it to someone else." I I do not know what the over-all picture is in our country, but I suspect the younger teachers may need this help as much as I did. I am sure that the nation has benefitted greatly. I hope we will not lose the gains by curtailment of the program. Probably it simply needs to be extended and opened up more to teachers in other areas.

I realize you have a very difficult job. I hope you have the time and personnel to make a thorough study of this matter.

Sincerely,

N L Jacobson

Ned L. Jacobson
Associate Professor of
Mathematics

NLJ:pg

cc Dr. Howard E. Holcomb

APR 19 1971

University of Dubuque
DUBUQUE, IOWA 52002 • TELEPHONE 583-1771

OFFICE OF THE PRESIDENT

April 15, 1971

Mr. Howard E. Holcomb
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

I have just received your note with the proposed budget reductions scheduled for the National Science Foundation for fiscal '72. Although the larger institutions have secured the lion's share of NSF support to date, these monies have been also enormously helpful at the University of Dubuque. We have been able to fund computer work that we would not have been able to secure otherwise, and we have received support in the development of our Science Department that has been essential.

I trust that the Nixon administration will be able to reverse its position on NSF reductions. These are difficult times for all colleges and universities but particularly difficult for the small private institution that does not have substantial endowment. In view of the high costs involved in science offerings, it would indeed be tragic for us if we were to lose all NSF support.

Sincerely,

Walter F. Peterson

WFP:bhm

SIMPSON COLLEGE
FOUNDED 1860
INDIANOLA, IOWA 50125

OFFICE OF THE PRESIDENT

APR 19 1971

April 14, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, Northwest
Washington, D. C. 20009

Dear Dr. Holcomb:

Those of us in colleges and universities note with alarm the proposed cut in the appropriations for science education in the budget of the National Science Foundation. This is one other instance where, in the most difficult period in the recent history of American higher education, support threatens to be withdrawn when we need it the most. Please communicate our concern to those who represent us in the executive and legislative branches of the Federal government.

Warm personal regards.

Most cordially,

Ralph C. Joan
President

RCJ:ajb

APR 19 1971

SIMPSON COLLEGE
FOUNDED 1860
INDIANOLA, IOWA 50125

ASSISTANT TO THE PRESIDENT

April 15, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R. Street NW
Washington, D.C. 20009

Dear Dr. Holcomb,

We are writing to express our concern in the NSF science educational cutbacks. It is our understanding that the proposed budget for NSF would eliminate under graduate research participation, science faculty fellowships, student science training programs and instructional scientific equipment programs and reduce funding in college science improvement programs, teacher institutes, pre-college course curriculum special projects and institutional grants.

Cutbacks in these areas would hinder the work of the small liberal arts colleges of the country. If we are to have a strong science program in this country, undergraduate research participation is important. It helps the student understand the relevance of science. The instructional scientific equipment program has been extremely important to the small colleges. It has made it possible for small colleges to update their science labs. If these funds are reduced or eliminated, we will no longer be able to adequately finance the scientific departments of our schools.

Teacher institutes have been very important in helping to keep teachers current in the new developments of science. The institutional grants have been most helpful in making it possible for us to cover some of the direct costs of our science departments. A reduction in any of the areas listed above will hinder the science programs of the small college, especially the private college that does not have the advantages of state support.

Would you please do whatever you can to help get the funds reinstated in these areas.

Sincerely yours,

Donald H. Koontz

Donald H. Koontz
Assistant to the President

APR 19 1971

WARTBURG COLLEGE

WAVERLY, IOWA
50677

OFFICE OF THE PRESIDENT

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal
Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Howard:

I am dismayed by the news that the proposed administration budget for the National Science Foundation would reduce support for science education and would also cut institutional support. I realize that the proposal includes an increase in funds for overall NSF needs for fiscal '72 but the change in allocation is perplexing and discouraging.

There is such general agreement that we are in danger of placing undue emphasis on massive research projects instead of investing in science education for citizenship, and I cannot understand the reasoning behind the '72 proposal.

I cannot reconcile the proposal either with the administration's expressed interest in the preservation of higher education. The shift in funds will undoubtedly be detrimental to our enterprise.

Whatever you can do to bring these views to the attention of our legislators will be appreciated.

Sincerely,

John W. Bachman
President

JWB:gb

APR 19 1971

CENTRAL COLLEGE
PELLA, IOWA 50219

Office of the President

April 15, 1971

Dr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street N.W.
Washington, D. C. 20009

Dear Dr. Holcomb:

As the president of an undergraduate institution, I am deeply disturbed by the seeming disregard for the role of undergraduate education in science evidenced by the proposed fiscal '72 budget for the NSF.

The elimination of the Undergraduate Research Participation and the Instructional Scientific Equipment Programs and the reduced funding of the College Science Improvement Program and Institutional Grants for Science will seriously hinder our ability to continue to provide high quality undergraduate instruction in the sciences. I believe it is quite correct to say that because of these programs significant improvements in our science departments have been made possible; their discontinuation will seriously hinder our attempts to provide an excellent education for our science majors.

Your efforts in this vital area will be appreciated.

Sincerely,

Kenneth J. Weller
President

KJW:lh

DIVINE WORD COLLEGE
EPWORTH, IOWA 52045 Ph. 319-876-3362
OFFICE OF THE PRESIDENT

VERY REV. HAROLD RIGNEY, S.V.D.
PRESIDENT

REV. CHARLES W. MALIN, S.V.D.
VICE-PRESIDENT

APR 19 1971

Howard A. Holcomb
Executive Associate for Federal Relations
A.A.C.
Washington, D.C.

Dear Mrs. H. Holcomb:

I regret that the support for science education by the N.S.F. is up for a reduction. I do hope that the proper authorities will reconsider this matter and restore, in proper perspective, the science education needs.

Yours sincerely

Harold Rigney, S.V.D.

APR 16 1971

COE COLLEGE
Cedar Rapids, Iowa 52402
OFFICE OF THE PRESIDENT

13 April 1971

Dr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Dr. Holcomb:

I write to express the concern of the faculty, administration, and trustees at Coe College concerning the proposed reduction of science educational funding from one-hundred million to seventy-seven million.

This funding reduction would have a devastating effect on the science programs in undergraduate institutions. Reduced funding of the undergraduate science programs seems to be justified on the basis of the reduced need for numbers of scientists. However, the effect on the undergraduate colleges and universities would be not so much in reduced numbers as a step toward the erosion of quality.

There are few programs financed by the Federal Government in which so few dollars can make so formidable a difference in the maintenance of quality as is represented in the investment in the undergraduate science education programs. We plead for restoration of these funds.

Sincerely yours,

Leo L. Nussbaum
President

LLN:1

graceland college
Lamoni, Iowa 50140 / Phone 515-784-3311
DIVISION OF SCIENCE AND MATHEMATICS

April 13, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Dr. Holcomb:

I am writing this letter to protest the proposal cutbacks in the programs sponsored by the National Science Foundation. Why should good programs like the Instructional Scientific Equipment Program, College Science Improvement Program, Teacher Institutes, Faculty Fellowships, and others be eliminated when the total NSF budget is increased?

Many of the programs being eliminated were of greatest value to students and faculty of the smaller colleges which I represent. It seems that the government once again favors those who are already affluent and forgets about those individuals who are in smaller institutions. Let me say again, I am opposed to the elimination of these NSF programs which have proven to be very beneficial during the past few years.

Sincerely,

Bruce M. Graybill

Bruce M. Graybill, Chairman
Division of Science and
Mathematics

BMG:pg

APR 16 1971

Morningside College
SIOUX CITY, IOWA 51106

OFFICE OF THE PRESIDENT

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

It is completely amazing to me that the National Science Foundation for the fiscal year '72 should make such drastic cuts in the allocations to science programs at our undergraduate four-year liberal arts colleges. This is very shortsighted on the part of our government and especially the key officials who administer the NSF. I wish that someway, somehow you and other officers and directors of the Association of American Colleges could make it known to the administrative people in the NSF what this means to us at the "grass root" level.

Much is being written these days about what we are facing nationally with the decline in the prestige of science. The private colleges, especially with their shortage of funds, feel rather frustrated at this point. Speaking for one college, we believe that a new degree of respect for science is necessary. We were hopeful at Morningside College that such funds, for example, could be made available to us which would help in having our college as a setting for working with both on-campus and off-campus people in getting a better all-encompassing grasp of the physical world and its broader relationship. Society needs the specific information that such activity would provide.

Speaking as just another college president, "crying in the wilderness", I hope that you will speak out in our behalf and make it known how we are in position to be helpful in hopefully resolving some of the problems that can only be resolved through the strengthening of the science teaching in our colleges and universities.

Sincerely,

Thomas S. Thompson

Thomas S. Thompson
President

TST:mp

APR 14 1971

The Iowa Association of
PRIVATE COLLEGES AND UNIVERSITIES
716 SECURITIES BUILDING • DES MOINES, IOWA 50309 • PHONE 282-3175

April 12, 1971

Mr. Howard E. Holcomb
Association of American Colleges
1818 R St. N.W.
Washington, D.C. 20009

VIA AIR MAIL

Dear Mr. Holcomb:

I am disheartened by the proposed NSF budget which could cut so much from the NSF programs for undergraduate education.

Doesn't anyone in Washington today realize what is happening to the programs of the small, liberal arts colleges? These institutions have educated thousands and thousands of Americans; why is not the financial crisis which threatens our very existence taken seriously? At a time when we desperately need increased assistance, this type of cutting is occurring.

Please register my discouragement somehow.

Sincerely yours,

Lloyd I. Watkins
President

Dictated by Dr. Watkins,
signed in his absence.

62-912 O - 71 - 27

APR 15 1971

ST. AMBROSE COLLEGE
DAVENPORT, IOWA 52803

OFFICE OF THE PRESIDENT

April 12, 1971

Howard E. Holcomb
Association of American Colleges
Washington, D. C. 20009

Dear Mr. Holcomb,

I regret very much the Administration's cutback for the support for science education in th e budget for the National Science Foundation.

The fact that the overall budget for the Foundation has been increased sizeably gives the impression that the Administration is supporting science education when in reality it is cutting back on what we consider a vital aspect of the Foundation's program.

I trust that your efforts may help to correct that impression and make more money available for science education.

Sincerely Yours,

S. G. Menke

Rt. Rev. S. G. Menke

APR 20 1971

McPHERSON COLLEGE

MERLIN L. FRANTZ
DEAN OF ACADEMIC AFFAIRS

April 16, 1971

Dr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R. Street, N.W.
Washington, D.C. 20009

Dear Dr. Holcomb:

Thank you for the information regarding the proposed Administrative budget for the National Science Foundation. It is, indeed, clear that this would have a negative effort upon science programs at McPherson College as well as other institutions.

We feel that the elimination of certain National Science Foundation Education Programs and reduction in others would be a serious blow to the science program at McPherson College. We, as an institution, and our students, as individuals, have been recipients of valuable aid through the following specific programs: Science Faculty Fellowship, Undergraduate Research Participation, Teacher Institutes, and Instructional Scientific Equipment. In most cases, the training could not have been obtained, or the equipment purchased, had it now been for the National Science Foundation assistance. From our point of view, the NSF Education Programs have represented an exceeding valuable avenue of federal assistance to higher education. The need for this assistance, both to institutions like ours and to the country, remains very high. We feel that these programs should not be dropped or curtailed. Thank you again for alerting us to the seriousness of this problem.

Sincerely yours,

Merlin L. Frantz

MLF:bb

cc: President J. Jack Melhorn

APR 19 1971

FORT HAYS KANSAS STATE COLLEGE
HAYS, KANSAS 67601
Office of Graduate Dean

April 15, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Dr. Holcomb:

I want to take this opportunity to register my concern about the proposed Administration budget for the National Science Foundation for Fiscal 1972. I am aware that the proposed budget shows an increase of $116 million, but with the accompanying shifts in program emphasis I am fearful that institutions such as ours will suffer greatly. I am disturbed that the Foundation's support for fundamental research will be substantially increased while support for science education and institutional support for science are being reduced.

While our basic research interests are not as great here, we are vitally interested in maintaining participation in programs such as Undergraduate Research Participation, Student Science Training Program, Instructional Scientific Equipment Program, College Science Improvement Program, Teacher Institute, and Institutional Grants. However, the elimination of a reduction of support for those would certainly reduce our level of participation.

I urge you to take whatever measures seem advisable in order to present our case to the appropriate people.

Sincerely,

Jimmy Rice

Jimmy Rice, Dean
Graduate Division

JR/ld

Kansas Wesleyan
SANTA FE AT CLAFLIN
SALINA, KANSAS 67401
913-827-5541

OFFICE OF THE PRESIDENT

April 13, 1971

APR 15 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, DC 20009

Dear Dr. Holcomb:

I watched with interest the proposed funding for the National Science Foundation for fiscal 1972, and while I realize that there is an increase of funds available, most of that increase comes in the area of research, with a reduction for the educational aspects of the National Science Foundation's work.

Through the years the National Science Foundation has perhaps done the best job of aiding education of any government agency. So much of what the government spends does not really affect education, although it is channeled through educational institutions. I think every program should be analyzed in terms of the effect of the money on the inter-reaction between faculty and students, and the proposed program for the National Science Foundation will reduce this inter-reaction significantly. The greatest inter-reaction between faculty and students takes place, of course, at the four year undergraduate college; and very little of many of the government programs has really been designed to enhance this dynamic relationship on the small college campus.

Kansas Wesleyan has benefited by some of the programs, and we have benefited greatly from the National Science Foundation programs in building a good faculty to work with students and in receiving some equipment for the course program which we have at the undergraduate level. It seems to me that the actions taken will reduce or eliminate many of the programs which have been advantageous to the four year undergraduate liberal arts colleges, which, of course, cuts at the very heart of education.

Thank you for giving me an opportunity to express myself.

Sincerely yours,

Paul W. Renich

Paul W. Renich
President

PWR/sh

APR 19 1971

FORT HAYS KANSAS STATE COLLEGE
HAYS, KANSAS 67601
Division of Natural Sciences and Mathematics Telephone (913) 628-5370

April 16, 1971

Dr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Dr. Holcomb:

I am writing with reference to a rather recent decision concerning the cut in science education support by NSF funds. Although they received a larger budget than last year they are giving less to science education. Schools the size of Fort Hays Kansas State College, or smaller, have received the most benefit from the science education program because we do stress quality education with research as only a secondary objective. We are particularly interested in Undergraduate Research Participation, Student Science Training, Instructional Scientific Equipment, Science Improvement, Teacher Institutes and Institutional Grant Programs. We feel these are geared to help students. Although it is important to support faculty level research we must not dilute the training of our future scientists. We certainly hope that these cuts can be completely or at least partly restored.

Sincerely,

G. W. Tomanek
Chairman

cm

APR 19 1971

SAINT BENEDICT'S COLLEGE
Atchison, Kansas 66002

Office of the President

April 16, 1971
Our 113th Year

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R St., NW
Washington, DC 20009

Dear Mr. Holcomb:

Thank you for your letter of April 7 in which you announce education cutbacks in the budget for the National Science Foundation.

I am opposed to these cutbacks for science education; we have enjoyed 1) Undergraduate Research Participation, 2) Science Faculty Fellowships, and 3) Instructional Scientific Equipment Program. Further, our personnel has started preparation of a College Science Improvement Program. These programs have been very significant in improving the quality of our undergraduate education in the sciences. Especially now when we are trying to greatly improve our science offerings for non-science majors we desperately need the undergraduate programs at NSF.

We shall appreciate every effort on your part to obtain funding for the same.

With kindest personal regards, I remain

Sincerely yours,

Alcuin

Father Alcuin Hemmen, O.S.B.
President

APR 16 1971

SOUTHWESTERN COLLEGE

April 14, 1971

Howard E. Holcomb
Executive Associate for
Federal Relations
1818 R. Street N. W.
Washington, D.C. 20009

Dear Mr. Holcomb:

A number of the National Science Foundation Programs have been helpful to the small colleges particularly the instructural scientific program, the college Science improvement program and of great importance the institutional grants. The grants for research have kept our faculty abreast of modern development and have given them and their students a feeling of participation in the development of their disciplines.

Curtailment of any of these programs is of serious concern, particularly in these times of financial crises. It is our hope that Congress and the Administration will see fit to continue these programs and strengthen their application to the needs of the small colleges.

Cordially yours,

J. Hamby Barton

J. Hamby Barton
Dean of the College

JHB/mc

APR 16 1971

SOUTHWESTERN
COLLEGE

April 13, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 "R" Street, Northwest
Washington, D.C. 20009

Dear Dr. Holcomb:

I am shocked, concerned, and perplexed about the tremendous cut-backs in the National Science Program for 1972, regarding undergraduate research participation, Science Faculty Fellowships, the Student Science Training Program, and the Instructional Scientific Equipment Program.

These are all very important on the undergraduate level, and I hope that some measure can be taken to restore this program to where it has been before.

Yours truly,

C. Orville Strohl
President

COS:ap

APR 15 1971

THE COLLEGE OF EMPORIA
EMPORIA, KANSAS 66801

April 13, 1971.

Mr. Howard E. Holcomb,
Executive Associciate for Federal Relations,
Association of American Colleges,
1818 R Street, N.W.,
Washington, D. C. 20009.

Dear Mr. Holcomb:

We at the College of Emporia are concerned about the proposed Administration budget for the National Science Foundation for Fiscal '72. Reductions in institutional support for science and science education will jeopardize new and imaginative programs being developed by many of the small colleges as well as hinder programs at the larger instiutions. Exciting new programs are being developed at the present but the proposed reduction in funds will require that these programs be abandoned or their programs will be postponed until adquate funds are available.

The Science Division at the College of Emporia is very sorry to hear that the Administration felt that such reductions are necessary and appropiate.

Sincerely,

Clarence W. Linsey

Clarence W. Linsey, Ph.D.,
Chairman, Division of Science.



APR 15 1971

STERLING COLLEGE

STERLING, KANSAS 67579

OFFICE OF THE PRESIDENT
WILLIAM M. McCREERY, PRESIDENT

April 13, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R St. N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

I appreciate what you have been doing in an endeavor to help bring to the attention of Congressmen the very valuable assistance which the National Science Foundation has been giving to higher education, and I wish to say that Sterling College has been especially benefitted by the instructional scientific equipment program. We regret very much that funds have been cut so that this program is no longer available to us. For a small college with very limited funds, it is greatly appreciated when one can make his dollar go twice as far as this program enabled it to do.

Sincerely yours,

Wm. McCreery

William M. McCreery
President

WMM:kk

APR 21 1971

Transylvania University
LEXINGTON, KENTUCKY 40508

Department of
Natural Science and Mathematics

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

This is a response to your letter of April 7th regarding the cuts in funds for science education.

In the past, the grants that we received under the Instructional Scientific Equipment Program made possible the purchase of equipment and instruments that we would never have been able to obtain without this help. This equipment has been very meaningful in our undergraduate program, especially in undergraduate research. Since this program has been eliminated, we have looked forward to a grant under the College Science Improvement Program. However, with funding reduced for this and fewer being granted, we cannot be very optimistic about our chances. With the high cost of scientific equipment, we are in a very difficult position and hope somehow that federal funds will be made more available.

Sincerely yours,

Monroe Moosnick
Chairman

MM:cs

We have also written to our congressman about the programs.

APR 19 1971

UNIVERSITY OF LOUISVILLE
LOUISVILLE, KENTUCKY
40208

OFFICE OF THE VICE PRESIDENT
FOR ACADEMIC AFFAIRS

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

At the University of Louisville we look with alarm and dismay upon the drastic cuts being proposed in the budget of the National Science Foundation for science education and for institutional support for science. At a time when scientific research and technological know-how are vital to fighting the battles on which our survival depends in such areas as health, pollution, and environmental design, it would seem to be a reckless policy to hobble our national research effort. And at a time when education desperately needs support and assistance in the teaching of the sciences, on which any rational mastery of our problems by the coming generation depends, it would seem inexcusably short-sighted to reduce the budget so drastically at this point. The achievements in scientific research and science education are not essentially local and do not have a primarily local impact. They cannot be sustained without vigorous leadership and support through the National Science Foundation.

Sincerely,

Wm. F. Ekstrom

William F. Ekstrom
Vice President for
Academic Affairs

WFE:v

APR 27 1971

BEREA COLLEGE
Berea, Kentucky

February 24, 1971

Honorable John Sherman Cooper
United States Senate
Room 125 - Old Senate Building
Washington, D. C. 20510

Dear Senator Cooper:

The bill to fund the National Science Foundation will soon be before the House. I note with concern that the funds particularly earmarked for UNDERGRADUATE RESEARCH PARTICIPATION have been eliminated from the bill as presently proposed. My concern is based on the fact that this particular item has been very effective in supporting research activities in smaller colleges, such as Berea, which do not have a graduate program. Berea's success in producing research scientists is shared by many other small colleges and this elimination of funds is one more link in a chain that threatens to reduce the possibility of small colleges making this important contribution to our nation.

The National Science Foundation made it possible for undergraduates to begin early an involvement in research that very frequently led to a life-time commitment. The National Science Foundation's support also enabled faculty members in small colleges with minimal facilities to continue research activities to the benefit of both their discipline and their teaching.

I urge you to consider the possibility of offering an amendment to the bill in its present form which would provide adequate support of UNDERGRADUATE RESEARCH PARTICIPATION.

Thank you very much.

Sincerely yours,

William M. Jones
Academic Vice President
and Dean of the College

WMJ:lf

CC: Dr. Gerrit Levey

This letter was also sent to Senator Marlow W. Cook, Congressman Tim Lee Carter, Congressman William O. Cowger, Congressman William H. Natcher, Congressman Carl D. Perkins, Congressman M. Gene Snyder, Congressman Frank A. Stubblefield, and Congressman John C. Watts.



APR 14 1971

THOMAS MORE COLLEGE
BOX 85, COVINGTON, KENTUCKY 41017

April 12, 1971

Mr. Howard E. Holcomb
Association of American Colleges
1818 R. Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

I am distressed at the news of the budgetary reduction of support for science education from $100 million to $77 million during Fiscal Year 1972. Equally distressing is the reduction of institutional support for science.

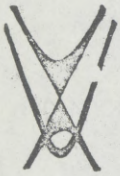
It would appear that now, a time of economic pause, is the very time that we should be engaged in expanding, rather than reducing funding in these vital areas so that the nation will have available to it the trained manpower and resources so vital to any real progress in the future.

Sincerely yours,

LeRoy C. Hill

LeRoy C. Hill
Coordinator of Government
and Foundation Relations

LCH:gld



APR 19 1971

XAVIER UNIVERSITY OF LOUISIANA new orleans 70125

OFFICE OF THE DEAN

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

We are asking your assistance and the cooperation of the Association of American Colleges in making our position known to the House Subcommittee on Science, Research and Development in regard to the proposed budget cuts for NSF Science Education.

In particular we are dismayed by the proposed cutbacks which would affect drastically both qualitatively and quantitatively Undergraduate Science Education in the nation's colleges at a time when it is in the national interest that the colleges produce the kind of manpower needed for the '70's and '80's.

The Xavier University of Louisiana Academic Community strongly urges that the budget cuts affecting especially NSF Undergraduate Science Education--in particular College Science Improvement Program--be restored, and that full funding for Fiscal '72 be assured.

Very sincerely yours,

Sister M. Veronica

Sister M. Veronica
Dean

SMV:sm

APR 15 1971

BOWDOIN COLLEGE

OFFICE OF THE PRESIDENT BRUNSWICK, MAINE 04011

April 13, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

For a number of years Bowdoin College has been the recipient of significant grants from the National Science Foundation particularly under the following programs:

Undergraduate Research Participation
Instructional Scientific Equipment
Teacher Institutes
Institutional Grants

Total annual funding has ranged between $350,000 and $500,000. Major cutbacks in these programs would result in serious dislocation at the College, particularly with regard to the Teacher Institutes which have formed the core of our summer program and have enabled efficient use of our physical plant on an almost year-round basis.

Sincerely yours,

Roger Howell, Jr.

RH/mb

62-912 O - 71 - 28

COLBY COLLEGE
WATERVILLE, MAINE 04901

APR 19 1971

OFFICE OF
THE PRESIDENT

April 15, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Howard:

I am appalled that the proposed administration budget for the National Science Foundation involves a reduction in support for science education.

This is an age in which we should be doing everything possible to foster the understanding of the implications of science for the world we live in, to say nothing of developing more good scientists. The young scientists who go into graduate school must come from undergraduate institutions, and nothing is more valuable for undergraduates in science than participation in research under the guidance of well informed faculty members. The elimination of Undergraduate Research Participation, Science Faculty Fellowships, the Student Science Training Program, and Instructional Scientific Equipment Program, to say nothing of reduced funding for the College Science Improvement Program, Teacher Institutes, Pre-College Course Curriculum, Special Projects, and Institutional Grants, leaves me with a heavy heart as I contemplate science education in the next decade.

As one small example, we have had a most successful Summer Institute in Science for science teachers in high schools here at Colby for over twelve years now, and I know that the teachers who have come to us for this additional education have gone back to their high school classrooms refreshed and invigorated. Anything that jeopardizes the continuation of such a program I would regard as a tragedy.

There surely must be areas in the complex enterprise of government where economies can be effected with less harm for the future than in this area, and I would hope very much that the funds that the administration contemplates reducing from these valuable programs could be restored. If there is anything I can do directly to be helpful, I hope you will let me know.

Cordially,

Robert E. L. Strider
President

RELS/A

FOUNDED 1782
WASHINGTON COLLEGE
CHESTERTOWN, MARYLAND 21620

DEPARTMENT OF CHEMISTRY

J. H. MCLAIN, CHAIRMAN
W. ALTON JONES, PROF. OF CHEMISTRY

APR 20 1971

19 April 1971

Dr. Howard E. Holcomb
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Dr. Holcomb:

We wish to express our alarm about the proposed cutbacks in Science Education. It is distinctly harmful to the small liberal arts and sciences colleges such as Washington for several reasons.

The timing is deadly. Right now we're fighting for our lives to combat the media distributed image that science is responsible for -- death, sickness and pollution and the consequent flocking of students to sociology, psychology and other courses of "concern" is the resultant phenomenon.

Next year for the first time in 27 years we will have no junior chemistry majors! This is despite a very proud record of our students competing extremely well at the Graduate level; some 60+% of our majors in the last 20 years have gone on to get an M.D., Ph.D. or equivalent at some of the best universities in the country.

It is realized that the job market is down right now but cyclization being inevitable it will not stay that way and five to six years hence, we and the country will be hurting.

I think another valid point would be the ecological emphasis. We cannot get anything really accomplished with 98% critics. We need support to train technically knowledgeable and scientifically oriented people.

Please do what you can.

Sincerely,

Joseph H. McLain
Chairman

MH

HOOD COLLEGE
FREDERICK, MARYLAND 21701

APR 15 1971

April 14, 1971

Dr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Dr. Holcomb:

Your letter of April 7 "Regarding NSF Science Education Cutbacks" was passed by our President to the Dean of the Faculty and by the Dean to me.

Here at Hood, a great deal of the progress we have made in science education in the last ten years, has been thanks to the support of NSF. The five grants from ISEP, two to biology, and one each to chemistry, psychology, and physics have enabled us to modernize the science teaching here. Equipment such as an infra-red spectrophotometer, - a sine qua non for identification of organic compounds, - an air table for friction-free experiments in physics, modern microscopes and an audio-tutorial lab for biology, apparatus for human and animal learning experiences in psychology, and many other similar instruments have greatly increased the quality of science education. A grant from Special Projects for a cooperative program of work in computer science education under which Hood, St. Agnes, St. Joseph, and Mount St. Mary's Colleges worked with NBS enabled all four of us to introduce remote access computer work. I, personally, got a great deal out of the Science Faculty Fellowship that I held. Finally, nothing that I have ever had any contact with in 25 years of teaching at liberal arts colleges, has done so much to spark interest and encourage innovation in science education as has our COSIP program. The direct and indirect benefits of this for the students, the faculty members, the local community, and the college will be continuing for many years to come.

The elimination of some of these programs and the reduced funding for others will discourage progress in undergraduate science education just at the time when it most needs to be encouraged.

Sincerely,

Phyllida M. Willis

Phyllida M. Willis, Director
COSIP Program and Chairman,
Department of Physical Sciences
and Mathematics

PMW:dg

APR 16 1971

LOYOLA COLLEGE

DEPARTMENT OF BIOLOGY
301-435-2500

4501 NORTH CHARLES STREET
BALTIMORE, MARYLAND 21210

15 April 1971

Mr. Howard E. Holcomb,
Executive Associate for Federal Relations
ASSOCIATION OF AMERICAN COLLEGES
1818 R. Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

At a time when the existence of small liberal arts colleges is threatened financially, NSF cutbacks hurt more than the Administration realizes. Elimination of funds for the Undergraduate Research Participation Program, the Instructional Scientific Equipment Program, the Science Training Program, and inadequate funding for COSIP, drives many of us in science education to wrath.

I am hoping this reaction to the proposed administration budget for '72 will make you aware that decisions of this sort, if continued, will sound the death knell for private education, when we are at present struggling to keep up with our peers in public education.

Sincerely yours,

Michael A. Lorenzo, S.J.

Michael A. Lorenzo, S.J., Ph.D.
Chairman - Biology Department

MAL/a

Mount Saint Mary's College
EMMITSBURG, MARYLAND 21727

DEPT. OF SCIENCE & MATHEMATICS

APR 19 1971

4-15-71

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R St., N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

I am deeply disturbed by the proposed cuts in the 1972 NSF budget in the area of Science Education. Over the past 15 years the quality of science background I have observed in incoming college freshmen has steadily improved, as has the level of competence of the faculty, particularly in small colleges; and much of the credit for this rightly goes to the efforts NSF has made over that time period. It is nothing less that shortsighted and false economy to curtail that support now, at a time when more than ever the serious problems of our society can find solutions only thru the applications of science. Perhaps some changes in emphasis are called for as we shift away from a wartime economy and decrease our interest in Space Programs (which may not be wise); but the problems of pollution, population, nutrition, understanding behavior, and controlling disease demand both a continuing research effort and a greater level of sophistication on the part of the public. And these can only be achieved by Science Education programs that are effectively supported at all levels.

Yours truly,

William G Meredith

William G. Meredith
Chairman

APR 20 1971

twelve college exchange
TWO HEBE COURT, NORTON, MASSACHUSETTS 02766 TELEPHONE 617-285-7110
PHILIP DRISCOLL, EXECUTIVE DIRECTOR

April 17, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

We are very disturbed by the recent indications that the National Science Foundation intends to further curtail funding in support of undergraduate science programs.

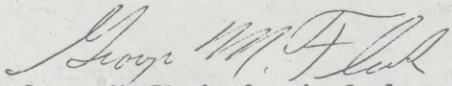
We have benefited most from the Instructional Scientific Equipment Program, the Undergraduate Research Participation Program, the Science Faculty Fellowship Program, and the Senior Postdoctoral Fellowship Program, programs which we feel have been among the most beneficial programs, per dollar invested, supported by the National Science Foundation.

The way to continued advancement in the area of science for the national interest and that of all humanity is to continue to have our undergraduate students — scientists and non-scientists alike — learn science and learn about science in an environment where modern tools and facilities are available, and where faculty are involved in contemporary research.

We urge that all possible measures be taken to halt the current trend toward curtailment, and to restore certain of the

programs in support of undergraduate education which have already been eliminated.

Respectfully submitted on behalf of the following twenty-four scientists who comprise the CHEMISTRY CONFERENCE OF THE TWELVE COLLEGE EXCHANGE,



George M. Fleck, for the Conference

Amherst College
Professor Richard D. Fink, Chairman, Department of Chemistry

Bowdoin College
Professor Dana W. Mayo, Chairman, Department of Chemistry
Professor David A. Wheatland

Connecticut College
Professor Oliver L. I. Brown, Chairman, Department of Chemistry
Professor Mary Gertrude McKeon

Dartmouth College
Professor Thomas A. Spencer, Chairman, Department of Chemistry

Mount Holyoke College
Professor George E. Hall, Chairman, Department of Chemistry
Professor Kenneth L. Williamson

Smith College
Professor George M. Fleck, Chairman, Department of Chemistry

Trinity College
Professor Henry A. De Phillips, Jr., Chairman, Department of Chemistry
Professor Ralph O. Moyer, Jr.

Vassar College
Professor Curt Beck, Chairman, Department of Chemistry
Professor Anne D. Gounaris

Wellesley College
Professor Elizabeth J. Rock, Chairman, Department of Chemistry
Professor James H. Loehlin

Wesleyan University
Professor John W. Sease, Chairman, Department of Chemistry

Wheaton College
Professor Bojan H. Jennings, Chairman, Department of Chemistry
Professor Francene Burnett
Professor Herbert R. Ellison
Professor Susan R. Epstein
Professor Maud A. Marshall
Professor John Urey

Williams College
Professor J. Hodge Markgraf, Chairman, Department of Chemistry
Professor Harold W. Warren

Regis College
Weston, Mass
02193

APR 27 1971

April 21, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Washington
D.C.

Dear Mr. Holcomb,

Due to my absences from Regis during the last few weeks I am writing this letter a bit late but I shall still send it, hoping it may adds its weight to the nations which I am sure you received.

The quality of courses offered at Regis in physics during the past few years has been of high grade thanks to the grants we have received from our government through National Science Foundation awards. We received a grant in 1968 to participate in the three year Study to improve physics teaching through the Olivet College of University of Michigan project - known as Slips. We also have been able to purchase equipment as a result of this participation as well as equipment at an earlier date through N.S.F. We

are convinced that Regis is offering both courses because of this assistance.

My hope is that our reactions may have influence in preventing such drastic reduction.

Sincerely yours,
Sister Mary Bernarda Murphy
Chairman, Physics Department

MERRIMACK COLLEGE
NORTH ANDOVER, MASSACHUSETTS 01845

OFFICE OF ASSISTANT TO THE PRESIDENT

April 15, 1971

Mr. Howard E. Holcomb
Association of American Colleges
1818 R. Street, N.W.
Washington, D. C. 20009

APR 19 1971

Dear Mr. Holcomb:

I was somewhat dismayed at your letter in regard to institutional cuts from the National Science Foundation for fiscal 1972.

An undergraduate school, such as Merrimack College, faces an extraordinary struggle in providing adequate education in the sciences. The College now has both a Civil and Electrical Engineering Department in addition to the other sciences.

The costs of providing an education to science majors has caused the administration to review its priorities in this area. I expect that both of the Engineering departments will be dropped in the very near future. The costs of continuing them in a small undergraduate school are excessive. The only source of funds for our science courses other than tuition has been the Federal Government.

I do hope and trust that some action will be taken to cover further cuts in this program.

Sincerely yours,

Earl V. Brown
Assistant to the President

LESLEY COLLEGE

CAMBRIDGE, MASSACHUSETTS 02138

April 15, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal
Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

APR 19 1971

Dear Mr. Holcomb,

I am writing to express concern over the proposed Administration budget cutback for science education for fiscal year 1972. The elimination of the College Science Improvement Program, Special Projects, and Institutional Grants will be particularly bad for Lesley College. It will be particularly bad for students here because the College is small, private and has the exclusive mission of preparing students for teaching careers in the elementary school. High tuition costs and the fact that the College has no endowments seems to be pricing us out of the market. Eliminating Lesley College as an appropriate alternative to teacher education in state colleges or in large university settings would clearly be a disservice to children in school.

Please use your office to argue for federal support funds in support of science education for teachers.

Sincerely yours,

George L. Miller

George L. Miller
Vice President for
Academic Affairs and
Dean of Teacher Education

GLM/jw

Office of the President
MOUNT HOLYOKE COLLEGE
South Hadley, Massachusetts 01075

APR 19 1971

April 17, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

I am writing you because I am deeply concerned about the proposed Administration budget for the National Science Foundation for the fiscal year 1972.

Reduction in support of science education would have serious, negative consequences for programs of science education at all educational levels. Such reduced funding is particularly deplorable at a time when educational institutions are addressing themselves more vigorously and creatively to the need for a scientifically enlightened public. The costs of such efforts are no less real than the obvious costs of scientific equipment, and all of these costs are increasing continuously. If educational institutions are to continue to sustain the high quality of the nation's scientific manpower and to serve the broader functions of scientific education, increased rather than decreased support from the National Science Foundation is required.

I hope that the Association of American Colleges will do everything possible to make the interest and feelings of academic institutions known.

Sincerely yours,

David B. Truman

SMITH COLLEGE
NORTHAMPTON, MASSACHUSETTS 01060
CLARK SCIENCE CENTER

DEPARTMENT OF CHEMISTRY

April 16, 1971

Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

APR 19 1971

Dear Mr. Holcomb:

The drastic change in budget priorities proposed by the National Science Foundation would seriously impair the quality of Chemistry Education at Smith College. The Undergraduate Research Participation Program, which is to be eliminated, has been an integral portion of our chemistry major for more than a decade, and it has been a highly successful program for developing creativity and independence. The various educational development programs have permitted us to make the continuing curricular changes required if chemistry education is to remain appropriate for these changing times.

There is a crisis in science in the United States, and it involves many different ideas about how science, technology, nature and man fit together in our world. If we are to provide appropriate educational responses to this deep crisis, we must radically change science teaching. Many of us are ready to accelerate our plans for curricular change and development to meet the needs of the 1970's. But these efforts will be expensive, and they must get underway immediately.

This is the time for increased spending by the Federal government for science education, particularly at the lower levels of education. The schools and the colleges are the places where significant innovation can occur. We need support for student-oriented research, for faculty professional development and retooling, and for curricular innovation. This is partly money for scientific equipment, and partly money for many people — students and their teachers. In these times of financial difficulties for our colleges, these funds cannot come from operating budgets.

I urge that NSF increase spending for science education as one of our highest national priorities in science.

Respectfully,

George Fleck
Associate Professor,
Physical Chemistry

GF/jg

Regis College
Weston, Massachusetts 02193

APR 21 1971

893-1820

April 17, 1971

Howard E. Holcomb
1818 R St. N.W.
Washington, D.C.

Dear Mr. Holcomb:

I was distressed to hear about the reduction in funding for science education in the proposed Administration budget for the National Science Foundation. As one who has been a recipient of NSF grants both for equipment and for Teacher Institutes, I can vouch for their tremendous contribution to the improvement of science teaching. It has been money very well spent - and where it was needed. I would like others in small colleges across the country to benefit from similar opportunities and, therefore, I ask you to do all in your power to prevent the proposed cuts.

Thank you.

Very truly yours,

Sister Dorothy McKenzie

Sister Dorothy McKenzie

SPRINGFIELD COLLEGE SPRINGFIELD, MASSACHUSETTS 01109

OFFICE FOR FEDERAL PROGRAMS

April 20, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R. St. N.W.
Washington, D.C. 20009

APR 22 1971

Dear Mr. Holcomb:

Our reaction with regard to proposed cuts in the NSF budget is most assuredly negative. We are not reacting to the cuts simply as a reduction in funds but rather as an elimination of programs that are vital to small colleges.

Springfield College has had some success over the years with the Instructional Scientific Equipment Program and Teacher Institutes both of which are scheduled for elimination. As a result of ISEP Grants and other types of NSF programs the College has also made excellent use of the Institutional Grants program.

We are sure that the lack of such funds will prevent us from innovation in approaches to teaching. It is particularly important to note that the programs that are to be eliminated bear most heavily on the smaller undergraduate colleges where teaching is of major importance.

The biology faculty at Springfield College, who represent the largest and most active portion of our science faculty, are opposed most vehemently to the cuts. They have had to curtail planning on a College Science Improvement Program.

We hope that you are successful in efforts to restore these vital programs.

Sincerely,

Jack Wilson

Jack Wilson,
Coordinator

JW/dl
cc: Hon. Edward P. Boland

62-912 O - 71 - 29

WELLESLEY COLLEGE
Wellesley, Massachusetts

April 21, 1971

APR 26 1971

Dear Mr. Bolen:

The Administration's proposed budget for the National Science Foundation for the fiscal year 1972, though substantially increased, reduces support for science education by about one-fourth. In addition, institutional support for science is being recommended for a two-thirds cut.

