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LETTER OF TRANSMITTAL

WASHINGTON, *D.C.*,
January 15, 1961.

MY DEAR MR. PRESIDENT:

I have the honor to transmit herewith the Annual Report for Fiscal Year 1960 of the National Science Foundation for submission to the Congress as required by the National Science Foundation Act of 1950.

Respectfully,

ALAN T. WATERMAN,
Director, National Science Foundation.

The Honorable
The President of the United States.

CONTENTS

THE DIRECTOR'S STATEMENT

One of the responsibilities of the National Science Foundation is the continuing study and analysis of the Nation's scientific research and development potential, including research facilities, scientific manpower, and education for science. A comprehensive program of studies based upon information from industry, Government, and nonprofit institutions was initiated some seven years ago. It is now possible to discern trends that shed light upon the current situation as well as being useful for long-range planning purposes. Indeed, on the basis of these and similar studies by industry and other agencies of the Government, the time appears ripe for the Federal Government to plan more effectively with respect to its interest, responsibility and participation in the future of the country's science and technology. At the same time, advantage is being taken of the opportunity to study more carefully the impact of science and technology upon the national economy.

Certain conclusions are clear. For the future, the principal concern lies in the field of education. This has been the subject of considerable discussion and some controversy. As a result, noteworthy progress has been made, especially in self study and improvement by schools, colleges, and other groups involved in general education. Much of the incentive and the pressure has come from the need to improve the teaching of science, but action has also extended to the teaching of modern languages and, in general, to the fundamental subjects of instruction.

There have been a perceptible tightening of standards and critical thought devoted to curricula and to the improvement of teacher training and course content. These efforts have been supported by the Federal Government and by interested organizations and local groups. The teaching profession, especially in secondary schools, has been the subject of sympathetic attention, and its prestige has undoubtedly improved. By and large, however, little progress has been made in providing adequate salaries and career prospects for secondary school teachers. We have still a long way to go.

In the area of scientific research and its extension into development and production there is a growing realization of the importance of continuity and proper apportionment of support through all stages, starting with basic research and extending through applied research, development, and production. However, it is still true that in spite of repeated emphasis upon the importance of basic research, support for this effort has only barely held its own in relation to the larger and seemingly more pressing problems of development. It has proved far more difficult to secure adequate support for basic progress in science than for the applications of science, because

of the seeming vagueness of the enterprise, especially when high-priority, costly practical goals have to be met. Vannevar Bush's pithy statement, "Applied research drives out basic", is constantly being verified. If the full potentialities of our society are to be realized, however, we must by all means insure that the frontiers of science are pushed forward energetically.

Although other shortcomings can be discerned in this whole chain, one outstanding fact has begun to emerge, namely, that our institutions of higher learning are in critical need of assistance, especially in their graduate schools and other professional training centers. The huge and mounting influx of students into our colleges and universities has focused attention upon the need for facilities for housing, classrooms and instruction. As these needs are met, maintenance funds must be provided. The recent report of the President's Science Advisory Committee, SCIENTIFIC PROGRESS, THE UNIVERSITIES AND THE FEDERAL GOVERNMENT, points out that research and education go hand in hand in the graduate schools of our universities; they should not be separated. Much of the present Government support to colleges and universities is earmarked for research, and particular research at that. Ways must be found to improve the environment for graduate student training, to give closer attention to the postdoctoral class, and to provide adequate and up-to-date research laboratories and equipment.

The natural habitat of basic research is the university. Although industry, Government, and independent research institutes do and should conduct basic research related to their objectives, it is the university that provides the freest and most independent environment for the progress of science.

Industry and Government have come fully to appreciate this role of the universities. In a very real sense they are the producers; industry and Government are the consumers. The latter look to the universities to train an adequate number of scientists and engineers through basic research. Government and industry also look to the universities for accurate, up-to-date research data and information, and novel ideas that may be explored through applied research. And finally, it is primarily to basic research that we must look for the occasional large breakthroughs in scientific thought that may revolutionize an era; the environment of universities is especially conducive to such events.

The needs of the universities at the present time are extremely critical. The widened gap between faculty and industrial salaries, in particular, militates against the universities in the retention of their most competent research faculty members and entices their most promising young Ph. D.'s. The graduate laboratories and research facilities of most universities are out of date and quite inadequate as compared with those of industry and Government. In many instances new buildings are required and, in practically all cases, renovation and extension of existing buildings and equipment.

In other respects the situation is even more disturbing. For a number of years an average of fewer than 50 percent of the competent research workers in our colleges and universities have been receiving adequate support for the problems they wish to undertake. For the past several years the national output of scientists and engineers with graduate degrees has remained substantially constant. Since the curve of national research and development effort continues to rise, the conclusion is easy to draw. We are now failing to meet the increasing demand for qualified professional scientists and engineers we require to achieve the research and development goals of the country, much less to meet world competition in modern technology.

To fill these needs by special national programs for each separate problem is only a partial answer. What is obviously needed is a source of funds that will enable a university to exercise initiative, judgment, and competence in meeting its own needs. Such uncommitted funds are now practically impossible to obtain in adequate amounts without Federal contribution. It is worthy of note that the two Federal agencies for which this type of general support in science is appropriate—namely, the National Science Foundation and the Department of Health, Education, and Welfare through its National Institutes of Health, have initiated modest programs of institutional grants to be used for scientific purposes as the head of the institution sees fit. These programs merit close attention. There is an opportunity here for the Federal Government to be of real service, provided adequate support can be furnished without violating the independence of the institution and without causing a withdrawal of other support from State, municipal, or private sources.

It is sometimes said that our major problems would be solved if only the Federal Government would go the whole way and subsidize or underwrite fully the research and training needs of our colleges and universities, thus obviating the need for project grants, equipment and training grants, and other special-purpose funding. It is true that this type of support would simplify university problems and provide the fullest opportunity for a university to grow and develop. It is also true that this type of support has been avoided hitherto, in the hope that universities may not have to become too dependent upon the Federal Government for support of research and research training.

However, now that the Federal Government is initiating a modest program of this type, it is important to call attention to the fact that the provision of uncommitted funds to universities, although admittedly important and hitherto neglected, does not directly accomplish quite the same thing as support by research project. What it does, under wise management and high competence, is to maximize the growth and independence of the institution and its contribution to research and education. On the other hand, the present form of research support in general use by the Federal Government offers the best opportunity to advance the progress of science, as

determined and recommended in each field by the country's leading scientists and engineers. It is also the system best adapted for the accomplishment of specific research of which Government agencies or the Nation may stand in need. These are not, of course, mutually exclusive; the most effective policy would incorporate adequate support of both kinds, with a proper balance between the two.

Support of basic research should be regarded as a form of investment, from which the returns in trained manpower are assured and research returns of definite value to the economy are statistically certain. Indeed, these dividends more than pay for the entire investment.

In addition to the physical needs of our colleges and universities, another problem is now before us—the need for special attention to what may be called "critical areas of science." These may be fields which at a given time show promise of highly significant contributions to the progress of science or to the furtherance of some important application, or both. Current examples are atmospheric physics, oceanography, and high-energy physics. Methods of identifying and dealing with such critical areas as they arise must be improved. The Foundation believes, however, that special attention to critical areas should be superposed upon general support of basic research across the board.

Another and newer kind of critical area is distinguished primarily by the high cost of the research equipment. Typical are high-energy particle accelerators in physics and the rockets and satellites required in space research programs. This problem is especially acute because of the difficult choice that confronts us: the lack of specific evidence as to the nature and importance of the research findings weighed against the prospect of no progress whatever unless the attempt is made. Clearly critical areas requiring very large and costly installations or equipment must be subject to special scrutiny which includes more than scientific justification alone.

So far as the overall progress of science is concerned, it is most important that basic research should proceed according to the judgment of the active research scientists. Each competent researcher is the best judge of the nature and aim of his own research. The whole purpose of the basic research investigator is to make an original contribution to his field of science. He must, therefore, keep fully informed regarding its status and the work of others. Because of this strong motivation, basic research has a "built-in" coordination. This can best be fostered by measures designed to improve communication among scientists. The national effort in basic science would only be weakened by central planning and direction in substantive content.

In development, the situation is quite different. Here the amounts of money are generally large, the precise objectives to be met are known, and the undertaking requires a considerable outlay of effort in manpower and facilities, as well as funds. Planning is essential, notably with respect to the current validity of the objective, the degree to which the proposed

development would meet this objective, and above all, the feasibility of the particular development contemplated. An organization engaged in development has the clear responsibility to pay careful and thorough attention to the planning and management of its development programs. It should provide for sufficient basic and applied research to enable it to plan and carry out its developmental programs most effectively. It should also employ such modern techniques as systems analysis and operations research to improve its planning and decision-making.

A final thought: As applied to the internal affairs of an industrial nation, science and technology have reasonably clear aims. These include national defense, improved health and welfare, full employment, and a high standard of living. In addition to these obvious and relatively well understood aims, however, there is a much deeper significance, especially in the pursuit of science itself. If the noblest ideals and goals of man have meaning, then religion, philosophy, poetry, literature, the arts, and scholarly activities are important considerations. Over the long haul these have played a fundamental role in the progress of man, perhaps the most fundamental of all. Science has provided mankind new vistas and new understanding both of his environment and of himself. Science has discovered and done much to perfect the so-called "scientific method," a technique that has helped to build a solid and enduring structure of knowledge. We should do well to recognize this aspect of science, for history suggests that the nation that ignores the contributions of scholarly, artistic, and philosophical pursuits to human progress is not capable of lasting leadership.

As the nations of the world work toward a better understanding of their relations, science, as defined by these broader considerations, offers great opportunity for collaboration in the attainment of common goals. Indeed, it may offer the most effective approach to the achievement of peace and justice which we can take at the present time. And we should remind ourselves that as man acquires more and more control over his environment and becomes increasingly able to draw upon nature's resources, it will require the combined wisdom of all mankind to make wise use of these powers.

ALAN T. WATERMAN,
Director, National Science Foundation.

Stimulating The National Research Effort

STIMULATING THE NATIONAL RESEARCH EFFORT

In *Strengthening American Science,** the President's Science Advisory Committee reported:

> It is apparent . . . that the Government exerts a powerful shaping influence on all U.S. science and technology. Not only the Nation's security but its long-term health and economic welfare, the excellence of its scientific life, and the quality of American higher education are now fatefully bound up with the care and thoughtfulness with which the Government supports research. If this support is halting and erratic, if it emphasizes mechanism and "hardware" to the neglect of fundamental understanding, if it lavishes money on a few popular fields and starves others of importance, if it fails to encourage exceptional men and exceptional programs, the net result could be an impoverished science and a second-rate technology.

How can the United States secure its science against impoverishment, prevent its technology from becoming second class during the final half of a century characterized by a scientific and technological revolution?

This Tenth Anniversary Annual Report of the National Science Foundation provides an opportunity for reviewing Foundation programs for promoting basic research and education in the sciences in the broader context of the Federal Government's response to this challenge.

The three factors which must be considered are:

1. Progress of research in science.
2. Development of the individual scientist.
3. The health and growth of the institutions (the environment) where science is taught and research performed.

Progress of Research in Science

Conduct of Basic Research

Basic research is an investment in knowledge. Since basic research is exploration into the unknown, the degree of success any single piece

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of research may achieve is uncertain. Support must therefore be planned and carried out over a wide range of subjects. Then, statistically, one may be assured of a high return in understanding and a new insight on a fair percentage of the work undertaken. In practice, one may even state with some confidence that the return on this small percentage far more than pays the cost of the entire investment. The analogy can be carried further. One should invest in daring projects that appear to have small chance of succeeding but a big payoff if they do. And there should be a fair proportion of standard gilt-edge projects that promise a small but reliable return. In this way, one can manage to advance knowledge across a wide range of fields, and yet follow an approach that is fiscally reasonable.

Some general understanding of the organizational pattern under which basic research is conducted in this country is essential if we are to resolve problems confronting basic research support today. According to National Science Foundation estimates for 1959–60, out of $12.5 billion total for research and development in the United States, about $1 billion (8 percent) supports basic research. It should be borne in mind that the latter amount covers many types of costs, including the operation of expensive research "tools," such as nuclear particle accelerators, research rockets, and radio telescopes. Of the total funds for basic research the Federal Government is the source of about half; industry gives slightly less than a third; and the universities and other nonprofit institutions contribute about one-fifth.

Another index to the relative proportion of effort among the principal sponsors of basic research is the number of scientists and engineers engaged in these activities. As is well known, many scientists and engineers combine research and development with other pursuits such as teaching or industrial production. If we simply add up the amount of time given to research and development activities by all our scientists and engineers, we find that this amounted in 1958–59 to the equivalent of about 340,000 full-time researchers, or about a third of the total number of persons who are scientists and engineers.

Of the 340,000 full-time equivalents in research and development, a little more than 30,000 are in basic research, or about 9 percent.

The primary source of support for uncovering new knowledge through basic scientific research is the Federal Government, and the primary source of manpower to perform the research is our institutions of higher learning. In fulfilling its commitment to stimulate progress in science, the U.S. Government is today supporting basic research in some 450 universities and research institutions in all 50 States, and in a dozen foreign countries as well.

A very compelling reason for the adequate support of basic research by Government is that such research helps to make possible the wise expenditure of funds for development—always many times costlier than fundamental studies. Sound investment of funds in basic research is the best way to uncover leads in all possible fields. From these leads, one can then select for future development those that appear to have the greatest potentialities.

Support Methods

In furthering the progress of research in science, the Foundation has consistently adhered to the following basic concept which it commends as a guide to the Federal Government and the Nation as a whole with respect to the support of basic research: No able scientist willing to undertake basic research should be precluded from doing so because of lack of financial support. Within such framework the Government invites research proposals from individuals or groups of scientists, submitted through their institutions. With the help of individual reviewers in the field involved and advisory panels whose members are chosen from among the Nation's top scientists and appointed by the agency to assist in the evaluation process, the Federal agency selects for support those proposals judged to have the greatest scientific merit.

This so-called "project method" of research support has a number of advantages. Properly interpreted, the plan is flexible and may be applied to narrowly defined problems in science or to broad areas. It enables the Government to move in freely with the support needed for promising and significant undertakings of current interest. It provides for a national program in the sciences, utilizes the advice of the scientists in each field, and is based upon the significance and merit of the research proposed and the competence of the investigators. Since each grant and contract requires the official indorsement of the investigator's institution, the plan has evolved with the concurrence of the Nation's universities and has had a most important indirect effect in helping to strengthen such institutions. In fact, such aid has often been of critical importance, particularly for the smaller schools.

With the increased sums available to it for support purposes, the Foundation is now able to make more grants of a broader type, often cutting across two or more departments of a university. For example, a grant awarded to the University of Pennsylvania will further research which applies concepts of chemistry and physics to the biological problem of regulation of metabolism within the cell. In another instance, scientists at the Massachusetts Institute of Technology will undertake a concerted attack upon the problem of the production and nature of

plasmas. Included are studies on gaseous electronics processes, plasma statics, magnetohydrodynamics of compressible and incompressible fluids, ionospheric physics, and some branches of astrophysics. This program is being supported by the Foundation with a 3-year grant.

Facilities for Research

Basic research today increasingly requires the use of large, complex, and expensive research tools. Although Government expenditures for research facilities since World War II have run into the hundreds of millions of dollars, for the most part these have been committed to practical research and hence have been available only to a small degree for purposes of basic research.

Traditionally, universities and other private research organizations have provided needed research tools from their own funds or from funds available from state or local sources. Now, however, the need for such major equipment as nuclear reactors, high-energy particle accelerators, high-speed computers, and radio and optical telescopes is too great to be met from such local resources or even from the combined resources of several institutions. If American science is to advance at a satisfactory rate, Federal support of needed facilities must be provided.

Each case must be judged on its individual merits. It is difficult to establish criteria that would be applicable in all cases. Factors to consider include the urgency of the need, the national significance of the development, the availability of trained personnel, and the degree and character of local backing. Recipient institutions are encouraged to participate financially to the extent possible. In some situations, the Federal Government must continue to supply funds for operating and maintenance, in addition to funds for construction.

International Participation

In a larger frame of reference, the progress of science has been measurably stimulated through participation of U.S. scientists in vast programs of international research with very substantial support by Government. An outstanding example is the brilliantly successful International Geophysical Year. Through a special committee established by the International Council of Scientific Unions (ICSU), a program encompassing the entire globe in 13 major fields of physics, together with extensive rocket and satellite programs, was undertaken, with the participation of 66 countries and supported on a world-wide scale by funds equivalent to many hundreds of millions of dollars. The IGY was successfully carried on without reference to political considerations, and demonstrated

that men of many different political persuasions are able to work together harmoniously for the advancement of knowledge.

Some aspects of the successful IGY are being continued under the program known as "International Geophysical Cooperation." Scientific studies are continuing in the Antarctic, in space science, in oceanographic research, and plans are being weighed for further studies in meteorology, geomagnetism, and other subjects. In programs already under way, Federal funds are being used to support special U.S. committees and their secretariats, under the National Academy of Sciences.

Continuing research programs in the Antarctic are being carried on by the 12 nations which participated in the IGY Antarctic program. General scientific recommendations for the area are made by the Special Committee on Antarctic Research (SCAR) of ICSU. The U.S. program is being developed, funded, and coordinated by the National Science Foundation. The Foundation looks primarily to the Committee on Polar Research of the National Academy of Sciences for program recommendations; NSF also considers proposals from qualified scientists interested in carrying out such research. The Foundation works with the Interdepartmental Committee on the Antarctic to coordinate the research activities of other agencies, such as the National Bureau of Standards, the Weather Bureau, and the Geological Survey, and provides them with funds for their participation in Antarctic research. Grants are also made to universities and various interested research organizations to complete the program of scientific activities in the Antarctic. To date, Congress has appropriated $10 million for this post-IGY program in the Antarctic.

Communication of Scientific Information

But whether he pursues his research in the frozen laboratory of the Antarctic or in the cloister of his own laboratory, the scientist wastes valuable hours if he is not familiar with the published results of research in his own field. Time saved for scientists in searching out what is already known is time they can actively spend on research. Improvement in the communication of scientific information is reflected in improved use of scientists' time—in effect, equivalent to an increase in the number of scientists available.

Axiomatic in the scientific community is the statement that no piece of research is complete until it is published. As the pace of scientific research accelerates and scientific publications multiply, it becomes increasingly difficult for a scientist to learn about and obtain access to everything that is published in this field. Accordingly, the Foundation is trying to make it easier for scientists to locate and acquire the published

results of research. The objective is to ensure that any U.S. scientist can obtain any item of unclassified scientific information he needs, no matter where it originates, and to develop improvements in the organization and availability of scientific information on behalf of all U.S. scientists.

Published results of scientific research are obtainable from many sources, private and public, at home and abroad. It is most important that significant scientific research publications, whether published in Great Britain, Sweden, Russia, or any other nation of the world, be identified, obtained, translated if necessary, and distributed to interested scientists in the United States. Similarly, unpublished reports from university laboratories, industry, and the Federal Government are an important medium of scientific communication. The Foundation attempts to make such reports more readily available. Additionally, it seeks to open new, and to keep open existing, channels of communication among scientists through partial support of scientific journals and reference aids and through the support of research directed toward more efficient organization, processing, and storing of information for rapid search.

Thus through vigorous support of meritorious research on both national and international fronts, through the provision of modern research facilities, and through improving communication among scientists, the Federal Government stimulates the progress of United States research. No other nation surpasses the United States in the scope and depth of its science. Since 1945, its scientists have been awarded more than half of all Nobel prizes in science—a not insignificant measure of the wisdom with which the Nation has pursued its policy toward encouraging science.

Development of the Individual Scientist

However meritorious the settled course of the Government's commitment to sustain and support the progress of research in science in these portentous years, trained manpower is required to convey it to fulfillment. As outlined in the foregoing section, Government seeks in a variety of meaningful ways to stimulate the progress and growth of scientific research. With equal vigor, it seeks to develop capable men and women who can be depended upon by the Nation to attain the goals of its scientific endeavor. At issue, therefore, is the competence of students, scholars, and teachers.

The manpower needed to carry forward the science of tomorrow is in today's classrooms across the Nation. Questions of moment are:

What is being taught? Who is doing the teaching? What are the opportunities for those who graduate? Satisfactory answers to these questions need urgently to be found if we are to meet fully our science-manpower requirements at this midcentury point in the scientific revolution. A panel of the Nation's foremost scientists and educators who serve the Federal Government did supply forthright answers to these questions, concluding that:

> . . . Americans should attach greater value to intellectual excellence.
>
> . . . Every school and college should reexamine its curriculum to make sure that in every aspect it is giving adequate challenge to the intellectual capacities of its students.
>
> . . . We should do far more than we are now doing to enhance the prestige of the teacher and to provide him with more effective support in his efforts to improve the effectiveness of his teaching.
>
> . . . We should move much further in the direction of adapting our educational programs to the widely varying competence of students, and seek especially to meet the needs of the most gifted students.
>
> . . . We should improve our scientific education at all levels, attempting to give better understanding of science to the nonscientist as well as to discover and stimulate more individuals who have the talents to become scientists and engineers.
>
> . . . To attain these ends we conclude that four major areas need specific and urgent attention throughout our educational system:
>
> (1) the curriculum and the content of courses,
> (2) the quality and effectiveness of teachers,
> (3) the recognition and encouragement of students, and
> (4) the development of intellectual leadership.**

Fellowships in Science

These objectives characterize the commitment of the Federal Government in its efforts to provide means for developing the numbers and kinds of well trained scientists required by industry, education, and Government. The Foundation's fellowship program, oldest of all Foundation-supported programs, is typical of the kind of support provided by other agencies of Government. It offers aid to graduate students, teachers, and advanced scholars in science, mathematics, engineering,

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** From Education for the Age of Science, a statement by the President's Science Advisory Committee, May 1959.

and certain social sciences, according to plans designed to meet the educational needs of individuals. It was inaugurated in 1952 by the predoctoral and regular postdoctoral programs with a budget of $1.4 million—almost half the Foundation's appropriation for that year.

As new needs have become apparent, additional programs have been added: in 1956, the senior postdoctoral program; in 1957, the science faculty program; in 1959, the cooperative graduate, teaching assistants, and secondary school teachers programs. By the end of fiscal year 1960, approximately $43 million will have been used for support of graduate students, teachers, and advanced scholars through these seven fellowship programs. After awards have been made for 1960, an approximate total of 13,000 graduate students and advanced scholars in science, mathematics, and engineering will have received awards, from among about 50,000 applications.

It should be noted, also, that the high standards of selection for Foundation fellowships have resulted in wide-spread interest in the applicants, with the result that many of the unsuccessful applicants for Foundation fellowships have received awards from other sources. This is particularly true in the case of applicants included in the honorable mention lists published by the Foundation each year.

The fellowship programs are productive methods for encouraging the college graduate to continue his education into, through, and beyond the graduate level of competence in science. Measures were needed as well to stimulate the enthusiasms of youth toward careers in science. Early in its history the Foundation, charged with responsibilities for scientific education policy as well as science policy, began to look closely into the training of scientists and engineers in the United States. It was an era when shortages in these professions were becoming severe. Newspaper and journal articles of the day reflected the growing anxiety about the Nation's chances of providing both for its immediate needs and for its anticipated growth in needs during the next few decades.

Science Teacher Training

It became clear to the Foundation that substantial support of scientific education programs was required in order that scientific progress and continued technological superiority might be assured. The immediate objectives would be to stimulate more young people to take up science, and beyond that to enable their teachers to improve themselves in the subjects they were teaching so that they could better stimulate their students.

An experimental program of institutes for teachers of science was therefore begun by the Foundation in fiscal year 1953, apparently the

first such effort ever sponsored by the Federal Government. It was an immediate success, and has been expanded each succeeding year.

This marked the beginning of a shift in national policy. Heretofore, the Federal Government's stake in education was never felt to be substantial enough to justify such direct action in the field of teacher training. The NSF experiment, coming at a time of great national need, paved the way for realization that the Federal Government does indeed have a stake in ensuring that the Nation's teachers are well educated so that, in turn, their students—the oncoming generation—will be trained to meet the demands of their civilization.

At the same time, the traditional place of State and local governments as managers of their educational systems was carefully preserved, through the NSF system of support to locally initiated projects rather than through establishment by the Federal Government of its own educational operations.

Other Government agencies followed this lead in establishing institute programs. Thus, the Foundation sponsored during one year—jointly with the Atomic Energy Commission—two institutes in nuclear engineering for college teachers; the AEC later obtained authority and funds for this type of program, and took over the sponsorship of these and several similar institutes.

The Foundation initiated, as well, certain special projects in science education designed: (1) to supplement the secondary school students' classroom training in science by introducing lectures by visiting scientists, supporting programs of State academies of science, and providing summer research training for students of special ability and aptitude; (2) to provide opportunities for undergraduate students in science, mathematics, and engineering to obtain experience in research laboratories, and to assist teachers by supporting conferences and special academic-year programs and programs of research participation; and (3) through programs of public understanding of science, to improve citizen understanding of the role of basic research and its fundamental relationship to progress in engineering and technology.

Support of teacher training became national policy in 1958. President Eisenhower, in a special education message to Congress, pointed out that programs of the National Science Foundation "have come to be recognized by the educational and scientific communities as among the most significant contributions currently being made to the improvement of science education in the United States." His message recommended a fivefold increase in appropriations for Foundation educational activities; of the five objectives he listed, three—improvement of subject-matter knowledge of science and mathematics teachers, improvement of

course content, and encouragement of science as a career—represented new fields of endeavor for the Federal Government, fields which had already been the subjects of "pilot experimentation" by the Foundation.

The same message recommended extension of the institute principle to foreign languages and counselling, under the sponsorship of the Office of Education.

Legislation embodying the presidential proposals was passed by the Congress in the National Defense Education Act of 1958. A milestone in Federal recognition of the problems of education, it is the national expression of policies earlier given impetus and substance by the pioneering programs of the National Science Foundation in science education.

Curriculum Improvement

A second major Foundation policy move in the field of science education came with the inauguration of projects designed specifically to improve science curricula within the Nation's schools. It was recognized early in the Foundation's history that, too often, science courses were being taught on the basis of outmoded textbooks and obsolete theories. Although teachers and school administrations had tried to keep up with rapidly evolving scientific disciplines, there existed no systematic channels through which they could learn of these changes in a manner designed to enable them to incorporate the knowledge into their classroom situations.

The Foundation also recognized that it was in the national interest to involve broadly based groups in action programs to remedy this problem. The problem had been identified; further discussion would not contribute to a solution unless the groups concerned were committed to produce specific materials useful to the classrooms at various levels.

Similarly, the NSF has scrupulously maintained the principle that, although classroom materials might be produced with the aid of the Federal Government, the Government has no control whatsoever over the content of these materials nor over their distribution. This remains in the hands of the scientists. The Government has no mechanism to "sell" the materials produced; the aim is merely to make available classroom materials that, if they are indeed better, will sell themselves to the schools needing them.

The Health and Growth of Institutions—Environment of Teaching and Research

Although the settled course of Federal aid to science and the scientist may hopefully continue along the constructive patterns outlined above, it needs underpinning in resolving a problem that has been paid relatively

little attention—support for educational institutions to enable them to develop their own capabilities in science and engineering.

Institutions have benefited substantially from Government support of research projects and from awards, such as fellowships, to individuals, but they have received little aid of a sufficiently general type to enable them to carry out their own plans for growth in science and engineering and to maintain a proper balance between these activities and others in which they engage. The needs are great: Graduate research laboratories require modernization in terms of buildings, equipment, and space; the salary scale in many institutions urgently needs adjustment upward; there is an acute and a continuing shortage of maintenance and operating funds; in the secondary schools the salary scale is also low. Although some progress is being made, much still remains to be done.

The Federal Government's policy with respect to the problems of the institutions is to point out the needs and to emphasize the importance of satisfying those needs—to the extent possible and in accordance with American traditions—from State and private sources. But it is also the responsibility of the Federal Government to exercise leadership in meeting this problem. The inadequacy of resources available to our educational institutions is a national problem which the Federal Government must help to meet.

Another problem is the growing need to evaluate and dispose of competing claims by those who support special areas of basic research declared to be critical. Atmospheric physics, oceanography, meteorology, and seismology are examples of areas which in recent years have been found to lack adequate support, trained personnel, facilities, and equipment. Different techniques may be required for handling such problem areas, but these special problems should not obscure the need for comprehensive support of basic research in all fields of science.

Support Should Emphasize Basic Research

The university is the traditional home of basic research. Ideally, it is here that the so-called uncommitted investigator, in an atmosphere of academic freedom, can pursue his individual researches without reference to practical objectives. In recent years, however, the universities have been subjected to new pressures in the form of the Government's need for a wide variety of so-called "contract research." Both the scientific community and the Federal Government have expressed concern lest outside demands for the solution of pressing practical problems jeopardize the university's traditional role of education and free research. The Foundation found it desirable to make a special study of the situa-

tion—"Government-University Relationships in Federally Sponsored Scientific Research and Development." This study notes that:

> In certain specialized fields, such as engineering, agriculture, and medicine, applied research is frequently closely related to educational objectives. Federal support of applied research projects in these fields appears to present no fundamental problem in terms of interference with the traditional functions of colleges and universities. However, with such exceptions noted, . . . Federal agencies [should] consider other alternatives before establishing large-scale applied research and development projects (particularly those concerned with development and testing) within institutions of higher learning. Such alternatives would include: (a) Federal laboratories; (b) industrial or other private laboratories; and (c) research centers organizationally separated from the institution proper.

The question of preserving the basic research functions of our universities is fundamental. So long as our universities are not able to obtain adequate funds to support normal activities, they may be tempted to supplement regular budgets, and possibly in so doing, to undertake projects and programs to meet needs other than strictly scientific and educational. This means that teachers and experienced research investigators needed for the guidance and training of future scientists may be diverted to urgent practical problems or away from a specialty of their free choice.

Rise of New Types of Research Organizations

It should be noted, also, that the years since the war have marked the rise of new organizational forms for the furtherance of basic research. These include Federal contract research centers, such as the national laboratories, of which Los Alamos, Argonne, and Brookhaven are major examples, which are managed by a university, a group of universities, or an industrial concern under contract to the Federal Government. In general they are engaged in both basic and applied research, where considerations of both cost and security have dictated that the work be carried on under direct Government sponsorship.

More recently, groups of universities have begun to collaborate in similar fashion to conduct basic research in other fields. In the field of astronomy, for example, the Foundation is supporting two major projects—the radio astronomy facility being constructed and operated at Green Bank, W. Va., by Associated Universities, Inc.; and the optical astronomy facility on Kitt Peak, Tucson, Ariz., being constructed and operated by the Association of Universities for Research in Astronomy,

Inc. A recent group to enter the field is the University Committee for Atmospheric Research, organized by a group of 14 universities.

It is clear that certain broad fields, such as astronomy, atmospheric research, oceanography, materials, and space research, lend themselves well to cooperative effort. It is practically certain that the expanding horizon of research in this country will dictate the organization of new forms of research activity here. In the first place, there will continue to be pressures for an organized attack upon any critical, practical problem, of either basic or applied science, such as that which currently obtains with respect to materials. Whether these needs can best be met by establishing special centers for the purpose, or whether coordinated programs should be set up in more decentralized fashion, will be matters for consideration in each case. In the second place, the voice of science itself will come increasingly to be heard demanding support for highly significant areas of science, mainly basic.

Group or Individual Support?

A word of caution is in order here. We must, of course, be alert to future trends and do justice to concerted efforts in science, but we must also be alert to the weaknesses as well as the strengths inherent in massive and concentrated effort. Are we likely, for example, to overemphasize group activity at the expense of the individual researcher? Certainly history indicates that capital discoveries can usually be attributed to a single person or a few individuals, although it is quickly admitted that their particular contributions may be only the climax of a host of prior smaller research contributions. Those who are familiar with group activities will probably agree, if they are candid, that the tendency of the group is to be conservative although powerful. In dedication to its objective, it reacts rather conservatively to radical ideas or subject matter lying on the periphery of its main activity. Furthermore, an organized group tends toward a singleness of purpose and of method which by its very nature is apt to ignore ideas from outside.

The large research center introduces another quite serious problem. A unique bulwark of university research is admittedly the close association between graduate faculty and graduate students. How can a specialized research center or facility effectively collaborate with university research and graduate education—if within the university, it tends to monopolize attention; if remote from the university, it suffers from inaccessibility? Although an organized group can mount a vigorous attack against broad and complex research problems, support must not be withheld from individuals and smaller groups who may approach the subject from other disciplines or other points of view. It is important

to achieve a desirable balance between group and individual effort, certainly in basic research; neither has sole merit.

Urgent Laboratory Needs

Today, outstanding needs exist that are not being met. Chief among these is the need for new or renovated laboratories, for research and teaching equipment and facilities, and, in certain fields, for costly modern research installations. Accordingly, the Foundation has recently embarked on a small experimental program designed to furnish funds for these purposes on a matching basis—that is, the Foundation furnishes half of the funds and the institution furnishes the other half. On top of this is the ever-mounting cost of maintenance. The situation appears to call for general aid to U.S. universities patterned somewhat after that provided universities in the United Kingdom by the University Grants Committee. In any event, the question arises of direct subsidy to educational institutions in order to increase the overall strength of their departments and to provide greater flexibility in their administration.

Direct financial assistance to academic departments or institutions raises a serious policy question: Should the Federal Government break precedent and provide direct aid to higher education in the fields of science? Can this be done without danger of loss of independence of the institutions supported? Can this be done wisely and acceptably by selective support in the manner of the current research support, or should it be done universally according to some suitable formula? Presumably, an obvious safeguard would be the provision for matching funds. Then there is the complicating factor of two primary classes of institutions: public and private. Despite the difficulties, however, it is quite clear that the needs are real and urgent. The responsibility of the Federal Government is to learn the facts, point out the problem and its urgency, and see that effective action is taken. This means consideration both of ways to assist State and private sources to meet the need (through such measures as revision of the tax structure), and of ways and means to provide some degree of direct support.

In Summary

Federal Government support of basic research and education in the sciences has clearly demonstrated its vitality and flexibility. In its broad attack on the degenerative and crippling diseases that afflict mankind; in its development and exploitation of nuclear energy for peaceful purposes; in its support of basic research unrelated to practical objectives, the Government effort has contributed to the general welfare. In doing

so, it has not encroached directly upon the independence of individual scientists and groups supported. Federal support of research at colleges and universities exists in various forms ranging from the very narrow to the very broad. The operations of current forms of support are continually studied with a view to adopting modifications and alternatives which would improve the environment for basic research and which at the same time would not be subject to abuse. All forms of support, both narrow and broad, have their place in the general pattern of Federal support. In the Foundation, we feel that each agency should use those forms best suited to particular needs at a particular time and should be free to vary the general pattern whenever desirable.

U.S. Research Strong

Research in the United States is inherently strong and versatile and, in comparison with other countries, is especially strong in industry-related programs. A nationwide program in support of basic research by the Federal Government has been established, aimed at progress in science along lines laid down by the scientists themselves. This program includes, as an important component, basic research in support of areas of research and development underlying the missions of individual Federal agencies. Basic research is also conducted vigorously by a number of leading industries, many of which provide support to universities and other research establishments chiefly in areas of interest to them. Colleges and universities continue to constitute the principal centers of basic research activity.

The evidence is, however, that basic research in the United States should be more strongly supported at colleges and universities in order to strengthen our future technology through progress made on the frontiers of science, in order to retain highly competent staff, and to assure high quality training of a great number of young scientists and engineers.

Government Organized for the Job

The Federal Government is now better prepared than ever before for the consideration of such matters because, in addition to the interested departments and agencies, there is the new Federal Council for Science and Technology, recently established by the President; the Special Assistant to the President for Science and Technology, in the White House; and the very active President's Science Advisory Committee.

Responsibilities for science matters in the Federal Government can be described as follows: With respect to the role of the Federal Government in the support of basic research, the National Science Foundation

with its National Science Board is primarily responsible for dealing with policy concerning Federal support of basic research throughout the country. On matters of policy coordination and future planning among Federal agencies, the Federal Council for Science and Technology makes recommendations to the President. The President's Science Advisory Committee, drawn from non-Government scientists and engineers, considers overall scientific and technological matters in relation to Government policy, with special reference to national security. The presence in the White House of the Special Assistant to the President for Science and Technology makes available to the President at all times advice and counsel on a wide range of scientific and technical affairs.

Potential Not Realized

In spite of the growth and strength of Federal programs in research and development and the assets that have been described, the potential of the country in science and technology is far from being realized. The element most requiring attention is a greater degree of support throughout the country for basic research and for the education and training of scientists and engineers. To realize our full potential in basic research, there must be widespread public recognition, understanding, and appreciation of the importance of intellectual and scholarly activity, and the pursuit of excellence in all fields of intellectual endeavor.

The fact remains that, in this country especially, we have not yet reached the point where we can step forth boldly and justify basic research in terms of its important objective, namely, the pursuit of knowledge for its own sake—as typified by the work of Galileo, Newton, Maxwell, Faraday, Henry, Darwin, Gibbs, and Einstein. Until we are willing to acknowledge and indeed proclaim the importance of purely intellectual and spiritual goals, we shall never realize the full advantages of basic research. If this point of view is correct, public attitudes must change to ensure United States science of high quality.

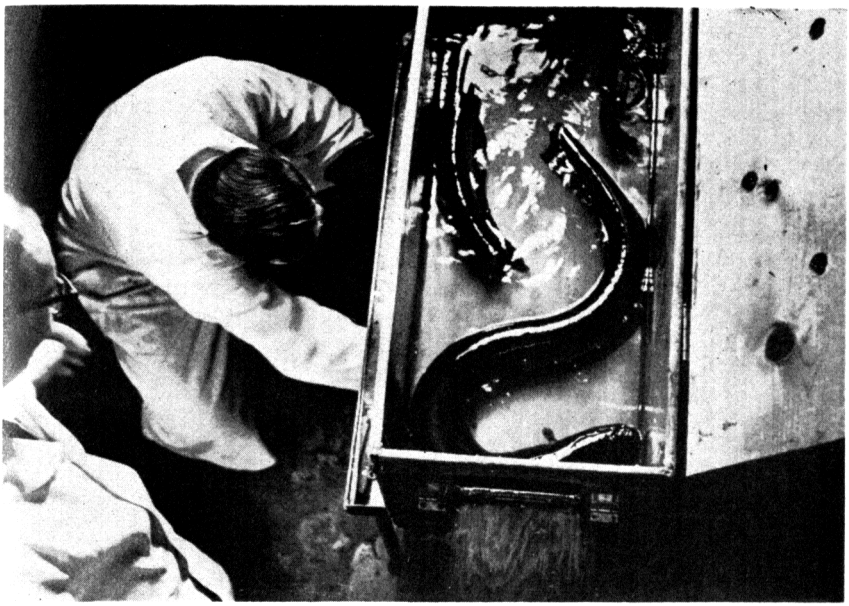
A Photographic Sampling of Foundation-Supported Activities

568169—61——3

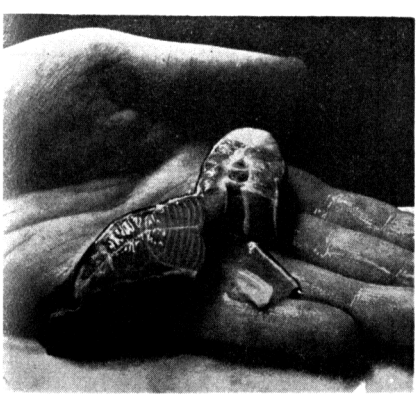
PHOTO CREDITS

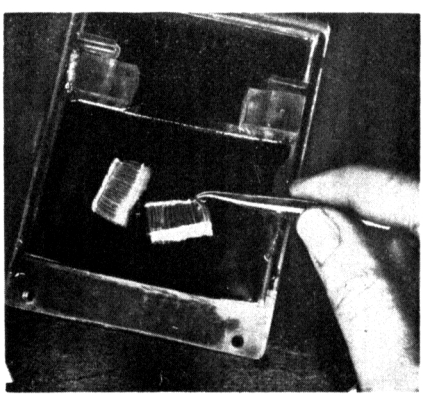
Page 21: Medical News Photos by Arthur Leipzig. Page 22: NSF photos. Page 23: (top) Martin Schwarzschild, Princeton University; (bottom) Corning Glass Works. Page 24: University of Vermont. Page 25: Smithsonian Institution. Page 26: Marine Biological Laboratory, Woods Hole, Massachusetts. Page 27: Chicago Natural History Museum. Page 28: NSF photos. Page 29: NSF photos. Page 30: Jerry Hirsch, Columbia University.

Electric Eel Illuminates Mechanism of Nerve Activity



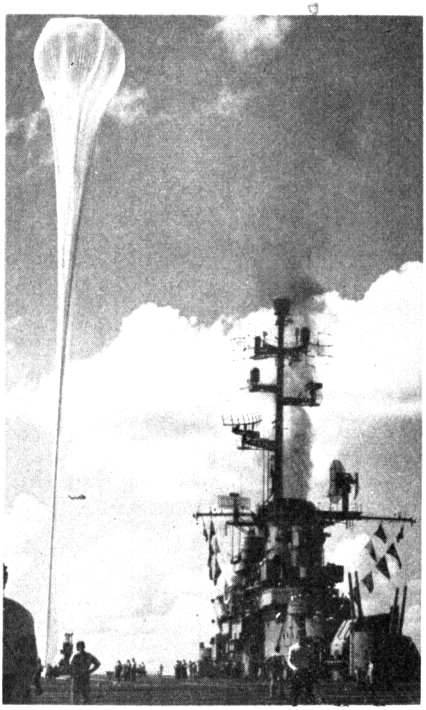
Of the 5- to 7-foot length of an electric eel, all but the first foot constitutes the electric organ composed of compartments arranged in columns. Each compartment is composed of a single cell, an electroplax, about one-half inch long, capable of producing 0.24 volt. The removal of one of these cells and its mounting for experimental purposes are also shown. See page 68.





Project ICEF for Studying Cosmic Rays at High Altitudes

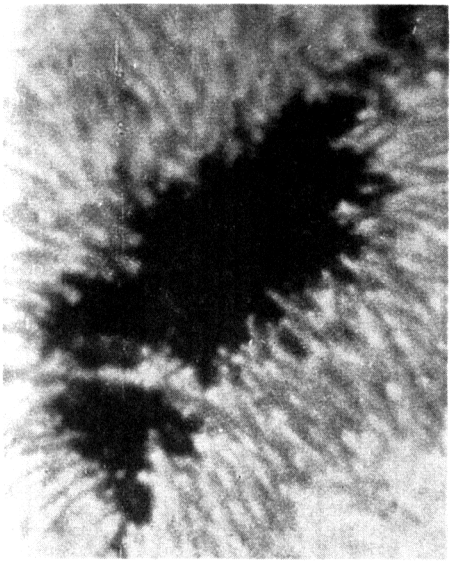
International Co-operative Emulsion Flights (PROJECT ICEF) took place from USS VALLEY FORGE early in 1960 to capture high-energy cosmic rays and the succeeding particle jets on nuclear emulsion flown at 100,000 feet in southerly latitudes. The giant emulsion stack has been divided among many universities in the United States and abroad for analysis and study. Project ICEF, sponsored by the National Science Foundation and the Office of Naval Research, is directed by the University of Chicago.



LEFT PHOTO shows 10 million cubic-foot balloon poised on bow of the aircraft carrier just prior to launching. Balloon and ship's stack gas stand straight up, showing care and precision with which carrier was kept on course to provide a "no wind" condition on deck.

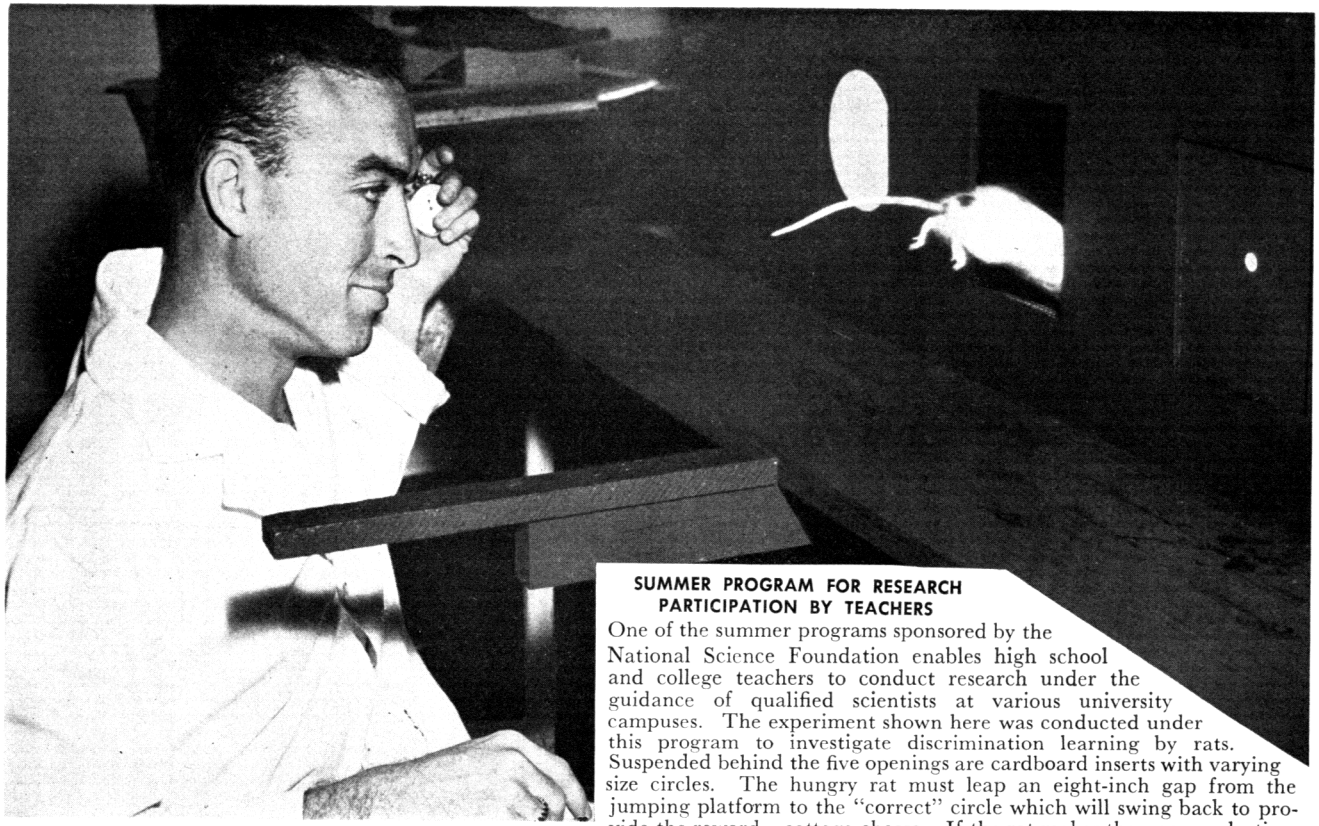
RIGHT PHOTO shows battered gondola containing nuclear emulsion, after one flight and prior to a second.

Balloon-borne Telescope Photographs Interior of Sun Spot



PROJECT STRATOSCOPE continues outstanding balloon astronomy research. The above photograph, released by the Foundation and the Office of Naval Research, was taken by STRATOSCOPE I—12-inch solar telescope-camera—at an altitude of 80,000 feet, and shows clearly for the first time white dots in the center of sun spot umbra. These spots, less than 200 miles in diameter, are apparently convection cells of rising gases, strongly suppressed by the magnetic field of the sun spot.

Photograph below show fused-silica primary-reflective mirror for a 36-inch telescope now under construction for observing stars, planets, and nebulae. The telescope with camera equipment will be lofted by unmanned balloon by the Princeton University STRATOSCOPE II team.

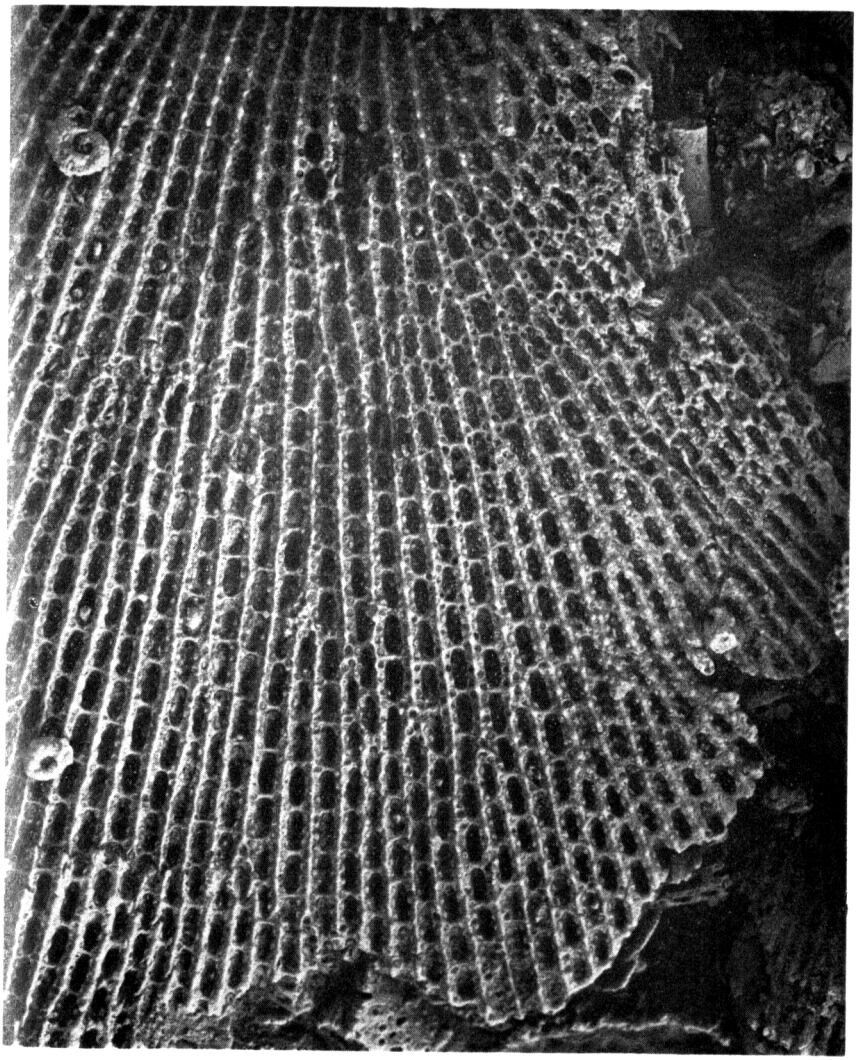


SUMMER PROGRAM FOR RESEARCH PARTICIPATION BY TEACHERS

One of the summer programs sponsored by the National Science Foundation enables high school and college teachers to conduct research under the guidance of qualified scientists at various university campuses. The experiment shown here was conducted under this program to investigate discrimination learning by rats. Suspended behind the five openings are cardboard inserts with varying size circles. The hungry rat must leap an eight-inch gap from the jumping platform to the "correct" circle which will swing back to provide the reward—cottage cheese. If the rat makes the wrong selection, it bumps its nose and falls into a net instead.

Small Aquatic Moss Animals Built Great Reefs

Bryozoa, a group of small aquatic organisms known as moss animals because of their superficial resemblance to plants, are the subject of a comparative study recently undertaken by an NSF grantee. An example of a bryozoan is *Fenestella rudis* Urlich, shown here. The genus *Fenestella* (resembling windows) occurred abundantly during the Paleozoic Era 330 million years ago. Despite an exceptionally delicate structure, nearly infinite numbers of bryozoa, each surrounded by calcareous walls, built great reefs. Some of the largest reefs, estimated to be 240 million years old, occur in the western approaches of the Ural Mountains. Acting much like giant sponges, the reefs often become saturated with oil, and in fact are a principal source of petroleum in Russia. The twisted shells are those of the marine worm *Spirobis,* often found in association with a Fenestella colony.

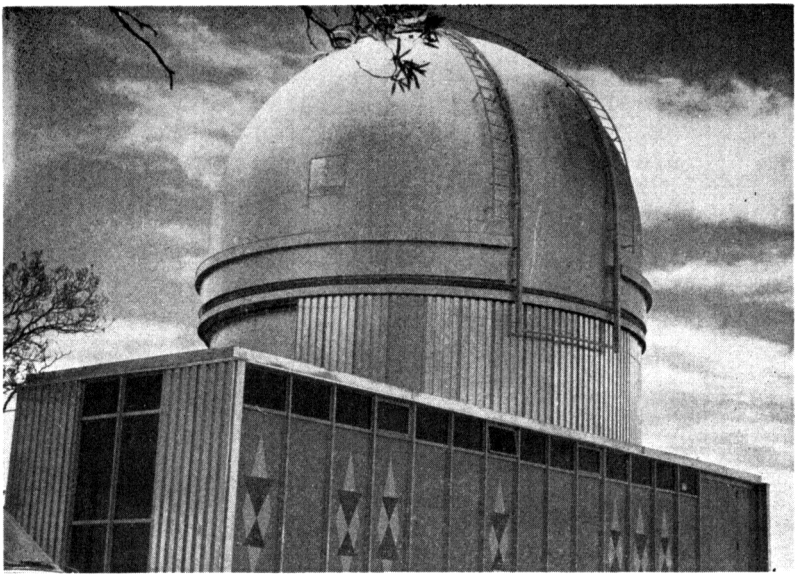


Recognizing the urgent need for new and more modern research facilities, the Foundation has provided assistance to universities and other nonprofit research institutions. The accompanying photograph is of a new 32,000-square foot, 4-story laboratory building at the Marine Biological Laboratory, Woods Hole, Mass. It replaces three wooden buildings dating from the late 19th century and provides research space for approximately one-third of the 375 to 400 summer investigators. It contains such special features as X-ray, cesium radiation, and isotope units, and refrigerated salt water laboratories. The shell of the building is waterproofed reinforced concrete faced with vertical cypress planking.

Unique Sacred Image of Tribal God Found in Arizona Excavations

A unique Katchina, or image of a tribal god, was one of the discoveries of an archaeological expedition to eastern Arizona. The nine-inch multicolored image carved from sandstone was found in a secret crypt in the remains of a large Kiva, or pueblo ceremonial chamber, near Vernon. When unearthed, the image's right arm was missing, probably broken off intentionally to curtail the image's "god-like" powers when the Pueblo Indians abandoned it six to seven centuries ago. The photograph is of a replica made at the site.

For description of other discoveries of this expedition see page 71.

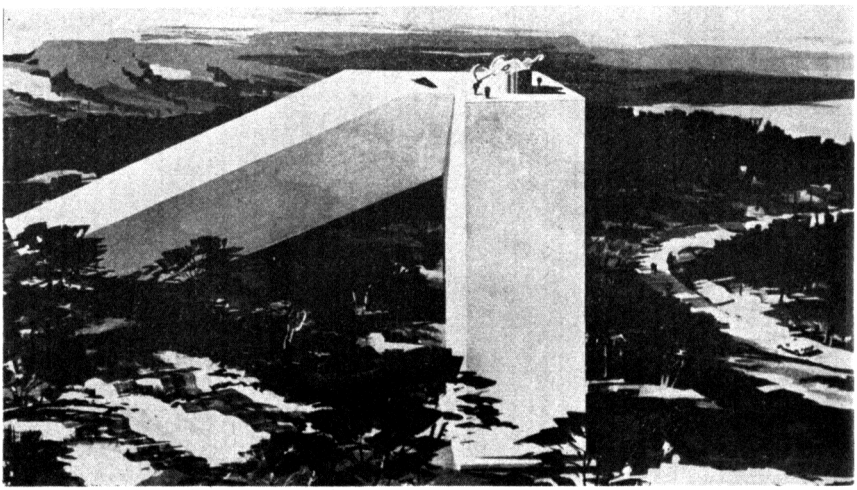


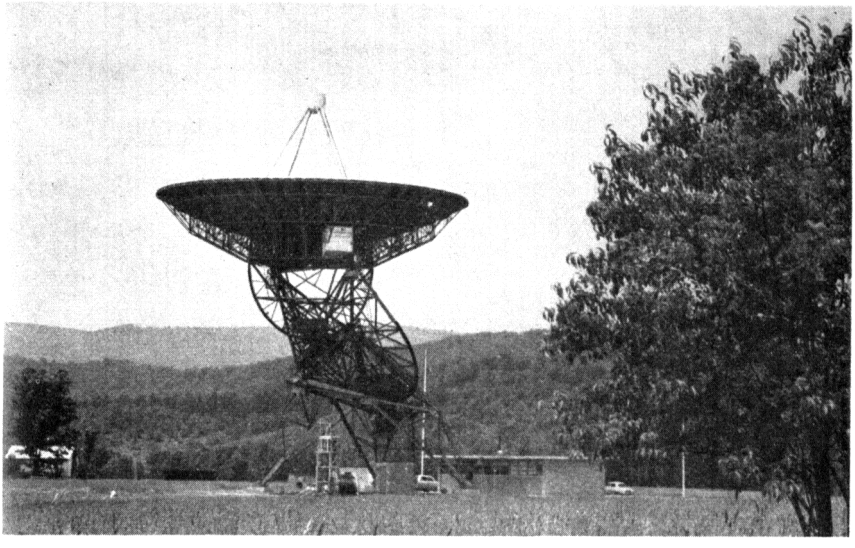
New Optical Facilities at Kitt Peak National Observatory

Kitt Peak National Observatory, dedicated March 15, 1960, has begun a major observing program with its 36-inch reflecting telescope, housed in building shown above. The structure includes office and dark room facilities, and an unusually high pier for the telescope to raise it above air turbulence at ground level.

Below is artist's conception of what will be the world's largest solar telescope, now under construction at the observatory. It will have a focal length of 300 feet, and will form images of the sun almost a yard in diameter. The building will stand 110 feet high, and the diagonal shaft will be 480 feet long, of which 280 feet will be underground. The observing room will also be underground.

Both the Kitt Peak National Observatory and the National Radio Astronomy Observatory are national research centers open to all qualified astronomers. They are maintained by the National Science Foundation; Kitt Peak is operated by the Association of Universities for Research in Astronomy, Inc., and NRAO by Associated Universities, Inc.

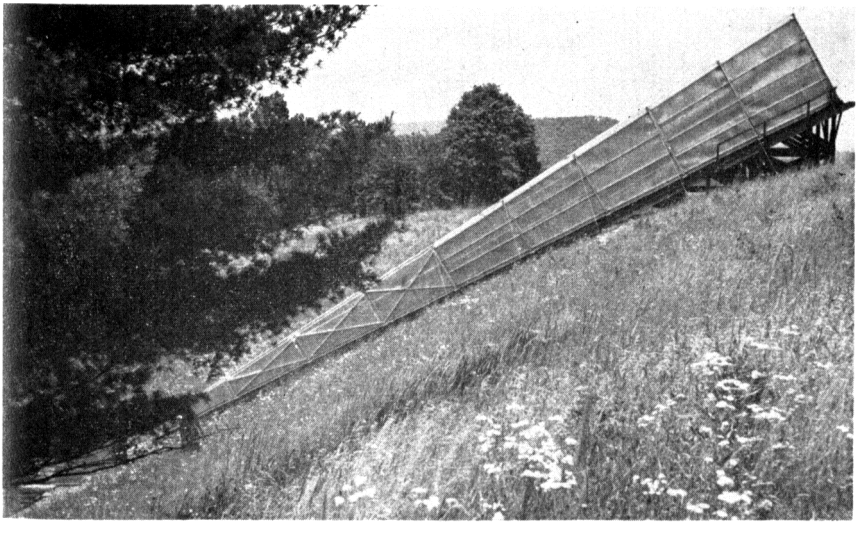


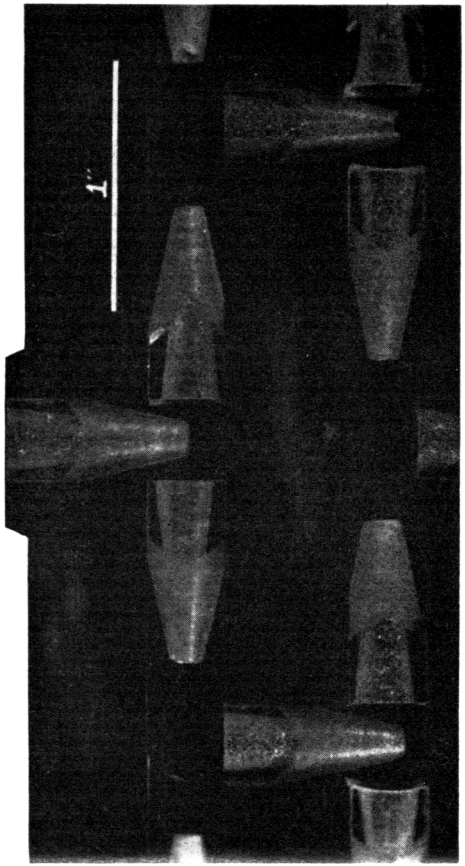


Radio Telescopes in Use at National Radio Astronomy Observatory

National Radio Astronomy Observatory telescopes now include the 85-foot Tatel telescope (above) and the "Little Big Horn" (below). The Tatel instrument has been used since March, 1959, for projects including a radio contour map of the center of the Milky Way galaxy and Project Ozma, to listen for signals by other beings in outer space. It is on a polar mount with one axis parallel to the axis of the earth and the other perpendicular, and may be rotated to point steadily at a celestial object moving across the sky.

The "Little Big Horn" is a radio telescope of unusual design, known technically as a horn antenna. It is fixed so that once each day it observes the strong radio source in Cassiopeia. This is used to measure accurately the energy of the incoming radio waves—which the 120-foot-long horn is particularly suited to do—and thus provides a calibrated source in the sky that all radio astronomers may use as a standard.



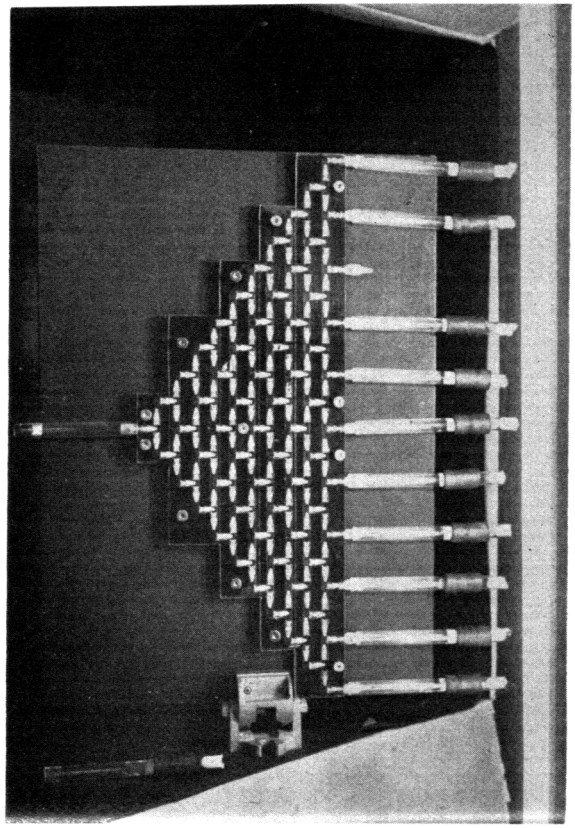


Maze for Studying Variation in Gravity Response of Fruit Flies

A. Entire maze. Flies are introduced in vial at left and finish in vials at right, being attracted by food in the latter vials and by a fluorescent light in a vertical position at the right. Variation in response to gravity causes the flies to finish in vials at different heights. By means of this maze it has been possible to show that the genetic variability of flies introduced into the maze influences the variability of their response to gravity. (See page 68). ⟶

B. Maze consists of numerous T-units in which flies, moving from left to right, are confronted with choice of going upwards or downwards. Cones discourage backward movement of the flies in the maze. One such unit and parts of two others are shown here.

⟵



Program Activities

of the

National Science Foundation

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SUPPORT OF BASIC RESEARCH IN THE SCIENCES

Research Programs

The Foundation's programs for the support of basic research are administered through the Division of Biological and Medical Sciences; the Division of Mathematical, Physical, and Engineering Sciences; the Office of Social Sciences; and for research to be carried out in the Antarctic, through the Office of Special International Programs.

Since the establishment of the Foundation, resources for these programs have grown from $1 million in 1952 to $78 million in 1960, recognition by the Government of the vital importance of basic research to our progress as a Nation and of the wholehearted acceptance of the Foundation and its programs by the scientific community.

These grants have been primarily for the work of individual scientists, at the Nation's colleges and universities, for specific research projects. Recently the research support program has been extended to provide support for "coherent" areas of sciences—research projects that are extremely broad in scope and may embrace the work of several investigators in a number of scientific disciplines. Examples of this type of support include research into the nature of the enzyme reactions through which the living cell obtains and makes use of the energy necessary for growth and development, the problem of the production and nature of plasmas, and low-temperature phase transitions. Such projects may enlist the joint efforts of chemists, physicists, biologists, and engineers.

NSF is also alert to problem areas of science, so-called critical areas, which have become so because of the stage of development of the science or because of national needs. For example, increased aid is being provided for oceanography and atmospheric sciences.

Support has been provided for the purchase of general purpose research equipment (electron microscopes, ultra centrifuges, etc.) and for specialized facilities such as nuclear research reactors, controlled environment laboratories, computer centers, and an oceanographic research vessel. In the past year such support has been expanded to provide assistance

on a matching basis for the construction and renovation of graduate research laboratories.

Facilities support has been extended to meet the essential need for major facilities which no single university could afford. For example, in the field of astronomy the Foundation fully supports and maintains national observatories managed by university associations and available to any qualified U.S. scientist for research purposes. They include the National Radio Astronomy Observatory, Green Bank, W. Va., and the Kitt Peak National Observatory, for optical astronomy, near Tucson, Ariz. A center for research in the atmospheric sciences has been initiated.

A detailed listing of research grants may be found in appendix C.

DIVISION OF BIOLOGICAL AND MEDICAL SCIENCES

Current Research Support

Developmental Biology

The Developmental Biology program supports a wide range of projects, wide both with respect to types of organisms used and to the level at which the investigator is working. Studies at the organismal level include microscopic and macroscopic changes in morphology during the life history of the organism, starting with the zygote and ending either with fully differentiated cells (from which originate a new generation of zygotes), or with ante mortem changes (terminating a generation). Typical of research at this level are an investigation of the early development of the mammalian embryo, using a technique which permits selective destruction of specific areas of the embryo without its removal from the uterus, and various studies of differentiation in the cellular slime molds.

At the cellular level is research on tissue and cellular changes which can often be causally associated with cellular interactions or morphological effects of products of one cell type upon cells of a different type. Examples of such studies would include investigations into processes regulating morphogenesis in tissues of vascular plants; research on selective adhesion among embryonic chick cells which are aimed at providing insight into the causes of morphogenetic movements during development; and studies of the effect of a maternal manganese deficiency on morphogenesis of the inner ear.

Work at the subcellular level is aimed at the study of fine structure, subcellular particles, macromolecular compounds, cytoplasmic duplication, chromosomal differentiation, immunological specialization, enzyme patterns, DNA-RNA-protein relations, and synthesis of proteins.

Investigations in this area include studies of the physical basis of plant cell-wall growth; differentiation of protein patterns during development; and characterization of respiratory enzymes of mitochondria and subcellular organelles, followed by a study of development after experimental modification of specific metabolic pathways.

Environmental Biology

The Environmental Biology program encompasses several areas which can be considered to constitute the general field of ecology in its broadest definition.

Quantification of major energy and water exchanges, and determination of the annual net production of dry matter by green plants, and the annual energy turnover of herbivore populations of rodents, lagomorphs, and ants within a desert creosote-bush community constitute the objectives of one type of research effort being supported in the area of community energetics. Another undertaking illustrative of work underway in this area involves studies of temperature effects on the total metabolism of a shallow-water estuarine-benthic community and upon laboratory microcosms representing the natural conditions of planktonic communities or fresh-water pond habitats.

Animal orientation and behavior investigations being supported include those involving the physical basis for the orientation of birds and other organisms during migratory activities, and the physiological mechanisms which tend to initiate migration.

When properly interpreted, data from Foundation-aided studies of fossil pollen and invertebrate animals taken from cores of lake beds and marine sedimentary deposits, should yield important additional clues to the environmental conditions and the patterns of plant and animal distribution of early geological periods, as well as reveal parameters of climatic cycles and further information on evolutionary processes of modern-day organisms.

Included at the forefront of ecological research today are investigations concerned with mechanisms governing population structure and change. At one institution a series of laboratory experiments utilizing quantitative biological models has been designed to analyze the role of intergenus, interspecies, and intraspecies competition in population phenomena. At another laboratory, rates of biological efficiency and population response of certain lower invertebrates to controlled predation, immigration, and radiation are receiving study.

Most of the combined nitrogen in the oceans is believed to be present as nitrate in the deeper waters. Although the conversion of organically combined nitrogen to nitrate usually involves nitrification by suitable marine microorganisms, the organisms responsible for the nitrification

process in coastal waters have not been isolated. One NSF-supported attack on this problem includes the development of a method for demonstration of nitrification in marine waters; an attempt to determine if autotrophic and heterotrophic microorganisms which oxidize ammonia or nitrate can be isolated from various depths in the ocean; and, examination of the significant environmental factors which may influence the rate of nitrification in these waters. Efforts to ascertain the influences which contribute to the productivity and biotic structure of fresh water habitats are being pursued as well.

In addition to that for general life history investigations, support is being provided for analyses of the responses and adaptations of plants and animals to physical conditions of the environment. Many facets of plant and animal community development and organization are also receiving attention.

With the evident increase of interest in the ecological aspects of host-parasite associations, Foundation-aided investigators are conducting a variety of studies concerning the relationships between physical and biological conditions external to the host and the composition and distribution of parasite populations.

Genetic Biology

The Genetic Biology program supports a variety of research projects—including preliminary and general investigations, studies of the nature of the genetic material, research in quantitative and mathematical genetics, and evolutionary studies.

A portion of the program consists of studies that may be termed preliminary or general—being concerned with establishing the existence of a genetic basis for observed variation, finding new hereditary traits, and the location of genes on the chromosomes.

Investigations of the transmission, action, physico-chemical nature, and mutation of genetic material comprise about half of the research now supported by the genetics program. Much of this work is being done with microorganisms in which special phenomena of reproduction and gene transmission are employed, including such processes as genetic transformation and transduction in bacteria. The investigation of gene action includes projects on gene-enzyme relations and the study of genes and differentiation—covering such subjects as genes and biosynthesis in bacteria and fungi, the genetic basis of morphogenesis in seed plants, and sex determination in a great variety of living things ranging from microorganisms to higher plants and animals. Research on the detailed structure of genes and chromosomes is advancing along different routes that appear to be converging towards a remarkably improved understanding

of the nature of genetic material. While some investigators study genetic fine structure by means of recombination due to rare crossing over between homologous chromosomes, others investigate the genetic properties of deoxyribonucleic acid (DNA) and associated substances.

There appears a reasonable hope for a break-through that will show the relationship between information acquired through one approach and that obtained by the other. Microorganisms, with their high rates of reproduction and their relatively simple chemical organization, are particularly favorable for this kind of work. Genetic control of mutation is the subject of an interesting group of projects—for example, the study of genes in maize that appear to convert their alleles into likenesses of themselves.

Quantitative and mathematical genetics is the basis for another segment of active grants. A number of projects apply electronic computers to genetic problems. For instance, a recent grant supports a study in which a laboratory population of fruit flies is to be paralleled by a mock population analyzed by a high speed electronic computer; a comparison of the actual breeding results from the fly population with those obtained by the computer with the mock population should serve as a valuable test of the theoretical considerations on which the computer population is set up.

Projects on the genetic basis of evolutionary phenomena are the basis for the remaining grants made in this program. Such studies are concerned with genetic differences between species and natural populations and include investigations of chromosome and gene variation, reproductive isolation, and hybridization. Grants in this area support studies on a wide variety of animals and plants—protozoans, marine invertebrates, insects, fishes and amphibians, a few lower plants, and numerous seed plants.

Metabolic Biology

Studies that are being supported by the Metabolic Biology program are directed toward discovery of metabolic flow patterns in plant, animal, and bacterial systems with specific emphasis on determination of sites and mechanisms of energy coupling and on biological control of direction and rate of synthesis and breakdown of metabolites. This aspect is best exemplified by the research involved in an investigation of the biological interconversions of a very unusual, naturally occurring group of compounds referred to as "terpenes." A number of bacteria have been isolated from soil and sewage which are capable of metabolizing camphor, borneol, isoborneol, terpin hydrate, menthol, menthone, limonene, carvone, pulegon, and related substances. In studying the breakdown

of these compounds two distinct metabolic pathways have been discovered and the intermediate products resulting from their breakdown have been studied by very recently discovered and complicated techniques utilizing vapor phase chromatography. The enzymes catalyzing the initial stages of breakdown of these compounds have been fractionated and purified to an extent that the energy relationships and mechanisms involved could be studied in considerable detail.

Included in this program are problems concerned with the purification of specific enzymes such as the enzymes involved in the metabolism of proteins, carbohydrates, lipids, amino acids, and steroids; also isolation of previously undescribed cofactors and the elucidation of the nature of specific reactants and metabolites which have been used to reveal significant results with respect to mechanisms of enzymes, catalyzed substrates, and energy coupling.

Studies on the comparative aspects of biocatalysis in microorganisms have led to the discovery of the universality of biochemical processes in many metabolic pathways and marked specificity in others. A number of projects being supported by this program have clearly indicated that the major metabolic pathways involved in living systems are similar. However, on closer examination and study of these processes, minor but significant differences in metabolic flow patterns have become apparent and these differences are being exploited for the study of mechanisms of chemotherapy.

By selection of mutants or of organisms capable of specific enzyme inductions, as has been done in studies on the adaptive nature of the enzymes involved in the tricarboxylic acid cycle in microorganisms, it has been possible to study the mechanisms responsible for the specifically induced enzymes and cofactors involved in this aerobic process and to obtain information concerning energy metabolism both in the growing and non-growing cell, as well as in enzyme systems purified from cell extracts.

Molecular Biology

Grantees of the Molecular Biology program are concerned with protein synthesis and structure and enzyme function, nucleic acid and the translation of genetic information into specific directions for synthesis and regulation of cellular substances, and the physical and chemical nature of viruses and the mechanism of virus infection. Others conduct research dealing with the nature of the biochemical world before and during the formation of the planet earth; the manner in which energy is transformed in living systems; and the physiological mechanisms, such as nerve conduction, muscular contraction, membrane permeability, and

vision. Research in this program has in common the dimensions of the systems studied, that is, the smallest functional units in biological systems (the enzyme molecule, the myosin which is the basis of muscular contraction, the ATP transporting its "bit" of chemical energy, and the nucleic acid with its specific coded nucleotide chain carrying the history and the future of each living organism).

Examples of research now under way include the following:

Ribonuclease is an enzyme crucial to the translation of the genetic code in deoxyribonucleic acid (DNA) into specific directions for protein synthesis via ribonucleic acid. Research is presently in progress which is attempting to correlate the configuration of ribonuclease protein chains to the properties of this enzyme.

In human blood serum there exist several genetically determined types of hemoglobin-binding proteins. It is believed that the amino-acid composition of these protein types is directly related to the particular sequence of nucleotide bases in the deoxyribonucleic acid of the genes. This relationship is being investigated with the assistance of a very useful technique for separating similar serum proteins.

Viruses are intriguing biological organisms—comparatively simple yet still showing many signs of organized, independent existence. One investigation using bacterial viruses as subject material is trying to understand the nature of virus infection of bacterial cells and, in particular, to learn the mechanism by which DNA is packed in the virus head and is propelled into the bacteria thru the virus tail.

The earth and its atmosphere have not always contained the myriad of organic compounds that we observe today. Somehow these compounds developed from simpler substances which composed the early earth. A speculation is that the primitive planet may have been surrounded by a mixture of methane, ammonia, water, and hydrogen. It is now known that, in a test tube, ultraviolet light or an electric spark in the presence of this mixture will be followed by amino-acid synthesis. Experiments are continuing to see whether sugar phosphates, nucleotides, and other organic compounds can be derived from simple mixtures under common physical conditions.

A basic property of the living organism is the ability to change energy to a form needed to satisfy its living processes. This is accomplished through the transfer of chemical energy stored in packets. In photosynthetic organisms these packets are derived directly from light energy; in nonphotosynthetic organisms the packets are formed as a result of the breakdown of energy rich compounds. One useful packet is known as adenosine triphosphate (ATP). ATP holds energy in its phosphate bonds which can drive biological reactions. Research projects currently

in progress are investigating the mechanism by which energy liberated during metabolism is converted into the biological currency of ATP phosphate bonds.

In recent years there has been controversy about whether the basic molecular event in muscle contraction is the internal shortening of a continuous element or whether it is the sliding motion of discontinuous elements toward each other. An attempt is being made to resolve this problem by studying the behavior of the contractile protein, myosin, in solution. The small scale methods of X-ray diffraction and optical rotation are being used to determine the character of the molecular transformations.