This proposed budget would eliminate Undergraduate Research Participation, Science Faculty Fellowships, the Student Science Training Program, and Instructional Scientific Equipment Program; inadequate or reduced funding is recommended for the College Science Improvement Program, Teacher Institutes, Pre-College Course Curriculum, Special Projects and Institutional Grants.

This is particularly distressing to me and Wellesley College Science Departments. Over the years support from the National Science Foundation has been extremely important to us. I would mention that the cutback in the Undergraduate Research Program bothers us in particular. In the past, Wellesley College has been fortunate in receiving a number of these Grants and in our Chemistry Department alone eight such Grants were received between 1962 and 1970.

Undergraduate research is strongly encouraged at the College and withdrawal of support for this program, along with the others, would be most unfortunate. Please consider the importance of these programs to institutions such as Wellesley when you react to the proposed budget.

Thank you very much.

Sincerely yours,

RMA/jc

Ruth M. Adams

The Honorable Edward P. Bolen
Room 2350 Rayburn House Office Bldg.
Washington, D. C.

WELLESLEY COLLEGE
Wellesley, Massachusetts

April 21, 1971

APR 26 1971

Dear Senator Kennedy:

The Administration's proposed budget for the National Science Foundation for the fiscal year 1972, though substantially increased, reduces support for science education by about one-fourth. In addition, institutional support for science is being recommended for a two-thirds cut.

This proposed budget would eliminate Undergraduate Research Participation, Science Faculty Fellowships, the Student Science Training Program, and Instructional Scientific Equipment Program; inadequate or reduced funding is recommended for the College Science Improvement Program, Teacher Institutes, Pre-College Course Curriculum, Special Projects and Institutional Grants.

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Undergraduate research is strongly encouraged at the College and withdrawal of support for this program, along with the others, would be most unfortunate. Please consider the importance of these programs to institutions such as Wellesley when you react to the proposed budget.

Thank you very much.

Sincerely yours,

RMA/jc

Ruth M. Adams

The Honorable Edward M. Kennedy
Room 431
Old Senate Office Building
Washington, D. C.

SIMMONS COLLEGE
300 THE FENWAY
BOSTON, MASSACHUSETTS 02115

DEPARTMENT OF CHEMISTRY

April 20, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

APR 26 1971

Dear Mr. Holcomb:

The proposed reduction in NSF funding of undergraduate science programs is, I believe, a disastrous error. The arguments against such reductions based on the medium-range effect these will have on graduate programs and the production of professional scientists are obvious and probably sound, even in this period of slowed growth and technical unemployment.

There is a much more important long range effect that is peculiar to undergraduate education itself. The loss of funding for strong science programs at the undergraduate level will inevitably lead to a concentration of the resources available to science departments for their majors. Unfortunately this will mean that science for the great majority of the collegiate population will get short shift and will in many cases be counter productive if we really wish to educate most of our students to understand both the power and limitations of science, scientists, and the scientific method. The long range effects of this neglect in an increasingly technocratic society could be a serious loss of even that little control the public now has over the technology we have developed.

Perhaps this means that the emphasis of the NSF undergraduate programs should be shifted a bit, but their wholesale loss leaves a vacuum with nothing in sight to fill it. Please use these arguments in any way you are able to help get the priorities straight on these issues.

Yours truly,

Jerry A. Bell

Jerry A. Bell
Associate Professor and
Chairman
Department of Chemistry

JAB:lmw
cc. William J. Holmes, President

western union Telegram

ZVA 131 (49)BA068
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WELLESLEY MASS 19 439P EST
MR HOWARD E HOLCOMB EXEC ASSOC FOR FEDERAL RELATIONS
ASSOCIATION OF AMERICAN COLLEGES 1818 R ST NORTHWEST WASHDC
FEEL PROPOSED ADMINISTRATION BUDGET FOR THE NSF VERY SHORTSIGHTED
EVERYONE RECONGIZES PROBLEMS OF RETRAING SCIENTIST TO COPE
WITH NEW PROBLEMS OF SOCIETY E. G. CONSERVATION WHY DENY FUNDS
TO PEOPLE NOW BEING TRAINED IN THESE IMPORTANT AREAAS,
PHYLIS J FLEMING DEAN OF WELLESLEY COLLEGE.

(430)

SPRINGFIELD COLLEGE SPRINGFIELD, MASSACHUSETTS 01109

April 22, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

APR 26 1971

Dear Mr. Holcomb:

My reaction to the proposed cutback in support for NSF Science Education is not one of panic for the future of this college since we do not count on grant money of this type for survival. However, we have had NSF grants and have given more for the money than the government is used to getting.

Reduction of our opportunities to get and use this kind of money is unfortunate for us in that it limits some of our best ideas for special projects of ultimate worth to mankind.

Should these cuts take place, together with all the other economies proposed in similar agencies, the accumulative effect will radiate to the rest of the economy to the country's detriment, in my opinion. This, of course, would ultimately have a negative effect upon private higher education which many consider to be a continuing essential in the national educational complex.

I have given my personal opinion and do not pretend to speak for Springfield College.

Sincerely yours,

Paul U. Congdon

PUC-v

Paul U. Congdon
Academic Dean

Lawrence House
Smith College
Northampton
Massachusetts 01060

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R St. NW
Washington D. C. 20009

APR 19 1971

Dear Mr. Holcomb:

Thankyou for calling my attention to the proposed budget cuts for National Science Foundation support of educational programs. As a recent NSF Undergraduate Research Participant, I can attest to the value of this program which has encouraged my interest in chemistry and helped me to plan for a career in science education. The logic of cutting back on educational and training programs while still supporting research fails me. Where are the researchers going to be trained to do all this worthwhile research, if not through the supportive programs of NSF ?

As a recently enfranchised citizen, I am also writing my congressman, but I hope your efforts of collecting letters will be rewarded.

Sincerely yours,

Elizabeth K. Stage

Elizabeth K. Stage

SMITH COLLEGE
NORTHAMPTON MASSACHUSETTS
OFFICE OF THE PRESIDENT

17 April, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

While predominantly an undergraduate college without a university's large, separate commitment to research, Smith College has shared only modestly in the various programs of the National Science Foundation which are presently threatened with drastic cuts or actual elimination. This share in the last four years is listed at the end of this letter. Modest though it may be, it has represented an extremely significant and useful source for Smith's faculty and students, enlarging and enriching what the College could afford on our own.

These programs had a national significance in that they broadened the basis of science education by strengthening it at Smith and other undergraduate colleges where a significant proportion of scientists and doctors begin their professional training. This contribution is particularly important at a college for women like Smith where a higher proportion of science graduates put their science training to work after college somewhere in science or industry than with any other major at Smith.

In particular, it was a matching grant from NSF under the Instructional Scientific Equipment Program in 1967 that made it possible for Smith to acquire the present academic computer which is extensively used for research and teaching. And in 1964 a major grant of $450,150 from NSF to support facilities for Chemistry, Psychology, and Zoology in the new Clark Science Center was a most important contribution to the construction of this $8 million Center, which has provided the College with modern facilities in science.

It is indeed tragic that Federal programs are slowly but surely moving away from support of the smaller private college at a time when there is increasingly fierce competition for the support so necessary for our very existence.

Faithfully yours,

Thomas C. Mendenhall

Thomas C. Mendenhall

TCM:jb

cc: Senator Brooke
Senator Kennedy
Congressman Conte

Program	1966-67	1967-68	1968-69	1969-70	1970-71
Undergraduate Research Participation	$10,000	$ -	$ 5,600	$ -	$14,290
Senior Foreign Fellowships	-	-	39,655	-	8,160
Instructional Scientific Equipment	66,000	24,700	-	6,500	7,500
Institutional Grants	8,764	18,290	14,845	11,148	10,360
Total Grant Awards	84,764	42,990	60,100	17,648	40,310

COLLEGE OF THE HOLY CROSS
WORCESTER, MASSACHUSETTS 01610

DEPARTMENT OF BIOLOGY

April 27, 1971

Mr. Howard E. Holcomb,
Executive Associate for Federal Relations,
Association of American Colleges,
Washington, D.C. 20009

APR 30 1971

Dear Mr. Holcomb:

I read your letter of April 7th.1971, sent to our College President in connection with NSF Science Education cutbacks. I became very concerned and felt that you should be supported. Although your April 19th deadline is past, I still would like to go ahead and collect as many signatures as possible from the faculty and the students of our science departments and send the petition to the Chairman, House Subcommittee on Science and Austronautics. I like to have the copies of the petition also sent to you for your file and to our area legislators and the President's Science Adviser. I am also thinking of sending copies of the petition to the Presidents of the Colleges and Universities in the city so that they are aware of what we are doing. Do you think this is too late?

Yours sincerely,

B. T. Lingappa, Ph. D.,
Professor of Biology

WELLESLEY COLLEGE
WELLESLEY, MASSACHUSETTS 02181

DEPARTMENT OF BIOLOGICAL SCIENCES

APR 19 1971

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

I find the proposed cuts in the NSF proposed budget for fiscal '71 very appalling. The elimination of the Undergraduate Research Participation Program, the Science Faculty Fellowships, and the Instructional Scientific Equipment Program is especially unfortunate, as each of them is extremely vital to continuation of high quality science education at a small liberal arts college. I hope something can be done to convince NSF and Congress to continue these programs.

Sincerely,

Mary M. Allen

MMA:s

Mary M. Allen, Ph.D.
Assistant Professor of Biology

cc: Mr. Joseph M. Hobbs
Assistant Director for Resources
Wellesley College

Honorable Margaret Heckler
House of Representatives
United States Congress

SUFFOLK UNIVERSITY
Founded 1906
41 TEMPLE STREET
BOSTON, MASSACHUSETTS 02114

Office of the Dean

APR 16 1971

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

I am very concerned to hear that the proposed Administration budget for the National Science Foundation for the fiscal year 1972 proposes to reduce support for science education and institutional support for science. We at Suffolk University have found these programs to be very helpful to our faculty and students in the past. Such programs as the Instructional Scientific Equipment Program, the College Science Improvement Program, the Teacher Institutes are vital for the future of science education for both Suffolk University and the nation. I hope the Association can do something to aid in continuing these programs with adequate funding.

Sincerely yours,

Donald Grunewald

Dr. Donald Grunewald
Vice President and Dean

DG/jmr

WHEATON COLLEGE
NORTON, MASSACHUSETTS 02766

OFFICE OF THE PRESIDENT

April 12, 1971

APR 15 1971

Dear Mr. Holcomb:

Here at Wheaton College we are greatly distressed about the prospect of the National Science Foundation's retreat from its long-standing commitment to scientific education as well as to scientific research. In my opinion, the wisest step that was ever taken by the early administrators of NSF was their active implementation of legislative provisions for education. It is hard to estimate how much scientific research is being done in the United States today only because money was earlier made available for the education of scientists who are now mature. Weakening of undergraduate research participation, college science improvement programs, institutional grants, and instructional scientific equipment programs will provide a special handicap to the small private colleges which have traditionally provided so important a segment of our national scientific community. At the very period in history when private institutions of higher education are clamoring for federal support of many kinds, it seems unwise and shortsighted to cut aid to scientific instruction in those colleges and universities. Science as a whole is certain to suffer.

It is my understanding that some policy makers expect a new national educational foundation to take over some of these functions of NSF. Unless and until that replacement is certain, however, I hope that you and our other representatives in Washington will do everything possible to persuade administrative and congressional leaders that currently proposed changes could be disastrous to the very purposes for which NSF was established.

Sincerely,

W. C. H. Prentice

W. C. H. Prentice
President

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

NAZARETH COLLEGE
KALAMAZOO, MICHIGAN 49074

APR 19 1971

April 15, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R. Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

I greet the news of the Administration's proposed budget, in which NSF support for science education would be reduced from $100 million to $77 million, with dismay. Our instruction in science has been improved and assisted by several of the educational programs. We are just one college, but if the good effect is multiplied by the improvement in many schools, one can see that a good thing was done for the nation. I do not think that the proposed cutback in support for science education is wise.

Sincerely yours,

Pauline Zeleznik, SSJ

(Sr.) Pauline Zeleznik, SSJ
Assoc. Prof. of Chemistry



April 13, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

APR 16 1971

Dear Mr. Holcomb:

The proposed cuts in the fiscal 1972 budget for the National Science Foundation are a cause for concern to higher education. Those programs to be eliminated, particularly Undergraduate Research Participation, the Student Science Training Program, and Instuctional Scientific Equipment Program are of special interest to small colleges like Aquinas.

Those programs scheduled for substantial reductions in funds are also of concern to us. Anything you can do to persuade the House Subcommittee on Science, Research and Development to restore these funds will make quality science education more feasible in this coming year.

Sincerely,

Norbert J. Hruby
President

jm



Office of the Vice President & Dean of Faculties 4001 W. McNichols, Detroit, Mich. 48221 (313) 342-1000

April 14, 1971

Mr. Howard E. Holcomb
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

APR 19 1971

Dear Mr. Holcomb:

The proposed NSF budget cuts will cause us serious damage. As a school not strong on doctoral programs, we have depended more on the Student Science Training Program, and Instructional Scientific Equipment Program; inadequate or reduced funding is recommended for college Science Improvement Program, Teacher Institutes, Pre-College Course Curriculum, Special Projects, and Institutional Grants.

The proposed cuts in these areas will weaken even more the precarious position of private institutions.

Sincerely,

James V. McGlynn, S.J.
Vice President and Dean of Faculties

JVM/sm

CALVIN COLLEGE
Knollcrest Campus • Grand Rapids, Michigan 49506

DEPARTMENT OF MATHEMATICS

April 27, 1971

Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street N.W.
Washington, D.C. 20009

MAY 3 1971

Dear Sir:

I am responding to your memorandum of April 7, in which you ask for reaction to the proposed budget cuts for the program of the National Science Foundation. We find these cuts to be particularly damaging, in that our participation in the programs of NSF was concentrated in exactly those programs for which cuts are proposed.

This is very true of the complete elimination of the Science Faculty Fellowship program. Several members of our staff have enjoyed the financial support available in this program, and we were extremely disappointed to see it eliminated. We simply do not have funds which in any way can substitute for the benefits of this program. Its elimination contributes directly to a diminution of the effectiveness of our faculty members.

We have also participated extensively in the Teacher Institute programs, and our experience has been that these programs have been very worthwhile not only for the participating teachers, but perhaps even more so for the participating faculty members. There is still a great and continuing need for such programs, and any cut back here can only be harmful.

Sincerely,

Carl J. Sinke

Carl J. Sinke, Chairman
Science Division, Calvin College

CJS/cp

62-912 O - 71 - 30

DEPARTMENT OF ASTRONOMY
THE UNIVERSITY OF MICHIGAN
PHYSICS-ASTRONOMY BUILDING
ANN ARBOR, MICHIGAN 48104

APR 19 1971

April 15, 1971

Dr. Howard E. Holcomb
Association of American Colleges
1818 R St. N. W.
Washington, D. C. 20009

Dear Dr. Holcomb:

I am informed that you will be testifying before a Congressional committee concerning the proposed cuts in the educational programs of N.S.F.

Although one naturally regrets reductions in any expenditures for support of science education, my attention has particularly been drawn to one example of what seems to be a lack of discrimination in the manner in which the reductions are made. I refer to the "Student Science Training Program," which it is proposed to wipe out completely.

My views are expressed in a letter to Mr. Marvin Esch, who represents my Congressional District. A copy of my letter to him is enclosed.

Very sincerely,

Freeman D. Miller

Freeman D. Miller

FDM:af
Enc.

March 16, 1971

The Honorable Marvin L. Esch
200 East Huron Street
Ann Arbor, Michigan

Dear Mr. Esch:

I have recently learned that as part of the reduction in spending for science education, the annual appropriation of some 2.5 million dollars for the National Science Foundation "Student Science Training Program" (SSTP) is to be dropped from future budgets.

I am not familiar with all, or even several, of the activities funded under this program, but I have taken part for a number of years in one of them. This is the Astro-Science Workshop at the Adler Planetarium in Chicago, under the chairmanship of Dr. J. Allen Hynek, Chairman of the Department of Astronomy of Northwestern University.

It appears to me that it is most unwise to eliminate across the board, all SSTP programs. No doubt some have failed to give value for the money spent. On the other hand, the extensive information compiled on "alumni" of the Astro-Science Workshop convinces me that it has been far more productive than I thought possible when it was established. It is clear that young people who have gone through this arduous program have advanced to college and even to graduate work with considerable distinction.

I suggest that instead of abolishing the entire SSTP program, it be cut back, and future support be given to those programs which can produce evidence that they have been productive.

A great deal of effort has been given to the organization of the Astro-Science Workshop (my contribution has been only one lecture annually, so I am not claiming that I have personally devoted a lot of time to it). It is most unfortunate that an eminently successful program should be written off so abruptly.

We hear a good deal now about the contracting market for physical scientists. There is no question that this is the present situation, but there are two points to be considered. One is that various professions have gone through such cycles in the past 25 years, and cuts have been made in advanced educational programs. About the time that the output of young trained men and women has been decreased, the demand has been on the upswing. The high school students enrolled in the Workshop will not be available as trained scientists for eight or nine years from now! The other point I would make is that there will still be a demand for the <u>best</u> scientists, and programs aiming toward the training of the most promising young students should be continued.

Sincerely,

Freeman D. Miller
Professor of Astronomy

CARLETON COLLEGE
NORTHFIELD, MINNESOTA
55057

DEPARTMENT OF CHEMISTRY

(507) 645-4431 x 224

April 21, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

APR 27 1971

Dear Mr. Holcomb:

In response to your request of April 7 for statements opposing reduction of National Science Foundation support for undergraduate science education, I am enclosing a statement which I sent to about 25 members of congress.

In addition to discussing this question with Congressman Davies, I suggest you also present our case to Mr. Donald Rice, Assistant Director of the Office of Management and Budget, Room 203, 17th and Pennsylvania Avenues, N.W., Washington, D. C. I am informed that Mr. Rice applied the pressure to N.S.F. which led to the budget cuts.

Sincerely,

James E. Finholt
Associate Professor of Chemistry

JEF:wjz

Enclosure

The Case for National Science Foundation Support of Undergraduate Science Education

James E. Finholt, Ph.D.
Associate Professor of Chemistry
Carleton College, Northfield, Minnesota

Science education at the undergraduate level has been greatly assisted during the past decade by the National Science Foundation, particularly in institutions which do not offer graduate level work in science. These institutions train well over half of all professional scientists and also provide basic education in science for hundreds of thousands of nonscience students. During the past two years the National Science Foundation has been reducing its commitment to undergraduate science education and in FY 1972 it is proposing to make further drastic reductions in its activity in this area. The purpose of this statement is to argue in favor of strong National Science Foundation support for undergraduate science education, particularly in non Ph.D. degree granting colleges.

The charter of the National Science Foundation charges it with the responsibility to support science education. This is a wise provision, because the ultimate quality of our nation's scientific and technological efforts is surely strongly dependent upon the quality of science education in our nation. Today, more than ever before, we need first rate scientists and engineers to help meet the challenges facing us in areas such as health care, agriculture, environmental protection, transportation, etc. Money spent on education today will be repaid many times over in the future. We also need citizens who are not scientists but yet have enough of a grasp of the strengths and limitations of science to make wise decisions about the role of science and technology. Today's headlines are concerned with the SST controversy, a perfect example of the kind of scientific-technological problems which must be faced again and again in the months and years to come. Only the best kind of science education will enable us to meet these challenges wisely.

Until about two years ago, the National Science Foundation was meeting its responsibilities in the area of undergraduate education in a completely satisfactory fashion through a variety of funding programs. In each program, grants were made on a competitive

basis to 30 to 50% of the proposals submitted to the Foundation. These proposals were carefully evaluated by panels of knowledgeable individuals from outside the Foundation as well as the Foundation staff. This process had the dual virtues of helping the Foundation to invest its funds wisely and enabling Foundation personnel to keep in close contact with science educators around the country. Recently, the National Science Foundation has been modifying its undergraduate science education activity. These changes have been made mainly in the following programs.

Instructional Science Equipment Program (ISEP)

This program provided funds on a 50-50 matching basis for the purchase of scientific equipment necessary for high quality science instruction.

Undergraduate Research Participation (URP)

This is the oldest and most important of the undergraduate science education programs developed by the National Science Foundation. It provides funds to enable science students to spend a summer doing research with faculty members. URP funds were the only support for research in many colleges without graduate programs. Science is research and it cannot be taught well at the college level in any college where no research is being conducted.

College Science Improvement Program (COSIP)

COSIP is a broad gauge program providing relatively large grants to an entire institution. These grants have often enabled a college to completely revise and improve its complete science program.

Science Faculty Fellowships

The teacher is the key to the quality of any educational program. Faculty fellowships enabled college science instructors to spend 3 to 12 months in full time study approximately every six years to try and keep up with the rapid advances in modern science. Without such periodic periods of retraining, any science teacher will become obsolete.

Student Originated Research (SOR)

This is the newest National Science Foundation Program and it will be operated on a large scale basis for the first time during the coming summer (1971). It supports science research projects designed and operated by undergraduate students. Faculty members are specifically barred from helping with these programs in any way beyond an occasional consultation. It will be a useful program for major universities with graduate research programs. It will be of little help to the students and faculty of non Ph.D. granting colleges. One of the major strengths of such schools is the opportunity they offer for students and faculty to work together. In colleges, the faculty are not distracted from working with undergraduates by the demands of graduate students. Secondly, without URP programs, many faculty members at small colleges will be unable to do any research. Without faculty research, student research cannot long flourish on its own. It is doubtful if <u>any</u> faculty members or students in non Ph.D. degree granting institutions can be found who would favor the Student Originated Research Program over the joint student-faculty Undergraduate Research Program.

The effectiveness of the kind of programs supported by the National Science Foundation in 1969 can be established in several ways. Evaluations published by the Foundation have always indicated that the funds committed to these programs have been wisely spent. The Foundation personnel who have administered these undergraduate education programs could certainly testify about the value of these programs. Science educators throughout the country have been highly pleased with the help the National Science Foundation has been able to provide.

Another way to evaluate these activities of the Foundation is to look at a specific example of the effect of Foundation help. The Chemistry Department of Carleton College, Northfield, Minnesota is a good case to consider. During the past 6 years this department has graduated an average of 15 chemistry majors each year. For comparison, the University of Minnesota, which is 20 times as large as Carleton, has only averaged about 50 chemistry graduates each year. Over half of these Carleton chemistry students have gone on to graduate work in science at major universities including schools such as Harvard and the University of California. During this time, Carleton chemistry students have been awarded 8 National Science Foundation Fellowships for graduate study, they have presented 13 research papers at state chemistry meetings, and, together with the faculty,

have published 9 research papers in national professional journals or at national meetings of the American Chemical Society. The faculty have also published 9 papers dealing with the teaching of chemistry. During this time the department developed a new course for non-science majors which has increased its enrollment from 7 to 70 in five years. It is no coincidence that this department has received two major ISEP grants, 5 URP grants, 1 Faculty Fellowship, and shared in college wide computer and COSIP grants during the past 6 years. This kind of relationship between NSF support and outstanding achievement can be duplicated at colleges all across the nation.

It is instructive to compare the FY 1969 budget to the FY 1972 budget for the programs discussed in the previous paragraphs.

	FY 1969 millions of dollars	Proposed FY 1972 millions of dollars
Instructional Scientific Equipment	4.6	0.0
Undergraduate Research Participation	4.0	0.0
Science Faculty Fellowships	2.5	0.0
College Science Improvement	8.8	4.0*
Student Originated Research	0.0	2.0

* The total COSIP budget for FY 1972 is 9 million dollars, but 5 million dollars is reserved for black colleges.

The total proposed National Science Foundation budget for FY 1972 is 116 million dollars greater than it was in FY 1971. It surely must be possible to find the 15.9 million dollars required to restore spending to the FY 1969 level for the undergraduate education programs which the Foundation is proposing to eliminate or drastically reduce. If economies must be made, the Student Originated Research Program should be cut rather than expanded.

The abandonment of undergraduate science education by the National Science Foundation comes at a particularly difficult time. Colleges and universities of all kinds are facing one of the most severe financial crises ever to challenge higher education. There are simply no sources of funds to replace the support being withdrawn by the National Science Foundation. No other federal agency can take up the slack. No source of nongovernment funds is available. If the National Science Foundation persists in its ill advised policies the only possible result will be a steady deterioration in the quality of scientific education in the United States.

ST. OLAF COLLEGE
SIDNEY A. RAND, PRESIDENT
NORTHFIELD, MINNESOTA 55057

April 14, 1971

Dr. Howard Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1 Dupont Circle, Suite 700
Washington, D.C. 20036

APR 20 1971

Dear Howard:

Enclosed is a copy of a letter I have recently sent to Congressman Quie, Senators Humphrey and Mondale, and also to Congressman John W. Davis, Chairman of the Subcommittee on Science, Research and Development, and Congressman Edward P. Boland, Chairman of the Subcommittee on HUD-Space-Science.

St. Olaf College is serious about the problems which will be created if the National Science Foundation budget for programs pertaining to undergraduate education is not brought back close to its former level. Here is an area where the Government has done significant things and a cutback will surely be disastrous in terms of the total production of scientists for the future. It is at the undergraduate level that the interest of so many budding scientists get sparked in terms of research and their own creative development.

Yours sincerely,

Sidney A. Rand
President

SAR:ss

Enclosure

ST. OLAF COLLEGE
SIDNEY A. RAND, PRESIDENT
NORTHFIELD, MINNESOTA 55057

April 14, 1971

The Honorable Hubert H. Humphrey
United States Senate
Washington, D.C. 20510

Dear Sir:

I am writing to take exception to H.R. 4743, the National Science Foundation authorization bill for 1972, which includes a continuing and dramatic decrease in funds for science education at the same time that the overall NSF budget is being raised. A detailed exposition of the case for undergraduate science was presented by Dr. Robert Fuller, President of Oberlin College, on March 30, 1971 before the House Subcommittee on Science, Research and Development.

The enabling act, Public Law 507, states specifically that the National Science Foundation shall "develop and encourage...education in the sciences". Since 1969, however, the percentage of the NSF budget allocated to education has dropped steadily. The impact falls in a special way on the four year colleges (public and private) rather than on the universities since research funds are increasing in a compensatory way for the larger institutions. Of particular concern is the elimination or cutting back of programs such as the Instructional Scientific Equipment Program, Student Science Training Program, College Science Improvement Program, Undergraduate Research Program, High School Teacher Institutes and Institutional grants.

For the next few years we may have a surplus of scientists emerging from our graduate schools. This does not mean, however, that this country can afford to destroy the quality of science education from kindergarten to the baccalaureate degree. We will continue to need excellent training in science for the scientists and the non-scientist alike at all levels. At the present time the National Science Foundation is the one federal agency responsible for that quality. It is thus bewildering to note the low priority given to science education below the graduate level as judged by the recommendations of the Foundation and the Office of Management and Budget.

Only a year ago the House Subcommittee on Science, Research and Development stated clearly the desirability of a national science policy "which indicates the wisdom of retaining these programs (undergraduate and lower education) within the NSF." We ask your help in seeing that this decision of the House subcommittee is reaffirmed and is supported with an adequate authorization of funds.

Respectfully yours,

Sidney A. Rand
President

SAR:ss

COLLEGE OF ST. SCHOLASTICA
DULUTH, MINNESOTA 55811

April 20, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street Northwest
Washington D.C. 20009

APR 26 1971

Dear Mr. Holcomb:

National Science Foundation Funds for Faculty Institutes, Faculty Research Participation, Science Faculty Fellowships, Undergraduate Research Participation, and Institutional Grants have been a very important part in the development of the biology and chemistry departments of the College of St. Scholastica.

We feel that we can prepare students to make a very fine contribution in the sciences, but the programs are costly and we are dependent upon federal help in the continual updating of faculty and purchase of new equipment as well as in providing research opportunities not available for students at an undergraduate college.

I firmly believe that cutting educational programs is a shortsighted attempt to stretch funds. I hope that these NSF programs will not be dropped.

Sincerely,

Sister Mary Odile Cahoon

Sister Mary Odile Cahoon
Chairman of Biology

SMOC:lm

CONCORDIA COLLEGE

DEAN OF THE COLLEGE

MOORHEAD, MINNESOTA
56560

APR 16 1971

13 April 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Howard:

I was very sorry to see you moving over to the AAC; but one can't have everything, at least not forever. And I know that you still have your eye on us anyway.

Your memorandum of 7 April concerning NSF science education cutbacks was brought to my attention. So I'd like to comment on that business, in accordance with your suggestions.

Of course part of the reason for the proposed cutbacks is the present "surplus," if that's what it really is, in the supply of scientists. Thus the elimination or reduction of some of the NSF facets in education may be defensible. On the other hand, it would be a bad mistake to eliminate the science faculty fellowships; even though education in science may be slowed down for a while, it would be unreasonable to stop upgrading the quality of the existing science faculties. A similar comment applies to the program of undergraduate research participation. These are the two things for which I would fight the hardest from my point of view as a member of an undergraduate college.

Best regards.

Yours very truly,

Carl

Carl L. Bailey
Dean of the College

CLB:jj

COLLEGE OF ST. THOMAS
ST. PAUL, MINNESOTA 55101

OFFICE OF THE PRESIDENT

APR 21 1971

April 16, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Dr. Holcomb:

I should like to add my reaction to that of the other college presidents regarding the elimination of National Science Foundation Summer Institutes for high school teachers in the proposed budget for the National Science Foundation for fiscal 1972.

It has been a good program for high school teachers in that it brought them up to date in their fields and gave them renewed interest in the science field.

Sincerely yours,

Terrence J. Murphy

(Rev. Msgr.) Terrence J. Murphy
President

COLLEGE OF SAINT BENEDICT
ST. JOSEPH, MINNESOTA 56374

Phone 612/363-7711

APR 19 1971

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

My colleagues and I are deeply concerned over the proposed Education cutbacks regarding NSF support for Science. The cutbacks will hurt most at the very place where support is most needed--the undergraduate level. There, not only is the undergraduate himself affected, but improvement of instruction, advancement of instructors, and innovation in teaching are all bound to suffer. I speak from experience. We have taken advantage of the benefits of science grants in the past. I know they make the difference.

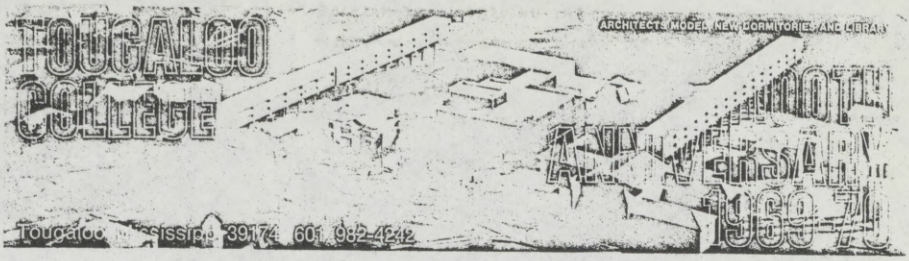
Please do what you can to help provide the students with adequate training in the sciences.

Sincerely,

Sister Mary Grell

Sister Mary Grell
Chairman of Biology

bm



OFFICE OF THE ACADEMIC DEAN

April 19, 1971

APR 21 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

It is a sad day in America when the National Science Foundation makes decisions that will probably be detremental to the welfare of American Colleges and Universities. Obviously the developing colleges should be receiving more aid for science education and institutional support for science. We question the intentions of the National Science Foundation when they propose to eliminate Undergraduate Research Participation, Science Faculty Fellowships, the Student Science Training Program, and Instructional Scientific Equipment Program at a time when the need for improvement is science is so great.

I feel we should take all necessary measures to assure an increase in the budget for all science program and establish support for other programs that will help in eliminating some of the problems we are having today with the environment and health. I hope more thought can be given to this before a final decision is made.

Sincerely yours,

Joseph A. Gore
Academic Dean

JAG:mhc

Member United Negro College Fund

THE UNIVERSITY OF MISSISSIPPI

UNIVERSITY, MISSISSIPPI 38677

APR 22 1971

OFFICE OF THE CHANCELLOR

April 20, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

With regard to the proposed cutbacks in the support for science education, I would like to make the following observations.

The science education programs have had a major impact not only in the development of the science and science related programs at the University of Mississippi but also in the improvement of the quality of science teachers and researchers. The National Science Foundation programs provide opportunities for talented individuals to pursue studies which they otherwise would not be able to do. The N.S.F. support through its various science education programs resulted in substantial improvement in the numbers trained at this institution and in the quality of the various programs. The success and leadership that this country has enjoyed in the past in science and technology have been due to the resource of trained manpower. The elimination or the reduction of the N.S.F. funds available in science education would effect drastically the development of programs in this area. We are hopeful that support in this area will continue since it is so vital to our future.

Sincerely,

Porter L. Fortune, Jr.

Porter L. Fortune, Jr.
Chancellor

Blue Mountain College
Blue Mountain, Mississippi 38610

APR 15 1971

OFFICE OF THE DEAN

April 13, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Dr. Holcomb:

In stating my reaction to the administration's proposed National Science Foundation science education cutbacks for fiscal 1972, I would like to express my concern over any reduction that might tend to retard development in the area of the sciences. For science, broadly speaking, offers our nation and the world the most positive hope for dealing with the physical problems of environment and population which are becoming so vital to the maintenance and improvement of the quality of life.

The programs being eliminated could have, with proper guidance, a direct effect upon ecological understanding and action. Hopefully, the administration will focus the energies and expertise of all its agencies and institutions upon the ecological problems of today and tomorrow so that the next generation and generations yet unborn might not have to live under human feed-lot conditions.

Sincerely,

William N. Washburn
William N. Washburn
Academic Dean

WNW:ch

62-912 O - 71 - 31

APR 16 1971

President's Room The Lindenwood Colleges

April 13, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

After conference with the faculty here at The Lindenwood Colleges who serve in the science areas, I am writing you in the hope that you can express to the appropriate committees of the Congress the serious handicap that will result if the Administration budget for the National Science Foundation for fiscal 1972 is adopted as proposed.

At this small college, we constructed science facilities several years ago in which we developed laboratories for student use in an effort to encourage research, even at the undergraduate level. My first task before assuming the presidency of this college was to deliver the dedicatory address at these facilities. I stated in that address that we would know if our science facilities were serving adequately only when we had students who were publishing research findings in responsible journals. Last year, to my delight, two of our undergraduate students published articles in the Journal of Physical Chemistry and the Journal of Nuclear Medicine. It's most discouraging to find that the proposed budget for the National Science Foundation eliminates Undergraduate Research Participation. Other programs that had been established by the National Science Foundation are eliminated or curtailed in ways which will make it extremely difficult for us to achieve the levels of performance we had geared ourselves for.

The record of the small, liberal arts college in the education of people in the science area is very outstanding. It seems to me that it is not a true saving to withdraw support from programs such as the Science Faculty Fellowships, the Student Science Training Program, and the Instructional Scientific Equipment Program.

At a time when the strong liberal arts colleges are finding it very difficult to maintain the high level of their performance, I hope that the Congress will give the most careful consideration to the possibility of restoring some of the aspects of the National Science Foundation program which are eliminated from the present budget.

Sincerely yours,

John Anthony Brown

John Anthony Brown
President

JAB:PJ

UNIVERSITY OF MISSOURI - KANSAS CITY

OFFICE OF THE CHANCELLOR

KANSAS CITY, MISSOURI 64110

APR 22 1971

19 April 1971

Dear Mr. Holcomb:

I am distressed at the fact that the Fiscal Year 1972 budget for the National Science Foundation, although containing an increase of $116 million to a new level of $622 million total, reflects within it sizeable reductions for science education and for the various institutional grants programs.

As an emerging University, the University of Missouri-Kansas City is particularly aware and appreciative of the special assistance available in the past from NSF programs such as the Undergraduate Research Participation Program, the Science Faculty Fellowship Program, the Instructional Scientific Equipment Program, and the Institutional Grants Programs. Programs such as these have been of enormous help to us. Without such support, universities lack the funds to effect the crucial difference between a bare maintenance of program adequacy and the desirable fulfillment of community and regional needs at a level of quality, and even of distinction in selected areas.

I hope you will do everything possible to relay the crucial importance of the above science education programs and institutional grants programs to the universities of this nation in their attempts to provide for a quality educational experience at both the graduate and undergraduate levels - and against the pressures of increasing numbers of students.

Sincerely,

James C. Olson
Chancellor

JCO:hd

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

MARYVILLE COLLEGE OF THE SACRED HEART
13550 CONWAY ROAD
ST. LOUIS, MISSOURI 63141

April 13, 1971

OFFICE OF THE DEAN

APR 16 1971

Mr. Howard E. Holcomb
Association of American Colleges
1818 "R" Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

As the Executive Associate for Federal Relations, you will, I am sure, be asked by many member institutions to represent their dismay over the proposed budget's effect on science education and research in the nation's colleges and universities. Although as a small college we have never received a National Science Foundation grant, we do heartily endorse the work being carried on by those institutions that receive these federal funds. In an age of ever-growing dependence on the continuous advance of science in every field, we certainly cannot afford to cut back on those programs that will train both faculty and students for an intelligent share in the imparting and dissemination of correct scientific knowledge. The work on pre-college curriculum in science must be continued if we are not to impede the pace of their progress in college. I sincerely hope that the Administration will reconsider the proposed cuts.

Thank you for your continued efforts on behalf of the institutions of higher education.

Sincerely yours,

Anne Webster, rsj

Sister A. Webster, R.S.C.J.

am

department of education / church of the nazarene, international headquarters

6401 the paseo, kansas city, missouri 64131, phone (816) 333-7000

edward s. mann
executive secretary

April 15, 1971

APR 19 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

As a representative of eight small liberal arts colleges in this country I am greatly shocked by the proposed budget for the National Science Foundation which would eliminate undergraduate research participation, science faculty fellowships, the student science training program, the instructional scientific equipment program, and which will reduce the funding for the college science improvement program, teacher institutes, pre-college course curriculums, special projects and institutional grants.

On the surface it would appear that there is a conspiracy against the small liberal arts colleges, for these are the particular programs which have proved to be of most benefit to the largest number of small colleges. I shall appreciate anything you may be able to do to get this message to those who have the opportunity of reversing this alarming trend in the allocation of priorities within the National Science Foundation.

Sincerely yours,

Edward S. Mann

Edward S. Mann

ESM:lp

APR 19 1971

TARKIO STUDY CENTERS IN LONDON, ENGLAND AND ALEXANDRIA, EGYPT

April 15, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 "R" Street
N.W. Washington, D.C. 20009

Dear Dr. Holcomb:

I am no little troubled by the apparent intent of the Administration to reduce significantly the monies channeled through the National Science Foundation in support of science education and institutional support for science. These proposals appear to me to be extremely short-sighted both in terms of the exceptionally rapid development that has taken place in the sciences over recent years and in terms of "making the real difference" in terms of future developments in the sciences.

Our institution is one of those few small liberal arts colleges that has contributed all out of proportion to our size to the undergraduate education of persons currently listed in "American Men of Science". Dr. Wallace Caruthers, inventor of nylon, was one of the earliest of our science alumni to attain a high pinnacle of success in a scientific field. I suggest that the more important element in that success was his early and "modern" introduction to the sciences. Without the continuing availability of such foundational instruction, I suggest that no amount of contributions in direct support of post-doctorate research will continue our country in a position of leadership in the sciences.

Further, it remains apparent to me that Federal leadership remains necessary in the continuing improvement of science education. It is true that we are securing new levels of private support for the public good - just as it remains true that such private support yet tends to follow Federal support. And without continued Federal "leadership" I would fully anticipate considerable deterioration in the further development and improvement of undergraduate science education.

Sincerely,

Eldon E. Breazier

Eldon E. Breazier, President

APR 19 1971

CARROLL COLLEGE
HELENA, MONTANA
59601

OFFICE OF THE PRESIDENT

April 15, 1971

Dear Mr. Holcomb:

It was with a great deal of regret that I learned about the reduced budget for the NationalScience Foundation for fiscal year 1972. I am especially concerned by the fact that our undergraduate programs in science, which have helped build the strength of our country, are now being left with practically no assistance. I feel that it is important that the programs in undergraduate research and in instructional scientific equipment be continued. Further, other aspects of the National Science Foundation Program should be re-emphasized, especially the college science improvement program, teacher instruction, and other special projects including institutional grants which have helped strengthen undergraduate science preparation.