Refined physical techniques such as electron microscopy and microspectrophotometry now permit direct observation of changes in cellular or organellar fine structure during the course of activities in the living cell. By using a combination of physical techniques it is the aim of a current study to elucidate the functional significance of cell fine structure. Investigators are observing changes in this structure as they occur during mitosis, differentiation, and contraction.

Psychobiology

Grant awards in the Psychobiology program cover research in physiological and experimental psychology and in animal behavior, as well as studies in measurement and quantitative techniques as these apply to the investigation of behavior and psychology.

In the area of physiological psychology and experimental psychology, current support includes investigation of the effects of cortical stimulation on learning and retention in monkeys; the effects of localized brain damage on the responsiveness of monkeys to visual and auditory incentives; behavioral changes in cats following restricted brain lesions produced by focused ultrasonic irradiation; and the perception by humans of complex visual and auditory patterns. Also being supported are experiments in discrimination learning with the special interest in assessing the validity of current mathematical models; studies of human learning and memory under conditions of infrequent opportunity for practice; and studies of the relationships between human perception and autonomic conditioning.

Animal-behavior support covers such research as descriptive and experimental studies of mechanisms in the pairing of predatory birds; analyses of instinctive behavior in birds and other vertebrates; and studies of the social behavior of a family of ants with special reference to analyzing the development of individual behavior patterns and to identifying chemical releasers of social behavior.

Support for research dealing with measurements and quantitative techniques includes work on techniques for constructing scales of subjective estimates of sensory stimuli with a view to clarifying the relations between the psychological response and the physical stimulus.

Regulatory Biology

The Regulatory Biology program supports studies of integrative and regulatory processes which operate within intact cells and organisms, both plant and animal. Quantitative methods are generally used which employ the tools of chemistry and physics, but the systems under examination are exceedingly complex because of the investigator's concern for the nature of the living responsive process as such. Sometimes only parts of plants or animals are used, such as single root hairs, thin slices of organs, or isolated single cells, but always the concern is for how these findings have a referred meaning for the whole organism. Studies supported by this program also include plant and animal diseases when attention is directed to regulatory responses made within either the host or the invading organism to the pathological relationship.

Among the more complexly organized animals, the nervous and endocrine systems are the main regulatory mechanisms which serve to control the physical and chemical nature of the internal environment; support of studies concerning these systems constitutes the major fraction of this program's activities. In mammals, much attention is directed to the hypothalamus and lower brain centers as they affect autonomic reflex functions. Highly refined methods are being employed to ablate or stimulate specific areas in the brain for the purpose of identifying nerve centers and pathways which control such body functions as blood pressure and flow, appetite and thirst, various behavior drives, and many aspects of autonomic visceral functions. Other studies in neurophysiology are concerned with the identification of receptive end organs, the reactions of individuals to environmental conditions permitting orientation to such external stimuli as polarized light, and with the relationship of light and dark periods of migratory preparation. Endocrine studies in various higher animals are devoted to the role of the pituitary gland as it is affected by the hypothalamus in regulating the reproductive cycle, and in controlling secretions of the pancreas, stomach, liver, intestine, and other digestive glands. Comparative endocrinology is represented by several projects devoted to a search among vertebrates for evolutionary changes in how hormones interact with each other and with the central nervous system to achieve autoregulation.

In plants, regulation of growth, reproduction, and resistance is achieved without the highly organized nervous and endocrine systems

found in complex animals. Almost a third of the projects supported are concerned with such topics in the general area of plant physiology and pathology as the orientation and response of plants to various environmental stimuli, resistance to the invasion of pathogenic organisms, basic nutritional requirements of plants and microorganisms, and the extraction of growth factors and reproductive hormones.

The very interesting and highly publicized field of "biological clocks" receives its share of attention from the program with support for work in the area dealing with the analysis of rhythmic behavior in dozens of plants, animals, and microorganisms. Analyses of all the basic regulatory devices of these organisms are being made to explain the persistence of rhythms which exist apart from overt environmental stimuli and affect such diurnal, lunar, and animal activities as movements of plant leaves and petals, wakefulness, emergence of insects from pupae, color changes in invertebrates, feeding and reproductive activities, menstrual cycle, migration, and finally the annual cyclical activities of plants and animals too numerous to mention.

An increasingly large number of projects are being supported which isolate from the whole organism individual cells or small groups of cells for study in vitro under controlled conditions. These studies on plant and animal preparations are designed to identify carefully the physiological parameters of such general cell phenomena as permeability and active transport across cell membranes, contraction of muscle fibers, conduction along nerves, etc., when attention is directed to the living phenomenon itself rather than to the metabolic or molecular mechanisms which might underlie it.

Systematic Biology

Currently, the program for Systematic Biology is supporting research in various aspects of the systematics of many kinds of plants and animals, both fossil and living, and which occur in widely diverse habitats.

Insects leave almost no fossil record in rocks and their evolutionary history is imperfectly known. The best source for preserved representatives of earlier geologic epochs is the Chiapas area of Mexico where large deposits of amber, fossilized tree resin, are located. Studies of these perfectly preserved specimens embedded in the amber, comparison with modern day forms, and correlation with the geologic ages at the various sites are providing knowledge of the antiquity of modern insects and their geographic distribution.

A natural basis rather than an artificial basis for nomenclatural classification is preferable, as the latter often completely obscures biological generalizations that a natural classification will bring to light. This is

illustrated by the rove beetles (family: Staphylinidae). One of its members is parasitic on mammals, while others are found in termite nests. Investigations of those beetles which inhabit societies of doryline ants (army ants, legionary ants, driver ants) has now shown that the society comprised of ants and their associated beetles is an adaptive unit. The ants and beetles have been interdependent throughout their history, so that the two, evolving side by side, resulted in changes in one calling for changes in the other.

Recognition of the importance of marine organisms has been rapidly improving and is reflected in the various research problems under consideration. The appearance of the first two parts of the "Fishes of the Western North Atlantic" and the enthusiastic reception of this critical reclassification by both American and foreign ichthyologists has stimulated research and provided the means and impetus to advance the study of these fishes. Assistance from NSF is enabling approximately 30 ichthyologists engaged in research on soft-rayed bony fishes of North America to complete pertinent studies and thus contribute to a particular phase of this unparalleled and monumental contemporary reference. Other projects of such an environment include work on marine algae, trematode parasites, living and fossil bivalve mollusks, marine fungi, growth of sea urchins, and varied problems concerning additional groups of marine organisms.

One of the more recent methods for assisting in the accurate taxonomic determination and identification of animals is the utilization of serological techniques. Interesting data are being accumulated with regard to the inter-relationship of mammals, and studies of avian proteins, have produced unusual and informative results. Data have demonstrated that serological investigations using chromotography, electrophoretic analysis, electro-migration patterns, and other modifications have potential value as a supplementary taxonomic tool. Considerable effort is being directed along that line.

The classic approach to systematics, such as faunistic and floristic surveys, is still a useful and necessary approach to taxonomy in little known areas or poorly understood groups. Such programs are exemplified by the vascular flora of North and South Carolina, flora of Panama, Oligocene flora of the Ruby Basin in Montana (fossil forms), Arctic American mosses, and faunas of the Deadwood Formation of the Black Hills. A plant survey of the Guiana Region of South America is continuing to supply valuable material collected in an area about which almost nothing was known until recent years when several expeditions have provided much data and discovered many new and unique species.

Experimental efforts are also being directed toward clarification of life histories of such forms as fishes and some invertebrates. Among the

cytotaxonomic problems, research is being carried out on the Umbelliferae (carrot family) and the violets.

These examples represent only a few of the many kinds of research currently underway in systematics and many questions are still unanswered. Modification in current practices, accumulation of data, and interpretation in light of new findings are certainly indicative of changes in emphasis and in philosophies associated with systematic biology in general.

Facilities for Research in the Biological and Medical Sciences

Support of research facilities was broadened during the 1960 fiscal year to include not only support of specialized facilities, such as marine and field stations, systematic biology museums and controlled environment laboratories, but also support for the development of graduate-level laboratories (renovation and new construction).

Specialized facilities, those considered unique, either in their program or their locations, and not found in the usual university or college department are supported at full cost by the Foundation. Graduate research laboratories require at least 50 percent participation by the institution in the cost of the enterprise for which aid is requested.

Specialized Research Facilities

Twenty-nine grants were awarded during the year in the specialized facilities program. Although all of them help to fulfill urgent needs, a few examples will highlight the importance of this kind of aid. Among these are the grant to the University of Texas Marine Station at Port Aransas, which permits the construction of a boat basin where the Station's boats may be kept. This will greatly facilitate the work of that rapidly improving station by permitting more adequate protection of boats, saving of travel and loading time, and more efficient general operation. Grants to the Desert Research Station of the American Museum of Natural History, to the Mt. Desert Island Biological Laboratory, to the Naples Zoological Station, to the Bermuda Biological Station, to the Science Lodge of the University of Colorado, and to the Rocky Mountain Biological Laboratory will aid in the improvement and renovation of research facilities, improvement and expansion of housing facilities, improvement of access roads, and assistance in general operations of these important scientific establishments. A grant to the University of Wisconsin will aid in construction of a new and modern hydrobiological laboratory, the only such establishment in the United States. A grant to the University of California (Berkeley) will permit the construction of an animal behavior field station where animals may be readily studied under conditions simulating those of the natural habitats. Another

grant to the University of California (Riverside) has allowed the retention of a large tract of desert terrain as a natural preserve for study of biological phenomena under arid conditions. A grant to the New York Botanical Garden will aid in construction of a building to adequately house one of the world's best and most complete botanical libraries. Another grant was to the Communications Research Institute, St. Thomas, V.I., which will permit the construction of a laboratory for research on communication phenomena in porpoises.

Graduate Research Laboratories

Forty-two grants to graduate research laboratories—most of them being for renovation or rehabilitation of existing space—made during the year will result in improvement of thousands of square feet of research laboratory space. Equally important are those grants which will permit adequate equipping of new laboratories which are being constructed with funds from other sources. These, as well as the few grants for construction of new laboratory buildings, greenhouses, etc., will help to provide the much needed additional space for enlarged staffs and their research projects.

Genetic Stock Centers

The importance of genetic stock centers in backing up research is potentially great. Such centers reduce the time and funds that individual workers would otherwise need to spend on stock maintenance. They also insure that valuable genetic material will be maintained and available when needed, rather than being lost through neglect or the decision to discard due to lack of space, time, etc.

Currently active grants support four such stock centers: (1) a Drosophila stock center at the California Institute of Technology; (2) a mouse mutant collection at the Jackson Memorial Laboratory; (3) a maize stock center at the University of Illinois; and (4) a center for *Neurospora* and other fungi at Dartmouth. Maintenance of stocks of genetically less well known organisms is also being supported—algae at Indiana University, *Paramecium caudatum* at the University of Miami, and Chinese hamsters at the Children's Cancer Research Foundation, Boston.

DIVISION OF MATHEMATICAL, PHYSICAL, AND ENGINEERING SCIENCES

Current Research Support

Astronomy

The Astonomy program supports research in all areas of astronomy, ranging from stellar spectroscopy through studies of primary cosmic

rays to the determination of the fundamental position of stars. It also supports research dealing with the development of improved instrumentation such as image amplifiers and more sensitive radio receivers.

Because of the present and probable future impact of U.S. space programs on astronomical research, the Foundation is considering how best to distribute its support. Within limitations of its budget, it will, of course, continue to support research at ground-based observatories and laboratories. In the area of space programs, it will generally not support the construction or operation of rocket launchers or space vehicles. NSF will, however, encourage astronomers in the development of ideas and instrumentation which make the best possible use of the national capability for astronomical observatories in space.

It will also endeavor to provide high-grade observing facilities for research and training purposes by young astronomers whose number is sharply increasing. See "Facilities" section on page 52 for other information on national observatories.

Atmospheric Sciences

Taken as a whole, the earth's atmosphere presents problems that require the services of nearly all branches of science. In the past, largely because of the extreme complexity of the subject, meteorologists and other scientists concentrated on the more tangible areas, such as temperature, wind, and moisture statistics, rather than trying to derive the properties of the atmosphere from fundamental physical parameters. The Atmospheric Sciences program helps bring the scientific disciplines of physics, chemistry, mathematics, etc., to focus on the interdisciplinary problems encountered in the study of the atmosphere. Research topics are many and varied, and include many features of the fundamental entities of energy, heat, mass, and motion.

Because of the importance of the sun's role in the circulation of the atmosphere, the Foundation is supporting research dealing with the effect of small and large variations in solar activity on the earth's circulation, climate, and daily weather.

Another research project is seeking to provide quantitative estimates of the exchanges of heat and water vapor between the sea surface and the atmosphere, and to relate these to the development of large-scale weather systems and their motion.

The transport of thermal energy throughout the troposphere is a subject of investigation. Thorough studies of this topic require the development of equations suitable for numerical integration which will yield the convective heating or cooling rate throughout the troposphere, and the testing of these results with balloon-borne radiation measurements.

The higher atmosphere is also a subject of investigation. The IGY and the advent of satellites have generated interest in the extra-terrestrial nature of many atmospheric phenomena. The origin, propagation, and interactions of cosmic rays and auroral particles are some of the subject areas being studied. Other upper-atmosphere investigations include the application of fluid mechanics to ionospheric physics; the three-dimensional field of motion, temperature, moisture, and ozone in and above the stratosphere; and geomagnetic fluctuations in the ionosphere.

More familiar topics, such as cloud and precipitation physics, are always of interest to the meteorological scientist. Research projects in these areas include studies ranging from cloud-chamber measurement of the absorbing ability of air-borne particles through the physical and chemical properties of condensation nuclei to the fire-starting characteristics of lightning storms. Several projects of these types, classified as weather-modification research, are also supported and monitored by this program and are reported on in detail in a separate annual report to the President and the Congress.

Chemistry

The Chemistry program supports research primarily in the fields of organic, inorganic, physical, and analytical chemistry.

In the field of organic chemistry considerable activity has continued on studies of the structure and total synthesis of natural products. A four-year research program has culminated in the total synthesis of chlorophyll, the green coloring matter of plants. (See page 66.) The structure and synthesis of this complex material has been the subject of research for more than a half-century. In two independent studies, pentacyclic triterpenes, such as hopenone, have been prepared by total syntheses for the first time. Podocarpic acid, the chief constituent of pine oil, has also been synthesized in the laboratory. The structure of a very complex alkaloid, gelsemine, which has a hexacyclic structure, has been established in a Foundation-supported research program.

Small-ring compounds, hitherto considered to possess too much strain to permit isolation, have now been synthesized. These include benzocyclobutenone, naphtho[b]cyclobutene, 1,2-diphenyldimethylenecyclobutene and diphenylcyclobutenedione. These compounds are of great interest because the four-membered rings are strained to the same extent as cyclobutadiene, which has defied isolation.

The trend toward physical-organic chemistry studies has continued with numerous investigations on rates, kinetics, and reaction mechanisms. Modern physical tools, methods, and instrumentation, such as nuclear-magnetic resonance, electron-paramagnetic resonance, and gas chroma-

568169—61——5

tography are being utilized extensively to explain well-known but not completely understood reactions, such as the Diels-Alder, Grignard, and Willgerodt reactions.

The absolute configuration of compounds is receiving an increasing amount of attention. Concepts of conformational analysis and the use of optical rotatory dispersion curves have been very useful in establishing the exact stereochemical configurations of groups attached to a particular atom.

Studies on the chemistry of divalent carbon is very much concerned now with questions of distinguishing between carbene and methylene and whether these entities are in a singlet state or a triplet state in particular reactions.

In analytical chemistry a new method has been developed for determining deuterium by means of a simple gas chromatographic technique. Investigations are underway to extend the utility of the rotated dropping-mercury electrode to permit it to function properly in non-aqueous media. Increasing emphasis is being placed on the application of gas chromatographic techniques to inorganic compounds.

In physical chemistry, molecular-structure determination, primarily by spectroscopic methods, is an important area of research support. Nuclear magnetic resonance studies of organic and inorganic compounds and reaction intermediates (such as free radicals) have become increasingly popular and important. Electron-paramagnetic resonance and infrared-spectroscopy studies of a variety of compounds and intermediates have been initiated. Classical kinetic studies are being conducted, primarily directed at reaction-mechanism determination. Thermodynamic investigations are being carried out on solutions (organic and inorganic systems) as well as pure compounds, using highly refined and precise calorimeters. Some of these studies are at temperatures approaching 0° K. A resurgence of interest in theoretical quantum mechanical calculations is taking place in a number of laboratories throughout the country in an effort to calculate atomic and molecular properties.

Research in inorganic chemistry is becoming more theoretical in nature, for example, the application of the crystal field theory to inorganic complexes. Research support of boron compounds is increasing at a rapid rate. Reaction mechanisms, structure determinations, and preparative inorganic chemistry of boron compounds are areas of particular interest. Transition elements and properties of optically active complex inorganic compounds are attracting considerable attention. Increased emphasis is being given to the study of inorganic compounds at high temperatures.

Earth Sciences

In the Earth Sciences program, support is provided for geochemistry, geology, geophysics, and oceanography. Probably the most significant projects currently being supported by this program are: crustal studies dealing with the structure of the earth's crust through the combined use of seismology, gravity measurement, and geology; studies of ocean currents; studies of the carbon-dioxide problem concerned with the equilibrium of CO_2 between the atmosphere and the ocean and with measurement of the carbon-14 content of ocean carbonates to trace turnover rates and circulation in the oceans; and feasibility studies and site surveys for Project Mohole, the attempt to drill a hole through the earth's crust and into the mantle.

Project Mohole, named for the Mohorovicic discontinuity located between the crust of the earth and the mantle, gives promise of great scientific rewards by providing much knowledge of the materials of the crust and the mantle. The hole will be drilled in the deep ocean because the crust there is much thinner than that underlying the continents. Complete cores of deep-sea sediments will give much history of the oceans and the evolution of life. The first phase will consist of drilling a series of experimental holes using an existing barge to test engineering calculations of deep-water drilling and to perfect positioning techniques for control of barge location.

Engineering Sciences

Along a broad front, the Engineering Sciences program continues to recommend research support for those projects which will provide either new knowledge concerning basic physical principles related to engineering or generalizations that reflect better understanding or more realistic prediction of the behavior of systems. In addition to the usual fields of engineering, the support picture is continually being broadened to include projects in rapidly developing fields such as those introduced by the advent of the space age, and fields unusual to engineering such as linguistics, learning machines, and even to areas such as biophysics of different land and sea fauna.

One of the more active areas of research support has been the field of kinetics and rate reactions largely through chemical engineering. In spite of the desirability of attaining steady-state processes, the engineer is faced with problems of both instability and nonlinearity in studying natural phenomenon, thus making the study of transient-rate reactions a very important one. Typical is a study of rates of gas absorption in water at contact periods much less than a second, taking into consideration unsteady state diffusion, boundary conditions, and thermodynamics

effects. Another interesting investigation is a study of the reaction kinetics of the system CO_2–H_2S–Na_2O–N_2O. The techniques developed promise to be applicable in the study of the kinetics of other heterogeneous systems.

The need for additional basic research in the heat-transfer area has been made manifest in many new engineering developments, particularly in space flight and attempts to control nuclear fission. In the former area, great emphasis exists on thermal-radiation studies since heat transfer takes place primarily through this mechanism in outer space. Furthermore, rocket motors and unconventional power plants for propulsion in space require high-temperature operation which results in substantial heat exchanges by radiation. On the other hand, developments in controlled nuclear fission are directly dependent on further basic knowledge of convection and boiling-heat transfer mechanisms. Pertinent to these areas are research grants for basic studies in the spectral absorptivities, transmissivities, and emissivities of various gas mixtures over a wide range of temperatures and pressures; heat transfer and flow phenomena in swirling flow; and conversion of solar energy to power.

Significant engineering developments in aeronautics, unit operations, turbomachinery, and many other fields are greatly dependent upon research being carried out in the general area of fluid mechanics. This area of research is exceedingly broad and research projects cover subjects such as turbulence, boundary-layer transition from laminar to turbulent flow.

The advent of the space age has stimulated a great deal of interest in studies involving the drag and heating of meteors, satellites, and space vehicles moving through low-density atmospheres at hypersonic speeds. Most of the research being done on these problems is supported by agencies whose missions are oriented toward space. However, several interesting studies were initiated this fiscal year under Foundation support. For example, grants were awarded for studies in free-molecule transfer processes at high speed, energy-transfer and momentum-transfer processes at solid surfaces exposed to high-speed free-molecule flow, emission and absorption properties of plasma fields under hypersonic flow conditions, magnetic-boundary layers, and magnetic shock.

In a different vein of growing interest are areas of overlap between physical, biological, and social sciences. Problems may range over a wide spectrum, from small-scale problems in bionics, such as the biophysics of bird flight, to large-scale socioregional problems such as basic transportation problems.

Mathematical Sciences

The field of mathematics is tremendously diversified and there is active research taking place in many parts ranging from rather concrete problems in applied mathematics to the far reaches of abstract symbolic logic. Parenthetically, it might be noted that since the introduction of the theory of logic into the design and coding of computing machines, even this field has turned out to have many useful applications. The Mathematical Sciences program strives to be equally receptive to proposals in all fields of mathematics.

In surveying current research in mathematics it is clear that there are certain fields which are particularly active now, and in which impressive progress is being made, much of it with NSF support. These include: partial differential equations, homological algebra, differential topology, group theory—particularly finite group theory—functions of several complex variables, and logic.

Physics

Current research being supported through the Physics program is aimed at discovering new general laws about our physical universe and enlarging our understanding of existing laws.

Einstein's theories of general relativity, which date back to about 1910, have attracted the attention of some of the world's greatest theorists. With the experimental demonstration of the Moessbauer effect and the terrestrial verification of the gravitational red shifts, there has been a rebirth of interest in certain fundamental concepts occurring in Einstein's theory, notably those of "field energy" and "gravitational radiation." Since Einstein's equations for the gravitational field are valid in any coordinate system, it is often difficult to distinguish physical effects from effects due to the curvature of the coordinate system; this leads to ambiguities in the expression to be used, for example, for "energy." The resolution of this troublesome problem and the contingent task of constructing a quantum mechanical treatment of the gravitation has been undertaken by NSF grantees. By employing the methods of quantum field theory with suitable restrictions, NSF grantees have been able to arrive at acceptable expressions for gravitational field energy and, further, have been able to define gravitational radiation objectively in expressions analogous to the Poynting vector of electromagnetic theory. These researches have significantly deepened our understanding of the basic concepts of general relativity and, therefore, the rest of physics.

Besides laws dealing with the fundamental processes, physicists under Foundation grants have continued their progress in learning how the physical universe is constructed. Of current concern is the manner in which the atomic nucleus is organized. For many years no adequate

theoretical model of the nucleus existed. Within the past decade this situation has improved to the point where now the shell model, the collective model, and finally the unified model of the nucleus provide a useful framework for interpretation of the data. In order to obtain critical data for guidance in the further development of these models, the Foundation supported a number of experimental investigations noted for their precision measurements.

In this group are included research on the properties of light nuclei with energy levels and other nuclear properties being determined by analysis of nuclear reactions; on measuring properties of nuclear levels using mostly deuteron-induced reactions with emphasis on determination of the finer structure of nuclear energy level schemes; on precision energy measurements of nuclear gamma rays using a 2-meter and a 6-meter, bent-crystal spectrometer; on measurements of nuclear-magnetic moments using newly developed nuclear-alignment methods for making additional nuclei susceptible to measurement; and on measurement of nuclear-excited state lifetimes using the continuous bremsstrahlung from an electron accelerator.

For investigation in the photonuclear reactions and the associated "giant resonances," the Foundation has made available a grant for a tandem Van de Graaff accelerator.

On the question of improving our knowledge of the structure of liquids, Foundation-grant recipients were able to make a number of advances. Of particular interest is the work utilizing the pseudo atom, positronium. (See page 72.)

Facilities for Research in the Mathematical, Physical, and Engineering Sciences

Facilities support by this division during 1960 totaled $9.5 million and included aid for two national observatories, a national center for atmospheric research, specialized research facilities at universities, and graduate research laboratories.

National Observatories and Centers

Continued support was provided for the National Radio Astronomy Observatory and the Kitt Peak National Observatory. A new National Center for Atmospheric Research was established by a contract with the University Corporation for Atmospheric Research signed on June 20, 1960.

1. National Radio Astronomy Observatory

A total of $950,000 was allocated to the contract under which Associated Universities, Inc., operates the observatory at Green Bank, W. Va.,

including $50,000 specifically earmarked for strengthening the library. Total funds obligated through fiscal year 1960 were $10,430,000.

A significant milestone was passed when on July 1, 1959, Dr. Otto Struve joined the observatory as its first permanent director. During the year, the central section of the laboratory and the complete residence hall were finished and occupied. The 84-foot telescope was in operation throughout the year. The only major construction item which has been funded and is not yet complete is the 140-foot telescope. Unofficial estimates indicate that this telescope will be completed in 1961.

A specialized radio telescope of somewhat unusual design was completed and began operation toward the end of March 1960. Known familiarly as "Little Big Horn," it is a horn antenna 120 feet in length, fixed in position so that it can observe the strong radio source in Cassiopeia once each day. This type was chosen because the energy it collects can be calculated precisely from its size. It is used to measure accurately the energy of incoming radio waves, thus providing a calibrated source in the sky that all radio astronomers can use as a standard. (See photograph, p. 29.)

2. Kitt Peak National Observatory

An additional $900,000 was provided in fiscal year 1960 for operations and improvements at the observatory, located near Tucson, Ariz., which is operated by the Association of Universities for Research in Astronomy, Inc. (AURA) on contract with NSF. In addition, a second grant ($252,300) was made to AURA for the space telescope design study program. To date $8,445,000 has been obligated under the main contract, and $412,000 granted for the space telescope study.

The 36-inch telescope and dome, and dining-assembly hall, the office building, dormitory, and shops were completed this year on Kitt Peak; the first third of the city laboratory building in Tucson was finished. Completion of the 84-inch telescope dome is expected in October 1960, but the telescope itself cannot be expected to be in full operation for several years. The 36-inch telescope with its associated spectrophotometers is in operation.

Construction of what will be the world's largest solar telescope is to begin at Kitt Peak in late 1960. This 300-foot focal-length instrument will form solar images as large as 34 inches in diameter. The telescope will be a large building with an 80-inch mirror mounted at the top to reflect sunlight to a 60-inch parabolic mirror at the bottom of a 480-foot shaft cored into the mountain. From this point light will be reflected an additional 280 feet to a 48-inch mirror and thence to an underground observing room. (See illustration, p. 28.)

This instrument will enable researchers to study the sun in much greater detail than has heretofore been possible, increasing substantially their meager knowledge of the star that keeps our planet alive.

The satellite-telescope project has been moving forward through the feasibility-study and preliminary-design stages. Design calculations on the vacuum spectrograph have been completed. A model of the astro-guider for the telescope has been designed and is under construction. Preliminary sketches have been drawn for an addition to the city laboratory required for the satellite project.

In March 1960, Dr. Aden Meinel resigned as director of the observatory in order to devote more time to research and to the satellite-telescope program. He was succeeded by Dr. C. D. Shane, president of AURA, on a temporary basis pending recruitment of a permanent Director. On June 8, 1960 the appointment of Dr. N. U. Mayall as permanent director of the observatory was announced; he assumed his new duties October 1, 1960. Dr. Mayall had a distinguished record of accomplishment as a member of the research staff at the Lick Observatory, where he had served since 1934.

3. National Center for Atmospheric Research

Congress appropriated $500,000 in fiscal year 1960 in response to a Foundation request for funds to study further and to plan for a national institute for atmospheric research. This request was based on the proposal, formulated by the University Committee (now Corporation) for Atmospheric Research, that a major institute be established.

Careful review and evaluation of this proposal by the National Science Board and the staff of the Foundation has culminated in a plan for a new Center, which will be a unique organization, and in no sense "just another laboratory."

First, the Center will be an intellectual focal point where leading scientists with diverse backgrounds can concentrate their talents on atmospheric problems. Its personnel will include a permanent staff and an approximately equal number of visiting scientists from this country and all over the world. The Center will be interdisciplinary in character, bringing the resources of engineering, chemistry, physics and mathematics to bear on atmospheric science. NSF looks to the Center to provide a bold imaginative approach to the vast problems of the atmosphere.

Second, the Center will be a research-planning center for large-scale programs that cannot be undertaken by individual groups. The Foundation expects that the Center will use ad hoc teams of university scientists to plan such major programs. While providing an intellectual base to support major atmospheric research, the Center will in no way direct research in universities. Rather it will stimulate the planning of joint

research-operations in which each group involved will participate according to its interest and talents.

Third, the Center will be a research-operations center. For each cooperative research program undertaken, the Center will synchronize and coordinate the research operations, which may be of a world-wide nature. The Center will arrange for and schedule necessary airplane flights, rocket launchings, and other complex operations, serving as a scientific "Combat Information Center" for each major program. In these operations maximum use will be made of existing Government facilities insofar as they can be made available by the responsible agencies.

It is intended to let the facilities of the Center grow as the program develops and the needs become clear. Because its activities will be nationwide and probably worldwide, all facilities may not be located at a single place. Some of the necessary vehicle-launching sites for high-altitude balloons and rockets must of necessity have special locations. There will certainly be a central interdisciplinary laboratory and offices for the staff, but operational facilities may be widely dispersed.

The Foundation plans to provide a basic core of financial support for the operation of the Center and additional funding as required for major cooperative programs. The initial contract was negotiated and signed with the University Corporation for Atmospheric Research on June 20, 1960. The contract is of 5 years' duration and $500,000 was obligated to launch the new activity. Dr. Walter Orr Roberts, formerly Director of the High Altitude Observatory in Boulder, Colo., has been appointed director of the new Center.

Specialized Research Facilities

Grants under this program are awarded primarily for construction.

1. University Nuclear Research Facilities

Grants totaling $1.5 million were made for nuclear research reactors—five were to institutions for improvements to existing reactors or reactors under construction and two for new reactors. An additional grant of $1 million was made for construction of a tandem 10 Mev Van de Graaff accelerator.

2. University Computer Facilities

Computer-facilities support consisted of grants to six universities at a cost of $1.7 million. In addition to this support for major computer facilities, 18 grants totaling $842,000 were made through the mathematical sciences program for direct support of computer centers—rental of computers, improvements in existing centers, operating costs, acquisition of small computers, etc.

3. *Oceanographic Research Vessel*

The award of a $3 million grant to the Woods Hole Oceanographic Institute for building and outfitting a general-purpose, 175-foot, oceanographic-research vessel was announced during the 1960 fiscal year. A committee including representatives of the Navy, Maritime Administration, and the Fish and Wildlife Service has been formed to advise the Foundation on decisions concerning the design and construction of the ship.

Graduate Research Laboratories

Support for graduate research laboratories, as in the case of the Biological and Medical Sciences Division, were awarded on a matching basis for construction of new facilities, renovation, rehabilitation of existing space, and for equipping of new laboratories constructed with non-NSF funds. Seventy-two grants for approximately $1 million were activated in 1960.

OFFICE OF SOCIAL SCIENCES

Fiscal year 1960 was the first full year of operation of the Office of Social Sciences, formally established in December 1958. This office replaces the previous Social Sciences Research Program and represents a forward step in the development of Foundation activities in the area. The year has been characterized by continuing steady growth in number of proposals received, in number of grants made, and in the variety of research for which support was granted.

The role of the National Science Foundation in the basic research effort of social science is rapidly growing in importance. As previously forecast, the effects of private foundation policy on support of basic social science research are now beginning to become apparent. Decisions made several years ago by the private foundations led to reduced emphasis on social science research (contrasted to support for social welfare, applied and service activities). The effect is showing up in the form of heavier demands on NSF by first rate investigators as grants from private sources run out.

Current Research Support

Anthropological Sciences

The Anthropological Sciences program includes basic research in archaeology, physical and cultural anthropology, linguistics, and related fields. Perhaps the outstanding positive effect of the Foundation's efforts in the period 1954–60 has been the long-term support made available for thorough exploration of important problems in cultural development.

An example is a coordinated investigation of the cultural and environmental circumstances of the development of village agriculture which has involved archaeological, geological, botanical, and zoological research. This program on the critical period of human development which saw the transition from food collection to food production is still continuing.

Work is in progress on a wide variety of anthropological problems including detailed study of the physical characteristics of Swiss migrants to the United States and their kin in Switzerland to test the hypothesis that migrants are not a random sample, biologically, of their ancestral stocks. Evidence is accumulating that various social and cultural factors lead to a certain degree of inadvertent selection for biological characteristics among migrants. Also underway are studies of socio-cultural characteristics and change in Mexico, Africa, Oceania, Alaska, and other areas. A group of people in Eastern Panama, the Choco, and Mainland Cuna, were identified as early as 1519 but the literature on these people is unusually sparse, indicating that they have been notably adept at avoiding contact with foreigners. As a result they have not been systematically studied by contemporary anthropologists. Like other relatively small societies in technologically undeveloped areas on the fringes of westernized areas, they are now in danger of being overwhelmed and losing their isolation. The program is supporting an effort to gain first hand knowledge of this group and its interaction with modern society before the situation changes irrevocably and the information becomes unavailable.

Studies of language are under way among the Algonquin Indians who speak Abenaki dialect and among the people of Fiji. An attempt is being made in northern California to relate techniques for dating linguistic phenomena with techniques for dating archaeological materials.

Archaeological excavations and surveys to study extinct cultures and cultural development are being conducted in the United States, Mexico, Middle and South America, Alaska, Europe, Western Asia, and Africa, In Africa a little known area of Northern Rhodesia, which promises to yield information on the technological and economic adjustments made by hunters and gatherers to post-Pleistocene environments, has been selected for intensive study. Owing to favorable soil conditions in the area, it may be possible to recover organic materials which would shed more light on cultural adaptations than could the recovery of stone tools alone. There is evidence that tools found in archaeological contexts duplicate devices still in use and the findings will be correlated with ethnographic background on the current inhabitants. A project in Peru reverses this approach—as an addition to a long-term social-anthro-

pological study which has been under way for some years concentrating on the social and cultural aspects of hacienda living in modern society, the Foundation is now supporting an archaeological survey of the area to extend intensive knowledge of the community back into prehistoric times and to increase the value of what is already known about it. Test excavations will be made in some of the prehistoric occupation areas, located at an altitude considerably above the upper limit of human occupation in modern times, in an effort to seek clues as to land-use patterns which permitted occupation of this very high area and to determine whether this occupation was seasonal or year-round. In the United States the Foundation is assisting the recovery and preservation of an important series of early wall paintings found in the Southwest. These ancient prehispanic murals are outstanding ethnographic records and their preservation and study will add to our knowledge of early human occupation of North America.

Sociological Sciences

The fields covered in the Sociological Sciences program include basic research in demography, human ecology, sociology, and social psychology. Psycholinguistics, an important new convergence between traditional linguistic analysis and psychological techniques of experimentation, is one of the most lively and promising developments in the social sciences. One of the current research projects supported in this field is a study of verbal behavior in bilingual individuals to investigate the relationship between the strictly linguistic properties of speech and such attributes of speakers and audience as motivation and task setting. Second-language learning provides an opportunity to study language as a process in acculturation, related to other forms of cultural learning. Another aspect of language learning is being studied in a project on the learning of grammar by children with the overall aim of defining a structural grammar that can generate all the correct sentences of a given language and illuminate the processes of learning and maturation whereby such a grammar is acquired by a native speaker of a language. Analogous problems are being studied through analysis of the linguistic structure of the sign language of the deaf.

A variety of problems connected with attitude formation and change are under study. Support has been given to the development of mathematical techniques for scaling attitudes and opinions and to experimental studies of the variables involved in attitude change. One investigator is experimenting on ways of inducing both readiness for, and resistance to, attitude change. Early results tentatively indicate that an individual's attitudes or beliefs can be strengthened and his resistance to arguments

directed against his beliefs can be increased, if he is exposed to a mild form of these opposing arguments before he is engaged in full-scale defense of his views against strong arguments. Another project is testing the effects of uncertainty, importance, and commitment upon voluntary exposure to information. It is hypothesized that people will seek information on alternative courses of action in relation to the degree of uncertainty they have about these courses.

Individual and group decision-making are being studied in several ways. A project under way is concerned with identifying measurable individual traits which enter into decision-making and relating these to the mathematical formulation of the theory of games. Another is examining the parameters of risk-taking as part of the development of an empirical theory about how people make decisions in situations where elements of doubt exist or where there is a high risk factor involved. The differential use of information under different conditions of small group structure is also being investigated, as is choice behavior in conflict situations where both the goal and the means have social implications.

The advent of the electronic computer promises to enlarge the social scientists' opportunity to manipulate complex systems and to understand better their systemic properties through constructing models of social or economic processes, fitting actual or estimated parameters, and then trying out a variety of experiments on the computer. Simulation studies are currently being supported on such diverse social processes as settlement and migration, conflict, and public discussion and choice.

Economic Sciences

The electronic computer has not only had an important effect on the kinds of experimentation performed in sociology; it has opened new avenues of investigation to economists. The Economic Sciences program, primarily econometric in emphasis, has supported computer studies of business-cycle analysis, international trade transactions, and economic behavior at the level of the individual consumption unit in addition to methodological research on such problems as the applicability of Fourier Analysis to economic time series, the testing of the concept of distributed lags, and improved methods of input-output analysis. Other areas of active research interest in economics include the economics of research and development. One project is investigating the relationships among technological change, research expenditures, and resource requirements, using agriculture as the case study. An effort is being made to determine whether regional differences in the rate of technological change can be related to regional distribution of agricultural research and education expenditures. Another project is investigating the basic conditions

within a business corporation which provide incentives for efficiency in research and development and inquiring into the conditions necessary for efficiency in research as compared to those needed for efficiency in production.

Other areas of economic theory under investigation include studies of capital accumulation, allocation of resources, and refinement of the mathematical statement of a general equilibrium theory of the competitive economy. Two current projects involve collaboration of economists and psychologists on experimental studies of bargaining, risk-taking, and decision making in economic contexts.

The field of economic and social geography, supported under this program, also has an interdisciplinary aspect. A topic such as the geography of famine in certain African areas has anthropological, as well as economic and geographic interest. A study of Asian urbanization will have important sociological implications and yet another project in economic geography involves computer techniques of simulation.

History and Philosophy of Science

The History and Philosophy of Science program supports basic research dealing with all the sciences—life, physical, and social. In the philosophy of science, grants made in fiscal year 1960 supported studies of the applications of symbolic logic to problems raised by developments in probability theory and psychometrics, the logic underlying physical problems of measurement in physics, and the concepts of physical meaningfulness and statistical meaningfulness. Research in the history of science may take the form of monographic studies of individual scientists, scientific expeditions, or special topics in science; or the research may result in broad studies of main currents in the development of scientific thought. The concepts developed from the wider perspective often provide the intellectual framework for the monographic research. The Foundation has supported research of both types in its program in the expectation that a balanced program will maximize progress.

Examples of the wide range of activities under way are a study on Charles Darwin's contribution to the study of ecology, a topic which has been very much overshadowed by the profound interest of scientists in Darwin's evolutionary studies; and a history of the Hayden Survey, an event of critical importance in the exploration, development, and scientific investigation of the American West. A mathematician is being supported in his studies on the early history of probability; he will examine the 14th- and 15th-century manuscripts on commercial arithmetic and on games which are the beginning of probability theory and study intensively the 18th century treatises on the subject. Other topics

include American science in the age of Jefferson, Arabic contributions to logic, and the history of the adaptation of thermodynamic concepts to chemistry.

OFFICE OF SPECIAL INTERNATIONAL PROGRAMS
U.S. ANTARCTIC RESEARCH PROGRAM

Program Operation

General

The geophysical research conducted during the International Geophysical Year in the Antarctic, up to that time a relatively unexplored region that received special emphasis under the program, proved of such significance that plans were made to continue Antarctic research on an international scale following the IGY. To assume the international planning role, the Special Committee for Antarctic Research (SCAR) was established by the International Council of Scientific Unions. This Committee, initially composed of representatives from the 12 nations which conducted programs in the Antarctic as part of the IGY, makes broad international program recommendations on the scientific work needed in the region.

Following a U.S. Government policy decision to continue operations in Antarctica beyond the winter of 1958–59 on a basis consistent with the U.S. national interest, the National Science Foundation was designated the agency of Government to coordinate U.S. scientific programs in the region, and the Department of Defense was named the agency to provide logistic support to such programs.

The six-station network in the Antarctic maintained by the United States during the IGY was reduced to a four-station network: The Pole Station, Byrd Station, the Naval Air Facility at McMurdo, and Hallett Station—the latter having a jointly operated program with New Zealand. In addition to operating these four stations, the United States agreed to supply scientific personnel and equipment under cooperative arrangements with other countries at the following stations: the Wilkes Station, formerly a U.S. station, now in the custody of Australia, and the Ellsworth Station, a U.S. station during the IGY, now in the custody of Argentina. The U.S. IGY Little America Station was shut down at the close of the IGY.

Eleven of the 12 nations which conducted research in the Antarctic during the IGY are now continuing scientific programs there. Measures to safeguard the use of Antarctica for peaceful purposes only and to insure the freedom of scientific investigations in the region were formulated during the past year by representatives of the 12 nations into the

Antarctic Treaty, which, as of July 1, 1960, had been ratified by 6 of the countries.

Program Administration

To undertake the detailed problems of coordinating a program of Antarctic research, the National Science Foundation established during 1958 the U.S. Antarctic Research Program under the Office of Special International Programs. Because it crosses the lines of many scientific disciplines and because it involves an exceedingly remote geographic area, the Antarctic Research Program must in one sense be a "package" program.

As for any other application for a Foundation grant, research proposals for Antarctic research received from governmental agencies, universities, and other institutions are evaluated on the basis of scientific merit through suitable review; selected to assure a balanced program; and supported to the extent of available funds and logistic support. Grantees must not only be provided with funds for research, but also travel accommodations, living space, and the necessary scientific facilities. Considerable liaison work with the Naval Support Force is necessary, therefore, to arrange for the logistic needs of each grantee. In addition, many grantees must work in cooperation with scientists of other nations. The liaison required with these other countries to assure such cooperative operations is carried out by the Foundation's staff in consultation with the Department of State.

Two groups serve in an advisory capacity to the U.S. Antarctic Research Program. Broad program objectives for this country, recognizing the recommendations of the SCAR, are considered by the Committee on Polar Research of the National Academy of Sciences and proposed to the Foundation as representing the opinion of the scientific community on the needs in certain areas of Antarctic research. The overall program suggestions made by the Academy's Committee serve as guidelines to the Foundation in the formulation of the U.S. Antarctic Research Program.

To assure full cooperation and coordination of intragovernment operations, the Interdepartmental Committee on Antarctic Research, composed of representatives of Government agencies with interests in the Antarctic, has been set up by the Foundation. It examines proposals and programs of the represented agencies and the broad program suggested by the Committee on Polar Research.

In its review process of proposals for Antarctic research, the Foundation includes, in its list of reviewers, members of the panels of the Committee on Polar Research of the National Academy of Sciences, specialists

in the field at universities and elsewhere, NSF program directors knowledgeable in the particular field of research, the Chief Scientist of the U.S. Antarctic Research Program, the logistics staff of the Antarctic Program, and lastly the scientific staff of the Antarctic Program for parallel study of scientific merit, budget, and final evaluation of the other reviews.

Participation by U.S. Scientific Personnel

Following selection of scientific proposals to receive Foundation support, arrangements are made to send scientists designated by grantee institutions and agencies to carry out investigations in Antarctica. Each new group of personnel selected annually must reach the Antarctic at the beginning of the austral summer, which in the Southern Hemisphere corresponds to the winter months in the Northern Hemisphere. The length of time each member of the group remains in Antarctica depends on the nature of the investigations for which he is responsible. For example, field work in geology and biology and traverse studies must be conducted away from established stations, and, therefore, requires extra logistic support to enable the scientists to live and work in the field, possible only during the Antarctic summer. Members of each group engaged in such investigations usually remain in Antarctica only for the austral summer, after which they are returned to the United States. They are referred to as the "summer contingent" of a given team. Other members of a group, known as the "winter contingent," are engaged in studies which can be continued at established stations on a year-round basis. Examples of the latter are meteorology, auroral studies, cosmic ray investigations, geomagnetism, and station seismology.

The first group of U.S. scientists to carry out research in the Antarctic following the IGY left the United States in the fall of 1958 and returned November–December 1959. This group is referred to as the U.S. Antarctic Research Program Team I.

The second group of scientists (Team II) left the United States in the fall of 1959. The summer contingent of this group returned February–March 1960, and the winter contingent will return November–December 1960.

Team III departed October–November 1960, with the summer contingent returning in February–March 1961 and the wintering complement expected to return in November–December 1961.

Even though additional disciplines beyond those included in the IGY have augmented the program, the change in the number of wintering-over personnel has not been significant because investigation has been primarily concerned with meteorology, glaciology, and upper atmosphere physics—work suitable for year-round operations. The most noteworthy

568169—61——6

change in the program has been the additional personnel working in the fields of biology, geology, cartography, and related programs, most suitable to summer efforts. Thus, the major enlargement has been in the area of summer personnel. The breakdown of U.S. scientific personnel in Antarctica is shown in the following table.

	1959 wintering-over team	1959–60 summer team	1960 wintering-over team
Administration	0	7	0
Biology	3	11	2
Cartography	1	2	0
Geology	0	13	0
Glaciology	3	9	2
Meteorology	13	1	17
Oceanography	0	4	2
Psychology	0	1	0
Traverse Seismology and Gravity	2	2	1
Traverse Engineering	2	0	2
Upper Atmospheric Physics	8	1	9
Total	32	51	35

A steady increase in the number and dollar amount of proposals received by the Foundation indicates a mounting interest in Antarctic research, particularly on the part of universities and other private institutions. Private institutions received 42 percent of funds available to Team I and 48 percent to Team II; it is anticipated they will receive approximately 55 percent of the funds available to Team III.

Exchange Scientists

Throughout the IGY, scientists from several countries cooperating in Antarctic research were exchanged between national expeditions, thus developing closer cooperation and mutual understanding.

The practice of exchanging scientists has been continued following the IGY. During fiscal year 1960 exchanges were arranged between the United States and the USSR and between the United States and France. A Soviet glaciologist is at the U.S. McMurdo Station; the U.S. counterpart—a seismologist-geophysicist—is at the Soviet Mirny Station. A French glaciologist accompanied the U.S. traverse party to northern Victoria Land, and in return the French Antarctic Expedition has suggested that arrangements can be made for an American scientist to winter over at either the Kerguelen Island Station or the Dumont d'Urville Station on the Continent.

The United States is also participating with Australia and France in the International Australian Analysis Center. It replaces the IGY Weather Central originally located at the Little America Station. A U.S. meteorologist is currently spending his second year in Australia assisting in the daily collection, analysis, and forecasting of Antarctic weather data.

In preparation for the forthcoming season, proposals are being considered for continuation of the Soviet-U.S., French-U.S. exchanges of scientific personnel. Discussions have been initiated with the United Kingdom, Belgium, Norway, and Chile for other possible scientist exchange programs.

Current Research Support

The Antarctic Research program covers many disciplines. Investigations underway encompass the following:

Observations and measurements of the aurora and airglow in the Antarctic include a study of geographical distribution, auroral spectral features, a determination of auroral height and form, and a survey of radio absorption. Geomagnetic observations are made at each of the stations, with additional field programs for the determination of absolute magnetic values. Experiments in ionospheric physics are carried out in many stations to probe the ionosphere for the determination of change in height, density, and diurnal effect; to measure radio noise; and to study low-frequency atmospheric phenomena, including field observations to establish latitude control of these effects. Surface and upper-air meteorological data are collected at all stations and on traverses, including special observations into the carbon dioxide and ozone content of the upper atmosphere.

Seismological investigations make use of permanent seismographs to record and measure earthquake waves and their travel paths, and of artificial vibrations to study ice thickness and sub-ice geology. Oceanographic research is carried out at stations along the Antarctic coasts and from the U.S. Navy ships sailing in Antarctic waters. Studies in biological and medical sciences include bacteriology, marine fishes, bird migration, psychology, and the study of insect distribution on the Antarctic Continent and in the surrounding area. Glaciological research is conducted to study the regimen and deformation of ice shelves, snow accumulations and wastage, thickness of the ice cap, and the chronological banding of the ice at depth.

Fiscal year 1960 marked the beginning of a new era in Antarctic mapping for the United States. Coordination of aerial photography, ground control, and office compilation resulted in the initiation of production of maps of important areas of West Antarctica.

An expanding program of research in the same disciplines as the above, with increased studies in geodesy and cartography, cosmic radiation, gravity, and geology, will be conducted by the team of scientists arriving in the Antarctic in the fall of 1960. An increased number of seasonal field programs are being planned to occupy sites in Western Antarctica to study the mountain ranges and nunataks, to explore the geological relationship between Western Antarctica, the Antarctica Peninsula, and South America. Geodesy and cartography programs will support these activities by providing detailed maps of areas in which scientists must carry out their programs, as well as providing cartographic material for developing maps of large areas of Antarctica for use by such groups as the U.S. Navy in carrying out its responsibilities to support the scientific program.

Significant Research Developments

TOTAL SYNTHESIS OF CHLOROPHYLL.—The total synthesis of chlorophyll, a highly complex natural product, has been accomplished, a feat which defied the efforts of the world's greatest chemists for years. Starting from simple molecules of known structure not derived from the natural product, a Foundation-supported investigator completely synthesized the chlorophyll molecule and proved it to be identical to the natural product.

Chlyorophyll, the green plant pigment, is ultimately responsible for production of the food needed by all living creatures and for the fossil fuels—coal and oil. It converts the energy of the sun into the chemical energy necessary to change carbon dioxide and water into sugar and starch through the process known as photosynthesis. It consists of two components—blue-green chlorophyll *a*, and yellow-green chlorophyll *b*, in a ratio of three to one. They differ very slightly in structure. Chlorophyll *a* is the one which has been synthesized.

The structure of chlorophyll as developed over the past 40 years has been proven accurate by this synthesis. It consists of 4 pyrrole rings joined to a magnesium atom in the center of the molecule. The pyrroles are also found in hemoglobin, the red blood pigment. Improved understanding by biologists of the role of chlorophyll in photosynthesis is sure to result. The new and ingenious methods of synthesis developed will most certainly be useful in the synthesis of other complex materials.

* * *

FACTORS REGULATING FEEDING BEHAVIOR IN MAN.—A new concept of how appetite is controlled stems from Foundation-sponsored studies on

integrations within the nervous system as they affect feeding behavior and satiety in man and various vertebrates. A multi-factor concept of regulation of feeding is based on the conclusions that appetite is satisfied by: (1) gastric distention resulting from the processes of eating, (2) by relief of low blood sugar or inadequate supply of glucose, (3) by shifting of body water, due to secretions into the gastro-intestinal tract with subsequent tissue dehydration, and (4) the thermal stress of elevation of the metabolic rate resulting from the intake of food itself. This concept acknowledges the ability of the central nervous system to take many different kinds of changes within the body and integrate them into a pattern of response. Whether all of these factors act upon the hypothalamus or lower brain centers is not known, but all of them must act eventually upon feeding reflexes, which means that they must either directly or through other neural pathways affect the motor nerve nuclei of the brain stem.

One can understand how the three generalized changes—sugar lack, water movement, and temperature gradients—might act upon the same neuron or upon all neurons. Whatever their critical actions, the end result of a deficiency of food must be sensitization of reflexes necessary for feeding, as a lack of water in a similar fashion must facilitate drinking reflexes. The key reactions within the brain must be selective enough to provide a basis for specific hungers or appetites. This implies a type of discrimination within the brain stem and lower centers, and it calls to mind Sherrington's conclusion that there is a spinal-hunger state. He noted "as a broad rule, spinal reflexes are more easily elicited when a well-nourished animal is hungry and expecting food, and less easily when it has just heavily fed. There is, so to say, a spinal hunger."

* * *

THE FIRST SYNTHETIC ANTIGEN.—The culmination of several years work on the preparation of high molecular weight polypeptides has been the discovery of the first synthetic antigen. (Antigens are substances which stimulate the production of antibodies.) This substance, a co-polymer of 3 amino acids—lysine, tyrosine, and glutamic acid in the proportion of 1 : 2 : 3—stimulates antibody production in test organisms. The antigenic polypeptide has been shown to be devoid of helical structure and hence it appears that only a short sequence of amino acids including L-tyrosine is necessary for antibody formation. This work represents another step toward an understanding of immune reactions in living organisms and of the nature of biological specificity. In the search for a means of producing effective, safe, and widespread immunization, agents of this type will play an extremely important role.

* * *

ALTERING THE STRUCTURE OF BIOLOGICAL MACROMOLECULES.—A new and simple method has been developed by a Foundation grantee for introducing sulfur in the form of thiol (–SH) groups into biological macromolecules—polysaccharides and nucleic acids, as well as proteins. This is accomplished through the use of a sulfur-containing succinic anhydride compound which displaces amino ($-NH_2$) groups in proteins and hydroxyl (–OH) groups in polysaccharides and nucleotides.

Thiol groups when introduced into the macromolecules may be located at active sites and, therefore, provide an excellent tool for probing molecular structure and for altering physical, chemical, and physiological characteristics of a broad spectrum of biological substances.

* * *

TRANSMISSION OF NERVE IMPULSE.—More complete understanding of the nature of nerve activity has been made possible by the isolation and identification of the acetylcholine receptor protein from the electric tissue of the electric eel. Acetylcholine is a chemical which plays a crucial role in transmitting nerve impluses.

When the nerve membrane is excited, acetylcholine is freed from its storage form and combines with the receptor protein. This combination triggers a change in the ionic permeability of the membrane, allowing sodium ions to enter and potassium ions to leak out, thus generating an electric current. This current propagates the neuron's message to another neuron or to an effector cell (e.g. muscle). Within milliseconds, the receptor-acetylcholine complex separates as a result of enzyme action and once again the nerve cell returns to its resting stage, ready for the next stimulus.

Identification of the receptor protein was made possible by comparing, in vitro, the binding strength of the receptor protein with acetylcholine-type compounds with the effect of these compounds on electrical activity in isolated electrical eel tissue. A striking correlation was observed between binding strength in the receptor protein solution and effect on electrical activity. (See photographs on page 21.)

* * *

GRAVITY RESPONSE DEPENDENT ON HEREDITARY FACTORS.—Although behavior is greatly influenced by the environment, there is a growing body of evidence that genetic factors play an important part in determining certain kinds of behavioral variation.

Fruit flies (Drosophila) have been shown to vary in their tendency to fly upward or downward when faced with a choice between the two alternatives. In an experiment, conducted with the aid of a National Science Foundation grant, fruit flies are introduced into a maze in which they encounter successive choice points where they may fly either upward

or downward. (See page 30.) The height of the terminal point reached by a fly depends on its response to gravity at the various choice points. If it always selects the upward choice, it finishes at top, the downward choice at bottom; if it sometimes goes upward and sometimes downward, it finishes at an intermediate position.

When a fly population is introduced into the maze, the individuals sort themselves out so as to give rise to a frequency distribution depending on their aggregate responses to gravity at the choice points. Introducing genetically different populations into the maze results in changes in the frequency distribution. This indicates that the variability in gravity response is dependent, at least in part, on the genetic variability in the population.

* * *

FINE STRUCTURE OF GENES DETERMINED.—Major questions of modern biology are the molecular structure of genes and how this structure allows the coding of genetic information. The discovery by an NSF grantee that subunits of a gene are arranged linearly within a gene is a major contribution to the solution of these questions.

The genetic material, at least in lower organisms, is deoxyribonucleic acid (DNA) which consists of a coiled double chain of simpler components called nucleotides. However, individual hereditary units (genes) have not been isolated, so it is not possible to determine by chemical techniques that a particular gene consists of a linear array of nucleotide pairs. But, it is possible to determine the most probable arrangement of separable genetic units utilizing the technique of genetic recombination. This technique is well known to geneticists who have used it to show that genes are arranged linearly within chromosomes. Determination of the fine structure of a gene, however, requires special materials and a selective device to detect rare recombinations between units that may be separated only by the spacing between nucleotides in the DNA molecule. Utilizing microorganisms, it is possible to obtain very large populations of offspring and by using selective techniques to detect events that occur once in 10,000 times or less.

A small section, the size of about 1,000 nucleotides of a DNA molecule, of the genetic material of a bacterial virus has been analyzed by recombination techniques. A large number of mutations of a gene which controls the ability of the virus to grow on certain bacteria has been obtained. If each mutation affects only a portion of a gene, then it is possible, by allowing two viruses with different mutant genes to reproduce within a single bacterium, to obtain progeny viruses that have the unmutated portion of the gene from each of the parent viruses. The "recombined" virus is able to grow on bacterial cells on which

neither of its parents could grow. If a large series of mutations are tested for recombination, then the array of results expected will depend on how the elements are connected with each other, that is, whether the arrangement is linear, branching, circular, or other. A total of 145 mutant genes were tested for recombination of the altered sections within the gene and it was shown that the mutated elements within the gene fit a linear pattern. Though all other possibilities were not eliminated, it is highly probable that the fine structure of a gene is a linear array of nucleotide pairs and perhaps the unit of recombination is a nucleotide pair.

* * *

PROGRESS IN DETERMINING MECHANISM OF ACTION OF VITAMIN B_{12}.—The first specific lead as to the chemical role of Vitamin B_{12} and to the discovery of the coenzyme to which the vitamin is changed in the body has recently been reported. Vitamins are essential substances which the body cannot itself manufacture.

Vitamin B_{12}, essential to animal life, was first isolated from liver in 1958. Its administration is the effective therapy for pernicious anemia.

The coenzyme, a complex organic cofactor, together with its protein entity make up an enzyme which is involved in the rearrangement of the carbon skeleton of essential amino acids (the building blocks of which proteins are composed). It acts as a carbon carrier transferring the carbon from one amino acid (glutamic) to a second (β-methyl aspartate). The coenzyme has the basic structure of Vitamin B_{12} to which two adenine-containing compounds are attached. Exposure to light destroys the activity of the coenzyme by splitting of the adenine complex.

* * *

LABORATORY STUDY OF BARGAINING BEHAVIOR IN BILATERAL MONOPOLY SITUATION.—The feasibility of the study of classical problems of economics under controlled laboratory conditions has been demonstrated by a Foundation-supported study of bargaining behavior in a situation known to economists as "bilateral monopoly." It represented the first active collaboration between an economist and an experimental psychologist.

In the bilateral monopoly situation the bargainers consist of a single "buyer" and a single "seller." Some actual situations that approach bilateral monopoly are: a franchised dealer negotiating with a manufacturer regarding quotas and wholesale price; two public utilities bargaining about the division of some price they have set on a joint service; and labor leaders in a unionized industry dealing with management representatives. This bargaining situation has been of long standing interest

to economists and there are a dozen "classical" theoretical solutions which attempt to describe the way in which the price, profit, or other payoff will be divided. These solutions are not in mutual agreement. The chief contribution of the new research is the development of an experimental situation of bilateral monopolistic bargaining in which several of the proposed theoretical solutions could be tested.

The results of the experimentation demonstrated that the actual outcome of bargaining in this situation cannot be predicted from economic considerations alone, but is subject to a variety of psychological and cultural forces as well. The experiments show that there is a clear tendency for bargainers to negotiate contracts at that quantity which maximizes joint payoff. Furthermore, they show that the greater the amount of information the bargainers have about their own and the other person's situation, the more likely they are to settle for maximizing joint payoff. Parallel tendencies are found with regard to the negotiated price at which the transaction is made, with a tendency to approach a fifty-fifty split of the maximum joint payoff under conditions of complete information.

A most important psychological factor in determining differential payoff, especially under incomplete information, is the level of aspiration (the amount of payoff the bargainer wanted or hoped to receive). In almost all cases studied, the bargainer who began with the higher level of aspiration did in fact receive the larger share of the joint payoff.

* * *

PREHISTORIC INHABITANTS OF ARIZONA.—An archaeological study of eastern Arizona has been supported by the Foundation in an attempt to gather information about the pre-history of this little-known area. Evidence has been discovered, near St. Johns, of a primitive people without pottery and probably without agriculture, living in the midst of other tribes with far more advanced cultures. Excavations have indicated that the tribe lived by hunting and gathering wild plants. Tools appear to have been limited to simple implements such as grinding stones and stone-tipped spears. Except for the addition of permanent homes they lived as did their more nomadic ancestors two thousand years before.

Just 70 miles away, other cultures grew corn, fired pottery, and built sturdier, larger, and more complex pit houses. The remote tribe, which existed for more than 2,000 years and inhabited the site as late as 300 A.D., defended itself against its more advanced neighbors and apparently refused to accept the cultural advances of its enemies.

For another discovery of this expedition, see page 27.

* * *

POSITRONIUM.—Positronium is the name given to a short-lived atom comprising a positron and an electron. The atom is similar to the normal hydrogen atom except that the proton, which forms the nucleus of the hydrogen atom, is replaced by a positron, a particle similar to the electron but with a positive electrical charge. Positronium is held together by the attractive force between the positively charged positron and the negatively charged electron in a manner entirely analogous to the attraction between proton and electron which holds together the hydrogen atom. The principal differences between hydrogen and positronium arise from the much lighter weight of the positron as compared to the proton. The positron has the same weight as an electron, so an atom of positronium has a weight equal to twice the electron weight while hydrogen weighs about 1,840 times as much as an electron. As a consequence of this weight discrepancy the radius of the positronium atom is twice the radius of hydrogen.

Positronium is an uncommon chemical element because of its very short lifetime, generally of the order of one ten-millionth of a second. The short lifetime is due to the annihilation of positrons and electrons when they come into proximity to one another—one of the classic illustrations of conversion of matter into radiation. The two particles are annihilated and generally two photons (electromagnetic radiation) are created which carry off the energy associated with the masses of the material particles.

A study of the chemical behavior of positrons and positronium in aqueous solutions has been carried out under a Foundation grant. It reveals that the concept of an oxidation potential is applicable to this problem and that the position of positronium in the electrochemical scale is between that of zinc and cadmium. This is of interest not only because positronium can be considered as a new chemical element, but also because it was never before obvious that ordinary chemical concepts can be applied to the extreme dilution of single atoms present in solutions. This work should also contribute a better understanding to problems related to the structure of water and liquids. The idea that the atom of positronium may be present in some form of cavity in water may possibly be related to some tentative explanations of the viscosity and compressibility of liquids in terms of such hypothetical cavities.

* * *

CHILEAN EARTHQUAKE TSUNAMI RECORDED.—Wave recorders at a depth of 330 feet have been operated off La Jolla, Calif., and at San Clemente Island under a Foundation grant made in May 1959 to continue installations originally made during the IGY.

The San Clemente gage consisted of three recorders located in a

triangle, which made it possible to analyze the records to determine the direction from which the waves travelled. The waves are generated by storms, and since the longest waves travel the fastest, it was possible to locate a given storm from its bearing and the regular decrease in length of the waves produced by it. Storms thus tracked in the Southern Hemisphere agreed with the weather maps as they now exist.

The gage at La Jolla recorded the large tsunami waves received from the Chilean earthquake on May 23, 1960. This is the most detailed tsunami wave recording yet made, as activity was recorded continuously for 7 days. Analysis will yield much new information about the selective attenuation of the energy of a tsunami.

* * *

INCREASING CARBON DIOXIDE IN ATMOSPHERE.—A sensitive infrared analyzer has been applied to the problem of measuring atmospheric carbon dioxide. This work began during the IGY and has been continued under NSF sponsorship. Since the method is much more precise than previous chemical methods, the results for the first time have clearly demonstrated annual cycles of carbon dioxide in the atmosphere. The air at the South Pole shows no seasonal variation, whereas on Mauna Loa there is a change from about 310 parts per million in October to 316 in May. Superimposed on these annual cycles is a steady increase, of the order of one part per million per year. Such an increase has been expected on theoretical grounds, from the burning of coal and petroleum, but this is the first convincing analytical proof of it.

* * *

GLACIAL EPOCHS MORE CLOSELY ESTABLISHED.—Various isotope techniques are yielding important results in the study of undisturbed cores of sediment from the ocean bottom. The ratio of oxygen-16 to oxygen-18 in the calcareous shells of various marine animals gives the temperature of the water at past epochs and hence is a good indicator of climate. The carbon-12/carbon-14 ratio and the protactinium-231/thorium-230 ratio give an absolute dating of these climate epochs. In this way, the investigator has found the date of the peak of the last interglacial period to be 96,000 years ago, with the previous glaciation having ended 10,000 years earlier.

* * *

IMAGE TUBE DEVELOPMENT PROVIDING SIGNIFICANT HELP TO ASTRONOMERS.—A new research tool that is giving astronomers previously unobtainable data may prove to be as great an advance over conventional astronomical photography as photography was over visual observations.

The device is called a photoelectric image intensifier, or image tube.

The development of image tubes, as well as investigations using these tubes, have been sponsored by the National Science Foundation.

In essence an image tube is an electronic device for amplifying the signal produced by a photon, or light unit—that is, faint light is in effect made brighter. This enables astronomers to observe heavenly objects heretofore too faint to be identified, or to use much shorter exposure times to lessen atmospheric distortion of brighter objects.

These tubes have already increased telescope speeds by as much as 30 times, and have the potential of increasing them by a factor of 100.

Identification of a very dense star cluster at the center of the Andromeda galaxy is an important result of use of one of the tubes. Little was previously known about this very small and bright light source except that it usually had the appearance of a star. Using the image tube mounted on the coudé spectograph of Lick's 120-inch telescope, astronomers made two spectroscopic exposures in about 15 and 45 minutes which ordinarily require 5–15 hours.

To state it differently, the 120-inch telescope with the image tube obtained results that would have required a 660-inch telescope without the tube.

An analysis of the spectroscopic results plus photometric data obtained independently shows that the bright object is apparently a large, dense cluster of stars similar to the well-known globular clusters but very much more massive. It is about 24 light years in radius, whirling at high speed, and contains a mass of stars equal to 10 million times the sun's mass.

If our sun were in the center of the cluster we would see about 10 thousand times as many stars in the night sky as we do now, and the total light from them would be greater than the light of the full moon.

A second investigation using an image tube recorded the infrared lines of the sun's corona in about one minute. The first photography of these lines, by Lyot at the Pic du Midi Observatory about two decades ago, required 4 hours. The fastest film now available requires an exposure in excess of half an hour. The need for the sky to be extremely transparent for an extended period had made earlier attempts most difficult.

Thirdly, an image tube recorded an observation of binary stars, a use for which the tubes are extremely valuable. Binary or twin stars revolve around each other. To the naked eye and frequently to telescope observations, they appear as one star. An investigation recorded binaries with separations as small as .3 second of arc using the image intensifier, while separations of 1.5 seconds of arc are almost impossible to photograph without it.

With the image tube it was possible to make exposures at 1/100

second, and record the binary images before atmospheric turbulence distorted them.

* * *

Research-Related Activities

Scientific Conferences and Symposia

The Foundation during 1960 sponsored and provided partial support for 44 conferences and symposia. In most cases, sponsorship was shared with one or more private or public agencies, including universities and scientific societies.

CONFERENCE ON OPTICAL PUMPING—Ann Arbor, Mich., July 8–15, 1959; Chairman: Peter Franken, Department of Physics, University of Michigan, Ann Arbor, Mich.; Cosponsor: University of Michigan.

INTERNATIONAL SYMPOSIUM ON FLUID MECHANICS OF THE IONOSPHERE—Ithaca, N.Y., July 8–15, 1959; Chairman: Henry G. Booker, School of Electrical Engineering, Cornell University; Cosponsors: International Scientific Radio Union, International Union of Theoretical and Applied Mechanics, International Union of Geodesy and Geophysics, International Astronautical Union.

CONFERENCE ON HIGH TEMPERATURE PROBLEMS IN AERONAUTICS—Stanford, Calif., Aug. 5–8, 1959; Chairman: Nicholas J. Hoff, Head, Department of Aeronautical Engineering, Stanford University, Stanford, Calif.; Cosponsors: Air Force Office of Scientific Research, Office of Naval Research, Office of Ordnance Research, Institute of the Aeronautical Sciences, American Society of Mechanical Engineers.

SEMINAR IN MATHEMATICS—University of New Brunswick, Fredericton, New Brunswick, Canada, Aug. 17–Sept. 11, 1959; Chairman: W. L. G. Williams, McGill University, Montreal, Canada; Cosponsor: Canadian Mathematical Congress.

GORDON CONFERENCE ON PHOTONUCLEAR REACTIONS—Kimball Union Academy, Meriden, N.H., Aug. 24–29, 1959; Chairmen: Peter Axel, Physics Research Laboratory, University of Illinois and A. O. Hanson, Department of Physics, University of Illinois, Urbana, Ill.; Cosponsor: Gordon Research Conferences.

FIRST INTERNATIONAL OCEANOGRAPHIC CONGRESS—United Nations Headquarters, New York, N.Y.; Aug. 30–Sept. 12, 1959; Chairman: Roger Revelle, Scripps Institute of Oceanography; Cosponsors: UNESCO, Special Committee on Oceanic Research of the International Council of Scientific Unions, American Association for the Advancement of Science, Department of Defense, and private foundations.

SYMPOSIUM ON THE DIFFERENCES AMONG GLOBULAR CLUSTERS—Toronto, Ontario, Canada, Aug. 31, 1959; Chairman: John F. Heard, David Dunlap Observatory, University of Toronto, Richmond Hill, Ontario, Canada; Cosponsors: American Astronomical Society, University of Toronto.

1959 INTERNATIONAL PLASMA PHYSICS INSTITUTE—Seattle, Wash., Aug. 31–Sept. 5, 1959; Chairman: Ronald Geballe, Department of Physics, University of Washington, Seattle, Wash.; Cosponsors: Boeing Scientific Research Laboratory, University of Washington.

CONFERENCE ON DIFFERENTIAL EQUATIONS—Mexico City, Mexico, Sept. 1959; Chairman: Solomon Lefschetz, Director, Center for Differential Equations, Research Institute for Advanced Study (RIAS), Inc.; Cosponsors: Research Institute for Advanced Study (RIAS), Inc., National University of Mexico, Office of Naval Research.

IMMUNOCHEMICAL APPROACHES TO PROBLEMS IN MICROBIOLOGY—New Brunswick, N.J., Sept. 1–3, 1959; Chairmen: Michael Heidelberger and Otto J. Plescia, Institute of Microbiology, Rutgers, the State University, New Brunswick, N.J.; Cosponsor: Rutgers, the State University.

SYMPOSIUM ON COLOR CENTERS IN ALKALI HALIDES—Corvallis, Oreg., Sept. 8–11, 1959; Chairman: Allen B. Scott, Department of Chemistry, Oregon State College, Corvallis, Oreg.; Cosponsors: Oregon State College, Office of Naval Research, U.S. Air Force Office of Scientific Research.

CONFERENCE ON THE GEOCHEMISTRY OF CARBONATE MINERALS AND ROCKS—Coonamesset, Mass., Sept. 14–18, 1959; Chairman: Robert M. Garrels, Laboratory of Mining Geology, Harvard University, Cambridge, Mass.; Cosponsor: The Geochemical Society.

INTERNATIONAL SYMPOSIUM ON HIGH TEMPERATURE TECHNOLOGY—Asilomar, Calif., Oct. 6–9, 1959; Chairman: Nevin K. Hiester, Manager, Chemical Engineering Section, Stanford Research Institute, Stanford, Calif.; Cosponsors: Air Force Office of Scientific Research, Air Research and Development Command, Army Research Office, Office of the Chief of Research and Development, Department of the Army, Atomic Energy Commission, National Aeronautics and Space Administration, Office of Naval Research, Aerojet-General Corporation, Corning Glass Works, Esso Research and Engineering Company, General Electric Company, Gladding, McBean and Company, Fansteel Metallurgical Corporation, Food Machinery and Chemical Corporation, Hughes Aircraft Company, Radio Corporation of America, Stanford Research Institute, Union Carbide Corporation, Westinghouse Electric Corporation.

SYMPOSIUM ON SYSTEMATICS—St. Louis, Mo., Oct. 14, 15, 1959; Chairman: Robert L. Dressler, Missouri Botanical Garden, St. Louis, Mo.; Cosponsor; Missouri Botanical Garden.

THIRD ASTROMETRIC CONFERENCE—La Plata Observatory and the Cordoba Observatory, Argentina, Oct. 30–Nov. 3, 1959; Chairman: Dr. R. P. Cesco (La Plata), and Dr. L. Gratton (Cordoba); Cosponsors: National Academy of Sciences, Special Committee of the International Astronomical Union on Astrometry in the Southern Hemisphere, and the Organization of American States.

HISTORY OF THE USE OF QUANTITATIVE METHODS IN THE SCIENCES—New York, N.Y., Nov. 20–21, 1959; Chairman: Pendleton Herring, President, Social Science Research Council, New York, N.Y.; Cosponsor: Social Science Research Council.

CONFERENCE ON PLASMA PHYSICS—U.S. Naval Postgraduate School, Monterey, Calif., Dec. 3–5, 1959; Chairman: Frederic H. Coensgen, Lawrence Radiation Laboratory, Livermore, California; Cosponsor: American Physical Society.

CONFERENCE ON ASTRONOMICAL OBSERVATIONS FROM ABOVE THE EARTH'S ATMOSPHERE—Cleveland, Ohio, Dec. 30, 1959; Chairman: Fred Hoyle, Cambridge University, England; Cosponsor: Case Institute of Technology, American Astronomical Society.

INTERNATIONAL SYMPOSIUM ON MAGNETO-FLUID DYNAMICS—Washington, D.C., and Williamsburg, Va., Jan. 17–23, 1960; Chairman: Hugh L. Dryden, National Aeronautics and Space Administration, Washington 25, D.C.; Cosponsors: International Union of Theoretical and Applied Mechanics, National Academy of Sciences, National Aeronautics and Space Administration, Air Force Office of Scientific Research, Office of Naval Research.

PHYSIOLOGY OF PARASITISM—New Brunswick, N.J., Jan. 29–30, 1960; Chairman: Leslie A. Stauber, Department of Zoology, Rutgers, the State University, New Brunswick, N.J.; Cosponsor: Rutgers, the State University.

SYMPOSIUM ON COMPARATIVE STUDIES OF IONIZING, ULTRAVIOLET, AND VISIBLE RADIATION—Asilomar, Calif., Feb. 1960; Chairman: Frank L. Campbell, Division of Biology and Agriculture, National Academy of Sciences—National Research Council, Washington 25, D.C.; Cosponsors: National Academy of Sciences-National Research Council, Atomic Energy Commission.

SYMPOSIUM ON DIFFERENTIAL GEOMETRY—Tucson, Ariz., Feb. 1960; Chairman: C. B. Allendoerfer, University of Washington, Seattle, Wash.; Cosponsor: American Mathematical Society.

CONFERENCE ON THE POLARIZATION OF STARLIGHT—Kitt Peak and Steward Observatories, Tucson, Ariz., Feb. 6, 1960; Chairmen: W. A. Hiltner, Yerkes Observatory, University of Chicago and Jesse R. Greenstein, California Institute of Technology; Cosponsor: Lowell Observatory.

FOURTEENTH ANNUAL SYMPOSIUM ON FUNDAMENTAL CANCER RESEARCH—Houston, Tex., Feb. 25–27, 1960; Chairman: T. C. Hsu, M. D. Anderson Hospital and Tumor Institute, Houston, Tex.; Cosponsors: The University of Texas, M. D. Anderson Hospital and Tumor Institute, University of Texas Postgraduate School of Medicine, Texas Division of the American Cancer Society, Texas State Department of Health.

REGIONAL DEVELOPMENTAL BIOLOGY CONFERENCES—Alligator Point Marine Laboratory of Florida State University, Tallahassee, Fla., March 18–19, 1960; Kenyon College, Gambier, Ohio, March 18–19, 1960; Mount Holyoke College, South Hadley, Mass., March 28–29, 1960; University of Arizona, Tucson, Ariz., April 21–22, 1960; Asilomar, Pacific Grove, Calif., May 19–21, 1960; Chairman: Emil Witschi, President, American Society of Zoologists, Department of Zoology, State University of Iowa, Iowa City, Iowa; Cosponsor: American Society of Zoologists.

SYMPOSIUM ON OPTICAL SPECTROMETRIC MEASUREMENTS OF HIGH TEMPERATURES—Chicago, Ill., March 23–25, 1960; Chairman: Thorfin R. Hogness, Deputy Director, Laboratories for Applied Sciences, University of Chicago, Chicago, Ill.; Cosponsors: University of Chicago, Jarrell-Ash Company.

SYMPOSIUM ON LIFE AND LIGHT—McCallum-Pratt Institute, Baltimore, Md., March 28–31, 1960; Chairman: William D. McElroy, Mergenthaler Laboratory for Biology, Johns Hopkins University, Baltimore, Md.; Cosponsor: Johns Hopkins University.