I think it is truly unfortunate that we have now lost the gains we have made the past decade by arbitrary cuts in the budget of the National Science Foundation. Basic interest and knowledge of science at the undergraduate level is needed if our scientific and technological know-how is going to be maintained.

I shall appreciate it if you would do all that you can to help the Congress realize that the National Science Foundation should be funded additionally and that the level of maintenance of the programs be continued.

Thank you for your assistance.

Sincerely yours,

Rev. Joseph D. Harrington
President

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, NW
Washington, D. C. 20009

NEBRASKA WESLEYAN UNIVERSITY
LINCOLN, NEBRASKA

OFFICE OF THE PRESIDENT

April 12, 1971

APR 15 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 "R" Street, N. W.
Washington, D. C. 20009

Dear Howard:

This is in reference to the proposed cut in the National Science Foundation budget for fiscal year 1972.

As the president of a small, liberal arts, four-year, undergraduate college, I must protest this reduction in funds with all of the strength, force and ability at my disposal. If anyone in Washington would take the time to investigate what has happened to science education at Nebraska Wesleyan University, they would recognize the tremendous value of the several programs of the NSF directed to the undergraduate college.

Specifically, we have developed a science education program that is outstanding from every point of view. The performance of our graduates in professional and graduate schools attests in part to that fact. The superior background which has been given to those entering the teaching profession is a further indication of the job that is being done on this campus.

I hope you will muster all of the resources available to communicate this fact of protest in an effective manner. The NSF has accomplished its purposes, has been diligent in performing its functions in a creative and helpful manner, and must continue to have a place of priority in this area of education.

Very truly yours,

Vance D. Rogers

Vance D. Rogers
President

APR 19 1971

CREIGHTON UNIVERSITY
OMAHA, NEBRASKA 68131

VICE PRESIDENT
FOR ACADEMIC AFFAIRS

April 16, 1971

Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

I am writing to you concerning institutional support for higher education. I know that appropriations are very difficult to make this year but I am concerned about the direction which these appropriations take.

I think it is very important that the NSF Institutional Grants Program for science education continue. As the Newman Report says, "all institutions need some flexible funding, some means of responding to new ideas or differing circumstances." Institutional grants are very important for this purpose.

I have found our NSF Institutional Grant very helpful, even though it is small. I appreciate the work you are doing to get the help we need.

Sincerely yours,

Clement J. Schneider, S.J.
Vice President for Academic Affairs

CJS:dr

April 19, 1971

Dictated over telephone by:

James F. Hornig
Associate Dean of Faculty for the Sciences
Dartmouth College
Hanover, New Hampshire

Dear Mr. Holcomb:

I should like to respond to your letter of April 7 regarding reductions in National Science Foundation budgeting for the support of science education in fiscal 1972. These reductions, particularly the Undergraduate Research Participation Program and College Science Improvement Program strike me as very unwise. The Instructional Scientific Equipment money in particular has been an immensely powerful force in improving the quality of all of the programs in the science departments here at Dartmouth over the past years.

May I express my particular dismay that these budgetary reductions are made at exactly the worst places if we wish to improve the level of innovation and responsiveness in undergraduate science education. It is just those faculty members who are most concerned with the changing needs of science instruction who will be most affected.

Cordially yours,

James F. Hornig

Princeton University DEPARTMENT OF BIOLOGY
PRINCETON, NEW JERSEY 08540

April 20, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

APR 26 1971

Dear Mr. Holcomb:

I am writing to express my extreme dismay at the proposal to cut from the NSF budget many programs which are essential to the continuance of high quality scientific education at our universities and colleges. No university, including the very richest, is able from its own budget to supply the money necessary to update the science equipment required to teach modern science in the laboratory. Without federal assistance in these areas one simply cannot teach what is most relevant to the educational needs of the student, and therefore one is not able to best prepare him to enter the every day business world. Much work also must constantly be done in upgrading teachers both at the college level and at the high school level, and funds for this purpose should have high priorities.

It is indeed a sorry day, if we can no longer educate students in the best traditions of science. The ultimate response to such cutbacks will be the elimination of laboratory training at many universities and colleges. Science is learned in the laboratory, not by reading text; and if laboratories are eliminated the scientific training at the universities will be emasculated as to make it almost worthless.

Sincerely yours,

Robert D. Lisk
Professor
Biology Department

RDL:mes

APR 19 1971

Princeton University DEPARTMENT OF BIOLOGY
PRINCETON, NEW JERSEY 08540

April 15, 1971

Mr. Howard Holcomb
Association of American Colleges
Washington, DC

Dear Mr. Holcomb:

I am writing to express my deep concern over the proposed cut in the NSF budget support for science education and institutional support. My home department of Biological Sciences at Hunter College in New York was converted from a third-rate to a first-rate department with the aid of an NSF Development Grant which helped in turn to upgrade standards throughout the City University of New York and influenced directly or indirectly the science education of thousands of students. The abrupt stoppage of this support at a time when it can not be replaced from elsewhere is greatly weakening and damaging what has already been accomplished. Similar examples of the harm being done by dismembering of the NSF science education programs are widespread over the country. Can something yet be done to reverse this disastrous decision and to reinstate these programs?

Please let me know if there are steps which can be taken by us at the University

Sincerely yours,

Ruth Sager

Ruth Sager

Professor of Biological Sciences, Hunter College, City University of New York

Visiting Fellow, Princeton University

Princeton University DEPARTMENT OF BIOLOGY
PRINCETON, NEW JERSEY 08540

April 13, 1971

Mr. Howard E. Holcomb
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

APR 14 1971

Dear Mr. Holcomb:

This is in response to your notice regarding N.S.F. Science Education cutbacks. Most of the programs which are being eliminated have benefited the Department of Biology here at Princeton at one time or another but the one program which we feel very strongly about is the "Undergraduate Research Participation". Over the last 10 years we have been fortunate enough to receive one of these grants each summer (except 1966) and it has been an enormous help in furthering not only the educational training of the grant participants but, in fact, has contributed substantially to the basic knowledge in the field of biology. To substantiate my point, I am enclosing a partial list of the undergraduate publications of this department which have been published over the last 10 years. Many of the participants in the N.S.F. program are among the authors listed and without the support of such a program as "Undergraduate Research Participation", much of the work represented by these publications would have been impossible.

We would be interested to know if there are any plans to offer an alternate source of funds for what we consider a first rate program in undergraduate education.

Sincerely,

Alan Wallace
Departmental Administrator

AW/bd
Encl.

UPSALA COLLEGE
EAST ORANGE
NEW JERSEY

OFFICE OF THE DEAN OF THE COLLEGE

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

APR 19 1971

Dear Mr. Holcomb:

The proposed cuts in the Administration budget for support for higher education can only be viewed with alarm. The programs that would be eliminated, such as Undergraduate Research Participation, Science Faculty Fellowships, the Student Science Training Program, and Instructional Scientific Equipment Program, are of major importance to the strength and vitality of liberal arts colleges of the size and type of Upsala. No less disturbing is the prospect of reduced funding for the College Science Improvement Program, which has been a major source of funds to up-date and revise college science curricula.

It is certainly to be hoped that those who understand the current difficulties in higher education will do everything possible to prevent the proposed budget from being approved in its present form. I know that the Association of American Colleges will be working toward that end.

Sincerely,

C. Alfred Perkins

C. Alfred Perkins
Dean of the College

CAP/amw

DREW UNIVERSITY

Madison, New Jersey 07940 / 201-377-3000

Office of the President

15 April 1971

APR 19 1971

Dear Dr. Holcomb:

It is truly incredible that in the Administration's budget for the National Science Foundation there is a twenty-five-percent reduction in support for sciene education and a sixty-six-percent reduction in institutional support for science. I am terribly eager, as is Mr. Nixon, to extricate our country from a disastrous war in Southeast Asia, but meanwhile we must not neglect our domestic challenges. The reduction of funds for science education seems to me to be shortsighted and comparable to a firm's cutting off its research and development funds when it sees itself in some troubled waters.

With best wishes,

Sincerely,

Robert F. Oxnam

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

RIDER COLLEGE
FOUNDED 1865

TRENTON, NEW JERSEY 08602

OFFICE OF
THE PRESIDENT

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal
Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

APR 19 1971

Dear Howard:

I am more than a little disturbed by the proposed budget cuts contained in the National Science Foundation budget for the fiscal year 1972, particularly in the area of science education. I am concerned in view of the fact that Rider has a rapidly developing science program and many of the programs that are being cut would hurt us in the development of this program. Our progress to date has been greatly helped by the Instructional Scientific Equipment Program, Special Projects, and Institutional Grants. Furthermore, we are in the middle of preparing a College Science Improvement Program proposal which is a critical adjunct to our planned science development program. The cutting of funds in this area can do nothing but damage to our existing program and hinder plans that we have for the future.

I urge you to make all necessary efforts to make our point of view known on these matters to the key Congressmen concerned.

Sincerely,

Frank N. Elliott

Frank N. Elliott
President

FNE:mjm

Dictated by Dr. Elliott
and signed in his absence

62-912 O - 71 - 32

APR 20 1971

FINCH COLLEGE
52 EAST 78 STREET
NEW YORK, N.Y. 10021

April 19, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb,

Your letter of April 7, 1971 regarding the proposed Administration budget for the National Science Foundation for Fiscal '72 has just come to my attention because Finch College has just resumed classes after spring vacation. I apologize for not responding earlier but hope that this response will reach you in time for it to have some effect.

I would like to go on record as believing that the budget cuts would seriously undermine significant education in the sciences. Although the United States has taken and maintained a leading position in scientific research in all fields for a long time, I do not believe it can continue to sustain this achievement if it does not encourage and support the education of its young scientists. My concern is not a political one, chiefly. Whether this country or another contributes scientific knowledge to the world is far less important than that such a contribution be made. If the United States, with all its resources in people and wealth, does not have the willingness to make such a contribution it would seem likely that few other societies would have adequate resource to do so. Mankind, in general, will be the poorer.

I think it should go without saying that graduate research is largely dependend upon the availability of those young people who are educated as undergraduates and upon those young academicians whose teaching is coupled with research projects which individual institutions cannot and, actually should not support financially at the cost of needed support in the humanities. The only viable source of required funds at this time is the federal government. But I would like to stress that such funds should be made available to support free and open inquiry rather than projects whose aim is only an immediate and self-serving one. For this reason, it is the college and university with the tradition of free inquiry which should administer funds.

Sincerely yours,

Iris Mueller

Iris Mueller, Ph.D.
Dean of the College

IM:ey

APR 20 1971

ITHACA COLLEGE
ITHACA, NEW YORK 14850

COLLEGE OF ARTS & SCIENCES

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

We have had an NSF Undergraduate Research Participation program at the College for the past three years, and will have our last one this coming summer. I believe that the elimination of this relatively inexpensive program will hurt the undergraduate education of the excellent potential science graduate student who is and will continue to be necessary in our country. I am enclosing a reprint from an article which appeared in the Ithaca Journal about our summer research program (about half supported by the NSF) and sum up the positive effect this has on the undergraduate science major.

Sincerely yours,

Heinz F. Koch, Chairman
Department of Chemistry

ROSWELL PARK MEMORIAL INSTITUTE

Department of Health • State of New York
Hollis S. Ingraham, M.D., Commissioner

666 Elm Street • Buffalo, New York 14203
Gerald P. Murphy, M.D., Director

APR 19 1971

4-16-71

Dear Mr Holcomb:

I have encouraged educators and scientists to get Congress to restore NSF budget for science education programs particularly the SSTP.

I have written all members of the Senate + HR. on the Full + Subcommittee dealing with the NSF programs.

Bella Abzug, Member of Congress, NYS. is helping us a great deal. The response nationally has been excessive!

Sincerely yours
Dr Edward G. Miraldi

APR 19 1971 CANISIUS COLLEGE
BUFFALO, NEW YORK 14208
DEPARTMENT OF CHEMISTRY

April 15, 1971

Mr. Howard E. Holcomb
Association of American Colleges
1818 R Street N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

The proposed Administration budget for support of the natural sciences despresses me. It is one thing to de-emphasize the over-production of new scientists but it is something else to lower the quality of scientific training of these students still remaining in these areas of study. Government support is essential to the operation of first-rate science departments at colleges.

I hope you can relay this feeling to the appropriate legistrators in Washington.

Sincerely yours,

Joseph F. Bieron

Dr. Joseph F. Bieron
Assistant Professor
Department of Chemistry

Jfb/am

NEW YORK UNIVERSITY
School of Education
Division of Science and Mathematics Education
23 PRESS BUILDING
WASHINGTON SQUARE, NEW YORK, N.Y. 10003
AREA 212 598-2926

APR 19 1971

April 15, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street N.W.
Washington, D.C. 20009

Dear Dr. Halcomb:

It is indeed regretful that the proposed NSF budget for fiscal '72 will result in a cutback on support for such science education programs as Teacher Institutes. We are just beginning to realize the educational dividends from past efforts and to develop ways in which future institutes may become a more potent factor in the improvement of science teaching in schools and colleges. To reduce these efforts will have drastic effects upon science education in this country.

Sincerely yours,

J. Darrell Barnard

J. Darrell Barnard
Chairman, Department
of Science Education

JDB/vs

NEW YORK UNIVERSITY
Courant Institute of Mathematical Sciences
National Science Foundation
In-Service Institute for
High School Teachers of Mathematics
251 MERCER STREET, NEW YORK, N.Y. 10012
AREA 212 460-7100

April 16, 1971

APR 19 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Dr. Holcomb:

I understand that the proposed budget for the National Science Foundation for 1972 reduces support for science education in a significant manner. In my opinion this is a very serious mistake since it will undermine existing programs and will certainly discourage innovations to improve science teaching. As director of a National Science Foundation Institute for High School Teachers of Mathematics at New York University since 1963, I can testify to the effectiveness of this program because of the hundreds of high school teachers we have trained and I can testify to the continuing need for the program because of the hundreds of applications we receive each year.

I urge you to attempt a reconsideration of this budget cut and in fact to attempt a significant increase in the budget for science education.

Sincerely yours,

Melvin Hausner

Melvin Hausner
Director

APR 22 1971

St. Lawrence University
Canton, New York 13617

Office of the President
Frank P. Piskor

Telephone (315) 379-5802

April 19, 1971

Mr. Howard E. Holcomb
Executive Director for Federal Relations
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

I am distressed to see that vital aspects of the NSF program relating to undergraduate instruction, undergraduate student research, improvement of undergraduate curricula, science faculty fellowships, and pre-college support are being drastically cut back for fiscal '72. St. Lawrence University sees these programs as vital to its undergraduate science program and key supporting instruments to the improvement of science teaching and undergraduate student research.

Moreover, efforts to trim support for equipment grants and general institutional grants cannot but fail to have a long term impact on the quality of undergraduate instruction in the sciences. I would earnestly urge the President and the Congress to reconsider the budgetary reductions in the above mentioned areas of National Science Foundation support to institutions of higher education. With foundations and corporate support on the wane, this additional cutback to support science education represents a staggering financial blow for the undergraduate college and its science program.

I urge your serious reconsideration of these budgetary cutbacks.

Sincerely,

Frank P. Piskor
President

jl

MAY 3 1971

COLGATE UNIVERSITY
HAMILTON, NEW YORK
13346

OFFICE OF THE PRESIDENT

April 26, 1971

Dear Mr. Holcomb:

It was with regret that I read your recent letter outlining proposed cutbacks in National Science Foundation funds. In an era when independently endowed institutions such as Colgate University are undergoing increasing financial pressures, the reduction of available funds for science education could pose a serious threat to the science effectiveness of many colleges and universities.

It is ironic for the academic community to be faced with reduced federal support, when many private philanthropic foundations are terminating assistance in the belief that the Federal Government is the agency to offset these losses!

Throughout the years, the National Science Foundation has been one of the pioneer agencies in assisting the colleges and universities of the nation to develop science capacity. It will be tragic for American higher education if the Colgates have to stage a holding action, or retreat, after so much has been accomplished.

The elimination and/or reduction of the NSF programs cited in your letter would seriously undermine the effectiveness of many institutions. At Colgate, for example, they strengthen a fundamental part of our efforts to attract and maintain a high quality student body and faculty. For the 1970-71 academic year, Colgate has received over $155,019 in support of programs which may not be continued. If the Federal Government proceeds with its plans systematically to withdraw and reduce support, survival of strong science programs at Colgate and many similar institutions will be jeopardized.

I deeply appreciate your concern in calling this matter to my attention. I hope that the urgency of our situation is clear to the Chairman of the House Subcommittee on Science, Research and Development. And furthermore, that Congress will take appropriate action to ensure the availability of these critically important National Science Foundation funds.

I am sending a copy of this letter to the following Congressmen: James M. Hanley, Peter Peyser and Louis Frey, Jr. Again, my sincere thanks for your interest.

Sincerely,

Thomas A. Bartlett

Thomas A. Bartlett

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

APR 21 1971

YESHIVA UNIVERSITY

BELFER GRADUATE SCHOOL OF SCIENCE

Amsterdam Avenue and 186th Street / New York, N.Y. 10033 / (212) LOrraine 8-8400

April 19, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street N.W.
Washington D.C. 20009

Dear Mr. Holcomb,

I am writing to express my disapproval of the proposed reductions in funding of such NSF programs as CSIP, Special Projects and, in particular, Inservice Institutes. Not only do these programs serve a useful purpose for their immediate audience, but their long-range effect is of the greatest importance in upgrading science instruction. It is a serious mistake to suppose that local school systems can replace such programs or provide adequate support for teacher and curriculum improvement.

Yours very truly,

Miriam S. Grosof
Acting Chairman,
Department of Mathematics
and Science Education

MSG:rf

COLLEGE OF MOUNT SAINT VINCENT
ON-HUDSON
RIVERDALE, NEW YORK 10471

APR 21 1971

OFFICE OF THE ACADEMIC DEAN

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

May I ask you to bring to the attention of Congress the grave injustice to undergraduate education that proposed cuts in the forthcoming administration budget for the National Science Foundation for fiscal '72 would constitute.

In the area of Undergraduate Research Participation, Faculty Fellowships, Scientific Equipment alone, the upcoming students will be short changed without aid. In our technological society, it is fatal to cut any scientific aid. Undergraduate institutions stand to lose most by this short-sighted policy. Ultimately, our nation will suffer.

May I ask your help to intervene against this deplorable lack of foresight.

Earnestly,

Sister Anne Courtney

Sister Anne Courtney
Academic Dean

SAC:co'c

APR 21 1971

Roberts
Wesleyan
College

716-594-9471

Office of the
Academic Vice President

Rochester, New York 14624

April 16, 1971

Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

With reference to proposed cuts in funding of NSF programs in Science Education, our program will suffer principally through lack of support in the Teacher Institutes and the Equipment Grant programs. We are essentially a teaching institution with only modest individual efforts in basic research. The re-allocation of NSF funds to research at the expense of educational programs in our opinion tends to aid the state university program at the expense of the private liberal arts college. We hope that the trend can be reversed for the sake of individualized education of our youth.

Sincerely,

Donald D. Kerlee

Donald D. Kerlee
Vice President and Academic Dean

DDK:vs

STATE UNIVERSITY COLLEGE
CORTLAND, NEW YORK 13045

OFFICE OF THE PRESIDENT

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

APR 21 1971

Dear Mr. Holcomb:

In response to your communication of April 7, 1971, regarding the National Science Foundation science education cutbacks, this is to express my concern about the cutbacks, particularly in the areas of Science Faculty Fellowships and the Student Science Training Program. I am also disturbed at the cutbacks in funds for Institutional Grants but I feel that in this area the administration of the grants could be tightened up for more effective use of funds. It is my feeling that most of the cutbacks in NSF funds have resulted from observed inadequacies in the proper use of funds previously allocated. It, therefore, appears that this type of setback in funding was inevitable, sooner or later, and that it can be avoided in the future by a better accounting system for appropriate use of such funding.

Sincerely yours,

Richard C. Jones

Richard C. Jones
President

APR 19 1971

Keuka College
KEUKA PARK, NEW YORK 14478

OFFICE OF THE PRESIDENT

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

Please add my name and comments to the replies of others who have protested the proposed cuts in National Science Foundation funds for the 1972 fiscal year.

The proposed reductions, which come at a time when all levels of education are forced to beg for increased federal support, strike me as the epitome of our mis-managed budgetary priorities. After recent sanctified expenditures by the administration in Laos and Cambodia, attempts to save the SST and bankrupt transportation systems, and increased emphasis on military research, we simply cannot allow a further deterioriation of our commitment to the sciences. The public continues to decry dwindling student interest in the sciences and rightly emphasizes our medical, ecological and research needs. Our federal spending is presently committed, so it seems to me, to that which creates crisis rather than alleviating it.

Our faculty and staff join me in offering our assistance to your efforts to influence congressional commitment to the scientific needs of the nation. Please advise me if we can help in specific ways.

Sincerely,

G. Wayne Glick

G. Wayne Glick
President of the College

GWG/bp

Office of the President

MARYMOUNT COLLEGE TARRYTOWN, NEW YORK 10591 TELEPHONE 914 631-3200

APR 19 1971

April 15, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

As a member of the Association of American Colleges, who is aware of the Association's interest in all federal budgetary actions which concern higher education, I feel that I must write to you, for whatever good it may be, my personal reactions to the proposed federal budget for the National Science Foundation.

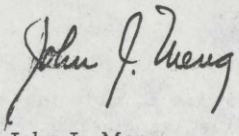
It is almost unbelievable that a civilized nation, the richest and most powerful one of the world, reduces rather than increases its support of science education at this time, on the threshold of the twenty-first century. When the whole civilication is an unprecedented crisis, due to overpopulation and uncontrolled exploitation of natural resources, the only hope for survival is more science education on all levels - a better understanding of what we are doing to ourselves and to our planet.

In this situation a cutback in funds for science education is a disaster of the greatest magnitude. The long range consequences which will be felt within the lifetime of our student population are incalculable. The immediate effect will be a sharp decline in teaching efficiency, both because of lack of equipment and lack of motivation of teachers. Many colleges, including Marymount, were counting on government support in their efforts to improve the teaching of sciences on their campuses. Marymount recently invested large sums in the renovation and refurbishing of its science facilities, in order to attract more science-oriented students and to qualify for federal programs, such as Undergraduate Research Participation. (A joint Psychology-Biology project was drafted and discussed in Washington a few months ago.) Also planned were attempts to obtain support from the Instructional Scientific Equipment Program, Science Faculty Fellowships and others. Obviously these efforts will have to be abandoned, and the deterioration and demoralization of the Science Departments will be immediate.

We solemnly protest the incredibly shortsighted and irresponsible policy of the federal government toward science, which is killing the best hope of this nation for the future.

With every good wish,

Sincerely yours,



John J. Meng
President

Office of Research Services

FORDHAM UNIVERSITY *Bronx, N.Y. 10458*

APR 19 1971

April 16, 1971

Dear Mr. Holcomb:

Attached is a copy of a letter sent by the Fordham Graduate Dean to Mr. Giaimo of the House Appropriations sub-committee on NSF authorizations and appropriations, and related issues in federal aid to higher education.

You may make any use of this you deem appropriate.

Sincerely,

Philip H. Des Marais
Director

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

PHD/ml
enc.

62-912 O - 71 - 33

Graduate School of Arts and Sciences

FORDHAM UNIVERSITY Bronx, N.Y. 10458

Office of the Dean

April 14, 1971

Representative Robert N. Giaimo
House of Representatives
Washington, D.C. 20515

Dear Congressman Giaimo:

I was delighted to meet with you at the Fordham Alumni luncheon which you so graciously hosted. As an individual who has a professional interest in the political scene, and as a Fordham alumnus, I was very much aware of your career in Congress and quite interested. Political science, I suppose, is my substitute for a political career. I have no intention of following my friend Bob Drinan.

When I returned to the campus I asked Mr. Philip DesMarais to send you the information that you asked me to supply. He tells me that he has sent it to you. If you were not sent the precise information you were looking for, please let me know.

Yesterday I had a visit from the regional director of the N.D.E.A., Dr. Eleanor Dolan. This is an annual event which we find quite helpful. It allows us to talk at length with the person who handles our N.D.E.A. business in Washington.

One item which she was instructed to discuss with me and other graduate deans was the following:

"In the submission of the fiscal year 1972 budget the Administration states that it will support as many, or more, graduate students through the awarding of research grants to faculty than it has through awarding fellowships in recent years. Graduate schools have been putting increasing emphasis on training doctoral students in college teaching and giving them supervised teaching experience. Will the support of students through research grants to faculty create any major obstacles to the university's efforts to develop programs for training doctoral students in teaching?"

My reaction to this proposal was strongly negative and so was that of the Chairmen of our Graduate Departments. I wish to share this with you because I have been told that this suggestion has come from representatives of the physical scientists who have been lobbying the National Science Foundation.

There is very good reason to award research grants to faculty and to use these grants to support graduate students. It would be a very serious mistake to do this either exclusively or extensively. Such grant support should be one part of a more diversified program particularly if, as I think it must, the Federal government wants the best return for its educational dollar. Let me explain why.

One of the root causes of our higher educational crisis has been the way in which Universities were tempted to run after the Federal dollar without thought as to what this would do to the whole educational enterprise. Money was made available for certain sciences. Universities went after it with the result that there are now huge, costly facilities and very expensive faculties (developed all out of proportion to actual university or national requirements) but there are very few students, or few students who are interested. Result: university budgets run with red ink.

To key graduate student support to faculty research grants is another way to repeat this distortion of graduate education. Money will go to the more enterprising "grantsmen", who may or may not be the best researchers. Even if they prove to be the best researchers, it will not be certain that their work will contribute most effectively to graduate education. The flow of money and students will largely escape the control of the university. The planning for the best use of faculty and facilities will be rendered increasingly difficult.

As I understand it, the national interest requires basic research, applied research and the education of scholars both as researchers and teachers. There is a further requirement that this be done in the most economic way possible. Taxpayers have every right to be concerned how their hard earned dollars are spent.

Funding graduate education through research grants to professors will achieve only part of the national goal. It will do this at the sacrifice of the training of future teachers and at a high cost to the taxpayer. The high cost will result from the impossibility of planning rationally for the use of our higher education resources as I tried to indicate above.

It is my conviction that there should be at least two other pieces in the funding picture: the continuation of traineeships and fellowships plus a most important item, institutional support. As I read it, the bill introduced by Rep. Edith Green and seven other of Democratic colleagues (HR 7248) moves in the proper direction. By providing institutional support and a flexible program of student financial aid it will encourage universities to make the educational dollar stretch as far as possible.

This comment on HR 7248 is only incidental. There are likely some parts of the bill that will need changing. My purpose in writing to you is to express my dissatisfaction with what seems to be an unfortunate emphasis in the Administration's approach to funding graduate education. As I see it, and as my colleagues see it, this type of funding will ultimately prove wasteful. It will effectively restrict the university's efforts to plan for the most economic use of its resources.

From my brief experience as Dean of a Graduate School, from the experience we at Fordham have gone through in three years of fiscal crisis, and what I know other institutions are going through at this moment, I think that academia is learning the hard lesson of fiscal responsibility. It would be sad indeed if the Federal government, with the best of intentions, made it difficult once more for universities to plan with an eye to strict economy.

Forgive me for being so long winded. Obviously, I feel strongly about this. I do not want to see graduate education harmed. Neither do I want to see the taxpayer placed under additional burdens. I think it is in the national interest to produce good researchers.but it is also crucial that we produce researchers who are also good teachers. I think that any funding pattern should be put to this test: will this encourage universities to make the best use of its facilities measured not only in dollar terms but also measured by what is a balanced program of education in the national interest.

I look forward to meeting you again. I thank you for your hospitality, your patience and your continued interest in Fordham.

With best wishes, I remain,

Sincerely yours,

James C. Finlay S.J.

James C. Finlay, S.J.
Dean, Graduate School



SAINT BONAVENTURE UNIVERSITY

SCHOOL OF GRADUATE STUDIES
OFFICE OF THE DEAN

SAINT BONAVENTURE, NEW YORK 14778

29 April 1971

MAY 3 1971

Howard E. Holcomb
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

As former Dean of the School of Arts and Sciences and the present Dean of the Graduate School I find the National Science Foundation cutbacks in Science Education to be very disturbing.

It appears to me that any substantial advance in science education for students at the secondary, college or graduate level will be brought to a virtual standstill. This will be brought about by decreases in fellowships, etc. and instructional equipment grants.

Perhaps your endeavours can reverse this trend.

Very truly yours,

Kenneth E. Anderson

Kenneth E. Anderson, Dean
School of Graduate Studies

KEA/ms

HARTWICK COLLEGE
ONEONTA, NEW YORK 13820

April 14, 1971

APR 16 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

I have received a copy of your memo dated April 7, 1971 in which you emphasize that NSF budgetary cutbacks regarding their science education program are highly significant in terms of their marked impact on the wide array of science education programs currently supported.

I decry this budgetary action and urge you to use this letter in support of action that would hopefully effect a reversal of the budgetary decision to cutback science education funding at this very critical period in our country's development. Indeed, we must provide additional educational funding if we are to more fully educate our evolving leadership to the importance of science rather than emasculate ourselves in this regard.

With best personal wishes, I remain

Sincerely yours,

Earl E. Deubler, Jr.
Professor of Biology
and Acting Chairman

EED/jah

cc: President Adolph Anderson

Office of Research Services

APR 16 1971

FORDHAM UNIVERSITY *Bronx, N.Y. 10458*

April 13, 1971

Dear Congressman Giaimo:

Fr. James Finlay, S.J., Fordham's Graduate School Dean, suggested I forward to you the attached memorandum on National Science Foundation appropriations, prepared by the Association of Jesuit Colleges and Universities.

While our scientists are naturally pleased about the increases in funds for research grants, we are also deeply concerned about the proposed reduction in funds for science education.

The proposed cutbacks in graduate fellowships, and institutional grants will hit hard at Fordham and many other universities of similar circumstances.

The elimination of the Science Development Grants is a blow because Fordham was just in the process of developing a proposal.

Thank you for all your efforts in the development of science in our country.

Sincerely,

Philip H. Des Marais

Philip H. Des Marais
Director

Rep. Robert V. Giaimo
House of Representatives
Washington, D.C. 20510

PHD/ml
enc.

APR 16 1971

ITHACA COLLEGE

ITHACA, NEW YORK 14850

April 14, 1971

Mr. Howard E. Holcomb
Association of American Colleges
181 R. Street N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

I wish to join other members of the academic communities in reacting to the reduction in the science education bedget for next year.

At a time when private institutions are facing financial chaos it is inconceivable that proposed budget cuts effecting undergraduate science education would be considered. The slack in science education can not be absorbed by institutial budgets.

Please consider any alternative budget considerations to correct the proposed reductions.

Yours truly,

CAMeyn

Charles A. Meyn
Coordinator of Financial Assistance

CAM:w

THE COLLEGE OF SAINT ROSE

ALBANY, NEW YORK 12203

OFFICE OF THE PRESIDENT

April 13, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

APR 16 1971

Dear Mr. Holcomb:

I am one of many Social Science-Humanists who believes that the National Science Foundation cutbacks are regrettable, if not completely irresponsible. I am appalled that the Undergraduate Research program and the Student Science Training program will suffer under these cutbacks. I am convinced that scientific knowledge, especially basic research, is the key to solving many of our environmental and social problems. The anti-science climate being established on university campuses will ultimately lead to a lower quality of life for all of mankind. We are responding to crass emotion and not reason when we cut back in the field of Science Education. The developing countries of the world show more wisdom than we do in their overall attitude toward basic research and motivating students toward the Sciences.

Sincerely yours,

Alfonse R. Miele
President

ARM/cr

wells college DEAN OF THE COLLEGE
in aurora, new york 13026

April 14, 1971

Mr. Howard E. Holcomb
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

APR 16 1971

Dear Mr. Holcomb:

I note with great concern the reduction of programs sponsored by the National Science Foundation which would result from the proposed administration budget for fiscal 1972 as it concerns science education. The implications of these reductions for a college like Wells are serious indeed.

As Wells College enters a period of fiscal uncertainty, indeed near-crisis, it must make the greatest possible use of public funds. The programs of the National Science Foundation whose reduction or elimination would be noted most seriously include Undergraduate Research Participation, Instructional Scientific Equipment Program, College Science Improvement Program, and Institutional Grants.

There is little question but that the program of Wells College in the sciences will suffer seriously if the financial burden in the scientific areas cannot be relieved by these programs.

I think that I am not over-dramatizing the present situation in higher education in claiming that these proposed cut backs will speed the demise of many private colleges.

Sincerely,

John M. Perry
Dean of the College

CLARKSON COLLEGE OF TECHNOLOGY
POTSDAM, NEW YORK 13676

OFFICE OF THE PRESIDENT

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R. Street, N.W.
Washington, D.C. 20009

APR 16 1971

Dear Mr. Holcomb:

I have read your communication of April 7, 1971 concerning N.S.F. science education cutbacks, and I am greatly concerned about these drastic changes which may be interposed in the support of higher education.

Over the years, Clarkson has received very welcome support from most of the higher education aid programs sponsored by the N.S.F. such as Undergraduate Research Participation, Science Faculty Fellowships, Instructional Scientific Equipment Programs, Science Development Programs, Teacher Institutes, and Institutional Grants. In fact, had these programs not been in existence, the contributions of our institution in supplying trained personnel as well as technical services to our region and the nation would have been severely curtailed. Further, I foresee in these proposed budget cutbacks a definite slowing of our development at a time when government funds will be badly needed to help train engineers, scientists, managers, and scholars to meet contemporary and future demands for the solution of problems concerning the environment, our system of higher education, and the services our changing nation and economy need.

Unless something is done to ameliorate the recommended cutbacks in federal support of higher education, I can foresee a time in the future when grave national as well as parochial difficulties may develop as the resultant of the potential forces generable by the proposed aid reductions.

Sincerely,

John W. Graham, Jr.

John W. Graham, Jr.

RUSSELL SAGE COLLEGE
TROY, NEW YORK 12180

APR 15 1971

OFFICE OF THE PRESIDENT

April 13, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

Somehow Congress has to see that all the students in graduate programs in science must first receive solid undergraduate instruction. Apparently the decisions regarding NSF money for Fiscal '72 all but eliminate undergraduate support. This is alarming because colleges like Sage are the seed bed for developing interests in science. We desperately need support for undergraduate research participation, science faculty fellowships, and scientific equipment. Major curtailment in these areas can't help but have an impact on the quality of students and possibly the number who graduate from liberal arts colleges and then go on in scientific fields.

I realize the tightness of the budget but this curtailment will work against the very ends that we seek.

Sincerely,

Charles U. Walker
President

CUW:mb

APR 15 1971

April 13, 1971

ROSARY HILL COLLEGE
4380 MAIN STREET
BUFFALO, NEW YORK 14226

OFFICE OF THE VICE-PRESIDENT

Dr. Edward E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R. Street, N. W.
Washington, D. C. 20009

Dear Doctor Holcomb:

I would like to express my concern over certain reductions in the National Science Foundation budget for Fiscal '72. This concern refers to science education and institutional support for science.

While a "no change" decision would, in itself, have been a reduction, a designed lowering of the funds available is incomprehensible.

I would be interested in knowing of the rational behind this decision.

Sincerely,

Alfred W. Zielonka

Alfred W. Zielonka, Ed. D.
Vice President

gb

APR 22 1971



THE UNIVERSITY OF NORTH CAROLINA
AT GREENSBORO

Office of the Vice Chancellor
for Academic Affairs

April 19, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R. Street, N. W.
Washington, D. C. 20009

Dear Dr. Holcomb:

I want to express my distress at the information which I have just received from you indicating the extent to which the support for education is being reduced in the proposed Administration budget for the National Science Foundation for 1972. The importance of such support for an institution like ours, which is an emerging comprehensive university in a community where innovative industrial and technological concerns are developing rapidly, is great indeed. What we have is an emerging institution in which scientific education has not heretofore been highly developed and where it is now very much in demand. There is a readiness in the community for the growth of scientific instruction and research which could be nourished most effectively by the kinds of support that the science education program of the National Science Foundation has undertaken.

I hope that you will use every resource of the Association of American Colleges to bring to the attention of the Administration and the Congress the great need in areas such as the North Carolina Piedmont for the expansion of science education.

Sincerely,

Stanley L. Jones

Stanley L. Jones

SLJ:bp

Livingstone College
Salisbury, North Carolina

OFFICE OF THE PRESIDENT

April 17, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R. Street, N. W.
Washington, D. C. 20009

APR 21 1971

Dear Dr. Holcomb:

I am indeed concerned and somewhat disturbed about the proposed administration budget for the National Science Foundation for the fiscal year 1972. Although the total budget for the Foundation contains an increase of $116 million, it is rather distressing that support for science education is being reduced by one-fourth, and that institutional support for science is being recommended for a two-third out to $12 million.

The proposed budget would eliminate or severely reduce many of the basic undergraduate programs that have been the academic life blood for the training of teaching personnel, providing equipment and apparatus for our teaching laboratories, and for curriculum improvements.

I am of the opinion that the proposed budget, if approved in its present form, would be disastrous to undergraduate educational institutions generally, and to predominantly "Black" institutions in particular.

Sincerely yours,

F. George Shipman
President

FGS:glc

GUILFORD COLLEGE
CHARTERED 1834 FOUNDED 1837

GREENSBORO, NORTH CAROLINA
27410

April 15, 1971

APR 19 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

We are most displeased about the proposed reduction in the level of federal support for science education during fiscal year 1972. High quality science programs in small colleges of modest means are becoming more and more difficult to finance. The possibility of additional federal support in the future provided some grounds for optimism about the continued existence and strength of these programs. The proposed reduction of funds for science education makes the future of strong science programs in small colleges seem dim indeed.

The Administration should be supporting us in these difficult times rather than withdrawing funds.

Yours sincerely,

William C. Burris
Academic Dean

WCB:cl

cc: President Grimsley T. Hobbs

QUEENS COLLEGE
CHARLOTTE, NORTH CAROLINA
28207

OFFICE OF THE PRESIDENT

April 15, 1971

Mr. Howard E. Holcomb
Association of American Colleges
1818 R Street, NW
Washington, D. C. 20009

APR 19 1971

Dear Mr. Holcomb:

The proposed reduction in the budget of the National Science Foundation, specifically the proposed cuts in instructional scientific equipment programs and matching grants to institutions will work a direct and immediate reversal for Queens.

With funds becoming increasingly scarce from all sources, it is a matter of concern to me that the federal government which has made a significant difference in small colleges like Queens has now chosen to reduce those programs precisely in the areas where they have produced the greatest results. Without this money Queens will not be able to stay abreast in its scientific instruction and our equipment will quickly become antiquated.

I would appreciate any efforts that can be made to continue the National Science programs in these areas at their current rates, at least.

Sincerely,

John E. Smylie

John E. Smylie
President

JES/bh

62-912 O - 71 - 34

APR 19 1971

ST. ANDREWS

PRESBYTERIAN COLLEGE

LAURINBURG, NORTH CAROLINA 28352

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

In response to your notice of April 7, 1971, let me express to you my displeasure over the proposed National Science Foundation budget cuts for fiscal 1972. The proposed rearrangements in the NSF budget promotes the saying the rich get richer and the poor get poorer in that the very large institutions which conduct most of the government research in this country will receive an even larger portion of NSF funds. I realize that President Nixon and Congress are concerned with channeling money toward the solution of societal problems but I strongly disagree with their methods. In my opinion, one of the best ways to promote this end is to strengthen the Student Science Training Program, Undergraduate Research Participation Program, College Science Improvement Program and Institutional Grants Program for smaller institutions. These are the institutions where principle emphasis is placed upon the interdisciplinary median of societal problems as opposed to the large institutions where research grants foster the continued professionalism that plagues the scientific community.

Sincerely yours,

Robert A. Pedigo

Robert A. Pedigo, Chairman
Division of Mathematics and
Natural Science

UNIVERSITY OF NORTH CAROLINA
AT
CHAPEL HILL

OFFICE OF THE PROVOST

April 16, 1971

APR 19 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, Northwest
Washington, D. C. 20009

Dear Mr. Holcomb:

Considerable concern has been expressed by my colleagues and staff over the proposed elimination of support for a number of programs in science education and institutional support for science. The students in the University and through them the people of North Carolina have derived a great deal of benefit from these programs, and we feel that future student generations will be deprived of much if these programs die.

An excellent example is Undergraduate Research Participation, which has attracted many of the very ablest students into careers in science. There is no oversupply of really top flight people in science, and this program is still valuable. The Instructional Scientific Equipment Program has provided means for improving and modernizing laboratory equipment. Our faculty has been greatly strengthened by the Science Faculty Fellowship Program and by the Institutional Grants Program.

The NSF graduate traineeship program has benefitted us in several ways. It has allowed us to attract promising students for graduate study in science, selecting them on the basis of academic qualifications and not on their ability to pay their own way. The educational allowance granted to the University for traineeships awarded has contributed importantly to support expenses associated with student and faculty research.

Reductions which have already been made in funding are being sorely felt, and further cuts would be indeed distressing. I hope very much that you and your associates will make every effort to persuade federal authorities to retain and maintain support for these programs.

Sincerely yours,

J. C. Morrow

J. C. Morrow
Provost

br

The University of North Dakota
GRAND FORKS 58201

VICE PRESIDENT FOR ACADEMIC AFFAIRS

April 14, 1971

Howard E. Holcomb, Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street N.W.
Washington, D.C. 20009

APR 19 1971

Dear Mr. Holcomb:

May I express my grave concern about the reduced federal funding for science education. For a number of years now we have had an academic year institute training people at the master's degree level in an interdisciplinary science program. I am confident that this program has done more to improve the level of high school teaching than any other program with anything approaching a comparable amount of budget. We have also had during the past three years one of the COSIP programs, which has helped immeasurably in the improvement of our faculty in three of the science departments.

With constantly increasing enrollments and only very slight increases in State-appropriated funds, we are faced with continuing erosion in the quality of our programs. This is likely to be particularly true in the rather expensive undergraduate and graduate level science areas. Therefore, institutional support is essential if we are to accommodate the increased number of enrollees being encouraged to attend college by the various federal support programs. It makes no sense for the administration to encourage increased enrollment, especially of disadvantaged groups, if the net result is to be a broad dilution in the quality of the education which public and private institutions are able to offer.

Sincerely,

W E Koenker

W. E. Koenker
Vice President
for Academic Affairs

ets

APR 19 1971

wilmington college
WILMINGTON, OHIO 45177 PHONE 513-382-0951

April 14, 1971

Dr. Howard E. Holcombe
Executive Associate
for Federal Relations
Association of Am. College
1818 R. Street N.W.
Washington, D. C. 20009

Dear Dr. Holcombe:

I am indeed disturbed by the proposal to reduce the support for science education in fiscal 72 by about 23 million dollars. Wilmington, like many other small liberal arts colleges has been moving far too slowly in the sciences, but we are beginning largely through our own efforts to reach that point in our development where we could very effectly use the acceleration which certain NSF programs provide. We now have a small instructional scientific equipment grant, and we are developing programs involving undergraduates in research. We have also been working for some time on a COSIP proposal. Under these circumstances it is indeed discouraging to realize that our chances of being able to move further are being seriously threatened by the proposed cut in these funds.

It is difficult for us to understand a proposal which will increase the total NSF budget, while decreasing the support for science education. This is to cut back on the roots while providing space for expansion for the branches. I would urge AAC to oppose this restrictive policy.

Sincerely,

Sterling P. Olmsted
Provost

SPO:llh

APR 19 1971

MIAMI UNIVERSITY
OXFORD · OHIO 45056

THE PRESIDENT

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Howard:

Please indicate to the House Subcommittee on Science, Research and Development on my behalf the deep distress we here at Miami feel over the proposed Administration budget for the National Science Foundation for fiscal 1972. Specifically, I am greatly troubled by the prospective elimination of undergraduate research participation, the science faculty fellowships, the instructional scientific equipment program, and the student science training program. As a University which has greatly benefited through the college science improvement program and institutional grants, Miami with many other comparable institutions can only be injured by the inadequate or reduced fundings of these programs.

Sincerely yours,

Phillip R. Shriver
President

js

APR 19 1971

THE CLEVELAND STATE UNIVERSITY
CLEVELAND, OHIO 44115

COLLEGE OF ARTS AND SCIENCES (216) 771-0250

April 14, 1971

Mr. Howard E. Holcomb,
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

I have followed closely the recent changes in the NSF program. Although the budget of the Foundation continues to grow, the programs of the Foundation which have been most effective in contributing to an educated citizenry have been among those cut back. I have in mind the Instructional Scientific Equipment Program, COSIP and, the various Teacher Institutes and Curriculum Projects. These are the programs which have contributed most toward improving undergraduate science instruction and it is these undergraduate programs which have extended the insights and understanding of science to large numbers of ordinary young people who will, sometime in the future, determine the policies of this country.

I am afraid that the Administration and Congress may have been too quick in responding to the current fashion in the country, particularly among the young, which is anti-science. There is also, I believe, a tendency to view science education as vocational rather than liberal in purpose. The value to the average citizen of an understanding of science appears to have been discounted.

I hope that through your efforts members of the Administration and Congress can be reminded of these facts and encouraged to continue a modest support for educational programs in science.

Sincerely yours,

Jack A. Soules

Jack A. Soules, Dean
College of Arts & Sciences

JAS:lt

APR 19 1971

UNIVERSITY OF DAYTON
DAYTON, OHIO 45409

THE PRESIDENT

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

The Administration's proposed budget for the National Science Foundation for Fiscal '72 which calls for reduction in support of science education from $100 million to $77 million and eliminates Undergraduate Research Participation, Fellowships, Student Science Training Program, Instructional Scientific Equipment Program and reduced funding for Institutes, Institutional Grants, and Special Projects is saddening and disheartening, indeed.

In substance, the University of Dayton will suffer curtailment or loss of the following NSF Programs:

Program	Grant
Student Organized Studies	$ 6,440
Institutional Grant for Science	$58,335
Summer Institute for Mathematics (H.S.)	$57,739
Summer Institute Electronic Engineering Tech.	$37,630
Institutional Scientific Equipment	$11,700

Elimination of the Student Organized Studies Program will create a diminution of the number of students participating in organized studies. Concerted effort should be made to encourage greater and more intensive student participation in science education.

Curtailment of Summer Institutes will weaken subject matter competence of science and mathematics teachers and will diminish the effectiveness of teaching. Past Institutes achieved significant improvement in teaching science and math in America's schools.

Reduction in Institutional Grants in Science will affect adversely curriculum improvement, contribute to lessening of materials and equipment purchases, detract significantly to improvement in teacher competence, and stultify many facets of science education that require added financial strength to insure academic strength.

Please convey to the Chairman of the House Subcommittee on Science, Research, and Development my disappointment in the Administration's reduction of funds at the expense of science education and urgently request that he reinstate with appropriate financial support all heretofore sponsored programs.

Sincerely,

Raymond A. Roesch

Reverend Raymond A. Roesch, S.M.
President

RAR/ed

Heidelberg College
Tiffin, Ohio 44883
(419) 447-2310

Office of the President

APR 21 1971

April 19, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb,

Thank you for the opportunity to respond to your memorandum of April 7 in regard to the proposed cutbacks in the NSF budget for fiscal 1972. Since Heidelberg has profited by some of the programs which are to be eliminated or reduced, we can speak with some authority about their usefulness.

We have received two Undergraduate Research Participation grants from NSF and both of them have stimulated our science program because of the emphasis on student design. The additional impact of these programs ramify far beyond the number of students who are actively engaged in them. To eliminate this program would preclude most institutions from encouraging their students to undertake research projects on their own initiative because the costs, while not high, are beyond fiscal possibilities for most of us.

Heidelberg has also benefitted from the Instructional Scientific Equipment Program in ways that have generated great interest among students and faculty members because the equipment provided has given us more sophisticated options in carrying on our instructional program. Heidelberg was one of the first institutions to receive a College Science Improvement grant (COSIP) and its impact will be felt long after the grant expires. It has permitted us to build up a first-rate Physics Department, to expand and experiment in biological education, and to improve our Chemistry program by inordinate degrees in a very short period of time. While the Teacher Institutes program leaves something to be desired, the other programs which

are scheduled for reduced funding are of critical importance to colleges and universities, including Heidelberg.

As a general observation, I think it is shortsighted of the Administration to reduce its support in the sciences just because a surfeit of trained people has suddenly appeared. Reducing support means reducing quality and standards of accomplishment and neither the nation nor its educational institutions can afford this luxury. More than that, liberal arts colleges like Heidelberg expose non-science majors to the complexities of the various sciences and the NSF programs now under fire permit us to offer a rich fare to these students. If we are forced to water down the science component for non-science majors, the adverse consequences will have an impact far beyond the present day.

With all good wishes,

Sincerely,

Leslie H. Fishel, jr.

LHFjr:lc

cc: Jackson E. Betts

BOWLING GREEN STATE UNIVERSITY
BOWLING GREEN, OHIO
43402

GRADUATE SCHOOL
OFFICE OF THE DEAN
PHONE: 419-372-2791

April 20, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

APR 22 1971

Dear Mr. Holcomb:

SUBJECT: NSF Science Education Cutbacks

The reduced and eliminated educational programs in the new NSF budgets are especially harmful to an emerging university such as this one. We lack the capacity to match the tremendous research efforts of mature and comprehensive universities. We can, however, compete successfully in educational programs. The cutbacks become, in effect, a selective repression of emerging universities and serve to cripple our capacity for offering quality education to students who turn to us in the belief that a university is a university and it is of no real consequence where they go and that a high quality education is available to them here. The cutbacks rob us of the opportunity to compete successfully with other universities and to give our students all that they deserve.

Sincerely,

Charles A. Leone
Dean

CAL:lf

MARIETTA COLLEGE
CHARTERED 1835
MARIETTA, OHIO
45750

OFFICE OF THE PRESIDENT

April 20, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

APR 26 1971

Dear Mr. Holcomb:

This is in belated acknowledgment of your April 7 communication regarding NSF science education cutbacks. We at Marietta College certainly are concerned. We presently have an Undergraduate Research Participation Program and a Cooperative College-School Science Program, both recently awarded. They are both most promising and exciting, and I should hate to think there was any risk of their being bobtailed or short circuited.

More in the neighborhood of unfortunate fact than fear, one of our fine Department Heads has been refused a Science Faculty Fellowship for his sabbatical in 1971-72. He planned to work in the history and philosophy of science, and of course his intended program will be adversely affected.

We are currently working up a College-Science Improvement Program proposal, and the prospect of "inadequate or reduced funding" is very serious indeed -- at the very least to the morale or spirit of the many Faculty members directly involved.

You are certainly at liberty to use this communication wherever it might be helpful.

Best wishes.

Sincerely,

Frank E. Duddy, Jr.

FED:jhr

FRANK E. DUDDY, JR.
President

URSULINE COLLEGE
LANDER ROAD AND FAIRMOUNT BOULEVARD
PEPPER PIKE / CLEVELAND, OHIO 44124

APR 19 1971

April 15, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

Your request for our reaction to the proposed cut in National Science Foundation funds for science education was referred to me by our President.

At a time when innovative science programs at the college level are so necessary and when a redirection of research and change in emphasis in many areas of science and science education is essential to attract science students and to provide an adequate science background for all students, we feel that it is, indeed, unfortunate that the Government support for science education is so drastically reduced.

Some of the programs that have been eliminated for 1972, in particular Undergraduate Research Participation, Instructional Scientific Equipment Program, and Teacher Institutes, will severely limit improvement of undergraduate instruction especially in small colleges.

Sincerely yours,

Sister Ann Gertrude

Sister Ann Gertrude
Chairman, Department of Chemistry

APR 19 1971

University of Cincinnati
Cincinnati, Ohio 45221

OFFICE OF THE VICE PRESIDENT FOR RESEARCH

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R. Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

This letter is in response to your request of April 7, 1971, regarding the NSF Science Education Cutbacks.

On behalf of the Office of Research at the University of Cincinnati, I wish to express our regret and dismay that these very valuable programs to the over-all science effort are being eliminated and/or reduced by the National Science Foundation.

Much good in the past has been done as a result of these programs, and there is no doubt that much more remains to be done.

Perhaps this effort on your part to generate letters in support of your concern will bring about a reassessment of these programs.

Sincerely,

Donald Harness

Donald Harness
Assistant to the Vice President
for Research

NOTRE DAME COLLEGE
4545 COLLEGE ROAD
CLEVELAND, OHIO 44121

April 14, 1971

APR 19 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

I am indeed distressed by the proposed cuts in the National Science Foundation budget which effectively eliminates several very worthwhile programs. I am particularly concerned in the loss of the Undergraduate Research Participation Program and the Student Science Training Program, both of which are currently functioning at Notre Dame College.

These two programs aim at finding and developing young talent in the sciences without which long range programs will be stifled. Neither of these programs is terribly expensive but their value is incontestable. At present the Student Science Training Program being implemented here at Notre Dame College is focused on the gifted student from the Cleveland inner-city high schools. The aim is not only to foster and develop talent but to open new vistas for these young people who have grown up with frustration. The funding for this particular program has been supplemented by a private foundation and by the personal donation of time and energy on the part of the faculty. All of this was triggered by the initial rather modest grant from NSF. The cutting of funds from the NSF budget closes the door to the private funding in many cases because the private foundations regard the NSF funding as an indication of a worthwhile program and hence are willing to add their support.

The reduced funding for the College Science Improvement Program and the elimination of the instructional Scientific Equipment Program will surely be reflected in a less vital program of science education particularly in the smaller colleges. This simply compounds the growing economic problems of the private college.

NSF has been plagued by the criticism that too much money goes to too few. Yet cutting funds to the URP and the SSTP in particular will cripple programs which reach large numbers of students in proportion to the funds needed.

I would appreciate it if these reactions were passed along to those making the budgeting decisions.

Sincerely,

Sister M. Jeanmarie DeChant, Ph.D.
Sister M. Jeanmarie DeChant
Associate Professor of Chemistry

Director of URP
Director of SSTP

THE COLLEGE OF STEUBENVILLE
STEUBENVILLE · OHIO 43952

APR 19 1971

Office of the President

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

We are distressed at the prospect of Federal cutbacks in the NSF Science Program, which once again points out science education on the college level is the first to suffer when budget juggling begins.

The proposed cuts in science education and institutional support for science each mean that many institutions, already faced with major financial problems, will be unable to further their programs or even maintain what they have planned.

Sincerely yours,

Kevin R. Keelan T.O.R.

(Very Rev.) Kevin R. Keelan, T. O. R.
President

hmt

OHIO UNIVERSITY
ATHENS, OHIO 45701

ASSISTANT TO THE PRESIDENT
CUTLER HALL

April 16, 1971

APR 26 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

President Claude R. Sowle authorized me to transmit to you the following statement. We trust that, along with the many other statements you receive, it will assist in preventing NSF Science Education cutbacks.

"With continuing reductions in science support, there has already been a significant impact on work effectiveness and morale in the scientific community. The reduction by NSF of its institutional support funds is a tactical error, if nothing else. These funds have proved very useful as an incentive-reward measure, particularly in the less affluent universities. Moreover, these funds have assisted in generating not only more financial support, but have provided necessary seeding of new projects for young faculty.

"The elimination of the Instructional Scientific Equipment program is surprisingly shortsighted for NSF. With an even greater need for instructional innovation and the attraction of the best students, the loss of this program will seriously damage the progress finally being made in improving undergraduate science instruction."

Sincerely,

Robert E. Mahn

Robert E. Mahn
Assistant to the President

REM:ed

cc Vice President Culbert
Dean Cohn

APR 26 1971

FINDLAY COLLEGE

FINDLAY COLLEGE
FINDLAY OHIO

ASSISTANT TO THE PRESIDENT

April 21, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Dr. Holcomb:

It is my understanding that the proposed Administration budget for the National Science Foundation for Fiscal 1972, although it contains an increase of $116 million, has eliminated, or greatly reduced, programs that are of great importance to colleges like Findlay College. I refer specifically to the programs in Undergraduate Research Participation, Science Faculty Fellowships, the Student Science Training Program, Institutional Scientific Program, College Science Improvement Program, Teacher Institutes, Pre-College Course Curriculum, Special Projects, and Institutional Grants.

Recently, we at Findlay College had what I feel for us was a costly experience. Most of the colleges in our area received NSF support to gain computer capability. New priorities in the Computer Division of NSF have made it impossible for them to fund this important area of scientific development--our request was apparently simply "too late to classify."

I feel that small colleges are facing truly crisis situations in education and particularly in the area of science education. We are in desperate need of help, both for program development and physical resources. I feel that it is important for the Administration to interpret to colleges the new directions in NSF funding--at the present time I do not understand how the new directions speak to our needs.

Yours very truly,

Louis F. Chenette

Louis F. Chenette
Director of Planning and Research

LFC:jmp

APR 26 1971

YOUNGSTOWN STATE UNIVERSITY
YOUNGSTOWN, OHIO 44503

April 22, 1971

Mr. Howard E. Holcomb
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

National Science Foundation's de-emphasis of undergraduate education programs represents a personal disappointment to us in the biology department of Youngstown State University. The last four years in this department ~~have~~ has been ~~one~~ a period of intense constructive changes during which a new chairman was appointed, eight new faculty members hired, new curriculum devised and innovative approaches were taken to undergraduate programs in biology. These programs were instituted by the assistance of NSF Undergraduate programs (two instructional scientific equipment grants and one undergraduate research participation grant). Our undergraduate research participation program has been successful beyond all expectations. At a recent regional AIBS meeting, research was presented by six of our undergraduate research participants. This pedalogical experience will prepare these young men and women for careers in life science — a kind of preparation that was totally non-existent at this institution just a few years ago.

Because of the innovation and success of our programs, sponsored by NSF, we had moved to a position where we were ready to apply for a college science improvement program and institute some summer teachers' institutes. Thus, it comes as a double disappointment to us to learn that these programs are greatly curtailed in the 1972 budget.

Following Sputnik, great emphasis was placed on elementary and high school education, many institutes were held and curriculum studies committees devised and instituted innovative curriculum at elementary and high school level but it has long been my opinion that college level instruction was neglected during this period. We are now receiving those students who have had benefit of greatly improved public school science programs and find that our tools are inadequate. Innovation ~~and~~ of college preparation of these students is necessary if we are to meet the scientific manpower demands of a technological society and these innovations must come from concerted effort of governmental agencies such as the National Science Foundation.

If the administration fears that we are faced with an excess quantity of future scientists, for goodness sake, let's don't sacrifice the quality of those few who must be produced.

Sincerely,

George W Kelley

George W. Kelley, Ph.D.
Chairman, Biology

GWK:ad

YOUNGSTOWN STATE UNIVERSITY
YOUNGSTOWN, OHIO 44503

April 20, 1971

APR 26 1971

Mr. Howard E. Holcomb
Association of American Colleges
1818 R. Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

The Chemistry Department at Youngstown State University recently began to implement various programs to develop closer relationships with area high school and college chemistry teachers as well as with high school students. In addition, we have been seeking methods to better handle the needs of our own undergraduate chemistry students. We feel that the continued development of programs such as these is a necessary part of the development of northeast Ohio, but the success of these programs will certainly require some outside funding. Unfortunately, a cutback in the National Science Foundation budget for science education would be detrimental to our goals and at a time when they are highly pertinent to Youngstown and its surrounding areas. We hope funds can be restored for science education.

Yours sincerely,

Leon Rand

Leon Rand
Professor and Chairman
Department of Chemistry

LR/nk

cc: Dr. Earl E. Edgar
Vice-president, Academic Affairs

THE DEFIANCE COLLEGE
DEFIANCE, OHIO 43512

April 14, 1971

APR 16 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb: RE: NSE Cutbacks

My immediate reaction to the NSF Science Education Cutbacks was one of dismay. It would work a distinct hardship on colleges who are attempting to develop programs of significance in the sciences. In particular, the Undergraduate Research Participation, Instructional Scientific Equipment, College Science Improvement, and Institutional Grants programs, in my opinion, should not be cut.

The problem of course comes at the point of making a close fit between the needs of society, the income available to the federal government, and the GNP. Education must be certain that it exhibits a recognition of these problems rather than an outright support of any and all programs.

Thus, without more information and insight into the total budget problem, I am not certain I object to these cutbacks, as much as I know we need the money.

Sincerely,

David G. Ruffer
Dean of Faculty

DGR/gja

THE COLLEGE OF WOOSTER
WOOSTER, OHIO 44691

OFFICE OF THE DEANS

April 14, 1971

APR 16 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
The Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

I am distressed by the administration's proposed budget for the National Science Foundation for fiscal 1972, for while it contains a substantial total increase, the support for science education is greatly reduced. I doubt that the President or the members of the Senate and the House of Representatives realize that the proposed NSF budget will eliminate much of the undergraduate support in which the National Science Foundation has taken the leadership in providing through the last decade--such programs as Undergraduate Research Participation, the Student Science Training Program, the Instructional Scientific Equipment Program, the College Science Improvement Program, Teacher Institutes, and in many respects the most important Institutional Grants all would be curtailed or eliminated.

I hope that you will express my thoughts to the chairman of the House Sub-Committee on Science, Research and Development, and I am taking the liberty of informing my representative and state senators by sending them copies of this letter.

Sincerely yours,

F. W. Cropp
Dean and Vice President
for Academic Affairs
Professor of Geology

FWC:kh

cc: Congressman John M. Ashbrook
Senator William Saxbe
Senator Robert Taft



RIO GRANDE COLLEGE
RIO GRANDE, OHIO 45674

April 14, 1971

APR 16 1971

Dr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, NW
Washington, DC 20009

Dear Sir:

Considering the number of unemployed scientists and engineers, it is difficult to argue the desirability of maintaining or increasing those portions of the National Science Foundation budget which would tend to increase this supply. Continued emphasis on grants and assistance to graduate schools is therefore ill-advised. However, in such areas as Institutional Grants and the Instructional Scientific Equipment Program much more should be done, especially if the emphasis is shifted toward undergraduate institutions. In particular, the training and retraining of elementary and secondary science teachers merits increasing levels of Federal support.

Sincerely yours,

Kenneth D. Myers

Kenneth D. Myers, Chairman
Division of Natural Sciences

KDM:bv

THE WESTERN COLLEGE
Oxford, Ohio 45056

Dean of the College

April 13, 1971

APR 15 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

Thank you for calling our attention to the proposed cut in support for science education. From the point of view of this College, such drastic cuts would have two serious results, not only for our own science program in the liberal arts context, but also for the nation as a whole.

First, the growing undergraduate interest in environmental problems demands, in our judgment, increased support of creative programs which would contribute to training persons able to understand and to help solve them.

Secondly, the strength of undergraduate science programs directly affects the quality of teachers in our nation's schools. It seems short-sighted in the extreme to deprive prospective teachers of the best science education our nation can offer.

We heartily support your efforts to have these issues seriously reconsidered.

Sincerely,

Marianne H. Micks

Marianne H. Micks
Dean of the College

MHM:pl

Mr. Carlton F. Maxwell
Director of Research Services
Cleveland State University
Cleveland, Ohio r44115

(216) 387-3630

APR 16 1971

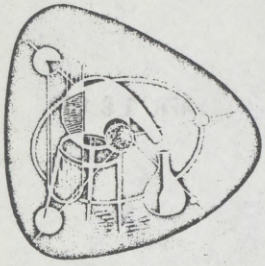
I am disturbed by the apparent placement of education within the NSF spectrum with a decrease in emphasis on such programs as the Instructional Scientific Equipment Program, Institutional Grants, COSIP and Teacher Institutes. Although COSIP is destined to receive essentially the same support of $4 million in Fiscal '72 as in Fiscal '71, this is essentially a reduction of support when you allow for inflation.

It would appear the Office of Management and Budget has been quite arbitrary in designating areas for reduced support. It would seem to be more appropriate to have solicited the education community for its view as a prelude to any cuts such as they have made.

It is our hope that Congress will look closely into the situation at NSF and provide adequate funding.

Dictated by Mr. Maxwell by phone 4/16/71.

APR 19 1971



Panhandle State College
Goodwell, Oklahoma
73939

Department of Chemistry
Tel. 349-2611 Ext. 254

April 16, 1971

Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R. Street, N. W.
Washington D. C. 20009

Dear Sir:

On behalf of Panhandle State College, I am writing to express strong disapproval of the funding of science education for fiscal year 72.

Many of the programs dropped or severely cut back are the programs from which small colleges benefited the most. It has been my observation that large colleges have received far more federal aid than should proportionately be theirs. The 72 budget reflects and enlarges this undesirable trend.

Sincerely,

R. Lynn Gardner

Dr. R. Lynn Gardner, Head
Department of Chemistry

RLG/csd

The University of Tulsa

Kermit E. Brown
Vice President for Research

APR 16 1971

April 15, 1971

AIR MAIL

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

I do indeed think that it is unfortunate that the budget for the National Science Foundation will cut support for science education by one-fourth and that the institutional support for science is being recommended for a two-third cut.

It is still extremely important that the United States have a strong scientific element and many of our problems, including social problems, could be solved by science education. I hope that these cuts will be changed in the future.

Sincerely,

Kermit E. Brown

Kermit E. Brown

KEB:mm

APR 21 1971

CONTINUING EDUCATION
a division of the
Oregon State System of Higher Education

OFFICE OF FEDERAL RELATIONS
Extension Hall Annex
University Campus
Corvallis, Oregon 97331
Tel. 503/754-2676

Howard E. Holcomb
Executive Assocaiate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

April 19, 1971

Dear Mr. Holcomb:

I appreciated the opportunity to respond to your inquiry about the potential impact of the proposed change in program priorities and budget allocation in the National Science Foundation's FY 1972 requests. While the Office of Federal Relations does not directly administer NSF funds, it works closely with all higher education institutions in the State of Oregon and through its nationally-circulated publications, maintains close contact with a large number of universities and colleges in other states.

This office, like most of its higher education colleagues in Oregon, is very supportive of the National Science Foundation and is eager to see an increase in the overall budget of that agency. But the proposed use of FY 1972 funds, by eliminating most educational training and institutional award activities, has caused dismay. An unanticipated side-effect may be a reopening of the conflict between those at the institutions who are responsible for overall program planning and for maintaining the balance between instructional and research activities, and those who see the proposed NSF budget only in terms of a way to identify financing for the research interests of individual faculty members. The breach between these two groups was largely healed after 1968 when NSF turned a significant portion of the decision-making process over to the institutions themselves. By forcing the universities to set their own priorities as to the use of their NSF grant funds, most institutions were able to develop a workable system whereby individual research interests could be fitted into the institutions' total plans for research and instruction activities. Discussions which I have attended since the NSF FY 1972 budget requests were first released show that this attitude of mutual accomodation is now breaking apart again. Unfortunately, too many faculty see the NSF budget in terms of "either - or".

I am certain you will receive a significant number of replies which document the actual impact of these potential changes on individual colleges and universities, so I will not reply to that question in my own response. I might add two other comments, however:

1) While it is generally accepted that there is a temporary oversupply in the production of certain categories of scientific manpower, the proposed NSF program reordering will strip the institutuons of a major resource they need to reshape their own instructional efforts, to experiment with the training of new types of scientific manpower, and to share an understanding

of science itself with a larger segment of the undergraduate student body. This last point seems especially significant. I have heard no one who is willing to state that science and technology does not play an increasingly important role in every citizen's life, and many sources are calling for a much expanded discussion of the impact of scientific technology at all levels of education;

2) Also, no one is stating that the science educators already employed throughout the country (at the elementary through graduate instruction level) have acquired all of the knowledge they will need to keep their courses timely and scientifically relevant. In fact, we know that scientific and technological information is increasing so rapidly that even more effort than is now the case needs to be placed on upgrading our current science manpower. The NSF institute and fellowship funds have represented one of the largest financial sources for providing this retraining. To eliminate these funds now speaks only to the need for quantity, not quality.

In summary, while we definitely support the NSF's attempt to increase funds available for research (an area too often neglected in federal program expansion in recent years) this effort cannot be made at the expense of a large share of the agency's support for instructional activities.

Please give my regards to Jack Talmadge at your next opportunity.

Cordially,

Mary Hall, Director
State-Wide Office of Federal Relations
Extension Hall Annex
Corvallis, Oregon 97330

MJH:dkr

APR 20 1971

WILLAMETTE UNIVERSITY
SALEM, OREGON 97301

DEPARTMENT OF BIOLOGY

April 16, 1971

AIR MAIL

Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

Your letter of 7 April 1971 regarding the proposed National Science Foundation science education cutbacks has been forwarded to me by Mr. William Blevins, Assistant to the President at Willamette University. I feel the administration budget proposal for the National Science Foundation for fiscal 1972 is a very unwise move.

It is becoming more apparent to many of us that the solutions of present and future problems will require a widespread understanding of Natural Science. Just awareness is not enough; an understanding of the consequences of any and all actions related to the environment is imperative.

In this regard, the elimination and reduction of programs for education on the undergraduate level reduce the potential for increasing individuals' understanding of Natural Science and the possible applications for the essential solutions to these environmental problems. More people educated in Environmental Science are needed. This proposed budget reduction will hinder the program to educate more students.

Sincerely,

Donald R. Breakey

Donald R. Breakey, Chairman
Natural Science and Mathematics
Concentration Area

DRB:oej

APR 26 1971

Portland, Oregon 97219

Telephone (503) 246-8251

Lewis and Clark College

Office of the President

April 20, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

This College has only occasionally qualified for NSF support of science education. However, the availability of assistance from the National Science Foundation for innovative approaches to undergraduate science education has served as a continuing challenge and encouragement for our science faculties to explore areas for possible improvement of their instructional programs. Elimination or reduction of funding for these NSF programs would remove this important challenge and stimulation to improvement of science education at Lewis and Clark.

Sincerely,

John R. Howard

JRH:ju

62-912 O - 71 - 36

UNIVERSITY OF OREGON

GRADUATE SCHOOL
Office of the Dean

EUGENE, OREGON 97403
telephone (code 503) 686-5128

APR 19 1971

April 16, 1971

Mr. Howard E. Holcomb
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

This letter is in answer to your memorandum of April 7, concerning NSF science education cutbacks.

Although it is always disconcerting to have funds cut back, in view of the current and projected employment situation and enrollment projections it is conceivable that NSF is moving in the right direction. I am not sure enough of the facts (or guesses) to have a firm opinion on this. Rather, my mind is open on the subject, and I am not prepared to castigate NSF at this time.

However, if we grant for the sake of argument that some cutback is desirable, or at least acceptable, the wisdom of the selected areas is not at all clear. In particular, the Undergraduate Research Participation program has been very successful. If we are to train fewer scientists we should at least insist that the ones whom we do train get the best possible scientific education. Research participation at an early stage of a student's career can be very important in strengthening motivation, providing incentive, and giving the student, especially the best students, a realistic view of their chosen career. All this is, of course, in addition to the specific benefits of learning technique and new scientific horizons which the URP student experiences.

The cut in the Institutional Grant program, which affects not only education, but also research will be a hard blow for universities. I cannot emphasize too strongly how important this program has been to our institution. The absolute amount of money is not that great, but its flexibility has made it useful out of proportion to the absolute magnitude of the grant.

I hope that these hurried remarks will be of some help to you.

Sincerely yours,

Robert M. Mazo

Robert M. Mazo
Associate Dean
Graduate School

CARLOW COLLEGE

ASSISTANT TO THE PRESIDENT

3333 Fifth Avenue • Pittsburgh, Pennsylvania 15213 • Telephone 412-683-4800

April 19, 1971

APR 20 1971

Mr. Howard E. Holcomb, Executive Associate
for Federal Relations
Association of American Colleges
1818 R. Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

With an increase of $116 million in the proposed National Science Foundation budget, it is extremely disappointing to see less emphasis being put on science education and institutional support for science. Past budgets have placed constraints on the education divisions of the Foundation, in facing the problem of meeting both the growing demands of the long-identified needs of our Nation's schools for improvement in the quality of science and mathematics education.

The Student Science Training Program, as one example of a program to be eliminated, is the only broad scale activity in the United States providing a sustained instructional effort which focuses on students who are succeeding in secondary school studies, and particularly in school science.

It is imperative that the education and institutional programs be continued at the same or increased level of budgeting if the National Science Foundation is going to continue with its philosophy of supporting what is considered good science that can be helpful to societal problems.

Very truly yours,

Thomas M. Hartnett

Thomas M. Hartnett
Assistant to the President

TMH/ak

WILSON COLLEGE
CHAMBERSBURG, PA. 17201

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

APR 19 1971

Dear Mr. Holcomb:

As you have urged in your letter of April 7 regarding NSF Science Education cutbacks, I am glad to write a few paragraphs deploring the proposed cuts in NSF funds for Science Education.

At a time when higher education in this country is fighting for its very existence, when colleges and universities are hard put financially to keep their doors open, when tuition rates are rising to ludicrous levels in desperate attempts by colleges to maintain high levels of quality in instruction, the proposed cutbacks can only bring further deterioration in the quality of preparation of the minds that will soon be leading the country. It is always the student who suffers when education falters financially. With science support withdrawn, students will have to be told: "We can't afford to educate you fully. We have no facilities to allow science students the ultimate training, which is independent research under the supervision of experienced teachers who are themselves vitally involved in basic research of their own. Since equipment is expensive, laboratory space is limited, and we cannot afford a large staff, you will have to educate yourself solely from texts. Practical research experience is financially impossible."

Students must usually earn money in the summer to pay tuition in the fall. They cannot afford the luxury of summer research with no supporting stipend -- research in which the student must also pay for any additional equipment and supplies, because there may no longer be a program like the NSF URP program to support his or her investigation. The college can scarcely afford to meet payrolls, let alone support student research. In fact, there may no longer be a mature investigator available to advise the promising student, because of cuts being made in college staffing. Such cuts increase the teaching loads of remaining staff to the degree that not only have they no time to supervise student research, they have no time to utilize their own hard-won (and often NSF supported) training in basic research. Even if they had the time, they could expect no support from a college in financial difficulty. The proposed cutbacks eliminate any hope the teacher/researcher might have had of Science Faculty Fellowship Aid.

Unless aid to science education increases, instead of being cut, eventually there will be only a few surviving educational institutions, only a few trained teachers engaged in original research and able to stimulate students to carry out original research, and only a few fortunate young people who have private funds sufficient to enable them to participate in the restricted training programs available. Hopefully, such an eventuality will be

avoided by continuing support of science education via such programs as NSF URP and Fellowship Aid to Science Faculty.

Thank you for inviting opinion on so important a matter.

Sincerely yours,

Dawson G. Grove
Eve L. MacDonald
Howard L. Holzman
John J. Groppe

Department of Biology

EIM:jwf

JUNIATA COLLEGE
Huntingdon, Pennsylvania 16652

JOHN N. STAUFFER, PRESIDENT

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

APR 19 1971

Dear Mr. Holcomb:

Let me tell you of my concern that every possible effort should be made to insure the maintenance, at the present level or higher, of certain National Science Foundation programs that are of invaluable benefit to our work in the sciences. The participation by undergraduate students in actual scientific research -- in a kind of partnership with their faculty mentors -- is one of the key aspects of our work in chemistry, biology, and other sciences. Juniata's unique success in the sciences is, in fact, based upon this approach to teaching. For this reason it seems imperative to us that the Undergraduate Research Participation program of NSF should be maintained.

Another program of very great importance is the Instructional Scientific Equipment Program. This program has been extremely valuable in that it gives partial support to our effort to provide modern scientific equipment in support of science instruction in general and also in support of student research participation as mentioned above.

We must also express concern that the Science Faculty Fellowships be maintained. It is self-evident that the rapid development of science requires faculty members to engage in constant renewal of their scientific knowledge and understanding. For this reason assistance is needed in helping our science faculty members to keep abreast of their fields.

Elimination or reduction of the programs mentioned would have a most adverse affect upon our programs in the teaching of science. Juniata's science programs have achieved remarkable success during the past half-century and we are most desirous of maintaining the high quality of our work, but support through NSF will be imperative in achieving this goal.

Cordially yours,

John N. Stauffer

April 14, 1971

i

FRANKLIN and MARSHALL COLLEGE
LANCASTER, PENNSYLVANIA

OFFICE of the PRESIDENT

APR 19 1971

April 14, 1971

Dear Mr. Holcomb:

President Keith Spalding is away from the office this week. In his absence and in view of the need to respond promptly, I shared your memorandum of April 7, 1971, with key faculty members in science departments at Franklin and Marshall College. They were, of course, greatly concerned by science education cutbacks in the proposed budget for the National Science Foundation.

Of particular concern was the elimination of the Undergraduate Research Program. Grants under this program have given students the opportunity to gain critical insights into science in ways not possible through conventional course assignments. The termination of the Institutional Grant Program was seen as equally unfortunate. Funds provided under this program were in large part assigned to the Committee on Grants at the College. By petition to the Committee, students and faculty could receive small grants for research projects for which funds might otherwise not have been available.

Those with whom I have spoken characterized the elimination of these programs as a grievous blow to undergraduate science education and expressed the hope that efforts would be made to restore the programs to the fullest extent possible.

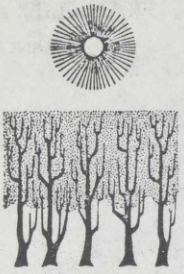
Sincerely,

John Synodinos

John A. Synodinos
Administrative Assistant
to the President

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

APR 19 1971



office of the president

cabrini college
king of prussia road
radnor, pennsylvania
19087

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R. Street N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

It was with dismay that I learned of the decision of the present Administration to permit reduction of the National Science Foundations's budget for the fiscal year 1972. Many of the areas of funding to be eliminated are of vital importance to the future welfare of our nation.

Sincerely,

Sr. Regina Casey, M.S.C.

Sr. Regina Casey, M.S.C.,
President

Sr. RC/pm

MILLERSVILLE STATE COLLEGE
MILLERSVILLE, PENNSYLVANIA 17551

April 15, 1971

APR 19 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

This letter is written to you to indicate our complete disenchantment with the proposed budget for the National Science Foundation for Fiscal 1972. I have been informed that this budget would eliminate many of the programs in science education which have been so valuable to the total academic community. Elimination and cutbacks of the many programs in science education will impose a severe hardship for many of the activities which were iniated by this college and are now in need of additional funding.

This college will be most appreciative of your assistance in counteracting the move to reduce the support for science education.

Sincerely,

William B. McIlwaine

William B. McIlwaine
Director, Grants and Awards

bp

MORAVIAN COLLEGE
1742 Founded 1807
BETHLEHEM, PENNSYLVANIA

OFFICE OF THE DEAN

April 14, 1971

Dr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R. Street, N. W.
Washington, D. C. 20009

APR 19 1971

Dear Dr. Holcomb:

The administration's proposed cuts in NSF funding for science education and institutional science support are indeed most distressing.

At Moravian College we have just completed and taken occupancy of a four million dollar science center providing excellent research facilities for students and faculty. The elimination of the Undergraduate Research Participation and Science Faculty Fellowships programs will most certainly make it difficult for us to make the most productive use of our research capabilities in science. It had also been our hope to apply for a grant under the College Science Improvement Program now that we have been successful in solving the critical problem of inadequate science facilities.

In short, we strongly support the efforts of AAC to seek by whatever means appropriate continued funding for these NSF programs which have proven so helpful to the cause of science education in our colleges and universities.

Sincerely yours,

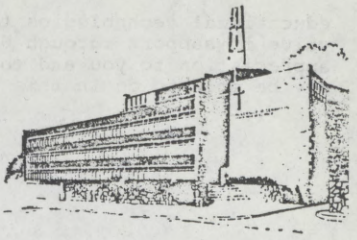
James J. Heller

James J. Heller
Dean of the College

Vice-President for Planning

University of Scranton *Scranton, Pennsylvania 18510*

(717) 347-3321 Ext. 283



April 16, 1971

Mr. Howard E. Holcomb,
Executive Associate for Federal Relations,
Association of American Colleges,
1818 R Street, N. W.,
Washington, D. C., 20009

Dear Mr. Holcomb:

In answer to your memorandum of April 7th regarding National Science Foundation Education cutbacks, I should like to express, as a member institution of the Association of American Colleges, our uneasiness over the future of the National Science Foundation under the new policy of de-emphasizing support for Science Education, Undergraduate Research Participation, Instructional Scientific Equipment, Teacher Institutes and Institutional Grants.