MIDWEST CONFERENCE ON THEORETICAL PHYSICS—Lafayette, Ind., April 1–2, 1960; Chairman: Solomon Gartenhaus, Department of Physics, Purdue University, Lafayette, Ind.; Cosponsor: Purdue University.

HISTOCHEMISTRY OF THE NERVOUS SYSTEM—New York, N.Y., April 10, 1960; Chairman: Oliver H. Lowry, President, Histochemical Society, School of Medicine, Washington University, St. Louis, Mo.; Cosponsor: Histochemical Society.

SYMPOSIUM ON THE STRUCTURE OF THE EYE—New York, N.Y., April 11–16, 1960; Chairman: George K. Smelser, Department of Anatomy, Columbia University, New York, N.Y.; Cosponsor: Columbia University.

INTERNATIONAL CROSS-FIELD SEMINAR ON SOLAR-WEATHER RELATIONSHIPS—Lake Arrowhead, Calif., April 15–22, 1960; Chairman: Walter Orr Roberts, Director, High Altitude Observatory, University of Colorado, Boulder, Colo.; Cosponsors: Committee on Cosmic-Terrestrial Relationships of the American Geophysical Union, High Altitude Observatory of the University of Colorado, University of California at Los Angeles.

SYMPOSIUM ON SUBDWARF STARS—Allegheny Observatory, University of Pittsburgh, Pittsburgh, Pa., April 19, 1960; Chairman: Martin Schwarzschild, Princeton University, Princeton, N.J.; Cosponsors: Allegheny Observatory and American Astronomical Society.

THIRD BIOLOGICAL WASTE TREATMENT CONFERENCE—New York, N.Y., April 20–22, 1960; Chairman: W. Wesley Eckenfelder, Department of Civil Engineering, Manhattan College, New York, N.Y.; Cosponsors: National Institutes of Health, Public Health Service, Manhattan College.

CONFERENCE ON SCIENCE MANUSCRIPTS—Washington, D.C., May 5–6, 1960; Chairman: Nathan Reingold, History of Science Society, Library of Congress, Washington 25, D.C.; Cosponsor: History of Science Society.

CONFERENCE ON TROPICAL BOTANICAL PROBLEMS OF CONCERN TO THE UNITED STATES—Fairchild Tropical Garden, Coconut Grove, Fla., May 5–7, 1960; Chairman: Frank L. Campbell, Division of Biology and Agriculture, National Academy of Sciences-National Research Council, Washington 25, D.C.; Cosponsor: National Academy of Sciences-National Research Council.

THE ROLE OF COMPUTER TECHNIQUES IN RESEARCH ON BRAIN FUNCTIONS AND BEHAVIOR—Cambridge, Mass., May 10–12, 1960; Chairman: Walter A. Rosenblith, Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, Mass.; Cosponsor: Massachusetts Institute of Technology.

CONFERENCE ON MECHANISMS OF ACTION OF STEROID HORMONES—Endicott House, Dedham, Mass., May 20–22, 1960; Chairmen: L. L. Engel and C. A. Ville, Massachusetts General Hospital, Harvard University, Cambridge, Mass.; Cosponsor: Harvard University.

INTERNATIONAL SYMPOSIUM ON NERVOUS INHIBITION—Seattle, Wash., May 31–June 4, 1960; Chairman: Ernst Florey, Department of Zoology, University of Washington, Seattle, Wash.; Cosponsor: University of Washington.

PHYSIOLOGICAL AND BEHAVIORAL ASPECTS OF TASTE—Ithaca, N. Y., June 1960; Chairman: Morley R. Kare, Department of Veterinary Physiology, New York State Veterinary College, Cornell University, Ithaca, N.Y.; Cosponsor: Cornell University.

CONFERENCE FOR DIRECTORS OF UNIVERSITY COMPUTING LABORATORIES—Chicago, Ill., June 2–4, 1960; Chairman: Philip M. Morse, Director, Computation Center, Massachusetts Institute of Technology, Cambridge, Mass.; Cosponsor: American Mathematical Society.

SYMPOSIUM ON BIOLOGICAL CLOCKS AND ANIMAL NAVIGATION—Cold Spring Harbor, N.Y., June 5–15, 1960; Chairman: Arthur Chovnick, Long Island Biological Association, Cold Spring Harbor, N.Y.; Cosponsors: Long Island Biological Association, National Institutes of Health, Office of Naval Research.

FIRST INTERNATIONAL POWDER METALLURGY CONFERENCE—Biltmore Hotel, New York, N.Y., June 13–17, 1960; Chairmen: Kempton H. Roll, Executive Secretary, Metal Powder Industries Federation, and Fritz V. Lenel, Department of Metallurgical Engineering, Rensselaer Polytechnic Institute, Troy, N.Y.; Cosponsors: Metal Powder Industries Federation, Powder Metallurgy Committee, Institute of Metals Division of the Metallurgical Society of the American Institute of Mining, Metallurgical, and Petroleum Engineers.

NINETEENTH GROWTH SYMPOSIUM—Waltham, Mass., June 20–22, 1960; Chairman: Edgar Zwilling, President, Society for the Study of Development and Growth, Biology Department, Brandeis University, Waltham, Mass.; Cosponsor: Society for the Study of Development and Growth.

FOURTH BERKELEY SYMPOSIUM ON STATISTICS AND PROBABILITY—University of California, Berkeley, Calif., June 20–July 30, 1960; Chairman: Jerzy Neyman, Director of the Statistical Laboratory, University of California, Berkeley, Calif.; Cosponsors: Office of Naval Research, Office of Ordnance Research, Air Force Office of Scientific Research, National Institutes of Health.

Patents Resulting From NSF-Supported Research

Three patents have been issued on inventions arising out of Foundation-supported research during the 1960 fiscal year, the first to result from Foundation-supported scientific activities. Patent No. 2,932,797 and Patent No. 2,932,798 both relate to "imparting energy to charged particles" and were developed during the course of research supported through a grant to Midwestern Universities Research Association. These patents have been obtained and are being administered, pursuant to agreement with MURA, by the Research Corporation, a nonprofit organization which distributes its total net income in support of scientific research through grants to academic and scientific institutions. The Foundation has secured for the Federal Government irrevocable, royalty-free, nonexclusive, nontransferable licenses to practice these inventions and cause them to be practiced for governmental purposes.

Patent No. 2,918,699, entitled "Press" was developed under a grant to Brigham Young University. Applications for patents on this invention have also been filed in the United Kingdom (No. 14,370/59) and in Canada (No. 771,918). The Foundation has also secured for the Government irrevocable, royalty-free, nonexclusive and nontransferable licenses to practice this invention and cause it to be practiced for governmental purposes. The Research Corporation is administering this invention pursuant to an agreement with Brigham Young University.

Fiscal Analysis of Research Programs

In fiscal year 1960, a total of 1995 grants were made in support of basic research to 362 institutions throughout the United States and its possessions; also to Japan, Lebanon, Netherlands, Southern Rhodesia, France, West Germany, Israel, Italy, England, Chile, Canada, Bermuda, Australia, and Argentina. Research expenditures totaled $78 million—$62 million for research grants and $16 million for facilities.

The average 1960 research grant was for the sum of $30,008 for a period of 2.2 years. This compares with the average grant in 1954 (earliest for which records are readily available) of $10,465 for 1.9 years.

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Table 1.—*Distribution of research grant funds by type of expenditure*[1] *fiscal year 1960*

Object	Average grant fiscal year 1960[2]	
	Amount	Percent
Salaries	$16,615	63.7
Permanent Equipment	3,813	14.6
Expendable Equipment	2,236	8.6
Travel	1,029	3.9
Other	2,411	9.2
Total direct	26,104	100.0
Indirect	3,904	15.0
Total	30,008	

[1] Based on budget estimates at time of activation.

[2] Based on 1,943 grants awarded totaling $58,303,861 for an average duration of 2.20 years.

The accompanying table summarizes the research grant program by subject categories. A detailed list of grants showing institution, principal grantee, title of project, duration, and amount is given in appendix C.

Table 2.—*National Science Foundation grants, by fields of science, fiscal year 1960*

Field	Number	Amount
Biological and medical sciences:		
Developmental biology	65	$1,706,495
Environmental biology	129	2,650,000
Genetic biology	74	2,100,300
Metabolic biology	116	3,103,100
Molecular biology	116	5,542,700
Psychobiology	83	2,192,730
Regulatory biology	121	3,527,275
Systematic biology	149	2,767,150
General biology	38	1,144,660
Total	891	24,734,410
Mathematical, physical, and engineering sciences:		
Astronomy	62	2,169,500
Atmospheric	44	3,912,525
Chemistry	222	5,462,500
Earth sciences	127	4,128,735
Engineering sciences	184	5,702,405
Mathematical sciences	132	3,648,600
Physics	145	6,444,100
Total	916	31,468,365
Social sciences:		
Anthropology	49	717,850
Economics	16	526,986
History and philosophy of science	12	85,750
Sociology	32	758,600
Total	109	2,089,186
Antarctic research (life and physical sciences)	79	3,625,851
Grand total	1,995	61,917,812

EDUCATION IN THE SCIENCES

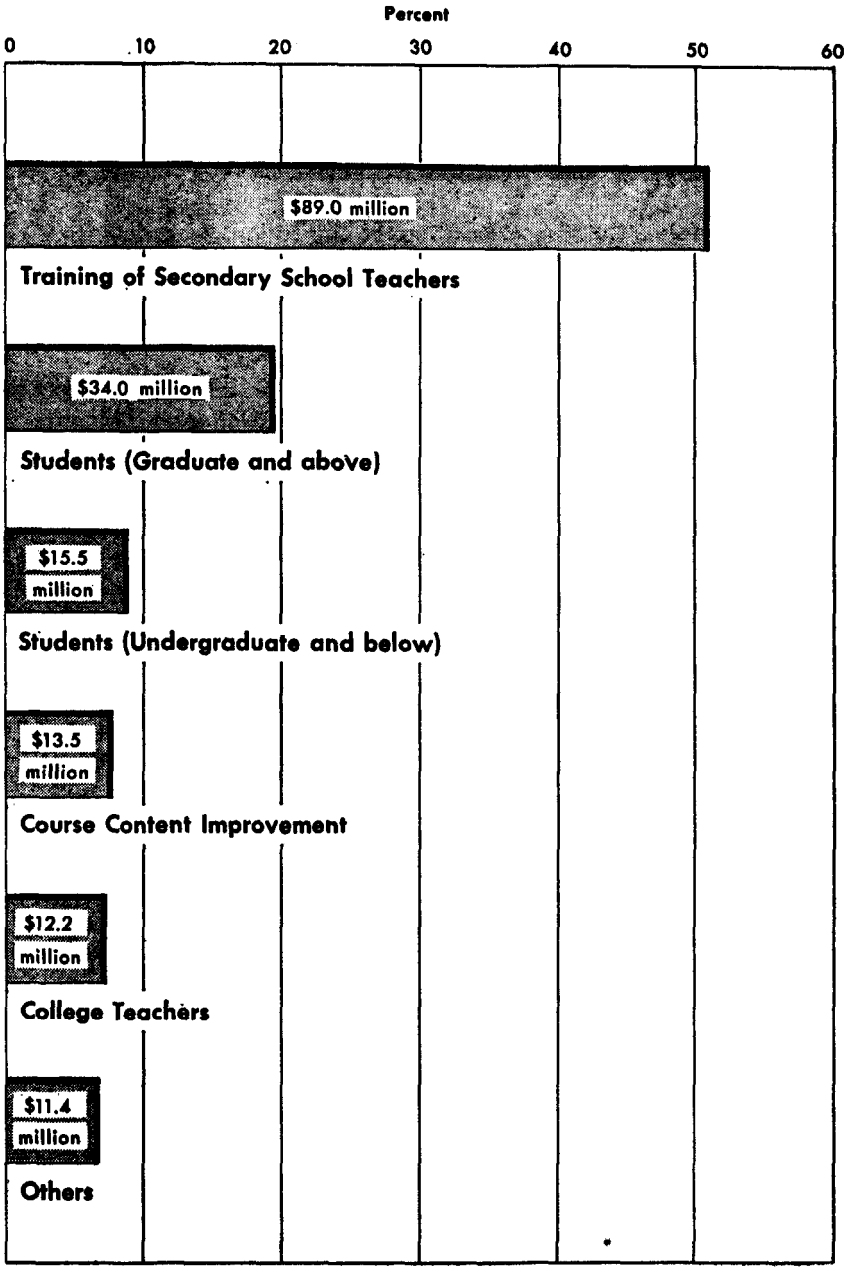
Nine years have elapsed and much money and effort have been expended for the promotion of education in the sciences by the Foundation since the initial grant for fellowships was made in 1952.

An appraisal of this activity conducted by the Foundation, through the Division of Scientific Personnel and Education, shows that a marked degree of success has attended these developing programs. The evidence indicates that the overall beneficial effect of the Foundation's educational activities is without precedent. The degree of acceptance of these activities by the scientific-educational community has been gratifying and, in some respects, startling; yet it is understandable because the Foundation's programs have been predicated on the requirements of that community. The success and acceptance of these education programs have stemmed from the fact that these efforts have made significant contributions toward meeting needs as they have been identified by those best equipped to know.

In the early years, primary emphasis was placed on the science-educational needs of the more advanced scholars—the graduate students and established scientists—through the fellowships programs. Initiated in 1952, with 624 awards at a cost of $1.5 million, these programs have increased their coverage to provide 4,010 fellowships representing a total obligation of $13.5 million in 1960.

The second period saw the continuance and diversification of these efforts and the advent of programs developed around the needs of the science, engineering, and mathematics teachers—programs, first, for college teachers; later, and with greater emphasis, for secondary school teachers. The program of institutes which began with 2 summer institutes in 1953 had grown by 1960 to 649 institutes—412 summer, 33 academic year, and 204 in-service, at a cost of over $33 million. One-half of all funds for education in the sciences has been used in support of secondary school teacher programs.

Figure 1. ***Distribution of Funds for Education in the Sciences Programs; By Problem Area, 1952–60, Inclusive.***



High school and college student programs were launched in 1953 with a very modest budget which has grown in 1960 to $11 million.

Support for activities designed to effect an improvement in science courses and curricula has increased since its beginning in 1954 to approximately $6 million in 1960.

The data presented in figure 1 represent the distribution of NSF funds according to broad program areas for education in the sciences. Funds for specific program activities are presented, as appropriate, in the general text.

Principles Guiding Operation of Education Programs

It seems appropriate at this time to restate the basic principles that have guided the Foundation in carrying out its responsibilities in scence education.

1. A successful attack on the problems of education in the sciences is a matter of critical importance to the Nation's welfare. This attack must be launched and prosecuted with sustained vigor and perception and should be based on the Nation's needs both now and in the future, whether in times of peace or war.

2. The educational system of the Nation is varied, complex and decentralized, but its fundamental strength rests on such attributes. Such assistance as the Foundation can bring to bear on the problem of improving education in the sciences must be rendered so as to respect and preserve what have proved to be fundamental strengths. The Foundation's programs must not result in NSF assuming any measure of control over the processes of education.

3. There is no substitute for excellence. The Foundation strives to encourage initiative and imagination on the part of scientists, scientist-teachers, educational institutions, and scientific organizations in devising promising new ways of improving education in the sciences. The Foundation will recommend support of those activities which, on the basis of the fullest internal and external review, seem most likely to be worthwhile. Each proposal will be judged individually on its intrinsic merit.

4. To be successful, attacks on problems of education require mutual and sympathetic cooperation between eminent teachers and eminent scientists. The Foundation will actively solicit and encourage such cooperation. Further, NSF's programs must be developed with the fullest cooperation and advice of the scientific-educational community. Only in this way can they attain the degree of relevance that is a prerequisite to success.

5. There is no one solution to the problems of education in the sciences. Concerted action by many individuals and groups working on

many facets simultaneously is necessary. The Foundation's activities must supplement, not compete with, those of others.

6. It is of paramount importance that education in the sciences be based upon the substantive content and nature of contemporary science itself. The scientific personnel and education activities of the Foundation will be based on this principle.

It will be noted that a basic theme underlies all these principles—cooperation with scientist-educators in the pursuit of excellence. To this end, in fiscal year 1960 the Foundation obtained in formal ways the counsel of more than 1,000 scientists who served on various panels and committees in reviewing proposals in science education and applications for fellowships. The opinions of many others were sought in informal ways. Special advisory panels were appointed to counsel with the staff on institutes, special projects, and course content.

Fellowship Programs

Fellowships have proved to be effective instruments in encouraging and facilitating the scholarly pursuit of knowledge. They provide an impetus toward the conquest of new frontiers of knowledge. They are investments in the future of individuals of high potential, individuals upon whom society is dependent to a marked degree for its future progress.

Awarding fellowships was among the first of the Foundation's activities. From the two original programs in 1952, this activity has grown to include, in 1960, seven different fellowship programs which have provided 13,350 awards through fiscal year 1960. These NSF fellowship programs are as follows:

1. *Graduate Fellowships* for students studying for a master's or a more advanced degree in science, mathematics, or engineering. (Initiated in 1952.)

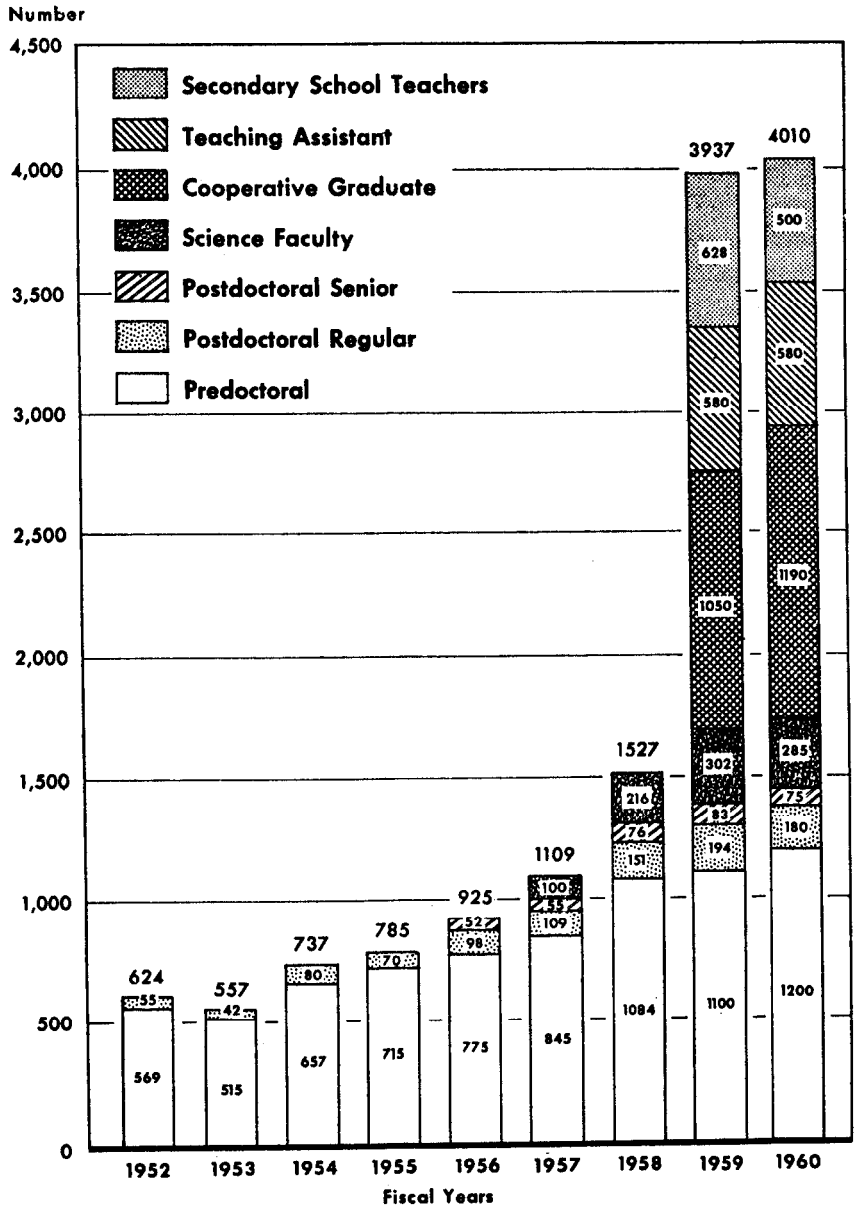
2. *Cooperative Graduate Fellowships* similar to graduate fellowships except that certain aspects of the program are administered jointly by the cooperating institutions and the National Science Foundation. (Initiated in 1959.)

3. *Summer Fellowships for Graduate Teaching Assistants* for support of summer study by graduate teaching assistants. (Initiated in 1959.)

4. *Postdoctoral Fellowships* primarily for individuals who have recently received a doctoral degree in science, mathematics, or engineering. (Initiated in 1952.)

5. *Senior Postdoctoral Fellowships* primarily intended for recognized senior scientists, mathematicians, and engineers. (Initiated in 1956.)

Figure 2. ***Growth of National Science Foundation Fellowship Programs. Number of Awards Offered, Fiscal Year 1952–60.***



6. *Science Faculty Fellowships* for junior college, college, and university teachers of science, mathematics, and engineering. (Initiated in 1957.)

7. *Summer Fellowships for Secondary School Teachers* for the support of individual graduate study by secondary school teachers of science and mathematics. (Initiated in 1959.)

A total of 4,010 fellowship awards were offered in 1960, representing a cost of approximately $13.5 million.

In addition to the previously listed programs, the Foundation, at the request of the Department of State, administered for the second year the U.S. component of a program of North Atlantic Treaty Organization (NATO) Postdoctoral Fellowships in Science. Under this program a total of 41 awards were offered to U.S. citizens in fiscal year 1960. For the first time, similar responsibilities were undertaken in 1960 for providing administrative guidance in the United States for a new fellowship program initiated by the Organization for European Economic Cooperation (OEEC)—the OEEC Senior Visiting Fellowships. The objective of this program is to strengthen insitutions in significant areas of research and training. A total of 27 awards were offered to U.S. citizens.

Recipients of NSF fellowships are selected in national competition solely on the basis of ability. Initial evaluation is performed by panels of scientists appointed by, and operated under the aegis of, the National Academy of Sciences-National Research Council, the Association of American Colleges, or the American Association for the Advancement of Science. Awards are made by the Foundation on the basis of the panels' recommendations and in compliance with statutory requirements. (See Appendix E for listing of fellowship awards.)

Graduate Fellowships (Predoctoral)

This program fosters nationwide competition, and awards are offered to those candidates for advanced degrees having the highest ability and those judged to have the greatest potential for developing into well-qualified scientists, mathematicians, and engineers. Because the standards for selection are high, these awards enjoy a high prestige value and are very much sought by many of the Nation's ablest students.

In fiscal year 1960 a total of 4,696 applications were received; the Foundation selected 1,200 persons for awards. In addition, 2,272 applicants were accorded Honorable Mention.

Cooperative Graduate Fellowships

The Cooperative Graduate Fellowship Program, like the Graduate Fellowship Program, is intended to support graduate students of the

highest ability in the pursuit of their scientific studies. This program, however, is designed to achieve broader distribution of awards among participating institutions; the institutions themselves play an important part in the preliminary evaluation of applicants and in the administration of the program.

Fiscal year 1960 marked the second year of the program's existence. All institutions which confer doctoral degrees in the science areas covered by these awards were invited to participate, thus increasing the number of participating institutions to 152, as compared with 115 in the first year.

A total of 3,091 individuals applied through 144 colleges and universities. The Foundation selected 1,190 individuals, representing 134 institutions, for awards.

Summer Fellowships for Graduate Teaching Assistants

First offered in 1959, this program was designed to enable graduate teaching assistants at designated participating institutions to devote full time, during the summer, to their own study and research in the sciences, mathematics, and engineering. Individuals apply through their own institutions and are initially evaluated by them. They are then evaluated centrally, with final selections being made by the Foundation solely on the basis of the applicants' ability.

As in the Cooperative Graduate Fellowship Program, all institutions which confer doctoral degrees in the science areas covered by these awards were invited to participate. There were 150 participating institutions in this year's program, compared with 115 institutions in fiscal year 1959.

Of the 1,362 individuals who applied in 1960, through 127 colleges and universities, the Foundation selected 580 awardees representing 118 institutions.

Postdoctoral Fellowships (Regular)

The Postdoctoral Fellowship Program, now in its ninth year of operation, offers support to individuals who have, in most cases, recently received doctoral degrees in science, mathematics, or engineering, and who need and are qualified for additional advanced training as investigators in their chosen fields. Since 1956 there have been two award periods each year—one in October and the other in March. Tenures may range from 6 to 24 months depending on the program planned by the individual.

There were two competitions in fiscal year 1960, with awards announced in October 1959 and in March 1960. Of the 782 applicants, the Foundation selected 180 persons for awards.

Senior Postdoctoral Fellowships

The Senior Postdoctoral Fellowship Program offers well established scientists, mathematicians, and engineers the opportunity to pursue additional study and/or research with a view toward increasing their competence in their specialized fields or toward broadening their knowledge in related fields of science. Tenures of 3 to 24 months are available, although the usual tenure is for 9 or 12 months.

Of the 259 applicants in this year's program, the Foundation selected 75 individuals for awards.

This program has received the enthusiastic support of the scientific community and appears to be meeting an important need. A renewal policy in the Senior Postdoctoral Fellowship Program has been established and becomes effective in the fiscal year 1961 competition, as follows:

> Any person who has held a Senior Postdoctoral Fellowship for 2 years is ineligible for a period of 5 years to hold another such fellowship.

Science Faculty Fellowships

The Science Faculty Fellowship Program provides an opportunity for college and university teachers of science, mathematics, and engineering with 3 or more years of science teaching experience at the collegiate level to improve their competence as teachers. Tenures of 3 to 15 months are available. A unique feature of this program is the provision which allows awardees to undertake their fellowship studies in either one, two, or three consecutive summer periods.

A review of this program, carried out in 1959, indicated that it should be divided administratively into two parts—one to be a competition among applicants with a Ph. D. degree, and the other for applicants in a non-Ph. D. category. The 709 applicants this year were thus categorized and the resulting groups of applicants were evaluated by two independent panels. The Foundation selected 285 individuals for awards, dividing the awards proportionately between the two groups as determined by the ability level and the number of applicants in each group.

Summer Fellowships for Secondary School Teachers of Science and Mathematics

This fellowship program enables secondary school teachers of high ability to undertake study programs in the subject matter of science and mathematics during one, two, or three summers. These fellowships, emphasizing study on an individual basis, are intended to supplement the

Foundation's institute programs, the latter being especially designed for training groups of teachers.

A total of 2,221 teachers—representing a 40 percent increase over 1959—applied for these fellowships. Many applicants failed to qualify because they lacked the undergraduate training prerequisite to graduate study in science or mathematics. The Foundation selected 500 individuals to be offered awards.

Extramural Fellowships

1. North Atlantic Treaty Organization (NATO) *Postdoctoral Fellowships in Science.*

Again, as in fiscal year 1959, the Foundation administered the program of NATO Postdoctoral Fellowships in Science. This program is designed to stimulate the exchange of scientists among the NATO countries by the fellowship mechanism, each member nation being charged with selecting fellows from among its own citizens.

Applications for fiscal year 1960 fellowships were received from 162 U.S. scientists; 41 applicants were offered awards by the Foundation.

The fellows will study in Canada, Denmark, France, the Federal Republic of Germany, Italy, The Netherlands, Norway, the United Kingdom—all NATO countries—as well as Israel and Sweden.

2. Organization for European Economic Cooperation (OEEC) *Senior Visiting Fellowships.*

In order to assist scientific and technical institutions to incorporate more quickly into their own advanced teaching and research programs the most recent developments in their own and other countries, the Organization for European Economic Cooperation has established a program of OEEC fellowships. Each member or associated OEEC country administers the OEEC fellowship program for its own nationals. In fiscal year 1960 the Foundation assumed the responsibility for administering this new program for citizens of the United States, including the selection of fellows.

This program emphasizes the strengthening of the scientific work of the institutions of the fellowship recipients, rather than research training of individual scientists, as such, or individual academic study. Fields supported include the mathematical, physical, biological, and engineering sciences, but not the social sciences or medicine. Awards normally are tenable for periods of 8 weeks to 6 months, and in unusual circumstances for as long as 1 year. Recipients of awards are usually expected to study abroad in one or more countries that belong to or cooperate with the Organization for European Economic Cooperation.

Thirty-five scientists applied for awards; 27 grants were made. The awardees will study in 10 European countries.

Institute Programs

The Foundation's institute programs are directed toward raising the level of the teaching of science, mathematics, and engineering in our Nation's schools. Consisting of three major types—Summer Institutes, Academic Year Institutes, and In-Service Institutes—these programs provide supplemental training in subject matter for high school and college teachers, as well as for staff personnel of technical institutes and elementary schools. As contrasted with the individualized study made available through fellowship programs, the institute programs offer "group" activities and employ course materials especially prepared to meet the subject matter needs of participating teachers.

A secondary objective of institute programs is to provide colleges and universities opportunity to carefully review science and mathematics courses now available to both pre-service and in-service teachers who seek to improve their teaching competence in these areas.

Since the program's inception in 1953, the Foundation has made grants for the support of 1,661 institutes—1,057 Summer Institutes, 102 Academic Year Institutes, and 502 In-Service Institutes. The largest portion of these, 1,418 or 85 percent, was for secondary school teachers. In 8 years of operation, a total of 81,000 opportunities for study have been made available through the NSF institute programs—opportunities for 73,550 high school teachers, 5,550 college teachers, 1,750 elementary school teachers, and 150 technical institute teachers. The institute programs have grown from an operation which involved the expenditure of $21,000 in 1953 to one with an estimated obligation in fiscal year 1960 of more than $33 million.

For fiscal year 1960 the Foundation supported 649 institute programs. Of this number, 412 were Summer Institutes; 33 Academic Year Institutes; and 204 In-Service Institutes. As shown in the table below, over 31,000 teachers received financial assistance which enabled them to pursue further study in the fields of science and mathematics.

Summer Institutes

A total of 412 NSF-sponsored summer institutes were held in the 1960 fiscal year with 22,000 teacher-participants (20,310 received NSF assistance). Each of these institutes offers courses directed toward a particular educational level and a specific level of attainment in a particular subject-matter area or, alternatively, in several scientific disciplines. In addition to course work, the institutes commonly provide seminars and

Table 3.—*Study Opportunities*[1] *in NSF Institute Programs*

	Fiscal year 1960	Fiscal years 1953–60
Summer institutes:		
High school	17,415	47,000
College	2,273	5,500
Elementary school	542	1,100
Technical institutes	80	150
	20,310	53,750
Academic year institutes:		
High school	1,494	4,850
College	43	50
	1,537	4,900
In-Service institutes:		
High school	8,888	21,700
Elementary school	405	650
	9,293	22,350
Total	31,140	81,000

[1] The above figures, representing study opportunities, do not reflect the number of individual teachers who were granted support. In some cases, a teacher may have attended more than one institute in a program and/or more than one program over a period of years.

colloquia, as well as lectures by eminent visiting scientists. Ample opportunity is provided for informal discussions between participants, and between participants and staff. Such discussions and other group-learning activities are encouraged in the typical institute through special arrangements which enable participants to live in the same dormitory, eat together, go on field trips, attend special lectures, etc.

Summer Institutes for High School and College Teachers of Science and Mathematics

This summer institute program is now in its seventh year of operation. Through these institutes, supplemental training has been made available to teachers of biology, radiation biology, chemistry, earth sciences, engineering, general science, geology, history and philosophy of science, isotope technology, mathematics, and physics. Institutes in radiation biology and isotope technology are sponsored jointly by the Foundation and the Atomic Energy Commission.

Of the 379 summer institutes supported by Foundation grants during the past fiscal year, 38 were for college teachers only; 24 for secondary school and college teachers, and the remaining 317, for secondary school teachers only.

The number of participants for each institute ranged from 15 to 150, the average number being 50 per institute. The average duration of a summer institute was approximately 7 weeks, although some institutes were of only 4 weeks' duration and others were in session for as many as 12 weeks.

Summer Institutes for Elementary School Supervisors and Teachers

Developed on an experimental basis in 1959, this program provides institutes designed to give elementary school supervisors and teachers opportunity to increase their knowledge of science and mathematics, so that appropriate components of these subjects can be taught more effectively to elementary school students. In fiscal year 1960 the Foundation continued to support this program by sponsoring 15 institutes, which were attended by approximately 550 participants.

Summer Institutes for Technical Institute Personnel

Organized and administered in a manner similar to the institutes for high school or college teachers, the Summer Institutes for Technical Institute Personnel are specifically designed to meet subject-matter needs of teachers of science, mathematics, and engineering in technical institutions not conferring the baccalaureate degree. In 1960, as in 1959, two institutes of this type were supported with approximately 80 participants.

Summer Conferences for College Teachers

Each summer conference is designed as a short course or as a lecture series in a specialized subject-matter area of science, mathematics, or engineering. Sixteen were supported in fiscal year 1960.

Academic Year Institutes

The Academic Year Institute Program supports efforts of universities and colleges in providing opportunities for experienced secondary school teachers of science and mathematics to spend an entire academic year in full-time study of the subject matter of their disciplines. Planned and conducted by the individual universities and colleges, the institute courses are especially designed to meet the needs of teachers whose formal scientific education is inadequate. These courses are aimed primarily at increasing the competence of teachers by improving their knowledge of subjects they teach.

Grants for two institutes held in 1956–57 marked the beginning of the Academic Year Institute Program. Because these institutes have been so successful in meeting the need for subject-matter training for experienced teachers, the number of institutes had been increased to 33 by the 1960–61 academic year, with places for 1,537 teachers.

In-Service Institutes

In-service institutes make it possible for science and mathematics teachers to continue studies on a part-time basis during the academic year at colleges and universities within commuting distance to their homes. Participating teachers receive no stipends, but are given modest travel and book allowances through sponsoring institutions which receive Foundation support to cover costs of operation. During 1959–60 a total of 182 in-service institutes for secondary school teachers received support and offered instruction for 8,650 participants. For the 1960–61 school year about 8,900 secondary school teachers will participate in 191 in-service institutes.

Approximately half of the course work offered in these institutes will be in the field of mathematics, with the remainder covering the range of the biological, physical, and earth sciences. As an innovation, two in-service institutes will be conducted in radiation biology, with joint support from the National Science Foundation and the Atomic Energy Commission. Noteworthy also are 19 institutes which will present background material for teachers who wish to familiarize themselves with the new physics course developed by the Physical Science Study Committee. (See page 100.)

In-service institutes for elementary school supervisors and teachers are similar to those for secondary school teachers. Courses offered have been especially designed to meet the elementary schools' need for informed instruction and supervision in science and mathematics in line with a primary objective of the program to give colleges and universities opportunity to experiment with course materials adapted to the training of elementary teachers.

The In-service Institutes Program will in the 1960–61 academic year support 13 institutes for elementary school personnel which will provide instruction for 405 teachers, supervisors, and principals.

Special Projects in Science Education

The Special Projects in Science Education activities deal primarily with the development and experimental testing of new ideas for the improvement of science education and of public understanding of science. The first projects of this kind were supported in 1953, consisting of mod-

est programs for secondary school science education and supplemental training of science teachers. From these early efforts, two major NSF operational programs emerged—Institutes and Course Content Improvement.

The major program categories included under the Special Projects in Science Education are: Secondary School Programs; College Programs and Teacher Improvement Programs; and Public Understanding of Science.

Secondary School Programs

Programs directed toward the secondary school level are intended to motivate high school students' interest in, and understanding of, science, mathematics, and engineering. Special projects focused on this objective are planned by universities, colleges, scientific societies, research organizations, and other groups, and supported by grants from the Foundation.

Visiting Scientists (Secondary Schools)

Grants are made under this program to professional groups to sponsor the visits of outstanding scientists to secondary schools for the purpose of acquainting students and faculties with the sciences as vital activities and providing counsel relative to careers and education in the sciences. In addition, an increasing opportunity for closer liaison between science faculties of colleges and universities and science teachers and students in secondary schools is made possible.

For fiscal year 1960, grants were made to the: American Chemical Society, American Institute of Biological Sciences, American Institute of Physics, Mathematical Association of America, and the University of Puerto Rico.

Traveling Science Libraries

This program is designed to interest the high school student in science and mathematics through the reading of stimulating books in these subject areas. The American Association for the Advancement of Science, assisted by a committee of experts, selects 200 books each year as representative of the books most appropriate for high school students in the various fields of science. Books are chosen for content, intrinsic interest, and a writing style suitable to the reading audience.

During the 1959–60 school year, 375 sets of 200 books each were sent to 1,678 high schools and preparatory schools, as well as to 4 county libraries serving a large number of small schools. During the summer months, many sets were loaned to National Science Foundation-sponsored institutes for science teachers.

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In addition, a traveling science library program for elementary schools was initiated during the past school year. A total of 802 elementary schools received sets of 160 books, and there were indications that this library service is particularly helpful to students of unusual ability.

Traveling Science Demonstration Lectures

This program provides opportunities for secondary school students and teachers to observe special science lecture-demonstrations in physics, chemistry, biology, and mathematics. Especially trained secondary school science teachers present the demonstration lectures. Currently four centers are established for the training of teachers. A total of 120 teachers began training in the summer of 1960.

The Oak Ridge Institute of Nuclear Studies (ORINS) is presently experimenting with academic-year training sessions of 12 week's duration for locally supported teachers; these sessions parallel the summer training sessions held at all four centers—ORINS, Michigan State University, Oklahoma State University, and the University of Oregon.

During academic year 1959–60, visits were made to about 1,700 high schools by the NSF-supported traveling teachers; about 12,000 teachers and 700,000 students were reached. In addition, 35 locally supported teachers have been trained and have returned to their own school districts for more intensive work over a longer period of time.

Science Clubs

Through the Science Clubs program, the Foundation provides support for extracurricular science projects carried on under the guidance of national youth organizations. The objective of this program is to stimulate the interest of pre-college age students in science and in scientific and engineering careers.

In fiscal year 1960, the Foundation continued to provide partial support to Science Service, a nonprofit organization which provides direction and central administrative services to the organization known as Science Clubs of America. Currently there are over 25,000 local affiliated Science Clubs, chiefly at junior and senior high schools, with a total membership of about 600,000. The Foundation also provided support to the Junior Engineering Technical Society for administering the development and distribution of 16 academic units (booklets) to over 650 local affiliated clubs. These booklets present topics pertinent to engineering, technology, or applied science. The Junior Engineering Technical Society provides brochures for career guidance; also ideas and materials for building chapter programs, and for improving the scientific potential of its members.

Summer Training for Secondary School Students

Through this activity, support is provided to colleges, universities, and other non-profit research institutions for programs offering opportunities to high-ability secondary school students to study and work with experienced scientists and mathematicians at the sponsoring institutions.

Two general types of training are presented. Most common are institute-type training courses, varying in duration from two to eleven weeks and featuring classroom work, laboratory exercises, and field trips centered around a specified area of science. In some cases, however, the training is based upon student participation in actual research projects of appropriate scope under the guidance of scientists.

About 7,100 students participated in this program at 136 different institutions during the summer of 1960.

State Academies of Science

This program provides aid to State Academies of Science and similar organizations for programs designed primarily to increase our young people's interest in science. Academies of Science are uniquely qualified for implementing programs of this type because of their active involvement with Junior Academies of Science and because of the broad diversification of professional talent represented in the academies' memberships. As the focal point for scientific interest in a region or community, each academy of science has an unusual opportunity to marshal all local and regional science resources in behalf of improved science education.

Programs of the separate academies cover a broad spectrum of activities: visiting scientists programs; special field trips; expanded junior academy activities; preparation of instructional material for teachers in connection with science fair programs; joint conferences of high school science teachers, college scientists, industrial scientists, and school administrators; etc.

During fiscal year 1960, a total of 43 grants were made to 28 State academies, 5 metropolitan academies, and 2 museums.

Science Career Information

Through this program the Foundation makes grants to scientific organizations for administering the preparation and distribution of career-guidance materials which give authoritative information to students considering professional careers in the various fields of science.

Ten grants were made to the: American Meteorological Society, American Society of Zoologists, American Institute of Biological Sciences, Botanical Society of America, Society of American Bacteriologists, Metallurgical Society of AIME, American Institute of Physics, American

Chemical Society, Council of Chief State School Officers, and National Academy of Sciences.

College Programs and Teacher Improvement Programs

The basic objectives of these programs are the improvement of science education and the development of more well qualified scientists and engineers. These programs provide opportunities for the undergraduate to improve his understanding of science, mathematics, and engineering, as well as assist teachers in developing their subject-matter backgrounds in these areas.

Visiting Scientists (Colleges)

This program facilitates visits by distinguished scientists to colleges and small universities for periods of two or three days to give lectures, to conduct classes and seminars if desired, and to meet students, faculty members, and administrative officers on an informal as well as formal basis in order to stimulate interest in science. These visits also make it possible for smaller institutions to become aware of developments in specialized fields of science and technology not commonly represented on the small college or university campuses. The program is administered through grants to appropriate professional scientific societies.

It is estimated that approximately 1,500 visits will be made to colleges during 1960–61, and that about half the colleges in the Nation will receive visiting scientists who represent one or more disciplines.

Visiting Scientists (Foreign)

Under this program grants are made to national professional societies to arrange for the visits of eminent foreign scientists to the science departments of our major colleges and universities. Such visits are usually for a period of a few weeks to several months. The visiting foreign scientists give lectures, conduct seminars, and meet with students and faculty with the objective of augmenting the quality of the research and educational activities of these institutions. Through these visits, leaders of American science are able to become better acquainted with the current state of knowledge in various scientific and engineering disciplines throughout the world.

Undergraduate Science Education

The Undergraduate Research Participation Program makes it possible for educational institutions to provide research training to high-ability undergraduates who have potential for scientific research and college teaching. This research experience is also intended to encourage participants to pursue graduate work in science. The Undergraduate Research

Training Program enables institutions or departments without active research in progress to initiate an investigative activity in which undergraduates could participate.

The 490 grants made in 1960 will help provide 3,338 undergraduates with a research experience in a variety of disciplines in the mathematical, biological, physical and engineering sciences, certain of the social sciences, and experimental psychology.

Research Participation for Teacher Training

Through this program, an opportunity is offered to teachers from secondary schools and small colleges to participate in scientific research during the summer. Initially the primary objective of this program, which began in 1959, was to improve the teaching of science through enlivening research experience provided teachers. However, with the development of this and other programs for teachers, emphasis has shifted somewhat to the objective of strengthening the Nation's research potential by providing teachers with the incentive and opportunity to become actual contributors to scientific knowledge. Recognizing that research and teaching are not mutually exclusive activities, the primary objective of developing teachers as teachers remains.

In fiscal year 1960, a total of 87 grants were made to educational institutions, making it possible for approximately 750 (500 secondary school and 250 college) teachers to obtain research experience during the summer of 1960.

Supplementary Training for Science Teachers

This program is aimed at improving the quality of science teaching at all educational levels through specialized conferences, workshops, etc., often of an experimental character. Programs may take the form of conferences directed toward improving instructional techniques, instruction in recent scientific advances, or inquiries into means of fostering new lines of educational scientific activity. NSF supported 41 of these projects in fiscal year 1960 with 4,000 teachers participating.

Special Field Institutes

Special Field Institutes supplement the advanced educational opportunities presently provided by university graduate schools or other advanced training centers for alleviating shortages of personnel in specialized scientific areas of critical importance in academic as well as scientific circles. These institutes are commonly cooperative graduate programs that assemble limited staff resources from several campuses and include industrial and Government scientists with unique specialization. Convening for a limited period of time to organize knowledge in un-

charted areas and to instruct research workers, faculty members, and postdoctoral and advanced predoctoral students, these institutes provide a well-conceived, short-term program of advanced study not readily available in usual graduate school situations.

Sixteen grants were made in 1960 for dealing with current advances in such fields as theoretical physics; mathematics and statistics; geophysical, oceanographic, and engineering applications of fluid dynamics; ethnography and anthropology; forest biology; marine sciences; and dynamical astronomy.

Public Understanding of Science

Under the Public Understanding of Science program, support is provided to educational institutions and scientific organizations to assist in developing ways of improving the lines of communication between the scientific community and the lay public in order to develop a broader concept of the impact of science upon the economy, welfare, and security of the Nation.

Since information on science is presented to the public primarily through the mass circulation media, initial experimental efforts are being directed toward steps to improve the quality and quantity of science news appearing in such publications.

These efforts in 1960 consisted of 13 grants for activities, such as conferences of scientists and newspaper editors, workshops for science reporters, and seminars for experienced science writers. Approximately 85 editors, 150 reporters, and 200 professional science writers participated.

Course Content Improvement Programs

Modernizing the content of science and mathematics curricula and courses, as well as all types of aids to learning and teaching, is essential to upgrading education for today's age of science. Content, adapted to the learner's level, must continuously reflect science as on-going inquiry and science at the level of understanding achieved by current knowledge. The purpose of the Foundation's Course Content Improvement Programs is to provide support for projects which engage the Nation's finest talent in the difficult and urgent task of achieving these goals.

These programs have evolved steadily since 1954. The complexity of problems in this domain, together with their far-reaching implications, led to an initially cautious approach through relatively small grants for a variety of exploratory studies. Support was increased considerably in fiscal years 1957 and 1958, when the first major effort was launched—the development of a new high school physics course. The results and

success of pilot projects, along with growing realization among first-rank scientists that such efforts merit high priority among their responsibilities, justified a further substantial increase to about $6 million annually in fiscal years 1959 and 1960.

First priority has thus far been given to new courses and materials for secondary schools, nearly 85% of program funds being allocated to this educational level during the period 1954–1960. In addition to continuing substantial support for high school projects, major effort must be focused upon the improvement of college and university programs, both through undertakings involving nationwide teams of scientists, mathematicians, and engineers and through modernization of curricula and courses within the great diversity of higher educational institutions and scientific and engineering fields. Also, recognition of the vital importance of elementary and junior high school experience in developing proper attitudes and laying the groundwork for subsequent schooling makes imperative a thorough study of science and mathematics curriculum improvement at this level.

Evaluation of projects supported by these programs points up two important aspects of course content improvement: first, assurance of excellence in content, for which perhaps the best guarantee is development and constant improvement of materials by top-level scientists, working with outstanding teachers and other experts; second, determining pedagogical feasibility through school trial, careful study of results, and revision of materials based thereon—an integral element in most projects. The widespread interest in course content developments is reflected in the great number of requests for information received by the projects, the Foundation, and other organizations. Substantial interest is also emerging in Europe, Asia, South America, and other parts of the world.

Course Content Studies and Development

Elementary-Junior High School

Foundation support for course content studies and development for elementary and junior high schools continued to be quite limited in fiscal year 1960 because further study of the problems involved and clarification of the Foundation's responsibilities are still required. These studies are now underway.

Another important need is an effort by scientists to identify significant content and to experiment with materials for pupils and teachers. The University of California received a grant to continue its interdisciplinary project on science for the first six grades; the University of Illinois, a grant for experimental work on instruction in principles of physical

science focused on astronomy. The basic importance of mathematics content throughout the elementary and secondary curriculum is conceded by all; the School Mathematics Study Group is continuing its highly promising work on sample courses for grades 7 and 8, and beginning the preparation of material for grades 4 through 6.

High School

Educational Services Incorporated received a grant to complete the first phase of work on a new high school course prepared by the Physical Science Study Committee. As the result of a 4-year effort by some of the Nation's most notable physicists, most materials for this course are now available to all interested schools. Some 30,000 students in 650 schools have already taken the course.

The School Mathematics Study Group received further support through Yale University for revision of sample textbooks and teacher's commentaries for grades 7 through 12, materials for teacher education, special materials for gifted students, and further evaluative studies. The American Institute of Biological Sciences was granted additional funds for efforts by the Biological Sciences Curriculum Study to devise and test textbooks, laboratory and field studies, teacher education materials, and other aids for high school biology. In chemistry support was given to two projects. Grants were made to Earlham College for the Chemical Bond Approach Project to prepare a second version of a text and laboratory guide for trial in some 50 schools during 1960–61, followed by a definitive edition to be published for general use. The University of California received funds for the Chemical Education Materials Study, which is beginning to devise and test text, laboratory, film, monograph and other materials for another type of high school chemistry course.

A related and difficult problem is that of helping teachers and school administrators learn more about new curriculum developments sponsored by various foundations and organizations. One approach will be tried by the National Council of Teachers of Mathematics through a grant for a series of eight regional conferences of mathematics supervisors.

College and University

Projects at colleges and universities follow three general patterns. One pattern involves a conference, series of conferences, or committee study to examine a field and define broad guidelines for curriculum reform. Support was provided for such studies on: introductory physics courses; chemistry for non-majors; and the undergraduate curriculum for chemistry, civil engineering, chemical engineering, sanitary engineering, experimental mechanical engineering, and anthropology.

A second type of activity, which may evolve from a project of the first sort, is the formation of a continuing body to conduct basic studies, provide liaison among specific course-content projects, supply information about developments, and stimulate efforts on the part of individual institutions or groups of colleges. The Mathematical Association of America received a grant to enable its Committee on the Undergraduate Program in Mathematics to assume this responsibility for that field, and comparable commissions concerned with college physics and experimental mechanical engineering have been recommended by the conferences in those fields.

The third kind of undertaking in the college and university studies category is the development of a specific new course which promises to be of wide interest and which includes elements of a truly novel nature. In this area grants were made to Harvard University for a new introductory biology course, to Ohio State University for work on a new laboratory program in organic chemistry, to Lehigh University and North Carolina State College for coordinated projects in experimental mechanical engineering, and to the Massachusetts Institute of Technology for a laboratory course on the principles of instrumentation.

Supplementary Teaching Aids

The objective of the Supplementary Teaching Aids program is to support the development of such aids to learning as new laboratory apparatus, motion pictures, and television presentations which have been designed to extend the range and scope of science, mathematics and engineering courses in significant ways.

For the design and development of prototypes of new laboratory equipment, 32 grants were made in 1960. Projects include an educational wind tunnel using smoke to visualize air flow, a small hypersonic wind tunnel, stereophotomicrography for submacroscopic anatomy, demonstrations for use with overhead projectors, equipment for instrumental chemical analysis, design of inexpensive computers, and a low-cost mass spectrophotometer.

Two educational television projects were granted support. A series of eight half-hour programs produced under a grant to the University of California at Berkeley will enable Nobel Laureate Wendell M. Stanley and his colleagues in the Virus Laboratory to bring the story of modern virus research and its implications for basic biology to large audiences. The use of television in providing teachers of mathematics with background knowledge and a detailed understanding of new curricula is the subject of a project sponsored by the Minnesota Academy of Science.

Educational film projects in a variety of fields were supported. Anthropology films, sensitively edited, can give the student an understanding of unfamiliar cultures; with this purpose in mind, a grant was made to Harvard University for the completion of a series of documentary films on !Kung Bushmen of South Africa. Under grants to the State University of Iowa and the University of Minnesota, films on principles of fluid mechanics will be produced. Iowa also received a grant for films on the biology of slime molds and the use of these organisms in teaching. Yeshiva University was awarded support to begin a series of films for high school and college biology courses which endeavor to put the viewer in the position of an original observer of plants and animals as an attempt is made to uncover fundamental principles through close observation of organisms in their natural environments. Yale University has received support for a series of short films for advanced high school and college courses in chemistry. A grant to the University of Illinois provides for experimentation with the use of films in presenting demonstration classes on new approaches to the teaching of elementary school mathematics.

Scientific Manpower Program

The Scientific Manpower Program is responsible for carrying out those functions of the National Science Foundation Act which require the maintenance of a register and clearinghouse of information on scientific and technical personnel. Through this program the Foundation makes available information on the Nation's resources of scientific and technical personnel, both for the purpose of administering its own programs and for the provision of information as required by other agencies concerned with science-oriented programs. In addition to providing information on the Nation's collective resources of scientific manpower, the Register program makes possible the location and identification of individuals with specialized skills when needed for important Governmental purposes, including mobilization.

The National Register of Scientific and Technical Personnel

On January 1, 1953, the National Science Foundation formally established the National Register of Scientific and Technical Personnel, which is the only comprehensive program for registration of the Nation's scientists. Information on more than 127,000 scientists was collected by the National Register during 1954–55.

Scientists were recircularized during 1956–58 and the National Register for that period includes information concerning some 170,000 scientists. In addition, a "finder's list" is maintained which includes about

20,000 engineers representing different geographical areas and engineering specialities.

During fiscal year 1960 the principal activities of the National Register were directed toward: (1) preparing a report covering the collection, tabulation, and analysis of data which was submitted to the House Committee on Science and Astronautics in "A Study of Scientific and Technical Manpower"; (2) analyzing the data collected and issuing a summary report, "Salary Profile of Scientists in the National Register of Scientific and Technical Personnel, 1956–58"; (3) servicing requests for Register information from industry, the scientific community, Government agencies, etc.; (4) developing questionnaires, revising specialty lists, and coordinating cooperating society operations for the recircularization of registrants according to the two-year cycle plan; and (5) coordinating the actual mailings to the scientific community.

A Study of Scientific and Technical Manpower

In response to a request from the House of Representatives Committee on Science and Astronautics, the National Science Foundation submitted, in January 1960, a comprehensive report covering (a) the status of the scientific and technical manpower register and the Foundation's manpower studies, and (b) the projected plans for the future, short-range and long-range, in these areas.

The report in summary made the following points concerning the National Register:

1. Approximately 90 percent of scientists in fields now considered of mobilization importance should be registered.
2. Certain applied and other science fields should be covered as they, in turn, are deemed important for this purpose.
3. Substantive information on employment and professional characteristics will be brought up to date at no longer than two-year intervals. Methods will be sought to maintain current addresses within one year.
4. Registration should be on a voluntary basis during peacetime. In a mobilizing situation, however, registration of scientists should be geared into other more comprehensive registration programs, some or all of which may be mandatory.
5. In view of the complexities of registering engineers, based on diverse training, types of jobs held, and the large number of engineers in the country, the Foundation has turned to the engineering profession to study this problem. The need for better information on numbers and professional characteristics of engineers is not questioned.

Salary Profile of Scientists in the National Register of Scientific and Technical Personnel, 1956–58

Salary information was published on some 137,000 full-time employed scientists, comparing fields of specialization, type of employer, work activity, level of education, and age group. The median annual salary for scientists employed full-time during the years 1956–58 was about $7,900. About 50 percent were in fields of chemistry and in life sciences, which include agricultural, biological, and medical sciences. Almost half the registrants worked for private industry or were self-employed; 28 percent were employed by educational institutions, and 19 percent worked for various Government agencies. Thirty-eight percent of the scientists reported that they were engaged in research, development, and design, and 16 percent reported that they were engaged in teaching.

Table 4.—*Median annual salaries of full-time employed scientists, by field, 1956–58*

Scientific and technical fields	Number	Salary
Total, all fields	136, 808	$7, 938
Agricultural sciences	9, 479	6, 625
Biological sciences	17, 616	6, 934
Medical sciences	1, 838	10, 873
Psychology	10, 938	6, 856
Earth sciences	12, 767	7, 975
Meteorology	2, 104	6, 924
Geography	965	6, 762
Mathematics	9, 866	7, 638
Astronomy	354	7, 400
Physics	12, 450	8, 462
Chemistry	34, 860	8, 660
Chemical engineering	4, 759	10, 219
Sanitary engineering	3, 330	8, 465
Other engineering	12, 836	9, 069
Other specialties	2, 646	7, 359

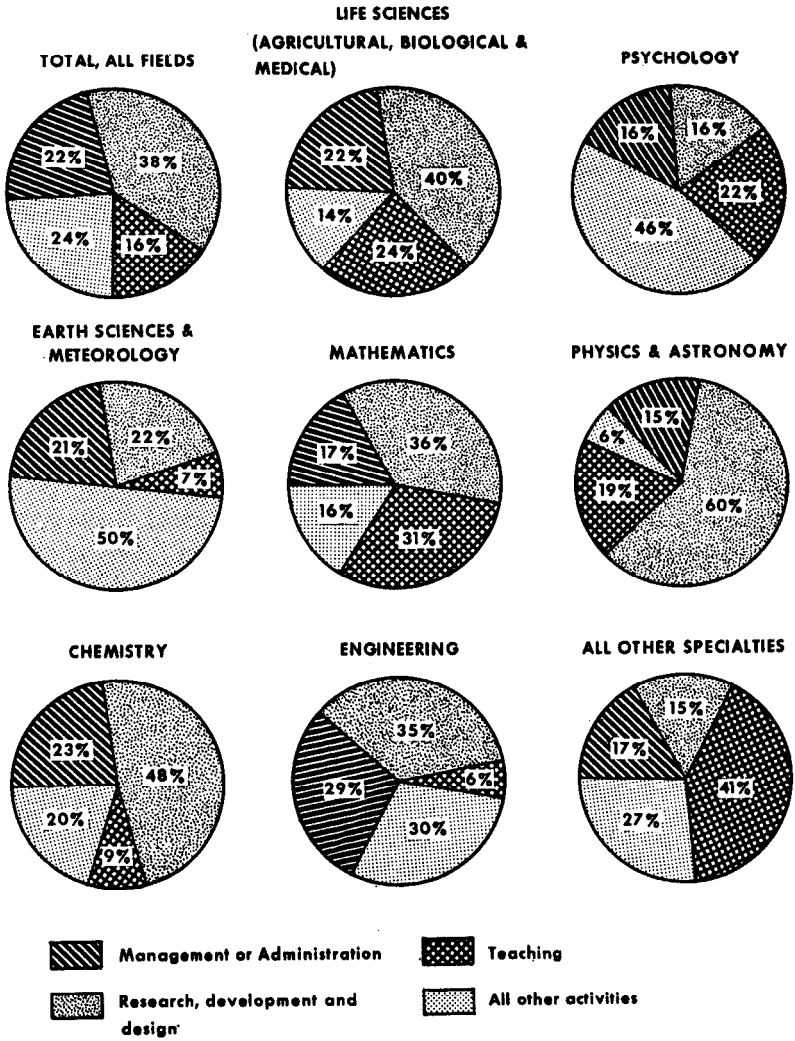
NOTE: Excludes 3,057 who gave no report of salary.

Source: National Register of Scientific and Technical Personnel, 1956–58.

Examples of Register Information Supplied During 1960

Register information on the professional and economic characteristics of U.S. scientists is made available to meet the needs of Government agencies and private organizations. In addition to the publication of Register materials, a number of special-purpose tabulations have been prepared. Generally, the Foundation makes available information in the form of statistical summaries. Individuals are identified only where

Figure 3. ***Field of Science and Work Activity of Full-Time Employed Scientists.****



Source: National Register of Scientific and Technical Personnel, 1956–1958.

* Total of 139,865 Scientists

S-17

an urgent need exists, where other sources cannot be used, and when it is in the national interest.

Information from the Register supplied in 1960 included: identification of top-level physicists with knowledge of the Japanese language; salary information on psychologists, pharmacologists, pharmaceutical chemists, hydrobiologists, and oceanographers; identification of physi-

cists with optical specialities and foreign language ability; educational background of geneticists and professional characteristics of other selected biological scientists; identification of poultry science specialists; professional characteristics of astronomers; information on age distribution and doctoral degrees held by scientists in a number of sub-fields of experimental biology; and extent of foreign language proficiency of geologists.

1960–61 National Register Program

The Foundation obtains its data through contracts with eight professional scientific societies, each of which is responsible for a specific area of coverage of information required for the National Register. The eight contractors work with, and through, about 200 specialized societies which obtain registrations under common standards established by the Foundation. The scientific societies circularize individual scientists, members and non-members alike, to insure the most complete coverage possible. Cooperating societies include the American Chemical Society, American Geological Institute, American Institute of Biological Sciences, American Institute of Physics, American Mathematical Society, American Meteorological Society, American Psychological Association, and Federation of American Societies for Experimental Biology. The U.S. Public Health Service cooperates in the registration of sanitary engineers; the U.S. Civil Service Commission in the maintenance of a roster of selected Government scientists and engineers.

During the spring of 1960 the scientific societies and the Public Health Service mailed out the revised questionnaire and specialties list. Some 350,000 questionnaires were mailed and it is anticipated that a total of 250,000 scientists will be registered by the end of calendar year 1960.

The task of coding, editing, and IBM processing about 100,000 questionnaires is scheduled for completion by the fall of 1960. This information will permit the National Register to develop current data relating to the Nation's supply, training, utilization, and general characteristics of scientific and technical personnel, and issue a preliminary report by the end of calendar year 1960. Processing of all questionnaires received will continue into 1961, and current plans are to prepare a final report of the data in the 1960 National Register by the end of calendar year 1961. Additional reports, as appropriate, will be prepared from data in the National Register.

Scientific Manpower Studies

The Scientific Manpower Studies activity is a part of the Foundation's function of providing ". . . a clearinghouse of information covering all scientific and technical personnel . . ." This program is directed toward meeting the scientific manpower information needs of Government

agencies, private organizations, and the public generally. Data on the supply, demand, education, and characteristics of the Nation's scientific and technical personnel resources are provided through published materials and through special studies, memoranda, etc. The Scientific Manpower Studies activity is the central program in the Federal Government for the provision of these types of material.

The program in fiscal year 1960 was concentrated on three general areas of study: improvement of basic data, demand studies, and scientific manpower in foreign countries. Funds provided to other Government agencies, universities, and research organizations have made it possible to initiate studies to improve information in these areas.

Manpower Studies Underway

Among the more important specific studies either initiated this year, continued as part of a series, or still underway from previous years are the following: surveys of scientific, engineering, and technician employment in private industry (see table 5 for some of the results of the 1959 industry survey), State governments, colleges and universities, and the Federal Government; a pilot survey of the employment of scientists and engineers in local governments; studies of students enrolled for advanced degrees; a survey of nonacademic mathematical employment; a methodological study of the identification of scientific and technical occupations in industry; pilot studies of the demand for scientists and engineers in the chemical and electrical equipment industries; a follow-up study of college graduates of June 1958 to determine employment and advanced training patterns; an analysis of the characteristics and employment plans of science doctorates of 1959; a study of high school backgrounds of doctorates of 1958; a registry of high school teachers of science and mathematics; a survey of Federal support of science education; a study of distinguishing characteristics of scientists and nonscientists; a study of professional manpower in Communist China; a revision of a study on Soviet professional manpower; and a followup study of engineers and related occupations from census population sample surveys.

These projects conform to the general series of studies recommended in *A Study of Scientific and Technical Manpower,* previously mentioned, and in the Foundation's report, *A Program of National Information on Scientific and Technical Personnel.* This latter report led to the designation of the Foundation to act as a "focal agency" for the coordination of studies of scientific manpower within the Federal Government. During the past year the Foundation has acted in this capacity in conjunction with studies of several Federal agencies and is appointing an Interagency Advisory Council in connection with this coordinating responsibility.

Table 5.—*Scientists and engineers in industry, by function and occupational group, January 1959*

Occupational group	All scientists and engineers	Scientists and engineers primarily engaged in					
		Research and development	Management and administration of		Exploration	Production and operations	All other activities
			Research and development	Other activities			
All groups	764, 100	236, 800	40, 300	65, 200	14, 300	294, 000	113, 500
Engineers	615, 400	174, 800	30, 800	57, 000	2, 700	255, 100	95, 100
Chemists	71, 500	33, 900	5, 000	3, 600	200	22, 500	6, 300
Physicists	14, 900	11, 200	1, 500	200	100	1, 400	500
Metallurgists	11, 400	4, 100	1, 100	1, 200	(1)	4, 400	500
Geologists and geophysicists	14, 800	600	200	1, 000	11, 000	1, 700	300
Mathematicians	11, 300	6, 200	700	500	100	2, 500	1, 300
Medical scientists	7, 000	900	200	200	(1)	2, 200	3, 500
Agricultural scientists	5, 600	1, 200	300	300	(1)	2, 100	1, 600
Biological scientists	5, 500	3, 200	400	200	100	900	900
Other scientists	6, 600	400	200	1, 100	(1)	1, 400	3, 500

[1] Less than 50 cases.

NOTE: Totals have been calculated on the basis of unrounded figures and therefore may not correspond exactly with those indicated by the rounded figures shown.

Source: Scientific and Technical Personnel in American Industry—A report on a 1959 survey (NSF–60–62).

Manpower Studies Published

Comparison of U.S. and U.S.S.R. Science Education—During the hearings on fiscal year 1961 appropriations before the Subcommittee on Independent Offices of the Committee on Appropriations of the House of Representatives, Foundation representatives were asked to provide a series of reports comparing science education in the United States and Soviet Union. This material was published as a part of the congressional hearings on the Foundation's fiscal year 1961 budget.

The following are among the major findings of this report on U.S. and U.S.S.R. education:

(1) A total of 46 million students are enrolled at all levels of formal education in the United States, and 36 million in the U.S.S.R. At the higher educational level there are nearly 3½ million enrolled in the United States and only 2.2 million in the U.S.S.R. As of 1959, about 8.3 million persons in the United States had graduated from college compared with about 3.7 million persons in the U.S.S.R.

(2) Higher education in the U.S.S.R. emphasizes engineering, science, and medicine; most diplomas are granted in these fields. Less than a quarter of the baccalaureates awarded in the United States are earned in these fields. Nearly one-third of the Soviet baccalaureates are in engineering, compared to about one-tenth in the United States.

(3) The U.S.S.R. currently has nearly 1 million professionally trained engineers, typically with at least a 5-year engineering-institute diploma. Engineers in the United States numbered about 850,000 in 1959, and perhaps a third or more of them did not possess a formal academic degree. Currently the U.S.S.R. is outproducing the United States in engineering graduates at a rate of approximately 3 to 1.

(4) Scientists and research scholars are developed in both countries through an exacting course of training at institutions of higher education. At the present time the United States has more than 135,000 persons who have earned a doctorate. In the U.S.S.R. there are nearly 105,000 persons with similar advanced degrees. About half of the U.S. doctorates are degrees in the natural sciences and engineering, while in the U.S.S.R. more than three-quarters are in science and engineering. Currently, the United States is awarding about 9,000 doctorates annually with about half in science and engineering. Annual production of similar degrees in the U.S.S.R. is now about 5,000 with about three-quarters in the sciences or engineering. (See figure 4.)

(5) Women represent a substantial proportion of the work force in both countries, particularly in the professional occupations.. About two-thirds of the women professionals in the United States are teachers or nurses. In the U.S.S.R. education and medicine also account for about

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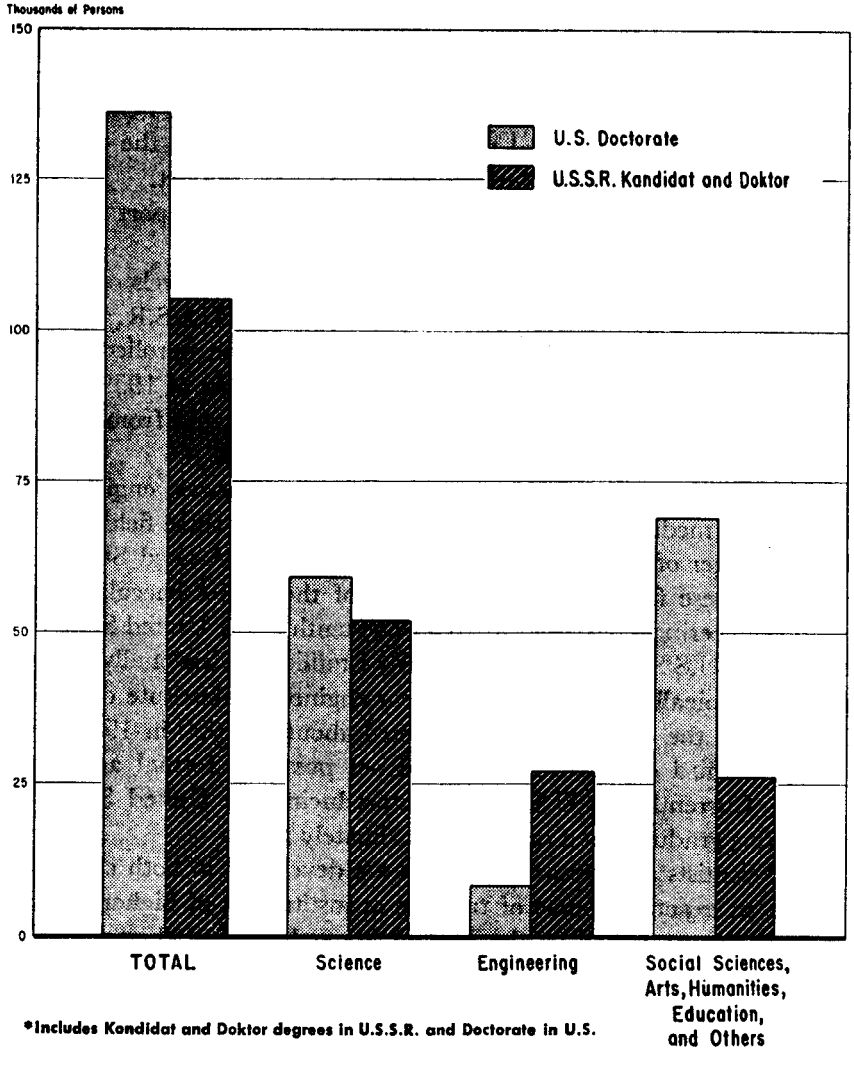
Figure 4. ***Estimated Number of Advanced Degree Holders,* 1959, United States and U.S.S.R.***



*Includes Kandidat and Doktor degrees in U.S.S.R. and Doctorate in U.S.

two-thirds of the professionally employed women. However, in the U.S.S.R. about 16 percent of these women are in engineering and they represent nearly one-third of the total in the occupation. Less than 1 percent of U.S. engineers are women.

Scientific Manpower–1959—Papers presented at the Eighth Conference on Scientific Manpower, held in conjunction with the annual meeting of the AAAS meeting in Chicago, December 1959. The conference theme was "Higher Education and Training in Emerging Fields of Science and Technology."

Statistical Handbook on Science Education.—A compilation of data on education, in general, and science and engineering education, in particular. This report is divided into three parts: the first is concerned with human resources data such as enrollments at all levels of education, degrees granted, number of teachers and faculty; the second with institutional, facility, and financial data such as number of schools, value of property, expenditures and income of institutions, and student support; and the third consists of appendix tables which contain more detailed information on the first two sections.

In addition, organizations which have received Foundation support for their manpower activities have released several reports, including "Identification of Scientists and Technical Personnel," by Surveys and Research Corporation, Washington, D.C., and "The Science Doctorates of 1958 and 1959, Their Numbers, Background, and Employment," by the National Research Council, Washington, D.C.

DISSEMINATION OF SCIENTIFIC INFORMATION

The fundamental purpose of the Foundation's program for the dissemination of scientific information is to make the results of research more readily available to scientists and engineers throughout the country. The Foundation, through its Office of Science Information Service (OSIS), is directing its efforts toward: (1) improving present scientific information services through the use of known and tested procedures, and (2) promoting a national research program for developing new techniques for handling information. As a part of this effort, NSF vigorously fosters increased cooperation and coordination among organizations active in this area, both within and outside of the Federal Government.

Program responsibilities cover four general subject areas: documentation research, foreign science information, scientific publications, and research data and information services. During fiscal year 1960, 184 grants and contracts totaling $4.8 million were awarded for these activities.

Coordination of Scientific Information Activities on a National Basis

Fiscal year 1960 marks the first full year of operations since assignment, by Congressional Act and Executive Order, to the Foundation of responsibility for national leadership in the scientific information field. The Foundation has taken steps to implement fully its role as coordinator of information activities throughout the country. This has involved the constructive evaluation of existing systems and practices for the dissemination of scientific information—providing support where necessary—and the development of solutions to problems through cooperation and coordination of the agencies and organizations concerned. The Foundation has supported and participated in an increasing number of meetings of representatives of Government and professional and private

groups throughout the country aimed at improving the effectiveness of information services in the various fields of science.

The Science Information Council, established by the Foundation in December 1958, has advised and made recommendations to NSF on a broad range of scientific information problems. It is composed of representatives of private industry, education, professional societies, Government, and others concerned with information problems.

Coordination Within the Federal Government

Considerable emphasis has been placed on closer coordination of scientific information activities of Federal agencies. In the first year since its establishment, the Federal Advisory Committee on Scientific Information (FACSI) has served as an effective forum for the discussion of common problems and as a mechanism for coordinating plans and suggestions for the improvement and expansion of agency programs for the dissemination of scientific information. (Membership consists of senior members of 17 Federal agencies, with significant scientific information programs.) In the translations area, for example, an ad hoc committee has worked effectively to develop the P.L. 480 program for the translation, overseas, of important foreign scientific literature requested by Government scientists.* Also related to the translation problem have been efforts during 1960 to coordinate the administration of mechanical translation research activities sponsored by several Federal agencies. This resulted in the formation of an Interagency Committee on Mechanical Translation Research. These two committees are part of the overall FACSI structure.

The full Federal Advisory Committee has participated in such matters as the development of a Federal policy for the support of non-Government publications, and the planning and operation of a program for obtaining cost data concerning scientific information activities of Federal agencies to help identify the size and scope of information activities within the Government.

Other interagency efforts illustrative of the coordinating role of the Foundation have included the convening of meetings of representatives of those agencies conducting scientific information programs in Latin American countries as a preliminary step to the possible development of a Governmentwide program in Latin America. Similarly, the Foundation has held interagency meetings to discuss the coordinate Government

* The Agricultural Trade Development and Assistance Act of 1954 (P.L. 480) as amended in 1958 permits financing of the overseas translation program with foreign currencies credited to the United States from the sale of surplus agricultural commodities abroad.

support of those abstract journals of special interest to the programs of one or more agencies.

Cooperation Among Private and Professional Organizations in the United States

In the field of scientific abstracting and indexing, support has been made available to the National Federation of Science Abstracting and Indexing Services (NFSAIS) in its efforts to coordinate and improve the work of organizations engaged in this field. In fiscal year 1960, such activities have included the preparation of a Bibliography of U.S. Abstracting and Indexing Services which has been compiled by the Library of Congress with the advice and assistance of the National Federation. The final list, which includes about 500 services, was published by the Federation in June 1960. Knowledge of the individual services will make it possible to effect cooperation on a wider, more comprehensive scale. Now under preparation is a union list of periodicals covered by member services of the Federation which will make it possible to identify gaps in coverage of important literature and also assist scientists to locate information more readily. In a third area of activity, the Foundation has enabled Federation representatives to visit the Soviet All-Union Institute of Scientific and Technical Information. All phases of the operations of the Soviet and United States abstracting systems were considered, as well as the possibility of exchanging materials and other cooperative measures.

In the area of foreign science information, for example, NSF has sponsored a working conference of officers and editors of 28 professional societies and academic institutions which administer the translation and publication of important Soviet journals. The Foundation has sought particularly to stimulate interest on the part of societies to develop new or improved approaches to making available significant foreign science literature.

The Foundation has been devoting particular attention to the stimulation and support of discipline-wide studies of communication patterns and problems which could lead to fundamental solutions of information problems in all areas of science. This has involved meetings and close working relationships with representatives of the American Institute of Biological Sciences, the American Institute of Physics, and the American Chemical Society. Recently, discussions have also been held with organizations in the earth sciences and psychology fields concerning the undertaking of discipline-wide investigations of their information and publication problems.

Finally, in order to further cooperative activity between Government agencies and private organizations, the Foundation has undertaken separate actions designed to strengthen professional activities and representation in the field of documentation. In the first instance, the Foundation has supported the establishment of the Office of Documentation within the National Academy of Sciences-National Research Council. This Office provides advice on documentation to Government and private groups, serves as a focus in the United States for international documentation activities, and acts as a mechanism for U.S. participation in international meetings. In the second instance, the Foundation has assisted the American Documentation Institute, the leading organization and spokesman for documentation in the United States, to establish a full-time professional secretariat. This action will enable the Institute better to provide leadership, professional representation, and exchange of information in the field of documentation.

International Cooperation

The purpose of Foundation activities on the international level has been to bring about more effective cooperation among national and international organizations concerned with scientific documentation, and to stimulate international cooperation where this is likely to be more effective or economical than national action. To this end, NSF has been cooperating with various international bodies including the International Federation for Documentation (FID) and the Abstracting Board of the International Council of Scientific Unions (ICSU). NSF has also worked with the European Productivity Agency in studying means for establishing a European Translations Center.

A study of scientific information activities of international organizations is in preparation by the Library of Congress under a grant from the Foundation.

Scientific Information Notes

National and international developments in the dissemination of scientific and technical information are reported in *Scientific Information Notes,* published bi-monthly by the Office of Science Information Service. This journal (originally entitled *Science Information News*) is serving effectively as a vehicle for the exchange of information among groups working in the field.

Documentation Research

The Foundation objective in this area is to stimulate and support both the improvement of existing methods and the development of new methods for handling scientific information. In this context, informa-

tion handling includes analysis of the content of scientific publications, selection of significant information for abstracts and index data, coding for storage and retrieval, searching for stored information, identification of information for selective dissemination, and automatic translation from one natural language to another.

The major current trend in documentation research is the growing concentration on development of ways of using machines to store and search information and to process automatically the language of documents for information retrieval and translation.

Use of Mechanical Aids

Serious research on ways to use machines to supplement human skills in organizing and searching large volumes of information began about a decade ago and has proven to be an extremely complex and difficult problem. Research tasks in this area require the combined talents and insights of linguists, mathematicians, logicians, computer engineers and programmers, librarians, and other information specialists. Rising interest in the possibilities of mechanized information handling has resulted in expansion of the research effort. Projects which received NSF support during 1960 include the following:

1. A large-scale test program at Western Reserve University for evaluating mechanized procedures developed for the automatic processing and searching of metallurgical literature.
2. At Chemical Abstracts Service, a program on mechanization of processing and searching of chemical information, including research on the semantics of chemical literature.
3. A program to investigate the organization of large files of information with a multi-level structure and self-organizing capability at the Electrada Corporation.

Other active NSF-supported projects in this area include mechanized linguistic analysis of scientific texts and identification of significant words and phrases for indexing and abstracting (University of Pennsylvania), systematization and mechanization of the operations of information searching systems and development of a normalized language (ITEK Corporation), and comparative studies of various indexing and classification systems (Association of Special Libraries and Information Bureaux and the National Book League of England, and Herner and Company of Washington, D.C.).

Mechanical Translation

With respect to research on mechanical translation, the Foundation is supporting two types of projects: (1) those concerned with developing

workable automatic procedures for translating foreign languages, and (2) those designed to provide better understanding of languages and of the basic problems of translation. One of the principal problems in mechanical translation is the lack of sufficiently precise knowledge about language to permit the preparation of machine instructions for dealing with syntactic structures and semantic choices.

The goal of research in mechanical translation is the eventual automatic production of translations from one language into another. This research may also contribute significantly to the development of procedures for automatic linguistic analysis for other purposes, such as automatic indexing and abstracting and mechanized search systems.

During 1960, Foundation-supported research on mechanical translation was expanded by a grant to the University of Washington for research into the lexicographical and structural problems of the Chinese language.

Continuing activities supported by grant include research on new logico-mathematical methods for the analysis of languages for machine translation (Cambridge Language Research Unit, England); also research on automatic translation of Russian into English (Harvard University and University of Cailfornia) and German into English (Massachusetts Institute of Technology).

Patterns of Scientific Communication

Precise, objective knowledge of the information needs of scientists is being sought as the basis for improving the dissemination, organization, and use of scientific information. Such findings should be helpful in designing information storage and retrieval systems of the utmost utility and service to scientists.

During the past year a *Review of Studies in the Flow of Information Among Scientists,* prepared for the Foundation by the Bureau of Applied Social Research, Columbia University, was made available. This report discusses completed studies and various methods used for gathering data, synthesizes the findings wherever they are at all comparable, and suggests other approaches that seem feasible and promising.

The Case Institute of Technology was given a grant to determine the feasibility of developing measures of the value of recorded scientific information and of the productivity of scientists in terms of the new information their work produces.

Research Information Center and Reviews of Documentation Research

Continued support was provided for the maintenance of the Research Information Center and Advisory Service for Information Processing,

which had been established the year before at the National Bureau of Standards. The Center collects all publications and reports pertaining to research on the processing of information expressed in language and other nonquantitative forms, such as photographs and circuit diagrams; and from time to time it prepares and issues background or state-of-the-art papers on particular research areas. In addition, the Foundation let a contract to Documentation, Inc. for a thorough state-of-the-art survey of coordinate indexing which makes use of individual indexing terms or short compound terms that are combined during a search. The study will cover operating experience, research and experimentation, and unsolved problems; it will include discussion of the various refinements devised to enable this type of indexing to handle relationships of various kinds among terms.

Publications on Documentation Research

The fifth and sixth in a series of descriptive reports entitled *Current Research and Development in Scientific Documentation* were published in October 1959 and May 1960. This semiannual report describes research and development projects under way in the United States, as well as foreign projects on which information can be obtained. An important feature of the latest edition is a new section describing research on problems not immediately connected with scientific documentation, but whose solution is likely to have an impact on the future of information handling. It covers selected work in automatic programming, pattern and speech recognition, linguistic analysis, and artificial intelligence.

Descriptions of some 50 technical information systems were published in *Nonconventional Technical Information Systems in Current Use,* No. 2, September 1959, and its March 1960 supplement. This publication describes systems which embody new principles for organizing subject matter or which employ automatic equipment for information storage and search, or for preparation of indexes.

Foreign Science Information

In the foreign science area the Foundation reinforces efforts of American scientists to learn about research activities going on in all countries and to obtain the results of research published in all languages. Although formidable problems still remain, in recent years there has been a significant increase in the amount of source and translated material available to U.S. scientists.

Translations

Stimulated largely by NSF's program, total U.S. and Western efforts in translation now cover some 5 percent of all Russian scientific and

technical journals. The Foundation, through scientific societies for the most part, supports the translation, in whole or in part, of 45 Russian journals. Other Federal agencies, foreign government organizations such as the Department of Scientific and Industrial Research in England, and certain private firms in this country have combined to make it possible for U.S. scientists to choose from 85 translated Soviet journals in various scientific fields.

There has also been a correspondingly larger output of selected article translations by private organizations. The availability of these items has been improving with the expansion of operations of the Special Libraries Translation Center, supported in part by the Foundation and by the Office of Technical Services of the Department of Commerce.

In addition to the increased availability of translations, there has been a marked growth in recent years in the volume of research journals published abroad, a large part of which normally flow to the United States. For example, in the Soviet Union alone some 300 new scientific journals have been published in the last 5 years. Similarly, this period marks the publication of 100 primary scientific journals in Communist China.

Importance of Foreign Scientific Literature

Stimulation of the broadening interest in foreign scientific literature has been a long term process. In part, this has resulted from Foundation initiative in granting funds for projects, such as cover-to-cover translations, travel to international meetings, or support for international conferences. Of equal importance has been the feedback to professional societies which has led to their growing interest in the problem.

Examples of this activity in 1960 include:

1. The American Mathematical Society which has received Foundation support for several years for translating Soviet mathematical material. The Society, with NSF support, is now studying the quality of mathematical research in China, Japan, and East Central Europe, in addition to the Russian translation work.

2. The American Institute of Biological Sciences (AIBS) which translates seven Soviet biological journals under grants from the Foundation. As a result of this experience and with Foundation aid, the AIBS sent representatives to the Far East to determine the kind of biological research now underway. The committee members are seeking ways to effect better communication and interchange of information with the Asiatic countries.

3. American Rocket Society representatives who contacted Japanese scientists at an international conference in Europe and completed arrangements to obtain English versions of Japanese

astronautical reports for publication in the Society's journal. U.S. material is being sent to Japan in exchange.

Professional Society Survey of Foreign Scientific Literature

Foreign scientific literature now available, much in translation, provides evidence of the quality of the research underway throughout the world. As a result of stimulation and support by the Foundation, a number of professional societies are now undertaking surveys of those countries whose research effort is little known in the United States and whose languages are understood by few Americans. These surveys should provide guidance as to the advisability of expanding the translations program to include scientific journals of these countries.

Other Approaches

In November 1959, NSF sponsored a working conference of officers and editors of 28 professional societies and academic institutions translating Soviet journals to discuss means for improving the dissemination of translated journals among U.S. scientists. The Foundation also sought to stimulate interest on the part of the societies in developing other approaches in addition to cover-to-cover journal translations. Emphasis was placed upon selective translation, critical reviews, and state-of-the-art papers.

Discussions have been held with members of the Science Council of Japan concerning the possible publication in English of outstanding Japanese scientific periodicals in such fields as theoretical physics, astronautics, genetics, and virology. A grant was made to the National Diet Library to prepare an English version of the *Index to Periodical Articles, Natural Sciences Section* which will list virtually all scientific publications issued in Japan. The journal, published quarterly, will hereafter appear monthly.

The Foundation made available reviews of mainland Chinese science for publication in appropriate U.S. scientific society journals, including the reprint of a comprehensive review of Communist Chinese science published as a supplement to *Science News Letter*. In cooperation with the Association of Asian Studies, the American Mathematical Society, the Social Science Research Council, the Library of Congress, the Department of Agriculture Library, and the Department of Commerce, the Foundation is supporting studies to learn more about Chinese publishing practices, to evaluate their scientific output, to identify the literature already available in the United States, to enhance the availability of such literature, and to assure the translation of significant research results.

In Latin America, the Foundation is developing its information program in close cooperation with the Pan American Union, the Organization of American States (OAS), the National Academy of Sciences-National Research Council, and other Federal agencies. A grant has been made, for example, to the Pan American Union for a cooperative study of the resources, services, and potential for expanding documentation centers in Latin America. Agreement has been reached whereby the Centro de Documentacion Cientifica y Tecnica de Mexico will undertake a comprehensive listing and evaluation of all Latin American scientific periodicals together with an analysis of present publication practices. The Foundation is working with the NAS–NRC Inter-American Scientific Cooperation Committee in developing approaches to the various existing information problems, including the identification of priorities, short-term, and long-term needs. OSIS has explored with several Federal agencies the extent of scientific information programs now being conducted in Latin American countries, together with problems and difficulties experienced and ways and means to bring about needed improvement.

Public Law 480 Translation Activities

An important adjunct to the Government effort to utilize more effectively the results of foreign research is the program of scientific information activities undertaken abroad by Federal agencies using foreign currencies accruing under Public Law 480. Under Foundation leadership, a translation project is underway in Israel and new programs were initiated in 1960 in Poland and Yugoslavia. A total of 31,420 pages of Russian, 9,032 pages of Polish, and 11,500 pages of Yugoslavian scientific material was in the process of being translated and distributed under this program at the end of the 1960 fiscal year.

The significance of this program lies in fostering increased availability of scientific research results to the United States and the rest of the world through close cooperation of scientific and governmental organizations within the countries concerned. Noteworthy has been the assistance of the scientists of Poland and Yugoslavia in calling to the attention of the Foundation the availability of newer and better scientific papers and books other than those which were known to the United States. It is expected that this program will stimulate these countries to publish more of their research results in English. Other countries may be expected to join in this effort.

Studies on Foreign Scientific Information Activities

The Foundation is supporting several studies on the organization and functions of scientific information activities abroad.

The study of scientific information activities of international organizations prepared by the Library of Congress has been extended to cover additional organizations.

A grant for a comprehensive study of the complex science information activities in the USSR was made to the Massachusetts Institute of Technology. This study is to include information on the recent major changes in the industrial information system, the newly formed Council for Cybernetics and its activities related to machine processing of information, as well as other heretofore unknown areas of such activities in the Soviet Union.

To enable U.S. scientists to develop foreign science information programs most suited to their needs and to facilitate exchange of information with their colleagues abroad, the Foundation has taken steps to make available relevant background information on foreign research to the U.S. scientific community. For example, in addition to the survey of mathematics research in Communist China, the Foundation has issued a grant to the American Association for the Advancement of Science for support of a symposium "Science in Communist China," at which state-of-the-art reviews in various fields of science will be presented. Publication of these reviews is expected.

In this connection the directory prepared by the Scandinavian Council of Applied Research listing all research institutions and their publications in Norway, Sweden, Finland and Denmark, will be made available to U.S. scientists by the NAS–NRC under Foundation support.

It is also planned to have an international directory, prepared in Western Germany, updated and translated. This directory contains brief summaries on major research and educational institutions, manpower, and budgets in various countries of the world. The necessary additional work will be done in Germany.

Research Data and Information Services

Through this program, the Foundation has increased its efforts to develop means by which the many specialized data and information service centers in the United States can be coordinated as a national system for serving the needs of the entire science community. Because of the differing requirements for data and reference services and the economic factors involved, emphasis is placed on the improvement of information services in the broad disciplines and technologies which for the most part provide basic sources of information for the highly specialized services.

Science Information Exchange

During the past fiscal year, the Foundation led efforts among Government agencies to establish a Science Information Exchange to collect, correlate, and disseminate information and data about all current research tasks, publicly or privately supported, in the mathematical, physical, engineering, life, and social sciences. It is planned that this new clearinghouse service (SIE) will incorporate present activities of the Bio-Science Information Exchange cooperatively supported for several years by a number of Federal agencies. It will also be administered by the Smithsonian Institution.

Survey of U.S. Data and Reference Services

A contract has been negotiated with the Batelle Memorial Institute to prepare an inventory of specialized information services in the United States with a view to publishing a national directory of the scope and nature of their activities. The results of this survey will be of special interest to planners of new data and reference services and will also assist in promoting the more efficient use of existing facilities.

In the area of critically evaluated data, the Foundation has continued to support the coordinating activities of the Office of Critical Tables of the National Academy of Sciences-National Research Council.

As part of the effort to improve existing services, support has been provided to Chemical Abstracts Service for the study and development of new or modified existing techniques to improve user access and reference to this immense collection of information of interest to chemists and other scientists.

"Unpublished" Information

The program of the Foundation in this area seeks to provide for systematic public announcement and dissemination of all significant unclassified scientific and technological information which is not published promptly in scientific journals and books.

In 1960, support was continued to the Office of Technical Services, Department of Commerce, for expansion of its program for announcing and disseminating Government research reports, particularly those containing basic research information. Foundation support of the Science and Technology Division of the Library of Congress was for the continued expansion of its catalogs and bibliographic records of Government reports. This has permitted the Division's Reports Reference Center to perform more comprehensive literature searches and to provide a higher quality reference service for an increasing number of users.

The Foundation is supporting basic studies to determine the factors

which promote or impede the announcement and publication of information presented orally at meetings and those which influence the availability, announcement, and publication of scientific information contained in unclassified Government reports.

Inventory of Federal Scientific Information Activities

Since 1958, the Foundation has been conducting a survey of Government agencies with scientific information activities to determine the quantity and subject matter of the scientific reports which they issue, the availability of these reports to scientists outside the Government, and the policies and procedures of these agencies with respect to their scientific information programs. The data obtained from this survey are being published in a series of bulletins entitled "Scientific Information Activities of Federal Agencies." The bulletins identify subject areas of agency research and development activities, names and types of information services provided, documents generated, how they are announced, and means for obtaining them. In 1960, three new bulletins were issued, covering the Office of Naval Research (NSF 59–19), The Department of Commerce—Part I (NSF 59–58), and the Government Printing Office (NSF 60–9). Others are in preparation and a contract has been let for continuing this effort during the next year.

Scientific Publications

The Foundation conducts and supports projects aimed at improving the effectiveness of the dissemination of scientific information through publication. Two classes of projects are supported: (1) those aimed at assisting present scientific publishing, and abstracting and indexing services; and (2) those directed toward developing new and improved systems for providing faster, more comprehensive scientific information at the lowest possible cost.

During fiscal year 1960, the Foundation's continuing activities in support of scientific publication resulted in grants to 57 publications of various types. Uses to which these funds were put included: initiating needed new primary journals; assisting existing primary journals to publish cumulative indexes, eliminate manuscript backlogs, and meet other financial emergencies; enabling abstracting and indexing services to expand their coverage; supporting experimental journals; and publishing a number of significant single items which could not be published without subsidy, including monographs, long papers, symposium proceedings, reviews, bibliographies, and data compilations.

The principal trends in scientific publishing evidenced by 1960 fiscal year activities of this program are as follows:

1. Increased interest in finding out more about the existing situation in publishing.

2. Willingness to experiment with new publication techniques and methods.

3. Improvement of U.S. abstracting and indexing of scientific literature.

4. Discipline-wide studies of communications patterns and problems.

5. Coordination of support of scientific publications by Federal agencies.

Situation in Scientific Publishing

Attempts have been made in recent years by individual societies, journals, and disciplinary groups to obtain adequate background and "yardstick" data on scientific communication media in their fields of interest. These attempts, while often useful for individual segments of publishing, have not been comprehensive and inclusive enough to give a sufficiently clear picture of the scientific publishing situation on a national basis.

To remedy this deficiency and provide valuable knowledge for planning purposes, the Foundation in 1959–60 launched a series of national surveys on scientific communication media. Professional scientific societies were studied first, because they publish the majority of research journals. Data were gathered on dues structure, membership, annual meetings, and journal support; a report was published in the fall of 1960. A comprehensive survey of research journals is currently under way and will be followed by studies of scientific symposia and conference proceedings, and scientific monographs. In addition, the publication "climate" in industry is being studied and a report on this source of research publications will be completed in 1961.

Experiments with New Publication Techniques and Methods

Many scientific journals have been published for years in the same format and by the same printing procedures in spite of improvements in printing design, economics, and methods. However, recent publications problems and financial crises have encouraged publishers to consider new publication techniques and methods. Moreover, a few individuals and organizations have been investigating the possibility of different methods for publication, and the publishing of "experimental journals". As an example, *Chemical Abstracts* is receiving support from the Foundation to enable it to experiment with, and publish, a permuted title index to current chemical literature; and in the field of plant taxonomy a pilot project is being supported to permit machine handling of pertinent data

568169—61——10

for plant species so that valuable indexes can be produced that are not feasible with present methods.

Improvement of U.S. Abstracting and Indexing of Scientific Literature

The Foundation, in consultation with scientific societies, existing abstracting and indexing services, and the National Federation of Science Abstracting and Indexing Services, has sought ways to identify gaps in U.S. coverage of scientific literature and to take steps to fill these gaps. Where new services are required, the Foundation has aided their establishment (for example, *GeoScience Abstracts*). In other cases, the Foundation has sought to expand existing services to cover areas of the literature not now included in any U.S. service. During 1960, for example, the Foundation granted additional support to *Biological Abstracts* to continue its expansion of coverage of the biological literature. Discussions with interested scientists, with societies, and with existing services have set plans in motion to expand present services to cover adequately the literature of geophysics.

Other services which have been aided to expand their subject coverage, eliminate backlogs, prepare cumulative indexes, survive financial difficulties, and reorganize certain phases of their operation on a sounder basis include: *Mathematical Reviews, Meteorological Abstracts & Bibliography, Bibliography of Extraterrestrial Radio Noise, Index to the Literature of American Economic Entomology,* and *Annotated Bibliography on Operations Research.*

Discipline-Wide Studies of Communications Patterns and Problems

One of the more promising developments which could lead to fundamental solutions to the publications problems in important areas of science is the increase in discipline-wide studies of communications patterns and problems.

The American Institute of Biological Sciences, recognizing that the field of biology has become one of the most diversified and splintered of all fields of science, is currently planning a long-range study of biology publications problems. Foundation support has been given for an initial feasibility study and it is expected that further support will be needed for the projected major study. In addition, the AIBS, with support and encouragement from the Foundation, has initiated studies into the feasibility of a centralized editorial-business management office at the Institute for a group of biological journals. It is hoped that this study will demonstrate whether professional services can be made available to small journals on a cooperative basis, in cases where journals cannot afford such

services individually, but where the growth of literature has made it difficult for them to continue with only part-time volunteer management by interested scientists.

Although, in the field of physics, the American Institute of Physics has maintained high journal standards for many years, and competently investigated problems as they arose in that field, it launched with Foundation support a needed full-scale study project into physics documentation in general.

The American Chemical Society is continuing to study publications problems arising in chemistry in order that chemists may have the type of literature and source material most required.

Recently, organizations in the earth sciences and psychology fields have expressed interest to the Foundation in undertaking discipline-wide investigations of their publications problems.

Coordination of Support of Scientific Publications by Federal Agencies

The Foundation has held a number of meetings with representatives of other Federal agencies, to discuss and to coordinate Federal support of particular journals (especially abstracting journals) which are of special interest to the programs of one or more agencies. These meetings have concerned such publications as the *Arctic Bibliography, Meteorological Abstracts & Bibliography,* and *Applied Mechanics Reviews.*

In addition, the Foundation has initiated discussions by the Federal Advisory Council on Scientific Information, with a view to developing a Federal policy for the support of non-Government publications.

SPECIAL INTERNATIONAL PROGRAMS

Greater concern with international scientific programs began in 1954 when the Foundation accepted a portion of the responsibility for U.S. participation in the International Geophysical Year 1957–58. The Office for the International Geophysical Year was established in 1955 to carry out Foundation responsibilities in this activity; near the close of the IGY, the name was changed to the Office of Special International Programs.

Many other programs of the Foundation have with growth developed international aspects which are handled through the appropriate division or office.

The Office of Special International Programs has been assigned responsibility for directing the U.S. Antarctic Research Program (see pp. 61 to 66), an outgrowth of the International Geophysical Year, and for initiating and developing cooperative and experimental programs in international science. The Office also provides liaison for the Foundation with international science activities of other Government agencies, which in some cases calls merely for the exchange of information and in others for the recruitment of scientific experts for particular assignments.

International Geophysical Year

The International Geophysical Year (IGY) was an 18-month period extending from July 1, 1957, through December 31, 1958, during which the scientists of 66 nations conducted geophysical observations over the entire globe. Planning and coordination of the world-wide IGY program was carried out by a Special Committee of the International Council of Scientific Unions. The formulation and conduct of the U.S. scientific programs was directed by the United States National Committee for the IGY, established by the National Academy of Sciences as the U.S. adhering body to the International Council of Scientific Unions. The Foundation's responsibility was to obtain and

administer Congressional appropriations for the program, which totaled $43.5 million, and to coordinate the interests of the U.S. Government in the undertaking.

The observational period of the IGY ended with the year 1958. However, by this date the collection of IGY data had only begun, and in fact is still going on; it is estimated that roughly 80 percent of the data is now available in the IGY World Data Centers. The IGY was followed by a program known as International Geophysical Cooperation–1959 (IGC–59) during which geophysical research in certain fields was continued on an international scale. The data from the IGC–59 effort are also being collected in the IGY World Data Centers.

During the past year the Foundation concluded its use of IGY appropriations by making grants for post-observational analysis of the IGY data, principally of an interdisciplinary research nature, and for the work of the IGY World Data Centers to fulfill their responsibilities for the collection, interchange, and publication of the data.

IGY World Data Centers

The three IGY World Data Centers are World Data Center A in the United States, World Data Center B in the USSR, and World Data Center C maintained by eight nations of Western Europe, Japan, and Australia. These Centers will house three complete sets of data, available to the scientists of the world. Copies of the data may be obtained from the Centers at a nominal cost to cover reproduction costs.

World Data Center A is organized into 11 subcenter archives, on the basis of different IGY disciplines, located at various institutions and agencies throughout the United States. A central coordination office for the U.S. World Data Center is maintained by the National Academy of Sciences in Washington, D.C.

All World Data Center A discipline subcenters will issue cumulative six-monthly catalogs in the calendar year 1960, both as an indication of data flow and as a users' index. The coordination office of World Data Center A will publish these cumulative six-monthly catalogs in combined form. Publications based on IGY observational data are being issued under disciplinary-report series by the appropriate archive subcenters and under a general-report series by the coordination office.

Communications regarding IGY data interchange in general should be addressed to: Director, World Data Center A, National Academy of Sciences, 2101 Constitution Avenue, NW., Washington 25, D.C. Inquiries concerning data in specific disciplines should be addressed to the appropriate subcenter listed below:

1. IGY World Data Center A: Airglow and Ionosphere; Cen-

tral Radio Propagation Laboratory, National Bureau of Standards, Boulder, Colo.

2. IGY World Data Center A: Aurora (Instrumental); Geophysical Institute, University of Alaska, College, Alaska.

3. IGY World Data Center A: Aurora (Visual); Rockefeller Hall, Cornell University, Ithaca, N.Y.

4. IGY World Data Center A: Cosmic Rays; School of Physics, University of Minnesota, Minneapolis 14, Minn.

5. IGY World Data Center A: Geomagnetism, Gravity, and Seismology; Geophysics Division, U.S. Coast and Geodetic Survey, Washington 25, D.C.

6. IGY World Data Center A: Glaciology; American Geographical Society, Broadway at 156th Street, New York 32, N.Y.

7. IGY World Data Center A: Longitude and Latitude; U.S. Naval Observatory, Washington 25, D.C.

8. IGY World Data Center A: Meteorology and Nuclear Radiation; National Weather Records Center, Asheville, N.C.

9. IGY World Data Center A: Oceanography; Department of Oceanography and Meteorology, Agricultural & Mechanical College of Texas, College Station, Tex.

10. IGY World Data Center A: Rockets and Satellites; National Academy of Sciences, 2101 Constitution Avenue, NW., Washington 25, D.C.

11. IGY World Data Center A: Solar Activity; High Altitude Observatory, Boulder, Colo.

Annals of the IGY

A comprehensive history of the IGY, including its organizational structure, planning phases, operational aspects, and results, is being published in a series of volumes entitled, *Annals of the International Geophysical Year,* by the Pergamon Press, Ltd., London. The following volumes have been published to date:

Volume I (1959)—Part I, The First International Polar Year; Part II, The Second International Polar Year; Part III, The Inception and Development of the IGY.

Volume IIA (1959)—Parts I–IV, The International Geophysical Year Meetings (first four CSAGI assemblies).

Volume IIB (1959)—Part V, The CSAGI Antarctic Conferences; Part VI, The CSAGI Arctic Conference; Part VII, The CSAGI Regional Conferences; Part VIII, The CSAGI Discipline Conferences.

Volume VII (1959)—Parts I–III, IGY Instruction Manuals

(Part I, World Days and Communications; Part II, CSAGI Guide to World Data Centers; Part III, Arctic Communication).

Volume VIII (1959)—Geographical Distribution of the IGY Stations.

Volume IX (1959)—The Membership and Programs of the Participating Committees.

Future volumes of the *Annals* will include key scientific data in summary working form and results of the program. Present international agreements provide for at least 25 additional volumes of the *Annals*.

Digests of most recent IGY results continue to be issued monthly in the *IGY Bulletin,* published by the U.S. National Committee for the IGY, National Academy of Sciences, Washington, D.C.

Foreign Science Program

During 1960, the activities of the Foreign Science Program have been mainly of a planning and liaison nature. A modest number of grants, however, have been made.

A grant to the National Academy of Sciences is supporting an exchange of scientists between the United States and the USSR, implementing the Bronk-Nesmeyanov Agreement signed in July 1959 between the Academies of Science, of the two countries. The Agreement, which covers a 2-year period, provides for about 40 exchange visits from each side by scientists who will lecture and observe research, plus an indefinite number of invitations to scientific meetings. Arrangements are now under way for visits by 13 Americans and 8 Soviets. Invitations have been sent by the National Academy of Sciences to the Soviet Academy for Soviet attendance at 24 scientific meetings; to date, nine Soviet scientists have attended two of these meetings. The Soviet Academy has arranged invitations for U.S. attendance at two meetings in the USSR. Discussions have begun in connection with the organization of a joint symposium in the field of radioastronomy.

To develop more comprehensive firsthand information on specific areas of science in foreign countries, grants were made to several distinguished American scientists for studies of microbiology in Japan, a review of research in geography in Western Europe, and a study of mathematical activity in Poland. These grants will result in reports that will be useful to the Foundation in its future programming and also may be distributed to U.S. research workers in these fields.

Assistance was provided to a number of outstanding American scientists to attend an international conference in Israel on "Science in the Advancement of New States." Subjects such as what science might do

to bring about the transformation of underdeveloped countries, future possibilities of energy sources, climate control, education and training, and international exchange of information were discussed. Attendance at this conference will serve to increase interest and provoke thought in this area among key American scientists.

International Science Education Program

The primary objective of this program is to strengthen our Nation's total scientific effort through improved programs of science education by providing American scientists and educators with the opportunities to join their foreign colleagues in endeavors that may prove of great value in raising the quality of science education in the United States. At the same time these program activities may result in raising the standards of education in the sciences throughout the Free World.

During fiscal year 1960 the Congress broadened the Foundation Act to authorize international scientific activities, previously centered around a one-way flow directed towards improving education in the sciences in the United States. Beginning in the past year, a number of cooperative programs were entered into or considered in which a two-way flow led to the exchange of ideas and information of great potential benefit to scientists and science educators in other countries, as well as to those in the United States. For example, inclusion of over 70 leading science teachers from abroad in the 1960 NSF Summer Institutes proved of considerable worth to the institutes program. It is expected that these foreign teachers will play key roles in improving science education in their own countries based on the experience gained at the Foundation-supported institutes. Another example of such programs is the extended support of science-curricula survey projects sponsored by international scientific organizations.

In general, the activities of the International Science Education Program are considered to be experimental in design and/or concerned with cooperative programming with international regional organizations or foreign institutions. Considerable attention has been given to assuring appropriate American participation in the ever-increasing number of cooperative projects being undertaken through the Office for Scientific and Technical Personnel of the Organization for European Economic Cooperation (OEEC). Similarly, attention is being devoted to developing and supporting cooperative projects with the science education components of the North Atlantic Treaty Organization (NATO), the Organization of American States, and the Asia Foundation.

Program Activities

During the 1960 fiscal year modest support was offered to projects developed under the three general program categories: curricula development programs, teacher-training programs, and science student programs. A new category—experimental cooperative programs—was initiated during the year.

Curricula Development Program

In conjunction with the serious attention being given to improving secondary school and undergraduate science curricula in the United States, support was given for studies of science subject matter taught in educational systems abroad. Grants were made for studies conducted by recognized American professional groups, in cooperation with foreign scientists and educators, for survey projects undertaken by approved exchange missions under the Lacy-Zaroubin Agreement, for international conferences on science education, and for the translation of foreign educational materials.

Teacher-Training Program

Under this program international cooperative projects were supported that were directed toward the quality improvement of U.S. teacher-training programs. Distinguished lecturers and leading science teachers from abroad participated in 1960 summer institutes. Furthermore, United States representation was assured at OEEC-sponsored teacher-training seminars and conferences. In addition, considerable staff assistance was given to the Asia Foundation in organizing two pilot teacher-training 1960 summer institutes in Pakistan and to the Organization of American States in presenting an experimental science institute in Argentina.

Science Student Program

Through these projects support was provided for science education activities that enabled science students and scholars to participate in international science education programs aimed at keeping them informed of latest scientific knowledge achieved abroad. Foundation support was offered to professional societies to administer a Visiting Foreign Scientist Program under which eminent foreign scientists visited the science departments of U.S. colleges and universities for the purpose of augmenting the quality of the research and educational activities at these institutions. Support was extended to International Special Field Institutes providing scholars and students from various nations with the opportunity to meet and exchange ideas and developments in a special field of scientific interest. The NATO program of advanced-study insti-

tutes has aroused wide interest, and participation of American graduate students and senior scientists was made possible through Foundation travel support.

Experimental Cooperative Program

As its role in international science becomes increasingly important, the Foundation is exploring methods of fostering closer contact between scientists and science teachers in the United States and Latin America. Successful Latin American participation in projects under the three previous general categories has been arranged. A further significant step in this direction was taken during the year. A pilot experimental exchange program, cooperatively supported by the Foundation and the Organization of American States, was planned making it possible for a limited number of U.S. scholars to take part in science activities in Latin America and for Latin American scientists to take part in research and training activities in the United States during the two-year period of July 1960–62. Responsibility for fostering these exchanges of senior staff members has been essentially placed on the institutions of higher learning concerned.

Relationships With International Science Programs of Other Government Agencies

Liaison with Science Officers of the Department of State

The Office of Special International Programs has continued to provide liaison for the Foundation with the science attaché program of the Department of State. At the request of the Science Adviser to the Secretary of State, briefing sessions for newly appointed Science Officers have been arranged prior to their departure for overseas posts in order to acquaint them thoroughly with Foundation programs. The suggestion has been made that Foundation staff members traveling abroad visit the Science Officers in the respective areas, and up-to-date information on the Foundation is furnished the Science Officers through a continuous flow of its publications.

Cooperation with the International Cooperation Administration

In 1957 the Foundation entered into a participating-agency service agreement with the International Cooperation Administration. Under its terms the Foundation agrees to secure, on a reimbursable basis, the services of certain scientific and technical experts for particular assignments in various countries, as requested by the International Cooperation Administration. During 1960 these requested services were for assignments in Indonesia, the Philippines, and Europe.

A science faculty member on leave from Louisiana State University made a comprehensive survey of Indonesian science as consultant to the Council for Sciences at Djakarta, Indonesia, from October to January. A formal report based on the survey was furnished to the Council, which included a critical evaluation of science facilities and activities and recommendations for their improvement under the supervision of the Council.

A similar survey of Philippine science was carried out between February and May by a scientist on leave from the faculty of Yale University as consultant to the Government of the Philippines to assist its National Science Development Board. The initial portion of the survey, completed in 1959, proved so valuable to the Board that the services of the consultant were requested for a second assignment in 1960. These surveys carefully evaluated Philippine science and recommended methods of improvement.

For U.S. representation in the European area, requests were made for experts to participate in meetings called by the Organization for European Economic Cooperation. These meetings related to the work of the two science components of the OEEC—the Applied Research Division and the Office for Scientific and Technical Personnel. Qualified scientists and technical experts drawn from universities, industry, and Government were recruited to represent the United States at various meetings.

THE NATIONAL RESEARCH AND DEVELOPMENT EFFORT, 1953–1960

Background of Survey Program

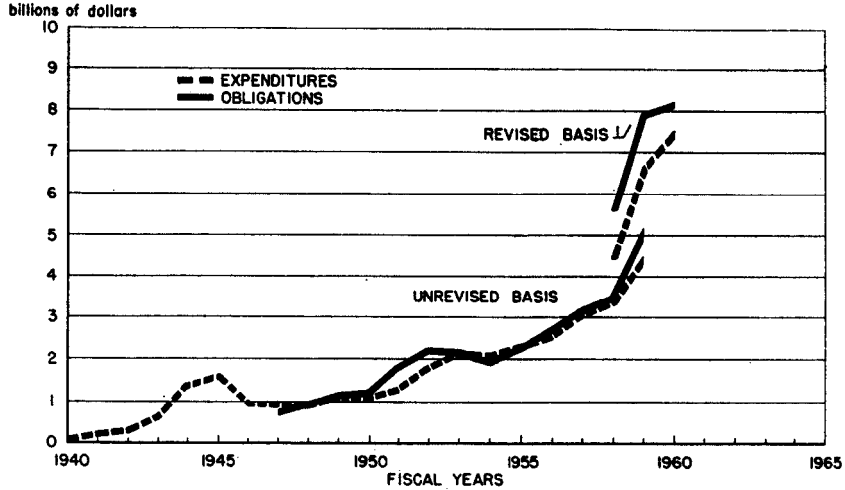
From its inception, the National Science Foundation has been concerned with the measurement and appraisal of the national research and development effort. Prior to the work undertaken by NSF in this field, little had been done. NSF's pioneering studies, conducted by its Office of Special Studies, have provided the first systematic and comprehensive information on the finances of research and development in the United States.

The Foundation began with a study of the Federal Government, and published the results first in 1953 under the title *Federal Funds for Science.* Prior to 1952, the U.S. Bureau of the Budget compiled statistical information on funds obligated by Federal agencies for research and development at colleges and universities. As these statistics became more important as bases for science policy formulation, the Foundation assumed responsibility for their annual compilation. Over the years, the study has expanded so that now *Federal Funds for Science*—an annual publication—includes the entire Federal program for research and development. The most recent issue contains a chart (fig. 5), indicating the trends in Federal expenditures and obligations for the past 20 years.

This initial effort to survey the Federal research and development program brought to light the need for information on the national scientific research and development effort. Further, the President's Executive Order 10521 of March 1954 specifically directed the National Science Foundation "to make comprehensive studies and recommendations regarding the Nation's scientific research and its resources for scientific activities."

A series of surveys begun in 1954 represents the first comprehensive examination of the Nation's research and development effort in terms of both dollars and manpower. Findings of the initial surveys were

Figure 5. *Trends in Federal Research and Development Budget.*



[1] Data based on expanded definition of development. For further details, see technical notes in *Federal Funds for Science VIII. The Federal Research and Development Budget, Fiscal Years 1959, 1960, and 1961.* Washington 25, D.C.: Supt. of Documents, U.S. Government Printing Office, 1959.

NOTE: Data include funds for both conduct of research and development and increase of R&D plant. Pay and allowances of military personnel in research and development included in totals in 1955 and subsequently.

Sources: Bureau of the Budget; National Science Foundation.

published in seven complete reports.[1] They form the basis for a statistical time series and provide benchmark information on the national R&D effort. The total effort is analyzed in terms of four sectors of the economy—the Federal Government, private industry, the colleges and universities, and "other nonprofit institutions."

Dr. George B. Kistiakowsky, Special Assistant to the President for Science and Technology, at the Tenth Anniversary Dinner of the National Science Foundation, May 12, 1960, referred to this phase of the Foundation's interest as follows: "Until the midperiod of the decade, economists had to guess the amount of research and development per-

[1] National Science Foundation. *Funds for Scientific Activities in the Federal Government, Fiscal Years 1953 and 1954* (1958); *Science and Engineering in American Industry. Final Report on a 1953–54 Survey* (1956); *Research and Development by Nonprofit Research Institutes and Commercial Laboratories, 1953* (1956); *Research by Cooperative Organizations. A Survey of Scientific Research by Trade Associations, Professional and Technical Societies, and Other Cooperative Groups, 1953* (1956); *Scientific Research and Development in Colleges and Universities—Expenditures and Manpower, 1954* (1959); *Scientific Research Expenditures by the Larger Private Foundations* (1956). Washington 25, D.C.: Supt. of Documents, U.S. Government Printing Office. *Research Expenditures of Foundations and Other Nonprofit Institutions, 1953–54.* National Science Foundation, Washington 25, D.C.; 1958.

formed within the United States. At that point, the National Science Foundation, on the basis of a thorough survey of the 1953 period pegged the dollar figure for R&D, not at the estimated $2.5 billion, but at more than double that amount—$5.4 billions.[2] Today it has more than doubled again, the Foundation's estimate being on the order of $12 billion."

The 1954 series broke new ground. For the first time, these surveys gave a systematic picture of how much research and development was being done in each of the various fields of science and in each sector of the economy, how much the Nation was spending on research and development, who was footing the bill, who was performing the work, and how many persons were engaged in research and development in each of the sectors and in each scientific field.

Trends in Total R&D Effort

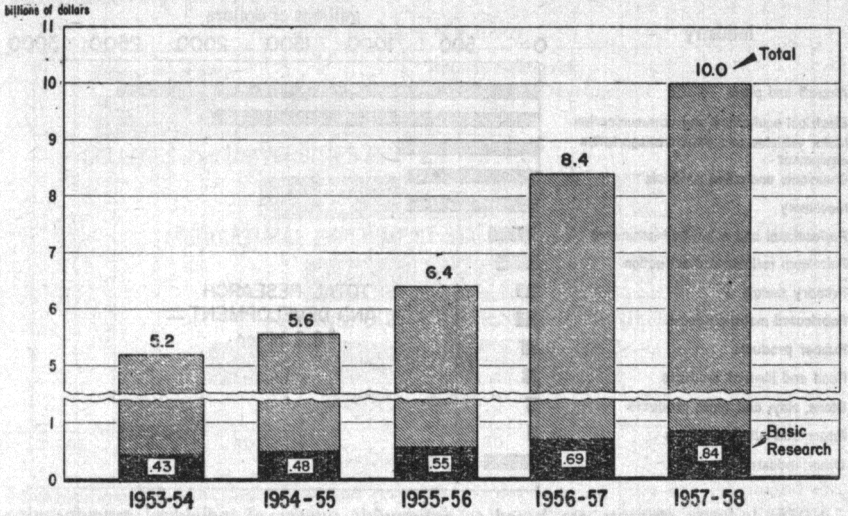
Information provided in the 1954 and subsequent statistical series shows that there has been a rise in current dollars expended for scientific research and development for each year since the first study. The 1958 total, $10 billion, was almost double the $5.2 billion estimated for 1954. Figure 6 shows the totals for research and development and the portions going for basic research for five years beginning with the year 1953–54.

Projected estimates of national totals have been published for the years 1959 and 1960—$11.2 and $12.4 billion, respectively. Figure 7 shows the increase in R&D funds for each year, by sector. The increase in research and development since the base year is primarily owing to a rise of almost 160 percent in the volume of funds used in the performance of research and development by private firms and certain types of related organizations which compose the "industry sector." Funds for performance of research and development by industry rose from $3.6 billion in 1953–54 to a projected $9.4 billion in 1959–60. During the same period, the other three sectors—the Federal Government agencies, colleges and universities, and other nonprofit institutions—also increased their expenditures for the performance of research and development.

These aggregates provide overall trend information. Equally important, however, is the knowledge afforded by each annual survey regarding the activities in each sector. Figures 8, 9, and 10 present the composition of each sector. Figure 8 shows that two industries, aircraft and parts and electrical equipment and communication, performed together 54 percent of the total for the industry sector during 1958.

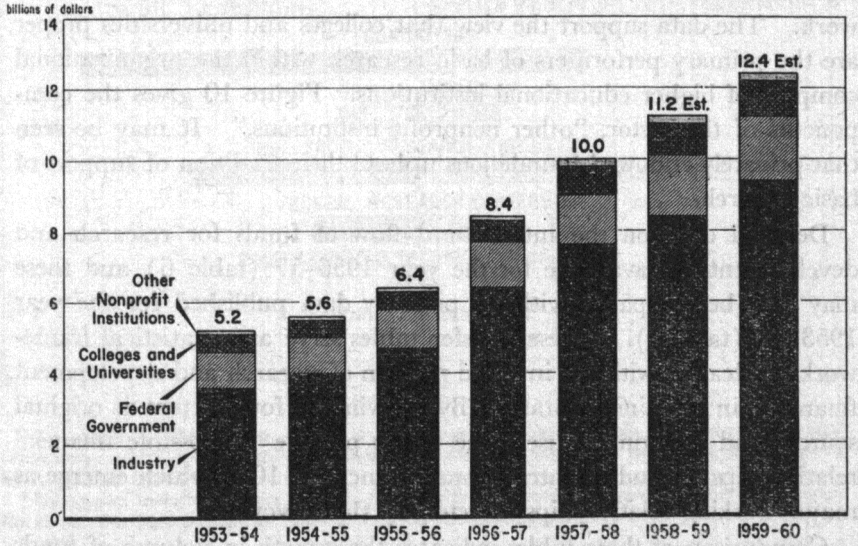
[2] This figure was originally estimated at $5.4 billion but later revision places the 1953–54 estimate at $5.2 billion.

Figure 6. *Funds Used for Basic Research Performance and for Total Research and Development in the United States, 1953–58.*



Source: National Science Foundation, 1960.

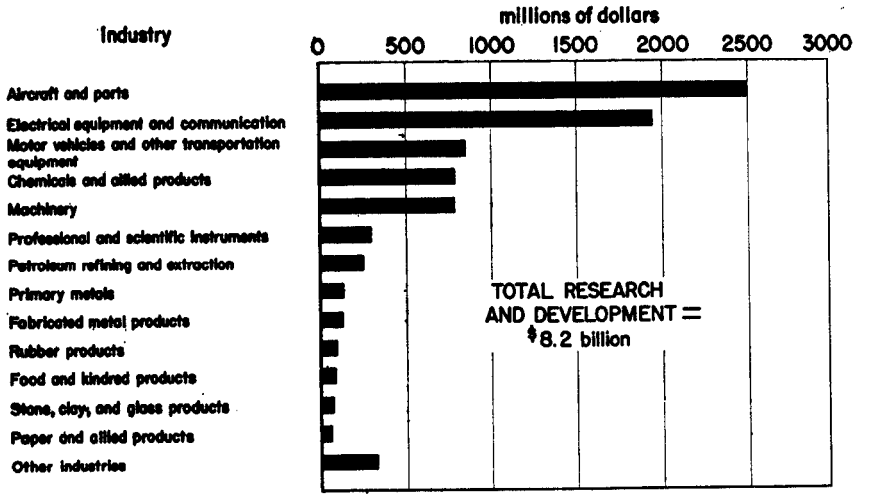
Figure 7. *Funds Used for Performance of Research and Development in the United States, by Sector, 1953–60.*



NOTE: Data on R&D funds for 1956–57 and 1957–58 are revised.

Source: National Science Foundation, 1960.

Figure 8. *Funds Used for Performance of Research and Development, by Industry, 1958.*



NOTE: Industry statistics are based on nationwide surveys of individual manufacturing and nonmanufacturing companies. They include the R&D activities of Federal contract research centers administered by industrial firms, but do not cover certain industry-oriented organizations, such as trade associations, that account annually for an estimated 1 percent of total industrial R&D performance.

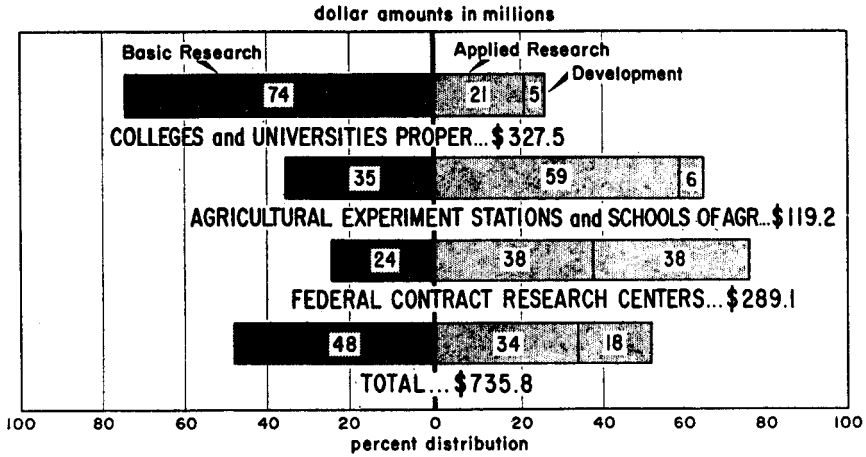
Source: National Science Foundation, 1960.

Figure 9 indicates the analysis of certain research expenditures in colleges and universities, by organizational unit, and by character of the work. The data support the view that colleges and universities proper are the primary performers of basic research within the organizational complex of higher educational institutions. Figure 10 gives the components of the sector, "other nonprofit institutions." It may be seen that privately endowed foundations uphold their tradition of support of basic research.

Detailed data on the intersectoral flow of funds for research and development are available for the year 1956–57 (table 6) and these may now be compared with the primary data published for the year 1953–54 (table 7). These transfer tables serve as a statistical framework for dealing with the involved pattern of research and development financing in the United States. By showing all four sectors as original sources and as ultimate users, the tables provide 16 possible financial relationships (including intrasectoral financing), 10 of which emerge as major working relationships reflected by the surveys.

Comparison of these tables indicates the growth in volume of funds in each sector. The major role of industry as a spender for performance of research and development is highlighted by the magnitude of its

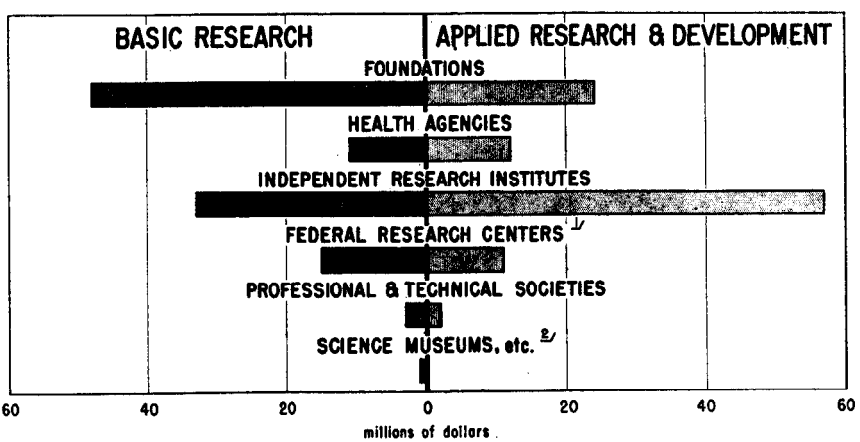
Figure 9. ***Expenditures for Separately Budgeted Research and Development in Colleges and Universities, by Character of Work and Organizational Unit, Fiscal Year 1958.***[1]



[1] Expenditures for separately budgeted research and development form one component of the total for colleges and universities. The remainder is comprised of departmental research and indirect costs of research.

Source: National Science Foundation, 1960.

Figure 10. ***Funds Used for Research and Development, by Type of Nonprofit Institution and Character of Work, 1957.***



[1] For example, RAND Corp., which is an independent organization, Brookhaven National Laboratory, and National Radio Astronomy Observatory, the latter two being administered by Associated Universities, Inc.

[2] This group includes science museums, zoological and botanical gardens, and arboretums. Not shown are $0.3 million for applied research and development.

NOTE: Data are based on reports from organizations in their role as sources or sponsors of research and development.

Source: National Science Foundation, 1960.

569168—61——11

Table 6.—*Transfers of R&D funds, by sector as source and as performer, 1953–54 (revised)* [a]

(Millions of dollars)

Sources of R&D funds, by sector	R&D performers, by sector					Percent distribution, R&D sources
	Federal Government agencies	Industry	Colleges and universities	Other nonprofit institutions	Total	
Federal Government agencies	$970	[b] $1,430	[b] $280	[b] $60	$2,740	53
Industry	.....	2,200	20	20	2,240	44
Colleges and universities [c]	.....	.....	130	.....	130	2
Other nonprofit institutions [c]	.....	.....	20	20	40	1
Total	970	[b] 3,630	[b] 450	[b] 100	5,150	100
Percent distribution, R&D performance	19	70	9	2	100	

[a] Data on sources of funds are based on reports by the performers. This table was published in *Reviews of Data on Research and Development*, No. 16, "Funds for Research and Development in the United States, 1953–59," Washington 25, D.C.: Supt. of Documents, U.S. Government Printing Office, December 1959. For full information, including a discription of each sector, the reader should refer to this bulletin.

[b] Includes funds from the Federal Government for research centers administered by organizations in this sector under contract with Federal agencies.

[c] Data include State and local funds received by these institutions and used for research and development.

NOTE: Percentages based on unrounded figures.

Source: National Science Foundation, December 1959.

Table 7.—*Transfers of R&D funds, by sector as source and as performer, 1956–57 (revised)* [a]

(Millions of dollars)

Sources of R&D funds, by sector	R&D performers, by sector					Percent distribution, R&D sources
	Federal Government agencies	Industry	Colleges and universities	Other nonprofit institutions	Total	
Federal Government agencies	$1,280	[b] $3,200	[b] $380	[b] $70	$4,930	59
Industry	.....	3,180	20	30	3,230	38
Colleges and universities [c]	.....	.....	170	.....	170	2
Other nonprofit institutions [c]	.....	.....	30	40	70	1
Total	1,280	[b] 6,380	[b] 600	[b] 140	8,400	100
Percent distribution, R&D performance	15	76	7	2	100	

[a] Data on sources of funds are based on reports by the performers. This table in preliminary form was published in *Reviews of Data on Research & Development*, No. 16, "Funds for Research and Development in the United States, 1953–59," Washington 25, D.C.: Supt. of Documents, U.S. Government Printing Office, December 1959. For full information including a description of each sector the reader should refer to this bulletin.

[b] Includes funds from the Federal Government for research centers administered by organizations in this sector under contract with Federal agencies.

[c] Data include State and local funds received by these institutions and used for research and development.

NOTE: Percentages based on unrounded figures.

Source: National Science Foundation, December 1959.

funds in both years. As the transfer-table data indicate, a substantial and growing proportion of funds used by the industry sector in the performance of research and development came from the Federal Government. In fact, the most significant change in the distribution of total funds among the sectors as sources, from 1953–54 to 1956–57, was the growing volume of Federal funds, which amounted to 59 percent of the total for 1956–57, as compared with 53 percent for 1953–54.

On a relative basis, funds used for performance of research and development within Federal Government laboratories were less in 1956–57, than in 1953–54, as the performance by the industry sector grew. The relative position of colleges and universities and other nonprofit institutions as sources of funds was virtually unchanged. As performers, both these sectors showed slight percentage decreases.

Basic Research Trends

Similar information has been obtained on basic research funds. The surveys disclose that funds used in performing basic research increased from $432 million in 1953–54 to a projected $1 billion in 1959–60, an increase of 150 percent. Throughout the period, these funds were about 8 percent of estimated total R&D funds (fig. 6).

The twofold increase in funds for basic research during the five-year period, 1954–58, indicates that colleges and universities ($208 to $392 million) and industry ($151 to $272 million) showed the largest absolute increases. The other two sectors, Federal Government and other nonprofit institutions, showed the greatest increase in relative terms, a rise of more than 130 percent. (See tables 8 and 9.)

Colleges and universities stand out as the most important users of funds for the performance of basic research in both years—accounting for about half the total—and they are relatively less important as sources of funds. The totals for colleges and universities combined with other nonprofit institutions comprise more than half the national total for performance of basic research in both years.

For the Federal Government, the picture is reversed in that this sector is still the source of the largest amount of funds for basic research—half the total—but continues to be less important from the point of view of funds reported for performance.

The largest intrasectoral entry for both years, the amount retained within the industry sector for the performance of basic research, rose by almost $100 million during the period. The largest intersectoral transfer in both years is that from the Federal Government to colleges and universities, and this rose by about $120 million from 1953–54 to 1957–58. Colleges and universities comprise the only sector, from a source point of

Table 8.—*Intersectoral transfers of funds used for performance of basic research, 1953–54 (revised)* [a]

(Millions of dollars)

Sources of basic research funds used	Basic research performers					Percent distribution, basic research sources
	Federal Government	Industry	Colleges and universities	Other nonprofit institutions	Total	
Federal Government	$47	[b] $19	[b] $119	[b] $10	$195	45
Industry	.....	132	11	4	147	34
Colleges and universities [c]	.....	.....	62	.....	62	14
Other nonprofit institutions [c]	.....	.....	16	12	28	7
Total	47	[b] 151	[b] 208	[b] 26	432	100
Percent distribution, basic research performance	11	35	48	6	100	

[a] Data on sources of funds are based on reports by the performers. This table was published in *Reviews of Data on Research & Development*, No. 22, "Funds for the Performance of Basic Research in the United States, 1953–58," Washington 25, D.C.: Supt. of Documents, U.S. Government Printing Office, August 1960. For full information, including a description of each sector, the reader should refer to this bulletin.

[b] Includes funds from the Federal Government for research centers administered by organizations in this sector under contract with Federal agencies.

[c] Data include State and local funds received by these institutions and used for basic research.

Source: National Science Foundation, August 1960.

Table 9.—*Intersectoral transfers of funds used for performance of basic research, 1957–58 (preliminary)* [a]

(Millions of dollars)

Sources of basic research funds used	Basic research performers					Percent distribution, basic research sources
	Federal Government	Industry	Colleges and universities	Other nonprofit institutions	Total	
Federal Government	$111	[b] $42	[b] $240	[b] $30	$423	51
Industry	.....	230	14	5	249	30
Colleges and universities [c]	.....	.....	111	.....	111	13
Other nonprofit organizations [c]	.....	.....	27	25	52	6
Total	111	[b] 272	[b] 392	[b] 60	835	100
Percent distribution, basic research performance	13	33	47	7	100	

[a] Data on sources of funds are based on reports by the performers. This table was published in *Reviews of Data on Research & Development*, No. 22, "Funds for the Performance of Basic Research in the United States, 1953–58," Washington 25, D.C.: Supt. of Documents, U.S. Government Printing Office, August 1960. For full information, including a description of each sector, the reader should refer to this bulletin.

[b] Includes funds from the Federal Government for research centers administered by organizations in this sector under contract with Federal agencies.

[c] Data include State and local funds received by these institutions and used for basic research.

Source: National Science Foundation, August 1960.

view, whose own funds for basic research are all used for performance within the sector.

Instrument of Policy

A background of comprehensive statistical data is essential to the development of science policy. Much of the factual information contained in the Foundation's policy reports has been drawn from Foundation studies. Such statistical information has been useful in the development of national science policy as well as policy relating to the operation of programs of the Foundation and of other Federal agencies. A good example concerning both types of policy development relates to the payment of indirect costs of federally sponsored research. Information developed in the 1958 survey of universities and colleges has had a strong impact on Federal policy relating to indirect costs as well as on individual agency policy.

The recently established Federal Council for Science and Technology within the Executive Office deliberates on matters of policy and program coordination and future planning among Federal agencies and makes recommendations to the President. The Foundation has served the Council in a number of its policymaking areas by conducting pertinent statistical and analytical studies.

Impact of Research and Development

In addition to its broad charter outlined above, the Foundation is charged with the responsibility for "appraising the impact of research upon industrial development and upon the general welfare."

Scientific research and development, recognized for its part in achieving military objectives, is now being appraised for its significance as a national activity in our economic system. This recognition was forcefully established with the Foundation's estimates for 1957 of $10 billion for research and development in the country as a whole and the employment of more than 300,000 scientists and engineers in this activity.

Extending the knowledge furnished by the fact-finding operations, the Office of Special Studies has undertaken a number of special analytical studies. These will provide better understanding of the nature and significance of the survey data. Specific examples of such projects are:

(1) *Case Institute of Technology.* The project conducted by Case Institute of Technology has been directed toward producing objective and quantitative procedures for allocating funds to and within the research and development activity of a company and tracing the relation of research and development to the growth of a company. Personnel at Case Institute have worked with chemical firms on a case history approach

to develop a methodology adaptable, at least experimentally, to other industrial firms.

(2) *Carnegie Institute of Technology.* A study at the Carnegie Institute of Technology has sought to understand the determinants entering into the level of research and development within the economy, particularly with reference to an individual industrial firm. Linked with this objective is the further goal of gaining insight into the diffusion of innovation within the economy.

(3) *Survey of Research Projects on Economic and Other Impacts of Scientific Research and Development.* The survey of projects pertaining to analysis of the impact of research and development has covered colleges and universities, research institutes, professional associations, and foundations. A publication on the survey pertaining to colleges and universities was released during 1960.

(4) *A Selected Annotated Bibliography on Impact of Research and Development on the Economy.* A selected annotated bibliography has been published to provide references representative of typical approaches to the study of research and development and to serve as a guide for further investigation.

(5) *Cost Index of Research and Development.* This project, in cooperation with the Department of the Army, Office of the Director of Research and Development, involves the development of an index to deflate R&D expenditures. It may offer insight on relations of various cost elements which will assist in planning and projecting research costs in constant and current dollars. The U.S. Bureau of Labor Statistics, under contract to this Office, is now undertaking to implement the index design and it is hoped that preliminary estimates of a cost index will become available during the next fiscal year.

(6) *Relation of Data on Research and Development to Overall Economic Activity.* The relation of research and development expenditures to the national income and gross national product accounts is being explored in order to obtain appropriate dollar measures of the level of scientific effort compared with total economic activity. This involves separation of the elements entering into existing measures of expenditures for both research and development and gross national product from the point of view of determining which of several types of relations are meaningful and useful for studies of scientific effort and economic growth.

Conclusion

With a strong base of fundamental information about the central forces of the R&D effort, the Foundation has begun to formulate a more

specialized and analytical examination of science and technology. Activities under this broadened approach to science and technology include analyses of the magnitude and character of research and development, the education of scientists and engineers, the utilization of scientific and supporting personnel, development of scientific facilities, dissemination of scientific information, effects of technological advances, and the organization and administration of the scientific community. In addition, having dealt in the past with some of these components in laying the groundwork for overall analyses, the Foundation feels the increasing importance of viewing the totality of all scientific activities in relation to the economy. Accordingly, the Foundation plans to synthesize these elements in a broad concept of science and technology and an understanding of each of their roles.

Appendices

APPENDIX A

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568169—61——12

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APPENDIX B

Financial Report for Fiscal Year 1960

SALARIES AND EXPENSES APPROPRIATION

Receipts

Appropriated for fiscal year 1960	$154,773,000	
Unobligated balance from fiscal year 1959	4,389,001	
Total availability		$159,162,001

Obligations

Support of science:		
Basic research:		
Biological and medical sciences	$24,413,405	
Mathematical, physical, and engineering sciences	30,695,143	
Social sciences	2,104,571	
Subtotal	57,213,119	
Basic research facilities:		
Development of graduate research laboratories	2,153,710	
Specialized biological facilities	2,828,251	
University computing facilities	1,671,500	
University nuclear research facilities	2,548,958	
Oceanographic research vessels	3,000,000	
Subtotal	12,202,419	
National research facilities:		
National Radio Astronomy Observatory	998,400	
Kitt Peak National Observatory	824,000	
National Center for Atmospheric Research	500,000	
Subtotal	2,322,400	
National research programs:		
Antarctic research	6,179,598	
Weather modification	1,429,640	
Subtotal	7,609,238	
Dissemination of scientific information	5,370,340	
Special international programs	23,658	
Subtotal, grants and contracts	84,741,174	
Program development, operation, and evaluation	2,136,041	
Total obligations—support of science		86,877,215

Support of scientific manpower:		
Fellowships	$13,391,316	
Institutes	33,775,040	
Research participation and scientific activities for teachers	2,347,946	
Science education for undergraduate students	2,871,482	
Science education for secondary school students	4,457,736	
Public understanding of science	316,501	
Course content improvement	6,299,436	
Science education and technical manpower information	891,075	
International science education	259,697	
Subtotal, grants and contracts	64,610,229	
Program development, operation, and evaluation	2,273,466	
Total obligations—support of scientific manpower		66,883,695
Executive direction and management		2,098,300
Total obligations, NSF		155,859,210
Allocations to other Government agencies:		
Department of the Army	$82,685	
Department of Commerce	2,657,640	
Subtotal		2,740,325
Total obligations, fiscal year 1960		158,599,535
Unobligated balance carried forward to fiscal year 1961		562,466
Total		159,162,001

INTERNATIONAL GEOPHYSICAL YEAR APPROPRIATIONS

Receipts

Total unobligated balance from fiscal year 1959	$1,707,589	
Total availability		$1,707,589

Obligations

Technical programs	$1,475,743	
Administrative expenses, National Academy of Sciences—National Research Council	119,610	
Administrative expenses, National Science Foundation	2,232	
Total obligations, fiscal year 1960		1,597,585
Unobligated balance (not available for obligation in fiscal year 1961)		110,004
Total		1,707,589

TRUST FUND

Receipts

Unobligated balance from fiscal year 1959	$6,613	
Donations from private sources	1,630	
Total availability		8,243

Obligations

Total obligations, fiscal year 1960	$894	
Unobligated balance carried forward into fiscal year 1961	7,349	
Total		8,243

APPENDIX C

Grants for Basic Research

ANTHROPOLOGICAL SCIENCES

AMERICAN UNIVERSITY, Washington, D.C.; Harvey C. Moore; *Acculturation and Culture Change;* 2 years; $12,800

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Frederick S. Hulse; *Biological Characteristics of Migrants;* 2 years; $18,200

Marvin A. Stokes, Geochronology Laboratories; *Late Prehistory of Northern Arizona;* 1 year; $9,500

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Walter Goldschmidt, Los Angeles; *Cultural Concomitants of Ecological Change;* 2 years; $30,800

Robert F. Heizer; *Culture History of the Western Great Basin;* 1 year; $4,500

John T. Hitchcock, Los Angeles; *Study of Nepalese Tribe;* 18 months; $22,800

Rene F. Millon; *Urbanization of Teotihuacan;* 2 years; $9,800

D. L. Olmsted, Davis; *Prehistory of Northern California;* 2 years; $13,000

John H. Rowe; *Interpretations of Peruvian Archaeology;* 1 year; $9,900

CARLETON COLLEGE, Northfield, Minn.; Frank C. Miller; *Acculturation Among the Chippewa;* 1 year; $4,200

CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; Svend Frederiksen; *Collection of Eskimo Texts;* 1 year; $12,800

CHICAGO NATURAL HISTORY MUSEUM, Chicago, Ill.; Paul S. Martin; *Archaeology of the Upper Little Colorado;* 1 year; $8,500

UNIVERSITY OF CHICAGO, Chicago, Ill.; Alan H. Jacobs; *Culture Change in the Masai;* 1 year; $7,700

Arthur J. Jelinek; *Prehistoric Change in New Mexico;* 1 year; $5,600

Norman A. McQuown; *Change and Continuity in Chiapas;* 2 years; $25,000

Manning Nash; *Social Change in a Plural Society;* 1 year; $17,800

COLUMBIA UNIVERSITY, New York, N.Y.; Ralph S. Solecki; *Prehistoric Man in Shanidar Valley, Northern Iraq;* 1 year; $23,500

William Duncan Strong; *Analysis of Excavation in Peru;* 1 year; $2,800

CORNELL UNIVERSITY, Ithaca, N.Y.; Charles F. Hockett; *Field Study of the Fijian Language;* 2 years; $22,300

Allan R. Holmberg; *Prehistoric Human Ecology in Peru;* 1 year; $20,000

DARTMOUTH COLLEGE, Hanover, N.H.; Gordon M. Day; *Study of the Abenaki Dialects;* 1 year; $10,000

HARTFORD SEMINARY FOUNDATION, Hartford, Conn.; Henry A. Gleason, Jr.; *Statistical Methods in Linguistic Reconstruction;* 1 year; $6,400

HARVARD UNIVERSITY, Cambridge, Mass.; Hallan L. Movius, Jr.; *Upper Palaeolithic Cultures in the Dordogne;* 2 years; $35,000

Evon Z. Vogt; *Study of Linguistic Usages;* 1 year; $6,000

HUMAN RELATIONS AREA FILES, New Haven, Conn.; George P. Murdock; *Atlas of Eurasiatic Cultures;* 1 year; $28,800

IDAHO STATE COLLEGE, Pocatello, Idaho; Earl H. Swanson; *Archaeological Investigations in Idaho;* 1 year; $13,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.; Frederic K. Lehman; *Ethnographic Research in Chin Hills;* 1 year; $9,800

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; Thomas A. Sebeok; *Computer Research in Psycholinguistics;* 1 year; $15,800

LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE, London, England; Raymond Firth; *Comparative Study of Extra-Familial Kinship;* 1 year; $22,300

LOS ANGELES STATE COLLEGE FOUNDATION, Los Angeles, Calif.; Robert H. Ewald and Louis C. Faron; *Ethnographic Survey in Eastern Panama;* 1 year; $6,000

LOUISIANA STATE UNIVERSITY, Baton Rouge, La.; William G. Haag; *Archaeological Research in the Caribbeans;* 1 year; $13,000

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; James B. Griffin; *Prehistoric Occupations of the Great Lakes Areas;* 1 year; $27,000

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Eldon Johnson; *Archaeology of Glacial Lake Agassiz Basin;* 1 year; $13,200

UNIVERSITY OF NEW MEXICO, Albuquerque, N. Mex.; Frank C. Hibben; *Recovery of Prehispanic Paintings;* 1 year; $12,800

NORTHWESTERN UNIVERSITY, Evanston, Ill.; W. Creighton Gabel; *Ecological Adaptations in the Later Stone Age;* 2 years; $21,900

UNIVERSITY OF OREGON, Eugene, Oreg.; Luther S. Cressman; *Mandan Culture History;* 1 year; $2,500

Luther S. Cressman; *Research on Northwest Prehistory;* 2 years; $21,700

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Alfred Kidder, II; *Archaeology of Tikal;* 1 year; $23,000

Froelich Rainey; *Research on Archaeological Techniques;* 1 year; $27,900

Ruben E. Reina; *Community Study in Peten;* 15 months; $20,000

SAN FERNANDO VALLEY STATE COLLEGE, Northridge, Calif.; Raoul Naroll; *Index of Social Development;* 1 year; $3,000

SMITHSONIAN INSTITUTION, Washington, D.C.; Clifford Evans; *Obsidian Dating;* 2 years; $21,900

Gordon D. Gibson; *Economic System of the Herero;* 1 year; $10,000

TEXAS TECHNOLOGICAL COLLEGE, Lubbock, Tex.; Francis E. Green; *Prehistoric Studies of Lubbock Reservoir;* 1 year; $6,000

UNIVERSITY OF TEXAS, Austin, Tex.; T. N. Campbell; *Archaeological Salvage Project;* 1 year; $8,200

TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; Henry Orenstein; *Indian Village Study;* 2 years; $4,200

Robert Wauchope and E. Wyllys Andrews; *Development of Pre-Columbian Culture;* 3 years; $40,700

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Simon Ottenberg; *Anthropological Study of Urban Nigeria;* 6 months; $2,800

YALE UNIVERSITY, New Haven, Conn.; Isidore Dyen; *Lexicostatistical Classification of the Malayopolynesian Languages;* 1 year; $3,450

ASTRONOMY

AMHERST COLLEGE, Amherst, Mass.; Albert P. Linnell and Robert H. Koch; *Eclipsing Binaries;* 1 year; $7,500

ASSOCIATION OF UNIVERSITIES FOR RESEARCH IN ASTRONOMY, INC. (AURA), Tucson, Ariz.; Aden B. Meinel, Kitt Peak National Observatory; *Preliminary Conceptual Design and Experimental Studies for Large Orbital Telescopes;* 1 year; $252,300

BRIGHAM YOUNG UNIVERSITY, Provo, Utah; D. H. McNamara; *A Spectrographic Study of Beta Canis Majoris Stars;* 2 years; $13,500

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; George H. Herbig, Lick Observatory, Mount Hamilton; *Design and Construction of High-Dispersion Nebular Spectograph;* 18 months; $30,300

Gerald E. Kron; *Photometric Investigations in the Southern Hemisphere at the Mount Stromlo Observatory, Canberra, Australia;* 1 year; $1,800

Jerzy Neyman; *Statistical Studies of Double and Multiple Galaxies;* 1 year; $12,100

Merle F. Walker; *Operation of the Lallemand-Type Image Converter;* 2 years; $34,600

George Wallerstien, *Abundances of the Elements in High Velocity G Dwarf Stars;* 2 years; $5,000

A. E. Whitford; *Application of a Pressure-Scanning Fabry-Perot Interferometer to High Resolution Stellar Spectroscopy;* 18 months; $17,500

A. E. Whitford, Lick Observatory; *24-Inch Photometric Telescope;* 2 years; $20,000

CARNEGIE INSTITUTION OF WASHINGTON, Washington, D.C.; Merle A. Tuve; *Development of Image Tubes for Telescopes;* 2 years; $130,000

Merle A. Tuve; *Radio Astronomy H-Line Installation in South America;* 1 year; $41,000

UNIVERSITY OF CHICAGO, Chicago, Ill.; Geoffrey Burbidge and E. Margaret Burbidge, Yerkes Observatory; *Spectroscopic and Photometric Studies of the Structure and Synamics of External Galaxies;* 2 years; $48,900

G. Van Biesbroeck; *Astrometric Investigations;* 1 year; $8,200

Gerard P. Kuiper; *Development of Two Interferometer Telescopes;* 1 year; $6,000

Richard H. Miller; *Equipment for Selected Photometric Observations;* 1 year; $8,800

William W. Morgan, Yerkes Observatory; *Studies in Stellar Classification;* 4 years; $35,700

WILLIAM C. ERICKSON, San Diego, Calif.; *A Design Study on Very Large Arrays for Radio Astronomy;* 3 months; $1,000

UNIVERSITY OF FLORIDA, Gainesville, Fla.; Alex G. Smith; *Measurement and Analysis of Planetary Emissions at Radio Frequencies;* 2 years; $26,500

GEORGETOWN UNIVERSITY, Washington, D.C.; Vera C. Rubin; *Photometric Reduction of Standardized Photographs of Galaxies;* 2 years; $7,200

HARVARD UNIVERSITY, Cambridge, Mass.; David Layzer; *Theoretical Energy Levels and Transition Probabilities;* 1 year; $17,600

William Liller; *Evolutionary Effects on the Continuous Spectra of Stars;* 1 year; $2,700

Martha H. Liller; *Intensity Distribution in Galaxies in the Virgo Cluster;* 1 year; $4,300

A. Edward Lilley; *Hydrogen-Line Radio Astronomy;* 6 months; $126,600

HIGH ALTITUDE OBSERVATORY OF THE UNIVERSITY OF COLORADO, Boulder, Colo.; Walter Orr Roberts; *Equipment for New Graduate Program in Astro-Geophysics;* 1 year; $9,060

UNIVERSITY OF ILLINOIS, Urbana, Ill.; Ivan R. King; *Dynamics of Star Clusters;* 1 year; $4,000

A. J. Meadows; *The Rotational Velocities of Early Type Stars in Galactic Clusters;* 1 year; $2,770

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; James Cuffey; *Light Curves, Color Curves, Periods and Changes in Periods of Short Period Variable Stars in the Globular Cluster Messier 53;* 1 year; $5,800

John B. Irwin; *Analysis of Photoelectric Observations of Cepheids;* 1 year; $6,900

INSTITUTE FOR ADVANCED STUDY, Princeton, N.J.; Bengt Stromgren; *Investigations of Age, Space Velocity, and Chemical Composition for 3000 A and F Stars Brighter Than 7^m on the Basis of Photoelectric Narrow-Band Photometry;* 2 years; $19,800

UNIVERSITY OF KANSAS, Lawrence, Kans.; Henry G. Horak; *Computations in Radiative Transfer and Theoretical Photometry;* 1 year; $9,600

Louisiana State University, Pierre R. Demarque; *The Influence of Chemical Composition on Stellar Evolution;* 2 years; $17,300

LOWELL OBSERVATORY, Flagstaff, Ariz.; Henry L. Giclas; *Proper Motion Survey of the Northern Hemisphere with the 13-inch Photographic Telescope;* 3 years; $41,600

John S. Hall; *Transfer of the Perkins Reflector to Flagstaff, Ariz.;* 1 year; $231,300

MARIA MITCHELL OBSERVATORY, Nantucket, Mass.; Dorrit Hoffleit; *Research on Variable Stars, Especially in Sagittarius;* 3 years; $10,800

UNIVERSITY OF MASSACHUSETTS, Amherst, Mass.; Robert Howard; *The Reduction of Observation of Magnetic Fields and Motions on the Surface of the Sun;* 2 years; $8,860

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Jerome B. Wiesner; *Detection of the Galactic Deuterium Line;* 19 months; $60,000

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Orren C. Mohler; *Associations Between Terrestrial Magnetic Storms and Solar Activity;* 1 year; $8,000

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; John R. Winckler and Edward P. Ney; *High Altitude Balloon Monitoring for Cosmic Rays and Solar Terrestrial Phenomena;* 4 months; $54,700

MOUNT HOLYOKE COLLEGE, South Hadley, Mass.; Kenneth M. Yoss; *Relative Frequencies of G and K Giants With Weak and Strong CN Adsorption;* 1 year; $850

NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.; G. M. Clemence; *Support of Astrometric Research in the Southern Hemisphere;* 2 years; $25,000

OFFICE OF NAVAL RESEARCH, Washington, D.C.; Edward P. Ney and John R. Winckler; *Solar Eclipse Measurements;* 1 month; $15,000

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; Philip C. Keenan; *Luminosities of Mira Variables and Related Variable Stars;* 2 years; $6,300

John D. Kraus; *Completion and Instrumentation of the 360-foot Standing-Parabola, Tiltable-Flat-Sheet-Reflector Radio Telescope;* 1 year; $71,900

W. E. Mitchell; *Photometric Atlas of the Solar Spectrum;* 1 year; $10,300

OHIO WESLEYAN UNIVERSITY, Delaware, Ohio; Arne Slettebak; *Installation of 16/24-Inch Schmidt Telescope at Perkins Observatory;* 2 years; $41,700

L. C. PELTIER, Delphos, Ohio; *Relocation of Observatory;* 1 year; $1,500

UNIVERSITY OF PENNSYLVANIA, Philadephia, Pa.; William Blitzstein and Frank B. Wood; *Astronomical Research in the Infrared;* 1 year; $7,700

PRINCETON UNIVERSITY, Princeton, N.J.; Martin Schwarzschild; *High Altitude Astronomy;* 2 years; $500,000

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; J. Mayo Greenberg; *The Scattering of Light by Small Particles;* 1 year; $24,000

Alan S. Meltzer; *Investigation of Astronomical Data Pertaining to Extinction and Polarization by Nonspherical Particles;* 1 year; $4,900

RIPON COLLEGE, Ripon, Wis.; Dino Zei; *Possible Turbulence in Sun Spots;* 1 year; $5,500

STANFORD UNIVERSITY, Stanford, Calif.; Ronald N. Bracewell; *Solar Radio Emission;* 1 year; $11,160

UNIVERSITY OF TEXAS, Austin, Tex.; Frank N. Edmonds, Jr.; *An Analysis of Solar Astronomy;* 18 months; $6,200

A. W. Straiton; *A Radio Telescope for Millimeter Wavelengths;* 1 year; $20,900

VASSAR COLLEGE, Poughkeepsie, N.Y.; Henry Albers; *An Infrared Survey of a Region in the Scutum Cloud;* 2 months; $2,200

WESLEYAN UNIVERSITY, Middletown, Conn.; Heinrich K. Eichhorn; *Determination of the Inner Systematic Errors of the Northern Hyderabad Zone of the Astrographic Catalogue and Redetermination of Its Plate Constants;* 1 year; $6,700

Thornton Page; *Nebular Spectroscopy in the Southern Hemisphere;* 1 year; $13,700