We at the University of Scranton, by participating in these almost since their beginnings, have been able to improve our offerings to students many-fold in the basic Science fields; without that assistance rendered by National Science Foundation Projects, the development of parts of our Science Program would still be lagging. This improvement over the last ten to twelve years has benefitted hundreds of students and, as these have graduated and gone into scientific careers, that benefit has been spread over large numbers of people. In this I speak from experience, having been a Science Department Chairman at the college level for some 28 years and having participated in several of the types of programs listed in your memorandum. In addition through Teacher Institutes the improvement in Science teaching has been extended over the area of the regional school districts. We would ask, therefore, that you, through the Association of American Colleges, do everything in your power to persuade legislators to continue authorization of these programs at the highest possible funding level so that this work may go on producing improvement in Science teaching. It is in these days of changing curricula and

educational technologies that we will continue to find major value in support through NSF Programs. I would express our appreciation to you and to the Association for any work you may be able to do in this area.

Very sincerely yours,

Leonard N. Wolf

Leonard N. Wolf, Ph. D.,
VICE PRESIDENT FOR PLANNING &
GOVERNMENT RELATIONS

LNW/ahc

APR 19 1971

LEHIGH UNIVERSITY
Bethlehem, Pennsylvania 18015
Telephone: (215) 867-5071, Ext. 221 or 231

A. C. ZETTLEMOYER
Provost and Vice President

April 16, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Dr. Holcomb:

On behalf of our president, Dr. W. Deming Lewis, I would like to respond to your letter of April 7 regarding cutbacks in the NSF Education Budget.

Many programs are not only being cut but actually being eliminated. The elimination of a program such as the Instructional Scientific Equipment Program is nothing short of a disaster for institutions trying to upgrade their facilities for undergraduate instruction. Similarly, reduced funding for the Institutional Grants Program places still more of a burden on institutions that have already received cutbacks or cancelled research projects but have commitments to graduate students in the middle of their degree programs. Finally, many of the cuts in other programs will have the effect of reducing the ability of institutions, particularly private ones, to meet the needs of society or adequately trained teachers and scientists.

Sincerely,

Eric V. Ottervik

Eric V. Ottervik
Vice Provost

EVO/jcm

Westminster College
New Wilmington, Pa. 16142

APR 21 1971

Dean of the College

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R. Street, N.W.
Washington, D.C. 20009

For transmittal to House of Representatives, Subcommittee on Science, Research and Development

Dear Mr. Holcomb:

The National Science Foundation has long had a well-balanced program, starting with the secondary level, designed to strengthen science education. Figures given for the budget now under consideration make it appear that there will be some unfortunate gaps in the program next year.

All of the components of science education must receive continuous attention to keep a strong whole: the students, the teachers in training, the teachers in service, curricula, teaching materials, facilities and equipment. All of these components exist, in some form, at three different levels: secondary, college, and post-graduate. To allow any component at any level to lag will hurt the entire program.

For over a decade, I have admired the National Science Foundation education programs as some of the most imaginative and effective programs ever to emerge from the federal government.

Very truly yours,

Phillip A. Lewis
Dean

PAL:nmb
cc: Congressman Clark

WILKES COLLEGE
WILKES-BARRE
PENNSYLVANIA 18703

April 17, 1971

Mr. Howard E. Holcomb
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

APR 22 1971

Dear Mr. Holcomb:

I would like to add to the correspondence concerning the proposed administration budget for the National Science Foundation for fiscal '72.

As a scientist familiar with the work of the Foundation and its value to me as a faculty member, director of summer institutes, director of undergraduate research participation, and administrator of an institution that presently is utilizing a College Science Improvement Program and one that has also enjoyed participation in the Instructional Scientific Equipment Program, I can say without reservation that it would be a tragic loss to our nation and the cause of science if this budget remains unchanged.

I could write pages and pages on experiences in which students have been significantly influenced in their life patterns and in their competence because of the investments made by the National Science Foundation in their behalf. These are frequently intangibles and difficult to measure, yet as a faculty member intimately related to these students over the period from 1955 to 1969, I think I am in a unique position to have seen the impact of these programs. I heartily endorse all efforts to call these matters to the attention of our legislators so that support for science education is not reduced by the 25 per cent proposed, nor the institutional support reduced by the 66 per cent proposed.

A copy of this letter is being sent to our Congressman, Daniel J. Flood who, I know, has a deep and continuing interest in the educational opportunities offered the young people of this area.

Sincerely yours,

Francis J. Michelini

Francis J. Michelini
President

FJM:mc

cc: The Honorable Daniel J. Flood

West Chester State College

West Chester, Pennsylvania 19380

School of Sciences and Mathematics
Office of the Dean

215—436—2540

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

APR 21 1971

Dear Mr. Holcomb:

President Rossey referred to me your information about NSF science education cutbacks. I will endeavor to share my unorthodox views of the matter.

A survey of the present employment situation suggest that efforts to educate large numbers of scientists have been overwelmingly successful to the point that large numbers of highly educated scientific personnel can no longer find employment. It would seem, therefore, that the federal efforts to encourage young people to enter the scientific disciplines accomplished their purpose and need not be continued. Consequently, cutbacks in programs designed to increase the number of scientists seem quite justified.

On the other hand, our culture and economy continues to be technologically oriented. For individuals to find a means of living successfully in our society continues to be an arduous task. That each person have some understanding of the natural part of our environment seems essential. Consequently, I favor support for programs that contribute to the public understanding of science. A great need that is not met by NSF funding in my estimation, is in the preparation of elementary school teachers and in the development of elementary school science programs. I would like to see a greater emphasis upon in-service institutes and workshops for elementary school teachers. For the most part, the departments of sciences are not equipped to do this job because what is needed is direct involvement of teachers at a fundamental but unsophisticated level of study.

By the way, within the last month I was priviledged to confer jointly with two members of congress and three representatives of the National Science Foundation about this problem. I was pleased to find that the legislators showed interest in the public understanding of science but was disappointed by the apparent orientation of the National Science Foundation in other directions.

Sincerely,

Russell K. Rickert

Russell K. Rickert, Dean
School of Sciences and Mathematics

RKR/sjb
cc President Rossey

Gettysburg College
GETTYSBURG, PENNSYLVANIA 17325

OFFICE OF THE PRESIDENT
PENNSYLVANIA HALL

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

APR 19 1971

Dear Howard:

As a small, private, liberal arts, church-related institution, Gettysburg College has never been close to the head of the list of those receiving support from the National Science Foundation. On the other hand, we have received material assistance over the years, and the strength of our present science program reflects that support. Further, our current projections for the future inevitably posit substantial support from outside agencies, including the National Science Foundation.

May I urge you and your colleagues to take those steps necessary to call to the attention of the Administration the dire effect of the proposed cutbacks. If we as an institution stood to lose nothing, I would still take this posture for the sake of science education in general.

Regards.

Sincerely,

C. A. Hanson
President

CAH:med

62-912 O - 71 - 37

APR 16 1971

BUCKNELL UNIVERSITY
Lewisburg, Pennsylvania 17837

OFFICE OF THE PROVOST

April 13, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Dr. Holcomb:

Some of the programs which the budget for the National Science Foundation for the fiscal year 1972 reduces or eliminates are extremely disturbing to those of us associated with the sciences at Bucknell University. The proposed Administration budget eliminates programs which have been very, very valuable in the motivation of both students and faculty toward excellence in science education. For example, Bucknell University has had very valuable experience with the Undergraduate Research Participation program. It has enabled a small number of highly motivated students to work with faculty for ten weeks each summer, work which often is continued without external funds during the following academic year. The elimination of this program takes a piece of the heart out of independent study and honors work in many undergraduate colleges. The elimination of Science Faculty Fellowships seems one more step to insure that opportunities for a faculty member to expand his horizons are to be sharply limited. These have served as a means for able young men to leave their campus for a year and immerse themselves completely in research, then, to return to a campus and to teaching with a renewed zest for their discipline, a zest which is not lost on their students. The termination of the Instructional Scientific Equipment Program also will have drastic effects on undergraduate departments of science since the very difficult financial plight of both public and private institutions will make it impossible to continue to equip laboratories with equipment of the quality which is deserved by the able young people who enroll in science programs in the country.

In a very real sense, one has the impression that deliberate efforts have been made to reduce the significance of undergraduate science programs in the United States at the very time when it is evident that new technology will be needed to solve the problems which have been created by technology and at a time when the critical issues of the country demand

a more rigorous and systematic approach to their solution than has been the case in the past. It is impossible to believe that the scientific method no longer is of value as an intellectual tool. The Administration's budget would appear to be a copout to anti-intellectualism or, simply, a failure to perceive the significance of the accomplishments of these programs during the past dozen years. I do hope that you will call attention to this matter in the Congress at every opportunity.

Sincerely yours,

Wendell I. Smith
Provost

WIS:gm

SAINT FRANCIS COLLEGE
LORETTO, PENNSYLVANIA 15940

Dean of the College

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

APR 16 1971

Dear Mr. Holcomb:

It is highly regrettable that the financial support for science education has been so drastically cut. Inability to obtain aid for a number of our programs included in your list to be affected will substantially influence our academic growth. One project especially may be endangered: we are just now launching an interdisciplinary environmental studies program involving not only the sciences but sociology, political science, economics, and industrial relations. This area is exceptionally well suited both with respect to natural resources and the actual sources of pollution--coal mines, steel mills, and towns that have no provision for sewage treatment. Private colleges such as ours could contribute much toward the educational basis for eventual solution of this national problem.

Sincerely,

E. J. Gergely
Dean of the College

EJG:ak

LEBANON VALLEY COLLEGE
ANNVILLE, PENNSYLVANIA 17003

APR 16 1971

OFFICE OF THE PRESIDENT

April 13, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

To provide instructional scientific equipment and instructional facilities for undergraduate education seems to be one of the most basic and uncomplicated ways for the Federal Government to assist higher education. Having learned of the elimination of these kinds of programs is distressing to say the least.

As our society cries for better basic educational programs, it indeed appears contradictory to have one of the fundamental assistances for such progress denied those of us who work in this field and who try to provide our society with capable people.

Thanks to you for your efforts in trying to meet our needs. I hope that you can get support and assistance from those who are able to act directly upon the problem and the programs.

Sincerely yours,

Frederick P. Sample

Frederick P. Sample
President

FPS:em

villanova university
VILLANOVA, PENNSYLVANIA 19085

APR 16 1971

Associate Dean for Sciences
College of Liberal Arts and Sciences

April 15, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

It was with a great feeling of melancholy that most of the science faculty and I received the news of the reduction in the support of science education by the National Science Foundation.

I personally found the elimination of the Undergraduate Research Participation program especially disheartening. Considering the amount of funds expended and the results produced with respect to human development, I feel that the program gave maximum return of any federally funded program with which I have been familiar.

Sincerely,

James J. Markham

James J. Markham, Ph. D.
Associate Dean for Sciences
College of Liberal Arts and Sciences

JJM:FA

APR 16 1971

LAFAYETTE COLLEGE
EASTON, PENNSYLVANIA 18042

OFFICE OF THE PRESIDENT

April 15, 1971

Dear Mr. Holcomb:

I am distressed to learn that there is a reduction in funds for the support of science education from $100 million to $77 million in the National Science Foundation budget request for fiscal year 1972.

During the past eleven years five departments at Lafayette College have participated in the N.S.F. Undergraduate Research Program receiving funding in excess of $95,000. In chemistry alone 28 of the 54 undergraduate participants during this period have subsequently attended graduate or professional schools, of these 16 are known to have received PhD's and 2 M.D. degrees. This program has been an integral part of the College honors program and has been instrumental in maintaining undergraduate teaching at a superior level.

Between 1964 and 1970 Lafayette received more than $114,000 toward two programs, the instructional scientific program and the institutional grant program. In each instance funds were used to improve laboratory facilities in physics, chemistry, geology and psychology and to assist faculty in the science areas by supporting summer research fellowships.

Furthermore, it was our intention to apply for support through the College Science Improvement Program in order to strengthen science instruction at the College. If funds for this program are reduced it may not be possible for Lafayette, with limited resources available through tuition and endowment income, to make all the necessary changes important for improved science instruction.

Reduction or elimination of the programs mentioned above would have a serious adverse impact on the programs of instruction in science at Lafayette College. Every effort should be made to fund these programs at previous levels so that the quality of science education is not impaired.

Sincerely yours,

K. Roald Bergethon

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

APR 16 1971

OFFICE OF
GOVERNMENT RELATIONS

URSINUS COLLEGE
COLLEGEVILLE · PENNSYLVANIA · 19426

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

Your bulletin of April 7 regarding the National Science Foundation cutbacks has been received. In a day when colleges are being urged to involve students in the educational process that is more closely related to the problems of modern life, I find it quite contradictory that programs such as the Undergraduate Research Participation should be eliminated. Likewise, the other programs are certainly devastating losses to colleges and universities throughout the country.

We, here at Ursinus, have very much benefitted from the instructional scientific equipment program and had hoped to benefit a great deal from participation in a college science improvement program. Therefore, I do find it quite disturbing, although not surprising, that these programs are being reduced or eliminated.

I sincerely hope that the Chairman of the House Committee on Science, Research and Development may reconsider funding for these areas rather than their reduction or elimination as proposed by the Administration budget.

Thank you for bringing this to our attention so promptly.

Sincerely yours,

W. Arthur Switzer

W. Arthur Switzer
President's Assistant for
Government Relations

WAS/rmd

ALBRIGHT COLLEGE
READING, PA. 19604

OFFICE OF THE PRESIDENT

April 12, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

APR 14 197

Dear Mr. Holcomb:

As our representative for Federal Relations I want you to know how we view with alarm the drastic cutback in the budget for the National Science Foundation fiscal year, 1972 in reducing support for science education and institutional support for science.

As a liberal arts college with a strong background for sciences, we have benefit by the numerous programs of the National Science Foundation and feel that quality education will suffer if special projects and institutional grants are not continued.

The undergraduate research participation and instructional scientific equipment program have been very helpful to the small liberal arts college. We urge the Congress to reinstate the amounts in the National Science Foundation Budget for these various programs. The future of scientific education and research is at stake if these programs are not continued.

Sincerely yours,

Arthur L. Schultz
President

S/h

SAINT JOSEPH'S COLLEGE
PHILADELPHIA, PENNSYLVANIA 19131

BIOLOGY DEPARTMENT

April 12, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

APR 14 1971

Dear Dr. Holcomb:

The continued distressing news regarding the cutbacks for science education under NSF auspices have now reached alarming proportions. As an intelligent human being, I am coming to bitterly resent these cutbacks in a necessary area at the same time as Administration spokesmen engage in Madison Avenue double talk about the support of science by this Administration.

I came to Saint Joseph's five years ago to find a Biology Department badly in need of updating along many fronts, and I am happy to say that due to various grants under NSF and other auspices, it has been possible for me to reform and reshape the Department. The small liberal arts college, such as Saint Joseph's, is traditionally the bastion and jewel of American education. It also is the institution most likely to suffer in its scientific offerings because of lack of funds for expensive but necessary equipment, and lack of opportunity for its faculty members to update and reorient their teaching objectives. The NSF Summer Institutes have made it possible for more than half of our staff to update and bring the latest information to the students. My own participation in two NSF programs has made possible the introduction of Mathematical Biology here at Saint Joseph's College. The College Science Improvement Program (COSIP) has revitalized all three of our departments, and through the introduction of closed circuit television in the Biology Department has given a fresh slant on the teaching of many of the older Biology sub-disciplines. The Institutional Grants of the NSF have made possible the support of student research beyond the budget capabilities of our Department. Other benefits have been the more frequent

attendance at scientific meetings and conventions of the faculty. A small institution, no matter how wisely it channels its resources, can, in this expanding age of science, quickly find itself obsolete, unless genuine support is forthcoming. What is needed is a farsighted, long range NSF program which supports not only basic research in the sciences, a most important matter, but also serves as a constant source of support for the improvement of the transmission of scientific information, both to scientists and non-scientists alike. I regard the Administration's proposed budget for Fiscal '72 as short sighted, self defeating and detrimental to the continued growth of the United States as a major force in world opinion. What the Administration must realize is that what is needed is more quiet, solid support for the transmission of scientific information and less gimmickry in the allocation of funds. Cancer will never be cured by money. The problem will only be solved by the application of many diligent minds analyzing a complex problem and synthesizing a solution.

Sincerely yours,

Louis S. Marks

Louis S. Marks, Ph.D.
Professor and Chairman
Department of Biology

LSM:m

SWARTHMORE COLLEGE
SWARTHMORE, PENNSYLVANIA 19081

April 12, 1971

APR 14 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street
Washington, D. C. 20009

Dear Mr. Holcomb:

I thought you may be interested in a carbon of a letter that the President of Swarthmore wrote to the Director of the National Science Foundation in regard to the proposed cutback in Science Faculty Fellowships. From our viewpoint we felt that the Science Faculty Fellowships was the most critical program being curtailed.

Incidentally, I am a bit confused about your statement on inadequate or reduced funding for the College Science Improvement Program. My impression is that the President's budget asks for $9 million for COSIP compared to $4 million for the present year and $6.8 million last year. It is true that the other programs are being cut back, and I also understand that next year may be the last COSIP year. At the present, however, the short term prospects for COSIP look good.

Looking forward to meeting you soon.

Cordially,

Richard M. Schrader

Richard M. Schrader

RMS/jfl

SWARTHMORE COLLEGE
SWARTHMORE, PENNSYLVANIA 19081

OFFICE OF THE PRESIDENT

(215) KI 4-7900

16 February 1971

Dear Dr. McElroy:

Your letter about President Nixon's proposed budget for the National Science Foundation was very heartening. It reflects the fact that science research and development are important priorities in the structure of our national life.

I did, however, want to express my concern about a program which has had measurable and tangible benefits to us at a small college. That is the Science Faculty Fellowship program. Faculty have eagerly sought these fellowships which provided them the release from teaching duties while at the same time providing incentive to carry out research projects. Because of the generous terms of the fellowship, faculty have been encouraged to take a year to carry out their project rather than having only a half-year leave at full salary which is all we can provide. While the results of the research project may have been varied, the effects on teaching have been clear cut: the faculty member returns from leave a more dynamic and knowledgeable teacher, better qualified to persuade young people to enter into careers in science.

Thus, I do hope that this program of Science Faculty Fellowship will be continued at least at the levels of previous years. It has had a beneficial effect on the teaching of science at a small college.

Sincerely,

Robert D. Cross,
President

Dr. William D. McElroy
Director
National Science Foundation
Washington, D.C. 20550

CHATHAM COLLEGE

WOODLAND ROAD
PITTSBURGH, PENNSYLVANIA 15232

April 12, 1971

APR 14 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

I am deeply concerned about the proposed cuts in the National Science Foundation budget areas for science education and institutional support for science.

Colleges and universities across the Nation are struggling valiantly with budget problems brought on, in part, by spiralling inflationary trends. To reduce these kinds of support at this time seems both unwise and unjust. The benefits to both institutions and individual students derived from these programs in the past should supply ample evidence for continued support.

I sincerely hope that you can be instrumental in initiating a reconsideration of these cutbacks and you have my wholehearted support.

Sincerely,

NWC/L

Norman W. Chmura
Provost

WAYNESBURG COLLEGE
WAYNESBURG, PENNSYLVANIA 15370

April 13, 1971

APR 15 1971

Mr. Howard E. Holcomb
Executive Associate for Federal
Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

This letter is in reply to your inquiry of April 7 concerning how the reduction in National Science Foundation funding for Fiscal '72 may affect the science program at Waynesburg College.

A grant proposal under the College Science Improvement Program is now being reviewed by the National Science Foundation. We assume that more adequate funding in this program would give us a better chance of receiving the grant. However we are still hopeful that the foundation will approve our proposal. One serious loss in recent years has been the elimination of the Instructional Scientific Equipment Program. When this program was operative we did receive several very fine grants which markedly improved science instruction at the college. We deeply regret the elimination of this program.

We will appreciate any influence you can bring to bear on those in Washington who might be able to increase National Science Foundation funding for science education.

Sincerely,

Bennett M. Rich
President

BMR:ebf

APR 19 1971

PROVIDENCE COLLEGE
PROVIDENCE, RHODE ISLAND 02918

Coordinator of Research

April 16, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Dr. Holcomb:

The changes in the National Science Foundation's "Program Emphasis" will have a crippling, if not devastating, effect on the scientific activities (including, of course, those of the social sciences) of most American colleges because the proposed changes strike at the heart of National Science Foundation support for undergraduate and predominantly undergraduate institutions.

To be more specific, let us look at a typical situation at a predominantly undergraduate institution, i.e., at Providence College. We have been successful in obtaining grants through the following National Science Foundation programs:

Undergraduate Research Participation
Instructional Scientific Equipment
Institutional (Formula) Grants (eligible almost exclusively via URP grants)
College Science Improvement
Graduate Traineeships (2-3 annually for the Physical Sciences)

Further, the National Science Foundation has encouraged us to use the Science Faculty Fellowship program, with its new summer provisions, to upgrade our faculty (especially in the social sciences).

If one examines the '72 National Science Foundation budget, it is abundantly clear that our sources of National Science Foundation funding have been all but eliminated. It is true that there are phase-out funds for the Graduate Traineeship program but the emphasis is on phase-out. The College Science Improvement Program is to be funded but, as I hear it from sources close to the National Science Foundation, very possibly for the last year.

What are our chances in the 'favored' areas, instrumentation and research? To date all our attempts to obtain funding from these programs have been for naught. We just cannot compete with the big universities.

Is ours not the typical situation?

This change in emphasis by the National Science Foundation is intensifying an already critical situation in the undergraduate and predominantly undergraduate institutions. Either the National Science Foundation must take cognizance of our needs in its planning or alternative funding by another federal agency has to be made available if disaster is to be averted.

Sincerely yours,

Theodore T. Galkowski

Theodore T. Galkowski
Coordinator of Research

TTG:EFD

62-912 O - 71 - 38

APR 19 1971

South Carolina College Council, Incorporated

1110 Daniel Building
Greenville
South Carolina 29602
803 / 233-6894

April 15, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

The sixteen member colleges of the South Carolina College Council oppose strongly the proposed reduction in undergraduate science education proposed in the NSF budget for 1971-72.

The obvious necessity for strong preparatory work at the undergraduate level demands federal attention at a time when institutional budgets at the independent colleges are under tremendous pressure.

Sincerely yours,

J. Lacy McLean

J. Lacy McLean
Executive Vice President

JLM/er

FURMAN UNIVERSITY
FOUNDED 1826
GREENVILLE, SOUTH CAROLINA
29613

OFFICE OF THE PRESIDENT

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, Northwest
Washington, D. C. 20009

APR 21 1971

Dear Mr. Holcomb:

I have learned with dismay that the Administration's proposed budget for the National Science Foundation would seriously curtail or eliminate the very parts of the program which have been most beneficial to undergraduate colleges. Surely members of the Congress understand that undergraduate colleges provide the graduate students who eventually assume leadership in teaching and research in the sciences. Our own Nobel Prize winner, Dr. Charles Townes, Furman 1934, is a case in point.

Furman University and colleges like it have benefited tremendously from the Student Science Training Program. We have seen young would-be scientists begin to bloom, then flower into excellent material for the graduate schools--and this has been because of the opportunities provided for them actually to participate in original research.

Furthermore, I know that a great many of the smaller colleges have been tremendously benefited by provision of funds for instructional scientific equipment. It is very difficult for the colleges to keep up with rapid inflation and the cost of increasingly complex scientific equipment. NSF did well to recognize this need, and I only hope that the present Congress will not allow this worthwhile program to die.

Furman University has benefited greatly from the grant for improvement of our science program. We are in the second year of this grant and have been able to increase our own support of the sciences to go along with the Federal funds. It is our hope that this type of grant, perhaps at a reduced level, might be available for a succeeding three-year period.

I hope I have said enough to indicate the seriousness of this threat to the budget of the National Science Foundation. Please do all you can to help us.

Cordially,

Gordon W. Blackwell

Gordon W. Blackwell

GWB:jh

cc: Senator Strom Thurmond
Senator Ernest F. Hollings
Congressman James R. Mann

THE CITADEL
THE MILITARY COLLEGE OF SOUTH CAROLINA
CHARLESTON, S. C. 29409

OFFICE OF THE
VICE PRESIDENT
FOR ACADEMIC AFFAIRS

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

The proposed substantial reduction in budgetary support for Fiscal '72 relative to science education and institutional support for science is a most short-sighted expediency which could have direlconsequences for the future. The elimination of Undergraduate Research Participation, Science Faculty Fellowships, the Student Science Training Program, and the Instructional Scientific Equipment Program could seriously reduce interest in and the effectiveness of undergraduate science instruction and bring about in a few years a shortage in scientific personnel similar to that experienced in the 1950's and early 1960's. Curtailment of programs to revitalize college science curricula and teachers will have a decidedly adverse effect on the smaller colleges where the most assistance is needed. Please use all influence possible to maintain National Science Foundation science education budgets at effective levels.

Sincerely yours,

Wallace E. Anderson

Wallace E. Anderson
Vice President for Academic Affairs

WEA/hm

HURON COLLEGE
HURON, SOUTH DAKOTA 57350

"Serving Since 1883"
OFFICE OF PRESIDENT
TELEPHONE 605 / 352-8721

April 23, 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street N.W.
Washington, D. C. 20009

APR 26 1971

Dear Mr. Holcomb:

I would like to write a short letter to you stating that we in the Midwest are deeply concerned with the changes in the educational funding as proposed by the Administration and the Congress. We are concerned, first of all, that such cuts should have been made but we would further say that we are concerned that the smaller colleges are always the ones that are hurt the worst by such cuts. This, I suppose, would be argued by such giants as Harvard and Yale but the fact remains that millions of dollars of their budgets are substantiated by the Government but very few, if any, dollars find their way to the private colleges.

I would urge you to work for the restoration of cuts that have been made in budgets such as the National Science Foundation and push for additional funding for private institutions.

Cordially,

Richard H. Timmins

RHT:p

Richard H. Timmins
President

APR 19 1971

Southwestern At Memphis

A college of liberal arts and sciences, founded in 1848

ASSOCIATE DEAN OF THE COLLEGE

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

I am writing in response to your memorandum of April 7, 1971, regarding NSF Science Education cutbacks.

Throughout the last decade Southwestern At Memphis has profited from a number of grants from NSF: several undergraduate research participation grants (including one for the summer of 1971), a science-faculty fellowship, several instructional scientific equipment program grants, several teacher institutes, and quite a few institutional grants. The largest effect on the college was from a College Science Improvement Program Grant. These grants have been absolutely vital to the increase in quality of the science programs at Southwestern.

While it cannot be cogently argued that the nation needs to produce as many Ph.D.'s in science as are currently being produced, it is abundantly evident that (a) there should not be a drastic cutback in science education since such a cutback will inevitably result in future manpower shortage and (b) there must be no decrease in the quality of science education if the United States is to maintain world preeminence in the sciences. Science education programs are vital not only to Southwestern but to all other colleges which are striving to attain or maintain programs of excellence in the sciences.

It must also be remembered that there is no projected decrease in the need of mathematicians and pre-medical students. These two categories of students are, of course, affected just as negatively by cutbacks in science education programs as are students in chemistry and physics. I believe that Congress and the administration should be extremely reluctant to delete or seriously cut back on the following very successful programs: Undergraduate Research Participation, Science-Faculty Fellowships, Instructional Scientific Equipment Program, College Science Improvement, Teacher Institutes, and Institutional Grants. I heartily support your efforts to bring the seriousness of this matter to the attention of the House Sub-Committee on Science Research and Development.

Sincerely,

Marshall Phillip Jones

Marshall Phillip Jones

MPJ/mw

KING COLLEGE
BRISTOL, TENNESSEE 37620

APR 30 1971

April 26, 1971

Dr. Howard E. Holcomb
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Dr. Holcomb:

I was discouraged but not surprised to learn that the National Science Foundation is planning to effect economies by cutting off and reducing funds to undergraduate science education. Such programs as Undergraduate Research Participation, The Instructional Scientific Equipment Programs and COSIP are necessary if colleges are to continue to supply scientific and technical personnel. It would appear that a deliberate decision has been made to curtail or dry up this source.

I assume that scientists in strictly undergraduate institutions can anticipate very lean times in the next few years. Those of us who are dedicated to undergraduate education protest the decision, and question the advisability of the priorities which have been set.

I think I state the case properly in saying that deliberate and conscious priorities have been set because a little more than a year ago Dr. McElroy, Director of the National Science Foundation, addressing a meeting of NSF Project Directors in Washington, stated that undergraduate science deserves support. In a question session afterwards he was asked how that statement could be understood when scientific equipment programs were being cut. He answered that priorities had to be set. It is unfortunate for scientists in undergraduate institutions that such priorities were adopted.

Sincerely,

Edward W. Burke

Edward W. Burke, Jr.
Professor of Physics

EWB:kh

APR 22 1971

THE UNIVERSITY OF TENNESSEE AT CHATTANOOGA

CHATTANOOGA, TENNESSEE 37403

DEPARTMENT OF BIOLOGY

April 19, 1971

Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American
Colleges
1818 R Street N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

I have been asked to reply to your letter of April 7, relative to our reaction to the proposed NSF budget allocations.

The proposed administrative budget curtailment of the National Science Foundation poses serious problems for undergraduate oriented institutions in the United States. The primary source of funds for improvement of undergraduate instruction in the sciences has come through the Education Division of the National Science Foundation, particularly through the Pre-college and College Education in the Sciences Divisions. Elimination of the programs such as Undergraduate Research Participation, Instructional Scientific Equipment Program, College Science Improvement Programs, and related programs will eliminate the primary financial resources for the undergraduate science departments which in the past have allowed for significant improvements and enrichment for undergraduate students.

While I do not have an exact percentage figure, I strongly suspect that 70 percent or more of the total colleges and universities affected by the National Science Foundation have been affected by these programs as contrasted with the research division of the National Science Foundation which has inter-action primarily with those offering graduate work. This also means a considerable degree of isolation of NSF from these institutions - further removing NSF from a knowledge of undergraduate education and research for the majority of students in this country.

One of the chief benefits of this continual infusion of funds from the National Science Foundation at the undergraduate level has been the impact on introductory courses - including those taken by non-science majors to fulfill general education requirements; an improved quality of these has done much to improve the public understanding of science. The loss of these funds coupled with expected increase

enrollments in the future will force a retrenchment in these heavily populated courses with the possible result of even further deterioration in the minds of the voting public as to the suitability and significance of science and technology in their lives.

Sincerely,

R. E. Garth

R. E. Garth, Head

REG:pc

cc:Dr. Floyd Brownley

MEMPHIS STATE UNIVERSITY
Division of Research and Services
Memphis, Tennessee 38111

Office of Research Administration

April 13, 1971

APR 14 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

The following are my comments regarding National Science Foundation Science Education cutbacks. Informal conferences with superintendents of the counties of West Tennessee indicate a small percentage of qualified teachers are teaching the science courses and that great difficulty has been experienced in recruiting qualified science teachers for Junior and Senior high schools. It is expected that this situation exists in the majority of the school systems throughout the nation.

We need to continue and increase our science teacher related program. Consequently, continued and increased support is urgently needed in those areas, especially the Student Science Training Program, the Instructional Scientific Equipment Program, the College Science Improvement Program and the Teacher Institutes.

It is strongly recommended that institutional support for science be continued, and definitely not reduced.

Sincerely yours,

Clark A. Neal

Clark A. Neal
Director of Research Administration

CAN/sle

ST. MARY'S UNIVERSITY
2700 CINCINNATI AVENUE
SAN ANTONIO, TEXAS - 78228

April 20, 1971

Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

APR 22 1971

Dear Mr. Holcomb:

I just received a copy of the notice you sent our Grants Office concerning NSF Science Education Cutbacks. I feel strongly that if programs such as Instructional Scientific Equipment Program, Undergraduate Research Participation, Science Faculty Fellowships, and Teacher Institutes are completely eliminated that science education as a whole is going to suffer in the future. In the past decade our department has been able to update labs and acquire many fine pieces of instructional laboratory and lecture demonstration equipment with the help of ISEP. I personally have benefited from the Science Faculty Fellowship and Summer Teacher Institutes.

The latter two programs help to keep science faculty members at small colleges updated and abreast of new methods and developments in various fields of science. The NSF totally or partially sponsored Teacher Institutes that I have attended were well administered by host institutions. (I commend especially the Special Training Division of Oak Ridge Associated Universities for the type and number of programs that they administer.) Complete curtailment of these and the other programs you listed on your April 7 notice may very well contribute significantly to college and pre-college science programs deteriorating back to "pre-Suputnik" days.

I urge you to contact the chairman of the House Subcommittee on Science, Research, and Development before his committee record closes later this month. Do whatever you can to prevent the elimination or serious reduction of these successful NSF programs.

I am sending copies of this letter to our Texas senators, Senators Bentsen and Tower, and Texas Representatives O.C. Fisher and H.B. Gonzalez.

Sincerely yours,

Homer D Fetzer

Homer D. Fetzer, Ph.D.
Department of Physics

ck

Huston-Tillotson College
A UNITED METHODIST-UNITED CHURCH OF CHRIST AFFILIATED COLLEGE
AUSTIN, TEXAS 78702

Chemistry DEPARTMENT

April 16, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R. Street, N.W.
Washington, D. C. 20009

Dear Dr. Holcomb:

Thank you for the statement on the proposed administration budget for the National Science Foundation for Fiscal '72 which contains provisions for drastic reductions in certain areas of its program.

A statement of my reaction to this matter is attached.

Thank you for this alert.

Sincerely yours,

J. H. Morton, Coordinator
Department of Chemistry

JHM/ow

cc: Dr. John T. King
President

April 16, 1971

TO WHOM IT MAY CONCERN

I and my colleagues view with great alarm the drastic reductions proposed in the 1972 Administration budget for the National Science Foundation in the areas of science education and institutional support. Such reductions will necessitate the elimination of programs vital to the health and ongoing of science in the country.

It is generally recognized that major scientific developments of the fifties and sixties, have taken place in the period in which the National Science Foundation has been active in the promotion and development of science education. After ten years of participation in the National Science Foundation science education programs as a director and instructor of teacher-institute programs, I can vouch for the great need and value of the services being rendered to the youth and adults in this field. The nation is stronger in its scientific resources as a result of this national effort. To eliminate this impetus, represents an economical attitude which the nation can ill afford.

We strongly urge the members of our Congress to restore to the National Science Foundation budget for '72 the funds needed to continue its science education and institutional support programs at least at the present level of operation.

J. H. Morton, Coordinator
Department of Chemistry

APR 19 1971

UTAH STATE UNIVERSITY · LOGAN, UTAH 84321
DIVISION OF RESEARCH

OFFICE OF
THE VICE PRESIDENT
FOR RESEARCH

April 13, 1971

Mr. Howard Holcomb
Association of American Colleges
1818 R Street N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

Graduate programs in Science are being reduced at a frightening rate. The consequences could have a prolonged depressing effect on the National economy and on the capability of the United States for finding solutions to the growing technical problems confronting the nation.

The alternatives offered in work-study and student loans fail to provide incentives for the most capable students who have the potential for bringing about scientific break throughs in knowledge.

The National policy is resulting in the destruction of the proven programs for attracting and developing quality students. Substituting for these activities, programs based on need will likely have the net effect of mass mediocrity.

While assistance to needy students is helpful and justified, we should also maintain programs that will seek out the distinctively capable students and provide incentives for them to continue advanced studies in fields that are important to the welfare of society.

Sincerely,

D. Wynne Thorne
Vice President for Research

em

Westminster College

SALT LAKE CITY, UTAH 84105

APR 16 1971

14 April 1971

Dr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Dr. Holcomb,

I am very upset and disappointed at the Administration's proposed reduction in National Science Foundation support for science education and for institutional support. Such a reduction will severely hamper or eliminate a number of successful and useful programs. As a former evaluation panelist for the National Science Foundation in the Undergraduate Research Participation and the Instructional Scientific Equipment programs, I was very impressed in reading over many of the proposals, especially in regard to their educational value and stimulation. Several of my students have participated in URP and I know the impact these programs have made upon them. The elimination or reduction of some of the NSF programs will place a particular burden upon the small colleges--many of which have not been successful in obtaining NSF funding. It will mean widening the gap existing between the "haves" and the "have-nots". I urge the "powers that be" to at least maintain the current level of spending in science education.

Sincerely yours,

Barry G. Quinn

Dr. Barry G. Quinn
Chairman, Division of Natural
Science and Mathematics

MIDDLEBURY COLLEGE
MIDDLEBURY, VERMONT
05753

APR 21 1971

OFFICE OF THE ACADEMIC VICE PRESIDENT

April 19, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

It is with mounting concern for the future quality of undergraduate education in science that I write you regarding the proposed National Science Foundation budget for 1972. As I understand it, a total budget increase of more than 20% is proposed but an even larger percentage reduction for support of science education is being recommended. If this recommendation is actually implemented, it seems inescapable that there will be deep-seated effects in the quality of science education even in privately supported colleges. Unfortunately, this recommendation comes at a moment when many of our young men and women, as well as others, are seriously questioning the role of science in our civilization. Is not this a time when we should be providing the very highest order of intellectual endeavor in science for our youth as they frame values and prepare to make their contribution to the quality of life?

Seven years ago Middlebury College made the major policy decision to embark upon a massive science development program. Even with substantial allocation of internal resources to the program it was necessary to call upon outside assistance from foundations and the federal government. A number of National Science Foundation programs--URP, SFF, ISEP, COSIP and Institutional grants--have made important contributions to this continuing program. With inflationary and other financial pressures which face all institutions of higher education, it will be impossible for Middlebury to fund these valuable NSF programs if federal support is reduced or eliminated.

Indeed we had hoped that our continued expenditure of internal resources in science development would qualify us

62-912 O - 71 - 39

for increased support by the National Science Foundation in 1972. For example, students in one of our science departments (Chemistry) have had an exhilarating experience working in partnership with faculty during several summers in the NSF-supported Undergraduate Research Participation program. Just this year another department (Biology) reached the stage of internal development which we hoped would qualify it for similar support. Even though the National Science Foundation referees felt the proposal was worthy, it could not be funded because of the proposed termination of the entire program after this fiscal year.

In the years ahead, as in the past, solutions to many of man's problems will depend on qualified and dedicated scientists. It is during the undergraduate years that attitudes and objectives begin to firm. I urge, therefore, a reconsideration of the proposed National Science Foundation budgetary recommendations to reinstate support to science education in full partnership with applied and fundamental research.

Sincerely yours,

Paul M. Cubeta

Paul M. Cubeta
Academic Vice President

NORWICH UNIVERSITY
OFFICE OF THE PRESIDENT
NORTHFIELD, VERMONT
05663

APR 16 1971

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

It is with deep regret that we view the Administration's proposal to reduce or eliminate a number of National Science Foundation educational programs.

Private institutions like ours badly need the support provided through these programs to institute change and to develop new concepts in our science curriculum.

We strongly urge you to express our sense of urgency in this matter to the House Subcommittee on Science, Research and Development.

Sincerely,

Barksdale Hamlett

Barksdale Hamlett
General, USA (Ret.)
President

BH:IC

RANDOLPH-MACON WOMAN'S COLLEGE
LYNCHBURG, VIRGINIA 24504

OFFICE OF THE PRESIDENT

April 12, 1971

APR 14 1971

Mr. Howard E. Holcomb
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

It is distressing to know of the curtailment of funds for science education as reflected in the proposed Administration budget for the National Science Foundation for fiscal 1972. As you and everyone else must know, these cuts come at a time when such funding is needed more than ever by our private colleges. Many of these colleges are literally struggling to keep alive and all of them are facing the serious problem of maintaining the quality of their educational programs. Without adequate support from Federal funds, science education in our colleges will not only remain at a standstill, but will actually decline both in quality and in quantity.