UNIVERSITY OF WISCONSIN, Madison, Wis.; Julian E. Mack; *Spectrum Line Shapes in the Solar Corona;* 2 years; $10,900

YALE UNIVERSITY, New Haven, Conn.; Harlan J. Smith; *Planetary Nonthermal Radio Emission;* 2 years; $33,500

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ADELPHI COLLEGE, Garden City, N.Y.; Sherman C. Lowell, *Atmospheric Applications of Theoretical Fluid Mechanics;* 8 years; $46,400

AMERICAN METEOROLOGICAL SOCIETY, Boston, Mass.; Kenneth C. Spengler; *Cumulative and Current Bibliography on Weather Modification and Cloud Physics;* 3 years, $40,800

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Myron L. Corrin; *The Surface Properties of Heterogeneous Condensation Nuclei;* 3 years; $114,900

Walter H. Evans and Robert L. Walker; *A Physical Model for the Lightning Discharge;* 3 years; $100,300

ATMOSPHERIC RESEARCH GROUP, Altadena, Calif.; Paul B. MacGready, Jr., Theodore B. Smith, and Clement J. Todd; *Flagstaff Cumulus Cloud Studies;* 3 years; $195,700

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Jacob Bjerknes; Los Angeles; *Sea Surface Temperature and Atmospheric Circulation;* 3 years; $86,000

Jorgen Holmboe, Gordon MacDonald, Walter Munk, and Clarence Palmer; *Theoretical and Experimental Atmospheric Sciences;* 3 years; $600,000

Walter H. Munk and Frank E. Snodgrass, Scripps Institution of Oceanography, La Jolla; *Oceanic and Atmospheric Tides;* 3 years; $129,000

UNIVERSITY OF CHICAGO, Chicago, Ill.; Horace R. Byers and Roscoe R. Braham; *Physical Effects of Silver Iodide Seeding in the Great Plains;* 3 years; $230,400

Dave Fultz; *Meteorological Experimental Hydrodynamics;* 3 years; $215,000

George W. Platzman; *Numerical-Dynamical Studies of the Atmospheric General Circulation;* 3 years; $79,000

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; Richard A. Schleusener; *Hail Suppression Evaluation;* 1 year; $7,900

Richard A. Schleusener; *Study of the Characteristics and Formation of Hail Over the Western Great Plains;* 2 years, $59,300

COLUMBIA UNIVERSITY, New York, N.Y.; William L. Donn; *Atmospheric Micro-Oscillations;* 3 years; $75,100

Richard L. Pfeffer; *Atmospheric Dynamics;* 3 years; $133,400

CORNELL UNIVERSITY, Ithaca, N.Y.; Ralph Bolgiano, Jr.; *Refractive Index Irregularities in Stably Stratified Atmosphere;* 3 years; $32,700

Henry G. Booker; *Propagation of Radio Waves in and Above the F. Region;* 3 years; $61,800

C. W. Gartlein; *Origin and Morphology of the Aurora;* 3 years; $104,300

HARVARD UNIVERSITY, Cambridge, Mass.; Richard M. Goody; *Atmospheric Physics (Studies of Various Atmospheric Phenomena);* 3 years; $172,200

UNIVERSITY OF HAWAII, Honolulu, Hawaii; Walter R. Steiger; *Cosmic Ray Neutron Monitor;* 1 year; $6,000

HIGH ALTITUDE OBSERVATORY OF THE UNIVERSITY OF COLORADO, Boulder, Colo.; Walter Orr Roberts; *Interdisciplinary Studies in Solar-Upper Atmosphere Relationships;* 3 years; $125,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.; Glenn Stout; *Evaluation of Electric Charges Induced in the Atmosphere;* 8 months; $12,000

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Lewis D. Kaplan; *Infrared Flux in the Earth's Atmosphere;* 3 years; $139,600

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Wendell Hewson and Gerald C. Gill; *Atmospheric Diffusion in Transitional States;* 3 years; $150,000

NATIONAL ACADEMY OF SCIENCES, Washington, D.C.; G. D. Meid; *Support of IGC Secretariat;* 1 year; $40,000

NATIONAL BUREAU OF STANDARDS, Washington, D.C.; F. W. Brown; *Airglow Photometer IGC—1959;* 1 year; $525

F. W. Brown; *World Data Center for Airglow and Ionosphere;* 1 year; $65,000

H. F. McMurdie; *Silver Iodide Studies;* 2 years; $40,000

NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY, Socorro, N. Mex.; Marvin H. Wilkening; *Radon and Its Decay Products in the Lower Atmosphere;* 3 years; $56,100

NEW YORK UNIVERSITY, New York, N.Y.; Gerhard Neumann; *Measurements of the Reynolds Stress and Wind Stress-Wind Relationships Over the Sea Surface;* 2 years; $50,500

OFFICE OF NAVAL RESEARCH, Washington, D.C.; B. Vonnegut, Arthur D. Little, Inc.; *Cloud Electrification Studies;* 1 year; $50,000

B. Vonnegut and C. B. Moore; *Cloud Electrification Studies;* 1 year; $50,000

OREGON STATE COLLEGE, Corvallis, Oreg.; F. W. Decker; *Observation of Hailfalls and Related Atmospheric Phenomena in Southern Oregon;* 2 years; $30,400

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; H. D. Rix; *Study of Photodetachment Cross Sections for Negative Halogen Ions;* 2 years; $59,800

TEXAS AGRICULTURAL AND MECHANICAL RESEARCH FOUNDATION, College Station, Tex.; Donald W. Hood; *Sea-Air Interface Carbon Dioxide Exchange Phenomena;* 2 years; $43,000

Vance Moyer; *Radar Investigation of Subtropical Precipitation;* 3 years; $90,200

UNIVERSITY OF TEXAS, Austin, Tex.; Charles W. Tolbert; *Microwave Radiating and Reflecting Properties of Precipitation;* 3 years; $115,000

TUFTS UNIVERSITY, Medford, Mass.; Irving Schell; *Ocean Ice–Sea Temperature–Weather Interrelations;* 3 years; $50,700

U.S. DEPARTMENT OF AGRICULTURE—FOREST SERVICE, Ogden, Utah; D. M. Fuquay; *Investigation of Cloud Modification Techniques to the Problem of Lightning-Caused Forest Fire;* 30 months; $63,900

U.S. WEATHER BUREAU, Washington, D.C.; F. W. Reichelderfer; *Specialized Upper Air Observations for the Santa Barbara Cloud Seeding Project;* 1 year; $4,200

Helmut Landsberg; *World Data Center A for Meteorology and Nuclear Radiation;* 1 year; $37,000

F. W. Reichelderfer; *Specialized Upper-Air Observations at Santa Monica, Calif.;* 1 year; $4,200

UNIVERSITY OF VERMONT AND STATE AGRICULTURAL COLLEGE, Burlington, Vt.; Richard J. Howard, *Molecular Association in Supersaturated Vapors;* 3 years; $52,700

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Robert G. Fleagle; *Wind, Temperature and Humidity Profiles at Sea;* 2 years; $40,500

CHEMISTRY

AGNES SCOTT COLLEGE, Decatur, Ga.; W. Joe Frierson; *Paper Chromatographic Separation, Spectrophotometric Determination and New Reagents for Determination of Traces of Metallic Ions;* 3 years; $3,400

ALBION COLLEGE, Albion, Mich.; Paul L. Cook; *Hydrogenations With Nickel-Aluminum Alloy in Aqueous Alkaline Solution;* 3 years; $10,500

ALFRED UNIVERSITY, Alfred, N.Y.; Clifford E. Myers; *Vaporization Properties of Phosphides;* 2 years; $13,300

George J. Young; *Adsorption and Wetting Phenomena in Hydrophobic Systems;* 2 years; $9,700

ARIZONA STATE UNIVERSITY, Tempe, Ariz.; Roland K. Robins; *Physical and Chemical Properties and Molecular Structure of Certain Purines and Purine Antagonists;* 3 years; $55,500

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Henry Freiser; *Application of Gas-Liquid Chromatography to Inorganic Separation Processes;* 3 years; $25,300

UNIVERSITY OF ARKANSAS, Fayetteville, Ark.; Samuel Siegel; *Stereochemistry of the Catalytic Hydrogenation of Aromatic and Hydroaromatic Compounds;* 3 years; $29,500

Kurt H. Stern; *Interactions in Solution;* 2 years; $11,400

BOSTON UNIVERSITY, Boston, Mass.; Norman N. Lichtin; *Chemical Kinetics, Activities and Ionization and Dissociation Equilbria of Electrolytes in Nonaqueous Media;* 3 years; $43,500

Ronald M. Milburn; *Redox Reactions of Ligands;* 2 years; $28,600

BOWDOIN COLLEGE, Brunswick, Maine; John E. Frey; *Solvent Properties of Compounds of Group IIIB Elements;* 2 years; $16,600

BROWN UNIVERSITY, Providence, R.I.; Robert H. Cole; *Dielectric Properties of Inert Gases;* 18 months; $13,300

Robert L. Kay; *Measurement of Transference Numbers in Solvents of Low Dielectric Constant;* 2 years; $11,000

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Walter Dannhuser; *Electrical Conductivity in Polymeric Systems;* 1 year; $5,600

Henry M. Woodburn; *Reaction of Trifluoroacetonitrile With Hydrogen-Containing Functional Groups;* 2 years; $12,000

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; G. Wilse Robinson; *Low Temperature Chemistry;* 3 years; $45,800

Ernest H. Swift; *Mechanisms of the Reactions Between Thioacetamide and Various Metals;* 3 years; $29,600

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Lawrence J. Andrews and Raymond M. Keefer; *Solvent Effects on Polar Reactions of Organic Substances With Halogens;* 3 years; $38,500

Kenneth Conrow; *Chemistry of Substituted Alkyl Tropilidenes;* 2 years; $9,000

Donald J. Cram; Los Angeles; *Chemistry of Organometallic Compounds;* 3 years; $36,500

W. F. Giauque; *Thermodynamic and Magnetic Properties at Low Temperatures;* 1 year; $116,500

Eugene R. Hardwick; Los Angeles; *Scintillation Study of Radiation Damage in Crystalline Solids;* 3 years; $18,700

James F. Horning; *Energy Transfer in Molecular Solids;* 2 years; $20,400

Frederick R. Jensen; *Basic Organic Chemistry;* 3 years; $54,100

Harry W. Johnson, Jr., Riverside; *Rearrangement of N-Bromosuccinimide to Beta-Bromopropionyl Isocyanate;* 2 years; $10,000

James D. McCullough; *Structural and Equilibrium Studies of Group VIB Compounds;* 2 years; $29,900

Donald S. Noyce; *Organic Reaction Mechanisms;* 3 years; $54,800

Robert L. Pecsok, Los Angeles; *Complexes of Chromium (II);* 2 years; $16,200

Andrew Streitwieser, Jr.; *Theoretical Organic Chemistry;* 3 years; $54,100

CALVIN COLLEGE, Grand Rapids, Mich.; Roger J. Faber; *Electron Spin Resonance Study of Organic Free Radicals in Solution;* 3 years; $11,500

CARLETON COLLEGE, Northfield, Minn.; Helen F. Greef; *Characterization of Phenyl-Substituted Hydroxydiphenyl-Triazenes;* 2 years; $6,200

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; Robert B. Carlin; *2, 6-Disubstituted Phenylhydrazones in the Fischer Indole Synthesis;* 42 months; $50,300

Robert R. Holmes; *Pentacoordinated Molecules;* 2 years; $12,000

Robert J. Kurland; *Chemical Studies in Nuclear Magnetic Resonance and Electron Paramagnetic Resonance;* 3 years; $25,700

Robert G. Parr and Frank O. Ellison; *Theoretical Studies of the Electronic Structure of Molecules;* 3 years; $59,700

Frederick D. Rossini; *Thermochemistry;* 2 years; $22,800

Philip L. Southwick; *Stereochemistry of Conjugate Addition;* 2 years; $18,800

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; Melvin J. Astle; *Catalysis of Organic Reactions With Ion Exchange Resins;* 2 years; $17,000

Peter Kovacic; *Reaction of Metal Halides With Organic Compounds;* 2 years; $23,600

P. E. Pierce; *Brownian Motion Theory for Interacting Particles;* 2 years; $17,500

Donald R. Whitman, *Analysis of Nuclear Magnetic Resonance Spectra;* 2 years; $20,900

CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; B. deB. Darwent; *The Lifetime and Reactions of Vibrationally Excited Species;* 3 years; $36,800

CENTRAL STATE COLLEGE, Wilberforce, Ohio; E. O. Woolfolk, *Reagents for Identification and Chromatographic Separation of Colorless Organic Compounds;* 3 years; $10,500

UNIVERSITY OF CHICAGO, Chicago, Ill.; Robert A. Clement; *Solvation Effects in Organic Reactions;* 30 months; $24,800

UNIVERSITY OF CINCINNATI, Cincinnati, Ohio; Frank R. Meeks, *Critical Phenomena in Binary Liquid Systems;* 2 years; $11,700

Milton Orchin, *Mechanism of Selenium-Catalyzed Dehydrogenations;* 2 years; $1,100

CLARK UNIVERSITY, Worcester, Mass.; Arthur E. Martell, *Metal Chelate-Catalyzed Hydrolysis of Salicyl Phosphate and Related Compounds;* 3 years; $22,900

Edward N. Trachtenberg; *Mechanism of Nucleophilic Displacement in Betahaloketones, Mannich Bases and Related Compounds;* 2 years; $12,400

COLORADO SCHOOL OF MINES, Golden, Colo.; J. L. Hall; *Acetonitrile as a Solvent for Inorganic Reactions;* 3 years; $19,800

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; John B. Rogan; *Variables Influencing the Participation of an Olefinic Bond During Solvolysis;* 14 months; $8,800

UNIVERSITY OF COLORADO, Boulder, Colo.; John R. Lacher and Joseph D. Park, *Vapor Phase Calorimetry;* 5 years; $55,800

Henry J. Richter; *Chemistry of Pyracene;* 2 years; $11,000

COLUMBIA UNIVERSITY, New York, N.Y.; Benjamin P. Dailey; *High Resolution Microwave Spectroscopy;* 3 years; $53,000

Benjamin P. Daily; *Quadrupole and Nuclear Magnetic Resonance Studies of Electronic Distributions in Organic Molecules;* 3 years; $87,600

Cheves Walling; *Free Radical Reactions;* 3 years; $51,700

UNIVERSITY OF CONNECTICUT, Storrs, Conn.; Roy J. Gritter; *Free Radical Chemistry of the Organic Ligands in Coordination Compounds;* 3 years; $18,300

William L. Masterton and Emil J. Slowinski; *Effect of Pressurizing Gases on Surface Tensions of Liquids;* 1 year; $9,000

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NORTHWESTERN UNIVERSITY, Evanston, Ill.; R. C. King; *Genetic Control of Oogenesis in Drosophila Melanogaster;* 3 years; $43,600

OGLETHORPE UNIVERSITY, Atlanta, Ga.; Arthur L. Cohen; *Morphogenesis of the Myxomycetes;* 1 year; $15,800

OREGON STATE COLLEGE, Eugene, Oreg.; Leo E. Jones; *Cytological Observations on Somatic Cells of Angiosperms in Microculture;* 3 years; $15,700

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Paul B. Green; *The Physical Basis of Cell Wall Growth;* 5 years; $57,600

James W. Lash; *An Analysis of* In Vitro *Chondrogenesis;* 1 year; $900

Donald G. Lee; *Vascularization of the Intervertebral Disc;* 1 year; $1,800

Roy G. Williams; *Studies of Bone and Cartilage in Rabbits;* 3 years; $22,400

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; Ian M. Sussex and Joan Eiger Gottlieb; *Morphogenesis in the Shoot of Vascular Plants;* 3 years; $41,800

PRINCETON UNIVERSITY, Princeton, N.J.; John T. Bonner; *Differentiation in the Cellular Slime Molds;* 5 years; $50,800

Lionel I. Rebhun; *Fertilization and Cleavage in Marine Invertebrate Eggs;* 5 years; $28,100

RESEARCH FOUNDATION, Oklahoma State University, Stillwater, Okla.; E. A. Grula; *Inhibition of Cell Division in Erwinia;* 3 years; $25,700

ROCKEFELLER INSTITUTE, New York, N.Y.; Man-Chiang Niu; *Induction of Specific Protein Synthesis;* 2 years; $33,200

Paul Weiss; *Physical Influences in the Self Regulation of Development;* 1 year; $6,000

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Charlotte J. Avers; *Cellular Differentiation in the Root Epidermis;* 3 years; $35,300

STANFORD UNIVERSITY, Stanford, Calif.; Clifford Grobstein; *Cell and Tissue Interactions in Development;* 5 years; $182,800

STATE COLLEGE OF WASHINGTON, Pullman, Wash.; E. S. E. Hafez; *Tubo-Ovarian Mechanisms of Ova Reception in Mammals;* 3 years; $32,800

STATE UNIVERSITY OF IOWA, Iowa City, Iowa; H. W. Beams; *Fine Structure of Cells;* 5 years; $43,600

UNIVERSITY OF TEXAS, Austin, Tex.; Walter V. Brown; *Fine Structure of Grass Chloroplasts;* 18 months; $15,900

UNION COLLEGE AND UNIVERSITY, Schenectady, N.Y.; Raymond Rappaport, Jr.; *Comparative Cytosurgical Studies of Cytokinesis;* 3 years; $3,000

UNIVERSITY OF VERMONT, Burlington, Vt.; Richard W. Glade; *Roles of Epidermis and Dermis in Amphibian Limb Regeneration;* 3 years; $13,400

VILLANOVA UNIVERSITY, Villanova, Pa.; Roman Maksymowych; *Cell Division and Tissue Differentiation During Leaf Development;* 2 years; $10,100

WASHINGTON UNIVERSITY, St. Louis, Mo.; Robert M. Burton; *Metabolism of the Developing Central Nervous System;* 3 years; $49,500

WAYNE STATE UNIVERSITY, Detroit, Mich.; Werner G. Heim; *Changes in the Serum Proteins During the Ontogeny of Mammals;* 1 year; $5,700

WESLEYAN UNIVERSITY, Middletown, Conn.; John B. Morrill, Jr.; *Development of Specific Proteins in the Molluscan Embryo;* 3 years; $28,000

UNIVERSITY OF WISCONSIN, Madison, Wis.; Robert L. Metzenberg; *Nucleic Acid and Protein Metabolism During Differentiation in Lethal Mutants of Drosophila;* 2 years; $12,800

YALE UNIVERSITY, New Haven, Conn.; Ian K. Ross; *Life Cycles, Cytology and Development of Selected Species of Myxomycetes;* 3 years; $9,800

J. S. Nicholas; *Experimental Analysis of Rat Development;* 3 years; $41,000

YESHIVA UNIVERSITY, New York, N.Y.; Meyer Atlas; *Uptake of Tritiated Nucleosides by the Mouse Embryo;* 2 years; $11,400

EARTH SCIENCES

UNIVERSITY OF ALASKA, College, Alaska; Troy L. Pewe; *Glaciological Investigations in Interior Alaska;* 2 years; $21,900

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Norman D. Newell; *Permo-Trassic Hiatus in Marine Rocks of Southeastern Europe;* 1 year; $1,500

AMHERST COLLEGE, Amherst, Mass.; Bruce B. Benson; *Isotopic Analysis of Dissolved Gases in Ocean Waters;* 2 years; $51,000

Bruce B. Benson; *Oxygen Isotope Determinations of Ancient Surface and Bottom Temperatures of the Oceans;* 2 years; $55,600

ARIZONA STATE UNIVERSITY, Tempe, Ariz.; Clyde A. Crowley; *Nininger Meteorite Collection;* 1 year; $240,000

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Duwayne M. Anderson; *Forces of Interaction Between Finely Divided Silicate Particles;* 2 years; $21,000

Jane Gray; *Palynology of the Tertiary Formations of the Northwestern United States;* 2 years; $24,000

BROWN UNIVERSITY, Providence, R.I.; Bruno J. Giletti, F. Donald Eckelmann and Alonzo W. Quinn; *Petrologic and Geochemical Problems Relating to Mountain Building;* 3 years, $100,000

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Edward J. Buehler; *Epifauna From the Hamilton Group of Western New York;* 1 year; $7,400

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Daniel I. Axelrod; Los Angeles; *The Tertiary Floras of Nevada;* 3 years; $20,000

Daniel I. Axelrod and William S. Ting, Los Angeles; *Late Cenozoic Pollen Floras of California;* 2 years; $18,200

M. N. Bramlette, H. C. Urey and Gustaf Arrhenius; *Purchase of Electron Microprobe;* 1 year; $76,500

Perry Byerly; *Creep on the San Andreas Fault;* 3 years; $31,750

Frank W. Dickson, Los Angeles; *Geochemical and Field Studies of Borate Genesis;* 2 years; $12,700

Frank W. Dickson; *Ore Forming Processes;* 2 years; $4,450

J. Freeman Gilbert and Leon Knopoff, Los Angeles; *Seismic Theory and Interpretation;* 3 years; $119,800

William S. Fyfe; *Some Aspects of the Properties of Solids and Solutions at High Pressures and Temperatures;* 2 years; $49,900

J. J. Jurinak and D. H. Volman, Davis; *Thermodynamics of Water Adsorption by Kaolinite in the Monolayer Region;* 2 years; $9,200

J. Knauss, Scripps Institution of Oceanography, La Jolla; *Direct Current Measurements;* 1 year; $71,400

George C. Kennedy and Leason Adams, Los Angeles; *Rapidly-Running Transitions at Very High Pressure;* 18 months; $33,400

George C. Kennedy, Los Angeles; *The Evaluation of Thermoluminescence as a Geological and Archeological Tool;* 2 years; $53,200

John E. Tyler, Visibility Laboratory; Scripps Institution of Oceanography, La Jolla; *Hydro Optics Research;* 2 years; $104,300

Harold C. Urey, Scripps Institution of Oceanography, La Jolla; *Isotope Research on Paleotemperatures;* 2 years; $23,000

John Verhoogen; *Iron-Titanium Oxide Minerals;* 3 years; $32,700

Lionel E. Weiss; *Structural Geometry of the Repeatedly Deformed Rocks of the Southern Sierra Nevadas;* 2 years; $9,000

CARTER COUNTY MUSEUM, Ekalaka, Mont.; Marshall E. Lambert; *Fossil Vertebrates of Southeastern Montana;* 5 years; $10,000

UNIVERSITY OF CHILE, Santiago, Chile; Cinna Lomnitz; *Andean Structure;* 2 years; $50,000

UNIVERSITY COLLEGE OF RHODESIA AND NYASALAND, Salisbury, Southern Rhodesia; Dennis I. Gough; *Paleomagnetic Studies in Southern Rhodesia;* 3 years; $22,900

COLORADO SCHOOL OF MINES, Golden, Colo.; Robert M. Hutchinson; *A Petrotectonic and Radiometric Study of the North Part of Pikes Peak, Batholith, Colorado;* 2 years; $15,600

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; D. B. Simons; *Model-Prototype Relationships for Flow and Sediment Transport in Alluvial Channels;* 1 year; $5,100

COLUMBIA UNIVERSITY, New York, N.Y.; Wallace S. Broecker; Lamont Geological Observatory; *Methods of Age Determination Based on Inequilibrium in the Uranium Decay Series;* 3 years; $50,000

Maurice Ewing, Lamont Geological Observatory; *Sediment Drilling in Water Covered Areas;* 1 year; $50,000

Maurice Ewing, Lamont Geological Observatory; *Support of the Research Vessel VEMA;* 1 year; $184,000

David B. Ericson, Robert J. Mezles and Alan W. H. Be, Lamont Geological Observatory, Pallsades; *Oxygen Isotope Determinations of Ancient Surfaces and Bottom Temperatures of the Oceans;* 2 years; $57,400

Marshall Kay; *Comparison of Paleozoic Structure and Faunas in Northwest Europe With Those in Nevada;* 8 months; $3,000

DARTMOUTH COLLEGE, Hanover, N.H.; Richard E. Stoiber; *Minor Elements in Sulfide Minerals;* 2 years; $11,800

DUKE UNIVERSITY, Durham, N.C.; S. Duncan Heron, Jr.; *Nature of Clay Minerals of the Atlantic Coastal Plain;* 2 years; $31,300

EARLHAM COLLEGE, Richmond, Ind.; Ansel M. Gooding; *Pleistocene Geology of Eastern Indiana;* 3 years, $17,800

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Lyman D. Toulmin; *Paleocene and Eocene Guide Fossils of the Coastal Plain of the Southeastern United States;* 27 months; $20,400

FRANKLIN AND MARSHALL COLLEGE, Lancaster, Pa.; Marvin E. Kauffman; *Jurassic Rocks in Western Montana;* 2 years; $7,130

UNIVERSITY OF GEORGIA, Athens, Ga.; Charles A. Salotti; *Field Investigations of Copper-Zinc Skarn Deposit at Cotopaxi, Colorado;* 2½ months; $2,500

John S. Schlee; *The Petrology of Basal Pennsylvanian Rocks of the Southern Appalachians;* 2 years; $14,100

UNIVERSITY OF HAWAII, Honolulu, Hawaii; Gordon A. Macdonald; *Geochemistry of Hawaiian Lavas;* 1 year; $15,700

IDAHO STATE COLLEGE, Pocatello, Idaho; Lawrence P. Richards; *Vertebrate Paleontology of the Tertiary Lake Beds of the Lemhi Valley Region, Idaho;* 1 year; $4,800

UNIVERSITY OF ILLINOIS, Urbana, Ill.; F. J. Steveson; *Paleobiochemical Research;* 2 years; $19,250

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; John B. Droste; *Effect of Diagenesis Upon Clay Minerals in the Saline Environment;* 1 year; $6,500

IOWA STATE UNIVERSITY, Ames, Iowa; Don Kirkham; *Use of Deuterium in Soil-Plant Research;* 2 years; $23,500

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Hans P. Eugster; *Low-Grade Metamorphic Reactions;* 2 years; $23,000

R. B. Montgomery; *Analysis of Serial Oceanographic Observations;* 3 years; $43,600

UNIVERSITY OF KANSAS, Lawrence, Kans.; William K. Hamblin; *Origin and Significance of Reverse Drag Fault Flexure Displacement;* 18 months; $17,000

James A. Peoples, Jr.; *Geophysical Investigations of the Midcontinent Gravity High;* 1 year; $12,600

KING'S COLLEGE, Newcastle-upon-Tyne, England; Stanley Keith Runcorn; *Paleomagnetism;* 2 years; $6,700

LEHIGH UNIVERSITY, Bethlehem, Pa.; J. Donald Ryan; *Cloverly-Inyan Kara Paleosurface;* 2 years; $17,500

Bradford Willard; *Study of the Harvey Bassler Collection;* 2 years; $6,600

LOS ANGELES COUNTY MUSEUM, Los Angeles, Calif.; Theodore Downs; *The Vertebrate Fauna of the Late Cenozoic of the Imperial Valley Region of California;* 1 year; $7,400

LOS ANGELES STATE COLLEGE FOUNDATION, Los Angeles, Calif.; Perry L. Ehlig; *Geology of the Pelona Schist;* 2 years; $6,100

ROYAL R. MARSHALL, Pasadena, Calif.; *Leads in Basalts and Eclogites;* 1 year; $7,950

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Arthur J. Boucot; *Silurian and Lower Devonian Shelly Faunas;* 8 years; $25,900

Harold W. Fairbairn; *Purchase of an X-Ray Fluorescence Spectograph and Associated Equipment;* 3 months; $20,000

UNIVERSITY OF MASSACHUSETTS, Amherst, Mass.; George E. McGill; *Tectonic Development of the Imbricate Fault Zone of the*

Sawtooth and Lewis and Clark Ranges; 3 years; $10,620

UNIVERSITY OF MIAMI, Coral Gables, Fla.; Cesare Emiliani; The Marine Laboratory, Miami; *Paleotemperature Research;* 3 years; $50,000

F. F. Koczy; *Feasibility Study for a Catamaran for Oceanographic Research;* 1 year; $18,600

F. F. Koczy, The Marine Laboratory, Miami; *Geochemistry of Radioactive Elements in the Marine Environment;* 1 year; $13,000

F. F. Koczy; *Support of the Research Vessel GERDA;* 1 year; $28,000

Gene A. Rusnak and Gote Ostlund; *Radiocarbon Dating Laboratory;* 2 years; $63,700

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; John M. DeNoyer; *Geophysical Investigations in the Huerfano Basin;* 2 years; $15,600

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Paul W. Gast; *Isotopes of Lead and Strontium;* 2 years; $29,000

Frederick M. Swain; *Carbon Cycles of the Jurassic Period;* 2 years; $10,500

UNIVERSITY OF MISSOURI, Columbia, Mo.; Don L. Frizzell; *Taxonomic Study of Fossil and Recent Fish Otoliths;* 2 years; $10,700

MONTANA STATE UNIVERSITY, Missoula, Mont.; Robert W. Fields; *Stratigraphy and Paleontology of the Intermontane Basins of Western Montana;* 3 years; $11,225

John Hower; *Comparison of Recent and Ancient Glauconites;* 1 year; $3,000

NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.; John N. Adkins; *Experimental Drilling in Deep Water;* 1 year; $172,550

John N. Adkins; *Study of the Problem of Drilling a Hole to the Mohorovicic Discontinuity;* 1 year; $80,500

UNIVERSITY OF NEW HAMPSHIRE, Durham, N.H.; Cecil J. Schneer; *Thermal Basis for Polytypism;* 2 years; $20,000

NEW YORK UNIVERSITY, New York, N.Y.; Brooks F. Ellis; *Lithofacies and Ostracod Studies in Long Island Sound;* 1 year; $5,000

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; Virgil I. Mann; *Gravity Survey in North Carolina;* 2 years; $12,700

OBERLIN COLLEGE, Oberlin, Ohio; Kathryn H. Clisby; *Pollen Studies and Pleistocene Chronology of San Augustin Plains;* 2 years; $3,360

OFFICE OF NAVAL RESEARCH, Washington, D.C.; Capt. J. C. Myers, USN; *Committee on Oceanography of the National Academy of Sciences;* 1 year; $20,000

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; R. P. Goldthwait; *Structure in the Stagnant Ice of Burroughs Glacier, Glacier Bay, Aklaska;* 15 months; $6,000

Leslie C. Coleman; *Ionic Substitution in Monoclinic Pyroxenes;* 2 years; $16,400

Richard P. Goldthwait; *Slope Form in Relation to Micro-Climate;* 2 years; $3,500

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; Charles G. Dodd; *Clay-Mineral Geochemical Research Program Related to the Occurrence of Borates;* 1 year; $10,400

H. E. Hunter; *Petrology of the Basic Intrusive Rocks of the Wichita Mountains;* 1 year; $12,000

OREGON STATE COLLEGE, Corvallis, Oreg.; Wayne V. Burt; *Operation of an Oceanographic Research Vessel;* 1 year; $50,000

W. H. Taubeneck; *Structure and Petrogenesis of Part of the Wallowa Mountains;* 4 Years; $350

UNIVERSITY OF OREGON, Eugene, Oreg.; J. Arnold Shotwell; Museum of Natural History; *Late Eocene Mammals of the Clarno Fauna of Oregon;* 2 years; $13,500

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; Benjamin F. Howell, Jr.; *Seismic Measurements of Crustal Thickness in the Central Appalachian Region;* 2 years; $15,900

M. L. Keith; *Composition of Calcareous Fossils and Limestones;* 2 years; $18,500

E. F. Osborn and Arnulf Muan; *The Role of Oxygen Pressure in the Crystallization and Differentiation of Basaltic Magma;* 3 years; $50,000

Joseph V. Smith and M. E. Bell; *Mineralogy of the Amphiboles;* 1 year; $9,200

O. F. Tuttle and C. W. Burnham; *Vapor Phase Composition in Granitic Magmas;* 2 years; $70,000

POMONA COLLEGE, Claremont, Calif.; Gerhard F. M. Oertel; *Mechanical Anisotropy of Solids During Deformation;* 1 year; $11,500

PRINCETON UNIVERSITY, Princeton, N.J.; William E. Bonini; *Seismic Crustal Measurements;* 2 months; $9,500

Alfred G. Fischer; *Paleographic and Teotonic Developments of Part of the Northern Calcareous Alps in Early Mesozoic Time;* 3 years; $22,900

John C. Maxwell; *Nature and Origin of the Rocky Mountain Crusted Structural Features;* 3 years; $27,800

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Philip F. Low; *The Relation Between Ion Diffusion in Clay Systems and the Properties of Clay-Adsorbed Water;* 3 years; $18,000

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; Samuel Katz; *Elastic Constants at High Pressure and Temperature;* 1 year; $8,600

SAINT LOUIS UNIVERSITY, St. Louis, Mo.; Otto W. Nuttli; *Motion of the Earth's Surface Produced by the S. Wave of Earthquakes;* 1 year; $8,400

SMITHSONIAN INSTITUTION, Washington, D.C.; E. P. Henderson; *Acquisition of Beyer Tektite Collection;* 6 months; $8,000

SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.; Eugene Herrin, Dallas Seismological Observatory; *Study of Regional Variations in Seismic Travel Time Data;* 2 years; $28,700

UNIVERSITY OF SOUTH DAKOTA, Vermillion, S. Dak.; Hugh D. Carlson; *The Petrology of the Tertiary Igneous Rocks of the Black Hills of South Dakota;* 2 years; $23,000

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; K. O. Emery; *Partial Support of Operation R/V Velero IV;* 2 years; $80,000

Paul Saltman and K. O. Emery; *Amino Acids in Basin Sediments Off Southern California;* 1 year; $23,300

SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.; Dirk de Waard; *Metamorphis-Tectonic Analysis of Precambrian Structures in the Southwestern Adirondack Mountains;* 3 years; $32,500

TEXAS AGRICULTURAL AND MECHANICAL RE-

SEARCH FOUNDATION, College Station, Tex.; Richard G. Bader; *Bathymetry and Sediments of the Bay of Campeche;* 2 years; $17,000

Donald W. Hood; *C^{14}/C^{12} Ratio of Organic and Inorganic Carbon Fraction of Waters of the Caribbean and Gulf of Mexico;* 1 year; $20,000

Donald W. Hood; *The Calcium Carbonate Solubility Equilibrium in Sea Water;* 2 years; $36,500

Hugh J. McLellan; *Aid for Operating a Research Vessel for Basic Studies in Physical Oceanography and Marine Geophysics;* 1 year; $30,350

UNIVERSITY OF TEXAS, Austin, Tex.; Virgil E. Barnes; *Research on Composition and Origin of Tektites;* 2 years; $36,000

Ronald K. Deford; *Study of the Petrography, Biostratigraphy;* 2 years; $30,000

Ernest L. Lundelius, Jr.; *A Paleoecological and Chronological Study of the Fossil Vertebrates Faunas from the Pleistocene River Terrace Deposits of Central Texas;* 2 years; $8,300

Keith Young; *Curating the Adkins Paleontological Collections;* 4 years; $32,000

U.S. COAST AND GEODETIC SURVEY, Washington, D.C.; J. H. Nelson; *World Data Center for Geomagnetism, Gravity, and Seismology;* 1 year; $35,000

Harris B. Stewart, Jr.; *Oceanographic Studies;* 1 year; $43,500.

UNIVERSITY OF UTAH, Salt Lake City, Utah; Kenneth L. Cook; *Geophysical Studies of the Belt of Great Trenches in Utah;* 18 months; $25,000

Armand J. Eardley; *Study of the Quaternary Sediments of the Great Salt Lake Desert;* 2 years; $27,100

VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg, Va.; Bruce W. Nelson; *Clay Mineral Diagenesis;* 3 years; $37,000

Charles I. Rich; Virginia Agriculture Experiment Station; *Aluminum Fixation in Interlayers of Expanded Clay Minerals;* 3 years; $20,200

WASHINGTON UNIVERSITY, St. Louis, Mo.; H. N. Andrews, Jr.; *Paleozoic Plants;* 3 years; $800

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Arthur W. Fairhall; *Specific C^{14} Activity of Sequoia Wood;* 1 year; $11,000

Richard H. Fleming; *Preliminary Mass Spectrometric Investigations;* 1 year; $4,800

Richard H. Fleming; *Recent Sediments in Northeast Pacific;* 2 years; $19,900

J. Hoover Mackin; *Tertiary Deformational History of the Great Basin-Colorado Plateau Transition Zone in Southwestern Utah;* 3 years; $26,100

Francis A. Richards; *Chemical and Related Oceanographic Studies of Oxygen-Deficient Marine Environment;* 2 years; $27,800

UNIVERSITY OF WISCONSIN, Madison, Wis.; John C. Rose; *Development of a Portable Apparatus for Determination of Absolute Gravity to One Milligal or Better;* 1 year; $26,300

George P. Woollard; *Gravity Data in the United States;* 1 year; $2,450

George P. Woollard, and R. P. Meyer; *Continuation of Seismic Refraction Crustal Studies in Selected Areas of Geologic Structure and/or Pronounced Gravity Anomalies;* 1 year; $54,700

WOODS HOLE OCEANOGRAPHIC INSTITUTION, Woods Hole, Mass.; Vaughan T. Bowen; *Chemical and Geochemical Studies in the Sea;* 2 years; $300,000

J. B. Hersey; *Analysis of Geological Survey Data;* 1 year; $15,700

YALE UNIVERSITY, New Haven, Conn.; Carl O. Dunbar, Peabody Museum of Natural History; *Curating Peabody Museum's Systematic Collection of Fusuline Foraminifera;* 1 year; $6,200

Mead LeRoy Jensen; *Mass Spectroscopy as an Aid in Determining the Origin of Mineral Deposits;* 2 years; $30,000

Karl K. Turekian; *Geochemistry of the Deep-Sea Sediments;* 2 years; $40,000

ECONOMIC SCIENCES

UNIVERSITY OF CHICAGO, Chicago, Ill.; Norton S. Ginsburg; *Study of Asian Urbanization;* 1 year; $15,000

HARVARD UNIVERSITY, Cambridge, Mass.; Burton H. Klein; *Economics of Research and Development;* 1 year; $14,400

Thomas C. Schelling; *Experimental Study of Bargaining;* 18 months; $26,500

IOWA STATE UNIVERSITY, Ames, Iowa; George Ladd and Wayne Fuller; *Distributed Lags in Econometric Analysis;* 2 years; $17,500

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Daniel B. Suits; *Research in Quantitative Economics;* 3 years; $56,500

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Jacob Schmookler; *The Economics of Invention;* 2 years; $2,850

NATIONAL BUREAU OF ECONOMIC RESEARCH, INC., New York, N.Y.; Geoffrey H. Moore; *Computer Studies of Business Cycles;* 3 years; $96,000

PORTLAND STATE COLLEGE, Portland, Oreg.; Clarke H. Brooke, Jr.; *Geography of Famine in Tanganyika;* 1 year; $13,000

PRINCETON UNIVERSITY, Princeton, N.J.; Fritz Machlup; *Economic Aspects of Inventions;* 2 years; $28,136

Oskar Morgenstern; *Mathematical Methods for Time Series Analysis;* 3 years; $50,000

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Vernon W. Ruttan; *Interrelationships Among Technological Change, Research Expenditures and Resource Requirements;* 2 years; $18,000

UNIVERSITY OF ROCHESTER, Rochester, N.Y.; Alexander Eckstein; *Study of Economic Fluctuations;* 2 years; $18,400

Lionel W. McKenzie; *Theory of the Competitive Economy;* 3 years; $32,500

Richard N. Rosett; *Investigation of Household Economic Behavior;* $1,400

Edward Zabel; *Efficient Accumulation of Capital;* 1 year; $2,900

SACRAMENTO STATE COLLEGE, Sacramento, Calif.; David E. Sopher; *Tribal Relocation in the Chittagong Hills;* $14,100

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Richard L. Morrill; *Simulation of Central Place Patterns;* 2 years; $15,800

UNIVERSITY OF WISCONSIN, Madison, Wis.; Guy Orcutt; *Economic Model Formulation and Analysis;* 3 years; $104,000

ENGINEERING SCIENCES

UNIVERSITY OF ALASKA, College, Alaska; Donald J. Cook; *The Magnetic Susceptibilities of Principal Minerals of the Light Metal Group;* 3 years; $39,800

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Gene M. Nordby; *Dielectric Constants of Concrete and its Constituents;* 2 years; $20,600

Donald C. Stinson; *Frequency Multiplying in Microwave Ferrites;* 3 years; $38,900

ARIZONA STATE UNIVERSITY, Tempe, Ariz.; Truet B. Thompson; *Time Series Approximation Synthesis of Delay-Type Devices;* 1 year; $11,500

UNIVERSITY OF ARKANSAS, Fayetteville, Ark.; Donald A. Gilbrech; *An Experimental and Theoretical Investigation of Laminar-Turbulent Transitions in Pulsating Flow Through Flexible-Elastic Tubes;* 2 years; $21,600

BROWN UNIVERSITY, Providence, R.I.; Joseph Kestin and John Ross; *Experimental and Theoretical Investigations into the Thermodynamic Functions of Substances;* 3 years; $101,200

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; Cornelius J. Pings; *Structure of Liquids;* 18 months; $13,600

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Cyril P. Atkinson and E. M. Rosenberg; *Vibrations of Nonlinear Systems Having Two Degrees of Freedom;* 3 years; $56,500

G. M. Corcos; *Turbulent Pressure Field in Fully Developed Pipe Flow;* 1 year; $18,800

J. T. Gier and R. V. Dunkle, Los Angeles; *Basic Studies on Solar Energy;* 2 years; $51,000

J. T. Gier and D. K. Edwards, Los Angeles; *Gaseous Radiation Studies;* 2 years; $27,800

Eldon L. Knuth, Los Angeles; *Free-Molecule Transfer Processes at High Speeds;* 3 years; $75,800

Hugh D. McNiven; *Vibrations of Finite, Elastic Rods;* 2 years; $15,800

Joseph A. Pask; *Rheology of Non-Ideal Dispersed Systems;* 3 years; $37,400

Donald Pederson, Charles A. Desoer and Ernest S. Kuh; *Actio Circuits;* 2 years; $38,800

R. A. Seban; *The Effect of Local Air Injection on the Heat Transfer from a Flat Plate;* 1 year; $12,400

L. M. Tichvinsky; *Stability of and Turbulence in Lubrication Films;* 1 year; $9,600

C. J. Vogt; *Physical Properties of Liquid Hydrocarbons at Elevated Pressure and Temperature;* 1 year; $5,900

C. R. Wilke, Andreas Acrivos, E. E. Petersen and J. M. Prausnitz; *Mass Transfer Mechanisms;* 3 years; $125,200

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; J. F. Osterle; *Fundamental Studies of Viscous Flow;* 2 years; $31,400

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HASKINS LABORATORIES, INC., New York, N.Y.; John J. A. McLaughlin and Seymour H. Hutner; *Phytoplankton Organisms of Bloom Waters;* 2 years; $25,500

HATHEWAY SCHOOL OF CONSERVATION, Massachusetts Audubon Society, Drumlin Farm, South Lincoln, Mass.; William H. Drury, Jr.; *Quantitative Studies of Bird Migration;* 2 years; $37,600

UNIVERSITY OF HAWAII, Honolulu, Hawaii; James C. Moomaw; *The Role of Soil Type in the Uptake of Phosphorus by Tropical Plants;* 3 years; $25,900

Leonard D. Tuthill; *Ecology of Cryptotermes Brevis;* 1 year; $3,800

HIGHLANDS BIOLOGICAL STATION, Highlands, N.C.; Robert E. Gordon; *Locomotive Periodicity in Plethodons;* 3 years; $24,300

UNIVERSITY OF IDAHO, Moscow, Idaho; Philip C. Dumas; *Rana Complex of the Pacific Northwest;* 3 years; $18,800

UNIVERSITY OF ILLINOIS, Urbana, Ill.; Bernard Greedberg; *Persistence of Bacteria in Blowflies;* 2 years; $11,800

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; David G. Frey; *Cladocera Re-*

mains in Lacustrine Sediments; 3 years; $22,700

IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa.; Kenneth D. Carlander; *Biology of Caddis and Mayflies;* 3 years; $22,500

LAKELAND FOUNDATION, Chicago, Ill.; Clifford E. Ahlgren, Quetico-Superior Wilderness Research Center; *Effects of Fire in Coniferous Forests;* 2 years; $9,800

LA SIERRA COLLEGE, Arlington, Calif.; Earl W. Lathrop; *Ecology of the Grasslands of the Tenaja Range;* 1 year; $2,700

MARQUETTE UNIVERSITY, Milwaukee, Wisc.; Rezneat M. Darnell; *Quantitative Aspects of Secondary Production in Estuarine Fish Populations;* 2 years; $12,000

UNIVERSITY OF MIAMI, Coral Gables, Fla.; John E. Randall, The Marine Laboratory, Miami; *Ecology of Coral Reef Fishes;* 1 year; $14,600

Ruth L. Wormelle, The Marine Laboratory, Miami; *Distribution of Pteropods in the Florida Current;* 1 year; $4,000

Peter J. Wangersky, The Marine Laboratory; *Prediction of Population Growth Patterns;* 2 years; $5,600

MICHIGAN STATE UNIVERSITY, East Lansing, Mich.; E. W. Roelofs and P. O. Fromm; *Influence of Photoperiodicity and Thyroid Activity on Fish Growth;* 2 years; $7,300

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Francis C. Evans; *Structure and Composition of Insect Communities;* 3 years; $35,200

Nelson G. Hairston; *Interspecific Relationships in Populations of Paramecium;* 4 years; $42,800

UNIVERSITY OF MICHIGAN RESEARCH INSTITUTE, Ann Arbor, Mich.; William S. Benninghoff and Claude W. Hibbard; *Pollen Analysis of Late Cenozoic Sediments;* 2 years; $6,300

UNIVERSITY OF MINNESOTA, St. Paul, Minn.; William H. Marshall; *Electronic Methods for Tracing Animal Movements;* 1 year; $1,500

Thomas F. Waters; *Trophic Structure of Fresh Water Stream Communities;* 3 years; $23,200

MONTANA STATE UNIVERSITY, Missoula, Mont.; Richard D. Taber and Robert S. Hoffman; *Ecology of Alpine Communities;* 1 year; $2,700

John J. Craighead; *Ecology of Ursus Horribilis;* 5 years; $19,400

NATIONAL PARK SERVICE, U.S. Department of the Interior, Carlsbad, N. Mex.; James K. Baker; *Biology of Petrochelidon Fulva;* 3 years; $8,700

UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; Robert W. Goss; *Mycorrhizae of Pinus Ponderosa in Grassland Soils;* 1 year; $9,900

NEW MEXICO HIGHLANDS UNIVERSITY, Las Vegas, N. Mex.; Lora M. Shields; *Algal Species in Semidesert Soils;* 1 year; $15,600

NEW MEXICO STATE UNIVERSITY, State College, N. Mex.; Ralph J. Raitt; *Annual Cycle of Lophortyx Gambelii;* 2 years; $8,200

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; William E. Fahy; *Meristic Structures in Fishes;* 3 years; $30,100

Gerald S. Posner; *Dynamics of an Estuarine Plankton Population;* 3 years; $26,500

NORTH DAKOTA STATE COLLEGE, Fargo, N. Dak.; Gregory B. Mulkern; *Food Habits and Preferences of Acridoid Orthoptera;* 3 years; $18,900

UNIVERSITY OF NORTH DAKOTA, Grand Forks, N. Dak.; Paul B. Kannowski; *Formicid Distribution and Populations in Relation to Environmental Factors;* 3 years; $8,800

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; Robert P. McIntosh; *Quantitative Ecological Study of the Vegetation of the Catskills;* 4 years; $15,400

OHIO WESLEYAN UNIVERSITY, Delaware, Ohio; J. Gordon Ogden; *Pollen-Stratigraphic Studies on the Vegetational and Climatic History of Ohio;* 3 years; $12,900

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; William T. Penfound; *Plant Succession in a Tall Grass Prairie;* 2 years; $5,900

OREGON STATE COLLEGE, Corvallis, Oreg.; W. K. Ferrell; *Photosynthetic and Respiratory Behavior of Douglas-fir Ecotypes;* 4 years; $35,600

Julius A. Rudinsky; *Population Dynamics of the Douglas-fir Beetle;* 2 years; $7,000

Charles E. Warren; *Dynamics of Simplified Stream Communities;* 3 years; $24,500

Ernest Wright and W. B. Bollen; *Soil Microbiology of North and South Aspects of Coast Range Forest Slopes;* 1 year; $7,200

UNIVERSITY OF OREGON, Eugene, Oreg.; Peter W. Frank; *A Population Study of Internal Limpets;* 3 years; $18,900

J. Arnold Shotwell, Museum of Natural History; *Environmental Change as a Factor in Mammalian Evolution;* 2 years; $19,000

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Robert H. MacArthur; *Comparison of Bird Species, Diversity and Habitat;* 3 years; $18,300

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; Richard C. Dugdale; *Phosphorus and Nitrogen Metabolism of Alaska Lakes;* 2 years; $27,000

PRINCIPIA COLLEGE, Elash, Ill.; Paul D. Kilburn; *Species-Area Relationships in Vegetation Types;* 3 years; $14,300

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Durward L. Allen; *Dynamics and Ecology of Castor Canadensis;* 3 years; $17,800

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; John G. New, State University Teachers College, Oneonta; *Life History of Percina Peltata Peltata (Stauffer);* 3 years; $900

UNIVERSITY OF RHODE ISLAND, Kingston, R.I.; Nelson Marshall; *Research on Life History of Aequipecten Irradians;* 3 years; $13,700

RICKS COLLEGE, Rexburg, Idaho; L. C. Pearson; *Annual Energy Budgets of Arid Plant Communities;* 2 years; $6,000

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Paul G. Pearson; *The Effects of Social Organization and Stress on Rodent Population;* 3 years; $23,300

ST. OLAF COLLEGE, Northfield, Minn.; Howard D. Orr; *Orientation of Small Mammals to Specific Areas;* 2 years; $7,000

UNIVERSITY OF ST. THOMAS, Houston, Tex.; J. P. Kennedy; *Reproductive Success in Sceloporus;* 2 years; $12,500

SAN JOSE STATE COLLEGE, San Jose, Calif.; L. Richard Mewaldt; *Migratory Restlessness in Birds;* 3 years; $12,400

UNIVERSITY OF SASKATCHEWAN, Saskatoon, Canada; Donald S. Rawson; *Dissolved Solids and Lake-Stream Productivity;* 2 years; $10,100

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; Orville J. Bandy; *Paleoecology of the Tecolote Tunnel Section of the Santa Ynez Mountains;* 2 years; $10,100

John S. Garth and Jay M. Savage; *Ecological Survey of Mid-water Marine Populations;* 1 year; $24,500

J. L. Mohr; *Faunas of the Central Arctic Basin and the Arctic Continental Shelf;* 2 years; $26,300

STANFORD UNIVERSITY, Stanford, Calif.; Walter C. Brown; *Herpteofauna of Philippine Tropical Forests;* 2 years; $14,700

TENNESSEE POLYTECHNIC INSTITUTE, Cookeville, Tenn.; Thomas C. Barr, Jr., *Speciation of Certain Carabidae in the Southern Appalachians;* 1 year; $5,600

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; J. Orvin Mundt; *Distribution of Group D Streptococci;* 2 years; $5,500

TEXAS TECHNOLOGICAL COLLEGE, Lubbock, Tex.; Vernon W. Proctor; *Autecology of Chara;* 3 years; $17,400

UNIVERSITY OF TEXAS, Austin, Tex.; Bassett Maguire, Jr., *Ecology and Genetics of Cave Dwelling Crustacea;* 3 years; $12,500

W. N. McFarland, Institute of Marine Science, Port Aransas; *Temperature Effects on Metabolism of Marine Ecosystems;* 2 years; $28,400

Calvin McMillan; *Comparative Studies of Grasses;* 1 year; $42,000

Howard T. Odum, Institute of Marine Science, Port Aransas; *Ecological Microcosms;* 3 years; $60,500

THIEL COLLEGE, Greenville, Pa.; John B. Stahl; *Biostratonomy of Profundal Dipteran Larvae;* 3 years; $8,000

TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; Franklin Sogandares-Bernal; *Life History and Ecology of Certain Opisthorchioid Trematodes;* 3 years; $19,600

Gerald E. Gunning; *Occupancy of Home Ranges by Centrarchids;* 2 years; $4,300

Alfred E. Smalley; *Trophic Efficiencies of Marsh Herbivores;* 2 years; $6,800

UNIVERSITY OF UTAH, Salt Lake City, Utah; Albert W. Grundmann; *Host-Parasite Interrelationships in Different Habitats;* 2 years; $17,500

VANDERBILT UNIVERSITY, Nashville, Tenn.; Elsie Quarterman; *Autecology of Lesquerella;* 4 years; $19,900

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Richard H. Fleming; *Foraminifera From Northeast Pacific Cores;* 2 years; $17,300

Dora P. Henry; *Systematics and Ecology of Eastern Pacific Barnacles;* 3 years; $37,100

Arthur R. Kruckeberg; *Plant Life of Serpentine Soils;* 5 years; $19,000

UNIVERSITY OF WISCONSIN, Madison, Wis.; Grant Cottam; *Structure and Synamics of the Maple Forest Community;* 3 years; $21,000

Arthur D. Hasler; *Migration Orientation of Pluvialis Dominica;* 2 years; $12,600

John T. Medler; *Population Study of Formica Cinerea Mayr;* 2 years; $8,700

WOODS HOLE OCEANOGRAPHIC INSTITUTION, Woods Hole, Mass.; Richard H. Backus; *Composition of Ocean Deep Scattering Layers;* 3 years; $80,600

Herbert Curl, Jr.; *Ecological Physiology of Marine Plankton Organisms;* 2 years; $42,500

John W. Kanwisher; *Energy Requirements of Benthic Marine Communities;* 3 years; $45,600

Bostwick H. Ketchum; *Microbiological Nutrification in the Oceans;* 3 years; $41,500

Bostwick H. Ketchum; *Nitrogen Cycle in the Sea;* 3 years; $41,600

John H. Ryther; *Environmental Physiology of Marine Plankton Algae;* 3 years; $53,300

Mary Sears; *Environmental Factors in Zooplankton Distribution;* 1 year; $13,600

YALE UNIVERSITY, New Haven, Conn.; James M. Blaut; *An Ecological Study of Swidden Agriculture;* 1 year; $10,000

Edward S. Deevey, Osborn Zoological Laboratory; *Paleolimnology;* 2 years $20,000

S. Dillon Ripley, Peabody Museum of Natural History; *Comparative Analytical Study of Megapode Developmental Adaptations;* 2 years; $6,800

Talbot H. Watermann; *Diurnal Migrations by Aphotic Zone Zooplankton;* 2 years; $12,500

GENETIC BIOLOGY

UNIVERSITY OF ARIZONA, Tucson, Ariz.; William B. Heed; *Evolutionary Studies in the Genus Drosophila;* 1 year; $9,200

BEREA COLLEGE, Berea, Ky.; Frank Seto; *Period of Action of Recessive Lethals in Drosophila Melanogaster;* 2 years; $5,000

BRANDEIS UNIVERSITY, Waltham, Mass.; Albert Kelner; *Spontaneous Mutation in Bacteria;* 3 years; $30,000

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; N. H. Horowitz; *Genetic Studies on Enzyme Synthesis;* 3 years; $76,300

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; David P. Bloch; *Histone Synthesis and Role of Histones in Cell Division and Development;* 2 years; $29,300

Spencer W. Brown; *Nature and Evolution of Lecano-Diaspidid Genetic Systems;* 3 years; $59,200

Bernard O. Phinney; Los Angeles; *Genetical Studies With Dwarf Mutants of Zea Mays;* 3 years; $61,500

Charles M. Rick, Davis; *Cyto-Genetics of Tomato Species Hybrids;* 4 years; $51,400

Richard W. Siegel, Los Angeles; *Analyses of Hereditary Endosymbiosis and Mating Type Determination in Paramecium;* 3 years; $27,200

Richard Snow; Davis; *Chromosomal Rearrangement in Two Species of Clarkia;* 2 years; $7,800

David A. Rodgers and Gerald E. McClearn; *Ethyl Alcohol Preference of Mice;* 1 year; $10,000

G. Ledyard Stebbins, Davis; *Developmental Genetics of Single Gene Differences in Barley;* 2 years; $41,000

UNIVERSITY OF CHICAGO, Chicago, Ill.; Edward D. Garber; *Chromosomal and Genetic Homology in the Genus Collinsia;* 3 years; $30,800

Hewson Swift; *Cytochemical Studies on Nucleic Acids;* 3 years; $73,600

CHILDREN'S CANCER RESEARCH FOUNDATION, Boston, Mass.; George Yerganian; *Genetics and Cytology of the Chinese Hamster;* 2 years; $50,000

CITY OF HOPE MEDICAL CENTER, Duarte, Calif.; William D. Kaplan; *Sterility Component of X-Ray and Chemically Induced Dominant Lethals in D. Melanogaster;* 1 year; $9,100

COLUMBIA UNIVERSITY, New York, N.Y.; Francis J. Ryan; *Mutation as a Macromolecular Process;* 3 years; $48,300

J. Herbert Taylor; *Genetic and Cytological Studies on the Genus Sciara;* 1 year; $12,800

CORNELL UNIVERSITY, Ithaca, N.Y.; L. F. Randolph; New York State College of Agriculture; *Cytogenetic Studies of Horticultural and Crop Plants;* 3 years; $22,000

Bruce Wallace; *Studies on the Microgrowth of Neurospora Hyphae;* 1 year; $3,300

DARTMOUTH COLLEGE, Hanover, N.H.; Raymond W. Barratt; *Collection and Maintenance of Genetic Stocks;* 3 years; $32,300

DUKE UNIVERSITY, Durham, N.C.; Lewis E. Anderson; *Diminutive Chromosomes in Bryophytes;* 2 years; $15,500

ELMIRA COLLEGE, Elmira, N.Y.; Ruth Z. Korman; *Genetic Studies on Staphylococci;* 3 years; $21,300

EMORY UNIVERSITY, Atlanta, Ga.; William H. Murdy; *Relationship Between Characters of Growth, Morphology and Cytology in Maize;* 2 years; $7,000

Charles Ray, Jr.; *Cytogenetic Studies of Tetrahymena Pyriformis;* 2 years; $15,000

UNIVERSITY OF FLORIDA, Gainesville, Fla.; J. R. Edwardson and M. K. Corbett; *The Nature of Cytoplasmic Male-Sterility in Higher Plants;* 2 years; $24,500

FREDERIC BURK FOUNDATION FOR EDUCATION OF SAN FRANCISCO STATE COLLEGE, San Francisco, Calif.; Sarane T. Bowen; *Genetic and Environmental Variation in Artemia Salina;* 2 years; $6,000

UNIVERSITY OF GEORGIA, Athens, Ga.; H. Branch Howe, Jr.; *Genetic Studies on Mating Type in Neurospora Crassa;* 2 years; $14,000

HARTNELL COLLEGE, Salinas, Calif.; James F. Wilson; *Investigation of Certain Problems in the Biology of Neurospora;* 3 years; $21,800

HARVARD UNIVERSITY, Cambridge, Mass., R. P. Levine; *Genetics of Chlamydomonas Reinhardi;* 2 years; $10,700

Stephan R. Taub; *Genetics of Mating Type Inheritance in Paramecium Aurelia;* 2 years; $13,800

UNIVERSITY OF HAWAII, Honolulu, Hawaii; H. Kamento; *Cytotaxonomy, Origin and Evolution of Orchid Species;* 2 years; $18,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.; Jerry Hirsch; *Experimental Behavior Genetics;* 2 years; $23,300

E. B. Patterson; *Studies of Genetic and Chromosomal Tester Stocks of Maize;* 3 years; $43,900

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; Stanley Zimmering; *Modification of Abnormal Gametic Ratios;* 2 years; $16,300

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Herman M. Kalckar; *Biochemical Genetics With Special Reference to Galactose Metabolism;* 3 years; $32,300

C. A. Thomas, S. R. Siskind, and P. E. Hartman; *Mode of Replication of a Phage;* 3 years; $59,900

C. A. Thomas; *Infectivity of Chemically Degraded and Reconstituted Bacteriophage;* 3 years; $28,900

Theodore R. F. Wright; *Basement Membranes of an Embryonic Lethal in Drosophila;* 2 years; $13,400

KANSAS STATE UNIVERSITY, Manhattan, Kans.; Abraham Eisenstark; *Genetic Control of Protein Specificity in Phage T3;* 2 years; $28,600

KENTUCKY RESEARCH FOUNDATION, Lexington, Ky.; Herbert Parkes Riley; *Chromosome Studies in Haworthia and Other South African Plants;* 2 years; $6,600

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Roger D. Milkman; *Analysis of a Polygenic System in Drosophila Melanogaster;* 2 years; $15,000

Robert R. Miller; *Speciation in Poeciliid Fishes;* 2 years; $26,400

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Ralph E. Comstock; *Linkage in Finite Cross-Fertilizing Populations;* 3 years; $77,200

Joseph G. Gall; *Some Structural and Chemical Features of Animal Cell Nuclei;* 5 years; $49,300

James C. Underhill; *Variation in Meristic Characters in Fishes;* 2 years; $7,100

UNIVERSITY OF MISSOURI, Columbia, Mo.; E. H. Coe, Jr.; *Unorthodox Inheritance in Maize;* 3 years; $18,700

E. R. Sears; *Cytogenetic Studies With Polyploid Species of Wheat;* 3 years; $46,300

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; B. J. Zobel; *Quantitative Genetic Studies in Loblolly Pine and Sweetgum;* 5 years; $65,300

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; William B. McIntosh; *Comparative Genetics of the Dearmouse and the Laboratory Mouse;* 2 years; $15,000

Henry L. Plaine; *The Nature of the Induction of Uncontrolled Growths by Specific Genes;* 1 year; $9,300

OHIO WESLEYAN UNIVERSITY, Delaware, Ohio; Robert W. Long; *Polyploidy and Subspeciation in the Helianthus Nuttallii Complex (Compositae);* 2 years; $3,700

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; Gerald Braver; *Intrachromosomal Effect of Crossing Over in Drosophila Melanogaster;* 2 years; $13,700

OREGON STATE COLLEGE, Corvalis, Oreg.; J. D. Mohler; *Phenogenetic Analysis of Gene Action in Polygenic Systems;* 2 years; $11,300

Robert M. Storm; *Studies on Biological Characteristics and Taxogenetic Features of Rana Aurora and Rana Pretiosa;* 1 year; $8,000

UNIVERSITY OF OREGON, Eugene, Oreg.; E. Novitski; *Genetics of Drosophila;* 3 years; $104,900

Franklin W. Stahl; *Growth, Mutation and Recombination in Bacteriophage;* 3 years; $85,200

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; Ellis Englesberg; *Genetics and Physiology of the Diauxie Phenomenon;* 4 years; $62,300

PRINCETON UNIVERSITY, Princeton, N.J.; Bruce M. Eberhart; *Enzyme Activity in Neurospora Crassa;* 2 years; $13,500

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Oliver E. Nelson; *Genetic Fine Structure of the Wx/wx Region in Maize;* 2 years; $21,200

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RESEARCH FOUNDATION, Oklahoma State University, Stillwater, Okla.; Margaret Hoover Brooks; *Gene Action in Cytoplasmic Male Sterility in Sorghum;* 2 years; $14,100

ROCKEFELLER INSTITUTE, New York, N.Y.; Rollin D. Hotchkiss; *Deoxyribonucleates Having Genetic Transforming Activity;* 8 years; $49,500

SAINT LOUIS UNIVERSITY, Saint Louis, Mo.; Irwin H. Herskowitz; *Genetic Studies of the Interaction Between Metabolism and Mutagenesis;* 1 year; $3,000

SANTA BARBARA BOTANIC GARDENS, Santa Barbara, Calif.; Marta S. Walters; *A New Organelle in Microsporocytes of Bromus;* 3 years; $12,800

SOUTHWESTERN LOUISIANA INSTITUTE, Lafayette, La.; William L. Flannery; *Mutational Origin of Halophilic Bacteria;* 1 year; $2,500

UNIVERSITY OF UTAH, Salt Lake City, Utah; Robert K. Vickery, Jr.; *Cytogenetic Studies of the Patterns of Evolution in Mimulus;* 2 years; $26,800

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Howard C. Douglas; *Electron Microscopy of Microorganisms;* 2 years; $27,900

Herschel L. Roman; *Transformation in Yeast;* 1 year; $4,400

UNIVERSITY OF WISCONSIN, Madison, Wis.; Sewall Wright; *Evolution and Genetics of Populations;* 3 years; $30,600

WOMAN'S MEDICAL COLLEGE OF PENNSYLVANIA, Philadelphia, Pa.; Max Levitan; *Population Dynamics of Linked Chromosomal Variants;* 2 years; $15,900

YALE UNIVERSITY, New Haven, Conn.; John Buettner-Janusch; *Chromosomal Evolution in the Order Primates;* 2 years; $42,400

Norman H. Giles; *Genetic Control of Adenine Biosynthesis;* 3 years; $45,900

Harry P. Rappaport; *Relationship Between the Transforming Principle and Some Enzymes of Bacillus Subtilis;* 2 years; $21,800

Charles L. Remington; *Evolution in Natural Populations of Lepidoptera;* 3 years; $3,400

Charles L. Remington; *Evolution in Natural Populations of Lepidoptera;* 2 years; $35,000

HISTORY AND PHILOSOPHY OF SCIENCE

AUGUSTANA COLLEGE, Rock Island, Ill.; Fritiof M. Fryxell; *The Hayden Survey;* 1 year; $9,000

Fritiof M. Fryxell; *The Hayden Survey;* 1 year; $5,000

UNIVERSITY OF CALIFORNIA, Berkeley Calif.; Ernest W. Adams; *Foundations of Measurement;* 1 year; $4,000

IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa; John C. Greene; *American Science in the Age of Jefferson;* 2 years; $7,400

LEHIGH UNIVERSITY, Bethlehem, Pa., Nicholas Rescher; *Arabic Contributions to Logic;* 2 years; $4,500

MACMURRAY COLLEGE, Jacksonville, Ill.; Walter B. Hendrickson; *Academies of Science in the Middle West;* 2 years; $2,500

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Paul K. Feyerabend, Minnesota Center for Philosophy of Science; *The Logic of Measurement;* 1 year; $8,050

SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.; Antonio Pace; *Study of Beccaria;* 1 year; $3,000

UNIVERSITY OF TEXAS, Austin, Tex.; Richard M. Martin; *Applications of Symbolic Logic;* 1 year; $5,900

UNIVERSITY OF WISCONSIN, Madison, Wis.; Erwin N. Hiebert; *Studies in Nineteenth Century Chemistry;* 15 months; $15,200

Robert C. Stauffer; *Darwin and the Development of Ecology;* 15 months; $16,400

YALE UNIVERSITY, New Haven, Conn.; Oystein Ore; *Early History of Probability;* 1 year; $4,800

MATHEMATICAL SCIENCES

AMERICAN MATHEMATICAL SOCIETY, Providence, R.I.; John H. Curtiss; *Finite Groups;* 4 weeks; $53,500

AMHERST COLLEGE, Amherst, Mass.; Alfred B. Willcox; *Structure of Banach Algebras;* 1 year; $4,800

BRANDEIS UNIVERSITY, Waltham, Mass.; William L. Hoyt; *Algebraic Geometry;* 2 years; $22,300

R. A. Kunze; *Harmonic Analysis in Lie Groups;* 2 years; $23,000

BROWN UNIVERSITY, Providence, R.I.; R. E. Meyer; *Wave Fronts in Nonlinear Radiation;* 2 years; $14,200

R. S. Rivilin; *Nonlinear Continuum Physics;* 2 years; $65,900

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Edwin F. Beckenbach and John W. Green, Los Angeles; *Convex Subadditive and Subharmonic Functions;* 1 year; $18,200

Robert J. Blattner; *Representations of Topological Groups;* 1 year; $3,100

Hans J. Bremermann; *Several Complex Variables;* 2 years; $24,000

Shiing-Shen Chern and Edwin H. Spanier; *Algebraic Topology and Differential Geometry;* 2 years; $70,800

R. J. DeVogelaere; *Boundary Value Problems;* 6 months; $4,500

Richard C. Gilbert, Charles J. A. Halberg, Jr., and Vernon A. Kramer, Riverside; *Perturbation of Operators;* 1 year; $6,800

Alfred Horn, Los Angeles; *Eigenvalues of Sums of Hermitian Matrices;* 1 year, $3,500

Richard Montague, Los Angeles; *Metamathematics;* 15 months; $13,750

Maxwell A. Rosenlicht; *Algebraic Geometry;* 1 year; $5,000

Maxwell Rosenlicht, Los Angeles; *Groups of Algebraic Transformations;* 1 year, $8,200

Edwin H. Spanier; *Properties of Manifolds;* 2 years; $43,300

Ernst G. Straus, Los Angeles; *Integer Valued Analytic Functions;* 2 years; $13,700

Charles J. Titus, Los Angeles; *Extensions by Interior Mappings;* 1 year; $3,000

Frantisek Wolf; *Operator Theory;* 2 years; $55,800

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; Morris H. DeGroot; *Optimum Sequential Sampling Plans;* 2 years; $10,500

Henry S. Leonard, Jr., *Primitive Linear Groups;* 2 years; $10,200

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; D. P. Eckman; *Control Systems Computer;* 1 year; $60,000

Charles Saltzer, *Finite Difference Operators;* 2 years; $12,800

CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; Eugene Lukacs; *Probability and Mathematical Statistics;* 3 years; $43,600

UNIVERSITY OF CHICAGO, Chicago, Ill.; A. Adrian Albert; *Research in Algebra;* 3 years; $73,300

William H. Kruskal; *Statistical Inference;* 2 years; $42,400

Richard K. Lashof and Eldon Dyer; *Algebraic Topology and Convex Surfaces;* 2 years; $44,900

O. F. G. Schilling; *Investigations in Valuation Theory;* 2 years; $5,600

Antoni Zygmund and Albert P. Calderon; *Partial Differential Equations;* 1 year; $5,000

COLORADO SCHOOL OF MINES, Golden, Colo.; Raymond A. Jordan; *Expansion of Computing Center (LGP-30);* 1 year; $5,100

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; Elmer E. Remmenga; *Establishment of Computing Center (IBM 650);* 3 years; $30,000

COLUMBIA UNIVERSITY, New York, N.Y.; Walter C. Strodt; *Ordinary Differential Equations;* 1 year; $12,200

CORNELL UNIVERSITY, Ithaca, N.Y.; W. H. J. Fuchs; *Complex Function Theory and Analysis;* 1 year; $26,500

Simon Kochen and A. Nerode; *Mathematical Logic;* 2 years; $37,300

Lionel Weiss; *Nonparametric Statistical Methods;* 2 years; $30,000

DARTMOUTH COLLEGE, Hanover, N.H.; John G. Kemeny; *Stochastic Processes;* 2 years; $19,800

DUKE UNIVERSITY, Durham, N.C.; Leonard Carlitz; *Algebra and Number Theory;* 2 years; $26,500

John H. Roberts; *Topology;* 2 years; $22,700

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Nickolas Heereman; *Power Series Rings;* 15 months; $8,800

Paul J. McCarthy; *Irreducibility of Polynomials;* 15 months; $8,700

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; Robert S. Ledley; *Installation of Electronic Computer;* 1 year; $30,000

UNIVERSITY OF GEORGIA, Athens, Ga.; Thomas R. Brahana; *Local Homology and Homotopy Theories;* 3 years; $26,300

M. K. Fort, Jr.; *Point Set Topology;* 2 years; $21,000

R. P. Hunter; *Continuous Associative Multiplications;* 2 years; $5,400

HARVEY MUDD COLLEGE, Claremont, Calif.; Courtney S. Coleman; *Ordinary Differential Equations;* 2 years; $4,100

UNIVERSITY OF HAWAII, Honolulu, Hawaii; Robert W. Hiatt; *Establishment of a Computing Center (IBM 650);* 1 year; $50,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.; M. M. Day; *Functional Analysis;* 2 years; $26,200

Alex Heller; *Algebraic Topology;* 2 years; $10,400

Michie Suzuki; *The Structure of Finite Groups;* 2 years; $30,800

A. H. Taub; *Numerical Analysis and Applied Mathematics;* 1 year; $66,400

R. A. Wijsman, Colin Blyth, D. L. Burkholder and D. M. Roberts, *Sequential Decision Procedures;* 2 years; $35,000

Herbert S. Wilf; *The Stability Theory of Numerical Integration;* 1 year; $2,300

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; Ernst Snapper, *Birational Geometry;* 2 years; $22,100

Louis Auslander; *Subgroups of Lie Groups;* 2 years; $21,500

William S. Gustin; *Area Theory;* 2 years; $13,000

P. R. Masani; *Stochastic Problems of Communication Theory;* 2 years; $16,200

Andrew H. Wallace; *Real Analytic Varieties;* 2 years; $13,700

George Whaples; *Algebraic Number Theory and Homological Algebra;* 1 year; $7,300

KENYON COLLEGE, Gambier, Ohio; Otto M. Nikodym; *Operators in Hilbert Space;* 2 years; $13,900

LOUISIANA STATE UNIVERSITY, Baton Rouge, La.; Eugene V. Schenkman; *Group Theory;* 2 years; $18,400

LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; Pasquale Porcelli; *Bounded Analytic Functions;* 2 years; $12,700

UNIVERSITY OF MARYLAND, College Park, Md.; John W. Brace; *Functional Analysis;* 1 year; $6,400

R. E. Fullerton; *Problems in Functional Analysis;* 3 years; $58,600

James A. Hummel and Michael Zedek; *Geometric Function Theory;* 2 years; $26,700

Carol R. Karp; *Infinitary Formal Calculi;* 2 years; $4,400

UNIVERSITY OF MIAMI, Coral Gables, Fla.; Paul M. Swingle; *Nonsimple Connected Sets and Algebras;* 3 years; $20,700

MICHIGAN STATE UNIVERSITY, East Lansing, Mich.; Leo Katz; *Discrete Methods in Mathematical Statistics;* 2 years; $29,800

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Arthur W. Burks; *Theory of Automata;* 2 years; $50,000

Nathaniel Coburn; *Hydromagnetic Flows;* 2 years; $19,500

Cecil C. Craig; *Computing and Data Processing;* 3 years; $150,000

Donald A. Darling; *Functional Analysis and Stochastic Processes;* 1 year; $9,800

Nicholas D. Kazarinoff; *Scalar Scattering by Convex Bodies;* 1 year; $11,000

Beauregard Stubblefield; *Product Spaces and Manifolds;* 1 year; $8,000

Jack E. McLaughlin; *Von Newmann and Frink Coordinations;* 1 year; $11,700

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Eugenio Calabi, Hidehiko Yamabe and L. W. Green; *Structure of Manifolds;* 2 years; $26,200

Bernard R. Gelbaum; *Banach Algebras;* 1 year; $12,300

UNIVERSITY OF MISSOURI, Columbia, Mo.; Curtis L. Wilson, Rolla; *Establishment of Computing Center (LGP30);* 3 years; $30,000

UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; M. A. Basoco; *Establishment of a Computing Center (Burroughs 205);* 1 year; $96,000

UNIVERSITY OF NEW HAMPSHIRE, Durham, N.H.; Robert H. Owens; *Establishment of Computing Center (Recomp);* 3 years; $50,000

NEW MEXICO COLLEGE OF AGRICULTURE AND MECHANIC ARTS, University Park, N. Mex.; George W. Gardner; *Computing Time for Basic Research;* 1 year; $18,000

NEW YORK UNIVERSITY, New York, N.Y.; Wilhelm Magnus; *Combinatorial Group Theory;* 2 years; $64,600

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; F. Burton Jones; *Classification of Plane Continua;* 2 years; $22,200

NORTHWESTERN UNIVERSITY, Evanston, Ill.; R. P. Boas; *Fourier Series;* 1 year; $13,800

Bruno Harris; *Cohomology Algebras;* 15 months; $8,700

H. C. Wang, T. Matsusaka, A. Rosenberg, D. Zelinsky, and W. M. Boothby; *Studies in Algebra and Algebraic Geometry;* 2 years; $104,700

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; Wladimer Seidel; *Boundary Behavior of Functions;* 2 years; $40,200

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; Charles A. Nicol; *The Ramanujan Function;* 1 year; $3,500

OREGON STATE COLLEGE, Corvallis, Oreg.; Fritz Oberhettinger; *Infinite Series;* 2 years; $24,500

PACIFIC UNION COLLEGE, Angwin, Calif.; Ivan R. Neilsen; *Expansion of Computing Center (Bendix G–15D);* 1 year; $20,000

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; David K. Harrison; *The Structure of Group Rings;* 2 years; $6,000

POLYTECHNIC INSTITUTE OF BROOKLYN, Brooklyn, N.Y.; Warren L. McCabe; *Installation of IBM 650 Computer;* 3 years; $60,000

PRINCETON UNIVERSITY, Princeton, N.J.; Alonzo Church and Ralph H. Fox; *Knot Theory and Metamathematics;* 2 years; $85,900

Donald C. Spencer; *Differentiable Manifolds and Sheaves;* 1 year; $4,500

Donald C. Spencer; *Differentiable Manifolds and Sheaves;* 1 year; $4,200

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Lamberto Cesari; *Asymptotic Behavior and Stability of Differential Systems;* 2 years; $27,200

Arthur H. Copeland; *Groups of Mapping Classes;* 2 years; $12,900

J. DeGroot; *Linearization of Mappings;* 2 months; $2,800

Johannes H. B. Kemperman; *Small Product-Sets in a Group;* 2 years; $12,800

RESEARCH FOUNDATION, Oklahoma State University, Stillwater, Okla.; Olan H. Hamilton; *Fixed Points for Plane Continua;* 2 years; $12,200

UNIVERSITY OF ROCHESTER, Rochester, N.Y.; R. A. Raimi; *Invariant Measures on Certain Cech Compactifications;* 1 year; $4,200

ROSE POLYTECHNIC INSTITUTE, Terre Haute, Ind.; Rheodore P. Palmer; *Establishment of Computing Center (Bendix G–15D);* 1 year; $15,000

SAN DIEGO STATE COLLEGE FOUNDATION, San Diego, Calif.; Charles B. Bell, Jr.; *Distribution-Free Statistics;* 2 years; $24,200

UNIVERSITY OF SOUTH CAROLINA, Columbia, S.C.; Rufus G. Fellers; *Computer Facility;* 3 years; $13,000

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; Herbert Busemann; *Area and Differentiability;* 1 year; $8,000

James Dugundji; *Cohomology Operations;* 2 years; $30,000

Albert L. Whiteman; *Theory of Cyclotomy;* 2 years; $15,900

STANFORD UNIVERSITY, Stanford, Calif.; Stefan Bergman; *Several Complex Variables;* 2 years; $46,200

Samuel Karlin; *Probability Theory and Functional Analysis;* 2 years; $58,100

Charles Stein; *Statistical Theory and Probabilistic Models;* 2 years; $60,000

Gabor Szego; *Toeplitz Forms and Orthogonal Polynomials;* 3 years; $51,000

TEACHERS COLLEGE, COLUMBIA UNIVERSITY, New York, N.Y.; Rosedith Sitgreaves; *Classification Procedures;* 3 years; $22,900

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; William H. Fletcher; *Establishment of Computing Center (IBM 650);* 1 year; $50,000

TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; Alfred H. Clifford, Paul F. Conrad, Paul S. Mostert, and Alexander Doniphan Wallace; *Augmented Algebraic Systems;* 2 years; $67,600

VANDERBILT UNIVERSITY, Nashville, Tenn.; John H. Stambaugh; *Computing Center;* 3 years; $95,000

WASHINGTON UNIVERSITY, St. Louis, Mo.; Allen Devinatz; *Spectral Problems in Harmonic Analysis;* 2 years; $24,100

James A. Jenkins; *Univalent Functions;* 2 years; $29,600

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Ross A. Beaumont and Richard S. Pierce; *Structure of Modules, Rings, and Groups;* 2 years; $41,000

Frank H. Brownell; *Differential Operators and Stochastic Processes;* 2 years; $55,000

Douglas G. Chapman; *Statistical Models for Exploited Populations;* 21 months; $27,600

J. M. Fell; *Representatives of Topological Groups and Algebras;* 2 years; $12,300

Ernest A. Michael; *Abstract Spaces;* 2 years; $41,900

WAYNE STATE UNIVERSITY, Detroit, Mich.; Samuel Kaplan; *The Seconda Dual of the Space of Continuous Functions;* 1 year; $3,800

Owen G. Owens; *Elliptic Differential Equations;* 1 year; $5,300

WESLEYAN UNIVERSITY, Middletown, Conn.; Thornton L. Page; *Establishment of Computing Center (IGP–30);* 2 years; $20,000

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; Walter Leighton; *Differential Equations and the Calculus of Variations;* 2 years; $30,800

UNIVERSITY OF WISCONSIN, Madison, Wis.; R. H. Bing; *Topology of Three-Space;* 2 years; $50,600

Edward R. Fadell; *Fiber Spaces;* 2 years; $9,500

Edmund H. Feller; *Rings and Modules;* 1 year; $1,800

Jacob Korevaar; *Fourier Analysis;* 3 years; $36,400

YALE UNIVERSITY, New Haven, Conn.; G. S. Hedlund and Shizuo Kakutani; *Analysis in the Large;* 15 months; $85,700

Nathan Jacobson; *Theory of Rings;* 1 year; $2,350

METABOLIC BIOLOGY

ALBANY MEDICAL COLLEGE, UNION UNIVERSITY, Albany, N.Y.; Richard A. Peabody, and Charles Hurwitz; *Mechanism of Action of Streptomycin;* 3 years; $21,300

ALBERT EINSTEIN MEDICAL CENTER, Philadelphia, Pa.; Herman Friedman; *Role of Nucleoproteins and Subcellular Particles in Antibody Formation;* 2 years; $14,600

Herman Friedman; *Nucleoproteins and Subcellular Particles in Antibody Formation;* 1 year; $17,400

AMERICAN UNIVERSITY OF BEIRUT, Beirut, Lebanon; John H. Schneider; *DNA Synthesis in Normal and Regenerating Livers;* 2 years; $9,000

BAYLOR UNIVERSITY, Waco, Tex.; Robert P. Williams, Houston; *Pigment and Porphyrin Produced by Bacillus Anthracis;* 2 years; $10,100

BIO-RESEARCH INSTITUTE, INC.; Cambridge, Mass.; Peter Bernfeld; *Behavior of Enzymes at High Dilutions;* 2 years; $18,000

BOSTON UNIVERSITY, Boston, Mass.; Charles Terner; *Metabolites of Isolated Tissues, Cells and Subcellular Functions;* 1 year; $30,000

BRANDEIS UNIVERSITY, Waltham, Mass.; Morris Soodak; *Enzymatic Mechanisms Involved in Biosynthesis of Thyroglobulin, A Glycoprotein;* 3 years; $44,200

BRIGHAM YOUNG UNIVERSITY, Provo, Utah; Jay V. Beck; *Studies on Metabolism of Thiobacillus Ferrooxidans and Other Autotrophic Bacteria;* 2 years; $16,800

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Arthur L. Black, Davis; *Rate of Flow of Carbon Through the Tricarboxylic Acid Cycle;* 2 years; $18,000

Roger David Cole, Davis; *Studies on Protein Synthesis During Pregnancy;* 2 years; $15,200

S. S. Elberg; *Intramonocytic Metabolism of Brucella Melitensis in Cell Culture;* 2 years; $26,800

David M. Greenberg; *Enzyme and Isotope Studies on One Carbon Metabolism and Methyl Group Biosynthesis;* 3 years; $46,700

Max Kleiber, Davis; *Synthesis of Milk Components by Intact Cows;* 2 years; $50,000

George G. Laties, Los Angeles; *Nature and Control of Cellular Development;* 3 years; $32,800

Allen G. Marr, Davis; *Biochemical Cytology of Bacteria;* 3 years; $35,000

R. Y. Stanier; *Physiology and Biochemistry of Bacteria;* 5 years; $113,000

T. E. Weier and C. R. Stocking, Davis; *Ultrastructure of Chloroplasts During Changes in Cell Metabolism and Isolation;* 3 years; $11,800

UNIVERSITY OF CHICAGO, Chicago, Ill.; Herbert S. Anker; *Mechanism of Antibody Synthesis;* 3 years; $28,500

Wayne J. McIlrath; *Physiological Functions of Boron in Plants;* 2 years; $15,000

UNIVERSITY OF CINCINNATI, Cincinnati, Ohio; Emily J. Bell; *Streptolysin O and Its Effects Upon Cellular Metabolism;* 1 year; $7,500

CITY OF HOPE MEDICAL CENTER, Duarte, Calif.; Riojun Kinosita and Jesse E. Sisken; *Metabolic Sequences in the Mitotic Cycle;* 2 years; $23,800

UNIVERSITY OF COLORADO, Boulder, Colo.; Richard Thompson; *Microbiological Equipment;* 1 year; $8,600

COLUMBIA UNIVERSITY, New York, N.Y.; R. F. Dawson; *Biosynthesis and Metabolism of Nicotinic Acid and Related Compounds in Nicotiana;* 3 years; $30,600

Philip Geigleson; *Induced Enzyme Formation in Mammalian Systems;* 2 years; $32,000

CONNECTICUT AGRICULTURAL EXPERIMENT STATION, New Haven, Conn.; H. B. Vickery; *Organic Acids in Leaves;* 2 years; $20,000

UNIVERSITY OF CONNECTICUT, Storrs, Conn.; Ralph P. Collins; *Identification and Metabolism of the Production of Volatile Substances Produced by Selected Fungi;* 2 years; $8,300

CORNELL UNIVERSITY, Ithaca, N.Y.; Lemuel D. Wright; *Specialized Laboratory Equipment Required in Research;* 1 year; $19,700

ELGIN STATE HOSPITAL, Elgin, Ill.; Lawrence I. Hochstein; *Bacterial Oxidation of N-Acetylglucosamine;* 2 years; $18,000

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Hans Gaffron; *Instrumentation for Photobiological Research;* 1 year; $26,100

UNIVERSITY OF GEORGIA, Athens, Ga.; Milton J. Cormier; *Mechanisms of Bioluminescent Reactions;* 2 years; $31,100

Robert C. Eagon; *Biosynthesis of Bacterial Polysaccharides;* 2 years; $12,000

William J. Payne; *Equipment for Research in Bacteriology;* 1 year; $14,000

Alfred W. Scott; *Equipment to Support the Research Programs in Biochemistry;* 1 year; $20,000

HARVARD UNIVERSITY, Cambridge, Mass.; Martin Lubin; *Amino-Acid Transport Systems;* 2 years; $34,000

Frederick Neidhardt; *Regulation of Ribonucleic Acid Synthesis in Bacteria;* 3 years; $37,000

William H. Pearlman, Boston; *Steroid Hormones: Studies Utilizing Radioisotopes;* 1 year; $11,100

Albert E. Renold; *Control of Amino Acid and Protein Metabolism in Adipose Tissue;* 2 years; $22,000

T. Hastings Wilson; *Cellular Uptake of Large Molecules by Intestinal Epithelium;* 4 years; $35,000

HASKINS LABORATORIES, New York, N.Y.; S. H. Hutner; *Heterotrophic Growth of Euglena;* 2 years; $14,400

HAVERFORD COLLEGE, Haverford, Pa.; Melvin Santer; *Environmental-Induced Changes in Ribonucleic Acid of Bacteria;* 3 years; $21,200

HOME FOR THE JEWISH AGED, Philadelphia, Pa; Henry Altschuler; *Laboratory Equipment for Current Research Projects;* 1 year; $21,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.; Ralph D. DeMoss; *Origin of Glucose in Cell Walls of Leuconostoc Mesenteroides;* 2 years; $17,500

David Gottlieb; *Physiology of Fungi;* 3 years; $46,200

R. H. Hageman; *Physiological Basis of Hybrid Vigor in Corn;* 2 years; $25,800

S. P. Mistry; *Biotin in Intermediary Metabolism;* 3 years; $45,000

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; W. J. van Wagtendonk; *Nucleic Acid Turnover in Paramecium Aurelia;* 3 years; $25,800

INSTITUT DE BIOLOGIE PHYSICO-CHIMIQUE, Paris, France; Marianne Grunberg-Manago; *Enzymatic Synthesis and Properties of Ribopolynucleotides and Natural Rna;* 1 year; $19,000

INSTITUT PASTEUR, Paris, France; Jaques Monod; *Specific Factors in Enzyme and Protein Biosynthesis;* 1 year; $5,000

IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa; Frederick G. Smith; *Respiratory Properties of Subcellular Particles of Fungi and Fungicide Action;* 1 year; $4,000

KAISER FOUNDATION RESEARCH INSTITUTE, Oakland, Calif.; Mary Belle Allen; *Com-*

parative Biochemistry of Photosynthetic Pigments; 3 years; $30,000

UNIVERSITY OF KANSAS MEDICAL CENTER, Kansas City, Kans.; Harold J. Nicholas; *Metabolism of Cholesterol in the Central Nervous System;* 2 years; $20,200

KANSAS STATE UNIVERSITY, Manhattan, Kans.; Philip Nordin; *Metabolism of Starch Granules;* 3 years; $14,300

UNIVERSITY OF KANSAS, Lawrence, Kans.; David Paretsky; *The Biochemistry of Rickettsiae;* 2 years; $26,200

LOS ANGELES STATE COLLEGE FOUNDATION, Los Angeles, Calif.; Joseph A. Sacher; *Auxin-Membrane Permeability Relations;* 3 years; $10,700

UNIVERSITY OF LOUISVILLE, Louisville, Ky.; Peter K. Knoefel; *Conjugation and Excretion in the Animal Body;* 1 year; $8,000

John W. Brown; *Amino Acid Incorporation Into Protoplasts of Sarcina Lutes;* 3 years; $20,000

UNIVERSITY OF MASSACHUSETTS, Amherst, Mass.; D. S. Van Fleet; *Histochemical and Cytochemical Studies of Phloem;* 3 years; $11,600

MICHAEL REESE HOSPITAL AND MEDICAL CENTER, Chicago, Ill.; Clarence Cohn; *Influence of Rate of Ingestion of Diet on Intermediary Metabolism;* 3 years; $30,000

MICHIGAN STATE UNIVERSITY, East Lansing, Mich.; Robert P. Scheffer; *Physiology of Parasitism;* 2 years; $17,300

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; I. A. Bernstein; *Biosynthesis of Deoxyribose;* 2 years; $24,000

G. R. Greenberg; *Enzyme Formation in Phage-Infected Bacteria;* 4 years; $84,000

James E. Hogg; *Controlling Factors in Lipid Glyconeogenesis;* 2 years; $16,700

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Albert W. Frenkel; *Nitrogen Metabolism of Photosynthetic Bacteria;* 2 years; $18,000

UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; Francis A. Haskins; *Metabolism of Coumarin and Related Compounds in Sweetclover;* 3 years; $30,000

John H. Pazur; *Enzymatic Synthesis of Carbohydrates;* 2 years; $12,600

George A. Young; *Utilization of Amino Acid Amides by Normal and Virus Infected Tissue Culture Cells;* 1 year; $6,000

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; Arthur Kelman; *Cellulolytic Enzyme Systems of Phytopathogenic Microorganisms;* 2 years; $18,700

S. B. Tove; *Interrelationships in the Metabolism of Short Chain Fatty Acids;* 3 years; $21,600

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; Robert W. Bernlohr; *Antibiotic Production During Sporogenesis;* 2 years; $13,000

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; J. R. Sokatch; *Oxidation of the Branched Chain Amino Acids by Microorganisms;* 3 years; $24,000

OREGON STATE COLLEGE, Corvallis, Oreg.; Vernon H. Cheldelin; *Metabolic Patterns in Microorganisms;* 1 year; $10,700

W. David Loomis; *Biosynthesis of Terpenes;* 2 years; $28,300

UNIVERSITY OF OREGON, Eugene, Oreg.; Bradley T. Scheer; *Humoral Control of Metabolism in Crustaceans;* 2 years; $36,000

Jacob Straus; *Biosynthesis of Anthocyanin in Corn Endosperm Tissue Cultures;* 3 years; $20,800

R. G. Wolfe, Jr.; *Enzyme Protein Structure Studies;* 2 years; $17,400

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Walter D. Bonner, Jr.; *Mechanisms of Cellular Oxidations in Plant Tissues;* 2 years; $18,400

James H. Jones; *Possible Biosynthesis of Vitamins A and D by Fish;* 3 years; $33,000

PHILADELPHIA GENERAL HOSPITAL RESEARCH FUND, Philadelphia, Pa.; Gerald Litwack; *Formation of Lysozyme Substrate in Cell Walls;* 1 year; $5,400

PIONEERING RESEARCH DIVISION, U.S. Army Quartermaster Research and Engineering Center Laboratories; Natick, Mass.; Elwyn T. Reese; *Inducers of Cellulase and of Other Polysaccharases;* FY–60–61–62; $20,000

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; Jean A. Gross; *Development and Reproduction of the Chloroplast;* 2 years; $9,500

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Joseph Kuc and Oliver E. Nelson; *Synthesis of Lignin in Plants;* 2 years; $19,900

Mark L. Tomes; *Biosynthesis of Carotenoids in the Tomato;* 2 years; $18,400

RESEARCH FOUNDATION FOR MENTAL HYGIENE, Albany, N.Y.; William Sacks, Orangeburg; *Cerebral Tricarboxylic Acid Cycle Enzyme Activities;* 3 years; $40,000

RESEARCH FOUNDATION, Oklahoma State University, Stillwater, Okla.; L. M. Henderson; *Equipment for Biological Research;* 1 year; $18,700

RICE INSTITUTE, Houston, Tex.; James W. Campbell; *Biochemistry of Animal Parasites;* 3 years; $21,000

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; J. Oliver Lampen; *Action of Polyene Antifungal Agents on Metabolic Activities in Yeast;* 3 years; $60,000

SAINT LOUIS UNIVERSITY SCHOOL OF MEDICINE, St. Louis, Mo.; Elijah Adams; *Enzymatic Degradation of Pharmacologically Active Compounds;* 2 years; $36,600

SETON HALL COLLEGE OF MEDICINE AND DENTISTRY, Medical Center, Jersey City, N.J.; Katherine Lewis, Department of Biochemistry; *Lysine Biosynthesis in Fungi;* 2 years; $17,700

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; S. C. Rittenberg; *Bacterial Metabolism and Physiology;* 4 years; $80,000

SOUTHWESTERN LOUISIANA INSTITUTE, Lafayette, La.; T. E. Wilson; *Priority of Enzyme Synthesis in Microorganisms;* 2 years; $13,000

STANFORD UNIVERSITY, Stanford, Calif.; C. E. Clifton; *Oxidative Assimilation by Microorganisms;* 4 years; $38,000

STATE UNIVERSITY OF IOWA, Iowa City, Iowa; R. E. Kallio; *High Molecular Weight Esters and Waxes in Bacterial Metabolism;* 4 years; $37,000

TEMPLE UNIVERSITY, Philadelphia, Pa.; John M. Ward; *Biochemical Aspects of Morphogenesis of the Slime Mold;* 2 years; $20,000

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; D. Frank Holtman; *Amino Acids and TCA Cycle Enzyme Inhibitors;* 2 years; $12,900

UNIVERSITY OF TEXAS, Austin, Tex.; James L. Larimer; *Gas Secretion and Carbonic Anhydrase;* 2 years; $14,000

UTAH STATE UNIVERSITY, Logan, Utah, George W. Welkie; *Ribonuclease Activity in Plant Tissue;* 1 year; $12,500

VANDERBILT UNIVERSITY, Nashville, Tenn.; Sidney P. Colowick; *Control of Carbohydrate Metabolism;* 2 years; $91,000

VETERANS ADMINISTRATION, Washington, D.C.; Ruth G. Wittler; *Metabolic Factors Required to Promote Reversion of Mycoplasma Mycoides to Bacterial Form;* 4 months; $5,300

VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg, Va.; C. J. Ackerman; *Cytidine Coenzymes in the Biosynthesis of Choline;* 2 years; $14,200

WASHINGTON UNIVERSITY, St. Louis, Mo.; Howard Gest; *Comparative Biochemistry and Physiology of Autotrophic and Heterotrophic Microorganisms;* 3 years; $40,000

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Erling J. Ordal; *Trace Inorganic Elements in the Metabolism of Bacteria;* 3 years; $75,000

WEIZMANN INSTITUTE OF SCIENCE, Rehovoth, Israel; Theodore Winnick; *Mechanisms of Biosynthesis of Polypeptides;* 3 years; $26,000

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; S. J. Cooperstein; *Purification and Characterization of the Cytochromes of Mammalian Tissues;* 3 years; $31,100

Warwick Sakami; *Methyl Group Metabolism in Animals;* 3 years; $42,500

UNIVERSITY OF WISCONSIN, Madison, Wis.; Paul J. Allen; *Relation of Metabolic Processes to the Development of Parasitic Fungi;* 2 years; $20,000

Robert M. Bock, and Harlyn O. Halvorson; *Protein Biosynthesis at the Template Level;* 3 years; $70,000

Dexter S. Goldman; *Fatty Acid Metabolism of the Tubercle Bacillus;* 3 years; $30,000

W. H. McShan; *Characteristics of Particulates Isolated From Anterior Pituitary Tissue;* 2 years; $31,000

P. W. Wilson and R. H. Burris; *Biological Fixation of Nitrogen;* 3 years; $35,000

WORCESTER FOUNDATION FOR EXPERIMENTAL BIOLOGY, INC., Shrewsbury, Mass.; Oscar Hechter; *Mode of Action of Insulin Upon Permeability Processes in Muscle Fibers;* 2 years; $30,000

David Stone; *The Influence of Nucleic Acid Preparations on Animal Cells in Culture;* 1 year; $15,000

YALE UNIVERSITY, New Haven, Conn.; John A. DeMoss; *Genetic and Physiological Control of Cellular Structures;* 3 years; $30,500

Arthur W. Galston; *Mechanism of Action of Hormones and Visible Radiations in the Control of Plant Cell Growth;* 4 years; $73,500

William S. Hillman; *Control of Growth and Flowering in the Lamnaceae;* 3 years; $44,700

YESHIVA UNIVERSITY, New York, N.Y.; Elsa Proehl Paulsen; *C_{19} and C_{21} Steroid Synthesis in the Adrenal Gland;* 3 years; $31,300

Harold J. Strecker; *Interconversion of Glutamic Acid and Proline;* 3 years; $21,000

MOLECULAR BIOLOGY

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Albert Siegal; *The Relationship Between Ribonucleic Acid and Protein;* 5 years; $95,000

Ralph W. G. Wyckoff; *Morphology and Composition of Macromolecules;* 3 years; $90,000

BARTOL RESEARCH FOUNDATION OF THE FRANKLIN INSTITUTE, Swarthmore, Pa.; William C. Denison; *Some Luminescences of Chlorophyll in Vivo and in Vitro;* 1 year; $12,900

UNIVERSITY OF BIRMINGHAM, Birmingham, England; H. Mueller and S. V. Perry; *Protein Synthesis in Muscle;* 2 years; $12,000

BRANDEIS UNIVERSITY, Waltham, Mass.; Nathan O. Kaplan and Saul G. Cohen; *Relation Between Structure and Function in Metalloenzymes;* 1 year; $50,000

Harold P. Klein; *Hydrocarbons and Related Compounds of Saccharomyces Cerevisiae;* 2 years; $16,000

Richard S. Morgan; *Structure of the Microsomal Particle and Related Ribonucleic Acids;* 2 years; $13,000

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; Robert B. Corey and Linus Pauling; *Structure of Proteins;* 3 years; $300,000

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; James Cason; *Nonantibiotic Metabolic Products of Molds;* 2 years; $16,000

William G. Clark, Los Angeles; *Mammalian Histodine Decarboxylase;* 2 years; $24,000

Heinz L. Fraenkel-Conrat; *Chemical Nature of Biologically Active Ribonucleic Acid;* 3 years; $100,000

Howard K. Schachman; *Macromolecules of Biological Interest;* 5 years; $170,000

UNIVERSITY OF CHICAGO, Chicago, Ill.; H. Burr Steinbach; *Intracellular Ion Distribution and Function;* 3 years; $41,800

Birgit Vennesland; *Chloroplast Reactions;* 5 years; $95,000

CHILDREN'S HOSPITAL OF BUFFALO, Buffalo, N.Y.; R. J. Martinez; *Hexokinases of Bacteria;* 2 years; $7,000

UNIVERSITY OF CINCINNATI, Cincinnati, Ohio; Richard A. Day; *Secondary and Tertiary Structure of Proteins;* 2 years; $9,000

COLLEGE OF CHARLESTON, Charleston, S.C.; Joseph R. Merkel; *Metal-Regulated, Photocatalytic Reactions of Flavin Systems;* 2 years; $9,000

COLUMBIA UNIVERSITY, New York, N.Y.; Sam M. Beiser, and Frederic Agate; *Properties of Steroid Hormone-Protein Conjugates;* 3 years; $45,000

Reinhold Benesch; *Modification of Proteins;* 4 years; $73,000

Irving Goodman; *Determinants of Biological Action;* 2 years; $22,000

Alvin I. Krasna; *The Role of the Enzyme Hydrogenase in Hydrogen Photosynthesis;* 2 years; $16,000

Barbara W. Low; *X-Ray Crystal Structure Studies of Insulin;* 3 years; $50,000

Stanley L. Miller; *Mechanisms for the Synthesis of Organic Compounds on the Primitive Earth;* 2 years; $19,000

David Nachmansohn; *Molecular Forces in Nerve Impulse Conduction;* 5 years; $120,000

Stephen Zamenhof; *Studies on the Biochemistry of Polysugarphosphates;* 1 year; $11,000

CORNELL UNIVERSITY, Ithaca, N.Y.; George P. Hess; *Structural and Functional Interrelationships in Enzymes;* 1 year; $19,000

Robert W. Holley; *Fractionation and Characterization of Ribonucleic Acid;* 3 years; $32,000

J. R. Vallentyne; *Ecological and Biogeochemical Studies of Amino Acids and Polypeptides;* 3 years; $43,000

DARTMOUTH COLLEGE, Hanover, N.H.; Shinya Inoue; *Analysis of Fine Structure of Living Cells;* 3 years; $230,000

Manuel F. Morales; *Configuration of Dissolved Proteins and Protein Models;* 5 years; $41,900

Arthur J. Samuels; *Immuno-Enzymology of Muscle Proteins;* 2 years; $11,000

Lucile Smith; *Oxidative Phosphorylation in Heart and Bacterial Particles;* 1 year; $5,000

EARLHAM COLLEGE, Richmond, Ind.; William K. Stephenson; *Alcohol Penetration into Living Cells;* 2 years; $13,300

EMORY UNIVERSITY, Atlanta, Ga.; John M. Reiner; *Mechanism of Infection and Multiplication of Bacterial Viruses;* 2 years; $14,000

HAHNEMANN MEDICAL COLLEGE, Philadelphia, Pa.; Peter Oesper; *Competitive Inhibitors for 1, 3-Diphosphoglyceric Acid;* 2 years; $14,000

HARVARD UNIVERSITY, Cambridge, Mass.; Konrad Bloch; *The Mechanism of Synthesis of Steroids in Biological Systems;* 3 years; $50,000

Oleg Jardetsky; *Nuclear Magnetic Resonance Studies of Biologically Important Molecules;* 2 years; $73,000

John H. Law; *Biochemistry of the Glycolipides;* 2 years; $11,600

A. K. Solomon; *Permeability of Cellular Membrance;* 3 years; $81,000

George Wald; *Research on Biochemistry of Vision;* 4 years; $32,000

James D. Watson; *Structure and Function of Bacterial Microsomes;* 3 years; $100,000

HEALTH RESEARCH, INC., Buffalo, N.Y.; David Harker; *Crystal Structure of Ribonuclease;* 1 year; $25,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.; S. Spiegelman; *The Mechanism of Enzyme Synthesis;* 5 years; $90,000

INSTITUTE FOR CANCER RESEARCH, Philadelphia, Pa.; Thomas F. Anderson; *Invasion of Host Cells by Bacterial Viruses;* 2 years; $23,000

Thomas F. Anderson; *Specific Synthesis in Bacteria and Bacteriophages;* 3 years; $159,000

IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa; S. Aronoff; *Intercellular Movements of Organic Compounds;* 2 years; $22,000

David A. Metzler; *Mechanism of the Catalytic Action of Riboflavin;* 3 years; $22,100

JOHANN - WOLFGANG - GOETHE - UNIVERSITÄT, Frankfurt/Main, West Germany; Erich Heinz; *Chemical and Physico-Chemical Basis of Active Transport;* 2 years; $28,000

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Michael Beer; *Electron Microscope Studies of Macromolecules and Cells;* 1 year; $50,000

Thomas C. Bruice; *Synthesis of a Series of Gem Mercaptoethylamines;* 4 years; $66,500

KANSAS WESLEYAN UNIVERSITY, Salina, Kans.; Orville L. Voth; *Interactions of Tocopherol with Proteins and Amino Acids;* 2 years; $7,000

KENTUCKY RESEARCH FOUNDATION, Lexington, Ky.; Richard S. Schweet; *Incorporation of Amino Acids into Ribonucleic Acid;* 18 months; $29,100

KYOTO UNIVERSITY, Maizuru, Japan; Hiroshi Fujita; *Differential Equation for the Ultracentrifuge;* 1 year; $1,300

UNIVERSITY OF MAINE, Orono, Maine, George R. Pettit; *Alkaloid and Triterpene Components of the Labiatae;* 2 years; $8,000

MANHATTAN COLLEGE, New York, N.Y.; Brother William Batt; *Lipase Purification and Kinetics;* 2 years; $20,000

MARINE BIOLOGICAL LABORATORY, Woods Hole, Mass.; Morris Rockstein; *Biochemical Basis for Light Orientation of the Starfish of the Woods Hole Area;* 5 years; $32,900

UNIVERSITY OF MARYLAND, College Park, Md.; R. G. Grenell, The Psychiatric Institute; *The Structure of Brain Lipide-Protein Complexes;* 1 year; $7,000

Harris J. Linder; *Histochemistry of Cocoon and Egg Shell Formation;* 2 years; $10,000

MASSACHUSETTS GENERAL HOSPITAL, Boston, Mass.; Jerome Gross; *Intermolecular Organization and Interactions of Normal and Abnormal Collagen;* 1 year; $20,000

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Vernon M. Ingram; *Chemical Structure of the Human Hemoglobins;* 3 years; $56,000

Boris Magasanik; *Regulation of the Metabolic Processes at the Molecular Level;* 2 years; $133,000

Alexander Rich; *Molecular Structural Studies on the Nucleic Acids and Related Compounds;* 3 years; $73,000

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; M. J. Coon; *Biological Hydrocarbon Oxidadation;* 3 years; $52,000

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Rufus Lumry; *Kinetics Studies of Enzyme Mechanisms;* 2 years; $25,000

Fred Smith; *Detailed Structure of Polysaccharides;* 4 years; $35,000

UNIVERSITY OF MISSOURI, Columbia, Mo.; Owen J. Koeppe; *Mechanism of Action of Glyceraldehyde - 3 - Phosphate Dehydrogenases;* 3 years; $22,000

MOUNT HOLYOKE COLLEGE, South Hadley, Mass.; Jytte Muus; *Chemical and Enzymatic Studies on Human Salivary Amylase;* 3 years; $33,600

Curtis G. Smith; *Inhibition of Riboflavin Synthesis in Eremothecium Ashbyii;* 2 years; $18,800

NATIONAL INSTITUTE OF ARTHRITIS AND METABOLIC DISEASES, Bethesda, Md.; Hugo Bauer; *Analysis and Identification of Products of Histidine Metabolism;* 2 years; $8,000

NEW YORK UNIVERSITY, New York, N.Y.; John S. Cook; *Erythrocyte Volumes and Ionic Fluxes in Solutions of the Alkali Salts of Monovalent Anions;* 21 months; $12,600

C. T. O. Fong; *Chemical Aspects of Hormone-Receptor Interaction;* 1 year; $13,000

Robert C. Warner; *Physical Properties of Enzymatically Synthesized Polynucleotides and of Ribonucleic Acid;* 3 years; $51,000

Robert Warner Chambers; *Synthesis of Nucleotides;* 3 years; $36,000

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; Claude Piantadosi; *Chemistry and Metabolism of Plasmalogens;* 2 years; $14,000

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Britton Chance; *Experimental Studies*

on Energy Transfer and Conservation; 5 years; $700,000

Mildred Cohn; *Mechanisms of Phosphorylation and Phosphate Transfer Reactions;* 2 years; $26,000

R. E. Forster; *Diffusion of Gases and Their Simultaneous Chemical Reaction With Hemoglobin;* 2 years; $20,000

George F. Springer and William Pepper; *Nature of Blood Group Active Substances;* 4 years; $40,000

Elizabeth Thorogood; *Leguma Hemoproteins;* 1 year; $11,000

PRINCETON UNIVERSITY, Princeton, N.J.; Frank Johnson; *Biochemistry of Luminescent Systems;* 3 years; $42,000

W. J. Kauzmann and J. R. Fresco; *Physical-Chemical Investigations of Biological Macromolecules;* 1 year; $70,000

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; Martynas Ycas and Walter S. Vincent; *Information Transfer Via Ribonucleic Acid;* 3 years; $42,000

RETINA FOUNDATION, Boston, Mass.; Tovard Laurent; *Interaction Between Concentrated Solutions of Hyaluronic Acid and Other Macromolecules;* 2 years; $24,000

ROCKEFELLER INSTITUTE, New York, N.Y.; Edward J. Murphy; *Electrical Conduction in Hydrogen-Bonded Substances;* 1 year; $10,000

Edward L. Tatum and Curtis A. Williams, Jr.; *Effects of Gene Mutation of Proteins of Neurospora Crassa;* 3 years; $65,200

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; G. S. Panson and C. E. Weill; *Liquid Thermal Diffusion of Natural Products;* 2 years; $9,800

David Pramer; *Concentration and Characterization of Nemin;* 2 years; $18,000

SAINT MARY'S HOSPITAL MEDICAL SCHOOL, Paddington, London, England; R. R. Porter; *Structural Basis of the Immunological Activity of Antibodies and Protein Antigens;* 5 years; $100,000

STATE UNIVERSITY OF IOWA, Iowa City, Iowa; George Kalnitsky and John P. Hummel; *Character of the Catalytic Site of Ribonuclease;* 3 years; $52,100

TEMPLE UNIVERSITY, Philadelphia, Pa.; Peter S. Olmsted; *Mechanism of in Vitro Polynucleotide Synthesis;* 2 years; $20,000

TEXAS A & M RESEARCH FOUNDATION, College Station, Tex.; H. K. Zimmerman and Hans Weidman; *Fundamental Chemistry of Aminosugars;* 1 year; $7,700

UNIVERSITY OF TEXAS, Austin, Tex.; Lester Packer; *Function of Subcellular Membranes;* 2 years; $24,000

Austen F. Riggs; *Biochemistry of Hemoglobin and of Nitrogen Fixation;* 3 years; $30,000

TRINITY COLLEGE, Hartford, Conn.; W. Scott Worrall; *Hypothesis on Intimate Mechanism of Proteolytic Enzymes;* 3 years; $12,300

TUSKEGEE INSTITUTE, Tuskegee Institute, Ala.; Horace D. Graham; *Determination and Reactions of Food Gums;* 1 year; $5,000

VANDERBILT UNIVERSITY, Nashville, Tenn.; Leon W. Cunningham; *Chemical and Enzymatic Studies of Glycopeptides;* 3 years; $21,000

VIRGINIA INSTITUTE FOR SCIENTIFIC RESEARCH, Richmond, Va.; Anton N. J. Heyn; *Fiber and Ultrastructure Research;* 2 years; $51,000

UNIVERSITY OF VIRGINIA, Charlottesville, Va.; Robert B. Martin; *Equilibrium and Kinetic Studies of Systems of Biological Interest;* 2 years; $15,000

WAKE FOREST COLLEGE, Winston-Salem, N.C.; Frank H. Hulcher; *Cytochrome f in Photosynthesis;* 2 years; $18,000

WASHINGTON STATE UNIVERSITY, Pullman, Wash.; Leonard B. Kirschner; *Osmotic Regulation and the Function of Regulatory Organs;* 3 years; $81,900

WASHINGTON UNIVERSITY, Saint Louis, Mo.; David Lipkin; *The Chemistry of Nucleic Acids and Related Substances;* 4 years; $80,500

Mildred Cohn; *Mechanisms of Phosphorylation and Phosphate Transfer Reactions;* 3 years; $39,000

Barry Commoner; *Molecular Basis of the Biological Properties of Tobacco Mosiac Virus;* 3 years; $170,000

Robert K. Crane; *Utilization of Hexoses by Animal Cells;* 2 years; $31,300

Tung-Yue Wang; *Globulin Fraction of Cell Nuclei;* 2 years; $17,000

WAYNE STATE UNIVERSITY, Detroit, Mich.; Maurice H. Bernstein; *Functional Modifications of Sperm Structure;* 2 years; $30,000

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; John Spizizen; *Fractionation of Deoxyribonucleic Acid;* 1 year; $1,500

UNIVERSITY OF WISCONSIN, Madison, Wis.; Philip P. Cohen and G. W. Brown, Jr.; *Comparative Biochemistry of Urea Biosynthesis;* 2 years; $27,000

Robert W. Fulton and Robert J. Shepherd; *Techniques for Purification of Unstable Plant Viruses;* 3 years; $23,000

Stephen A. Kuby and Henry A. Lardy; *Enzyme Kinetics and Mechanisms;* 1 year; $70,000

YALE UNIVERSITY, New Haven, Conn.; Henry A. Harbury; *Interactive Effects in Heme and Flavin Systems;* 3 years; $89,200

Patricia F. Knight; *Cathepsin Specificity and Antibody Formation;* 2 years; $15,000

Frederic M. Richards; *Relation of Structure to Function in Ribonuclease;* 4 years; $67,200

Julian M. Sturtevant; *Physico-Chemical Studies of Proteins and Related Reactions;* 3 years; $45,000

YESHIVA UNIVERSITY, New York, N.Y.; Sasha Englard; *The Structural Nature of Malic Dehydrogenase;* 2 years; $17,000

Nathar W. Penn; *Nature and Role of the Mitochondrial Acceptor Fraction in Protein Metabolism;* 2 years; $14,000

PHYSICS

ADELPHI COLLEGE, Garden City, N.Y.; Henry Brysk; *An Asymptotic Formulation in the Theory of Scattering;* 2 years; $9,100

UNIVERSITY OF ALABAMA, University, Ala.; Charles E. Mandeville; *Structure of Nuclei;* 2 years; $38,000

AMERICAN UNIVERSITY OF BEIRUT, Beirut, Lebanon; Frans Bruin; *Paramagnetic Resonance of Free Radicals;* 3 years; $9,400

AMHERST COLLEGE, Amherst, Mass.; Robert H. Romer; *Nuclear Spin Resonance in Helium Solutions;* 3 years; $21,500

BOSTON UNIVERSITY, Boston, Mass.; Edward Booth; *Nuclear Resonance Scattering of Bremsstrahlung;* 1 year; $17,500

BOWDOIN COLLEGE, Brunswick, Maine; Myron A. Jeppesen; *Photoelectric Emission from Small Particles in Pulsed Light;* 2 years; $26,800

Walter D. Jones; *Semiempirical calculation of Molecular Parameters;* 2 years; $7,000

BRANDEIS UNIVERSITY, Waltham, Mass.; Max Chretien; *Bubble Chamber Research on Elementary Particles;* 2 years; $25,100

BRIGHAM YOUNG UNIVERSITY, Provo, Utah; Harvey Fletcher; *Musical Acoustics;* 2 years; $48,400

John H. Gardner; *Gyromagnetic Ratio of the Free Electron;* 1 year; $9,100

John H. Gardner; *Electron Paramagnetic Resonance at Very High Pressures;* 3 years; $51,700

BROWN UNIVERSITY, Providence, R.I.; Philip J. Bray; *Nuclear Magnetic Resonance Studies of Molecular and Ionic Crystals;* 3 years; $26,800

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; Jesse W. M. Dumond and Harry A. Kirkpatrick; *Precision Comparison of the X-ray Wavelength Scales;* 1 year; $16,700

John R. Pellam; *Properties of Matter at Low Temperatures;* 2 years; $214,100

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Paul H. Barrett, Santa Barbara; *Large Air Shower Detector;* 1 year: $6,200

Robert R. Hewitt; *Nuclear Electric Quadrupole Interactions With Metallic Environments;* 3 years; $29,900

M. Tinkham; *Solids at Millimeter Submillimeter Wavelength;* 3 years; $54,900

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; S. A. Friedberg; *Investigations in Low Temperature Physics;* 2 years; $21,500

Robert T. Schumacher; *Magnetic Resonance and Electronic Properties of Solids;* 2 years; $32,100

CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; James G. Brennan; *Interaction of Mu Mesons With Nuclei;* 2 years; $12,000

Karl F. Herzfeld; *Spectrographic Study of Relaxation Processes;* 2 years; $45,000

UNIVERSITY OF CHICAGO, Chicago, Ill.; Clayton F. Giese; *Molecular Beam Experiments;* 2 years; $37,300

A. W. Lawson and Morrel H. Cohen; *Solid State Investigations;* 3 years; $124,300

Robert S. Mulliken and C. C. J. Roothaan; *Quantum Mechanical Studies on Molecular Structure;* 3 years; $206,800

R. W. Thompson; *Double Cloud Chamber for High Energy Particles;* 3 years; $219,600

CITY COLLEGE, New York, N.Y.; Harry Lustig; *Theoretical Analysis of Nuclear Reaction Data;* 1 year; $8,400

COLBY COLLEGE, Waterville, Maine; Dennison Bancroft; *Precision Measurement of the Velocity of Sound in Gases;* 2 years; $11,500

COLLEGE OF PUGET SOUND, Tacoma, Wash.; Martin E. Nelson; *Primary Cosmic Rays;* 2 years; $15,400

UNIVERSITY OF COLORADO, Boulder, Colo.; Albert A. Bartlett; *Beta-Ray Spectroscopy;* 2 years; $39,300

Wesley E. Brittin; *Research in Theoretical Physics;* 2 years; $42,200

UNIVERSITY OF CONNECTICUT, Storrs, Conn.; Arnold Russek; *Theory of High-Energy Atomic Collisions;* 2 years; $20,500

CORNELL UNIVERSITY, Itaca, N.Y.; David M. Lee; *Helium Solutions at Low Temperatures;* 2 years; $35,800

Jay Orear; *Scattering of Muons by Nuclei;* 2 years; $99,400

L. G. Parratt; *X-ray Spectroscopy;* 2 years; $34,500

DARTMOUTH COLLEGE, Hanover, N.H.; William T. Doyle; *Color Centers in Ionic Crystals;* 2 years; $43,700

UNIVERSITY OF DENVER, Denver, Colo.; Byron E. Cohn; *Maintenance of the Inter-University High Altitude Laboratories;* 3 years; $15,000

DEPAUW UNIVERSITY, Greencastle, Ind.; Malcolm Correll; *Solar Magnetic Fields;* 3 years; $23,100

DUKE UNIVERSITY, Durham, N.C.; Horst Meyer; *Thermal and Magnetic Properties at Low Temperatures;* 2 years; $48,200

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Harvey Hall; *Investigations in Elementary Particle Phenomena;* 2 years; $41,500

Joseph E. Lannutti; *High Energy Nuclear Physics;* 2 years; $51,000

UNIVERSITY OF FLORIDA, Gainesville, Fla.; Thomas A. Scott; *Cryogenic Investigations at High Pressures;* 2 years; $50,900

FORDHAM UNIVERSITY, New York, N.Y.; Joseph F. Mulligan, Alfons Weber, Joseph Shapiro, and Frederick L. Canavan; *Theoretical Analyses in Physics Research Using a Computer;* 3 years; $51,900

FRANKLIN INSTITUTE, Philadelphia, Pa.; Franz R. Metzger; *Resonance Fluorescence Studies Using the Centrifuge Method;* 3 years; $117,900

GEORGIA INSTITUTE OF TECHNOLOGY, Atlanta, Ga.; James R. Stevenson; *Photoexcitation Phenomena in Insulators;* 2 years; $12,400

UNIVERSITY OF GEORGIA, Athens, Ga.; Malcolm F. Steuer, and Lewis C. Thompson; *Nuclear Structure;* 1 year; $85,800

GOUCHER COLLEGE, Baltimore, Md.; John I. Lodge; *Interactions of Elementary Particles;* 2 years; $8,800

HARVARD UNIVERSITY, Cambridge, Mass.; Francis M. Pipkin; *Measurement of Nuclear Magnetic Moments and Other Properties;* 2 years; $27,200

Norman F. Ramsey; *Molecular Beam Studies;* 3 years; $90,000

HAVERFORD COLLEGE, Haverford, Pa.; Fay Ajzenberg-Selove; *Neutron Spectra and Energy Levels of Light Nuclei;* 3 years; $47,200

HOWARD UNIVERSITY, Washington, D.C.; Erwin M. Horl; *Structure Studies of Solidification Permanent Gases;* 2 years; $43,900

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.; Thomas Erber; *Bremsstrahlung and Pair Production at High Energies;* 2 years; $15,400

Leonard I. Grossweiner; *Electron Density Effects in Semiconductors;* 2 years; $22,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.; Frederick Seitz; *Theoretical Studies of Crystalline Materials;* 2 years; $35,100

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; E. J. Konopinski; *The Theory and Interpretation of Elementary Particle Interactions;* 2 years; $105,100

INSTITUTE FOR ADVANCED STUDY, Princeton, N.J.; Robert Oppenheimer; *Theoretical Physics;* 3 years; $180,000

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; G. H. Dieke; *Spectroscopy of Solids;* 2 years; $15,700

LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton

Rouge, La.; J. S. Levinger; *Theoretical Nuclear Physics;* 3 years; $50,400

MANCHESTER COLLEGE, North Manchester, Ind.; Charles S. Morris; *Gamma Ray Spectra;* 2 years; $21,500

MARQUETTE UNIVERSITY, Milwaukee, Wis.; Arthur G. Barkow; *Elementary Particle Reactions in Photographic Emulsions;* 2 years; $15,600

Paul J. Cressman; *Lifetimes of Excited States;* 2 years; $23,000

UNIVERSITY OF MARYLAND, College Park, Md.; Hans R. Griem; *Experimental and Theoretical Plasmadiagnostics;* 2 years; $21,200

Joseph Weber; *Theoretical and Experimental Research in General Relativity;* 2 years; $68,400

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Bruno Rossi; *Cosmic Ray Air Shower Research;* 30 months; $176,100

John C. Slater; *Research in the Field of Chemical and Solid-State Physics;* 2 years; $399,800

John C. Slater; *Research in Neutron Physics;* 2 years; $199,400

UNIVERSITY OF MASSACHUSETTS, Amherst, Mass.; Phillips R. Jones; *Atomic Collisions Below 25 KEV;* 2 years; $26,000

MIAMI UNIVERSITY, Oxford, Ohio; David F. Griffing; *Auger Effect in Mesonic Atoms;* 2 years; $23,900

MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing, Mich.; Clarence D. Hause and Thomas H. Edwards; *Near Infrared Molecular Spectroscopy;* 2 years; $35,300

Sherwood K. Haynes; *Low Energy Beta-Ray Spectroscopy;* 2 years; $17,000

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Marcellus L. Wiedenbeck; *Structure of Neutron-Deficient Isotopes;* 1 year; $33,800

UNIVERSITY OF MISSISSIPPI, University, Miss.; A. J. Zuchelli; *Annihilation of Positrons in Condensed Media;* 2 years; $37,300

UNIVERSITY OF MISSOURI, Columbia, Mo.; Paul W. Schmidt; *X-Ray Studies of Polydisperse Colloidal Systems;* 4 years; $53,700

NEW MEXICO COLLEGE OF AGRICULTURE AND MECHANIC ARTS, University Park, N. Mex.; Robert E. McDaniel; *Investigation of the Heavy Nuclei Component of Cosmic Radiation and of Allied Nuclear Reactions;* 2 years; $9,400

NEW YORK UNIVERSITY, New York, N.Y.; Lyle B. Borst; *Neutron Resonance Scattering;* 3 years; $96,000

OFFICE OF NAVAL RESEARCH, Washington, D.C.; William Wright; *Fund Transfer for High Energy Cosmic Ray Project;* 1 year; $215,000

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; Harold H. Nielsen; *Infrared Spectra of Polyatomic Molecules;* 3 years; $52,500

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; Sybrand Broersma; *Viscous Force Constants of Objects;* 2 years; $27,400

J. Rud Nielsen; *Vibration of Spectra of Crystals and Polymers;* 2 years; $12,400

UNIVERSITY OF OREGON, Eugene, Oreg.; Dwight W. Berreman; *Study of Crystal Lattice Vibrations;* 2 years; $10,200

Shang-Yi Ch'en; *Narrow Diffuse Bands of Atoms Produced by Close Collisions with Foreign Particles;* 3 years; $46,100

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; Edwin R. Fitzgerald; *Dynamic Properties of Metals;* 2 years; $23,600

Walter I. Goldburg; *Nuclear Magnetic Resonance Studies;* 2 years; $29,700

D. H. Rank; *Precision Infrared Spectroscopy;* 3 years; $69,100

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; C. W. Ufford; *Theoretical Problems in Atomic and Nuclear Spectroscopy;* 2 years; $61,400

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; Manfred A. Biondi, Gerald Chanin and Myron P. Garfunkel; *Low Temperature Studies of Metals;* 2 years; $85,600

Bernard L. Cohen; *Nuclear Structure and Nuclear Reactions;* 2 years; $121,500

C. Dean and G. A. Jeffrey; *Crystal and Molecular Structures;* 2 years; $16,700

Lorne A. Page; *A Multi-mode Charged Particle Analyzer;* 2 years; $31,600

PORTLAND STATE COLLEGE, Portland, Oreg.; Laird C. Brodie; *Impurity Effects on Oscillatory Properties;* 2 years; $14,300

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Kenneth L. Andrew; *Secondary Standards in High Precision Spectroscopy;* 30 months; $12,400

Frederik J. Belinfante; *Field Theory and Elementary Particles;* 3 years; $25,100

Hubert M. James; *Phase Transition in Molecular Crystals;* 3 years; $44,400

R. W. Stanley; *Primary Standards and High Precision Spectroscopy;* 30 months; $18,400

REED COLLEGE, Portland, Oreg.; Robert L. Martin; *Optical Properties of Silver and Thallium Halides;* 3 years; $18,900

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; Edmond Brown; *Electronic Band Structure of Semiconductors;* 1 year; $10,900

J. P. Davidson; *Theory of Nuclear Octupole Moments;* 2 years; $17,200

John E. Winhold; *Fast Neutron-Induced Nuclear Reactions;* 2 years; $24,700

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; Richard Mould, College on Long Island; *A Study of Location Correlations;* 1 year; $1,800

UNIVERSITY OF ROCHESTER, Rochester, N.Y.; R. E. Marshak; *Elementary Particle Physics;* 1 year; $9,100

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Elihu Boldt; *Decay of Cosmic Ray Particles at Sea Level;* 1 year; $14,100

Peter Lindenfeld, Ernest A. Lynton and Bernard Serin; *Low Temperature Properties of Metals and Alloys;* 2 years; $57,000

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SAINT PETER'S COLLEGE, Jersey City, N.J.; Po Lee; *Electric Discharge Through a Metallic Capillary;* 2 years; $16,600

UNIVERSITY OF SANTA CLARA, Santa Clara, Calif.; William T. Duffy, Jr.; *Magnetic Susceptibilities of Free Radicals;* 2 years; $9,800

SEATTLE PACIFIC COLLEGE INSTITUTE FOR RESEARCH, Seattle, Wash.; Donald Karlee; *Primary Cosmic Rays and Scattering of Heavy Ions by Nuclei;* 2 years; $25,700

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tering as a Random Flight Process; 2 years; $20,600

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South Dakota State College, Brookings, S. Dak.; George H. Duffey; *Application of Quantum Mechanics to Chemical Bonding;* 2 years; $16,000

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Stevens Institute of Technology, Hoboken, N.J.; Hans Meissner; *Studies of Superconductivity;* 2 years; $38,100

Swarthmore College, Swarthmore, Pa.; Irving E. Dayton; *Excitation Functions for Molecular Spectra;* 2 years; $18,400

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Erich M. Harth and Jack Leitner; *Development of a Fast-Cycling Bubble Chamber;* 2 years; $114,800

Texas Technological College, Lubbock, Tex.; Henry C. Thomas; *Inner Bremsstrahlung in Electron Capture;* 2 years; $11,600

University of Texas, Austin, Tex.; Walter E. Millett; *Annihilation of Positrons in Matter;* 3 years; $38,000

Trinity College, Hartford, Conn.; Robert Lindsay; *Antiferromagnetic Materials;* 3 years; $11,500

Tufts University, Medford, Mass.; Kathryn A. McCarthy; *Thermal Conductivity of Alkali Halide Crystals;* 2 years; $37,300

Tulane University of Louisiana, New Orleans, La.; John R. Shewell; *Quantum Mechanics in a Noncommuting Phase Space;* 1 year; $4,400

University of Utah, Salt Lake City, Utah; J. W. Keuffel; *Cosmic Ray Mesons;* 3 years; $77,100

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Vanderbilt University, Nashville, Tenn.; Joseph H. Hamilton; *Nuclear Spectroscopy;* 2 years; $22,100

Charles E. Roos; *Photosigma Measurements Using High Magnetic Fields;* 1 year; $28,400

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Edwin A. Vehling; *Nuclear and Electronic Magnetic Relaxation in Crystals;* 2 years; $18,600

Wayne State University, Detroit, Mich.; Leonard O. Roellig; *Nucleation of Bubbles in a Superheated Liquid Exposed to Ionizing Radiations;* 2 years; $35,800

Wesleyan University, Middletown, Conn.; Forrest I. Boley; *Atmospheric Cerenkov Radiation;* 2 years; $39,600

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Whitman College, Walla Walla, Wash.; Robert B. Bennett; *Vaporization of Cesium in Argon Atmosphere;* 2 years; $15,300

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Williams College, Williamstown, Mass.; Fielding Brown; *Ferroelectric and Semiconducting Properties of Barium Titanate;* 2 years; $19,900

University of Wisconsin, Madison, Wis.; Harold W. Lewis; *Problems in Theoretical Physics;* 2 years; $29,000

Julian E. Mack; *Structure of Atomic Spectra;* 2 years; $42,500

R. Rollefson; *Summer Research Institute of Theoretical Physics;* 2 months; $27,600

University of Wyoming, Laramie, Wyo.; Burton H. Muller; *Nuclear Relaxation Times in Paraffin Hydrocarbons;* 3 years; $15,900

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PSYCHOBIOLOGY

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Amherst College, Amherst, Mass.; John W. Davenport; *Reinforcement Variables in Simple Learning Situations;* 3 years; $14,100

University of Arizona, Tucson, Ariz.; Robert W. Lansing; *Attention Changes in Man;* 2 years; $18,600

Joe T. Marshall; *Research in Speciation;* 3 years; $31,400

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Brandeis University, Waltham, Mass.; Richard Held; *Visual-Motor Coordination in Mammals;* 2 years; $24,000

Brown University, Providence, R.I.; Frances L. Clayton; *Factors Influencing Strength of Secondary Reinforcers;* 2 years; $11,100

J. W. Kling; *Factors Influencing Response Strength;* 2 years; $14,400

Lewis P. Lipsitt; *Studies of Discrimination Learning;* 2 years; $11,600

University of California, Berkeley, Calif.; Norman H. Anderson, Los Angeles; *Probabilistic Discrimination Learning;* 3 years; $37,700

Nicholas E. Collias, Los Angeles; *Anal-*

ysis of Nest Building in Weaverbirds; 29 months; $19,600

W. E. Jeffrey, Los Angeles; *Research on Discrimination Learning;* 2 years; $20,500

Jaques W. Kaswan, Los Angeles; *Factors in Visual Perception;* 3 years; $30,700

David Krech and Marion C. Diamond; *Histological Correlates of Behavioral and Biochemical Measures;* 2 years; $20,700

Peter R. Marler; *Instinctive Behavior in Vertebrates;* 2 years; $50,300

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CARLETON COLLEGE, Northfield, Minn.; Peter M. Guthrie; *Symbolic Puzzle-Box Learning;* 1 year; $2,400

CENTRAL INSTITUTE FOR THE DEAF, Saint Louis, Mo.; Carl E. Sherrick, Jr.; *Study of Vibratory Stimuli;* 1 year; $4,000

UNIVERSITY OF CHICAGO, Chicago, Ill.; Robert A. Butler; *Effects of Brain Damage on Responsiveness to Visual and Auditory Incentives;* 2 years; $21,500

CLEVELAND HEARING AND SPEECH CENTER, Cleveland, Ohio; Earl D. Schubert; *Interaural Temporal Disparity;* 1 year; $10,700

CORNELL UNIVERSITY, Ithaca, N.Y.; J. E. Hochberg; *Dimensions of Form Perception;* 3 years; $14,700

Peter P. Kellogg, and William C. Dilger; *Ethological Investigation of Bird Sounds;* 3 years; $50,000

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DUKE UNIVERSITY, Durham, N.C.; C. Alan Boneau; *Empirical Study of the t Test;* 1 year; $10,000

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; H. D. Baker, and J. C. Smith; *Behavioral Measurement of Visual Functions;* 1 year; $7,700

UNIVERSITY OF FLORIDA, Gainesville, Fla.; Thomas J. Walker, Jr.; *Accoustical Behavior of Orthoptera;* 2 years; $15,500

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; Richard D. Walk; *Study of Visual Depth Perception;* 2 years; $15,400

UNIVERSITY OF GEORGIA, Athens, Ga.; Bernard S. Martof; *Behavior and Ecology of Amphibians;* 3 years; $29,700

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S. Smith Stevens; *The Construction of Sensory Scales;* 5 years; $172,500

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INSTITUTE OF LIVING, Hartford, Conn.; John S. Stamm; *Effects of Cortical Stimulation on Learning and Retention;* 3 years; $61,500

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; James Deese; *The Relationship Between Verbal Context and Free Recall;* 2 years; $11,300

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Charles D. Michener; *Origin and Evolution of the Female Castes of Bees;* 3 years; $48,000

MARQUETTE UNIVERSITY, Milwaukee, Wis.; John I. Johnson; *Effects of Muscular Tension on Human Learning;* 1 year; $5,700

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Kenneth N. Stevens; *Research on Speech Perception;* 2 years; $50,500

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UNIVERSITY OF MIAMI, Coral Gables, Fla.; Warren J. Wisby; *Anatomy and Physiology of the Visual Apparatus of Pelagic Fishes;* 13 months; $7,300

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J. David Birch; *Role of Extinction in Reversal Learning;* 2 years; $24,100

James Olds; *Brain Changes and Learning;* 3 years; $62,400

Robert A. McCleary; *Studies of Interocular Transfer;* 3 years; $50,700

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NEW YORK STATE PSYCHIATRIC INSTITUTE, New York, N.Y.; Carney Landis; *Studies of Flicker-Fusion Determinants;* 3 years; $47,900

NORTHWESTERN UNIVERSITY, Evanston, Ill.; Stephen E. Glickman; *Studies of Animal Behavior;* 1 year; $5,800

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman Okla.; Irene Hulicka; *Drive and Incentive as Determinants of Performance;* 1 year; $130

UNIVERSITY OF OREGON, Eugene, Oreg.; Robert F. Fagot; *Psychophysical Measurement;* 14 months; $9,600

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PRINCETON UNIVERSITY, Princeton, N.J.; Byron A. Campbell; *Studies on Aversive and Reinforcing Properties of Stimuli;* 3 years; $36,500

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ST. OLAF COLLEGE, Northfield, Minn.; William W. Rozeboom; *Mediation Processes in Human Avoidance Behavior;* 2 years; $2,800

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SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.; Thomas J. Case; *Integrative Mechanisms in the Pairing of Predatory Birds;* 3 years; $37,600

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UNIVERSITY OF TORONTO, Toronto, Canada; Abram Amsel; *Inconsistent Reward Situations;* 26 months; $29,400

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UTAH STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Logan, Utah; Keith L. Dixon; *Communication Signals in Birds;* 2 years; $11,000

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Salisbury, *Metabolic Approach to the Study of Flower Formation;* 2 years; $22,300

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Friedrich P. J. Diecke; *Olfactory Sense in Vertebrates;* 4 years; $47,400

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Luigi Provasoli; *Nutritional Studies on Marine Organisms;* 3 years; $59,800

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G. E. Peterson; *Natural Functions of Antibiotics;* 3 years; $28,100

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Arnold V. Wolf, Chicago; *Theory and Experimentation Concerning Sea Water Drinking;* 3 years; $63,500

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KAISER FOUNDATION RESEARCH INSTITUTE, Oakland, Calif.; Ellsworth C. Dougherty; *Cultivation of Micrometazoa;* 3 years; $42,200

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OREGON STATE COLLEGE, Corvallis, Oreg.; Carroll W. Fox; *Biological Action of "Estrogenic" Compounds in Legumes;* 2 years; $25,700

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568169—61——15

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STEPHEN F. AUSTIN STATE COLLEGE, Nacogdoches, Tex.; Walter H. Lewis; *Cytotaxonomic Study of the Tribe Oldenlandieae (Rubiaceae)*; 2 years; $9,000

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; Arthur C. Cole, Jr.; *Revisionary Studies of the Ant Genus Pogonomyrmex Mayr;* 1 year; $3,700

L. R. Hesler; *Taxonomic Study of the Agaricales of the Southeastern United States;* 3 years; $24,700

UNIVERSITY OF TEXAS, Austin, Tex.; W. Frank Blair; *Study of Amphibian Speciation and Evolutionary Relationships;* 3 years; $34,400

Clark Hubbs; *Interbreeding of Fish Populations in Relation to Speciation and Geographic Differentiation;* 3 years; $20,900

Louis S. Kornicker, Institute of Marine Science, Port Aransas; *Taxonomic Classification of Ostracodes Inhabiting the Laguna Madre;* 2 years; $12,000

ERNEST R. TINKHAM, Indio, Calif.; *Desert Sand Dune Biota;* 1 year; $2,200

TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; George H. Penn; *Systematics of the Dwarf Crawfishes;* 2 years; $21,500

Arthur L. Welden; *Taxonomic Study of the Thelephoraceae of the Lesser Antilles;* 3 years; $17,800

UNIVERSITY OF UTAH, Salt Lake City, Utah; George F. Edmunds, Jr.; *Higher Classification of the Ephemeroptera;* 2 years; $23,400

VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg, Va.; Perry C. Holt; *Systematic Studies of the Family Branchiobdellidae;* 3 years; $14,500

Robert D. Ross; *Systematics, Distribution and Ecology of Fishes of the Southern Appalachians;* 2 years; $20,000

UNIVERSITY OF VIRGINIA, Charlottesville, Va.; Walter S. Flory, Jr., The Blandy Experimental Farm, Boyce; *Biosystematic Analysis of Zephyranthes and Hymenocallis;* 3 years; $22,300

WASHINGTON STATE UNIVERSITY, Pullman, Wash.; George E. Hudson; *Appendicular Myology and Avian Taxonomy and Phylogeny;* 5 years; $39,700

John Mooring; *A Cytogenetic and Cytotaxonomic Study of Chaenactis;* 3 years; $16,100

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Belle A. Stevens; *Systematic Studies of Decapod Crustacea;* 3 years; $8,000

WEST VIRGINIA UNIVERSITY, Morgantown, W. Va.; M. E. Gallegly; *Sexuality in the Genus Phytophthora;* 3 years; $20,700

WORLD LIFE RESEARCH INSTITUTE, Colton, Calif.; Bruce W. Halstead and F. Rene Modglin; *Use of Venom Organs in Determining Phylogenetic Relationships;* 1 year; $1,400

YALE UNIVERSITY, New Haven, Conn.; Theodore Delevoryas; *Investigation of North American Cycadeoids;* 3 years; $18,500

June R. P. Phillips; *Middle Ordovician Bryozoa in the Type Areas of New York State;* 2 years; $11,200

CONTINUING ANTARCTIC RESEARCH

Antarctic Advisory Committee

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; James H. Zumberge, *A Study of the Status of Polar Research by American Universities, and the Development of Recommendations as To How Universities and Other Academic Institutions Can Contribute the Most in Future Polar Research;* 1 year; $12,500

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL, Washington, D.C.; G. D. Meid; *Committee on Polar Research of the Continuing U.S. Antarctic Research Program;* 1 year; $81,200

G. D. Meid; *Activities of the Committee on Polar Research;* 1 year; $69,303

Aurora and Airglow

ARCTIC INSTITUTE OF NORTH AMERICA, INC., Washington, D.C.; Norman J. Oliver; *Continuation of Aurora and Airglow Research in Antarctica;* 2 years; $198,480

Norman J. Oliver; *Correlation and Data Reduction of IGY and IGC Auroral Data From Antarctica;* 1 year; $12,773

Norman J. Oliver; *Study of Energetic Solar Particles Associated With Disturbances and Their Effects Upon the Terrestrial Ionospheres;* 1 year; $18,173

L. G. HANSCOMB AIR FORCE BASE, Bedford, Mass.; Norman J. Oliver; *Continuation of Patrol Spectrograph Data Reduction;* 1 year; $45,600

Biology and Medicine

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Robert Cushman Murphy; *Study of Pelagic Birds, Including Research Into the Behavior, Life History, Tolerances, Disturbances, and Systematic Relationships;* 1 year; $4,721

ARCTIC INSTITUTE OF NORTH AMERICA, Washington, D.C.; William J. L. Sladen, Johns Hopkins University; *Support for Medical Microbiological Work In USARP, 1959–60;* 1 year; $9,000

BERNICE P. BISHOP MUSEUM, Honolulu, Hawaii; J. Linsley Gressitt; *Studies of Airborne Organisms in the Antarctic Area; 1959–60;* 1 year; $20,827

J. Linsley Gressitt; *Studies of Airborne Organisms in the Antarctic Area; 1960–61;* 1 year; $32,039

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Karl C. Hamner, Los Angeles; *Studies of Endogenous Rhythms at the South Pole;* 1 year; $23,923

COLLEGE OF WILLIAM AND MARY, Williamsburg, Va.; William J. Hargis, Jr.; *A Study of the Ecto- and Endo-Parasites of Antarctic Fishes;* 1 year; $11,830

DUKE UNIVERSITY, Durham, N.C.; Knut Schmidt-Nielsen; *Continuation of Salt and Water Metabolism of Adelie Penguins;* 2 years; $10,692

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; William M. Smith; *Antarctic Scientific Personnel Project;* 1 year; $10,980

William M. Smith; *Observations of Individual and Group Behavior 1959–60 Antarctic Victoria Land Traverse;* 1 year; $7,900

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; W. J. L. Sladen and Carl Eklund; *U.S. Antarctic Research Bird-Banding Program;* 2 years; $21,850

KAISER FOUNDATION RESEARCH INSTITUTE, Richmond, Calif.; Ellsworth C. Dougherty; *Antarctic Microfauna;* 1 year; $10,106

Ellsworth C. Dougherty; *Studies of Soil and Freshwater Microfauna and Microflora of the "Dry Valley" Region, Victoria Land, Antarctica;* 1 year; $13,102

UNIVERSITY OF KANSAS, Lawrence, Kans.; Rufus H. Thompson and Kenneth B. Armitage; *A Biological Investigation of Fresh Water Lakes in Antarctica;* 1 year; $18,288

STANFORD UNIVERSITY, Stanford, Calif.; Donald E. Wohlschlag; *Ecological and Physiological Studies of McMurdo Sound Marine Animals;* 18 months; $69,715

Donald E. Wohlschlag; *Support of the Antarctic Research Laboratory NAF, McMurdo, for the continuing 1960 Biological and Medical Sciences Program;* 1 year; $67,950

Donald E. Wohlschlag; *The Support of the Biological Laboratory at NAF McMurdo for the Continuing 1961 Biological and Medical Sciences Program;* 18 months, $50,405

UNIVERSITY OF TEXAS, Austin, Tex.; Carl H. Oppenheimer; *The Significance of Bacteria and Organic Carbon Concentrations to the Organic Cycle of Antarctic Waters;* 18 months; $17,729

O. B. Williams; *Study of the Airborne Bacteria and Fungi of the Antarctic;* 1 year; $17,450

Orville Wyss; *Continuation of the Study of Bacteria, Fungi, and Other Biota, in Air, Soil, and Melt Pools in Antarctica;* 2 years; $43,032

VIRGINIA FISHERIES LABORATORY, Gloucester Point, Va.; William J. Hargis; *Continuation of Study of Certain Parasites of Antarctic Vertebrates and Invertebrates;* 2 years; $40, 204

UNIVERSITY OF WISCONSIN, Madison, Wis.; Richard Lee Penney; *Analysis of Data Collected on the Behavior of the Adelie Penguin;* 2 years; $4,236

Richard Lee Penney; *Study of the Behavior of the Adelie Penguin;* 1 year; $7,800

Cosmic Rays

FRANKLIN INSTITUTE, Philadelphia, Pa.; Martin A. Pomerantz; Bartol Research Foundation; *Investigations of Time Variations of the Primary Cosmic Radiation Near the Geomagnetic Pole;* 2 years; $49,860

Martin A. Pomerantz; Bartol Research Foundation; *Investigations of Time Variations of the Primary Cosmic Radiation at a Geomagnetic Pole;* 1 year; $14,600

Geodesy and Cartography

AMERICAN GEOGRAPHICAL SOCIETY, New York, N.Y.; William Briesemeister; *Preparation of a New Map of Antarctica;* 1 year; $17,780

Geology

UNIVERSITY OF KANSAS, Lawrence, Kans.; Edward J. Zeller; *Determination of Age of Low Temperature Conditions in Antarctica by Thermoluminescence of Rocks: 1959–60;* 1 year; $15,850

Edward J. Zeller; *Determination of Age of Low Temperature Conditions in Antarctica by Thermoluminescence of Rocks: 1960–61;* 18 months; $31,955

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; J. C. Craddock; *Bedrock Geology and Geomorphology of Some Nunataks in the Transantarctic Trough;* 1 year; $1,208

OHIO STATE RESEARCH FOUNDATION, Columbus, Ohio; Samuel B. Treves; *Geological Investigation of Antarctic Horst Area;* 18 months; $69,479

TUFTS UNIVERSITY, Medford, Mass.; Robert L. Nichols; *Geomorphological Field Project in the Wright, Victoria and Gran Mountain Dry Valleys;* 1 year; $31,996

U.S. DEPARTMENT OF THE INTERIOR, Washington, D.C.; E. W. Pehrson; *Investigation of Methods and Conditions of Mineral Exploration in Isolated Areas Such as Antarctica;* 1 year; $12,900

UNIVERSITY OF WISCONSIN, Madison, Wis.; Robert F. Black; *Study of Patterned Ground in the Antarctic;* 18 months; $41,639

Robert H. Dott, Jr.; *Stratigraphic and Tectonic Relationships of Western Antarctica and Lower Palmer Peninsula to the Andean Mobile Belt;* 1 year; $16,523

Geomagnetism

U.S. COAST AND GEODETIC SURVEY, Washington, D.C.; *Conduct of the 1961 Geomagnetic Program;* 2 years; $77,014

Magnetic Field Surveys in Antarctica; 2 years; $27,820

H. Arnold Karo; *1960 Antarctic Magnetic Observatories;* 1 year; $13,000

Glaciology

ARCTIC INSTITUTE OF NORTH AMERICA, New York, N.Y.; Walter A. Wood; *Conduct of Station and Traverse Glaciology of the Continuing U.S. Antarctic Research Program;* 2 years; $1,973

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; James H. Zumberg; *Ross Ice Shelf Studies: 1959–60;* 1 year; $30,350

James H. Zumberg; *Ross Ice Shelf Studies; 1960–61;* 1 year; $51,785

MOUNT UNION COLLEGE, Alliance, Ohio; John R. Reid, Jr.; *Ice Fabrics of a Firn Fold Near Camp Michigan, Antarctica;* 1 year; $2,125

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; Richard P. Goldthwait; *Glaciology of Antarctic Firn;* 2½ years; $53,972

R. P. Goldthwait; *Reduction and Analysis of Glaciology Data From Antarctica 1959–60;* 1 year; $45,815

SNOW, ICE AND PERMAFROST RESEARCH ESTABLISHMENT, Wilmette, Ill.; *Preparation for Future Drilling and for Remeasurement of the Drill Hole at Byrd Station, Antarctica;* 1 year; $19,000

UNIVERSITY OF WISCONSIN, Madison, Wis.; G. P. Woollard; *Reconnaissance Trail and Airborne Measurements in Glaciology and Related Studies in Antarctica—1960;* $51,025

G. P. Woollard, E. C. Thiel and C. R. Bentley; *Support for Antarctic Traverse Program;* 2 years; $488,342

Gravity

UNIVERSITY OF WISCONSIN, Madison, Wis.; G. P. Woollard; *Gravimetric Connections Between Key Points in Antarctica for: (A) Changes in Elevation of the Ice Surface With Time; (B) Changes in Land-Sea Relations; (C) Studies of Crustal Structure, Subice Geology and Ice Thickness;* 2 years; $20,450

Ionospheric Physics

NATIONAL BUREAU OF STANDARDS, Washington, D.C.; F. W. Brown, Boulder, Colo.; *Continuation of a Vertical-Incidence Antarctic Ionospheric Program;* 2 years; $169,509

STANFORD UNIVERSITY, Stanford, Calif.; R. A. Helliwell; *Continuation and Extension of VLF Phenomena in the Antarctic;* 2 years; $70,274

R. A. Helliwell; *Geomagnetic Latitude Control of VLF and ELF Phenomena;* 1 year; $59,740

R. A. Helliwell; *Study of Very Low Frequency Observations at South Pole and Byrd Stations;* 1 year; $30,450

Meteorology

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Charles D. Keeling, Scripps Institution of Oceanography, La Jolla; *Abundance of Carbon Dioxide in the Atmosphere in Antarctica;* 2 years; $38,652

U.S. WEATHER BUREAU, Washington, D.C.; F. W. Reichelderfer; *Antarctic Meteorological Research Program—1961;* 30 months; $442,176

F. W. Reichelderfer; *Atmospheric-Oceanic-Glaciologic Interaction in an Antarctic Interdisciplinary Research Program;* 1 year; $99,156

F. W. Reichelderfer; *International Antarctic Analysis Center, U.S. Participation;* 1 year; $15,763

Oceanography

TEXAS A & M RESEARCH FOUNDATION, College Station, Tex.; Luis Capurro; *Study of the Waters of the South Atlantic and Antarctic;* 1 year; $21,660

U.S. NAVY HYDROGRAPHIC OFFICE, Washington, D.C.; Wm. H. Littlewood; *Ship-Based Oceanographic Studies in Antarctic and Subantarctic Regions;* 18 months; $116,850

Shore-Based Seasonal Oceanographic Studies at McMurdo Sound; 2 years; $59,950

Polar Research Center

UNIVERSITY OF WISCONSIN, Madison, Wis.; G. P. Woollard; *Establishment of a Polar and Geophysical Research Center at the University of Wisconsin;* 1 year; $125,490

Related Scientific Support

ARCTIC INSTITUTE OF NORTH AMERICA, New York, N.Y.; Robert C. Faylor; *Related Scientific Support of the U.S. Antarctic Research Program;* 1 year; $163,927

L. G. HANSCOMB AIR FORCE BASE, Bedford, Mass.; A. P. Crary; *For Travel and Per Diem;* 1 year; $1,500

U.S. WEATHER BUREAU, Washington, D.C.; F. W. Reichelderfer; *Antarctic Field Operations;* 2 years; $69,977

Station Seismology

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; Hugo Benioff; *Operation, Upkeep, Replacement of South American Earth Strain Stations at Nana, Peru, and Santiago, Chile;* 1 year; $9,756

Frank Press; *Exchange Scientist With USSR Antarctic Expedition;* 1 year; $25,475

Frank Press; *Operation of Wilkes Seismograph Station and Interpretation of Records for the Year 1961;* 1 year; $6,600

COLUMBIA UNIVERSITY, New York, N.Y.; Jack Oliver; *Conduct of Station Seismology Program—1961;* 1 year; $1,044

U.S. COAST AND GEODETIC SURVEY, Washington, D.C.; H. A. Karo; *Antarctic Seismological Observatories—1961;* 2 years; $10,000

INTERNATIONAL GEOPHYSICAL YEAR

Aurora and Airglow

UNIVERSITY OF ALASKA:
Operational Costs of Auroral Observations $3,500

NATIONAL BUREAU OF STANDARDS:
Airglow Data Reduction in the International Geophysical Year 8,500

Cosmic Rays

THE FRANKLIN INSTITUTE OF THE STATE OF PENNSYLVANIA:
Data Reduction and Shipboard Neutron Monitor Station for the International Geophysical Year Cosmic Ray Program 8,000

NEW YORK UNIVERSITY:
Studies of the Primary Cosmic Ray Spectrum 870
Measurements of Neutrons of Solar Origin at High Altitudes 822

Glaciology

ARCTIC INSTITUTE OF NORTH AMERICA:
Antarctic Glaciology Personnel and Data Reduction 13,603
Data Reduction on McCall Glacier and Brooks Range 3,500
Study of Antarctic Glacial Geology 2,055

THE OHIO STATE UNIVERSITY:
Antarctic Data Reduction and Publication 12,660

Gravity Measurements

ARCTIC INSTITUTE OF NORTH AMERICA:
Antarctic Gravity Personnel 14,209

Ionospheric Physics

UNIVERSITY OF ALASKA:
Ionospheric Absorption, Cosmic Noise Method 700
Operation of an Atmospheric Whistler Station in Alaska 1,326