My own college is facing the necessity of substantial expenditures to improve its science facilities. This cannot be done unless there is substantial continuing support from Federal funds for science education.

Your efforts on behalf of our colleges are greatly appreciated. Let us know if there is any way in which we may cooperate.

Sincerely yours,

William F. Quillian, Jr.
President

WFQ:h

PACIFIC LUTHERAN UNIVERSITY · TACOMA, WASHINGTON 98447

Office of the President

April 15, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street N.W.
Washington, D.C. 20009

APR 20 1971

Dear Howard:

So that you may have my reaction to the NSF Science Education Cutbacks, I want to send you some comments which you may use in any way you wish.

We were dismayed to learn of the suspension last year of the Instructional Scientific Equipment Program, as this had been the primary means by which we have modernized and upgraded laboratory curricula in the sciences. Private institutions simply cannot meet such needs from tuition income, and must gain outside grant support not only to progress, but even to maintain past gains.

It was even more disheartening to learn this year of the elimination of the Undergraduate Research Participation Program. This has been the most important single impetus for developing a first-rate chemistry program on this campus. Worthwhile as the individual projects have been, the value to the development of the department has been many times greater in attracting and maintaining highly qualified students and faculty. In no other way can the smaller private institution enable students and faculty alike to make such productive use of the summer months. It is a waster of carefully developed national resources to allow strong programs in the education of scientists and citizens to decline by withdrawing support.

Sincerely yours,

Eugene Wiegman
President

Whitworth College SPOKANE, WASHINGTON 99218

CHEMISTRY DEPARTMENT

April 21, 1971

APR 26 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Mr. Holcomb:

I certainly can react to the proposed National Science Foundation budget in which a number of programs relating to science education are being reduced or cut.

I have personally had the satisfaction of participating in the Science Student Program as director, and more recently I have been involved in a cooperative program with a local school district in the training of elementary teachers, which program has been funded by the NSF.

These endeavors are directed toward the long-range future, and I do not see how we can afford to ignore that. We will not have any needs for funds for high-powered research at the graduate or post doctoral level if we pay no attention to the means by which we recruit science personnel. To cut off our teaching ventures at the pocket is a mistake hard to rectify in the near future.

I have nothing but high respect for the National Science Foundation, and I believe that they have gotten more results per dollar than any other scientific agency I know of that is funded by tax monies. I hope that our congressmen will take another look at their budget and increase the funding for training at the baccalaureate and pre-college levels including teacher training.

Very truly yours,

Hugh W. Johnston, Director
Office of Institutional Research
WHITWORTH COLLEGE

HWJ:LC

TELEPHONE AREA 509 HU 9-3550

Seattle University
GRADUATE SCHOOL
OFFICE OF THE DEAN SEATTLE, WASHINGTON 98122

April 16, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N. W.
Washington, D. C. 20009

APR 19 1971

Dear Mr. Holcomb:

Seattle University is a small University which places primary emphasis on its undergraduate programs. In recent years we have been fortunate in receiving grants from the National Science Foundation for faculty research and the NSF Institutional Grants as matching grants. These institutional grants have been very important for us in supporting small projects for faculty research and to support other projects for improvement of teaching in our courses in science and engineering. Grants to support institutes for High School teachers of science and mathematics have helped not only the High School teachers who participated in the institutes but have provided a way for our faculties in science and mathematics to become acquainted with High School teachers and their problems. This latter acquaintance has led to many cooperative efforts to improve teaching in the local High Schools.

Programs such as the Undergraduate Research Participation Program have been helpful in developing programs in research for undergraduates here at the University. We have had several grants under the Instructional Scientific Equipment Program. It is evident to me that research at Seattle University and further development of our teaching programs and our contact with High School teachers would be greatly hampered, if not brought to a halt, were the Foundation to make deep cuts in its programs from which we have benefited so greatly in the past.

I thank you for your interest in promoting our interests before Congress.

Sincerely yours,

James J. Cowgill, S.J.

James J. Cowgill, S. J.
Dean, Graduate School
Director of Research and
Institutional Development

APR 15 1971

intellectual
professional
creative
excellence
for women

Fort Wright College Spokane, Washington 99204

April 13, 1971

Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
Washington, D.C.

Re: NSF Science Education Cutbacks

Dear Mr. Holcomb:

I would like to respond to the propsed cutbacks in the various NSF science programs as an experienced Director of an NSF-sponsored In-Service Institute for junior and senior high school teachers.

At Fort Wright College we are in the eleventh year of this In-Service Institute for teachers of science and social sciences and mathematics. The program is an integrated, sequential program which has serviced approximately 600 teachers of the Inland Empire, a region which includes Spokane as the major city and the surrounding area with a radius of up to 200 miles. Since this part of the country is rather thinly populated as compared to many areas, we find that there are many very small high schools and grade schools, and also that the teachers may have to handle subject matter courses for which they have little if any preparation simply because the subjects are required whether or not there is adequate teacher-preparation. As a result of this type of situation many teachers certainly do need all the help that they can get, and this is what we have tried to provide for them. We have teachers traveling a one-way distance of 185 miles each Saturday for class, and since on an In-Service Institute the participant only receives tuition, books and fees and some mileage, it is obvious that the real incentive is to learn and to come where they can get the help that is needed. Many teachers have been coming in for several years, since new courses are offered each year, and their own teaching changes emphasis and they need new concepts for current problems.

With all of this in mind I feel that any cutback in the teacher-training programs, is of special significance since this is to reflect on the ideas and concepts and interpretations of coming high school students. The teachers have profited very much over the years in these various programs, and especially now as they try to help the high school students interpret the difficult science problems and above all the complications of the interdisciplinary sciences with the social sciences of the modern world, these teachers need all the help that then can use. The NSF has done a tremendous thing during the years with the emphasis on the grants and programs. It would be a pity now with the new environmental problems facing the teaching group that the programs might have to be cut and thus these teachers could not get the help they need.

Thank you.

Sincerely yours,

Sister Ione Gautereaux

Sister Ione Gautereaux, Ph.D., Chairman, Dept. of Science
Director, NSF-sponsored In-Service Institute

WEST VIRGINIA STATE COLLEGE
INSTITUTE, WEST VIRGINIA
25112

Department of Chemistry

APR 26 1971

To: Mr. Howard E. Holcomb
Executive Associate for Federal Relations

From: Dr. Angie T. King, Chairman
Division of Natural Sciences and Mathematics

Re: NSF Science Education Cutbacks

We live in a technological age. Therefore, if the United States is to remain competitive with other nations in the world community, it is imperative that our keenest scientific minds are trained. Scientific education and research are costly ventures when estimated on a cost-analysis basis. Hence, failure to maintain strong science support by the federal government will ultimately reduce the U.S. potential to a critical point.

These words are meant to convey a sense of the humanitarian aspects (such as medical and industrial research) as well as the economic and military status of science. Failure to provide strong backing in any of these areas will inevitably lead to a catastrophic dilemma for the United States.

APR 19 1971

WEST VIRGINIA WESLEYAN COLLEGE
Buckhannon, West Virginia 26201
DEVELOPMENT OFFICE
Telephone (304) 473-7332

April 14, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

West Virginia Wesleyan College, located in Buckhannon, West Virginia, with an enrollment of over 1,600 students this year currently has a National Science Foundation grant from the Office of Computing Activities to experiment with the use of computers in classroom instruction over a three-year period. We have been advised that further grants for this purpose have been cancelled, whereas we had hoped that after the three-year experimental period the grant might be extended into an improvement grant particularly into the college science improvement program.

Under the leadership of Dr. Ernest Capstack, head of our chemistry department, the science faculties of West Virginia Wesleyan College and three similar liberal arts colleges in the area, Salem, Davis and Elkins and Alderson-Broaddus, have been working for some time on ways and means of improving the science programs at all four institutions. One of the resources which they hoped would give them some help is the National Science Foundation, but the reductions in the programs for science education and for institutional support apparently rules out the kind of help that we were hoping for in this program. It seems as though we are just getting to the point where we can qualify for some additional help from the National Science Foundation and now we learn that most of these programs are being cancelled or curtailed to the point where they will not be helpful to the small institutions like ours that really need the help.

We would like to know why the shift in emphasis is being made and what prompted this change in direction for funds from the National Science Foundation. Is this the wish of Congress,

or is this the Research Organizations looking for more funds, or has the National Science Foundation written off support of the small liberal arts college science departments that have contributed so much in the field of undergraduate science over the past several years? It is a little bit difficult for us to understand why these constant and sudden changes are being made in programs at the federal level. Are these changes a result of change in administration or has someone decided that several of these programs are not well conceived from the very beginning, or are the changes being made for other reasons not quite clear to those of us who are geographically removed from the Washington, D. C. area? It certainly would help many of us if we had some answers to these questions.

Sincerely yours,

Herbert L. Sharp
Director of Development

HLS:ls

APR 16 1971

Morris Harvey College
CHARLESTON, WEST VIRGINIA 25304

Office of the President

April 15, 1971

Dr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D. C. 20009

Dear Dr. Holcomb:

We are indeed discouraged and disappointed by the proposed budget for the National Science Foundation for fisal '72. There is little in this program that will be of substantial assistance to the private undergraduate liberal arts college. Our institutions are not primarily concerned with scientific research but we are concerned with the basic problem of providing good instruction in the sciences. About the only real help the NSF has given us in the past has been matching grants for purchasing equipment. This has been extremely helpful to us and we would certainly hope the program could be continued on a substantial level. In fact, the whole program of aid to our undergraduate institutions could, in our opinion, very profitably be reviewed and revised.

Sincerely,

Marshall Buckalew
President

MB/es

BETHANY COLLEGE
BETHANY, W. VA.
26032

DEAN OF THE FACULTY

April 14, 1971

APR 16 1971

Dr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 R Street, N.W.
Washington, D.C. 20009

Dear Dr. Holcomb:

This is just a short note to let you know that I think that the proposed cut in the Nantional Science Foundation Program for the fiscal year 1972 is unfortunate at a time when institutions are facing such difficult financial problems.

It also seems to me that some of the most valuable programs have been eliminated. Will you please keep me posted as to the developments in this area.

Sincerely,

Barrie Richardson
Vice President and
Dean of the Faculty

BR:jok

APR 16 1971

WHEELING COLLEGE
WHEELING, WEST VIRGINIA 26003

OFFICE OF THE PRESIDENT

April 15, 1971

Mr. Howard E. Holcomb
Executive Associate for Federal Relations
Association of American Colleges
1818 R Street N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

I would like to say a word to you about how valuable to Wheeling College the Undergraduate Research Participation Program of NSF has been.

The URP program has heavily been involved in making our Department of Chemistry one of the outstanding departments in the Upper Ohio Valley. Since the Upper Ohio Valley has a heavy concentration in Chemistry, the development of our department has been of considerable importance to industry in our area. An evidence of this statement would be the recent donation of an Atomic Absorption Spectrophotometer to Wheeling College for ecological studies by Consolidation Coal.

We are now in a situation where our Biology Department is also growing as rapidly and as vigorously as Chemistry did in the past. A very modest amount of help through the Undergraduate Research Participation Program would be of extreme value to us. We have, for instance, taken a used panel truck, torn out the insides of it and made it into a mobile ecological laboratory. We are now taking this mobile laboratory to all elementary and secondary schools in the area to give them some impression of what the scientific problems are when one speaks seriously about ecology. Such a program, we feel, will avoid the foolish anti-industrial bias of many ecological ventures of the recent past. It is the sort of program, in our judgment, which helps to build a stable society.

Finally I would like to also say that the Institutional Grants Program has also been of real significance to Wheeling College. It would be a pity to have it die.

I would be quite happy to give you any further information that might support the statements I have made above. In summary, therefore, I hope that the National Science Foundation budget inasfar as it affects undergraduate science programs will remain vigorous and strong.

Sincerely,

Frank R. Haig, S.J.

Frank R. Haig, S.J.
President

FRH:em

APR 19 1971

LAKELAND College
A CHRISTIAN LIBERAL ARTS
SHEBOYGAN, WISCONSIN 53081 • PHONE 565-2011 — AREA CODE 414

Department of Biology

April 16, 1971

Mr. Howard E. Holcomb
Exec. Assoc. for Fed. Relations

Dear Sir:

Naturally I am disturbed about the cut backs in the NSF budget. I think the same end could be accomplished by re-evaluating the distribution of funds. In the past few years much money has been spent on junior high school and secondary teachers to "beef up" their programs. Little has been done to aid the college level teacher. Most funds for college level were funneled into research — much of it meaningless. I'd like to see a program for up-dating the college teacher.

In small colleges, the pay scale is usually lower than in surrounding area high schools; yet it is next to impossible for the college teacher to receive federal aid in obtaining additional course work which he needs to improve his teaching. This must be done and the money, therefore, comes out of his own pocket.

I feel the cut backs are unjustified. The public is swinging its pendulum again - this time away from the sciences. This is a gross mistake.

R. J. Ertel
Asst Professor of Biology

Northland College
ASHLAND, WISCONSIN 54806

April 13, 1971

APR 16 1971

Mr. Howard E. Holcomb
Executive Associate for
Federal Relations
Association of American Colleges
1818 "R" Street, N. W.
Washington, D. C. 20009

Dear Mr. Holcomb:

The proposed administration reductions for the National Science Foundation for fiscal '72 will indeed weigh heavily upon the progress which has been made during the past several decades in the areas of physical and natural science. Colleges, such as ours, that have modest programs in undergraduate science education will be forced to severely curtail their curriculum. Special projects which have been the lifeblood of the relatively small private liberal arts colleges will have no choice but to close out the operation.

At a time when this nation is forced to redefine its priorities, it is my fervent hope that the budget for the National Science Foundation will not only be restored, but will also receive additional increases and support.

Sincerely,

Roy Hoover,
Dean of Academic Affairs

RH/ma

62-912 O - 71 - 40

THE CARDINAL STRITCH COLLEGE
MILWAUKEE, WISCONSIN
53217

OFFICE OF THE PRESIDENT

APR 15 1971

April 12, 1971

MEMO To: Howard E. Holcomb,
AAC Executive Associate for Federal Relations

From: Sister Mary Aquin Miller
President, Cardinal Stritch College

Re: National Science Foundation Budget
for Fiscal '72

The reduction of support for science education in the proposed NSF budget for Fiscal '72, particularly on the undergraduate level, will greatly affect the four-year colleges who have benefited from this program. It would be helpful if the level of support for Science Faculty Fellowships and programs for Student Science Training and Instructional Scientific Equipment could be restored.

Thank you for your efforts in this behalf.

Sister Mary Aquin Miller

Sister Mary Aquin Miller
President

LAWRENCE UNIVERSITY
APPLETON, WISCONSIN 54911

April 20, 1971

APR 26 1971

Mr. Harold E. Holcomb
Association of American Colleges
1818 R Street N.W.
Washington, D. C. 20009

Dear Mr. Holcomb:

In answer to your memorandum of April 7 to President Smith, I can only reply that I am appalled, along with my fellow faculty members in the sciences, at the cut in the funds for undergraduate education in the NSF budget for Fiscal 1972. Whatever the need for Ph.D. scientists in terms of numbers, we need to make sure that the ones who become Ph.D.'s are the best qualified that we can find. The undergraduate program in science is crucial to that goal and the four programs that are slated for elimination have contributed greatly to the goal of quality undergraduate education in science. In addition, the quality of undergraduate science departments determines the view of science by those who take science only as undergraduates, a very important point for the future of our society in a technological age.

Sincerely yours,

Robert M. Rosenberg

Robert M. Rosenberg
Professor of Chemistry
Associate Dean of Lawrence
and Downer Colleges

RMR/ec

APPENDIX E

Additional Statements and Material Submitted for the Record

May 28, 1971

Senator Edward M. Kennedy
Chairman, Special Subcommittee on
the National Science Foundation
Senate Committee on Labor and
Public Welfare
Washington, D. C.

Dear Senator Kennedy:

The National Association of State Universities and Land-Grant Colleges and the Association of American Universities share a deep concern over trends in the financing of academic science and the support of education for science. We believe that your Subcommittee has a splendid opportunity to reverse a downward spiral of Federal support that in our judgment constitutes a long-range threat to the capacity of our colleges and universities to serve the nation effectively through science.

Enclosed is a statement which represents the best judgment of our associations on the authorization level for the various programs of the National Science Foundation. We commend these proposals to you and the other members of the Subcommittee.

Sincerely yours,

Charles V. Kidd

Charles V. Kidd
Executive Secretary
Association of American Universities

Ralph K. Huitt

Ralph K. Huitt
Executive Director
National Association of State Universities and Land-Grant Colleges

FROM

The Association of American Universities
ONE DUPONT CIRCLE, SUITE 730, WASHINGTON, D. C. 20036

Statement to the

Special Subcommittee on the National Science Foundation

of the

Senate Committee on Labor and Public Welfare

on the

Authorization for the National Science Foundation
For
Fiscal Year 1972

by

The National Association of State
Universities and Land-Grant Colleges
and
The Association of American Universities

June 1, 1971

I Introduction

We deeply appreciate the privilege of expressing the joint views of the National Association of State Universities and Land-Grant Colleges and the Association of American Universities on the authorization bill of the National Science Foundation for fiscal 1972. Important issues are at stake, and they are particularly significant for the colleges and universities of the nation which are responsible both for training scientists and for conducting a large share of the National research. In this connection, the universities and colleges which are members of these two associations conduct about four-fifths of the academic research funded with Federal funds, and they grant about four-fifths of all Ph.D.'s in science and engineering.

The President proposed a $622 million budget for N.S.F. for fiscal year 1972, an increase of $116 million over fiscal year 1971. The House of Representatives has authorized the same figure. This level is somewhat misleading because it includes at least $74 million in activities transferred from other agencies to N.S.F. Therefore if one looks at the National Science Foundation increase for

the government as a whole it approximates only $42 million ($116 million minus $74 million).

The action of the House resulted in important shifts of emphasis within the ceiling of $622 million. Some of these seem to us sound; others seem to us deplorable. Moreover, we believe that the authorization of $622 million is too low.

The House action essentially cut scientific research support and the important new program (RANN) designed to direct science more explicitly to national needs in order to finance increases in specialized research facilities and equipment, institutional support for science and science education.

Our position is that the proposed increases are needed, but that there should not be cuts in other important programs to finance those increase. This is the position which we advocated before the House Committee, and it is the position which we urge upon this committee. In summary, we propose a $687 million authorization for the National Science Foundation. Our proposal, as compared with the President's budget and the House action, is as follows:

(in millions of dollars)

Program	President's Budget	House Authorization	AAU-NASULGC Proposal
Scientific Research Project	$ 258	$ 246	$ 277
Special Research Facilities	6	10	6
National and Special Research Programs	167	136	167
Institutional Support	12	29	35
Science Education	77	99	99
	520	520	585
Other Programs	102	102	102
Total	$ 622	$ 622	$ 687

We continue to believe that our proposals are sound, and there follows an explanation for the authorization proposed for each major program where we consider the House action inadequate.

II Scientific Research Project Support

We believe that the transfer of research of a basic character from other agencies to N.S.F. is sound if the transfers are made judiciously and if they do not squeeze other important items in the N.S.F. program. In this connection, the House proposed an authorization level of $246 million for this item, a reduction of $12 million below the amount requested by the President. The House level is $70 million above the 1971 level, but of this only $15 million is available for new scientific initiatives. The remainder of the increase simply finances work in progress transferred from other agencies.

At an average cost of $48,000 per project, $15 million would finance only about 300 projects. In our judgment, the new starts should be increased to about 1,000 and to do this the authorization level should be $277 million. This would enable N.S.F. both to finance research properly transferred from other agencies and to expand adequately support for basic research.

This increase is also critically important to the maintenance of a balance between the investment in the future -- basic research -- and the proposed expansion in the investment related to urgent, immediate problems.

III National and Special Research Programs

The President proposed a marked expansion -- amounting to $81 million -- in a cluster of activities collectively labelled as Research Applied to National Needs (RANN). The House cut this program by $30 million to a level of $1 million.

We believe that it is sound for N.S.F. to support research in these areas. We believe that universities should be concerned with these problems of society, and that it is important and feasible for universities to mount a problem oriented

as well as a discipline oriented research effort. We support the $81 million level proposed by the President for the RANN program, and we deplore the cut made by the House.

However, this laudable attempt by N.S.F. to bring science more directly into the mainstream of the problems of American society should not be done at the expense of halting the healthy expansion of basic research. That is the reason for our urgent recommendation (above) that the House proposed cut of $12 million below the President's budget in scientific research projects be rejected and that instead this item be increased by $20 million above the President's budget.

IV Institutional Support for Science

Our associations have noted with extreme concern the President's budget request of only $12 million for fiscal 1972 for the institutional support of science, a reduction of no less than $62 million from the $74 million requested only two years ago. It is explained that funds for these institutional programs are being reduced -- "eliminated" seems to us a more nearly accurate term -- "are being shifted to the support of high-priority research to better utilize existing science capacilities," in contrast with the development of additional capability.

The House proposed an authorization level of $28.8 million for this program, but this would still be below the $34.5 million appropriated in fiscal year 1971. The House moved in the right direction, but not far enough.

We have no quarrel with the goal of enlisting more scientific resources in the solution of problems relative to the needs of our society. We agree that there needs to be more "Research Applied to National Needs. . .to focus and stimulate the application of science and technology to major national, regional, and local problems; to increase societal benefits from research; to exploit scientific and technological opportunities; and to advance national economis productivity." But

we also believe it is unwise to continue to exploit existing capacity without, at the same time, making some significant efforts at the growth and improvement of that capability and capacity.

It has been clearly demonstrated that "targeted" project grants are an effective and efficient way to solve pressing problems, to exploit present opportunities, to advance lagging technologies. But we have also begun to learn in the last few years that the "use" of our resources and their expansion and improvement are not the same thing, that we need to "invest" in the development of an enhanced national scientific competence. In making an investment, we are interested in the development of a resource. In putting a resource to "use," we are basically talking about its exploitation. The "targeted" project grant mechanism serves the latter function admirably, but it was not designed to serve the former.

This is why we strongly urge this Committee to protect the National Science Foundation's Institutional Support for Science Programs. We have known now for some time that we needed -- and needed badly -- at least some institutional support to counterbalance our reliance on targeted project support. We believe it would be unwise to eliminate, even during periods of serious fiscal constraints, these modest programs that aim in this direction.

In our opinion, the Science Development grants of N.S.F. -- funded at a level of $30.2 million in F.Y. '70, $20.0 million in F.Y. '71, and nominated by the President for extinction in F.Y. '72, can serve an important national purpose. The era of expanding the number of departments in the country capable of producing Ph.D.'s is over. The major task now is to strengthen existing departments and to increase the quality of training. We therefore urge that the Science Development grants be continued at the $20.0 million level in F.Y. '72 with the clear understanding that the funds will be used to enhance standards of doctoral study.

We are especially concerned about the fate of the Institutional Grants for Science program, and urge that it be maintained at least at the $14.5 million previous level. This is exactly the kind of program that we desperately need to expand and extend, not weaken and curtail. As helpful and useful as they are in other ways and for other purposes, project grants actually weaken the institution's capacity to serve the nation effectively, by draining off resources through the pre-emption of faculty and staff and through the draining of institutional financial resources through cost sharing, matching requirements, unrealistic reimbursement of indirect costs, and the like.

Because of this, these Associations strongly supported the Committee's efforts to enact H. R. 11542 -- the Miller bill -- in the last session of the Congress and have applauded the re-introduction of the bill as H. R. 8 in the present session. We urge in the strongest possible terms that the Committee hold early hearings this year on H. R. 8 and to pursue action on it vigorously. It should be considered with other measures for general institutional support. If the Committee has no such plans for this session, then we suggest it might want to consider adding institutional support to H. R. 4743 as a separate title.

A recent report released by the Carnegie Commission on Higher Education (The New Depression in Higher Education, a report of a study made under the direction of Dr. Earl F. Cheit) documented what it called the most serious financial crisis in the history of American higher education. This crisis is very real and very serious. Every day we read of mounting deficit operations among the private institutions. The public institutions, for whom deficit operations are impossible, report resorting (as the private ones have also done) to the trimming of expenditures for supplies, travel and laboratory and other equipment; cutting funds for experimental programs; freezing the hiring of faculty and staff and not filling vacated positions. At a time when the President

is proposing a massive student-aid-program, institutions across the nation have been forced to cut their own student-aid funds from 18 per cent a year of the total instructional budget in 1959 to less than 4 per cent in 1969. And I would repeat, this situation occurs just at the time the Federal government is asking for additional efforts from the colleges and universities in the form of the acceptance of additional millions of students, mostly from low-income and disadvantaged families, and of additional research efforts toward the solution of pressing national problems.

At the very least we strongly urge that the Institutional Grants for Science program, which provides, dollar-for-dollar, by far the most valuable funds for the colleges and universities, at least be protected at its present minimal level. This requires an increase of $22.5 million above the President's proposed budget of $12.0 million for this item.

V. Science Education Support

In total the President's budget proposed a decrease from $100 million to $77 million in this area. This decline is from a base of $120 million in F. Y. '70. In our judgment, the proper course of action during this period of rapid change in supply and demand relationships for those with training in science is to hold a steady course for the time being. There should be some readjustments by altering the balance between support of graduate fellowships and traineeships and support of other efforts in the educational field.

This is the one area within which we believe the House increase above the level proposed by the President was sound. The House enacted an authorization level of $99.3 million, a $20 million increase above the $77.3 million level in the President's budget. The funds were distributed as follows, a distribution which we support:

	(in millions)	
Total	$ 99.3	
Student development	38.5	
Graduate fellowships and traineeships		29.0
Other		9.5
Instructional personnel development	32.0	
Instructional program development	28.5	

We applaud this increase, and trust that the Senate will not fall below the $99.3 million level.

There follows an explanation of our concern over the President's proposal and of our support for the $99.3 million authorization level enacted by the House.

We wish to point out that many of these programs -- such as science education for students, college teacher programs and science faculty fellowships -- are for the important early stages of science education, and directed towards institutions which need strengthening in science.

The N.S.F. programs for graduate fellowships and traineeships are basic "investment in scientific resources" programs. We were distressed by the recommendation of the budget request that these programs be funded at only $20 million in fiscal 1972, about half the total for just two years ago. With this amount, no new fellowships could be awarded, and the President's proposal constituted a long step towards phasing out these programs. This recommendation, according to N.S.F. sources, is "in recognition of the existing balance of supply and demand for graduates with advanced science and engineering degrees and projected surpluses in some areas." The President's proposal for N.S.F. was consistent with his proposals in other areas. Between 1968 and 1971, government-wide support for graduate student fellowships reduced the total number of Federally supported fellows almost 40 percent -- from 51,446 in 1968 to 30,790 in 1971!

We agree with the House that this is an unwise trend. Just two years ago, the National Science Board, in its first annual report based on the requirements of the National Science Foundation Reorganization Act sponsored by this Committee, forcefully addressed itself to the national nature of graduate work in the sciences -- from the standpoint of both the mobility of graduate students and of the national need for their "production." It called for the recognition of a national responsibility for graduate training, with the vastly greater costs for instruction and research at this level making it much more difficult for the institutions to maintain nationally adequate graduate programs.

This nation has always suffered from its tendency to move rapidly from complacency to overreaction. We do not need to continue to increase the supply of Ph.D.'s as rapidly as we have over the last few years; neither can we afford to shut off and dig up the pipeline.

The readjustment to new levels of support should be orderly and approached in stages for several reasons. Current demand for Ph.D.'s in some fields still exceeds supply. The nation is in a period of transition during which a higher proportion of Ph.D.'s will be employed in places other than the large research oriented universities. It would not be prudent to cut off support until the significance of this shift becomes clearer. The country will continue to require a strong set of graduate departments in all fields of advanced learning. A precipitous cut in support for Ph.D. candidates has a disruptive effect on the departments themselves. Finally, the long-range relationships between demand for and supply of Ph.D.'s in specific fields is by no means clear.

Accordingly, we recommend that $29.0 million -- as recommended by the House -- rather than $20.0 million be provided in F. Y. '72 for graduate fellowships and traineeships.

In total, we proposed that the Committee authorize the $99.3 million -- the House level -- for all of the N.S.F. educational activities, as contrasted with the $77.3 million proposed by the President.

VI Conclusion

In our judgment, the difficulties which we have pointed out stem basically from an inadequate total N.S.F. budget for fiscal year 1972. This is true of the House authorization, which merely robbed Peter to pay Paul. It seems plain that the addition of relatively small sums to the N.S.F. budget would enable N.S.F. to support both an increase in support of basic research projects and the larger National and special research programs, and to support highly commendable educational activities which have demonstrated a high return for a relatively small investment.

In summary, we propose that the N.S.F. authorization be at a level of $687 million -- an increase of $65 million above the President's budget and the House authorization. The proposed increases are not indiscriminate and across the board. They are targeted on specific high priority areas where the Nation will gain by a relatively small increased investment in science and science education.

Statement of the American Council on Education for the Special Subcommittee on National Science Foundation of the Committee on Labor and Public Welfare, United States Senate

Submitted May 28, 1971

The American Council on Education* is gratified that the Budget for FY 1972 contains, for the National Science Foundation, a proposed 22 percent increase in funding to a total of $622 million.

The Council is greatly disturbed, however, at the sharp shift of emphasis that would occur if the proposed allocations to specific programs were to take place.

In Section 3 of the National Science Foundation Act, the Foundation is instructed that in exercising its authority and discharging its functions one of its objectives shall be "to strengthen research and education in the sciences." (Emphasis supplied.) Historically, the Foundation has sought a careful balance in fulfilling this dual function. Yet the 1972 budget proposal, while increasing total funding by 22 percent, would actually decrease educational support by 34 percent. Such an imbalance would be devastatingly damaging to science education immediately and in the long run to science research itself. The Council urges that the Congress restore the balance.

Specifically we suggest that the following programs be authorized and funded to the extent indicated:

* The American Council on Education is the coordinating agency for higher education in the United States. It includes among its members 1661 colleges, universities and regional and national educational associations.

1. Institutional Support for Science to $34.5 million, the level of FY 1971 estimates. Included in this broad program should be a restoration of the Instructional Scientific Equipment Program.

2. Science Education Support to the FY 1971 level of $100.6 million. Specifically, the Council believes that several programs that Budget proposals would eliminate or phase out should be restored, so that we can continue to maintain, at a modest level, a flow of capable scientific manpower through all levels of education. We urge the restoration of the high school student science training program, the undergraduate research participation program, postdoctoral fellowships, and college science faculty fellowships and research participation. In addition we urge that the program of graduate fellowships and traineeships be maintained at least to the current Fiscal year level, which would require an appropriation of approximately $9 million above the Budget request. We doubt the wisdom, even in economic terms, of relying exclusively on research assistantships as a means of supporting the education of our most talented young scientists.

In many departments and agencies of the Government support for academic science--directly for research and indirectly for science education--is being reduced. It is essential, if the nation is to maintain its scientific capability, that the National Science Foundation programs fill this gap.

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In many departments and agencies of the Government support for academic science--directly for research and indirectly for science education--is being reduced. It is essential, if the nation is to maintain its scientific capability, that the National Science Foundation programs fill this gap.

COLLEGE OF THE HOLY CROSS
WORCESTER, MASSACHUSETTS 01610

OFFICE OF THE VICE PRESIDENT AND DEAN

21 May 1971

Honorable Edward M. Kennedy
Senate Office Building
Washington, D.C.

Dear Senator Kennedy:

Enclosed is a letter sent to the Honorable George P. Miller, Chairman of the House Subcommittee on Science and Astronautics.

The College administrators, faculty members and students, in signing this letter, wish to express their strong opposition to the elimination or curtailment of National Science Foundation programs so vital to the support of science education in the United States.

We respectfully call your attention to this situation and urge your assistance in the continuation of National Science Foundation programs.

Sincerely yours,

Joseph R. Fahey, S.J.

(Rev.) Joseph R. Fahey, S.J.
Dean

JRF:ss

COLLEGE OF THE HOLY CROSS
WORCESTER, MASSACHUSETTS 01610

DEPARTMENT OF BIOLOGY

Honorable George P. Miller
The Chairman
House Subcommittee on Science and Astronautics
U.S. House of Representatives
2365 Rayburn House Office Building
Washington, D.C. 20515

Honorable George P. Miller:

We the undersigned faculty and students of the College of the Holy Cross, Worcester, Massachusetts 01610, express our strong opposition to elimination or curtailment of National Science Foundation programs supporting science education in the country. Elimination of support to such programs as Undergraduate Research Participation, Student Science Training Program, Instructional Scientific Equipment Program, and Science Faculty Fellowships affect the badly needed improvements in science education in the nation. The Traineeship grants helped support students pursuing graduate studies but no new traineeships will be funded in FY1972. We view these developments with great concern because they seriously diminish our effectiveness in providing relevant science education of quality. Therefore, we urge you to take necessary action and reinstate these programs. There is greater need to reorient the emphasis in all areas of science and this is an educational problem. Quality education will suffer unless it is supported. We urge you to enable the National Science Foundation to provide the needed support for healthy development of science education across the country.

Signatures or Position of the Faculty / Class of the Student

Joseph F. Donohue, Vice President of the College
Joseph R. Fahey, S.J. - Dean of the College
Joseph H. McSweeney - Associate Professor - Biology
Banadakoppa T. Lingappa - Professor of Biology
Robert S. Crane - Assoc. Prof. Biology

Copies forwarded to: Senator Kennedy
Senator Brooke
Rep. Donohue
Dr. Edward David, Jr.

Signatures	or	Position of the Faculty Class of the Student
Thomas J. Wichler		1972
Harry F. Doyle		'71
Brian McNamara		'73
William M. Sweeney		'71
Brendan Donovan		'71
[illegible]		'73
Matthew J. Hogan		'72
Mark E. Reynolds		'72
Kieran L. Donovan		'72
[illegible]		'72
William Cook		72
William Shea		72
Michael F. Heine		'72
Juan R. Navas		'72
[illegible]		'73
William C. Mattern		72
Edward [illegible]		74
Peter Scott Hayward		'72
Gregory C. Flynn		'73
Louis J. Oggiani		'73
[illegible]		'71
John J. Thaler II		'73
Paul Ramano		'73
David Vullancourt		'73
James E. Mattern		'73

Signatures	or	Position of the Faculty Class of the Student
Robert K. Jordan		Instructor
Francis Horvath		Student
Joseph A. McKenzie '72		
Robert S. Madden		'73
Richard G. Sheehan		'71
John M. Meenan		'72
Dominick R. Cange		'73
Anthony Falzone		'72
Robert Bitterman		'73
Claude M. Christoffers	Student	'72
John A. McAuthy Jr.		"71"
Peter W. Toda		71
Christopher Collins		'73
Jim McSheehan		72'
Ronald W. Boone		74
William Maughe		71
William J. Hilfman		'72
Robert B. Boulrice		'72
[illegible]		'73
Robert Aube		'74
Wilson Greer		'74
John D. Cutting		'73
Marc J. Chrodelaine		'71
Karl Gunter		'73
Ward J. Cooper		'71

Signatures	or	Position of the Faculty Class of the Student
John J. Molongoski		1971
John P. Morin	Student	1971
Joel Nagron	"	1972
William F. Fullen, Jr	Student	72
Peter G. Truex	"	73
Wayne R. Marquis	"	1973
David E. Dowling	"	1973
Gene E. Karach	"	'73
Richard Komunicki	Vice-Pres Bio Society (1970)	1971
James H. Tunstone	Instructor Biology Dept.	
John Rapinchuk	Student	'73
[illegible]	"	1972
Frank Pratt	Student	'71
[illegible]		'72
Joseph Lebrun	Student	'73
Christopher J. Lynch	"	'71
Jerome Cuss, Jr.	"	'71
Henry C. Bodenheimer	"	'71
James J. O'Connor	"	'71
Richard A. Mafuzzi	"	'72
John the Cascio	"	'72
Miguel O. Pietri	"	'72
William R. Campbell	Professor	
John Suozzo		'72
Steven F. Viegas	PAST MEMBER OF AN N.S.F. PROGRAM	'74
Dennis J. Sullivan	Student	'72

Signatures	or	Position of the Faculty Class of the Student
Arthur V. McTavell III		1974
Riccardo M. DeGirolami		1974
William N. Angelo		1974
Michael Krausz		1974
Daniel Lyons		1974
Edward Molyneaux		1974
Richard Turek		1974
Jim Quigley		1974
Curt Waligura		'74
Michael Cammarata		1974
C J Cammarata. Pres, Bio Society		1972
Justin Doherty		1973
Lou Dell Italia		1974
Paul J. Cyplenski		1972
William G Karl		1972
Malcolm N. Joseph III - HRA		1971
John F. Kerrigan, Jr.		1974
Stanley J Kostka, Jr.		1974
[illegible]		1971
John H. Fetting III Past-Pres. Bio Society		1971
Joel R Viola		Laboratory Supervisor Biology Dept.
Michael J. Kilfoyle		1971
William [illegible]		1971
Joseph E.O. Malley		1971
William H. Fitzgerald Jr.		Associate Professor
Edward Goodwin		1974

Signatures	or Position of the Faculty Class of the Student
Louise J. Nordstrom	Ass't Prof. in Economics
Rev Raymond F. X Cahill S.J.	Prof of Economics
Rev. Thomas J. Cahill S.J.	Assoc Prof Econ.
Rev. Joseph B Powers SJ	Computer Center
Richard P. Burke, SJ	Associate Professor
F. Callahan SJ	Ass't Prof Phil.
E.D. McCarthy SJ	Instructor Theology
James F. Clarkin	Student of Political Science
Thomas J. Loretto SJ	Professor of Physics
Robert Sleminski	1972
Philip Hayes	1972
Michael T. Flood	1972
Thomas A. Hickey	1973
Eugene D. Sullivan	1973
Richard J. Tutino	1973
Gustavo J Perez	1973
Peter T. Hedglon	History Students, Class of 1973
Steven Daly	1973
William Murphy	1971
William Kelly	1971
Paul Howard	1971
Ron Northaven	1973
Tom Goehring	English student
Gilbert T. Kleinman II	Hilltop - 72
Robert E. Laflamme	Chem - '71

Signatures	or Position of the Faculty Class of the Student
William A. [illegible]	Associate Professor in Biology
Paul R. Perreault	Student
Anthony M. Caputo	Student
Paul J. Lancuty	Treasurer, Holy Cross Biology Society
Clifford A. Browning	Holy Cross - 1971
Robert A. Klein	Student - 1973
[illegible]	student - 1971
David P. Johnson	student 1973
[illegible]	student 1973
Richard K. Skinner	Student 1973
John Siracco	Student - 1971
James C. Hebert	Student - 1973
Michael [illegible]	Student - 1973
Benton Hoffman	Asst Prof. Biology
Brian T. Laplante	student - 1973
Denis Bonjagni	student - 1973
Randolph Sousa	student 1973
Matthew Buckley	student 1973
Peter H. Gilligan	student 1973
Joseph G. Coroso	student 1973
Christopher Deacutis	student 1973
Timothy Ward	student '73
Martin J. Vittek	student '73
Richard Klein	Co-Chairman Pre-Med Society '72
John C. Bathurst	Student - '71
[illegible]	Bio Society Vice-President-Elect 1971

Signatures	or	Position of the Faculty Class of the Student
Nicholas R. Lumiere Jr.		74
William J. Flanagan Jr.		74
Joseph T. Cipolla		'74
Michael J. Berrington		'74
David C. Smith		'74
Daniel E. Alton III		'74
Richard Brown		'74
Anthony K. Buttrus		74
John J. Hallway Jr.		'74
Thomas Cowan		'74
Robert P. Hayes		71
George J. Magnuson Jr.		'74
Ralph J. Gania		'74
Richard Rudolph		74
Andrew Pomahtera		74
Vincent Novella		'71
John Sheehan		'74
Tom Evy		74
James Triplett		74
Brian Turrisi		74
Robert Lomazzo		74
Anthony J. Fassi		'73
Richard Cambria		'73
Christopher J. Vsale		'72
Francis J. Feild		'72