NATIONAL BUREAU OF STANDARDS:
Operation of South American Ionospheric Sounding Stations 573
Ionospheric Quality Control and Training 269
Ionospheric Data Processing and Publication in the International Geophysical Year Ionospheric Physics Program 2,000

Longitude and Latitude

U.S. COAST AND GEODETIC SURVEY:
Longitude and Latitude Program in Hawaii 4,100

Oceanography

COLUMBIA UNIVERSITY:
Operations of Island Observatories 15,840
Operational Cost for Radiochemistry Analysis 381

TEXAS A & M RESEARCH FOUNDATION:
Radiochemistry Analysis of Sea Water in the International Geophysical Year Oceanography Program in the Atlantic and the Gulf of Mexico 4,583

Rocketry

OFFICE OF NAVAL RESEARCH:
Provision of a Factory Trained Representative at Aerobee Firings 5,292

Seismology

COLUMBIA UNIVERSITY:
Seismic Measurements in the Atlantic 1,902
Operational Costs for Long Period Wave Studies 699

Solar Activity

NATIONAL BUREAU OF STANDARDS:
Data Reductions and Publication in the International Geophysical Year Solar Activity Program 5,000

World Days

NATIONAL BUREAU OF STANDARDS:
Operation of AGEWARN and U.S. Regional Warning Centers in the International Geophysical World Days Program 13,800

General Related Scientific Support

36 Travel Grants (see international travel for listing) 12th General Assembly International Union of Geodesy and Geophysics 23,145

ARCTIC INSTITUTE OF NORTH AMERICA:
Antarctic Scientific Field Supervision Costs 670

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL
ICSU Support for International Geophysical Year Symposia 5,378
Support of the International Geophysical Year Bulletin 29,532
Support of the International Geophysical Year Documentary Film 65,726
Support of International Geophysical Year Education 19,455
Support of International Geophysical Year Documentation 13,281
Support of the International Geophysical Year Annuals 54,347

Publication of International Geophysical Year Annuals and Data Interchange ---------- 5,000
United States National Committee—International Geophysical Year Symposium ---------- 10,000

World Data Centers

UNIVERSITY OF ALASKA:
Archives in Aurora ---------- 120,760
AMERICAN GEOGRAPHICAL SOCIETY:
Archives in Glaciology ---------- 53,585
THE HIGH ALTITUDE OBSERVATORY OF THE UNIVERSITY OF COLORADO:
Archives in Solar Activity ---------- 17,000
UNIVERSITY OF MINNESOTA:
Archives in Cosmic Rays ---------- 27,868
NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL:
Operation of the Data Coordination Office for the World Data Center ---------- 1,080
Rocket and Satellite World Data Center A ---------- 48,000
NATIONAL BUREAU OF STANDARDS:
Archives in Airglow and Ionosphere ---------- 10,000
AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS:
Archives in Oceanography ---------- 83,222
U.S. WEATHER BUREAU:
Archives in Meteorology ---------- 40,000

Heat and Water

COLUMBIA UNIVERSITY:
Correlation of Bottom Topography With Oceanic Parameters in the Interdisciplinary Research Program of the International Geophysical Year ---------- 10,200
Correlation of Volcanic Ash Layers in Deep-Sea Cores From the Eastern Pacific in the Interdisciplinary Research Program of the IGY ---------- 7,800
Analysis of Oceanographic and Biologic Data Obtained During the IGY in the Interdisciplinary Program ---------- 6,000
OHIO STATE UNIVERSITY:
Analysis of Geological Data From Spitzbergen ---------- 6,664
UNIVERSITY OF WASHINGTON:
Analysis of Heat Budget Data of Station Alpha in the International Geophysical Year Interdisciplinary Research Program ---------- 21,927
U.S. WEATHER BUREAU:
Interrelations of Meteorological and Solar-Cosmical Phenomena in the Arctic Hemisphere ---------- 25,000

Upper Atmosphere

UNIVERSITY OF MINNESOTA:
Charged Particle Orbits in the Earth's Magnetic Field ---------- 8,743
NATIONAL BUREAU OF STANDARDS:
Theoretical Studies of High Atmospheric Data in the International Geophysical Year Interdisciplinary Research Program ---------- 15,000
Worldwide Mapping of Ionospheric Data by Numerical Methods in the International Geophysical Year Interdisciplinary Research Program ---------- 10,000

Special Research

CARNEGIE INSTITUTE OF TECHNOLOGY:
Special Research Surveys by Distinguished Scientists From Abroad ---------- 80,000

Earth Satellite—Scientific Experiments

LINFIELD RESEARCH INSTITUTE:
Absolute Signal Strength and Frequency Measurements in the International Geophysical Year Earth Satellite Program ---------- 2,100
NATIONAL BUREAU OF STANDARDS:
Electron Density Profiles ---------- 210
RESEARCH INSTITUTE FOR ADVANCED STUDY:
Development of Instrumentation for the Determination of the Flux of Heavy Primary Cosmic Ray Nuclei in the IGY Earth Satellite Program ---------- 14,500

SPECIALIZED FACILITIES

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; L. R. Aronson; *Construction of a Laboratory Addition for Animal Behavior Research;* 2 years; $80,000

Mont A. Cazier, Southwestern Research Station, Portal, Ariz.; *Construction of Housing Units;* 2 years; $17,750

BERMUDA BIOLOGICAL STATION FOR RESEARCH, INC., Saint Geoge's West, Bermuda; W. H. Sutcliffe, Jr.; *Improvements and Additions to Research Facilities of the Bermuda Biological Station;* 2 years; $111,000

BROWN UNIVERSITY, Providence, R.I.; R. S. Rivlin; *Establishment of a Computing Center;* 2 years; $350,000

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Raymond E. Ewell; *Purchase of Ancillary Research Reactor Equipment;* 1 year; $139,295

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; G. D. McCann; *Digital Computing Facility;* $66,500

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Frank A. Beach; *Establishment of a Field Station for Research in Animal Behavior;* 3 years; $367,700

D. R. Parker, Riverside; *Desert Research Station;* 1 year; $15,000

Stanislavs Vasilevskis, Lick Observatory, Mount Hamilton; *Equipment for Surveying and Automatic Measurement of Astrographic Plates;* 3 years; $174,350

F. P. Zachelle, Davis; *Construction of a Controlled Environment Chamber of New Design;* 2 years; $17,400

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; Alan J. Perlis; *Construction of a Computer;* 3 years; $250,000

UNIVERSITY OF CHICAGO, Chicago, Ill.; H. B. Steinbach; *Modernization of Whitman Laboratory of Zoology;* 3 years; $60,000

CITY OF HOPE MEDICAL CENTER, Duarte, Calif.; W. D. Kaplan; *Construction of Laboratory Facilities for Genetics Research;* 1 year; $11,250

UNIVERSITY OF COLORADO, Boulder, Colo.; John W. Marr; *Improvement of Road to Mountain Field Stations;* 1 year; $11,850

COLUMBIA UNIVERSITY, New York, N.Y.; Charles F. Bonilla, *Support of Nuclear Reactor Facility;* 3 years; $247,700

COMMUNICATION RESEARCH INSTITUTE, Virgin Islands; John C. Lilly; *Construction of*

a Communications Research Laboratory; 2 years; $107,000

CORNELL UNIVERSITY, Ithaca, N.Y.; Henry Dietrich; *Cabinets for the Insect Collections of the Department of Entomology;* 1 year; $25,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.; William J. Fry; *Equipment for Ultrasound Research Facility;* 1 year; $69,000

Ross J. Martin; *Assistance To Increase Reactor Research Capabilities;* 1 year; $51,097

UNIVERSITY OF KANSAS, Lawrence, Kans.; E. R. Hall; *Construction of a Research Wing for the Museum of Natural History;* 3 years; $317,500

Ronald L. McGregor; *Construction of an Experimental Greenhouse for Plant Taxonomy;* 1 year; $33,500

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; T. J. Thompson; *Equipment for MIT Reactor Project;* 1 year; $235,340

MISSOURI BOTANICAL GARDEN, Saint Louis, Mo.; F. W. Went; *Construction of a Botanical Research and Herbarium Building;* 2 years; $250,000

UNIVERSITY OF MISSOURI, Columbia, Mo.; Elmer Ellis; *Support of a Research Reactor;* 3 years; $625,000

MONTANA STATE COLLEGE, Bozeman, Mont.; J. H. Pepper; *Controlled Environmental Chamber for Entomological Research;* 1 year; $6,000

MONTANA STATE UNIVERSITY, Missoula, Mont.; O. L. Stein; *Controlled Environmental Facilities;* 1 year; $5,700

MOUNT DESERT ISLAND BIOLOGICAL LABORATORY, Salisbury Cove, Maine; Alvin W. Rieck; *Replacements, Improvements and Support of Facilities for Biological Research;* 3 years; $30,350

NAPLES ZOOLOGICAL STATION, Naples, Italy; Peter Dohrn; *Support of Basic Research Facilities at the Naples Zoological Station;* 1 year; $12,000

Peter Dohrn; *Support of Basic Research Facilities at the Naples Zoological Station;* 4 years; $48,000

NEW YORK BOTANICAL GARDEN, New York, N.Y.; William C. Steere; *Partial Support for Construction of a New Library Wing;* 3 years; $300,000

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; Forrest J. Remick; *Equipment for Expanding Basic Research in the Natural Engineering Sciences;* 1 year; $168,126

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; William E. Stephens; *Acquisition of a 10 MEV Tandem Van De Graaff Accelerator;* 2 years; $1,041,000

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; L. A. Cohen; *Construction of a Laboratory for the Study of Body Orientation and Motor Coordination;* 2 years; $35,000

William B. Kehl; *New Computing Facility (IBM 7070);* 2 years; $210,000

PRINCETON UNIVERSITY, Princeton, N.J.; A. K. Parpart; *Installation of a Sea Water System for Biological Research;* $11,500

ROCKY MOUNTAIN BIOLOGY LABORATORY, Crested Butte, Colo.; Robert K. Enders; *Construction of Research Facilities at the Rocky Mountain Biological Laboratory;* 1 year; $9,000

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; J. O. Lampen; *Additions to Pilot Plant Facilities;* 1 year; $46,000

STANFORD UNIVERSITY, Stanford, Calif.; John G. Herriot; *Purchase of a Computer System;* 1 year; $295,000

UNIVERSITY OF TEXAS, Austin, Tex.; Howard T. Odum, Institute of Marine Science, Port Aransas; *Construction of a Boat Basin for Marine Research;* 1 year; $51,000

UNIVERSITY OF VIRGINIA, Charlottesville, Va.; Lawrence R. Quarles; *A Hot Cell for the University of Virginia Reactor Facility;* 1 year; $41,400

UNIVERSITY OF WASHINGTON, Seattle, Wash.; David B. Dekker, *Establishment of Computing Center;* 1 year; $500,000

Robert L. Fernald; *Expansion and Modernization of Research Facilities of the Friday Harbor Marine Laboratories;* 2 years; $350,000

UNIVERSITY OF WISCONSIN, Madison, Wis.; R. A. Alberty; *Construction of Laboratories for Research on Macromolecules;* 3 years; $97,500

A. D. Hasler; *Construction of a Hydrobiology Laboratory;* 3 years; $480,000

WOODS HOLE OCEANOGRAPHIC INSTITUTION, Woods Hole, Mass.; Paul M. Fye; *Design and Construction of an Oceanographic Research Vessel;* 2 years; $3,000,000

WORCESTER FOUNDATION FOR EXPERIMENTAL BIOLOGY, Shrewsbury, Mass.; Ralph I. Dorfman; *Construction of Solvent Distillation Facility;* 1 year; $65,000

YALE UNIVERSITY, New Haven, Conn.; Willard D. Hartman; *Storage and Systematic Arrangement of Research Collections;* 3 years; $25,000

DEVELOPMENT OF GRADUATE RESEARCH LABORATORIES

UNIVERSITY OF AKRON, Akron, Ohio; Maurice Morton; *Conversion of Library Space Into a Laboratory for Physico-Chemical Research in Polymer Chemistry;* 1 year; $14,400

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Albert Siegel; *Construction of a Greenhouse and Headhouse for Plant Virus Research;* 1 year; $7,000

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; A. D. Maynes; *Construction of a Wet Chemical Anatlytical Laboratory;* 1 year; $11,000

E. H. Swift; *Construction of Facilities for Conducting Hazardous Research Experiments;* 1 year; $33,600

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; P. R. Stout and W. C. Snyder; *Renovation of Research Laboratories for Soils and Plant Nutrition and Plant Pathology;* 2 years; $150,000

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; R. B. Sutton; *Extension of Cyclotron Room;* 1 year; $20,000

E. M. Williams; *Renovation of the Electrical Distribution System for Research Laboratories of the Department of Electrical Engineering;* 1 year; $10,000

CORNELL UNIVERSITY, Ithaca, N.Y.; F. A. Long; *Modifying Two Rooms for Graduate Research in Organic and Physical Chemistry;* 1 year; $5,100

John F. McManus; *Atmospheric Controlled Room;* 1 year; $3,000

Robert L. Sproull; *Renovation of Graduate Research Laboratories in the Physics Building;* 1 year; $7,800

EMORY UNIVERSITY, Atlanta, Ga.; A. E. Wilhelmi; *Improvement of Hood and Ven-*

tilating Systems of Biochemistry Laboratories; 1 year; $21,000

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Seymour L. Hess; *Modernization of Graduate Research Laboratories in Meteorology;* 1 year; $3,000

UNIVERSITY OF FLORIDA, Gainesville, Fla.; G. R. Noggle; *Controlled Environment Chamber for Plant Research;* 1 year; $5,000

GEORGETOWN UNIVERSITY, Washington, D.C.; W. C. Hess; *Renovation of Microbiology and Pharmacology Research Laboratories;* 1 year; $15,750

HOWARD UNIVERSITY, Washington, D.C.; Lloyd N. Ferguson; *Construction and Equipping Six Graduate Research Laboratories in the Attic of the Chemistry Building;* 1 year; $13,800

UNIVERSITY OF ILLINOIS, Urbana, Ill.; G. M. Almy; *Construction of Research Buildings at the Betatron Laboratory;* 1 year; $27,300

H. E. Carter; *Remodelling Program for Physical Chemistry;* 1 year; $50,000

N. M. Newmark; *Modernization and Expansion of Graduate Research Laboratories in Civil Engineering;* 1 year; $17,800

R. J. Winzler and S. M. Reynolds; *Remodeling Biochemistry and Anatomy Research Laboratories;* 1 year; $17,300

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; Harry G. Day; *Renovation of Graduate Research Laboratories;* 1 year; $16,000

Allan C. G. Mitchell; *Converting Space in New Physics Wing Into Research Laboratories;* 1 year; $6,800

John B. Patton; *Modernization of Graduate Research Laboratories;* 30 months; $49,600

Sid Robinson; *Modernization of Animal Facilities;* 1 year; $34,300

IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa.; Percy H. Carr and Daniel J. Zaffarano; *Filling in Two Open Courts With Research Rooms;* 1 year; $40,000

KANSAS STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCES, Manhattan, Kans.; Ralph G. Nevins; *Construction of Graduate Research Laboratories;* 1 year; $5,700

Milton E. Raville; *Construction of a Graduate Research Laboratory;* 1 year; $4,800

KENTUCKY RESEARCH FOUNDATION, Lexington, Ky.; F. L. Yost; *Renovation of Physics Research Laboratories;* 1 year; $3,200

LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; H. B. Williams; *Renovating and Air Conditioning a Graduate Research Microanalytical Laboratory and Research Instrument Room;* 1 year; $22,500

UNIVERSITY OF MARYLAND, College Park, Md.; George A. Snow; *Provision of a Darkroom for Use in High Energy Physics;* 1 year; $8,000

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; L. C. Anderson; *Modernizing Eight Graduate Research Laboratories;* 1 year; $20,000

D. E. S. Brown; *Renovation of Zoology Research Laboratories;* 1 year; $38,000

Stuart W. Churchill, Donald R. Mason and Brymer Williams; *Renovation of Graduate Research Laboratories;* 1 year; $11,100

Wendell E. Hewson; *Construction of an Addition to the Meteorological Laboratories;* 1 year; $19,250

K. L. Jones; *Renovation of Plant Physiology Research Laboratories;* 1 year; $15,000

M. J. Sinnott; *Renovation of Graduate Research Laboratories;* 1 year; $1,500

James T. Wilson; *Renovation and Construction of Graduate Research Laboratories in the Department of Geology;* 1 year; $7,235

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Bryce L. Crawford; *Modernization of the Physical Chemical Instrumental Research Laboratories;* 1 year; $50,000

E. R. Eckert; *Equipping a High Temperature Laboratory;* 1 year; $7,500

Paul W. Gast; *Expansion of Research Laboratory Facilities in Geochemistry;* 1 year; $2,850

J. W. Hall; *Conversion of a Greenhouse to a Paleobotanical Research Laboratory;* 1 year; $4,800

W. G. Shepherd; *Additions to the Graduate Research Laboratories;* 1 year; $21,500

N. T. Spratt, Jr.; *Modernization of Graduate Laboratories for Zoological Research;* 1 year; $5,000

F. M. Swain; *Remodeling Organic Geochemistry Laboratory;* 1 year; $8,000

Tibor Z. Zoltai; *Modernization of X-Ray Laboratory in the Department of Geology and Mineralogy;* 1 year; $6,050

UNIVERSITY OF MISSOURI, Columbia, Mo.; Warren R. Fleming; *Renovation and Reconstruction of Zoological Research Laboratories;* 2 years; $20,000

UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; C. E. Georgi and R. E. Hill; *Conversion of a Greenhouse to Laboratories and Construction of a Cold Room;* 1 year; $6,500

NEW MEXICO STATE UNIVERSITY OF AGRICULTURE, ENGINEERING AND SCIENCE; George W. Gardiner; *Improvement of Research Space in the Research Center Building;* 1 year; $12,500

UNIVERSITY OF NEW MEXICO, Albuquerque, N. Mex.; J. L. Riebsomer; *Additional Research Facilities for Organic and Physical Chemistry;* 1 year; $11,100

Eugene W. Rypka; *Refurbishment of Laboratories for Microbiological Research;* 1 year; $1,500

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; G. F. D'Alelio; *Conversion of Four Undergraduate Laboratories to Modern Graduate Research Laboratories;* 1 year; $12,100

E. A. Peretti; *Modernization of Graduate Research Laboratories;* 1 year; $14,400

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; A. B. Garrett; *Remodeling a Portion of McPherson Laboratory;* 1 year; $55,000

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; Robert H. Perry; *Modernization of Graduate Research Facilities;* 1 year; $6,700

UNIVERSITY OF OREGON, Eugene, Oreg.; Harry Alpert; *Renovation and Improvement of Laboratories for Research in Biological and Physical Sciences;* 1 year; $70,175

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; M. R. Fenske; *Modernization of Graduate Research Laboratories;* 1 year; $9,500

E. H. Ludwig; *Modernization and Furnishing of Virology and Tissue Culture Laboratories;* 1 year; $12,500

R. L. Pike; *Furnishings for a Nutrition Research Laboratory;* 1 year; $2,000

UNIVERSITY OF PENNSYLVANIA, Philadelphia,

Pa.; Norman Brown; *Construction of a Laboratory for Electron Microscopy;* 1 year; $6,600

Julius Halpern; *Conversion of Storage Space for Research;* 1 year; $12,000

Noah S. Prywes; *Renovation and Construction of a Graduate Research Laboratory in the Moore School of Electrical Engineering;* 1 year; $9,900

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; Lorne A. Page; *Renovation of the Low-Energy Nuclear and Electron Physics Laboratory;* 1 year; $13,700

G. A. Jeffrey; *Renovation of Crystallography Laboratory;* 1 year; $11,000

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Henry Koffler; *Construction of Research Greenhouse;* 1 year; $41,400

E. T. McBee; *Furnishing and Finishing of Two Large Research Laboratories;* 1 year; $43,900

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; W. R. Beam; *Construction of Electron Physics Laboratories;* 1 year, $19,200

James B. Cloke; *Modernizing Sixteen Graduate Research Laboratories;* 1 year; $13,100

N. D. Greene; *Modernization of a Laboratory for Graduate Research in Corrosion and Related Phenomena;* 1 year; $5,200

RESEARCH FOUNDATION, OKLAHOMA STATE UNIVERSITY, Stillwater, Okla.; Clark A. Dunn; *The Renovation and Modernization of the Chemical Engineering Graduate Research Laboratory;* 1 year; $3,300

RICE INSTITUTE, Houston, Tex.; LeVan Griffis; *Renovation and Construction of Graduate Research Laboratory in Engineering;* 1 year; $17,200

R. B. Turner; *Modernizing Three Graduate Research Laboratories;* 1 year; $14,900

ROCKEFELLER INSTITUTE, New York, N.Y.; Frank Brink, Jr.; *Furnishing of Graduate Student Research Laboratories;* 2 years; $32,250

UNIVERSITY OF ROCHESTER, Rochester, N.Y.; John W. Graham, Jr.; *Modernization of Graduate Research Laboratories in the College of Engineering;* 1 year; $59,300

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; J. B. Allison; *Furnishings for Biological Research Laboratories;* 2 years; $109,400

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; M. C. Kloetzel; *Renovation of Bacteriology Research Laboratories;* 1 year; $48,700

STANFORD UNIVERSITY, Stanford, Calif.; David M. Mason; *Transport Processes Research Laboratory;* 1 year; $8,000

Byrne Perry; *Small-Scale Fluid Mechanics Laboratory for Doctoral Research;* 1 year; $2,300

O. Cutler Shepard; *Construction of a Laboratory for a Radioactive Tracer Facility;* 1 year; $3,200

STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion, S. Dak.; F. E. Kelsey; *Furnishings for Biochemistry and Pharmacology Research Laboratories;* 1 year; $5,000

STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N.J.; Luigi Z. Pollara; *Modernizing a Laboratory for Graduate Research in Organic Chemistry;* 1 year; $7,500

SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.; W. R. Fredrickson; *Conversion of Unused Space Into a Physics Research Laboratory;* 1 year; $13,500

Henry E. Wirth; *Renovation of Two Graduate Research Laboratories;* 1 year; $11,300

TEXAS A & M RESEARCH FOUNDATION, College Station, Tex.; S. R. Wright; *Development of a Graduate Research Laboratory;* 1 year; $16,300

TUFTS UNIVERSITY, Medford, Mass.; M. Kent Wilson; *Modification of an Old Laboratory To Provide a Modern Graduate Research Laboratory for Physical-Inorganic Chemistry Research and a Machine Shop for Research;* 1 year; $12,500

TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; Eugene Copeland; *Remodeling and Furnishing Biology Research Laboratories;* 1 year; $9,900

VANDERBILT UNIVERSITY, Nashville, Tenn.; Leonard B. Beach; *Improvement of New Research Space in Physics;* 1 year; $7,000

Louis J. Birchner; *Installation of New Hoods and Laboratory Benches in Six Laboratories for Organic, Inorganic and Analytical Research;* 1 year; $7,700

R. B. Channell and E. Quarterman; *Laboratory Renovation and Construction of a Greenhouse for Biological Research;* 1 year; $11,600

R. R. Purdy; *Furnishings for Research Laboratories of Departments of Anatomy, Biology, Biochemistry, Microbiology, and Physiology;* 2 years; $110,000

VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg, Va.; R. W. Engel; *Construction of Research Laboratories for Biochemistry, Nutrition and Microbiology;* 2 years; $52,700

WASHINGTON STATE UNIVERSITY, Pullman, Wash.; J. L. Culbertson; *Modernizing of Five Graduate Research Laboratories for Organic Chemistry;* 1 year; $9,100

J. I. Stokes and A. Hecht; *Renovation and Furnishing for Two Graduate Research Laboratories;* 1 year; $6,700

WASHINGTON UNIVERSITY, St. Louis, Mo.; H. N. Andrews, Jr.; *Renovation and Furnishing of a Plant Histology Laboratory;* 1 year; $1,950

UNIVERSITY OF WASHINGTON, Seattle, Wash.; E. E. Day and A. S. Kobayshi; *Modernization of the Brittle Coating Research Laboratory;* 1 year; $1,700

WAYNE STATE UNIVERSITY, Detroit, Mich.; George Coleman; *Fixed Equipment for the Life Sciences Research Center;* 1 year; $50,000

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; R. L. Frantz and N. Alldridge; *Renovation of Primate Behavior Laboratory and Construction of Botanical Research Laboratory;* 1 year; $11,250

Oliver Grummitt; *Modernization of Graduate Level Research Laboratories;* 1 year; $3,100

UNIVERSITY OF WISCONSIN, Madison, Wis.; L. A. Fraser; *Renovation of Zoological Research Laboratories;* 1 year; $9,800

Marion L. Jackson; *Reconstruction of Two Rooms as Laboratories and Renovation of One Laboratory Room;* 1 year; $7,450

Stephen C. Kleene; *Modernization of Facilities for Graduate Mathematics Research;* 1 year; $50,000

Julian E. Mack; *Construction of a Spectroscopic Laboratory;* 1 year; $6,700

Carl Olson; *Renovation of Veterinary Pathology Research Laboratory;* 1 year; $6,000

P. C. Rosenthal; *Modernization of Graduate Research Laboratories;* 1 year; $13,400

J. F. Stauffer; *Renovation of Botanic Research Greenhouses;* 1 year; $9,700

GENERAL

BROWN UNIVERSITY, Providence, R.I.; Frederick G. Sherman; *Purchase of Equipment for Basic Research in Biology;* 1 year; $21,200

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Sidney Shulman; *Short-Term Research by Medical Students;* 3 years; $12,600

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; C. E. ZoBell and G. O. Arrhenius, Scripps Institution of Oceanography, La Jolla; *An Electron Microscope for Research in Cell Biology;* 2 years; $61,400

UNIVERSITY OF CHICAGO, Chicago, Ill.; L. T. Coggshall; *Short-Term Research by Medical Students;* 3 years; $25,920

COLLEGE OF MEDICAL EVANGELISTS, Loma Linda, Calif.; John Eric Peterson; *Short-Term Research by Medical Students;* 3 years; $8,640

COMISION NACIONAL DE ENERGIA ATOMICA, Buenos Aires, Argentina; Jorge A. Sabato; *(1) Fabrication of Perfect Single Crystals of Alpha Uranium, and (2) Relationship Between Physical and Mechanical Properties and Substructures in Uranium Metal;* 6 months; $11,700

CORNELL UNIVERSITY, Ithaca, N.Y.; Lawrence W. Hanlon; *Short-Term Research by Medical Students;* 3 years; $21,600

Benjamin M. Siegel; *Research Training in Electron Microscopy;* 5 years; $40,100

DUKE UNIVERSITY, Durham, N.C.; C. G. Bookhout, Duke University Marine Laboratory; *Summer Research and Training at the Duke University Marine Laboratory;* 3 years; $26,600

EMORY UNIVERSITY, Atlanta, Ga.; Arthur P. Richardson; *Short-Term Research by Medical Students;* 3 years; $17,280

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Leland Shanor; *Support of an Electron Microscope Facility for Research;* 2 years; $42,200

UNIVERSITY OF GEORGIA, Athens, Ga.; Lawrence R. Pomeroy, The Marine Institute, Sapelo Island; *Equipment for Marine Biological Research at the University of Georgia Marine Institute;* 1 year; $20,400

HARVARD UNIVERSITY, Cambridge, Mass.; Henry C. Meadow, Medical School, Boston; *Short-Term Research by Medical Students;* 3 years; $32,400

UNIVERSITY OF ILLINOIS, Urbana, Ill.; H. O. Halvorson; *Equipment for Basic Bacteriological Research;* 2 years; $100,000

Milan Novak, Graduate College, Chicago; *Short-Term Research by Medical Students;* 3 years; $17,280

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; Richard C. Starr; *Culture Collection of Algae;* 5 years; $34,600

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Thomas B. Turner; *Short-Term Research by Medical Students;* 3 years; $21,600

LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; W. W. Frye, New Orleans; *Short-Term Research by Medical Students;* 3 years; $12,960

MARINE BIOLOGICAL LABORATORY, Woods Hole, Mass.; Philip B. Armstrong; *Research Training in Marine Biology;* 5 years; $177,800

MAYO ASSOCIATION, Rochester, Minn.; Joseph B. Berkson; *Estimation Problems Bearing on Biological Problems;* 2 years; $16,000

MEDICAL COLLEGE OF SOUTH CAROLINA, Charleston, S.C.; John T. Cuttino; *Short-Term Research by Medical Students;* 3 years; $8,640

UNIVERSITY OF MIAMI, Coral Gables, Fla.; Lauren C. Gilman; *Maintaining Type Cultures of the Various Syngens of Paramecium Caudatum;* 3 years; $13,800

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; William N. Hubbard, Jr.; *Short-Term Research by Medical Students;* 3 years; $4,320

A. H. Stockard, University of Michigan Biological Station; *Research at the University of Michigan Biological Station;* 3 years; $31,000

UNIVERSITY OF MISSOURI, Columbia, Mo.; J. C. Thaemert; *Electron Microscope for Interdisciplinary Research Use;* 1 year; $45,300

NATIONAL ACADEMY OF SCIENCES, Washington, D.C.; Harold J. Coolidge; *Pacific Science Board;* 3 years; $75,600

NORTHWESTERN UNIVERSITY, Evanston, Ill.; Ray L. Watterson; *Research Equipment;* 1 year; $23,000

UNIVERSITY OF OKLAHOMA, Norman Okla.; Mark R. Everett, Oklahoma City; *Short-Term Research by Medical Students;* 3 years; $8,640

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Thomas F. Anderson; *Support of a Program of Electron Microscopy;* 5 years; $38,200

Julian B. Marsh; *Short-Term Research by Medical Students;* 3 years; $21,600

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; Davis G. Johnson, Syracuse; *Short-Term Research by Medical Students;* 3 years; $17,280

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; J. W. Bartholomew; *An Electron Microscope for Biological Research;* 1 year; $45,400

STATE UNIVERSITY OF IOWA, Iowa City, Iowa; Norman B. Nelson; *Short-Term Research by Medical Students;* 3 years; $8,640

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; Roland H. Alden, Memphis; *Short-Term Research by Medical Students;* 3 years; $15,120

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Robert L. Fernald, Friday Harbor Laboratories; *Research in Oceanography at the Friday Harbor Laboratories;* 1 year; $4,000

WEST VIRGINIA UNIVERSITY, Morgantown, W. Va.; Edward J. Van Liere; *Short-Term Research by Medical Students;* 3 years; $8,640

UNIVERSITY OF WISCONSIN, Madison, Wis.; H. Ris; *Summer Course in the Principles and Techniques of Tissue Culture;* 2 years; $18,000

YALE UNIVERSITY, New Haven, Conn.; Vernon W. Lippard; *Short-Term Research by Medical Students;* 3 years; $32,400

Daniel J. Merriman, Bingham Oceanographic Laboratory; *Research Equipment for the Bingham Oceanographic Laboratory;* 1 year; $14,500

APPENDIX D

Grants Other Than Research

Education in the Sciences

ACADEMIC YEAR INSTITUTES FOR HIGH SCHOOL TEACHERS

Arizona State University, Tempe, Ariz.; Alan T. Wager; 11 months; $274,500
Atlanta University, Atlanta, Ga.; K. A. Huggins; 9 months; $251,400
Boston College, Chestnut Hill, Mass.; Stanley J. Bezuszka; 10 months; $222,900
Brigham Young University, Provo, Utah; Lane A. Compton; 9 months; $274,500
Brown University, Providence, R.I.; Elmer R. Smith; 12 months; $300,700
University of Georgia, Athens, Ga.; Jonathan J. Westfall; 9 months; $277,400
Iowa State Teachers College, Cedar Falls, Iowa; Robert A. Rogers; 11 months; $305,700
University of Kansas, Lawrence, Kans.; Lee M. Sonneborn; 9 months; $252,300
Louisiana State University and Agricultural and Mechanical College, Baton Rouge, La.; Houston T. Karnes; 11 months; $259,800
Michigan State University of Agriculture and Applied Science, East Lansing, Mich.; John Mason; 9 months; $274,100
University of Michigan, Ann Arbor, Mich.; Leigh C. Anderson; 11 months; $277,800
University of Minnesota, Minneapolis, Minn.; Charles Hatfield; 12 months; $310,000
New Mexico Highlands University, Las Vegas, N. Mex.; E. Gerald Meyer; 11 months; $304,900
University of North Carolina, Chapel Hill, N.C.; Edwin C. Markham; 10 months; $294,500
University of Notre Dame, Notre Dame, Ind.; Arnold E. Ross; 11 months; $228,600
Oklahoma State University of Agriculture and Applied Science, Stillwater, Okla.; James H. Zant; 12 months; $269,600
Oregon State College, Corvallis, Oreg.; Stanley E. Williamson; 12 months; $290,300
Pennsylvania State University, University Park, Pa.; William H. Powers, 9 months; $272,600
University of Pennsylvania, Philadelphia, Pa.; William E. Arnold; 9 months; $267,300
University of Puerto Rico, Rio Piedras, P.R.; Mariano Garcia; 9 months; $110,800
San Diego State College Foundation, San Diego, Calif.; John E. Eagle; 11 months; $288,400
Stanford University, Stanford, Calif.; Harold M. Bacon; 9 months; $278,400
State University of South Dakota, Vermillion, S. Dak.; Charles M. Vaughn; 11 months; $312,500
Syracuse University Research Institute, Syracuse, N.Y.; Alfred T. Collette; 10 months; $288,900
University of Texas, Austin, Tex.; Robbin C. Anderson; 11 months; $297,400
Tuskegee Institute, Tuskegee Institute, Ala.; W. Edward Belton; 9 months; $260,600
University of Utah, Salt Lake City, Utah; Thomas J. Parmley; 12 months; $309,300
University of Virginia, Charlottesville, Va.; James W. Cole, Jr.; 11 months; $297,600
Washington University, St. Louis, Mo.; E. U. Condon; 9 months; $278,200
University of Wisconsin, Madison, Wis.; Donald H. Bucklin; 12 months; $305,800

ACADEMIC YEAR INSTITUTES FOR HIGH SCHOOL AND COLLEGE TEACHERS

Harvard University, Cambridge, Mass.; Francis Keppel; 9 months; $326,500
University of Illinois, Urbana, Ill.; Joseph Landin; 12 months; $299,200
Ohio State University, Columbus, Ohio; John S. Richardson; 9 months; $311,200

IN-SERVICE INSTITUTES FOR COLLEGE TEACHERS

University of Oklahoma, Norman, Okla.; Richard V. Andree; 9 months; $21,015

IN-SERVICE INSTITUTES FOR HIGH SCHOOL TEACHERS

Adelphi College, Garden City, N.Y.; Abe Shenitzer; 9 months; $28,080
University of Akron, Akron, Ohio; Roger F. Keller, Jr.; 9 months; $5,280
Alabama College, Montevallo, Ala.; Paul C. Bailey; 9 months; $13,620
University of Alabama, University, Ala.; Ralph L. Chermock; 9 months; $21,690
Albertus Magnus College, New Haven, Conn.; Florence D. Jacobson; 8 months; $9,300
Albright College, Reading, Pa.; Richard J. Kohlmeyer; 9 months; $4,270
Alfred University, Alfred, N.Y.; E. Gordon Ogden; 9 months; $8,450
American University, Washington, D.C.; Leo Schubert; 9 months; $20,870
Arizona State College, Flagstaff, Ariz.; Agnes M. Allen; 9 months; $11,220
Arizona State University, Tempe, Ariz.; Ernest E. Snyder; 9 months; $10,440

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Robert W. Hoshaw; 9 months; $13,230

Arthur H. Steinbrenner; 9 months; $5,880

BALL STATE TEACHERS COLLEGE, Muncie, Ind.; Charles Brumfiel; 8 months; $12,600

BOSTON COLLEGE, Chestnut Hill, Mass.; Stanley J. Bezuszka; 8 months; $15,390

BOWDOIN COLLEGE, Brunswick, Maine; Richard L. Chittim; 8 months; $8,930

BOWLING GREEN STATE UNIVERSITY, Bowling Green, Ohio; W. H. Hall; 9 months; $12,480

BRIDGEWATER COLLEGE, Bridgewater, Va.; Harry G. M. Jopson; 8 months; $9,200

BROWN UNIVERSITY, Providence, R.I.; Charles B. MacKay; 9 months; $5,640

BUCKNELL UNIVERSITY, Lewisburg, Pa.; William K. Smith; 9 months; $5,680

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Harriet F. Montague; 9 months; $7,790

BUTLER UNIVERSITY, Indianapolis, Ind.; Ralph K. Birdwhistell; 9 months; $17,970

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Clifford Bell; Los Angeles; 9 months; $4,070

Clifford Bell; Los Angeles; 9 months; $5,060

Clifford Bell; Los Angeles; 9 months; $9,000

Clifford Bell; Los Angeles; 9 months; $7,970

Clifford Bell; Los Angeles; 9 months; $9,580

Arthur F. Kip; 9 months; $10,660

CENTRAL MICHIGAN UNIVERSITY, Mount Pleasant, Mich.; Malcolm H. Filson; 9 months; $10,140

Lauren G. Woodby; 9 months; $19,010

CENTRAL STATE COLLEGE, Edmond, Okla.; Earl C. Rice; 9 months; $5,400

COLLEGE OF THE HOLY CROSS, Worcester, Mass.; Raymond J. Swords; 9 months; $8,950

COLLEGE OF THE PACIFIC, Stockton, Calif.; Emerson G. Cobb; 9 months; $7,530

COLLEGE OF ST. CATHERINE, St. Paul, Minn.; Sister Seraphim; 8 months; $4,900

COLLEGE OF SAINT THOMAS, St. Paul, Minn.; Martin Allen; 8 months; $20,460

COLORADO COLLEGE, Colorado Springs, Colo.; Wilbur H. Wright; 8 months; $4,870

COLORADO STATE COLLEGE, Greeley, Colo.; Harley F. Glidden; 6 months; $7,220

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; Elmer E. Remmenga; 9 months; $7,100

UNIVERSITY OF COLORADO, Boulder, Colo.; William E. Briggs; 9 months; $8,800

John M. Cleveland; 9 months; $6,730

UNIVERSITY OF CONNECTICUT, Storrs, Conn.; David J. Blick; 9 months; $20,850

DARTMOUTH COLLEGE, Hanover, N.H.; Charles J. Lyon; 6 months; $4,840

UNIVERSITY OF DELAWARE, Newark, Del.; G. Cuthert Webber; 9 months; $4,950

DE PAUL UNIVERSITY, Chicago, Ill.; Willis B. Caton; 9 months; $5,610

UNIVERSITY OF DETROIT, Detroit, Mich.; Lyle E. Mehlenbacher; 10 months; $13,910

DISTRICT OF COLUMBIA TEACHERS COLLEGE, Washington, D.C.; Daniel B. Lloyd; 9 months; $8,850

DOMINICAN COLLEGE OF SAN RAFAEL, San Rafael, Calif.; Sister M. Augusta; 8 months; $6,740

DRAKE UNIVERSITY, Des Moines, Iowa.; Earle L. Canfield; 9 months; $15,330

DUKE UNIVERSITY, Durham, N.C.; Sherwood Githens, Jr.; 9 months; $5,720

EAST TEXAS STATE COLLEGE, Commerce, Tex.; Roy N. Jervis; 8 months; $22,560

Arthur M. Pullen; 9 months; $5,750

EASTERN KENTUCKY STATE COLLEGE, Richmond, Ky.; H. H. LaFuze; 9 months; $14,810

EASTERN MONTANA COLLEGE OF EDUCATION, Billings, Mont.; Oliver W. Peterson; 8 months; $4,770

EASTERN NAZARENE COLLEGE, Wollaston, Mass.; P. Calvin Maybury; 9 months; $6,630

EMORY UNIVERSITY, Atlanta, Ga.; Charles T. Lester; 8 months; $14,620

Robert H. Rohrer; 9 months; $5,120

EVANSVILLE COLLEGE, Evansville, Ind.; Clarence W. Buesking; 9 months; $4,820

FENN COLLEGE, Cleveland, Ohio; Walter R. Van Voorhis; 8 months; $6,890

FISK UNIVERSITY, Nashville, Tenn.; Edward L. Maxwell; 8 months; $8,000

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; J. Stanley Marshall; 9 months; $37,440

UNIVERSITY OF FLORIDA, Gainesville, Fla.; N. Eldred Bingham; 9 months; $27,430

FORDHAM UNIVERSITY, New York, N.Y.; Henry F. DeBaggis; 9 months; $11,370

FURMAN UNIVERSITY, Greenville, S.C.; J. A. Southern; 9 months; $7,190

GEORGE PEABODY COLLEGE FOR TEACHERS, Nashville, Tenn.; H. Craig Sipe; 9 months; $4,870

UNIVERSITY OF GEORGIA, Athens, Ga.; Gerald B. Huff; 9 months; $7,450

UNIVERSITY OF HAWAII, Honolulu, Hawaii; Jimmie B. Smith; 8 months; $4,930

HOLY NAMES COLLEGE, Spokane, Wash.; Sister M. Eugene Gautereaux; 8 months; $6,700

UNIVERSITY OF HOUSTON, Houston, Tex.; Martin Wright; 9 months; $13,080

HOWARD PAYNE COLLEGE, Brownwood, Tex.; Leonard R. Daniel; 9 months; $5,980

HUMBOLDT STATE COLLEGE FOUNDATION, Arcata, Calif.; Orval M. Klose; 8 months; $9,950

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.; Haim Reingold; 9 months; $49,350

INCARNATE WORD COLLEGE, San Antonio, Tex.; Sister Joseph Marie; 9 months; $9,880

INDIANA CENTRAL COLLEGE, Indianapolis, Ind.; Robert M. Brooker, 9 months; $7,720

INDIANA STATE TEACHERS COLLEGE, Terre Haute, Ind.; John C. Hook; 8 months; $7,050

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; David M. Raup; 9 months; $7,060

KANSAS STATE COLLEGE OF PITTSBURG, Pittsburg, Kans.; R. G. Smith; 9 months; $15,100

KANSAS STATE TEACHERS COLLEGE, Emporia, Kans.; Ted F. Andrews; 9 months; $19,800

KENT STATE UNIVERSITY, Kent, Ohio; Kenneth B. Cummins; 9 months; $7,130

KNOXVILLE COLLEGE, Knoxville, Tenn.; Robert H. Harvey; 8 months; $16,330

LAKE FOREST COLLEGE, Lake Forest, Ill.; Harold C. Jensen; 9 months; $5,800

LE MOYNE COLLEGE, Memphis, Tenn.; Marvin L. Head; 9 months; $9,100

LEWIS AND CLARK COLLEGE, Portland, Oreg.; Elvy Frederickson; 9 months; $5,670

LONG BEACH STATE COLLEGE FOUNDATION, Long Beach, Calif.; John J. Baird; 9 months; $11,580

LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; Henry G. Jacob, Jr.; 9 months; $12,400

LOYOLA UNIVERSITY, New Orleans, La.; F. A. Benedetto; 9 months; $9,610

MANHATTAN COLLEGE, New York, N.Y.; Luke V. Titone; 9 months; $10,750

Bernard Alfred Welch; 9 months; $10,870

UNIVERSITY OF MARYLAND, College Park, Md.; Howard Laster; 9 months; $19,440

MCNEESE STATE COLLEGE, Lake Charles, La.; S. M. Spencer; 9 months; $5,750

UNIVERSITY OF MIAMI, Coral Gables, Fla.; J. H. Curtiss; 9 months; $12,230

MISSISSIPPI COLLEGE, Clinton, Miss.; Archie H. Germany; 9 months; $16,840

MISSISSIPPI STATE UNIVERSITY, State College, Miss.; R. D. Boswell, Jr.; 8 months; $13,960

MISSOURI BOTANICAL GARDEN, Saint Louis, Mo.; Norton H. Nickerson; 9 months; $8,560

UNIVERSITY OF MISSOURI, Columbia, Mo.; Harold Q. Fuller; 8 months; $8,680

MONTCLAIR STATE COLLEGE, Upper Montclair, N.J.; Max A. Soble, 10 months; $6,150

MOUNT MERCY COLLEGE, Pittsburgh, Pa.; William A. Uricchio; 8 months; $6,640

MUNICIPAL UNIVERSITY OF OMAHA, Omaha, Nebr.; Merle E. Brooks; 9 months; $16,850

MURRAY STATE COLLEGE, Murray, Ky.; Alfred Wolfson; 9 months; $9,780

NEBRASKA WESLEYAN UNIVERSITY, Lincoln, Nebr.; Walter R. French, Jr.; 9 months; $9,300

UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; James A. Rutledge, University High School; 9 months; $8,240

UNIVERSITY OF NEVADA, Reno, Nev.; E. M. Beesley; 10 months; $14,860

NEWARK COLLEGE OF ENGINEERING RESEARCH FOUNDATION, Newark, N.J.; Henry Zaztzkis; 9 months; $5,820

UNIVERSITY OF NEW HAMPSHIRE, Durham, N.H.; M. Evans Munroe; 9 months; $7,720

NEW YORK STATE SOCIETY FOR MEDICAL RESEARCH, INC., New York, N.Y.; Albert S. Kuperman; New York University; 9 months; $6,100

NEW YORK UNIVERSITY, New York, N.Y.; Morris Kline; 10 months; $17,340

Morris H. Shamos; 8 months; $8,890

L. E. Spock; 8 months; $7,400

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; H. V. Park; 9 months; $6,540

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; William A. White; 9 months; $8,810

NORTHEAST MISSOURI STATE TEACHERS COLLEGE, Kirksville, Mo.; Dean A. Rosebery; 9 months; $7,930

NORTH TEXAS STATE COLLEGE, Denton, Tex.; Robert C. Sherman; 8 months; $8,300

NORTHERN MICHIGAN COLLEGE, Marquette, Mich.; Holmes Boynton; 8 months; $12,500

NORTHLAND COLLEGE, Ashland, Wis.; Jesse M. Caskey; 9 months; $11,470

Jesse M. Caskey, 9 mos.; $11,130

NORTHWESTERN STATE COLLEGE, Alva, Okla.; Joe W. Melton; 9 months; $9,180

NORTHWESTERN UNIVERSITY, Evanston, Ill.; E. H. C. Hildebrandt; 9 months; $9,100

OHIO STATE UNIVERSITY, Columbus, Ohio, William R. Riley; 9 months; $7,430

UNIVERSITY OF OKLAHOMA, Norman Okla.; Richard V. Andree; 9 months; $23,310

OREGON STATE COLLEGE, Corvallis, Oreg.; Albert R. Poole; 9 months; $3,500

UNIVERSITY OF OREGON, Eugene, Oreg.; A. F. Moursund; 8 months; $3,570

PACE COLLEGE, New York, N.Y.; Edward Ritter; 8 months; $6,280

PAN AMERICAN COLLEGE, Edinburg, Tex.; Sidney S. Draeger; 9 months; $11,670

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; William H. Powers; 9 months; $29,890

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; J. E. Hazel; 9 months; $11,760

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; Peter Gray; 8 months; $7,780

David Halliday; 8 months; $7,840

John C. Knipp; 8 months; $8,320

PRAIRIE VIEW AGRICULTURAL AND MECHANICAL COLLEGE, Prairie View, Tex.; E. E. O'Banion; 9 months; $18,640

UNIVERSITY OF PUERTO RICO, Rio Piedras, P.R.; Virgilio Biaggi, Jr.; Mayaguez; 9 months; $13,660

Augusto Bobonis; 9 months; $1,260

Augusto Bobonis; 1 year; $250

Augusto Bobonis; 9 months; $14,400

Juan D. Curet; 9 months; $12,700

PURDUE UNIVERSITY, Lafayette, Ind.; M. Wiles Keller; 9 months; $36,400

UNIVERSITY OF REDLANDS, Redlands, Calif.; Paul R. Gleason; 8 months; $9,460

TEACHERS COLLEGE, COLUMBIA UNIVERSITY, New York, N.Y.; Howard F. Fehr; 8 months; $8,460

REED COLLEGE, Portland, Oreg.; Arthur H. Livermore; 9 months; $18,340

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; F. Reese Nevin, College of Education at Plattsburgh; 10 months; $9,790

RICKS COLLEGE, Rexburg, Idaho; Merle R. Fisher; 8 months; $7,100

UNIVERSITY OF ROCHESTER, Rochester, N.Y.; John J. Montean; 8 months; $6,330

John J. Montean; 8 months; $6,320

John J. Montean; 8 months; $6,610

ROCKHURST COLLEGE, Kansas City, Mo.; William C. Doyle; 9 months; $5,800

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Emory P. Starke; 9 months; $11,670

Emory P. Starke; 9 months; $14,070

Emory P. Starke; 9 months; $800

SACRAMENTO STATE COLLEGE FOUNDATION, Sacramento, Calif.; H. Stewart Moredock; 9 months; $20,880

ST. LOUIS UNIVERSITY, Saint Louis, Mo.; John J. Andrews; 9 months; $3,370

ST. PETER'S COLLEGE, Jersey City, N.J.; Frank J. McMackin; 9 months; $9,450

UNIVERSITY OF SAN FRANCISCO, San Francisco, Calif.; Edward J. Farrell; 9 months; $6,430

SAN JOSE STATE COLLEGE, San Jose, Calif.; Max Kramer; 9 months; $12,950

Laurence E. Wilson; 9 months; $5,550

UNIVERSITY OF SANTA CLARA, Santa Clara, Calif.; Irving Sussman; 9 months; $23,800

SARAH LAWRENCE COLLEGE, Bronxville, N.Y.; Edward J. Cogan; 8 months; $1,000

Edward J. Cogan; 8 months; $17,960

UNIVERSITY OF SCRANTON, Scranton, Pa.; Joseph A. Rock, S.J.; 9 months; $5,590

Joseph A. Rock, S.J.; 9 months; $3,950

SHORTER COLLEGE, Rome, Ga.; Emma Lewis Lipps; 9 months; $16,650

SMITH COLLEGE, Northampton, Mass.; Kenneth W. Sherk; 9 months; $30,150

SOUTH CAROLINA STATE COLLEGE, Orange-

burg, S.C.; George W. Hunter; 9 months; $30,470
UNIVERSITY OF SOUTH CAROLINA, Columbia, S.C.; A. P. French; 9 months; $14,570
SOUTHEASTERN STATE COLLEGE, Durant, Okla.; Leslie A. Dwight; 9 months; $5,120
Ernest Sturch, Jr.; 9 months; $3,950
SOUTHERN UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; Russell M. Ampey; 9 months; $14,040
SOUTHWESTERN LOUISIANA INSTITUTE, Lafayette, La.; James R. Oliver; 9 months; $25,390
STATE TEACHERS COLLEGE, Salem, Mass.; Thomas I. Ryan; 8 months; $12,030
STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion, S. Dak.; Theodore L. Reid; 9 months; $20,800
STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N.J.; Robert H. Seavy; 9 months; $17,700
TEMPLE UNIVERSITY, Philadelphia, Pa.; Leonard Muldawer; 9 months; $15,300
TENNESSEE AGRICULTURAL AND INDUSTRIAL STATE UNIVERSITY, Nashville, Tenn.; William N. Jackson; 9 months; $17,620
TEXAS WOMAN'S UNIVERSITY, Denton, Tex.; Harold T. Baker; 9 months; $3,300
UNIVERSITY OF TEXAS, Austin, Tex.; E. J. Knapp, Texas Western College of the University of Texas, El Paso; 9 months; $5,500
UNIVERSITY OF TOLEDO, Toledo, Ohio; Archie N. Solberg; 9 months; $12,210
TOUGALOO SOUTHERN CHRISTIAN COLLEGE, Tougaloo, Miss.; A. A. Branch; 8 months; $16,300
UNION COLLEGE AND UNIVERSITY, Schenectady, N.Y.; C. W. Graves; 8 months; $14,200
UNION UNIVERSITY, Jackson, Tenn.; Ralph T. Donnell; 9 months; $3,930
UTAH STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Logan, Utah; Joe Elich; 9 months; $10,080
John K. Wood; 9 months; $7,080
UNIVERSITY OF UTAH, Salt Lake City, Utah; E. Allan Davis; 9 months; $7,670
UNIVERSITY OF VIRGINIA, Charlottesville, Va.; William C. Lowry; 9 months; $13,680
WAKE FOREST COLLEGE, Winston-Salem, N.C.; Ben M. Seelbinder; 9 months; $6,380
UNIVERSITY OF WASHINGTON, Seattle, Wash.; Arthur D. Welander; 8 months; $1,200
WAYNE STATE UNIVERSITY, Detroit, Mich.; Karl W. Folley; 8 months; $11,190
William V. Mayer; 8 months; $8,620
WEST VIRGINIA UNIVERSITY, Morgantown, W. Va.; I. Dee Peters; 9 months; $4,440
WESTERN KENTUCKY STATE COLLEGE, Bowling Green, Ky.; Ward C. Sumpter; 9 months; $12,580
WESTERN MICHIGAN UNIVERSITY, Kalamazoo, Mich.; George G. Mallinson; 9 months; $12,400
WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; Stefan Machlup; 9 months; $9,120
WESTERN WASHINGTON COLLEGE OF EDUCATION, Bellingham, Wash.; Marie B. Pabst; 8 months; $8,870
WILKES COLLEGE, Wilkes-Barre, Pa.; Thomas R. Richards; 9 months; $4,630
WILLIAM JEWELL COLLEGE, Liberty, Mo.; Wallace A. Hilton; 9 months; $11,400
WISCONSIN STATE COLLEGE, Eau Claire, Wis.; Lawrence F. Wahlstrom; 9 months; $12,040
WOMAN'S COLLEGE OF THE UNIVERSITY OF NORTH CAROLINA, Greensboro, N.C.; Hollis J. Rogers; 9 months; $21,590
WORCESTER POLYTECHNIC INSTITUTE, Worcester, Mass.; Richard F. Morton; 9 months; $9,270
YALE UNIVERSITY, New Haven, Conn.; Stuart R. Brinkley; 8 months; $14,510
YESHIVA UNIVERSITY, New York, N.Y.; A. Gelbart; 9 months; $49,960
YOUNGSTOWN UNIVERSITY, Youngstown, Ohio; Clair L. Worley; 9 months; $7,620

IN-SERVICE INSTITUTES FOR ELEMENTARY SCHOOL TEACHERS AND ADMINISTRATORS

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Franklyn M. Branley; 5 months; $2,710
UNIVERSITY OF ARIZONA, Tucson, Ariz.; Arthur H. Steinbrenner; 9 months; $5,530
BEMIDJI STATE COLLEGE, Bemidji, Minn.; Richard E. Beitzel; 9 months; $5,250
EAST TEXAS STATE COLLEGE, Commerce, Tex.; Roy N. Jervis; 9 months; $5,830
IOWA STATE TEACHERS COLLEGE, Cedar Falls, Iowa; Flenadine Gibb; 7 months; $5,200
KANSAS STATE TEACHERS COLLEGE, Emporia, Kans.; Ted F. Andrews; 9 months; $6,520
MILLERSVILLE STATE COLLEGE, Millersville, Pa.; William B. McIlwaine; 9 months; $5,360
NORTHERN ILLINOIS UNIVERSITY, De Kalb, Ill.; Eugene W. Hellmich; 9 months; $5,650
NORTHWESTERN UNIVERSITY, Evanston, Ill.; E. H. C. Hildebrandt; 8 months; $8,610
OREGON STATE COLLEGE, Corvallis, Oreg.; Albert L. Leeland; 9 months; $5,750
SAINT JOSEPH COLLEGE, West Hartford, Conn.; Sister Maria Clare Markham; 9 months; $5,480
SAN JOSE STATE COLLEGE CORPORATION, San Jose, Calif.; John L. Marks; 9 months; $6,100
TEXAS WOMAN'S UNIVERSITY, Denton, Tex.; Dixie Young, 9 months; $6,000

SUMMER INSTITUTES FOR COLLEGE TEACHERS

AMERICAN UNIVERSITY, Washington, D.C.; Leo Schubert; 6 weeks; $45,350
ARIZONA STATE UNIVERSITY, Tempe, Ariz.; Gordon L. Bender; 6 weeks; $39,700
BUCKNELL UNIVERSITY, Lewisburg, Pa.; Charles Hestin Coder, Jr.; 6 weeks; $44,000
UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; John W. Green; Los Angeles; 8 weeks; $66,300
George Jura; 7 weeks; $22,600
CLEMSON COLLEGE, Clemson, S.C.; Robert W. Moorman; 8 weeks; $53,500
COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; Milton E. Bender; 10 weeks; $63,800
UNIVERSITY OF COLORADO, Boulder, Colo.; Robert W. Pennak; 6 weeks; $44,900
EMORY UNIVERSITY, Atlanta, Ga.; William H. Jones; 9 weeks; $43,680
UNIVERSITY OF FLORIDA, Gainesville, Fla.; Herbert A. Meyer; 6 weeks; $50,100
FORT LEWIS AGRICULTURAL AND MECHANICAL COLLEGE, Durango, Colo.; Herbert D. Hart; 5 weeks; $35,900
INDIANA UNIVERSITY, Bloomington, Ind.; Wayne R. Lowell; 6 weeks; $31,400

IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa; Glenn Murphy; 6 weeks; $46,400

KANSAS STATE COLLEGE OF PITTSBURG, Pittsburg, Kans.; Leon C. Heckert; 8 weeks; $51,500

LOUISIANA POLYTECHNIC INSTITUTE, Ruston, La.; Melvin A. Nobles; 9 weeks; $36,900

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Gordon L. Brownell; 6 weeks; $29,000

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.: Melvin Levine; 8 weeks; $19,800

NEW YORK UNIVERSITY, New York, N.Y.; Joseph D. Gettler; 8 weeks; $51,700

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; H. F. Robinson; 6 weeks; $41,400

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; H. D. Crockford; 6 weeks; $56,400

OAK RIDGE INSTITUTE OF NUCLEAR STUDIES, Oak Ridge, Tenn.; Ralph T. Overman; 4 and 6 weeks; $20,600

OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Stillwater, Okla.; Jan T. Tuma; 9 weeks; $46,300

OREGON STATE COLLEGE, Corvallis, Oreg.; Howard H. Hilleman; 8 weeks; $67,000
Albert V. Logan; 6 weeks; $48,800

UNIVERSITY OF OREGON, Eugene, Oreg.; Richard C. Castenholz; 8 weeks; $36,100

REED COLLEGE, Portland, Oreg.; Kenneth E. Davis; 6 weeks; $50,950

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; A. A. K. Booth; 4 weeks; $19,300
A. A. K. Booth; 4 weeks; $19,200

SAN JOSE STATE COLLEGE CORPORATION, San Jose, Calif.; W. H. Myers; 6 weeks; $47,700

STANFORD UNIVERSITY, Stanford, Calif.; Harold M. Bacon; 6 weeks; $52,200

STATE UNIVERSITY OF IOWA, Iowa City, Iowa; Titus Carr Evans; 8 weeks; $19,000

STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N.J.; Robert H. Seavy; 6 weeks; $39,900

SYRACUSE UNIVERSITY, Syracuse, N.Y.; Marshall W. Jennison; 6 weeks; $14,500

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; George K. Schweitzer; 4 weeks; $29,000

TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; John K. Hampton, Jr.; 8 weeks; $19,200

UNIVERSITY OF WISCONSIN, Madison, Wis.; H. Van Engen; 8 weeks; $44,700

SUMMER INSTITUTES FOR TECHNICAL INSTITUTE TEACHERS

UNIVERSITY OF HOUSTON, Houston, Tex.; Herbert H. Curry; 8 weeks; $51,200

OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Stillwater, Okla.; High Lineback; 8 weeks; $49,700

SUMMER INSTITUTES FOR HIGH SCHOOL AND COLLEGE TEACHERS

BROWN UNIVERSITY, Providence, R.I.; Leallyn B. Clapp; 6 weeks; $39,400

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Edward L. Triplett; 6 weeks; $36,850

CLARK UNIVERSITY, Worcester, Mass.; Charles T. Bumer; 6 weeks; $54,900

COLLEGE OF WILLIAM AND MARY, Williamsburg, Va.; Melvin A. Pittman; 8 weeks; $97,200

COLORADO COLLEGE, Colorado Springs, Colo.; Richard G. Beidleman; 8 weeks; $77,900

COLORADO STATE UNIVERSITY, Fort Collins, Colo.; John J. Faris; 8 weeks; $94,000

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Charles W. Edington; 8 weeks; $19,000

UNIVERSITY OF HAWAII, Honolulu, Hawaii; Sidney C. Hsiao; 6 weeks; $13,050

UNIVERSITY OF KANSAS, Lawrence, Kans.; Russell N. Bradt; 8 weeks; $101,875

KENYON COLLEGE, Gambier, Ohio; Eric S. Graham; 7 weeks; $41,600

MICHIGAN STATE UNIVERSITY, East Lansing, Mich.; Wayne Taylor; 11 weeks; $151,700

MISSISSIPPI STATE UNIVERSITY, State College, Miss.; Clyde Quitman Sheely; 11 weeks; $146,600

UNIVERSITY OF MISSISSIPPI, University, Miss.; George Vaughan; 10 weeks; $137,800

NEBRASKA WESLEYAN UNIVERSITY, Lincoln, Nebr.; Walter R. French, Jr.; 8 weeks; $62,500

OREGON STATE COLLEGE, Corvallis, Oreg.; Albert R. Poole; 8 weeks; $61,500

PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE, Philadelphia, Pa.; Arthur Osol; 6 weeks; $27,300

PRINCETON UNIVERSITY, Princeton, N.J.; J. G. Bradshaw; 6 weeks; $39,500
J. G. Bradshaw; 6 days; $39,100

REED COLLEGE, Portland, Oreg., Arthur H. Livermore; 6 weeks; $36,000

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Emory P. Starke, 6 weeks; $82,100

UNIVERSITY OF SOUTH CAROLINA, Columbia, S.C.; W. L. Williams; 8 weeks; $82,825

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; D. Victor Steed; 6 weeks; $44,900

TEMPLE UNIVERSITY, Philadelphia, Pa.; Elmer L. Offenbacher; 8 weeks; $86,000

UNIVERSITY OF VERMONT AND STATE AGRICULTURAL COLLEGE, Burlington, Vt.; N. James Schoonmaker; 7 weeks; $68,600

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Arthur D. Welander; 8 weeks; $40,800

SUMMER INSTITUTES FOR HIGH SCHOOL TEACHERS

ADELPHI COLLEGE, Garden City, N.Y.; Howard A. Robinson; 6 weeks; $86,450

AGRICULTURAL AND TECHNICAL COLLEGE OF NORTH CAROLINA, Greensboro, N.C.; Gerald A. Edwards; 6 weeks; $58,300

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station, Tex.; Coleman M. Loyd; 12 weeks; $1,200

ALABAMA COLLEGE, Montevallo, Ala.; Paul C. Bailey; 6 weeks; $55,000

UNIVERSITY OF ALABAMA, University, Ala.; Charles K. Arey; 11 weeks; $39,400
Charles K. Arey; 11 weeks; $73,500

UNIVERSITY OF ALASKA, College, Alaska; William R. Cashen; 8 weeks; $67,400

ALBANY STATE COLLEGE, Albany, Ga.; Alexander A. Hall; 6 weeks; $46,200

ALLEGHENY COLLEGE, Meadville, Pa.; Robert E. Bugbee; 7 weeks; $67,000

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; C. Bruce Hunter; 4 weeks; $14,100

AMERICAN UNIVERSITY, Washington, D.C.; Leo Schubert; 8 weeks; $65,100

ANTIOCH COLLEGE, Yellow Springs, Ohio; James F. Corwin; 8 weeks; $86,600

APPALACHIAN STATE TEACHERS COLLEGE, Boone, N.C.; I. W. Carpenter, Jr.; 6 weeks; $43,100

ARIZONA STATE COLLEGE, Flagstaff, Ariz.; Agnes M. Allen; 8 weeks; $59,200

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Millard G. Seeley; 8 weeks; $78,700

Arthur H. Steinbrenner; 8 weeks; $56,600

ARIZONA STATE UNIVERSITY, Tempe, Ariz.; Alan T. Wager; 8 weeks; $70,100

UNIVERSITY OF ARKANSAS, Fayetteville, Ark.; Billy J. Attebery; 6 weeks; $38,900

Lowell F. Bailey; 6 weeks; $58,200

UNIVERSITY OF ARKANSAS MEDICAL CENTER, Little Rock, Ark.; Horace N. Marvin, 7 weeks; $17,000

ATLANTA UNIVERSITY, Atlanta, Ga.; K. A. Huggins; 9 weeks; $64,500

AUBURN UNIVERSITY, Auburn, Ala.; Ernest Williams; 10½ weeks; $128,500

BALL STATE TEACHERS COLLEGE, Muncie, Ind.; Charles Brumfiel; 10 weeks; $80,600

Jerry J. Nisbet; 10 weeks; $81,100

BENEDICT COLLEGE, Columbia, S.C.; T. J. Hanberry; 6 weeks; $51,400

BIRMINGHAM-SOUTHERN COLLEGE, Birmingham, Ala.; Wiley S. Rogers; 8 weeks; $71,000

BOSTON COLLEGE, Chestnut Hill, Mass.; Stanley J. Bezuszka, S.J.; 6 weeks; $52,625

Stanley J. Bezuszka, S.J.; 6 weeks; $61,500

BOSTON UNIVERSITY, Boston, Mass.; George P. Fulton; 6 weeks; $54,450

BOWDOIN COLLEGE, Brunswick, Maine; Samuel E. Kamerling; 6 weeks; $36,400

Reinhard L. Korgen; 6 weeks; $60,550

Noel C. Little; 6 weeks; $14,500

BOWLING GREEN STATE UNIVERSITY, Bowling Green, Ohio; Bruce R. Vogeli; 5 weeks; $41,200

BRADLEY UNIVERSITY, Peoria, Ill.; A. Wayne McGaughey; 6 weeks; $41,700

BRIGHAM YOUNG UNIVERSITY, Provo, Utah; Lane A. Compton, Eyring Science Center; 8 weeks; $19,000

L. Edwin Hirschi, Stewart School; 7 weeks; $33,200

Reed M. Izatt; 8 weeks; $43,800

BROWN UNIVERSITY, Providence, R.I.; Elmer R. Smith; 6 weeks; $58,800

Elmer R. Smith; 6 weeks; $61,400

BUCKNELL UNIVERSITY, Lewisburg, Pa.; Lester Kieft; 6 weeks; $62,500

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Harriet F. Montague; 6 weeks; $47,300

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; F. E. Blacet; Los Angeles; 6 weeks; $93,100

Raymond L. Libby; Los Angeles; 6 weeks; $14,500

Robert A. Rice; 7 weeks; $92,800

Edward D. Roessler; Davis; 8 weeks; $101,900

Martinus Van Waynen; 8 weeks; $101,500

CARLETON COLLEGE, Northfield, Minn.; Robert T. Mathews; 6 weeks; $45,500

Arild J. Miller; 6 weeks; $47,200

Frank L. Wolf; 6 weeks; $48,300

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; Paul E. Guenther; 6 weeks; $52,300

CATHOLIC UNIVERSITY OF PUERTO RICO, Santa Maria, P.R.; Joseph W. Stander; 6 weeks; $33,800

CENTRAL CONNECTICUT STATE COLLEGE, New Britain, Conn.; Kenneth G. Fuller; 6 weeks; $48,400

CENTRAL MICHIGAN UNIVERSITY, Mt. Pleasant, Mich.; Lester H. Serier; 6 weeks; $50,300

Lester H. Serier; 6 weeks; $49,800

CENTRAL MISSOURI STATE COLLEGE, Warrensburg, Mo.; Sam P. Hewitt; 8 weeks; $72,800

UNIVERSITY OF CHATTANOOGA, Chattanooga, Tenn.; J. Horace Coulliette; 7 weeks; $69,300

CHICO STATE COLLEGE FOUNDATION, Chico, Calif.; Robbins S. King; 6 weeks; $61,600

CLAFLIN COLLEGE, Orangeburg, S.C.; Hampton D. Smith, Sr.; 9 weeks; $76,800

CLARKSON COLLEGE OF TECHNOLOGY, Potsdam, N.Y.; F. Gordon Lindsey; 8 weeks; $78,200

CLEMSON COLLEGE, Clemson, S.C.; Floyd I. Brownley, Jr.; 6 weeks; $58,300

COLBY COLLEGE, Waterville, Maine; Evans B. Reid; 6 weeks; $79,900

COLGATE UNIVERSITY, Hamilton, N.Y.; Carl Munshower; 6 weeks; $47,900

Carl Munshower; 6 weeks; $48,500

Oran B. Stanley; 6 weeks; $58,600

COLLEGE OF THE HOLY CROSS, Worcester, Mass.; Raymond J. Swords, S.J.; 6 weeks; $55,300

COLLEGE OF THE PACIFIC, Stockton, Calif.; Herschel Frye; 10 weeks; $75,100

COLORADO STATE COLLEGE, Greeley, Colo.; John A. Beel; 8 weeks; $62,900

UNIVERSITY OF COLORADO, Boulder, Colo.; Charles R. Bitter; 7 weeks; $46,800

John M. Cleveland; 8 weeks; $53,900

Newell Younggren; 6 weeks; $47,200

COLUMBIA COLLEGE, Columbia, S.C.; Philip E. Graef; 8 weeks; $61,600

UNIVERSITY OF CONNECTICUT, Storrs, Conn.; David J. Blick; 6 weeks; $79,400

CONVERSE COLLEGE, Spartansburg, S.C.; Walter James Wyatt; 8 weeks; $76,900

CORNELL UNIVERSITY, Ithaca, N.Y.; R. William Shaw; 6 weeks; $54,200

DARTMOUTH COLLEGE, Hanover, N.H.; Richard S. Pieters; 8 weeks; $75,525

UNIVERSITY OF DELAWARE, Newark, Del.; John A. Brown; 8 weeks; $37,000

UNIVERSITY OF DENVER, Denver, Colo.; Earl A. Engle; 9 weeks; $74,900

DEPAUL UNIVERSITY, Chicago, Ill.; Willis B. Caton; 6 weeks; $25,200

DEPAUW UNIVERSITY, Greencastle, Ind.; Donald J. Cook; 6 weeks; $44,100

UNIVERSITY OF DETROIT, Detroit, Mich.; Everette L. Henderson; 6 weeks; $54,200

Lyle E. Mehlenbacker; 6 weeks; $41,000

DRAKE UNIVERSITY, Des Moines, Iowa; B. E. Gillam; 6 weeks; $46,500

DUKE UNIVERSITY, Durham, N.C.; Lewis E. Anderson; 9 weeks; $115,400

Donald J. Fluke; 8 weeks; $19,000

Thomas D. Reynolds; 9 weeks; $134,000

EASTERN ILLINOIS UNIVERSITY, Charleston, Ill.; Weldon N. Baker; 8 weeks; $76,400

EASTERN MICHIGAN UNIVERSITY, Ypsilanti, Mich.; James M. Barnes; 6 weeks; $60,200

EASTERN NEW MEXICO UNIVERSITY, Portales, N. Mex.; Ruth B. Thomas; 8 weeks; $61,300

EAST TENNESSEE STATE COLLEGE, Johnson City, Tenn.; Douglas G. Nicholson; 8 weeks; $73,300

EAST TEXAS STATE COLLEGE, Commerce, Tex.; Roy N. Jervis; 6 weeks; $33,800
EMMANUEL MISSIONARY COLLEGE, Berrien Springs, Mich.; Harold T. Jones; 8 weeks; $42,200
EMORY UNIVERSITY, Atlanta, Ga.; Trevor Evans; 7 weeks; $39,400
FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Dwight B. Goodner; 8 weeks; $51,300
Dwight B. Goodner; 8 weeks; $55,200
UNIVERSITY OF FLORIDA, Gainesville, Fla.; N. E. Bingham; 8 weeks; $110,700
FORDHAM UNIVERSITY, New York, N.Y.; Frederick L. Canavan, S.J.; 6 weeks; $49,800
Henry F. DeBaggis; 6 weeks; $49,600
Henry F. DeBaggis; 6 weeks; $49,600
FORT HAYS KANSAS STATE COLLEGE, Hays, Kans.; W. Toalson; 8 weeks; $45,600
FRANKLIN AND MARSHALL COLLEGE, Lancaster, Pa.; Bernard Jacobson; 6 weeks; $29,800
John H. Moss; 8 weeks; $40,800
Richard I. Weller; 6 weeks; $28,900
GEORGE PEABODY COLLEGE FOR TEACHERS, Nashville, Tenn.; H. Craig Sipe; 10 weeks; $129,300
GEORGETOWN UNIVERSITY, Washington, D.C.; Malcolm W. Oliphant; 8 weeks; $50,000
GEORGE WASHINGTON CARVER FOUNDATION OF TUSKEGEE INSTITUTE, Tuskegee Institute, Ala.; James H. M. Henderson; 8 weeks; $19,000
GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; David Nelson; 8 weeks; $49,300
UNIVERSITY OF GEORGIA, Athens, Ga.; T. H. Whitehead; 6 weeks; $48,600
T. H. Whitehead; 9 weeks; $60,100
T. H. Whitehead; 9 weeks; $68,700
GRAMBLING COLLEGE, Grambling, La.; Archie L. Lacey; 8 weeks; $44,500
HAMILTON COLLEGE, Clinton, N.Y.; Brewster H. Gere; 6 weeks; $47,600
UNIVERSITY OF HAWAII, Honolulu, Hawaii; Albert J. Bernatowicz; 6 weeks; $71,000
HOPE COLLEGE, Holland, Mich.; Jay Folkert; 6 weeks; $38,900
HOWARD PAYNE COLLEGE, Brownwood, Tex.; Leonard R. Daniel; 6 weeks; $48,400
HOWARD UNIVERSITY, Washington, D.C.; Marie C. Taylor; 8 weeks; $49,400
HUMBOLDT STATE COLLEGE, Arcata, Calif.; E. Charles Parke; 6 weeks; $60,700
HUNTER COLLEGE OF THE CITY OF NEW YORK, New York, N.Y.; Jewell Hughes Bushey; 6 weeks; $47,400
UNIVERSITY OF IDAHO, Moscow, Idaho; K. A. Bush; 8 weeks; $41,400
Edgar H. Grahn; 8 weeks; $74,200
Edgar H. Grahn; 8 weeks; $94,200
ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.; Haim Reingold; 8 weeks; $101,200
ILLINOIS STATE NORMAL UNIVERSITY, Normal, Ill.; Clyde T. McCormick; 8 weeks; $30,700
ILLINOIS WESLEYAN UNIVERSITY, Bloomington, Ill.; Wayne W. Wantland; 8 weeks; $70,700
UNIVERSITY OF ILLINOIS, Urbana, Ill.; Max Beberman; 8 weeks; $31,700
Roger K. Brown; 8 weeks; $61,500
Peter E. Yankwich; 8 weeks; $36,200
INDIANA STATE TEACHERS COLLEGE, Terre Haute, Ind.; John C. Hook; 10 weeks; $87,100
INDIANA UNIVERSITY, Bloomington, Ind.; Robert B. Fischer; 8 weeks; $50,900
Shelby D. Gerking; 6 weeks; $38,300
L. S. McClung; 4 weeks; $21,600
Marie S. Wilcox; Thomas Carr Howe High School; 6 weeks; $50,500
INTERAMERICAN UNIVERSITY OF PUERTO RICO, San German, P.R.; Ismael Velez; 7 weeks; $49,200
IOWA STATE TEACHERS COLLEGE, Cedar Falls, Iowa; Irvin Brune; 8 weeks; $69,600
IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa; J. J. L. Hinrichsen; 6 weeks; $39,200
Orlando C. Kreider; 6 weeks; $90,900
JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; William Kelso Morrill, Sr.; 6 weeks; $47,300
KANSAS STATE COLLEGE OF PITTSBURG, Pittsburg, Kans.; R. G. Smith; 8 weeks; $63,200
KANSAS STATE TEACHERS COLLEGE, Emporia, Kans.; Otto M. Smith; 12 weeks; $201,500
KANSAS STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Manhattan, Kans.; J. R. Chelikowsky; 8 weeks; $54,900
Leonard E. Fuller; 8 weeks; $88,700
UNIVERSITY OF KANSAS, Lawrence, Kans.; Edward L. Shaw; 8 weeks; $19,800
KENT STATE UNIVERSITY, Kent, Ohio; Kenneth B. Cummins; 8 weeks; $66,200
KNOX COLLEGE, Galesburg, Ill.; Herbert Priestley; 6 weeks; $51,200
Rothwell Stephens; 6 weeks; $50,700
LAFAYETTE COLLEGE, Easton, Pa.; Fred V. Roeder; 6 weeks; $62,800
LEHIGH UNIVERSITY, Bethlehem, Pa.; H. R. Gault; 6 weeks; $37,200
LONGWOOD COLLEGE, Farmville, Va.; Blanche C. Badger; 4 weeks; $16,500
LOUISIANA POLYTECHNIC INSTITUTE, Ruston, La.; John A. Moore; 9 weeks; $69,100
LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; Hulen B. Williams; 9 weeks; $54,200
Hulen B. Williams; 9 weeks; $72,100
LOYOLA UNIVERSITY OF LOS ANGELES, Los Angeles, Calif.; Berthold R. Wicker; 6 weeks; $35,900
MACALESTER COLLEGE, Saint Paul, Minn.; Russell B. Hastings; 8 weeks; $72,100
UNIVERSITY OF MAINE, Orono, Maine; S. H. Kimball; 6 weeks; $48,100
MARQUETTE UNIVERSITY, Milwaukee, Wis.; Clarence F. Dineen; 6 weeks; $36,900
L. J. Heider; 6 weeks; $34,700
MARSHALL FOUNDATION, INC., Huntington, W. Va.; Donald C. Martin; 11 weeks; $76,700
Donald C. Martin; 11 weeks; $77,800
UNIVERSITY OF MARYLAND, College Park, Md.; Joshua R. C. Brown; 7 weeks; $83,800
Joshua R. C. Brown; 7 weeks; $84,625
Richard A. Good; 6 weeks; $33,800
MEMPHIS STATE UNIVERSITY, Memphis, Tenn.; J. W. Fox; 8 weeks; $66,800
H. S. Kaltenborn; 8 weeks; $61,400
MIAMI UNIVERSITY, Oxford, Ohio; Bruce V. Weidner; 8 weeks; $66,200
MICHIGAN COLLEGE OF MINING AND TECHNOLOGY, Houghton, Mich.; Donald G. Yerg; 8 weeks; $48,800
UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Frank R. Bellaire; 6 weeks; $43,100
MIDDLE TENNESSEE STATE COLLEGE, Murfreesboro, Tenn.; J. Eldred Wiser; 11 weeks; $86,900
UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; William H. Marshall; 5 weeks; $20,400
Francis A. Spurrell; 6 weeks; $14,500
Frank Verbrugge; 8 weeks; $105,960
MISSISSIPPI SOUTHERN COLLEGE, Hattiesburg, Miss.; B. O. Van Hook; 9 weeks; $103,200