Signatures	or Position of the Faculty / Class of the Student
Jos. A. Martus S.J.	Chairman, Dept Chemistry
[illegible]	[illegible]
[illegible]	Asst. Prof. of Chemistry
Michael R. McBrath	Assistant Professor of Chemistry
William Auchuchunga	Assistant Professor of Chemistry
James Burke Doherty	Senior
Donald Dumas	Sophmore
Roy B Hannon	Sophomore
Robert M. Duke	Sophomore
Philip Dilascentis	Sophomore
[illegible]	Sophomore
Edward Gallagher	Junior
Aaron Carr	Junior
James F. Lynch	Senior
R. E. McCole	Junior
Joseph B. Savage	Junior
Joseph Vogt	JUNIOR
[illegible]	Junior
Patrick A. Pardee	Junior
[illegible]	JUNIOR
Alfred R. Desautels, S.J.	Professor of French.
Christopher J. Carey	Soph.
Bruce A. Loughran	Freshman
Edward J. [illegible]	Junior
Robert E. Daly	Freshman

Signatures	or Position of the Faculty Class of the Student
Paul Omers	1972
John Jenusaitis	72
Frank Lego	'72
Geo D'Angelo	'72
Paul E. Hoccy	'72
Thomas Helin	'72
Chris Augusta	71
Anthony Pellegrini	1972
Francis Prado	'72
Roger A. Golin	72
Henry McCarthy	1971
Michael Hanley	1972
Richard O'Rorke	1973
Daniel T. Mahon	1974
James Gigas	1974
Joseph C McDonald	Staff
John F. Scully	staff
John F. Reaction	staff
James Tucas	1972
Bhupendra Patel	1971
P. Michael Saint	1971
Joseph J. Holmes	Prof of History
William A. Carroll S.J.	Prof. Classics
Laurence M. Landino	1971
Frank E. Metrosky	1973

Signatures	or Position of the Faculty Class of the Student
Roger Johnson	Assoc Prof. of Sociology
Thomas C. Gariépy	Class of 1971
Robert G. Rodriguez	Class of 1973
Robert G. McMillen	Asst. Prof Sociology
Paul F. Sopha	Class of 1971
William R. Fitzsimmons	Asst. Prof. Sociology
Vincent G. Foote	Assoc. Prof. of Theology
A. T. Stecker	Instructor of Theology
John E Wakim	Junior '72
Joseph M. Fallon Jr	Asst Prof. of Sociology
Joseph Tai Hoalan	Special student
Paul E. McMaster PhD	Assoc Prof. Chemistry
Edward F. Wall Jr	Assoc Prof. of History
Robert Martin	Instructor in History
James F. Powers	Assistant Professor, History
James M. Heneghan	Junior
Brian T. Rohn	Freshman
Clyde Park, Ph.D.	Philosophy
[illegible]	Director Div. of Theatre Art
Fred Augusto	A.C. '73
Stephen J. Mauer	'73
William J. Farmer Jr.	'71
James M. McCloney	L. Bryan
Diane A. Libbey	cataloger Library
Rose Morello	

Signatures	or Position of the Faculty Class of the Student
Leonard C. Sulski, Chairman +	Assn. Prof. of Math.
Vincent Cl. McBrien	
Francis Lattanzio	1971
John R. McCarthy	
David H. Deely	Ass't Prof. Math
John MacDonnell Jr.	
Catherine Leigh McCarthy	Instructor, Math
Jerry E. Struzek	1973
Joseph H. Paciorek	Assistant Professor Mathematics
David F. Berri	1971
Melvin C. Tews	Asso. Prof. of Mathematics
Richard James Angus	Class 1971
William R. Stout	1971
Mildred Nestor	Cataloger (Library)
Roland Roulin	Cataloger (Library)
Veronica E. Hennigan	Asst. Acquisition
Charlotte E. Rickson	order asst.
Margaret Wrightson	Secretary - Library
Isabel Miller	Periodical Librarian
James A. Kaufman	Research Associate

Signatures	or Position of the Faculty Class of the Student
Frank R. Tingleshire	Assoc. Prof. of Pseudo-Ed.
Kenneth W. Tarrant, Jr.	English Maj. '72
William J. McGovern, Jr.	Hist. Maj. '74
William A. Strzyzinski	Physics Major '71
Patrick A. Devaney	Physics Major '71
F. W. Kaseta	Assoc. Prof.
Rev. Robert B. MacDonnell, S.J.	Assoc. Prof. of Physics
Htung Li (Tung Li)	Assist. Prof. of Physics
Ram Sarup	Prof. of Physics
Edward F. Kennedy	Prof. of Physics
Jim Beyer	Asst. Prof. of Physics
Paul J. Radell	Pre-Med. '72 (SP)
Tsu-chang Mao	Graduate Student - Chemistry '71
Paul [illegible]	Asst. Prof. - Pol. Sci.
Patrick A. Sullivan	Circulation Librarian
Selina L. Martin	Reference Librarian
Philip O'Leary Jr.	Alumnus, class of '70

Signatures	or Position of the Faculty Class of the Student
Paul O. Denault	'74
Gary A. Hoyt	'73
John P. Kelly	74
[illegible]	74
Mike McDonnell	'73
Michael P. [illegible]	'73
John K. Maguire	74.
Rodney DeLeaver	'74'
William C. Daly	73

Signatures	or Position of the Faculty Class of the Student
John Patrick Depealis	
Roger J. [illegible]	'74
Stephen J. Olson	
Michael [illegible]	
Michael A. Machado	Student ~ 1974
Richard A. Danville	Student 1973

Signatures	or	Position of the Faculty Class of the Student
John W. Flavin, SJ		Chairman, Biology Department
Dorie C. Scarpelli		student 1973
[illegible]		[illegible]
Michael A. Cook		student
Neil Hurley		student

Signatures	or Position of the Faculty Class of the Student
[illegible] Colloran, S.J.	Chairman Dept. of Psychology
William M. Ewald, Ph.D.	Assistant Professor of Psychology
Paul S. Rowland, Ph.D.	Professor of Psychology
Gilbert De Mar, Ph.D.	Lecturer Dept. of Psychology
[illegible] M. [illegible], Ph.D.	Assistant Professor of Psychology

Signatures	or	Position of the Faculty Class of the Student
Patrick Brown '74		
Francis Black '74		
Ralph [illegible]		
[illegible] '74		
Paul J. [illegible] '74		
Richard Stillage '74		
Peter Kular '74		
Tim Sullivan '74		
Mike Guilfoyle '74		
Stan Hulas '74		

Signatures	or Position of the Faculty Class of the Student
Jerome J. Jordyl	Associate Prof
Robert K. Sadar Jr.	Instructor
Frank Petrella	Associate Professor
Gary C. Clark	Class of '72
Dennis M. Manning	Class of '72
Michael Shekleton	" '72
Richard P. Macfussy	Class of '72
Thomas J. Finery	class '72
James E Duckett	" '72
Neil A. Cleary	class '72
Michael L Gerrity	Class '72
John E. Harrington	Class '72
Carlos Palacios	class '72

STATEMENT OF DR. ROY E. HEATH ON BEHALF OF
THE AMERICAN ASSOCIATION OF STATE COLLEGES
AND UNIVERSITIES PRESENTED TO THE SPECIAL
SUB-COMMITTEE ON NATIONAL SCIENCE FOUNDATION
OF THE SENATE LABOR AND PUBLIC WELFARE COMMITTEE
JUNE 2, 1971

The American Association of State Colleges and Universities appreciates this opportunity to present a statement regarding the support needed from the National Science Foundation budget to support undergraduate education in science and science education. The Association's membership comprises 277 institutions that educate 22+% of the students in higher education, just under 30% of the students in four-year colleges and universities, and just under 50% of the teachers certified by the states.

As Director of the Office of Research and Development of the Wisconsin State University System, (the sixth largest system in the states with 64,214 students and graduating 65.5% of the Wisconsin certificated teachers with their first baccalaureate degree) I am speaking in reference to the problems we find in the nine Wisconsin State Universities, typical members of the AASCU.

As one compares the annual funding levels of the total NSF budget along with the annual funding levels for undergraduate science and science education it becomes crystal clear that the intent of the Office of Management and Budget, with the tacit agreement of the NSF top administration, is to significantly reduce support of undergraduate science and science education. Using the NSF Annual Reports and the 1972 OMB recommendations it appears that undergraduate and science education has gone from 26.7% of the budget in 1964 to less than 11% in 1972. Changes in programs and in reporting make comparisons difficult so I have included the comparative categories below. The point is made that the projected dollar drop in the plans for 1972 is disturbing, particularly in light of significant increases in the total budget. Certainly there has been no drop in science education needs.

We appreciate the interest that the House and Senate subcommittees have taken in specifying support for science education programs over and above the levels recommended by the Office of Management and Budget and the National Science Foundation. One can not help but wonder why the message to continue support levels in science education has not been accepted by either the OMB or the National Science Board.

COMPARISON OF FISCAL 1964* NSF BUDGET AND OMB RECOMMENDATIONS FOR FISCAL 1972 FOR PROGRAMS IN UNDERGRADUATE AND TEACHER EDUCATION IN SCIENCE

1964 Annual Report		1972 OMB Recommendations	
Institutes	$ 43,246,729	$ 23,300,000	Institutes
Research Participation and Scientific Activities for Teachers	3,714,884	3,500,000	College Teacher Awards
Science Education for Undergraduate Students	6,051,566	2,000,000	Undergraduate Education, Student Development
Science Education for Secondary Students	3,918,672	7,700,000	Science Curriculum Improvement
Course Content Improvement	13,975,712	9,900,000	Course & Curriculum Development
Institutional Grants for Science	11,380,023	12,000,000	Institutional Grants
Instructional Equipment for Undergraduate Education	8,650,102	4,000,000 5,000,000	College Science Improvement College Science Improvement (Special for Black Colleges)
Total	$90,934,000	$67,400,000	Total

Total Budget	$353,200,000	Total Budget Request	$622,000,000
% to Science Education	26.7	% to Science Education	10.8

* Using comparable data the year 1959 represented the highest percentage with 35%, 1957 was 27%, 1958 was 28%, 1960 was 32%, 1961 was 28%, 1962 was 26% and 1963 was 23%.

Problems Similar to Those of Private Colleges:

You will note that our statement will be in general agreement with that presented by the private colleges because of our emphasis upon undergraduate education and our similar needs for students, faculties and equipment.

Undergraduate Research Participation:

The Undergraduate Research Participation program has been particularly productive for undergraduate science instruction in all colleges and universities. This program was not recommended for funding in 1972, possibly because it was hoped that the new Student Originated Studies Program, which is seriously underfunded, would pick up part of the load. This change leaves many faculty members from small or developing institutions without possibilities of research support--research that makes their teaching more relevent--research that keeps them at the cutting edge of learning--research that develops teams of students and faculty searching for new knowledge. In addition it supplies needed student financial support and essential research supplies.

We recommend reinstatement of the URP program and a minimum level of funding of $6,000,000, adjusted within your total budget allocation.

College Science Improvement Program:

The College Science Improvement Program forces realistic long-term planning on institutions. Wisconsin State University-La Crosse is the only one of the Wisconsin State Universities to receive a grant to date. The results of this grant in improving the life science programs at La Crosse has been most encouraging. We feel this program justifies greater support.

Instructional Scientific Equipment Program:

In the 1969 presentation of NSF to the House subcommittee on appropriations it was stated: "A reliable survey indicates that an average of $100,000,000 per year is needed during this decade to equip laboratory courses requiring either complete refurbishing, 'more of the same' kind of apparatus to handle increased enrollment, or equipment for new experiments that are needed to replace outmoded ones."

In spite of this estimate, the Instructional Scientific Equipment program was funded for only 4.7 million in 1969, 4.0 million in 1970, and none for 1971. Needs have changed even more than anticipated with the new emphasis on environmental problems and much portable field equipment is now needed in addition to that surveyed above.

We recommend reinstatement of ISEP at a $8.0 million level, particularly since the Higher Education Act's Title VI-A funding has suffered set backs.

Summer Student Training Program:

The Summer Student Training Program originated in 1959 and has been operating serving 5,000-7,000 students annually. Proof of its success can be found in a 1967 study made by the NSF of 5,000 questionnaires of the participants in the 1960 program showing:

a. 98% of the participants entered college

b. 81% of the male students, and 65% of the female students majored in science.

c. 85% of the males and 74% of the females are taking, or plan to take, graduate work.

d. 41% of the males and 22% of the females have active plans to work for the Ph.D. degree.

With such success, I question the wisdom of destroying a program that can mean so much to the future of science in America. Is $2,000,000 enough?

Science Faculty Fellowship Awards and College Teacher Awards:

Science Faculty Fellowships and College Teacher Awards are most helpful to the faculties of small private colleges and emerging state colleges. Typical of the reactions to these programs is Dr. Nathan Coward's letter, see addendum, indicating the many advantages to be gained in this type of program. The funding for these programs should continue at least at the 1971 levels.

Institutional Grants for Science:

This is an excellent program because it allows the Presidents of the various grantee institutions to have seed monies for developing new or different programs. The liberalization of the policy, the past two years, allowing reasearch from the USOE and other agencies to count was helpful to the universities such as Wisconsin State University-Oshkosh. If the program reverts to funding only on strict science research grants, the smaller less prestigious institutions will suffer. Wisconsin State University-Oshkosh has used their funds to support starter grants in research, see addendum. This program should be continued.

Institutes:

The total budget request for institutes for 1972 is only $23.3 million--equal only to the summer institute funding level this subcommittee specified last year. The planned breakdown is apparently programmed as follows: Note column 4.

	FY 1969	FY 1970	FY 1971	Budget Recommendation FY 1972	Suggested Level for 1972
Institute Totals	$ 30.9	36.9	26.8	23.3	36.3
Summer	$ 21.6	23.2	23.1	11.3	23.3
Academic Year	8.9	8.4	2.7	2.8	2.8
In-Service	3.5	4.45	3.3	3.5	4.5
Comprehensive Grants	0	4.4	1.2	5.0	5.0
Systems Grants	0	0	.35	.70	.7

May I suggest that the program be returned to the 1970 level of 36.+ million as shown in the last column.

The cost of academic year institutes is high and therefore does not reach the number of persons reached in summer and in inservice institutes. It is a good but expensive program.

The inservice programs were partly funded from the 23.3 limitation funds this summer and they were started in the summer. They are relatively low cost and should be increased.

The comprehensive grants and system grants are new programs and represent new approaches and should be funded.

You may not realize that for fiscal 1972 NSF has raised the student stipend from $75 per week to $100 per week. The dependency allowance will be raised from $15 per week to $20 per week. In addition, full negotiated overhead will be allowed rather than the maximum previous 15% limitation. These changes result in providing less than 8,000 stipends from NSF's recommended 11.3 million budget. Compare this number with the 19,000 students supported on the 23.3 million of this summer.

One must remember that each high school teacher instructs at least 125 students per day so that the projected drop, when viewed from daily science student contacts, becomes 1,375,000 on a drop of 58%.

A total of $23.3 million, as we recommended above, for summer institutes still would only support 15,000 to 16,000 participants with next years increased costs.

The need still exists for these summer programs. Nation wide the ratio of applicants to positions is still 2 to 1.

Dr. Robert Brown of Michigan Technological University in Houghton, Michigan reports that for 30 positions in his ecology institute he received 493 applications (16-1). Of these 230 had no previous institute experience, 120 had one institute, 68 had two institutes and 75 were ineligible. Two-thirds of those offered stipends had no previous institute experience.

The Wisconsin State Universities program in Environmental Assessment at Chippewa Lake Field Station, the old Clam Lake Job Corp Center, was permitted 48 stipends and even though the requirements of having a background in college chemistry, physics and biology were spelled out carefully in the announcement we received 352 applications (7-1). Of the 51 stipends awarded and accepted 31 had no previous institute experience.

According to figures recently released by the NSF Institute Section -- 63% of new participants in institutes in 1970 had had no institute experience. Total institute participation continues to equal the allocations.

The need still exists for these Summer Institutes. They still are among the best programs NSF has ever offered. We recommend returning to the 36.+ million budget for this group of programs for fiscal 1972 and this would require your adding 9 million for summer institutes.

Finally -- we recognize and support the serious needs of fundamental research. We recognize and support the needs of graduate education. We question, however, the judgments that recommend increased expenditures and significant transfers at the expense of science education and undergraduate education. Particularly since these programs have a proven record of success and innovation. Programs that have high visibility and the interest and support of your constituents.

WISCONSIN STATE UNIVERSITY
SUPERIOR, WISCONSIN
54880

DEPARTMENT OF CHEMISTRY

March 12, 1971

Dr. Roy Heath, Director
Research and Development
Board of Regents
Wisconsin State University Systems
Madison, WI 53702

Dear Roy:

You asked me to present some of the benefits that have been obtained from the NSF Research Participation grants. I am happy to do so.

First: The summer research experience is itself of great importance to any teacher of science. It helps reduce the number of what Dr. Jim Dan Hill used to call "Sterile Ph.D.'s". Typically, the undergraduate institution has been long on teaching and short on research. This eventually reduces the quality of the instruction as the teachers get increasingly out of date in their fields and just plain lazy in the mind. All schools and all teachers cannot be continuously on the research frontiers. Most of us do not possess the single minded dedication to a specialized field needed to carry out any but the most trivial of problems under our own steam. Therefore, postdoctoral work under the NSF program has been a lamp in the darkness for many of us."

Second: The continuing grants that we have been allowed to use at our own schools have helped us continue some of the research that we started at the host schools. In particular: My work with Robert Kiser at Kansas State was continued here with senior students."

Third: We have gotten equipment for the school that could not have been obtained with the "normal" allotments. Science is expensive to teach and unless we receive some outside help, we cannot hope to survive above the bare subsistence level. Of course the argument against this is that the local administration should support science more in line with its needs. However, to be more practical, few locals fully realize these needs. If the scientific endeavor is to be supported at the grass roots; that is, at the small to medium sized undergraduate institution, nationally directed support is needed.

Sincerely,

Nathan A. Coward

Nathan A. Coward
Professor of Chemistry

March 25, 1971

Senator Edward Kennedy
Senate Committee On Labor And Public Welfare
U. S. Senate Bldg.
Washington, D. C.

We the undersigned urge you and your committe to recommend passage of the Ammendment to continue the National Science Foundation Science Training Programs for High School Students. Those of us who have children who have participated in this program are convinced of its value in terms of the personal development of the children as well as the National interest of the country.

Stark Lohwyt 16-73 212 ST Bayside, NY 11360
Maurice Sendacz 19 Dongan Place N.Y. N.Y. 10040
Louis D. Hammond 97-09-64th Road Rego Park N.Y. 11374
[illegible] Engelman 205 WEST END AVE, NEW YORK 11,
Marty Diamond 99-11-57 Ave. Rego Park, NEW YORK
William J. Scott 77 Columbia St N.Y.C. New York
Anthony Pizzi 91-23 Gold Rd Ozone Park N.Y.
Frank De Leonardis 378 Woodlawn Ave. N.J.
Lew Parker 90-08 32nd Avenue Jackson Hgts N.Y.
Fuzz Smith 835 Riverside Dr. N.Y.C. 10032
Harry Brownstein 1718 Grand Ave Bx. 10453
Charles Shabin 144-49-75 ave Flushing, N.Y.
Bodyn Davis 54 Riverside Drive N.Y. N.Y. 10024
Blossom Apple - 2786 Bainbridge Ave. Bronx, N.Y.
Harold W. Rosengren 7 Creek Rd Hazlet, N.J.
Doris Hoffman 2009 Cruger Ave. Bronx, N.Y. 10462
Hanna Mernit 315 W. 102nd St N.Y.C. 10015

WALDEMAR MEDICAL RESEARCH FOUNDATION, INC.
Waldemar Road & Sunnyside Boulevard, Woodbury, L. I., New York . Telephone: 516-GE 3-2500

June 1, 1971

STATEMENT:

We ask the Senate Appropriations Committee to approve an action similar to that taken by the House Science and Astronautics Committee on April 29, 1971, which mandates upon the National Science Foundation the continuation of the Student Science Training Program (SSTP) at the budgetary level of prior years, at $2 million. We ask that the Senate require the Director of the National Science Foundation expend these funds expressly as appropriated and be permitted to reprogram a portion of the allocation only with the approval of the Committees of the House and Senate having jurisdiction in these areas. We ask that other educational programs of the National Science Foundation which were mandated by the House Science and Astronautics Committee meet with similar approval.

My colleagues and I have worked for many years to improve science education. We have assisted the National Science Foundation in devising their science education programs, have helped run them, and now are petitioning Congress to assure their continuance.

We are extremely concerned about the NSF decision to terminate support of SSTP after the summer of 1971. We feel that it reflects mistaken judgment concerning national priorities. We learned the decision

to eliminate SSTP and other educational programs was reached by Dr. Lloyd G. Humphreys shortly after his appointment as assistant director for education without consultation with the staff of the National Science Foundation. Dr. Humphreys has stated that this decision was made at the highest levels of the National Science Foundation, on recommendation from the Office of Management for the Budget, and Dr. Schultz, at a time when both of these gentlemen were unaware of the content and impact of the program. In April, Dr. Schultz, Director of OMB, replied in poetry replied, in regard to SSTP that

> "...this type of program has had a small effect
> on changing students' choices and the courses they select
>
> And further we don't see now the need for a reliance
> on special Federal efforts to add more men in science."

Dr. William D. McElroy, Director of the National Science Foundation, appeared before your committee on May 24, 1971, and confirmed, upon questioning, that the SSTP evaluations were favorable, that the program did direct talented minds into science, and on further questioning, agreed with Senator Allott that the high school age was the best time for influencing young people to make career choices.

Since the reasons for terminating and curtailing NSF educational programs were based on a misapprehension belatedly recognized, it is only reasonable to request the restoration and continuation of SSTP. We cannot understand the logic of discarding this successful program which has developed and become more effective with each succeeding year. High

school students who return to their classrooms stimulate other students with their ideas and enthusiasm. Science project work is encouraged. High school science teachers experience a catalytic effect and update their knowledge. A companion educational program of the NSF, Teacher Institutes, aids and supports science teachers in their desire to increase their scope and talents. The SSTP program has been evaluated by the NSF quite thoroughly, six studies in the past ten years, and has been adjudged effective in all of these areas.

In creating the National Science Foundation, Congress, in Public Law 507-81st Congress as amended through July 18, 1968, states in Section 3, Paragraph A(1) "The Foundation is authorized and directed to initiate and support basic scientific research and programs to strengthen scientific research potential in the mathematical, physical, biological, engineering, social, and other sciences..." We do not for a moment question the importance of dealing with such societal problems as pollution, transportation, and the production of energy. However, to substitute these areas for the basic sciences even limits our very ability to deal effectively in the long run with societal problems. SSTP and other educational programs of the National Science Foundation that were scheduled for curtailment by the NSF, programs which we call upon you to continue, are just those programs requested by the Law that "strengthen the scientific research potential" of our nation.

The NSF consideration that an oversupply of scientists at the

present time requires that priorities must be redirected, admittedly ignores that the productivity of SSTP is approximately ten years in the future. The shortage of scientific talent in 1958, post-Sputnik, was the cause that initiated these training programs. We have faced scientific talent shortages in the past that were engendered by the feeling current among people making career choices in times of unemployment among the professionals. Our youth is turning away now from scientific studies and professional training. It is just at this time, therefore, that programs such as SSTP need encouragement to assure the availability of a pool of scientific talent for our nation in the next decade.

The plight of young people seeking useful opcupation to which to devote their summer is a national problem. Unemployment of young people is reaching disastrous proportions. President Nixon has rightfully recognized this problem and has requested that $64 million be devoted to providing summer employment to disadvantaged young people. We estimate that it will require approximately $1,500 or more per person to put these teenagers to work for the summer (Chicago Sun-Times, April 10, 1971). SSTP will place approximately 5,000 young people in an educationally gainful occupation for $300-$400 per person for the summer. Not only is SSTP more economical in this respect, but the training they receive will reap increased dividends for the nation ten years in the future. We question the logic which discontinues SSTP in the face of crying need for many such programs for young people in this and other areas of endeavor.

62-912 O - 71 - 43

Let me assure the senators that our intense feelings concerning continuation of SSTP arise out of essentially selfless motives. We and our institutions contribute greatly in addition to the support given by the National Science Foundation. Young people who have requested continuation of the program ask not for themselves, but for students who follow after them to receive similar benefits. NSF support, however, is indispensable for the success of the program. National publicity and the prestige of the NSF makes it possible for talented people throughout the United States to offer themselves for admission. They do so in numbers far in excess of the meager capacity of the programs available. This competition is good for the student and heightens his interest. The program is offered to high ability juniors who get brief but vital acquaintance with the latest ideas and concepts of science, who meet other talented individuals for the first time, and who learn to stretch their mental muscles. It permits them to be oriented in multiple scientific disciplines so that they may choose their academic careers more wisely. They cannot receive such experience in the normal high school environment.

Others who have written you, I am sure, have done so solely because they feel strongly that these programs should be continued on the basis of their merit. I suspect that you rarely receive requests for program support where the constituents themselves do not have a direct interest. I earnestly solicit your support for an NSF budget which mandates

educational expenditures for SSTP and other educational programs upon the NSF. More than 150 past and present directors of SSTP activities in universities and research institutions of our country join with me in this request.

Leo Gross, Ph. D.
Director of Educational Programs

LE MOYNE COLLEGE
LE MOYNE HEIGHTS
SYRACUSE, NEW YORK 13214

PHYSICS DEPARTMENT

April 8, 1971

Senator Edward M. Kennedy, Chairman
Senate Subcommittee on NSF (Authorization)
Room 431
Old Senate Office Building
Washington, D. C. 20510

Dear Senator Kennedy:

The National Science Foundation has requested authorization for its FY 1972 programs. This request diminishes science education funds, while greatly increasing total NSF funds. Such a reduction strikes at support for science education in the four-year undergraduate colleges at a moment when this support is most needed. I am writing you to ask your subcommittee to redress this situation.

In his comments on the FY 1972 NSF budget, Dr. McElroy said that "new emphasis will be placed on the development of science curriculum and course content that will be of significant benefit to a broader spectrum of students and that will increase the career options of science and engineering graduates." In his testimony before the Subcommittee on Science, Research and Development, Dr. Humphreys said that the NSF is planning support of problem-oriented introductory courses to improve science education for the general student in high school and the lower division of college. He went on to say that such courses "will attract certain students currently rejecting the scientific disciplines, will better serve the needs of general education in science, and can serve as introductions to science for the avowed major as well." I am certain that most educators would applaud the goals contained in both of these statements.

If these goals are ever to be achieved, they will have to be achieved where the students are to be found. This means, in the concrete, they will have to be achieved in the four-year undergraduate colleges. It is in the undergraduate colleges that we find the broad spectrum of students taking introductory science courses, courses which are most often their last exposure to the study of science. This is precisely where students become aware of what science and technology have contributed to the building of the society in which we live; if they perceive that this society is in need of change, this is where they will acquire knowledge of the science and technology that will be needed to bring about any kind of constructive change. It is in the four-year colleges that we find the young people who reject the scientific disciplines; if they are to be attracted to new innovative science courses, where else can it be done? It is idle to formulate plans for innovation in science education while at the same time cutting support for science education in undergraduate institutions.

Permit me to comment briefly on three NSF programs. I am project director for an NSF Instructional Scientific Equipment Program grant made to Le Moyne College last year. I know from first-hand experience how valuable this program can be. I have used this grant, together with matching funds from the college, to construct a modest microwave spectrometer which will be used by undergraduate students to study electron spin resonance in magnetic crystals. In many other schools this program has also fostered the development of new instructional materials and new techniques in science education. Yet, in FY 1972 the Instructional Scientific Equipment Program is not scheduled to receive any funds whatever, just when new types of equipment are needed for environmental education.

Another program which is not due to be funded next year is Undergraduate Research Participation. In past years this excellent program has given a large number of undergraduates the opportunity to gain direct experience in scientific research -- an experience all too often reserved to graduate students. The program has helped demonstrate that the gifted undergraduate develops most rapidly if given the chance to apply himself to the solution of a significant and challenging problem. I urge you to fund this program.

I also commend to your continued support the College Science Improvement Program. This most comprehensive of all NSF programs in science education assists colleges to accelerate the development of their science capabilities; it helps make good colleges into excellent ones. Exclusive of the black colleges, this program is due to be funded at the same level as last year and at a lower level than FY 1970. I ask you to increase the authorization for this program in order that more colleges may participate in it.

Briefly, the proposed National Science Foundation budget has its priorities sadly misplaced. While NSF is seeking a large increase in total funds from $507 million last year to $622 million in FY 1972, it is cutting into support of science education on the undergraduate level. This means that more money than ever will go into training of specialists and less into general education, while the needs of our society seem to demand just the opposite. I ask your subcommittee to reverse this development in the four-year undergraduate colleges.

Sincerely,

Thomas E. Murray, S.J.

Thomas E. Murray, S.J.
Director, Federal Relations Office

TEM/ek

OFFICE OF THE PRESIDENT
WELLESLEY COLLEGE
WELLESLEY, MASSACHUSETTS 02181

April 21, 1971

Dear Senator Kennedy:

The Administration's proposed budget for the National Science Foundation for the fiscal year 1972, though substantially increased, reduces support for science education by about one-fourth. In addition, institutional support for science is being recommended for a two-thirds cut.

This proposed budget would eliminate Undergraduate Research Participation, Science Faculty Fellowships, the Student Science Training Program, and Instructional Scientific Equipment Program; inadequate or reduced funding is recommended for the College Science Improvement Program, Teacher Institutes, Pre-College Course Curriculum, Special Projects and Institutional Grants.

This is particularly distressing to me and Wellesley College Science Departments. Over the years support from the National Science Foundation has been extremely important to us. I would mention that the cutback in the Undergraduate Research Program bothers us in particular. In the past, Wellesley College has been fortunate in receiving a number of these Grants and in our Chemistry Department alone eight such Grants were received between 1962 and 1970.

Undergraduate research is strongly encouraged at the College and withdrawal of support for this program, along with the others, would be most unfortunate. Please consider the importance of these programs to institutions such as Wellesley when you react to the proposed budget.

Thank you very much.

Sincerely yours,

Ruth M. Adams

RMA/jc

The Honorable Edward M. Kennedy
Room 431
Old Senate Office Building
Washington, D. C.

CARLETON COLLEGE
NORTHFIELD, MINNESOTA
55057

DEPARTMENT OF CHEMISTRY (507) 645-4431 x 224

March 25, 1971

Senator Edward M. Kennedy, Chairman
Special Subcommittee on the National Science Foundation
The United States Senate
Washington, D.C. 20515

Dear Senator Kennedy,

I am a chemistry teacher in a small liberal arts college in Minnesota. I am very much concerned about some recent actions taken by the National Science Foundation to reduce its support for undergraduate science education. The FY 1972 budget of the Foundation for undergraduate education should be increased by 16 million dollars just to bring it to the same level as the FY 1969 budget. This sum is needed to prevent the complete abolition of most of the undergraduate education programs developed by the National Science Foundation during the past decade. These programs are vital to the continued well being of science education in this country, particularly in non PhD granting institutions. When the National Science Foundation presents its FY 1972 program to your committee, you will be in a strong position to influence the policy of the Foundation. I strongly urge you to do whatever you can to at least return National Science Foundation support for undergraduate education to the FY 1969 level. I have enclosed with this letter a statement outlining some of the arguments supporting my position on this issue.

Sincerely,

James E. Finholt
Associate Professor of Chemistry

The Case for National Science Foundation Support of Undergraduate Science Education

James E. Finholt, Ph.D.
Associate Professor of Chemistry
Carleton College, Northfield, Minnesota

Science education at the undergraduate level has been greatly assisted during the past decade by the National Science Foundation, particularly in institutions which do not offer graduate level work in science. These institutions train well over half of all professional scientists and also provide basic education in science for hundreds of thousands of nonscience students. During the past two years the National Science Foundation has been reducing its commitment to undergraduate science education and in FY 1972 it is proposing to make further drastic reductions in its activity in this area. The purpose of this statement is to argue in favor of strong National Science Foundation support for undergraduate science education, particularly in non Ph.D. degree granting colleges.

The charter of the National Science Foundation charges it with the responsibility to support science education. This is a wise provision, because the ultimate quality of our nation's scientific and technological efforts is surely strongly dependent upon the quality of science education in our nation. Today, more than ever before, we need first rate scientists and engineers to help meet the challenges facing us in areas such as health care, agriculture, environmental protection, transportation, etc. Money spent on education today will be repaid many times over in the future. We also need citizens who are not scientists but yet have enough of a grasp of the strengths and limitations of science to make wise decisions about the role of science and technology. Today's headlines are concerned with the SST controversy, a perfect example of the kind of scientific-technological problems which must be faced again and again in the months and years to come. Only the best kind of science education will enable us to meet these challenges wisely.

Until about two years ago, the National Science Foundation was meeting its responsibilities in the area of undergraduate education in a completely satisfactory fashion through a variety of funding programs. In each program, grants were made on a competitive

basis to 30 to 50% of the proposals submitted to the Foundation. These proposals were carefully evaluated by panels of knowledgeable individuals from outside the Foundation as well as the Foundation staff. This process had the dual virtues of helping the Foundation to invest its funds wisely and enabling Foundation personnel to keep in close contact with science educators around the country. Recently, the National Science Foundation has been modifying its undergraduate science education activity. These changes have been made mainly in the following programs.

Instructional Science Equipment Program (ISEP)

This program provided funds on a 50-50 matching basis for the purchase of scientific equipment necessary for high quality science instruction.

Undergraduate Research Participation (URP)

This is the oldest and most important of the undergraduate science education programs developed by the National Science Foundation. It provides funds to enable science students to spend a summer doing research with faculty members. URP funds were the only support for research in many colleges without graduate programs. Science is research and it cannot be taught well at the college level in any college where no research is being conducted.

College Science Improvement Program (COSIP)

COSIP is a broad gauge program providing relatively large grants to an entire institution. These grants have often enabled a college to completely revise and improve its complete science program.

Science Faculty Fellowships

The teacher is the key to the quality of any educational program. Faculty fellowships enabled college science instructors to spend 3 to 12 months in full time study approximately every six years to try and keep up with the rapid advances in modern science. Without such periodic periods of retraining, any science teacher will become obsolete.

Student Originated Research (SOR)

This is the newest National Science Foundation Program and it will be operated on a large scale basis for the first time during the coming summer (1971). It supports science research projects designed and operated by undergraduate students. Faculty members are specifically barred from helping with these programs in any way beyond an occasional consultation. It will be a useful program for major universities with graduate research programs. It will be of little help to the students and faculty of non Ph.D. granting colleges. One of the major strengths of such schools is the opportunity they offer for students and faculty to work together. In colleges, the faculty are not distracted from working with undergraduates by the demands of graduate students. Secondly, without URP programs, many faculty members at small colleges will be unable to do any research. Without faculty research, student research cannot long flourish on its own. It is doubtful if any faculty members or students in non Ph.D. degree granting institutions can be found who would favor the Student Originated Research Program over the joint student-faculty Undergraduate Research Program.

The effectiveness of the kind of programs supported by the National Science Foundation in 1969 can be established in several ways. Evaluations published by the Foundation have always indicated that the funds committed to these programs have been wisely spent. The Foundation personnel who have administered these undergraduate education programs could certainly testify about the value of these programs. Science educators throughout the country have been highly pleased with the help the National Science Foundation has been able to provide.

Another way to evaluate these activities of the Foundation is to look at a specific example of the effect of Foundation help. The Chemistry Department of Carleton College, Northfield, Minnesota is a good case to consider. During the past 6 years this department has graduated an average of 15 chemistry majors each year. For comparison, the University of Minnesota, which is 20 times as large as Carleton, has only averaged about 50 chemistry graduates each year. Over half of these Carleton chemistry students have gone on to graduate work in science at major universities including schools such as Harvard and the University of California. During this time, Carleton chemistry students have been awarded 8 National Science Foundation Fellowships for graduate study, they have presented 13 research papers at state chemistry meetings, and, together with the faculty,

have published 9 research papers in national professional journals or at national meetings of the American Chemical Society. The faculty have also published 9 papers dealing with the teaching of chemistry. During this time the department developed a new course for non-science majors which has increased its enrollment from 7 to 70 in five years. It is no coincidence that this department has received two major ISEP grants, 5 URP grants, 1 Faculty Fellowship, and shared in college wide computer and COSIP grants during the past 6 years. This kind of relationship between NSF support and outstanding achievement can be duplicated at colleges all across the nation.

It is instructive to compare the FY 1969 budget to the FY 1972 budget for the programs discussed in the previous paragraphs.

	FY 1969 millions of dollars	Proposed FY 1972 millions of dollars
Instructional Scientific Equipment	4.6	0.0
Undergraduate Research Participation	4.0	0.0
Science Faculty Fellowships	2.5	0.0
College Science Improvement	8.8	4.0*
Student Originated Research	0.0	2.0

* The total COSIP budget for FY 1972 is 9 million dollars, but 5 million dollars is reserved for black colleges.

The total proposed National Science Foundation budget for FY 1972 is 116 million dollars greater than it was in FY 1971. It surely must be possible to find the 15.9 million dollars required to restore spending to the FY 1969 level for the undergraduate education programs which the Foundation is proposing to eliminate or drastically reduce. If economies must be made, the Student Originated Research Program should be cut rather than expanded.

The abandonment of undergraduate science education by the National Science Foundation comes at a particularly difficult time. Colleges and universities of all kinds are facing one of the most severe financial crises ever to challenge higher education. There are simply no sources of funds to replace the support being withdrawn by the National Science Foundation. No other federal agency can take up the slack. No source of nongovernment funds is available. If the National Science Foundation persists in its ill advised policies, the only possible result will be a steady deterioration in the quality of scientific education in the United States.

OFFICE OF
SENATOR
EDWARD M. KENNEDY
WASHINGTON, D.C.
MAR 22 11 09 AM '71

MUSEUM OF SCIENCE AND INDUSTRY
FOUNDED BY JULIUS ROSENWALD
57TH STREET AND SOUTH LAKE SHORE DRIVE
JACKSON PARK
CHICAGO, ILLINOIS 60637

March 16, 1971

Honorable Edward Kennedy, Chairman
Subcommittee on National Science Foundation
Senate Committee on Labour & Public Welfare
Senate Office Building
Washington, D. C. 20510

Dear Senator Kennedy:

As one who has followed the Student Science Training Program (SSTP), I am very much distressed to learn that Dr. Lloyd C. Humphreys, Assistant Director of the National Science Foundation, indicated that the SSTP program would be eliminated entirely after the summer of 1971. This program has been of outstanding value to our high school youth interested in science.

I suppose the elimination is due to lack of funds. I have been informed that $2.5 million specifically earmarked for this program, which is held during the summer months, would enable the program to be continued. I would hope that you, as Chairman of the Science Subcommittee of the Senate Labour and Public Welfare Committee, could offer such an amendment. I am sending a copy of this letter to our two Illinois Senators, who, I would hope, would give you support on this matter.

I hope I am not imposing on you by writing to you on this important subject, but I do think that you have a deep interest in the youth of our Nation and will try to help in this important matter.

Sincerely yours,

Noble J. Puffer

Noble J. Puffer
Educational Supervisor

CC: Honorable Adlai Stevenson, III
Honorable Charles Percy

LOS ALAMOS HIGH SCHOOL
LOS ALAMOS, NEW MEXICO 87544

ROBERT L. LOAR, PRINCIPAL
PAUL L. SIZEMORE, ASSISTANT PRINCIPAL
WILLIAM M. VALIGURA, ASSISTANT PRINCIPAL

J. GWYNETH LILES, COUNSELOR
MELVIN C. LORA, COUNSELOR
JEROME J. MILLER, COUNSELOR

March 19, 1971

The Honorable Edward Kennedy
The United States Senate
Labor and Public Affairs Committee
Washington, D.C. 20515

Dear Senator:

It has recently come to our attention that a decision has been made to terminate funding of all summer Student Science Training Programs sponsored by the National Science Foundation. As experienced secondary school teachers, we strongly urge that Congress amend the appropriation to the National Science Foundation to specify that a certain portion of its funds be spent for high school summer science programs.

As an educator, I have observed that these programs have had an impact far beyond the benefit to the individual participant. The overall effect of these S.S.T.P. programs has been to markedly influence science education and interest in science and to generate enthusiasm for scholarly work. Those students who have actually participated in the programs help assure the country of the existence of a talented and capable group in future years. They may not all become scientists, but they will be citizens who are more knowledgeable about scientific affairs and as such are more able to meaningfully participate as voters in decisions which involve scientific matters with social overtones.

We encourage you to support any effort to earmark funds specifically for these programs in the NSF appropriation.

Sincerely yours,

Robert Caswell
Mr. Robert Caswell
Science Dept. Chairman
Physics Dept.

Leon Cooper
Mr. Leon Cooper
Chemistry Dept.

Gloria Cordova
(Miss) Gloria Cordova
Chemistry Dept.

Robert Eikleberry
Mr. Robert Eikleberry
Biology Dept.

Duane Wagner
Mr. Duane Wagner
Earth Science

GRINNELL COLLEGE
GRINNELL, IOWA 50112

April 22, 1971

Senator Edward M. Kennedy
Chairman, Special Subcommittee on
National Science Foundation
Senate Labor and Public Welfare Committee
Senate Office Building
Washington, D.C.

Re: HR 4743

Dear Senator Kennedy:

For the past three years, funds granted to Grinnell College under a College Science Improvement Program grant have supported anthropological field work, laboratory analysis, and teaching experimentation. The program was most successful, and it allowed the department to acquire facilities which can be and in the future, financially allowed students and faculty participation, and permitted new, exciting experiences which the College had previously not been able to develop.

While I recognize the problems of tight money, I sincerely hope that many of the NSF programs (e.g., Undergraduate Research Participation, COSIP, etc.) will continue to be funded.

The value of these programs cannot be overestimated.

Sincerely,

Ralph E. Luebben
Professor of Anthropology

MOUNT TOM MEDICAL GROUP, INC.

NEUROLOGY
ANN MICHELSON HIRSCHHORN, M.D.

UROLOGY
RICHARD CLARK HIRSCHHORN, M.D.
MORRIS MARVIN HILF, M.D.

159 ESSEX STREET
HOLYOKE, MASS. 01040

6 STONY HILL ROAD
INDIAN ORCHARD, MASS. 01051

TEL: HOLYOKE 534-3321

UNION PLAZA MEDICAL CENTER
EASTHAMPTON, MASS. 01027
TEL.: EASTHAMPTON 527-0990

March 24, 1971

Honorable Senator Edward Kennedy
Senate Office Building
Washington D. C. 20515

Dear Senator Kennedy:

I am writing to request that you support the Congressional appropriation of $2.5 million for High School Student Science Training Programs held primarily during the summer of 1972 at institutes across the country.

The National Science Foundation has supported the Jackson Laboratory, Bar Harbor, Maine, Summer Training Program for Precollege Students since 1960. The Grant to be given to the Jackson Laboratory for this program in 1971 will be about $19,000. The foundation has announced that it will terminate its support of Summer Science Training Programs at the conclusion of the 1971 Summer Session. I feel very strongly that these programs should not be terminated for the reasons listed below. Therefore, I am requesting that you support the Congressional appropriation whose support would permit the continuation of the programs.

These programs introduce bright young people to the concepts and techniques of scientific research. The availability of these programs stimulates greater student and parent interest in secondary school science resulting in an upgrading of science education at both the scondary and elementary school levels. The presence of bright, uninhibited, questioning minds at research institutions during the summer stimulates new insights and approaches to research by their sponsoring scientists. The program does not contribute to current science manpower problems, either by meeting the demand in times of growth or by swelling the excess in times of contraction, since participants will not enter the manpower pool for many years to come. The $2.5 million mandate requested for 1972 is a small investment for the future yield. Many costs are borne by the grantee institutions, especially the cost of providing volunteer teachers and well-equipped laboratories for the summer student training program participants.

I am a Neurologist in practice in Western Massachusetts and I am particularly interested in the program at the Jackson Laboratory, Bar Harbor, Maine because I was privileged to be a member of the College Student Program in the early 1950's. I was given an opportunity to take part in a research project which resulted

in the identification of the research breed of mice with muscular dystrophy. These findings, though perhaps serendipitous for a young student, have provided a great tool for research in the field of muscular dystrophy. I have since gone on to medical school and resident training in Neurology. I did further research for several years after completing my training and I am now in private practice in an area which is understaffed in my particular specialty. This is just one example of the successful outcome of one summer student training program.

Once again, I ask your support for the Congressional appropriation of $2.5 million earmarked for the High School Student Science Training Programs to be held primarily during the summer of 1972. This will be considered by the Senate Committee on Education and Labor with hearings to be held this months.

Thank you for your kind attention.

Very truly yours,

Ann M. Hirschhorn, M. D.
Neurologist

AMH:cam

WALDEMAR MEDICAL RESEARCH FOUNDATION, INC.
Waldemar Road & Sunnyside Boulevard, Woodbury, L. I., New York 11797 Telephone: 516-GE 3-2500

May 14, 1971

Senator Edward M. Kennedy, Chairman
National Science Foundation Sub-Committee
Senate Office Building
Washington, D. C.

Dear Mr. Kennedy:

I urge once again that support be given to the National Science Foundation budget at the levels of former years. In particular, we speak out for the Student Science Training Program (SSTP) which introduces young people to the concepts and techniques of scientific research. This program was completely eliminated from the National Science Foundation budget, apparently at the behest of Dr. Schulz of the Office of Management and the Budget.

Should your committee hold hearings on this matter, we request the opportunity to testify. Either I or Dr. Edwin Mirand would appreciate this opportunity. I enclose a copy of the statement made by Dr. Mirand on this matter before a subcommittee of the House Appropriations Committee.

We appreciate your favorable consideration of our request.

Sincerely,

Leo Gross

Leo Gross, Ph. D.
Director of Educational Programs

LG:eg
Enc.

62-912 O - 71 - 44

STATEMENT OF: Dr. Edwin A. Mirand, Associate Institute Director
and Dean of Graduate Studies

Roswell Park Memorial Institute
Buffalo, New York 14203

before the HUD, Space, Science Sub-Committee of
the House Appropriations Committee

Wednesday, May 12, 1971

Mr. Chairman, Gentlemen of the Subcommittee:

Your invitation to appear before this Committee is greatly appreciated. Many of my colleagues throughout the United States and I have labored long to improve science education. We have assisted the National Science Foundation in devising their science education programs, have helped run them, and have petitioned Congress to insure their continuance.

We are pleased to find that the House Science and Astronautics Committee on April 29th approved the action taken by the House Science and Research and Development Subcommittee to restore the deleted educational programs and in particular, the Student Science Training Program (SSTP) to the budgetary levels of FY 1971. It is heart-warming that the Committee has, furthermore, mandated upon the Director of the National Science Foundation (NSF) the necessity to expend these funds expressly in support of the programs designated in each line of the budget, allowing only minor changes.

We are here to request that these decisions of the House Science and Astronautics Committee be approved by this Committee and be forwarded to the full House for its approval. Your approval of the budget presented to you requires the NSF to carry out the aim of the Congress and insures that this will not be obviated by shifting funds at the NSF Director's discretion.

We are extremely concerned about the NSF decision to terminate support of the SSTP after the summer of 1971. We feel that it reflects mistaken judgment concerning national priorties.

My own interest in the NSF educational budget arises out of more than 18 years of experience as a Director of SSTP programs which have permitted me to introduce to careers in science more than 2,000 talented high school students. My staff and I have given of ourselves far beyond the call of our institutions and the funds allocated for these purposes because we feel it is every scientist's duty not only to increase the scope of man's knowledge, but also to provide the next generation of scientists to carry the work forward.

Colleagues of mine who operate other SSTP programs (Dr. Victor Satinsky of Hahnemann Medical College; Dr. Loren G. Hill of the University of Oklahoma; Dr. Kenneth J. Torgerson of the University of Arizona; Dr. Frantisek Wolf of the University of California; Drs. J. A. Hynek and Jay Burns of Northwestern University; Dr. J. Christman of Loyola University, New Orleans, La., and many other SSTP directors) participate in such work because of their dedication to the needs of the next generation of scientists.

Our intense feelings concerning continuation of this program arise out of essentially selfless motives: We contribute far in excess of any support the NSF might give. However, NSF support is indispensable for the success of the program. The national publicity and the prestige of the NSF makes it possible for the most talented young people to offer themselves. They do so in numbers far in excess of the meager capacity of the programs available. Approximately ten times as many applications are received as appointments available. This competition is good for the student and heightens his interest. Furthermore, SSTP introduces

young people to science at a time when they are first making their career choices. The program is offered to high ability high school juniors, who get a brief but very vital acquaintance with the latest ideas and concepts of science, who meet other talented individuals for the first time and who learn to stretch their mental muscles. It permits them to be oriented to multiple disciplines in the sciences so that they may choose their academic careers more wisely. They cannot receive such experience in the normal high school environment.

By all odds, the SSTP has been the most successful of the educational programs offered by the NSF. It has also forced the instructional staffs at high schools constantly to upgrade their own knowledge. However, the Asst. Director of the National Science Foundation stated on January 15, 1971, that the program was being terminated because it had not been sufficiently evaluated and was deemed unfruitful. However, the contrary is the case. SSTP is the only program that had been thoroughly evaluated by the NSF. Since 1959, there have been six follow-up studies (see listing attached). The general tenor of these evaluations has been that the SSTP participants, when compared with other students of equal interest and intelligence, were more likely to choose a science major in college, to go on to graduate school, and to win graduate degrees. In short, they have displayed more marked motivation to work in science. Summarizing these statistics, we noted that a follow-up of 5,000 cases of 1960 high school participants showed that 85% of the males and 67% of the females were undergraduate science majors. When this survey was made (1967), 82% of these males and 71% of these females were graduate students with science majors. SSTP can thus not be faulted for lack of productivity.

The human content of the program may be indicated by citing a few cases. I am particularly moved to mention to you the career of my former student, Lawrence Okun. Dr. Okun took an undergraduate degree in physics at Wesleyan and a doctoral degree in molecular genetics at Stanford. He is now a post-doctoral fellow at Harvard Medical School. The SSTP Director of the Jackson Laboratories, Mr. R. F. Shea, is proud of many of his illustrious alumni. Two of them, Dr. Howard M. Temin, at the University of Wisconsin, and Dr. David A. Baltimore, now at M.I.T., have both made substantial contributions to the fields of molecular biology and cancer research. Dr. Leo Gross, Director of the Waldermar Medical Research Foundation program, tells of a young man suffering from a hereditary ailment - Gaucher's disease - who has dedicated his life to the study of metabolic diseases, now as a Professor of Medicine at the University of Illinois. A talented young man's boredom, resulting from insufficient challenges within his high school experiences, apparently underwent impressive changes after his intellectual challenge in the Waldermar program. He is now an Associate Professor of Psychology at the University of Oregon and the Director of the Clinical Psychology Laboratory.

Without question, the impact of SSTP experiences on the student participant has been enormous. The few cases cited above are like the tip of the iceberg projecting above the water. The rapid growth in critical thinking and in creativity generated by SSTP participation results in the development of constructive attitudes and philosophies which cannot be derived from textbooks or the high school environment alone. These students are truly exposed to the scientific method in exploring the unknown at a time in their lives that is critical to their future development.

Clearly, SSTP has achieved the goals set by the NSF since it first undertook 13 years ago to win talented individuals to choose scientific careers. Continuation of SSTP at present is especially vital to provide scientific talent for all levels of our technologic society in view of the trend away from science in high schools and on the campuses of our universities. Were it curtailed, the future supply of talented individuals necessary for national scientific excellence might be sorely limited. Moreover, it is the NSF's mandate to concentrate on developing potential scientists. This groups is a fragile resource, capable of being shunted to other fields of endeavor.

The NSF's plan to terminate support for SSTP on the basis of a current oversupply of scientific and technical talent is disquieting. It ignores the condition that this program's productivity in terms of needs is ten years into the future. May we not see at that time shortages in scientific personnel similar to those the nation experienced prior to World War II and in 1958 post-Sputnik years?

The NSF Directors, by their own admission, made the choice to curtail SSTP and other educational programs without consultation with the NSF staff and advisors and followed the edicts of the Office of the Management of the Budget (OMB), which may have been unaware of the nature of the programs or of their success. The Chicago Daily News of May 1, 1971, reported OMB Director, George P. Schultz, as stating mistakenly that this program had "a small effect... on student choices... and we don't see now the need... to add more men in science." You know from previously quoted NSF studies that the SSTP program is effective in winning students to scientific careers and that national excellence requires an intelligent, talented cadre of scientific leaders in the future.

What is more distressing to us is the fact that the NSF Administration's stress is misplaced. In creating the National Science Foundation in Public Law 507-81st Congress, as amended through July 18, 1968, the Congress stated in section 3, paragraph A(1) - and we quote "that the Foundation is authorized and directed to initiate and support basic scientific research and programs to strengthen scientific research potential in the mathematical, physical medical, biological, engineering, social and other sciences.....!"

We do not for a moment question the importance of dealing with such societal problems as pollution, urbanization, transportation and the production of energy. However, to substitute these areas for the "hard" sciences even limits our very ability to deal effectively in the long run with these societal problems.

The SSTP program and other educational programs of the National Science Foundation that were scheduled for curtailment by the NSF are just those programs called for by the law that "strengthen the scientific research potential" of our country. The NSF's decision to terminate SSTP is defended by Dr. Lloyd G. Humpreys, Assistant NSF Director (Education) for the very reasons these programs should be continued when he says "when we look to the future, the need to educate in science and technology a greater variety of people for a broader range of purposes assumes increasing importance." (Remarks before the House Science and Astronautics Committee, March, 1971).

Further, it is an anomaly that a successful program, which brings 5,000 young people into intellectually gainful occupations for the summer, should be terminated at a time when President Nixon acts to

increase summer jobs for youth. Mr. Nixon's plan will provide $64 million to put "disadvantaged" teen-agers to work this summer (Chicago Sun-Times, April 10, 1971). Compare this to the $2 million recommended and approved by the House Science and Astronautics Committee, which will put a proportionally far larger number of young people into summer occupations that will reap fantastic dividends for the country ten years in the future.

Dr. Philip Handler, head of the National Academy of Sciences, has decried as misplaced the conception of national priorities followed by the NSF in reducing educational support and in directing the National Science Foundation more and more toward applied research, contrary to the original intentions spelled out at the time of its founding (Science, April 16, 1971).

The training offered by the SSTP, and the other NSF educational programs is designed for the small, but admittedly talented, group of individuals who are of increasing importance to national welfare in our technological age. Scientific talent is not a generally available commodity. It requires a special turn of mind, a consuming curiosity about the unknown. It is a delicate plant that must be carefully nurtured to grow.

I should like to point out again that none of the people who have written to support a mandate upon the NSF to continue its educational programs could even remotely benefit personally by the continuation of these programs. They have written to you, as I did, solely because we all feel strongly that these programs should be continued on the basis of their merit. I suspect you rarely receive requests for program support where the constituents themselves do not have a direct interest.

I earnestly solicit your support for the NSF budget, as approved by the House Science and Astronautics Committee and the mandate the Committee has placed upon the NSF to continue these specific programs. More than 150 present and past directors of SSTP activities in the universities and research institutions of our country join with me in this request.

I thank you for your courtesy in letting me appear before you.

SSTP

EVALUATION STUDIES BY

THE NATIONAL SCIENCE FOUNDATION

1. Edgerton, Harold A. "A Look at the 1959 National Science Foundation's Summer Science Training Programs for High Ability Secondary School Students", Richardson, Bellows, Henry & Co., Inc., New York, Dec. 1959.

2. Edgerton, Harold A. "Impact of a National Science Foundation's Summer Science Training Programs for High Ability Secondary School Students", Richardson, Bellows, Henry & Co., New York, Dec. 1961.

3. Edgerton, Harold A. "Three Years after SSTP - A Follow-up Study of the Participants in the 1960 SSTP", Performance Research, Inc., Washington, D. C., April 1965.

4. "Follow-up Study of 1960 SSTP Participants - Five Years after Participation", American Institute for Research, Silver Springs, Md., Jan., 1968.

5. "Follow-up Study of 1963 SSTP Participants - Three Years after Participation", American Institute for Research, Silver Springs, Md., Jan., 1968.

6. In press.

U. S. SENATE, WASHINGTON, D. C. April 27, 1971

Dr. Warren E. Miller
Director, Center for Political Studies
The University of Michigan
Ann Arbor, Michigan 48106

Dear Dr. Miller:

You may be sure that I, along with many other members of the Congress, share your concern for the abrupt decision by the administration to discontinue a number of science education programs at the National Science Foundation.

Some of the budget cutting has been done under the guise of a shift in priorities, and some of it has been done on the premise that we have too many scientists and engineers now and any increase in their number should be discouraged.

For my part, I cannot help but see this as part of the administration's failure to commit itself to the support of higher education. Certainly there can be no higher priority today, and I heartily concur with you that to reduce the quality of social scientific personnel, at a time when we are groping desperately for answers in this field, is a great mistake.

It is my understanding that the House Subcommittee on Science, Research and Development, the authorizing committee for NSF, is about to release a proposed line item budget for 1972 that restores many of the cuts proposed by the administration. Unfortunately, the Subcommittee did not restore funds for the Advanced Science Education program, all funds of which have been used in recent years for Advanced Training Projects like the one you describe. Apparently the testimony and correspondence dealing with the budget did not call attention to this program, perhaps because the amount of money involved was relatively small.

It seems to me that your letters indicate the significance of the Advanced Science Training Projects and the great illogic in discontinuing this program. It seems clear that the arguments for such a program are the same as those involved in restoring the other science education programs that were dropped by the administration - that this is a program that makes a highly significant contribution to educational quality and is not directed toward increasing the number of scientists and engineers.

Therefore, I am asking the Senate's Special Subcommittee on the National Science Foundation to look into the possibility of restoring the Advanced Training Projects to the budget when that committee holds its authorization hearings.

Meanwhile, thank you for calling this matter to my attention.

With best wishes,

Sincerely,

Philip A. Hart

U.S.S.

ISR

CENTER FOR POLITICAL STUDIES / INSTITUTE FOR SOCIAL RESEARCH / THE UNIVERSITY OF MICHIGAN / ANN ARBOR, MICHIGAN 48106

March 17, 1971

Senator Philip Hart
U.S. Senate
Washington, D.C. 20000

Dear Senator Hart:

I am enclosing a copy of the letter I have recently sent to Dr. McElroy of the National Science Foundation. I am also enclosing our last Annual Report which will refresh your memory on the nature of the summer program that now is threatened by the termination of Advanced Training Projects within NSF. ~~I think this move is nothing short of disastrous~~, and I hope that it may be possible for you to respond to it in a positive fashion. I would, of course, be delighted to provide you with any added information and to do whatever else I might to retain this important contribution to our ability to respond to the problems facing our society.

Sincerely,

Warren E. Miller/os

Warren E. Miller
Director
Center for Political Studies

os
Enclosures

ISR

CENTER FOR POLITICAL STUDIES / INSTITUTE FOR SOCIAL RESEARCH / THE UNIVERSITY OF MICHIGAN / ANN ARBOR, MICHIGAN 48106

March 17, 1971

Dr. William D. McElroy, Director
National Science Foundation
1800 G Street, N.W.
Washington, D.C. 20550

Dear Dr. McElroy:

I am writing this letter with a mixture of dismay and confusion. We recently received word from one of the Foundation's project officers that the Advanced Training Projects were to be discontinued. I am dismayed because this will certainly be an exceedingly serious setback to our summer program which each year [redacted] Certainly in the instance of our own training program, [redacted] committed to professional careers [redacted] Discontinuation of this training opportunity will simply leave them less able to function as thoroughly professional research scientists and scholars without altering their career perspectives.

[redacted] with which I am particularly concerned--the Advanced Science Seminars sponsored by the Inter-university Consortium for Political Research--h[redacted] and sociology across the country. [redacted] for as many as a quarter of the Ph.D. recipients in political science. There is a further irony in the fact that the program has gained much of its present quality as a [redacted]

I think that one could raise serious questions about the basic decision to reduce the pool of professional manpower, but even without doing so, it seems to me the end of the Advanced Training Projects is certain to be thoroughly dysfunctional for our society at large as well as for the academic community and those of its members who would otherwise participate in these programs. [redacted] I hope that it will be possible for the Foundation to provide some corrective for the decision which is apparently governing this important aspect of Foundation policy and activity.

Sincerely,

Warren E. Miller
Director
Center for Political Studies

os
cc: Senator Philip Hart ✓
Senator Robert Griffin
Congressman Marvin Esch
Professor Robert W. McKelvey

STATEMENT OF DR. ROY E. HEATH ON BEHALF OF
THE AMERICAN ASSOCIATION OF STATE COLLEGES
AND UNIVERSITIES PRESENTED TO THE SPECIAL
SUB-COMMITTEE ON NATIONAL SCIENCE FOUNDATION
OF THE SENATE LABOR AND PUBLIC WELFARE COMMITTEE
JUNE 2, 1971

The American Association of State Colleges and Universities appreciates this opportunity to present a statement regarding the support needed from the National Science Foundation budget to support undergraduate education in science and science education. The Association's membership comprises 277 institutions that educate 22+% of the students in higher education, just under 30% of the students in four-year colleges and universities, and just under 50% of the teachers certified by the states.

As Director of the Office of Research and Development of the Wisconsin State University System, (the sixth largest system in the states with 64,214 students and graduating 65.5% of the Wisconsin certificated teachers with their first baccalaureate degree) I am speaking in reference to the problems we find in the nine Wisconsin State Universities, typical members of the AASCU.

As one compares the annual funding levels of the total NSF budget along with the annual funding levels for undergraduate science and science education it becomes crystal clear that the intent of the Office of Management and Budget, with the tacit agreement of the NSF top administration, is to significantly reduce support of undergraduate science and science education. Using the NSF Annual Reports and the 1972 OMB recommendations it appears that undergraduate and science education has gone from 26.7% of the budget in 1964 to less than 11% in 1972. Changes in programs and in reporting make comparisons difficult so I have included the comparative categories below. The point is made that the projected dollar drop in the plans for 1972 is disturbing, particularly in light of significant increases in the total budget. Certainly there has been no drop in science education needs.

We appreciate the interest that the House and Senate subcommittees have taken in specifying support for science education programs over and above the levels recommended by the Office of Management and Budget and the National Science Foundation. One can not help but wonder why the message to continue support levels in science education has not been accepted by either the OMB or the National Science Board.

62-912 O - 71 - 45

COMPARISON OF FISCAL 1964* NSF BUDGET AND OMB RECOMMENDATIONS FOR FISCAL 1972 FOR PROGRAMS IN UNDERGRADUATE AND TEACHER EDUCATION IN SCIENCE

1964 Annual Report		1972 OMB Recommendations	
Institutes	$ 43,246,729	$ 23,300,000	Institutes
Research Participation and Scientific Activities for Teachers	3,714,884	3,500,000	College Teacher Awards
Science Education for Undergraduate Students	6,051,566	2,000,000	Undergraduate Education, Student Development
Science Education for Secondary Students	3,918,672	7,700,000	Science Curriculum Improvement
Course Content Improvement	13,975,712	9,900,000	Course & Curriculum Development
Institutional Grants for Science	11,380,023	12,000,000	Institutional Grants
Instructional Equipment for Undergraduate Education	8,650,102	4,000,000 5,000,000	College Science Improvement College Science Improvement (Special for Black Colleges)
Total	$90,934,000	$67,400,000	Total
Total Budget	$353,200,000	Total Budget Request	$622,000,000
% to Science Education	26.7	% to Science Education	10.8

* Using comparable data the year 1959 represented the highest percentage with 35%, 1957 was 27%, 1958 was 28%, 1960 was 32%, 1961 was 28%, 1962 was 26% and 1963 was 23%.

Problems Similar to Those of Private Colleges:

You will note that our statement will be in general agreement with that presented by the private colleges because of our emphasis upon undergraduate education and our similar needs for students, faculties and equipment.

Undergraduate Research Participation:

The Undergraduate Research Participation program has been particularly productive for undergraduate science instruction in all colleges and universities. This program was not recommended for funding in 1972, possibly because it was hoped that the new Student Originated Studies Program, which is seriously underfunded, would pick up part of the load. This change leaves many faculty members from small or developing institutions without possibilities of research support--research that makes their teaching more relevent--research that keeps them at the cutting edge of learning--research that develops teams of students and faculty searching for new knowledge. In addition it supplies needed student financial support and essential research supplies.

We recommend reinstatement of the URP program and a minimum level of funding of $6,000,000, adjusted within your total budget allocation.

College Science Improvement Program:

The College Science Improvement Program forces realistic long-term planning on institutions. Wisconsin State University-La Crosse is the only one of the Wisconsin State Universities to receive a grant to date. The results of this grant in improving the life science programs at La Crosse has been most encouraging. We feel this program justifies greater support.

Instructional Scientific Equipment Program:

In the 1969 presentation of NSF to the House subcommittee on appropriations it was stated: "A reliable survey indicates that an average of $100,000,000 per year is needed during this decade to equip laboratory courses requiring either complete refurbishing, 'more of the same' kind of apparatus to handle increased enrollment, or equipment for new experiments that are needed to replace outmoded ones."

In spite of this estimate, the Instructional Scientific Equipment program was funded for only 4.7 million in 1969, 4.0 million in 1970, and none for 1971. Needs have changed even more than anticipated with the new emphasis on environmental problems and much portable field equipment is now needed in addition to that surveyed above.

We recommend reinstatement of ISEP at a $8.0 million level, particularly since the Higher Education Act's Title VI-A funding has suffered set backs.

Summer Student Training Program:

The Summer Student Training Program originated in 1959 and has been operating serving 5,000-7,000 students annually. Proof of its success can be found in a 1967 study made by the NSF of 5,000 questionnaires of the participants in the 1960 program showing:

a. 98% of the participants entered college

b. 81% of the male students, and 65% of the female students majored in science.

c. 85% of the males and 74% of the females are taking, or plan to take, graduate work.

d. 41% of the males and 22% of the females have active plans to work for the Ph.D. degree.

With such success, I question the wisdom of destroying a program that can mean so much to the future of science in America. Is $2,000,000 enough?

Science Faculty Fellowship Awards and College Teacher Awards:

Science Faculty Fellowships and College Teacher Awards are most helpful to the faculties of small private colleges and emerging state colleges. Typical of the reactions to these programs is Dr. Nathan Coward's letter, see addendum, indicating the many advantages to be gained in this type of program. The funding for these programs should continue at least at the 1971 levels.

Institutional Grants for Science:

This is an excellent program because it allows the Presidents of the various grantee institutions to have seed monies for developing new or different programs. The liberalization of the policy, the past two years, allowing reasearch from the USOE and other agencies to count was helpful to the universities such as Wisconsin State University-Oshkosh. If the program reverts to funding only on strict science research grants, the smaller less prestigious institutions will suffer. Wisconsin State University-Oshkosh has used their funds to support starter grants in research, see addendum. This program should be continued.

Institutes:

The total budget request for institutes for 1972 is only $23.3 million--equal only to the summer institute funding level this subcommittee specified last year. The planned breakdown is apparently programmed as follows: Note column 4.

	FY 1969	FY 1970	FY 1971	Budget Recommendation FY 1972	Suggested Level for 1972
Institute Totals	$ 30.9	36.9	26.8	23.3	36.3
Summer	$ 21.6	23.2	23.1	11.3	23.3
Academic Year	8.9	8.4	2.7	2.8	2.8
In-Service	3.5	4.45	3.3	3.5	4.5
Comprehensive Grants	0	4.4	1.2	5.0	5.0
Systems Grants	0	0	.35	.70	.7

May I suggest that the program be returned to the 1970 level of 36.+ million as shown in the last column.

The cost of academic year institutes is high and therefore does not reach the number of persons reached in summer and in inservice institutes. It is a good but expensive program.

The inservice programs were partly funded from the 23.3 limitation funds this summer and they were started in the summer. They are relatively low cost and should be increased.

The comprehensive grants and system grants are new programs and represent new approaches and should be funded.

You may not realize that for fiscal 1972 NSF has raised the student stipend from $75 per week to $100 per week. The dependency allowance will be raised from $15 per week to $20 per week. In addition, full negotiated overhead will be allowed rather than the maximum previous 15% limitation. These changes result in providing less than 8,000 stipends from NSF's recommended 11.3 million budget. Compare this number with the 19,000 students supported on the 23.3 million of this summer.

One must remember that each high school teacher instructs at least 125 students per day so that the projected drop, when viewed from daily science student contacts, becomes 1,375,000 on a drop of 58%.

A total of $23.3 million, as we recommended above, for summer institutes still would only support 15,000 to 16,000 participants with next years increased costs.

The need still exists for these summer programs. Nation wide the ratio of applicants to positions is still 2 to 1.

Dr. Robert Brown of Michigan Technological University in Houghton, Michigan reports that for 30 positions in his ecology institute he received 493 applications (16-1). Of these 230 had no previous institute experience, 120 had one institute, 68 had two institutes and 75 were ineligible. Two-thirds of those offered stipends had no previous institute experience.

The Wisconsin State Universities program in Environmental Assessment at Chippewa Lake Field Station, the old Clam Lake Job Corp Center, was permitted 48 stipends and even though the requirements of having a background in college chemistry, physics and biology were spelled out carefully in the announcement we received 352 applications (7-1). Of the 51 stipends awarded and accepted 31 had no previous institute experience.

According to figures recently released by the NSF Institute Section -- 63% of new participants in institutes in 1970 had had no institute experience. Total institute participation continues to equal the allocations.

The need still exists for these Summer Institutes. They still are among the best programs NSF has ever offered. We recommend returning to the 36.+ million budget for this group of programs for fiscal 1972 and this would require your adding 9 million for summer institutes.

Finally -- we recognize and support the serious needs of fundamental research. We recognize and support the needs of graduate education. We question, however, the judgments that recommend increased expenditures and significant transfers at the expense of science education and undergraduate education. Particularly since these programs have a proven record of success and innovation. Programs that have high visibility and the interest and support of your constituents.

WISCONSIN STATE UNIVERSITY
SUPERIOR, WISCONSIN
54880

DEPARTMENT OF CHEMISTRY

March 12, 1971

Dr. Roy Heath, Director
Research and Development
Board of Regents
Wisconsin State University Systems
Madison, WI 53702

Dear Roy:

You asked me to present some of the benefits that have been obtained from the NSF Research Participation grants. I am happy to do so.

First: The summer research experience is itself of great importance to any teacher of science. It helps reduce the number of what Dr. Jim Dan Hill used to call "Sterile Ph.D.'s". Typically, the undergraduate institution has been long on teaching and short on research. This eventually reduces the quality of the instruction as the teachers get increasingly out of date in their fields and just plain lazy in the mind. All schools and all teachers cannot be continuously on the research frontiers. Most of us do not possess the single minded dedication to a specialized field needed to carry out any but the most trivial of problems under our own steam. Therefore, postdoctoral work under the NSF program has been a lamp in the darkness for many of us."

Second: The continuing grants that we have been allowed to use at our own schools have helped us continue some of the research that we started at the host schools. In particular: My work with Robert Kiser at Kansas State was continued here with senior students."

Third: We have gotten equipment for the school that could not have been obtained with the "normal" allotments. Science is expensive to teach and unless we receive some outside help, we cannot hope to survive above the bare subsistence level. Of course the argument against this is that the local administration should support science more in line with its needs. However, to be more practical, few locals fully realize these needs. If the scientific endeavor is to be supported at the grass roots; that is, at the small to medium sized undergraduate institution, nationally directed support is needed.

Sincerely,

Nathan A. Coward

Nathan A. Coward
Professor of Chemistry

To: SENATE SPECIAL SUBCOMMITTEE ON THE NATIONAL SCIENCE FOUNDATION

STATEMENT FOR THE

ASSOCIATION OF AMERICAN COLLEGES
and the
NATIONAL COUNCIL OF INDEPENDENT COLLEGES AND UNIVERSITIES
by

President Frederic W. Ness
Association of American Colleges

June 2, 1971

The Associations which I represent have never before been moved to comment to the Senate authorizing committee on National Science Foundation programs. We have asked to submit this statement, however, because we believe that continued support of science education programs is vital to the welfare of our nation.

The Association of American Colleges is comprised of approximately 850 liberal arts colleges in the nation, five-sixths of them private; its affiliate, the National Council of Independent Colleges and Universities, includes most of the additional independent colleges in the nation for a combined total of about 1,000 educational institutions.

When the proposed National Science Foundation budget was released on January 29, these colleges were deeply concerned by the proposed reduction of $45.8 millions in science education and institutional support for science, while simultaneously the overall budget for NSF was being increased by $116 million!

Our association attempted to measure the degree of their concern by asking member colleges to comment directly to our headquarters. More than 250 colleges responded, many of them

writing also to their Senators and Representatives, including members of this subcommittee. Copies of their letters and telegrams were furnished this subcommittee last week.

A synthesis of their evaluations of the NSF budget indicates that they have an appreciation for the Administration's concerns over terminated personnel in discontinued and reduced mission-oriented programs, for the nation's needs in developing and utilizing applied research in addition to basic research, and for problems related to a lagging economy. This synthesis shows also great alarm over vitiating support for the primary mechanism by which the people of the United States support science education. These member colleges understand the requirements of research but believe they cannot be separated from education.

We look, therefore, with pleasure on, and wish to commend the Chairman and his bi-partisan co-sponsors for, the introduction of S. 1968, which places a floor under institutional support for science and science education support.

We respectfully urge the committee to take the next step, perhaps an historic first, in reporting out a line-item budget in these areas. We believe this is necessary at a time when influences outside the agency itself, while attempting to solve some of society's critical problems, may detrimentally alter the basic NSF goals outlined in P.L. 507 -- the development

and encouragement of a national policy for the promotion of basic research and education in the sciences.

Programs we urge to be included, to assure the proper priority for science education in NSF funding for fiscal 1972, are:

Undergraduate Research Participation (URP) -- marked for elimination in the budget; we believe it should be restored for at least $4 million;

Instructional Scientific Equipment Program (ISEP) -- not funded in fiscal 1971 and marked for elimination again in 1972; we believe it should be revived with at least $6 million;

Student Science Training Program (SSTP) -- marked for elimination; this program merits $2 million;

Science Faculty Fellowships -- yet another program marked for elimination; this program needs a minimum of $3 million;

College Science Improvement Program (COSIP) -- a program with significant achievement; starving and being divided into black-white racial segments, it should be brought to full vigor with at least $15 million, with special assistance for all disadvantaged colleges, black or white.

If all science education and institutional science support programs were funded at highest previous levels of spending, the overall financial problems facing higher education in this nation would not be solved. That is another, and broader, problem.

But if adequate funding in science education and institutional science support could be achieved and maintained, those national problems, yielding to an informed and educated public in the sciences, could be brought toward solution. The continued world leadership of this nation in technological advancement and understanding could move a considerable distance toward being assured.

President Frederic W. Ness
Association of American Colleges
1818 R Street, NW
Washington, D. C. 20009

Senator KENNEDY. A very active and interested member of our subcommittee was unable to attend today's hearing because of a prior commitment. I order his statement printed in the record at this point as though read.

STATEMENT OF SENATOR THOMAS F. EAGLETON, A U.S. SENATOR FROM THE STATE OF MISSOURI

Senator EAGLETON. The National Science Foundation has long been a principal supporter of basic reesarch and science education in the United States and it is important that the Foundation continue these long-established efforts.

Science education and fundamental research have been the cornerstones of much of the increase in material wealth experienced in the United States in the last few decades. Carefully and sensitively handled, our future efforts in these fields will make an even greater contribution to the enhancement of man's well-being in the future, and in nonmaterial as well as material terms.

Science and scientists are caught up in a whirlwind of change in our society that is, in part, a phenomenon of their creation. From that fact, it follows that science has the responsibility, as well as the capability, to lend a positive influence to the direction and rate of change in our society to insure that all of society's needs are adequately and timely served.

The Congress and the National Science Foundation responded affirmatively to this responsibility in 1968 when the Congress broadened the Foundation's responsibilities to include applied research. That early awareness of the importance of focusing a part of the Nation's scientific resources on research applied to societal problems culminated earlier this year in the creation of the RANN (Research Applied to National Needs) program and the formation of a Research Application Directorate at the National Science Foundation.

In announcing the creation of the RANN program, Dr. McElroy described the reason for its creation in these terms:

> The National Science Foundation has as its central objective support of basic science and science education. In addition, however, it has become increasingly obvious that the Foundation has an important and perhaps crucial role to play, to the contribution of new scientific knowledge, in the struggle to alleviate a number of pressing national needs and problems. While we have had an ongoing program of research on a variety of such problems, it is now apparent that a broader and more concentrated effort must be made towards their solution.

I share Dr. McElroy's view of the significance and importance of the RANN program, and I believe RANN is a necessary and timely addition to the National Science Foundation's programs.

The RANN project is a plan for action—now. In selecting projects to be conducted through RANN, NSF focuses on those problems for which government, academic, and industry capabilities already exist—today—to mount successful research programs. RANN will focus its efforts on concentrations of governmental, academic, and industrial capabilities that already exist and where there is skilled, but at present idle or underutilized, manpower ready to go to work.

I consider it a matter of the utmost urgency that the Foundation use its recources in creative, imaginative ways to bring the RANN program fully to fruition.

In view of the importance of the RANN program, I should note that a number of individuals have called my attention to factors that may diminish the effectiveness of the RANN program, as well as other NSF programs. Some individuals cited an apparent inclination on the National Science Foundation's part to deal almost exclusively with scientists within the university community. If this is so, I think it is time that NSF squarely face the reality that not all high quality, productive scientific talent in the United States is found in universities. Individuals and groups of scientists with serious proposals worthy of NSF's careful attention, and perhaps funding, can be found in for-profit and not-for-profit organizations whose relationship to university communities varies from close to none. I also understand that the matching funds requirement established by the Congress, under which grant recipients must share the costs for investigations they carry out, severely inhibits the capacity of some organizations—and particularly organizations like the Federal laboratories where there are no non-federally derived funds available for cost-sharing—to conduct research. It appears futile to urge that such organizations devote more of their efforts to research on socially relevant problems in the face of requirements such as cost-sharing that unrealistically limit their ability to do such work.

With cutbacks in aerospace and defense industries, many creative scientists are unemployed. The resulting break-up and dispersion of expert teams of skilled people with proven ability is costly. Scientists, engineers, and technicians have been among the hardest-hit groups. Highly trained individuals in government laboratories and universities, as well as private industry, find themselves in "holding patterns." They wait for a time when money will be available to do work that is rewarding to them and rewarding to all of us. Many are leaving scientific and engineering research fields entirely. With the loss of their jobs, many have lost their self-esteem and pride. Some have lost the essential ingredient.

That has characterized their work in the past—their capacity to think in daring terms and to pursue those thought to fruition.

I do not argue that the National Science Foundation can, or should, become a WPA for scientists and engineers. That is not what it was set up to be, and that is not what it should become. I do think, though, that we can ill afford to ignore the individuals and teams in governmental, academic, and industrial organizations with the existing capabilities to mount successful research programs. With adequate financial resources, they could begin work tomorrow. They represent quick-start, early pay-off capabilities. Many of these individuals and teams may be called upon in the near future to begin work on precisely the kinds of questions and problems that RANN proposes to attack. The question simply is "when?"

The RANN program can, and should, serve as the vehicle by which we can begin creatively using our existing national laboratories, as

well as university-related, federally funded laboratories and aerospace companies—and all the trained people who go with them—in a high priority program to apply our advanced research and technology to human needs.

The RANN program offers the National Science Foundation unique opportunities to serve the needs of all Americans, and to demonstrate the usefulness and relevance of science to the public. I commend the NSF for its foresight in developing the RANN program, and reaffirm my interest in, and support for, this important effort.

Senator KENNEDY. We are very appreciative of the witnesses who have commented, and the subcommittee will stand adjourned.

(Whereupon, the meeting was adjourned at 12 o'clock noon.)

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