UNIVERSITY OF MISSOURI, Columbia, Mo.; R. F. Brooks; 8 weeks; $62,500
Paul B. Burcham; 8 weeks; $50,200
Paul B. Burcham; 8 weeks; $49,300
Harold Q. Fuller; Rolla; 8 weeks; $93,200
Louis V. Holroyd; 8 weeks; $62,600
MONTANA STATE COLLEGE, Bozeman, Mont.; L. O. Binder, Jr.; 5 weeks; $53,400
MONTANA STATE UNIVERSITY, Missoula, Mont.; LeRoy H. Harvey; 8 weeks; $14,400
Frederick H. Young; 10 weeks; $53,300
MONTCLAIR STATE COLLEGE, Upper Montclair, N.J.; Max A. Sobel; 6 weeks; $73,500
MOREHEAD STATE COLLEGE, Morehead, Ky.; William B. Owsley; 8 weeks; $61,200
MORGAN STATE COLLEGE, Baltimore, Md.; Thomas P. Fraser; 6 weeks; $55,100
MURRAY STATE COLLEGE FOUNDATION, Murray, Ky.; Alfred Wolfson; Murray State College; 8 weeks; $80,900
UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; John R. DeMuth; 8 weeks; $89,300
UNIVERSITY OF NEVADA, Reno, Nev.; George Barnes; 8 weeks; $66,100
UNIVERSITY OF NEW HAMPSHIRE, Durham, N.H.; Harold A. Iddles; 8 weeks; $83,500
Harold A. Iddles; 8 weeks; $85,100
M. Evans Munroe; 8 weeks; $61,600
NEW MEXICO COLLEGE OF AGRICULTURE AND MECHANIC ARTS, University Park, N. Mex.; E. L. Cleveland; 8 weeks; $115,900
NEW MEXICO HIGHLANDS UNIVERSITY, Las Vegas, N. Mex.; James P. Zietlow; 8 weeks; $59,300
UNIVERSITY OF NEW MEXICO, Albuquerque, N. Mex.; Frank C. Gentry; 8 weeks; $62,200
Loren D. Potter; 9 weeks; $21,300
UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; Edward A. Cameron; 6 weeks; $104,100
Victor A. Greulach; 6 weeks; $88,400
NORTH DAKOTA STATE COLLEGE, Fargo, N. Dak.; F. L. Minnear; 8 weeks; $93,700
UNIVERSITY OF NORTH DAKOTA, Grand Forks, N. Dak.; J. Donald Henderson; 8 weeks; $80,400
NORTH TEXAS STATE COLLEGE, Denton, Tex.; Robert C. Sherman; 6 weeks; $47,200
NORTHEAST LOUISIANA STATE COLLEGE, Monroe, La.; Aaron Seamster; 9 weeks; $44,300
NORTHERN ILLINOIS UNIVERSITY, DeKalb, Ill.; Martin W. Reinemann; 8 weeks; $62,600
Frederick W. Rolf; 8 weeks; $64,300
NORTHERN MICHIGAN COLLEGE, Marquette, Mich.; Holmes Boynton; 6 weeks; $58,000
NORTHWESTERN STATE COLLEGE, Natchitoches, La.; W. G. Erwin; 9 weeks; $49,900
NORTHWESTERN UNIVERSITY, Evanston, Ill.; E. H. C. Hildebrandt; 8 weeks; $64,200
UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; Emil T. Hofman; 7 weeks; $64,400
Emil T. Hofman; 7 weeks; $71,400
Arnold E. Ross; 7 weeks; $143,100
OAK RIDGE INSTITUTE OF NUCLEAR STUDIES, Oak Ridge, Tenn.; Ralph T. Overman; 4 weeks; $31,300
OBERLIN COLLEGE, Oberlin, Ohio; Wade Ellis; 8 weeks; $112,000
OHIO STATE UNIVERSITY, Columbus, Ohio; John S. Richardson; 8 weeks; $124,700
OHIO UNIVERSITY, Athens, Ohio; L. P. Eblin; 6 weeks; $57,700
OHIO WESLEYAN UNIVERSITY, Delaware, Ohio; Robert A. Roberts; 6 weeks; $38,000
Leonard N. Russell; 8 weeks; $75,300
OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Stillwater, Okla.; Imy V. Holt; 9 weeks; $67,100
James H. Zant; 8 weeks; $63,900
UNIVERSITY OF OKLAHOMA, Norman, Okla.; Horace H. Bliss, Oklahoma Science Service; 4 weeks; $40,700
Horace H. Bliss, Oklahoma Science Service; 8 weeks; $43,900
Horace H. Bliss, Oklahoma Science Service; 8 weeks; $44,500
Horace H. Bliss, Oklahoma Science Service; 8 weeks; $75,300
OREGON STATE COLLEGE, Corvallis, Oreg.; Stanley E. Williamson; 8 weeks; $600
UNIVERSITY OF OREGON, Eugene, Oreg.; A. F. Moursund; 8 weeks; $63,300
PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; William H. Powers; 6 weeks; $108,450
UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; J. F. Hazel; 6 weeks; $80,800
PRAIRIE VIEW AGRICULTURAL AND MECHANICAL COLLEGE, Prairie View, Tex.; E. E. O'Banion; 6 weeks; $48,300
PRATT INSTITUTE, Brooklyn, N.Y.; John Michael O'Gorman; 6 weeks; $39,800
PRINCETON UNIVERSITY, Princeton, N.J.; J. G. Bradshaw; 6 weeks; $43,100
UNIVERSITY OF PUERTO RICO, Rio Piedras, P.R.; Augusto Bobonis; 8 weeks; $68,300
F. Bueso; 6 weeks; $57,800
J. A. Ramos; Mayaguez; 6 weeks; $13,900
PURDUE UNIVERSITY, Lafayette, Ind.; John E. Christian; 6 weeks; $14,700
D. A. Davenport; 8 weeks; $44,600
D. A. Davenport; 8 weeks; $46,100
M. Wiles Keller; 8 weeks; $57,300
R. W. Lefler; 8 weeks; $41,200
R. W. Lefler; 8 weeks; $45,700
R. W. Lefler, 8 weeks; $46,800
J. R. Singleton; 8 weeks; $58,500
RANDOLPH-MACON WOMAN'S COLLEGE, Lynchburg, Va.; Paul A. Walker; 6 weeks; $60,400
UNIVERSITY OF REDLANDS, Redlands, Calif.; Judson Sanderson; 9 weeks; $49,800
REED COLLEGE, Portland, Oreg.; Burrowes Hunt; 8 weeks; $48,800
RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; Emery L. Will; State University College of Education, Oneonta; 6 weeks; $48,800
Edgar W. Flinton, New York State College for Teachers, Albany; 6 weeks; $48,900
Alexander G. Major, State University College of Education at Potsdam; 6 weeks; $46,400
UNIVERSITY OF RHODE ISLAND, Kingston, R.I.; Elmer A. Palmatier; 6 weeks; $34,400
UNIVERSITY OF ROCHESTER, Rochester, N.Y.; William A. Fullagar; 6 weeks; $47,200
RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Alan A. Boyden; 6 weeks; $41,050
Helgi Johnson; 6 weeks; $41,800
Robert L. Sells; 7 weeks; $50,470
Emory P. Starke; 6 weeks; $84,950
SACRAMENTO STATE COLLEGE FOUNDATION, Sacramento, Calif.; Carl E. Ludwig, Sacramento State College; 6 weeks; $62,500
SAINT AUGUSTINE'S COLLEGE, Raleigh, N.C.; Prezell R. Robinson; 6 weeks; $50,600
ST. CLOUD STATE COLLEGE, St. Cloud, Minn.; Harold Hopkins; 5 weeks; $50,900
SAINT LOUIS UNIVERSITY, St. Louis, Mo.; Theo. A. Ashford; 6 weeks; $28,500
Francis Reagan; 6 weeks; $48,100

University of San Francisco, San Francisco, Calif.; Edward J. Farrell; 6 weeks; $46,500

San Jose State College Corp., San Jose, Calif.; John L. Marks; 6 weeks; $48,600

Charles E. Smith, Jr.; 6 weeks; $26,300

University of Santa Clara, Santa Clara, Calif.; Abraham P. Hillman; 6 weeks; $40,700

Seattle University, Seattle, Wash.; Ernest P. Bertin, S.J.; 8 weeks; $75,900

Seton Hill College, Greensburg, Pa.; Sister Mary Thaddeus; 6 weeks; $42,100

Simmons College, Boston, Mass.; Philip M. Richardson; 6 weeks; $24,400

John A. Timm; 6 weeks; $24,400

South Carolina State College, Orangeburg, S.C.; George W. Hunter; 8 weeks; $80,100

University of South Carolina, Columbia, S.C.; W. L. Williams; 8 weeks; $83,425

South Dakota School of Mines and Technology, Rapid City, S. Dak.; Howard C. Peterson; 8 weeks; $127,600

South Dakota State College, Brookings, S. Dak.; Kenneth Howard; 8 weeks; $62,400

Southeastern State College, Durant, Okla.; Leslie A. Dwight; 8 weeks; $46,500

University of Southern California, Los Angeles, Calif.; Willard Geer; 6 weeks; $38,700

Jay M. Savage; 6 weeks; $46,650

Southern Illinois University, Carbondale, Ill.; W. C. McDaniel; 8 weeks; $49,800

I. L. Shechmeister; 8 weeks; $54,000

Southern Methodist University, Dallas, Tex.; Joe P. Harris, Jr.; 6 weeks; $30,500

Southern University, Baton Rouge, La.; J. Warren Lee; 8 weeks; $55,000

Southwest Missouri State College, Springfield, Mo.; Carl V. Fronabarger; 6 weeks; $27,200

Southwestern Louisiana Institute, Lafayette, La.; James R. Oliver; 9 weeks; $55,400

James R. Oliver; 9 weeks; $79,800

Southwestern State College, Weatherford, Okla.; Earl A. Reynolds; 8 weeks; $48,400

Spring Hill College, Mobile, Ala.; Francis J. Kearley, Jr.; 6 weeks; $29,400

Stanford University, Stanford, Calif.; Harold M. Bacon; 6 weeks; $47,250

Paul Kirkpatrick; 6 weeks; $60,500

State Teachers College, California, Pa.; Gabriel P. Betz; 9 weeks; $55,400

State University of Iowa, Iowa City, Iowa; Titus Carr Evans; 8 weeks; $19,770

State University of South Dakota, Vermillion, S. Dak.; M. M. Hasse; 8 weeks; $64,200

M. M. Hasse; 8 weeks; $77,100

Stephen F. Austin State College, Nacogdoches, Tex.; Alvin F. Shinn; 6 weeks; $28,700

Stetson University, De Land, Fla.; Gene W. Medlin; 8 weeks; $59,800

Stevens Institute of Technology, Hoboken, N.J.; Robert H. Seavy; 6 weeks; $59,400

Syracuse University, Syracuse, N.Y.,; John G. Burdick; 6 weeks; $51,050

John G. Burdick; 6 weeks; $51,000

William R. Frederickson; 6 weeks; $79,800

William R. Frederickson; 6 weeks; $61,400

Teachers College, Columbia University, New York, N.Y.; Myron F. Rosskopf; 6 weeks; $49,300

Temple University, Philadelphia, Pa.; Elmer L. Offenbacher; 8 weeks; $87,900

David S. Sarner; 6 weeks; $30,400

Tennessee Agricultural and Industrial State University, Nashville, Tenn.; Rugherford H. Adkins; 8 weeks; $51,600

Texas Christian University, Forth Worth, Tex.; Ben F. Goldbeck; 6 weeks; $91,400

Texas Technological College, Lubbock, Tex.; Earl D. Camp; 9 weeks; $86,000

Earl D. Camp; 9 weeks; $86,000

Texas Southern University, Houston, Tex.; Robert J. Terry; 12 weeks; $93,300

Texas Woman's University, Denton, Tex.; Harold T. Baker; 6 weeks; $47,400

University of Texas, Austin, Tex.; Addison E. Lee; 9 weeks; $117,100

Thiel College, Greenville, Pa.; Bela G. Kolossvary; 6 weeks; $42,000

University of Toledo, Toledo, Ohio; Robert R. Buell; 8 weeks; $59,600

Tufts University, Medford, Mass.; M. Kent Wilson; 6 weeks; $49,100

Tulane University of Louisiana, New Orleans, La.; E. Peter Volpe; 6 weeks; $46,300

Tuskegee Institute, Tuskegee Institute, Ala.; W. Edward Belton; 8 weeks; $59,700

W. Edward Belton; 8 weeks; $59,700

Union College and University, Schenectady, N.Y.; D. K. Baker; 8 weeks; $130,800

D. K. Baker; 8 weeks; $130,800

Utah State University, Logan, Utah; Joe Elich; 10 weeks; $76,800

Vanderbilt University, Nashville, Tenn.; E. Baylis Shanks; 8 weeks; $110,400

University of Vermont and State Agricultural College, Burlington, Vt.; Nelson L. Walbridge; 8 weeks; $78,700

N. James Schoonmaker; 7 weeks; $67,300

Virginia Polytechnic Institute, Blacksburg, Va.; Robert C. Krug; 8 weeks; $54,000

Virginia State College, Petersburg, Va.; Richard H. Dunn; 8 weeks; $100,350

University of Virginia, Charlottesville, Va.; James W. Cole, Jr.; 8 weeks; $72,500

Washington State University, Pullman, Wash.; Alfred B. Butler; 8 weeks; $89,700

Sidney G. Hacker; 8 weeks; $58,100

Sidney G. Hacker; 8 weeks; $60,100

University of Washington, Seattle Wash.; L. A. Sanderman; 8 weeks; $60,000

Wayne State University, Detroit, Mich.; Walter Chavin; 8 weeks; $19,000

Karl W. Folley; 8 weeks; $66,100

Wesleyan University, Middletown, Conn.; Joseph S. Daltry; 6 weeks; $94,400

Joseph S. Daltry; 6 weeks; $96,500

Western Kentucky State College, Bowling Green, Ky.; Ward C. Sumpter; 8 weeks; $76,200

Western Michigan University, Kalamazoo, Mich.; George G. Mallinson; 8 weeks; $48,100

Western Reserve University, Cleveland, Ohio; Ralph H. Petrucci; 11 weeks; $129,900

West Texas State College, Canyon, Tex.; Hollis L. Cook; 12 weeks; $89,100

West Virginia University, Morgantown, W. Va.; James B. Hickman; 6 weeks; $92,900

WEST VIRGINIA WESLEYAN COLLEGE, Buckhannon, W. Va.; John C. Wright; 6 weeks; $59,800

UNIVERSITY OF WICHITA, Wichita, Kans.; Clarence G. Stuckwisch; 6 weeks; $27,000

WILLIAM JEWELL COLLEGE, Liberty, Mo.; Frank G. Edson; 8 weeks; $76,100

WISCONSIN STATE COLLEGE, River Falls, Wis.; Richard J. Delorit; 8 weeks; $39,000

WISCONSIN STATE COLLEGES, State Capitol, Madison, Wis.; Eugene R. McPhee; 6 weeks; $42,200

UNIVERSITY OF WISCONSIN, Madison, Wis.; Robert A. Jaggard; 6 weeks; $46,735
Peter J. Salamun; Milwaukee; 6 weeks; $39,400

WITTENBERG UNIVERSITY, Springfield, Ohio; Everett H. Bush; 8 weeks; $44,100

WOMAN'S COLLEGE OF THE UNIVERSITY OF NORTH CAROLINA, Greensboro, N.C.; Hollis J. Rogers; 6 weeks; $46,200

WORCESTER POLYTECHNIC INSTITUTE, Worcester, Mass.; 8 weeks; $600

UNIVERSITY OF WYOMING, Laramie, Wyo.; Carl A. Cinnamon; 8 weeks; $19,000
Palmer O. Steen; 8 weeks; $76,300

XAVIER UNIVERSITY, Cincinnati, Ohio; John B. Hart; 6 weeks; $38,800

YALE UNIVERSITY, New Haven, Conn.; Stuart R. Brinkley; 6 weeks; $87,300
Dirk Brouwer; 6 weeks; $38,425

SUMMER INSTITUTES FOR ELEMENTARY SCHOOL TEACHERS AND ADMINISTRATORS

COLLEGE OF ST. CATHERINE, St. Paul, Minn.; Sister Seraphim; 6 weeks; $34,400

DEPAUW UNIVERSITY, Greencastle, Ind.; Donald J. Cook; 6 weeks; $28,500

UNIVERSITY OF KANSAS, Lawrence, Kans.; Robert W. Ridgway; 8 weeks; $51,800

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Joseph N. Payne; 4 weeks; $27,700

NORTHERN ILLINOIS UNIVERSITY, DeKalb, Ill.; Frederick W. Rolf; 8 weeks; $49,900

NORTHERN MICHIGAN COLLEGE, Marquette, Mich.; Henry S. Heimonen; 6 weeks; $37,700

UNIVERSITY OF RHODE ISLAND, Kingston, R.I.; Elmer A. Palmatier; 6 weeks; $31,500

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Guido G. Weigand; 6 weeks; $38,100

SAN FERNANDO VALLEY STATE COLLEGE FOUNDATION, Northridge, Calif.; Ruth L. Roche; 6 weeks; $37,700

SAN JOSE STATE COLLEGE CORPORATION, San Jose, Calif.; James R. Smart; 6 weeks; $36,500

UNIVERSITY OF SOUTH CAROLINA, Columbia, S.C.; Frederick H. Giles, Jr.; 6 weeks; $27,700

SOUTHERN UNIVERSITY, Baton Rouge, La.; Woodrow H. Jones; 8 weeks; $31,500

TEACHERS COLLEGE, Columbia University, New York, N.Y.; Frederick L. Fitzpatrick; 6 weeks; $29,600

UNIVERSITY OF TEXAS, Austin, Tex.; W. T. Guy, Jr.; 6 weeks; $31,400

SUMMER CONFERENCES

AMERICAN UNIVERSITY, Washington, D.C.; Matthew F. Norton; *Summer Conference in Stratigraphy and Structure of the Appalachians for College Teachers of Geology and Earth Sciences;* 14 days; $17,800

BUTLER UNIVERSITY, Indianapolis, Ind.; Ralph K. Birdwhistell; *Summer Conference in the Recent Developments in Nonaqueous Solvents for College Teachers of Undergraduate Chemistry;* 14 days; $14,500

CARLETON COLLEGE, Northfield, Minn.; Robert A. Reitz; *Summer Conference in Solid-State Physics for College Teachers of Physics;* 13 days; $10,600

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; Burton V. Dean; *Summer Conference on New Applications of Mathematics and Statistics in the Design and Operation of Complex Systems for College Teachers of Mathematics and Engineering;* 19 days; $27,300

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo; Donal R. Wood; *Summer Conference in Genetics for College Teachers of Genetics;* 19 days; $14,600

CORNELL COLLEGE, Mount Vernon, Iowa; Cecil F. Dam; *Summer Conference in Radioisotopes and Their Uses for Junior College Teachers of Biology, Chemistry, and Physics;* 12 days; $16,700

UNIVERSITY OF DETROIT, Detroit, Mich.; Paul M. Reinhard; *Summer Conference in Scientific Engineering for College Teachers of Engineering in Graphics, Mechanics, Physics and Mathematics;* 12 days; $8,400

UNIVERSITY OF FLORIDA, Gainesville, Fla.; Wallace S. Brey; *Summer Conference in Nuclear Resonance for College Teachers of Chemistry and Physics;* 12 days; $12,400

GEORGETOWN UNIVERSITY, Washington, D.C.; Matthew P. Thekaekara, S.J.; *Summer Conference in the Recent Advances in Astro-Geophysics for College Teachers of Physics and Astronomy;* 24 days; $20,800

LONG ISLAND BIOLOGICAL ASSOCIATION, Cold Springs Harbor, N.Y.; Paul Margolin; *Summer Conference in the Recent Developments in Molecular and Developmental Genetics for College Teachers of Genetics;* 20 days; $15,300

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; Victor A. Greulach; *Summer Conference in Botany, With Emphasis on Plant Evolution and Plant Evolution and Plant Physiology for Junior College and College Teachers of General Biology and General Botany;* 19 days; $13,800

UNIVERSITY OF OKLAHOMA, Norman, Okla.; William Viavant; *Summer Conference in Computer Programing and Related Mathematics for College Teachers of Science and Mathematics;* 25 days; $29,700

PURDUE UNIVERSITY, Lafayette, Ind.; Warren W. Brandt; *Summer Conference in Chromatography: Theory and Practice for College Teachers of Chemistry;* 13 days; $14,400

SACRAMENTO STATE COLLEGE FOUNDATION, Sacramento, Calif.; George N. Beaumariage; *Summer Conference in Recent Developments in Mathematics and the Teaching of Arithmetic for College Teachers and Elementary School Supervisors of Arithmetic;* 13 days; $21,700

TUFTS UNIVERSITY, Medford, Mass.; M. Kent Wilson; *Summer Conference in the Recent Advances in Chemical Bonding for College Teachers of Chemistry;* 11 days; $16,100

WASHINGTON UNIVERSITY, Saint Louis, Mo.; Gerald L. Esterson; *Summer Conference in*

Systems Engineering Theory for Chemical Engineering Teachers; 24 days; $22,310

SUMMER SCIENCE TRAINING PROGRAM FOR SECONDARY SCHOOL STUDENTS

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station, Tex.; Melvin C. Schroeder; 5 weeks; $12,400

John J. Sperry; 6 weeks; $4,703

AGRICULTURAL AND TECHNICAL COLLEGE OF NORTH CAROLINA, Greensboro, N.C.; B. T. White; 6 weeks; $22,110

UNIVERSITY OF ALASKA, College, Alaska; William S. Wilson; 3 weeks; $11,040

AMERICAN ACADEMY OF ARTS AND SCIENCES, Boston, Mass.; Gordon O. Thayer, Thayer Academy; 10 weeks; $25,220

AMERICAN METEOROLOGICAL SOCIETY, Boston, Mass.; Vincent J. Schaefer; 7 weeks; $21,490

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Franklin M. Branley; 8 weeks; $8,950

APPALACHIAN STATE TEACHERS COLLEGE, Boone, N.C.; F. Ray Derrick; 5 weeks; $13,830

ARIZONA STATE COLLEGE, Flagstaff, Ariz.; J. Harvey Butchart; 5 weeks; $7,340

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Henry Freiser; 10 weeks; $40,450

BENNETT COLLEGE, Greensboro, N.C.; J. Henry Sayles; 6 weeks; $32,740

BOWLING GREEN STATE UNIVERSITY, Bowling Green, Ohio; W. H. Hall; 5 weeks; $4,760

UNIVERSITY OF BRIDGEPORT, Bridgeport, Conn.; Willard P. Berggren; 7 weeks; $25,040

BROOKLYN COLLEGE, Brooklyn, N.Y.; Samuel Borofsky; 6 weeks; $7,350

BROWN UNIVERSITY, Providence, R.I.; Charles B. MacKay; 6 weeks; $20,430

BUCKNELL UNIVERSITY, Lewisburg, Pa.; Lester Kieft; 6 weeks; $16,620

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Robert Guthrie; 8 weeks; $12,570

BUHL PLANETARIUM AND INSTITUTE OF POPULAR SCIENCE, Pittsburgh, Pa.; Arthur L. Draper; 6 weeks; $3,500

BUTLER UNIVERSITY, Indianapolis, Ind.; William H. Bessey; 7 weeks; $7,010

CALIFORNIA STATE POLYTECHNIC COLLEGE, San Luis Obispo, Calif.; William Thurmond; 4 weeks; $15,990

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Clifford Bell; Los Angeles; 6 weeks; $5,820

Norris W. Rakestraw, Scripps Institution of Oceanography, La Jolla; 10 weeks; $7,470

D. M. Reynolds; Davis; 6 weeks; $17,900

Robert A. Rice; 6 weeks; $19,130

UNIVERSITY OF CHICAGO, Chicago, Ill.; William H. Meyer; 6 weeks; $53,500

COLGATE UNIVERSITY, Hamilton, N.Y.; Robert E. Todd; 6 weeks; $14,890

COLLEGE OF THE PACIFIC, Stockton, Calif.; Jesse S. Binford, Jr.; 6 weeks; $4,310

COLORADO COLLEGE, Colorado Springs, Colo.; Richard G. Beidleman; 8 weeks; $9,320

COLORADO SCHOOL OF MINES, Golden, Colo.; James L. Hall; 6 weeks; $17,820

COMMITTEE FOR ADVANCED SCIENCE TRAINING, INSTITUTE FOR MEDICAL RESEARCH, Cedars of Lebanon Hospital, Los Angeles, Calif.; Harry Sobel; 10 months; $6,700

COOPER UNION FOR THE ADVANCEMENT OF SCIENCE AND ART, New York, N.Y.; Edward M. Griswold; 6 weeks; $28,900

CORNELL UNIVERSITY, Ithaca, N.Y.; Thomas R. Nielsen; 6 weeks; $36,010

UNIVERSITY OF DENVER, Denver, Colo.; H. P. Leighly, Jr., 9 weeks; $6,650

UNIVERSITY OF DETROIT, Detroit, Mich.; Jon J. Kabara; 8 weeks; $250

EAST TEXAS STATE COLLEGE, Commerce, Tex.; Roy N. Jervis; 5 weeks; $6,100

EASTERN MONTANA COLLEGE OF EDUCATION, Billings, Mont.; Oliver W. Peterson; 8 weeks; $2,380

EMORY AND HENRY COLLEGE, Emory, Va.; Marius Blesi; 5 weeks; $6,800

EMORY UNIVERSITY, Atlanta, Ga.; J. G. Lester; 5 weeks; $23,735

FISK UNIVERSITY, Nashville, Tenn.; Samuel P. Massie; 6 weeks; $14,120

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Dwight B. Goodner; 6 weeks; $9,220

UNIVERSITY OF FLORIDA, Gainesville, Fla.; Luther A. Arnold; 8 weeks; $14,630

GENEVA COLLEGE, Beaver Falls, Pa.; Roy M. Adams; 9 weeks; $6,120

UNIVERSITY OF GEORGIA, Athens, Ga.; T. H. Whitehead; 6 weeks; $10,020

GODDARD COLLEGE, Plainfield, Vt.; George Beecher; 5 weeks; $8,540

UNIVERSITY OF HAWAII, Honolulu, Hawaii; Donald C. McGuire; 7 weeks; $13,470

HIRAM COLLEGE, Hiram, Ohio; Edward B. Rosser; 5 weeks; $6,380

UNIVERSITY OF HOUSTON, Houston, Tex.; John C. Allred; 6 weeks; $11,270

HOWARD PAYNE COLLEGE, Brownwood, Tex.; Leonard R. Daniel; 5 weeks; $7,350

HOWARD UNIVERSITY, Washington, D.C.; Herman Branson; 8 weeks; $15,270

HUMBOLDT STATE COLLEGE FOUNDATION, Arcata, Calif.; John M. Borgerson; 4 weeks; $14,030

HUNTER COLLEGE, New York, N.Y.; Melvin S. Schwartz; 6 weeks; $6,390

Henry D. Thompson; 5 weeks; $5,880

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.; Haim Reingold; 34 weeks; $18,960

UNIVERSITY OF ILLINOIS, Urbana, Ill.; J. S. Dobrovolny; 6 weeks; $13,700

INDIANA UNIVERSITY, Bloomington, Ind.; Paul Klinge; 2 weeks; $27,220

INTER AMERICAN UNIVERSITY OF PUERTO RICO, San German, P.R.; Ismael Velez; 9 weeks; $15,620

KANSAS STATE TEACHERS COLLEGE, Emporia, Kans.; Otto M. Smith; 6 weeks; $14,790

UNIVERSITY OF KANSAS, Lawrence, Kans.; Robert W. Baxter; 3 weeks; $17,240

KEENE TEACHERS COLLEGE, Keene, N.H.; Alan N. Hall; 6 weeks; $26,930

KENYON COLLEGE, Gambier, Ohio; William R. Transue; 4 weeks; $12,080

KNOX COLLEGE, Galesburg, Ill.; Paul H. Shepard; 3 weeks; $17,290

KNOXVILLE COLLEGE, Knoxville, Tenn.; Joseph M. Reyes; 8 weeks; $35,890

LEHIGH UNIVERSITY, Bethlehem, Pa.; Albert Wilansky; 6 weeks; $5,010

LOUISIANA POLYTECHNIC INSTITUTE, Ruston, La.; T. J. Laswell; 8 weeks; $19,060

LOUISIANA STATE UNIVERSITY, Baton Rouge, La.; Harry J. Bennett; 10 weeks; $8,530

John F. Christman; 9 weeks; $19,040

LOYOLA UNIVERSITY OF LOS ANGELES, Los Angeles, Calif.; Clarence J. Wallen; 9 months; $3,040

MANHATTAN COLLEGE, New York, N.Y.; Leonard O'Conner, F.S.C.; 6 weeks; $11,450
MANKATO STATE COLLEGE FOUNDATION, INC., Mankato, Minn.; James A. Andersen; 4 weeks; $16,940
UNIVERSITY OF MARYLAND, College Park, Md.; Howard Laster; 12 weeks; $4,320
UNIVERSITY OF MIAMI, Coral Gables, Fla.; C. P. Idyll; The Marine Laboratory, Miami; 9 weeks; $10,060
MICHIGAN COLLEGE OF MINING AND TECHNOLOGY, Houghton, Mich.; U. J. Noblet; 5 weeks; $13,810
UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Leigh C. Anderson; 6 weeks; $19,270
UNIVERSITY OF MISSISSIPPI, University, Miss.; Samuel F. Clark; 4 weeks; $14,460
MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing, Mich.; M. Isobel Blyth; 6 weeks; $35,260
UNIVERSITY OF MISSOURI, Columbia, Mo.; John E. Peterson; 2 weeks; $7,000
Charles E. Remington, Jr.; 7 weeks; $14,650
MONTANA STATE COLLEGE, Bozeman, Mont.; James W. Cusick; 4 weeks; $17,810
MOREHEAD STATE COLLEGE, Morehead, Ky.; Margaret B. Heaslip; 4 weeks; $5,370
MORGAN STATE COLLEGE, Baltimore, Md.; John W. King; 6 weeks; $20,300
MORRIS BROWN COLLEGE, Atlanta, Ga.; Prince Wilson; 9 weeks; $25,660
MURRAY STATE COLLEGE, Murray, Ky.; W. E. Blackburn; 8 weeks; $19,240
NATIONAL CHILDREN'S CARDIAC HOSPITAL, Miami, Fla.; Milton S. Saslaw; 40 weeks; $3,760
UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; Donald G. Hanway; 9 weeks; $7,500
NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY, Campus Station, Socorro, N. Mex.; Burrell L. Wood; 9 weeks; $24,070
NEW YORK BOTANICAL GARDEN, New York, N.Y.; Arthur Cronquist; 5 weeks; $12,690
NEW YORK UNIVERSITY, New York, N.Y.; Harry A. Charipper; 6 weeks; $6,120
NORTH CAROLINA COLLEGE AT DURHAM, Durham, N.C.; James S. Lee; 6 weeks; $17,100
NORTH CAROLINA STATE COLLEGE, Raleigh, N.C.; W. A. Reid; 6 weeks; $16,740
NORTH DAKOTA AGRICULTURAL COLLEGE, Fargo, N. Dak.; J. A. Callenbach; 10 weeks; $1,530
UNIVERSITY OF NORTH DAKOTA, Grand Forks, N. Dak.; K. B. MacKichan; 2 weeks; $5,690
NORTHERN MICHIGAN COLLEGE, Marquette, Mich,; Henry S. Heimonen; 4 weeks; $10,820
NORTHWESTERN STATE COLLEGE OF LOUISIANA, Natchitoches, La.; Rene J. Bienvenu; 9 weeks; $4,920
Alan H. Crosby; 9 weeks; $6,280
NORTHWESTERN UNIVERSITY, Evanston, Ill.; F. G. Seulberger; 5 weeks; $21,770
UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; A. E. Ross; 7 weeks; $16,480
OHIO UNIVERSITY, Athens, Ohio; William G. Gambill, Jr.; 3 weeks; $17,030
OKLAHOMA STATE UNIVERSITY, Stillwater, Okla.; L. F. Sheerar; 6 weeks; $10,280
OREGON STATE COLLEGE, Corvallis, Oreg.; R. E. Gaskell; 7 weeks; $18,450
PAN AMERICAN COLLEGE, Edinburg, Tex.; Paul R. Engle, Observatory and Astro-Science Center; 6 weeks; $8,550
UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; John R. Jablonski; 13 weeks; $4,030
POLYTECHNIC INSTITUTE OF BROOKLYN, Brooklyn, N.Y.; C. G. Overberger; 8 weeks; $7,560
PRAIRIE VIEW AGRICULTURAL AND MECHANICAL COLLEGE, Prairie View, Tex.; E. E. O'Banion; 6 weeks; $7,550
Israel E. Glover; 6 weeks; $6,240
Charles H. Nicholas; 6 weeks; $7,080
UNIVERSITY OF PUERTO RICO, Rio Piedras, P.R.; Francisco Garriga; 6 weeks; $9,470
Eddie Ortiz Muniz; Mayaguez; 6 weeks; $10,500
PURDUE UNIVERSITY, Lafayette, Ind.; George A. Gries; 8 weeks; $16,390
RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; John McCarthy; 6 weeks; $13,140
ROSCOE B. JACKSON MEMORIAL LABORATORY, Bar Harbor, Maine; John L. Fuller; 10 weeks; $13,010
ROSWELL PARK MEMORIAL INSTITUTE, Buffalo, N.Y.: E. A. Mirand; 8 weeks; $9,640
RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Charles H. Stevens; 3 weeks; $10,960
ST. CLOUD STATE COLLEGE, St. Cloud, Minn.; Phillip Younger; 4 weeks; $14,420
ST. JOHN'S UNIVERSITY, Jamaica, N.Y.; Daniel M. Lilly; 6 weeks; $11,610
ST. LOUIS UNIVERSITY, St. Louis, Mo.; John J. Andrews; 4 weeks; $4,660
ST. MARY'S COLLEGE OF CALIFORNIA, St. Mary's College, Calif.; Albert B. Costa; 6 weeks; $8,740
ST. OLAF COLLEGE, Northfield, Minn.; Albert E. Finholt; 8 weeks; $28,730
SAN JOSE STATE COLLEGE, San Jose, Calif.; Wilbur Sprain; 4 weeks; $8,730
UNIVERSITY OF SANTA CLARA, Santa Clara; Calif.; Arthur T. Phelps; 6 weeks; $13,390
SOUTH DAKOTA STATE COLLEGE, Brookings, S. Dak.; Stanley Sundet; 6 weeks; $6,350
SOUTHERN ILLINOIS UNIVERSITY, Carbondale, Ill.; Leo Kaplan; 6 weeks; $18,550
SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.; Frank J. Palas; 5 weeks; $6,940
STATE UNIVERSITY OF IOWA, Iowa City, Iowa; Robert Yager; 8 weeks; $23,920
STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion, S. Dak.; Sherwood Cummings; 2 weeks; $7,660
STEPHEN F. AUSTIN STATE COLLEGE, Nacogdoches, Tex.; E. L. Miller; 6 weeks; $8,750
STETSON UNIVERSITY, De Land, Fla.; Harland C. Merriam; 8 weeks; $22,830
UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; James F. Davidson; 8 weeks; $7,070
J.H. Wood; 6 weeks; $15,630
TEXAS WOMAN'S UNIVERSITY, Denton, Tex.; Robert W. Higgins; 8 weeks; $16,410
UNIVERSITY OF TEXAS, Austin, Tex.; H. J. Ettlinger; 6 weeks; $9,910
Bennie R. Ferrone; 6 weeks; $10,320
Grant Taylor, Anderson Hospital and Tumor Institute, Houston; 6 weeks; $3,970
UNIVERSITY OF TULSA, Tulsa, Okla.; F. T. Gardner; 6 weeks; $5,120
UNIVERSITY OF UTAH, Salt Lake City, Utah; E. Allan Davis; 4 weeks; $5,070
VIRGINIA STATE COLLEGE, Petersburg, Va.; Paul L. Brown; 6 weeks; $11,930
WALDEMAR MEDICAL RESEARCH FOUNDATION, INC., Port Washington, N.Y.; Norman Molomut; 8 weeks; $18,040
WASHINGTON UNIVERSITY, St. Louis, Mo.; Owen J. Sexton; 5 weeks; $3,050
WEST VIRGINIA UNIVERSITY, Morgantown, W. Va.; O. J. Burger; 4 weeks; $7,280
WEST VIRGINIA WESLEYAN COLLEGE, Buckhannon, W. Va.; John C. Wright; 3 weeks; $8,900

Western Kentucky State College, Bowling Green, Ky.; Tate C. Page; 8 weeks; $28,280
Western Michigan University, Kalamazoo, Mich.; George G. Mallinson; 6 weeks; $13,340
Wiley College, Marshall, Tex.; Gertrude C. Ridgel; 6 weeks; $6,500
Wisconsin State College, Superior, Wis.; Howard Thomas; 4 weeks; $6,960
Wisconsin State College, La Crosse, Wis.; Robert H. Uber; 6 weeks; $8,560
Wofford College, Spartanburg, S.C.; James C. Loftin; 8 weeks; $12,600
Worcester Foundation for Experimental Biology, Shrewsbury, Mass.; Hudson Hoagland; 9 weeks; $21,680
Yeshiva University, New York, N.Y.; Moses D. Tendler; 8 weeks; $14,320

RESEARCH PARTICIPATION FOR TEACHER TRAINING

Agricultural and Mechanical College of Texas, College Station, Tex.; J. B. Page; 3 months; $20,950
University of Arizona, Tucson, Ariz.; A. B. Weaver; 3 months; $23,150
Boyce Thompson Institute for Plant Research, Inc., Yonkers, N.Y.; Lawrence P. Miller; 3 months; $8,900
Brigham Young University, Provo, Utah; K. LeRoi Nelson; 3 months; $19,925
Brooklyn College, Brooklyn, N.Y.; Louis G. Moriber; 3 months; $4,800
University of Buffalo, Buffalo, N.Y.; Howard Tieckelmann; 3 months; $14,790
University of California, Berkeley, Calif.; Donald C. Bryant; 3 months; $30,745
Clark University, Worcester, Mass.; Arthur E. Martell; 3 months; $12,265
Clarkson College of Technology, Potsdam, N.Y.; F. Gordon Lindsey; 3 months; $18,690
College of the Pacific, Stockton, Calif.; Joel W. Hedgpeth, Pacific Marine Station; 3 months; $11,870
College of Wooster, Wooster, Ohio; John D. Reinheimer; 3 months; $1,250
Colorado State University Research Foundation, Fort Collins, Colo.; 3 months; $19,265
University of Colorado, Denver, Colo.; William C. Strickler; 3 months; $35,010
University of Colorado, Boulder, Colo.; Bert M. Tolbert; 3 months; $24,345
Cornell University, Ithaca, N.Y.; Philip G. Johnson; 3 months; $33,990
University of Delaware, Newark, Del.; James C. Kakavas; 3 months; $18,655
Drake University, Des Moines, Iowa; Leland P. Johnson; 3 months; $16,660
Florida State University, Tallahassee, Fla.; Leland Shanor; 3 months; $19,680
Furman University, Greenville, S.C.; J. A. Southern; 3 months; $15,985
University of Georgia, Athens, Ga.; Robert A. McRorie; 3 months; $23,000
Goshen College, Goshen, Ind.; Henry D. Weaver, Jr.; 3 months; $6,145
High Altitude Observatory of the University of Colorado, Boulder, Colo.; Donald E. Billings; 3 months; $4,425
Highlands Biological Station, Inc., Highlands, N.C.; Thelma Howell; 3 months; $5,095
Howard University, Washington, D.C.; Lloyd N. Ferguson; 3 months; $21,605
Illinois Institute of Technology, Chicago, Ill.; Leslie R. Hedrick; 3 months; $12,525
Indiana University, Bloomington, Ind.; Paul Klinge; 3 months; $24,400
Institute for Paper Chemistry, Appleton, Wis.; George D. Jernegan; 3 months; $8,050
Iowa State University of Science and Technology, Ames, Iowa; Paul F. Romberg; 3 months; $28,850
Kansas State Teachers College, Emporia, Kans.; Ted F. Andrews; 3 months; $13,580
University of Kansas, Lawrence, Kans.; C. A. VanderWerf; 3 months; $21,400
Kentucky Research Foundation, Lexington, Ky.; E. M. Spokes; 3 months; $3,660
Knox College, Galesburg, Ill.; Russell Sutton; 3 months; $6,420
Long Beach State College Foundation, Long Beach, Calif.; Darwin L. Mayfield; 3 months; $10,510
Louisiana State University, Baton Rouge, La.; John F. Christman; 3 months; $26,010
University of Maryland, College Park, Md.; Howard Laster; 3 months; $7,280
University of Massachusetts, Amherst, Mass.; D. S. Van Fleet; 3 months; $5,855
Miami University, Oxford, Ohio; Harry Weller; 3 months; $18,070
University of Mississippi, University, Miss.; Barton Milligan; 3 months; $10,650
Montana State University, Missoula, Mont. Ludvig G. Browman; 3 months; $4,535
Newark College of Engineering Research Foundation, Newark, N.J.; James A. Bradley; $13,515
New Mexico Highlands University, Las Vegas, N. Mex.; E. Gerald Meyer; 3 months; $19,665
University of New Mexico, Albuquerque, N. Mex.; Philip E. Bocquet; 3 months; $19,435
North Carolina State College of Agriculture and Engineering, Raleigh, N.C.; Homer C. Folks; 3 months; $26,940
North Dakota State College, Fargo, N. Dak.; J. A. Callenbach; 3 months; $23,635
University of North Dakota, Grand Forks, N. Dak.; Francis A. Jacobs; 3 months; $16,100
University of Notre Dame, Notre Dame, Ind.; Milton Burton; 3 months; $11,060
North Texas State College, Denton, Tex.; Robert C. Sherman; 3 months; $16,960
Ohio State University, Columbus, Ohio; F. E. Deatherage; 3 months; $8,795
Oklahoma State University, Stillwater, Okla.; Robert MacVicar; 3 months; $18,410
University of Oklahoma, Norman, Okla.; Horace Bliss, Oklahoma Science Service; 3 months; $17,355
Carl D. Riggs, Biological Station, Willis; 3 months; $16,480
Oregon State College, Corvallis, Oreg.; A. T. Lonseth; 3 months; $8,415
Pennsylvania State University, University Park, Pa.; W. Conrad Fernelius; 3 months; $20,085
University of Redlands, Redlands, Calif.; Robert H. Maybury; 3 months; $10,030
Rensselaer Polytechnic Institute, Troy, N.Y.; R. L. Strong; 3 months; $17,110
Research Foundation of State University of New York, Albany, N.Y.; Edwin C. John, Syracuse; 3 months; $11,125

UNIVERSITY OF RHODE ISLAND, Kingston, R.I.; Eugene C. Winslow; 3 months; $8,195
UNIVERSITY OF ROCHESTER, Rochester, N.Y.; 2 months; $23,060
ROSWELL PARK MEMORIAL INSTITUTE, Buffalo, N.Y.; Edwin A. Mirand; 3 months; $14,950
ST. JOHN'S UNIVERSITY, Jamaica, N.Y.; Paul T. Medici; 3 months; $15,130
UNIVERSITY OF SOUTH CAROLINA, Columbia, S.C.; Peyton C. Teague; 3 months; $20,240
UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; Edgar Warnhoff; 3 months; $17,325
STANFORD UNIVERSITY, Stanford, Calif.; O. Cutler Shepard; 3 months; $10,965
STATE UNIVERSITY OF IOWA, Iowa City, Iowa; Ralph L. Shriner; 3 months; $13,745
STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion, S. Dak.; George P. Scott; 3 months; $16,590
TEMPLE UNIVERSITY, Philadelphia, Pa.; David S. Sarner; 3 months; $14,710
UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; W. E. Jefferson; Memphis; 3 months; $7,105
TEXAS SOUTHERN UNIVERSITY, Houston, Tex.; L. L. Woods; 3 months; $6,715
UNIVERSITY OF TEXAS, Austin, Tex.; Addison E. Lee; 3 months; $17,615
UNIVERSITY OF UTAH, Salt Lake City, Utah; W. J. Burke; 3 months; $20,110
VANDERBILT UNIVERSITY, Nashville, Tenn.; Larry C. Hall; 3 months; $21,030
UNIVERSITY OF VERMONT, Burlington, Vt.; Howard M. Smith, Jr.; 3 months; $17,935
VIRGINIA FISHERIES LABORATORY, Glouster Point, Va.; Robert S. Bailey; 3 months; $21,525
UNIVERSITY OF VIRGINIA, Charlottesville, Va.; Stephan Berko; 3 months; $9,645
Jacques J. Rappaport; 3 months; $6,040
Bart Van't Riet; 3 months; $11,135
WAYNE STATE UNIVERSITY, Detroit, Mich.; Karl H. Gayer; 3 months; $15,750
WESTERN STATE COLLEGE, Gunnison, Colo.; C. G. Warren; 3 months; $1,370
UNIVERSITY OF WISCONSIN, Madison, Wis.; Donald H. Bucklin; 1 year; $48,635
YALE UNIVERSITY, New Haven, Conn.; Harlan J. Smith; 3 months; $1,370

UNDERGRADUATE RESEARCH PARTICIPATION PROGRAM

ADELPHI COLLEGE, Long Island, N.Y.; 9 months; $4,890
AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station, Tex.; 1 year; $3,400
2 years; $9,545
AGRICULTURAL AND TECHNICAL COLLEGE OF NORTH CAROLINA, Greensboro, N.C.; 1 year; $4,220
1 year; $5,175
ALBRIGHT COLLEGE, Reading, Pa.; 1 year; $1,845
ALFRED UNIVERSITY, Alfred, N.Y.; 3 months; $5,485
ALLEGHENY COLLEGE, Meadville, Pa.; 1 year; $8,595
AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; 1 year; $22,925
AMERICAN UNIVERSITY, Washington, D.C.; 3 months; $3,740
AMHERST COLLEGE, Amherst, Mass.; 3 months; $4,090
ARIZONA STATE UNIVERSITY, Tempe, Ariz.; 1 year; $2,635
UNIVERSITY OF ARIZONA, Tucson, Ariz.; 1 year; $10,350
UNIVERSITY OF ARKANSAS, Fayetteville, Ark.; 1 year; $13,995
ARLINGTON STATE COLLEGE, Arlington, Tex.; 9 months; $575
ASBURY COLLEGE, Wilmore, Ky.; 1 year; $3,220
AUBURN UNIVERSITY, Auburn, Ala.; 1 year; $6,980
BARNARD COLLEGE, New York, N.Y.; 2 years; $6,840
2 years; $6,900
1 year; $4,095
BARTOL RESEARCH FOUNDATION OF THE FRANKLIN INSTITUTE, Swarthmore, Pa.; 2 years; $5,695
BOSTON COLLEGE, Chestnut Hill, Mass.; 1 year; $5,890
BOSTON UNIVERSITY, Boston, Mass.; 1 year; $7,175
1 year; $7,590
BOWDOIN COLLEGE, Brunswick, Maine; 2 years; $5,010
3 months; $920
BRANDEIS UNIVERSITY, Waltham, Mass.; 1 year; $4,830
2 years; $8,650
1 year; $6,670
2 years; $7,650
BRIDGEWATER COLLEGE, Bridgewater, Va.; 2 years; $4,140
BROWN UNIVERSITY, Providence, R.I.; 1 year; $19,380
12 months; $10,280
BRYN MAWR COLLEGE, Bryn Mawr, Pa.; 3 months; $4,140
2 years; $9,640
3 months; $4,865
BUCKNELL UNIVERSITY, Lewisburg, Pa.; 3 months; $5,500
9 months; $715
9 months; $715
UNIVERSITY OF BUFFALO, Buffalo, N.Y.; 3 months; $1,960
BUTLER UNIVERSITY, Indianapolis, Ind.; 9 months; $2,590
CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; 3 months; $7,180
2 years; $8,280
2 years; $10,350
2 years; $10,350
UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; 3 months; $4,565
3 months; $16,820
1 year; $5,740
1 year; $8,840
1 year; $9,235
1 year; $23,665
2 years; $9,000
CANISIUS COLLEGE, Buffalo, N.Y.; 3 months; $5,950
CARLETON COLLEGE, Northfield, Minn.; 3 months; $1,380
CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; 3 months; $4,830
3 months; $7,900
9 months; $2,690
1 year; $3,330
1 year; $5,890
1 year; $7,350
CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; 3 months; $5,875
CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; 1 year; $4,815
3 months; $3,120

UNIVERSITY OF CHICAGO, Chicago, Ill.; 3 months; $13,210
3 months; $5,615
UNIVERSITY OF CINCINNATI, Cincinnati, Ohio; 1 year; $3,450
CITY COLLEGE OF THE COLLEGE OF THE CITY OF NEW YORK, New York, N.Y.; 9 months; $9,810
3 months; $11,040
CLARKSON COLLEGE OF TECHNOLOGY, Potsdam, N.Y.; 1 year; $5,750
COE COLLEGE, Cedar Rapids, Iowa; 9 months; $495
3 months; $1,365
COLBY COLLEGE, Waterville, Maine; 3 months; $565
COLGATE UNIVERSITY, Hamilton, N.Y.; 1 year; $8,715
COLLEGE OF CHARLESTON, Charleston, S.C.; 1 year; $3,360
COLLEGE OF NOTRE DAME OF MARYLAND, Baltimore, Md.; 9 months; $4,255
COLLEGE OF WOOSTER, Wooster, Ohio; 2 years; $5,090
2 years; $11,590
COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; 3 months; $5,610
1 year; $3,795
1 year; $6,230
UNIVERSITY OF COLORADO, Boulder, Colo.; 3 months; $12,215
3 months; $13,410
1 year; $7,670
COLUMBIA UNIVERSITY, New York, N.Y.; 3 months; $2,530
2 years; $7,385
UNIVERSITY OF CONNECTICUT, Storrs, Conn.; 1 year; $2,760
2 years; $5,175
COOPER UNION FOR THE ADVANCEMENT OF SCIENCE, New York, N.Y.; 1 year; $6,025
CORNELL COLLEGE, Mount Vernon, Iowa; 1 year; $3,570
2 years; $4,140
CORNELL UNIVERSITY, Ithaca, N.Y.; 3 months; $10,350
CREEDMOOR INSTITUTE FOR PSYCHOBIOLOGIC STUDIES, Jamaica, N.Y.; 2 years; $6,495
DARTMOUTH COLLEGE, Hanover, N.H.; 9 months; $175
1 year; $5,175
2 years; $3,680
2 years; $4,320
2 years; $9,150
2 years; $11,390
UNIVERSITY OF DENVER, Denver, Colo.; 1 year; $4,770
UNIVERSITY OF DETROIT, Detroit, Mich.; 1 year; $7,940
DICKINSON COLLEGE, Carlisle, Pa.; 1 year; $6,040
DILLARD UNIVERSITY, New Orleans, La.; 1 year; $5,575
DREXEL INSTITUTE OF TECHNOLOGY, Philadelphia, Pa.; 3 months; $3,450
3 months; $5,855
DUKE UNIVERSITY, Durham, N.C.; 2 yrs.; $10,005
DUQUESNE UNIVERSITY, Pittsburgh, Pa.; 2 years; $10,320
EARLHAM COLLEGE, Richmond, Ind.; 3 months; $8,680
EASTERN NAZARENE COLLEGE, Wollaston, Mass.; 2 years; $10,400
EVANSVILLE COLLEGE, Evansville, Ind.; 2 years; $8,855
FAIRFIELD UNIVERSITY, Fairfield, Conn.; 2 years; $7,590
FLORIDA AGRICULTURE AND MECHANICAL UNIVERSITY, Tallahassee, Fla.; 1 year; $4,750
FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; 1 year; $12,880
FORDHAM UNIVERSITY, New York, N.Y.; 1 year; $14,490
FRANKLIN AND MARSHALL COLLEGE, Lancaster, Pa.; 3 months; $8,050
2 years; $9,810
FURMAN UNIVERSITY, Greenville, S.C.; 1 year; $7,480
GEORGE WASHINGTON CARVER FOUNDATION OF THE TUSKEGEE INSTITUTE, Tuskegee Institute, Ala.; 1 year; $15,990
GEORGIA INSTITUTE OF TECHNOLOGY, Atlanta, Ga.; 2 years; $11,730
UNIVERSITY OF GEORGIA, Athens, Ga.; 1 year; $3,335
1 year; $6,440
9 months; $1,060
GRINNELL COLLEGE, Grinnell, Iowa; 3 months; $4,740
GUSTAVUS ADOLPHUS COLLEGE, St. Peter, Minn.; 9 months; $1,495
HAMILTON COLLEGE, Clinton, N.Y.; 3 months; $4,120
HAMPDEN-SYDNEY COLLEGE, Hampden-Sydney, Va.; 3 months; $1,000
HARVARD UNIVERSITY, Cambridge, Mass.; 3 months; $17,250
HAVERFORD COLLEGE, Haverford, Pa.; 2 years; $4,620
3 months; $760
UNIVERSITY OF HAWAII, Honolulu, Hawaii; 1 year; $4,025
3 months; $4,445
HOLLINS COLLEGE, Hollins College, Va.; 9 months; $6,555
HOWARD UNIVERSITY, Washington, D.C.; 9 months; $5,425
HUMBOLDT STATE COLLEGE, Arcata, Calif.; 1 year; $5,170
ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.; 3 months; $6,610
1 year; $5,520
9 months; $1,700
1 year; $5,640
UNIVERSITY OF ILLINOIS, Urbana, Ill.; 3 months; $8,045
9 months; $6,605
1 year; $8,970
2 years; $6,275
IMMACULATE HEART COLLEGE, Los Angeles, Calif.; 1 year; $10,810
IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa; 1 year; $9,690
1 year; $13,205
JOHN CARROLL UNIVERSITY, Cleveland, Ohio; 1 year; $2,765
JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; 1 year; $4,195
1 year; $9,400
JUNIATA COLLEGE, Huntingdon, Pa.; 1 year; $8,220
KANSAS STATE COLLEGE OF PITTSBURG, Pittsburg, Kans.; 3 months; $2,725
9 months; $2,210
1 year; $5,030
KANSAS STATE TEACHERS COLLEGE, Emporia, Kans.; 1 year; $5,900
KANSAS STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Manhattan, Kans.; 3 months; $2,690
3 months; $3,620

9 months; $770
1 year; $4,830
1 year; $5,235
1 year; $5,750
1 year; $6,130
1 year; $9,720
2 years; $8,805

UNIVERSITY OF KANSAS, Lawrence, Kans.; 1 year; $22,880

KENTUCKY RESEARCH FOUNDATION, Lexington, Ky.; 1 year; $33,015
1 year; $1,825

KENYON COLLEGE, Gambier, Ohio; 9 months; $750
1 year; $850

KNOX COLLEGE, Galesburg, Ill.; 2 years; $7,265

LAFAYETTE COLLEGE, Easton, Pa.; 3 months; $975
2 years; $3,795

LAMAR STATE COLLEGE OF TECHNOLOGY, Beaumont, Tex.; 3 months; $6,930

LA VERNE COLLEGE, La Verne, Calif.; 2 years; $7,880

LEBANON VALLEY COLLEGE, Annville, Pa.; 3 months; $4,140

LEHIGH UNIVERSITY, Bethlehem, Pa.; 3 months; $4,360
1 year; $4,105
1 year; $4,430
2 years; $11,220

LINFIELD RESEARCH INSTITUTE, McMinnville, Oreg.; 2 years; $5,775

LONG ISLAND BIOLOGICAL ASSOCIATION, Cold Spring Harbor, N.Y.; 3 months; $8,685

LOUISIANA POLYTECHNIC INSTITUTE, Ruston, La.; 9 months; $595

MANHATTAN COLLEGE, New York, N.Y.; 9 months; $1,210
9 months; $1,840
2 years; $5,540

UNIVERSITY OF MARYLAND, College Park, Md.; 3 months; $3,740
1 year; $7,935

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; 9 months; $5,500

MERCYHURST COLLEGE, Erie, Pa.; 3 months; $2,115

MIAMI UNIVERSITY, Oxford, Ohio; 3 months; $8,170
2 years; $7,590

UNIVERSITY OF MIAMI, Coral Gables, Fla.; 2 years; $7,935

MICHIGAN COLLEGE OF MINING AND TECHNOLOGY, Houghton, Mich.; 3 months; $750
3 months; $3,400
9 months; $900
1 year; $6,800

MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing, Mich.; 1 year; $5,295
9 months; $1,840
1 year; $16,270
1 year; $12,650
1 year; $9,495
1 year; $4,875

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; 1 year; $8,050
3 months; $1,025

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; 3 months; $4,090
3 months; $9,240
1 year; $11,650
1 year; $12,125

MISSISSIPPI STATE UNIVERSITY, State College, Miss.; 9 months; $1,840
9 months; $2,485
3 months; $3,105
2 months; $4,025
3 months; $4,220

UNIVERSITY OF MISSOURI, Columbia, Mo.; 9 months; $2,115
9 months; $2,500

MONTANA STATE UNIVERSITY, Missoula, Mont.; 2 years; $3,515
2 years; $4,865

MOREHOUSE COLLEGE, Atlanta, Ga.; 2 years; $6,015

MOUNT HOLYOKE COLLEGE, South Hadley, Mass.; 3 months; $4,785

MUHLENBERG COLLEGE, Allentown, Pa.; 2 years; $5,635

UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; 1 year; $4,385
2 years; $9,660

NEWARK COLLEGE OF ENGINEERING RESEARCH FOUNDATION, Newark, N.J.; 9 months; $2,015

NEW JERSEY NEURO-PSYCHIATRIC INSTITUTE, Princeton, N.J.; 1 year; $2,130; 1 year; $3,945

NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY, Socorro, N. Mex.; 3 months; $9,780

NEW MEXICO STATE UNIVERSITY, University Park, N. Mex.; 1 year; $23,380

NEW YORK UNIVERSITY, New York, N.Y.; 9 months; $3,050
3 months; $5,510

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; 9 months; $5,395
9 months; $8,225
1 year; $3,340
1 year; $4,545
1 year; $7,075

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; 3 months; $3,315
3 months; $5,540
3 months; $6,210
3 months; $6,625
1 year; $5,005
2 years; $9,945

NORTH DAKOTA AGRICULTURAL COLLEGE, Fargo, N. Dak.; 1 year; $15,675
1 year; $5,275
1 year; $4,210

UNIVERSITY OF NORTH DAKOTA, Grand Forks, N. Dak.; 3 months; $570
3 months; $3,100
9 months; $245
9 months; $750
9 months; $855
9 months; $1,150
2 years; $3,600
2 years; $5,725
2 years; $8,715
9 months; $730

NORTHEASTERN UNIVERSITY, Boston, Mass.; 9 months; $4,500

NORTHERN ILLINOIS UNIVERSITY, De Kalb, Ill.; 3 months; $2,990

NORTHWEST NAZARENE COLLEGE, Nampa, Idaho; 1 year; $3,720

NORTHWESTERN STATE COLLEGE OF LOUISIANA, Natchitoches, La.; 9 months; $575

NORTHWESTERN UNIVERSITY, Evanston, Ill.; 3 months; $14,730
3 months; $4,140
1 year; $9,395

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; 9 months; $1,670
3 months; $955

OBERLIN COLLEGE, Oberlin, Ohio; 3 months; $4,485

OHIO STATE UNIVERSITY, Columbus, Ohio; 1 year; $7,015
9 months; $900
OHIO UNIVERSITY, Athens, Ohio; 2 years; $9,655
UNIVERSITY OF OKLAHOMA, Norman, Okla.; 2 years; $3,930
OREGON FOREST RESEARCH CENTER, Corvallis, Oreg.; 3 months; $2,610
OREGON STATE COLLEGE, Corvallis, Oreg.; 3 months; $5,060
9 months; $480
9 months; $1,840
9 months; $2,635
1 year; $3,710
1 year; $4,335
1 year; $4,740
1 year; $7,070
1 year; $7,200
2 years; $4,305
UNIVERSITY OF OREGON, Eugene, Oreg.; 1 year; $31,820
PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; 1 year; $4,370
UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; 1 year; $4,530
2 years; $8,310
2 years; $9,660
2 years; $10,350
UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; 2 years; $10,120
POLYTECHNIC INSTITUTE OF BROOKLYN, Brooklyn, N.Y.; 9 months; $4,515
3 months; $10,465
POMONA COLLEGE, Claremont, Calif.; 1 year; $14,185
UNIVERSITY OF PORTLAND, Portland, Oreg.; 2 years; $4,830
PRINCETON UNIVERSITY, Princeton, N.J.; 1 year; $14,625
UNIVERSITY OF PUERTO RICO, Rio Piedras, Puerto Rico; 9 months; $2,800
PURDUE UNIVERSITY, Lafayette, Ind.; 1 year; $6,270
UNIVERSITY OF REDLANDS, Redlands, Calif.; 1 year; $6,130
REED COLLEGE, Portland, Oreg.; 1 year; $5,835
RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; 3 months; $3,365
3 months; $4,200
3 months; $6,660
2 years; $3,740
2 years; $4,050
2 years; $4,830
2 years; $7,875
RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; 3 months; $13,540
UNIVERSITY OF RHODE ISLAND, Kingston, R.I.; 3 months; $1,070
3 months; $1,070
3 months; $1,185
3 months; $1,245
RICE INSTITUTE, Houston, Tex.; 1 year; $5,405
UNIVERSITY OF ROCHESTER, Rochester, N.Y.; 3 months; $6,215
2 years; $9,840
ROCKY MOUNTAIN BIOLOGICAL LABORATORY, Crested Butte, Colo.; 3 months; $9,730
ROLLINS COLLEGE, Winter Park, Fla.; 1 year; $5,670
ROSCOE B. JACKSON MEMORIAL LABORATORY, Bar Harbor, Maine; 3 months; $22,170
ROSEMONT COLLEGE, Rosemont, Pa.; 8 months; $3,250
RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; 9 months; $3,565
SAINT JOSEPH COLLEGE, West Hartford, Conn.; 2 years; $9,570
ST. LOUIS UNIVERSITY, St. Louis, Mo.; 3 months; $2,705
9 months; $1,655
9 months; $2,070
1 year; $4,990
2 years; $4,005
2 years; $6,550
SAINT MARY'S COLLEGE, Winona, Minn., 1 year; $5,100
1 year; $7,870
ST. OLAF COLLEGE, Northfield, Minn.; 1 year; $9,150
SAN DIEGO STATE COLLEGE FOUNDATION, San Diego, Calif.; 1 year; $5,465
UNIVERSITY OF SAN FRANCISCO, San Francisco, Calif.; 1 year; $4,200
SAN JOSE STATE COLLEGE, San Jose, Calif.; 1 year; $10,600
UNIVERSITY OF SCRANTON, Scranton, Pa.; 3 months; $4,430
2 years; $8,460
SEATTLE UNIVERSITY, Seattle, Wash.; 1 year; $1,520
12 months; $4,890
SMITH COLLEGE, Northampton, Mass.; 1 year; $4,890
UNIVERSITY OF SOUTH CAROLINA, Columbia, S.C.; 1 year; $5,500
1 year; $6,210
2 years; $4,485
2 years; $4,830
SOUTH DAKOTA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Brookings, S. Dak.; 1 year; $3,420
2 years; $11,040
UNIVERSITY OF THE SOUTH, Sewanee, Tenn.; 1 year; $5,140
SOUTHERN ILLINOIS UNIVERSITY, Carbondale, Ill.; 1 year; $6,795
1 year; $2,590
SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.; 9 months; $4,390
SOUTHERN MISSIONARY COLLEGE, Collegedale, Tenn.; 1 year; $6,040
SOUTHERN UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; 9 months; $1,225
SOUTHWESTERN AT MEMPHIS, Memphis, Tenn.; 2 years; $5,735
STANFORD UNIVERSITY, Stanford, Calif.; 3 months; $6,255
2 years; $9,660
STEPHEN F. AUSTIN STATE COLLEGE, Nacogdoches, Tex.; 2 years; $11,105
STATE UNIVERSITY OF IOWA, Iowa City, Iowa; 3 months; $3,450
9 months; $865
1 year; $4,165
1 year; $4,315
SWARTHMORE COLLEGE, Swarthmore, Pa.; 3 months; $8,165
2 years; $10,895
3 months; $5,865
SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.; 3 months; $1,800
1 year; $11,915
TENNESSEE AGRICULTURAL AND INDUSTRIAL STATE UNIVERSITY, Nashville, Tenn.; 9 months; $900
TENNESSEE POLYTECHNIC INSTITUTE, Cookeville, Tenn.; 9 months; $4,830

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; 1 year; $4,280
9 months; $500
1 year; $2,490
TEXAS CHRISTIAN UNIVERSITY, Fort Worth, Tex.; 1 year; $4,200
TEXAS LUTHERAN COLLEGE, Seguin, Tex.; 1 year; $7,590
TEXAS WOMAN'S UNIVERSITY, Denton, Tex.; 1 year; $2,660
UNIVERSITY OF TEXAS, Austin, Tex.; 3 months; $2,025
2 years; $4,155
2 years; $8,325
UNIVERSITY OF TOLEDO, Toledo, Ohio; 9 months; $920
TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; 9 months; $7,985
UTAH STATE UNIVERSITY, Logan, Utah; 3 months; $3,915
UNIVERSITY OF UTAH, Salt Lake City, Utah; 3 months; $10,120
3 months; $10,280
1 year; $2,460
VANDERBILT UNIVERSITY, Nashville, Tenn.; 1 year; $4,300
VASSAR COLLEGE, Poughkeepsie, N.Y.; 2 years; $5,985
UNIVERSITY OF VERMONT, Burlington, Vt.; 1 year; $5,405
1 year; $3,350
VIRGINIA FISHERIES LABORATORY, Gloucester Point, Va.; 3 months; $8,055
WABASH COLLEGE, Crawfordsville, Ind.; 2 years; $11,805
WASHINGTON STATE UNIVERSITY, Pullman, Wash.; 1 year; $2,210
2 years; $4,705
UNIVERSITY OF WASHINGTON, Seattle, Wash.; 2 years; $9,390
WESLEYAN UNIVERSITY, Middletown, Conn.; 2 years; $3,395
WEST VIRGINIA UNIVERSITY, Morgantown, W. Va.; 1 year; $5,520
1 year; $7,360
WESTERN MICHIGAN UNIVERSITY, Kalamazoo, Mich.; 1 year; $6,465
WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; 1 year; $22,340
WESTERN STATE COLLEGE OF COLORADO, Gunnison, Colo.; 2 years; $11,820
WHEATON COLLEGE, Norton, Mass.; 3 months; $1,710
WHITTIER COLLEGE, Whittier, Calif.; 2 years; $4,350
UNIVERSITY OF WICHITA, Wichita, Kans.; 9 months; $345
1 year; $2,400
WILKES COLLEGE, Wilkes-Barre, Pa.; 2 years; $4,850
UNIVERSITY OF WISCONSIN, Madison, Wis.; 3 months; $875
1 year; $11,350
WORCESTER POLYTECHNIC INSTITUTE, Worcester, Mass.; 3 months; $2,185
3 months; $8,400
XAVIER UNIVERSITY, Cincinnati, Ohio; 1 year; $4,025
9 months; $460
YALE UNIVERSITY, New Haven, Conn.; 3 months; $11,270
1 year; $3,450
1 year; $5,520
1 year; $6,705
2 years; $10,935
2 years; $11,390

UNDERGRADUATE RESEARCH TRAINING PROGRAM

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station, Tex.; 3 months; $2,550
AGRICULTURAL AND TECHNICAL COLLEGE OF NORTH CAROLINA, Greensboro, N.C.; 3 months; $5,650
UNIVERSITY OF ARKANSAS, Fayetteville, Ark.; 9 months; $1,610
ARLINGTON STATE COLLEGE, Arlington, Tex.; 3 months; $1,600
9 months; $575
1 year; $3,095
BELOIT COLLEGE, Beloit, Wis.; 1 year; $5,595
BETHANY COLLEGE, Bethany, W. Va.; 1 year; $5,900
BRADFORD DURFEE COLLEGE OF TECHNOLOGY, Fall River, Mass.; 1 year; $4,805
CARROLL COLLEGE, Waukesha, Wis.; 1 year; $3,345
CENTRAL COLLEGE, Pella, Iowa; 1 year; $4,500
CHAPMAN COLLEGE, Orange, Calif.; 1 year; $3,560
COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; 2 years; $7,755
1 year; $4,220
1 year; $7,420
CORNELL UNIVERSITY, Ithaca, N.Y.; 3 months; $7,635
DARTMOUTH COLLEGE, Hanover, N.H.; 9 months; $5,750
3 months; $6,255
DEFIANCE COLLEGE, Defiance, Ohio; 1 year; $3,550
UNIVERSITY OF DENVER, Denver, Colo.; 2 years; $3,570
DREW UNIVERSITY, Madison, N.J.; 3 months; $6,255
EARLHAM COLLEGE, Richmond, Ind.; 3 months; $5,925
GENEVA COLLEGE, Beaver Falls, Pa.; 1 year; $7,900
GRINNELL COLLEGE, Grinnell, Iowa; 3 months; $6,130
HAMPDEN-SYDNEY COLLEGE, Hampden-Sydney, Va.; 2 years; $3,300
HARVEY MUDD COLLEGE, Claremont, Calif.; 1 year; $6,900
IDAHO STATE COLLEGE, Pocatello, Idaho; 9 months; $955
9 months; $1,415
IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa; 2 years; $7,750
2 years; $8,370
JUNIATA COLLEGE, Huntingdon, Pa.; 9 months; $3,195
UNIVERSITY OF KANSAS, Lawrence, Kans.; 3 months; $3,635
9 months; $3,105
KENYON COLLEGE, Gambier, Ohio; $400
KING'S COLLEGE, Wilkes-Barre, Pa.; 2 years; $8,420
LAFAYETTE COLLEGE, Easton, Pa.; 1 year; $8,655
2 years; $3,795
LA VERNE COLLEGE, La Verne, Calif.; 1 year; $3,625
LOYOLA UNIVERSITY, New Orleans, La.; 1 year; $5,430
MARIAN COLLEGE, Indianapolis, Ind.; 9 months; $2,875
MEXICO CITY COLLEGE, Carretera Mexico Toluca, Mexico; 3 months; $5,250

MILLSAPS COLLEGE, Jackson, Miss.; 2 years; $34,065
MISSISSIPPI STATE UNIVERSITY, State College, Miss.; 9 months; $2,215
3 months; $4,345
MOUNT MARY COLLEGE, Milwaukee, Wis.; 9 months; $500
NEWARK COLLEGE OF ENGINEERING, Newark, N.J.; 3 months; $2,755
3 months; $4,755
NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; 1 year; $4,455
UNIVERSITY OF NORTH DAKOTA, Grand Forks, N. Dak.; 9 months; $1,405
NOTRE DAME COLLEGE, Cleveland, Ohio; 2 years; $7,885
OCCIDENTAL COLLEGE, Los Angeles, Calif.; 2 years; $6,690
OHIO WESLEYAN UNIVERSITY, Delaware, Ohio; 1 year; $3,235
2 years; $9,670
OREGON STATE COLLEGE, Corvallis, Oreg.; 3 months; $4,250
9 months; $770
9 months; $705
9 months; $730
PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; 3 months; $805
UNIVERSITY OF PUERTO RICO, Rio Piedras, P.R.; 2 years; $7,710
REED COLLEGE, Portland, Oreg.; 1 year; $5,405
RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; 1 year; $3,855
ST. JOHN'S UNIVERSITY, Collegeville, Minn.; 1 year; $2,500
ST. JOSEPH COLLEGE, Emmitsburg, Md.; 1 year; $2,240
ST. JOSEPH'S COLLEGE FOR WOMEN, Brooklyn, N.Y.; 1 year; $3,070
ST. MARY'S COLLEGE, Notre Dame, Ind.; 2 years; $8,115
SAN DIEGO STATE COLLEGE FOUNDATION, San Diego, Calif.; 1 year; $9,920
1 year; $8,395
SKIDMORE COLLEGE, Saratoga Springs, N.Y.; 2 years; $3,000
SMITH COLLEGE, Northampton, Mass.; 2 years; $8,825
SOUTHEAST MISSOURI STATE COLLEGE, Cape Girardeau, Mo.; 1 year; $8,715
SOUTHWESTERN AT MEMPHIS, Memphis, Tenn.; 2 years; $8,295
1 year; $7,820
STETSON UNIVERSITY, De Land, Fla.; 9 months; $2,015
UNIVERSITY OF TAMPA, Tampa, Fla.; 3 months; $1,755
TEXAS WOMAN'S UNIVERSITY, Denton, Tex.; 2 years; $11,385
UNIVERSITY OF TOLEDO, Toledo, Ohio; 1 year; $14,590
VASSAR COLLEGE, Poughkeepsie, N.Y.; 1 year; $4,260
VILLANOVA UNIVERSITY, Villanova, Pa.; 1 year; $2,990
9 months; $1,300
VIRGINIA STATE COLLEGE, Petersburg, Va.; 1 year; $6,160
WASHINGTON STATE UNIVERSITY, Pullman, Wash.; 9 months; $920
WAYNE STATE UNIVERSITY, Detroit, Mich.; 3 months; $6,480
WESLEYAN UNIVERSITY, Middletown, Conn.; 3 months; $3,335
WEST VIRGINIA WESLEYAN COLLEGE, Buckhannon, W. Va.; 2 years; $5,340
WILKES COLLEGE, Wilkes-Barre, Pa.; 1 year; $3,045
UNIVERSITY OF WISCONSIN, Madison, Wis.; 1 year; $9,205
WOFFORD COLLEGE, Spartanburg, S.C.; 9 months; $560
XAVIER UNIVERSITY, Cincinnati, Ohio; 8 months; $1,840
YALE UNIVERSITY, New Haven, Conn.; 1 year; $2,880
1 year; $5,865

VISITING SCIENTIST PROGRAM

AMERICAN ANTHROPOLOGICAL ASSOCIATION, Washington, D.C.; Leslie A. White; *Program of Visiting Lecturers in Anthropology;* 1 year; $21,670
AMERICAN CHEMICAL SOCIETY, Washington, D.C.; Donald J. Cook; *Program of Visiting Scientists in Chemistry;* 1 year; $10,900
Donald J. Cook; *Visiting Scientists Program to Secondary Schools;* 1 year; $17,500
AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Washington, D.C.; Hiden T. Cox; *Program of Visiting Lecturers in Biology to High Schools;* 1 year; $7,475
Hiden T. Cox; *Program of Visiting Scientists in Biology;* June 30, 1961; $76,070
Hiden T. Cox; *Program of Visiting Lecturers in Biology to High Schools;* 1 year; $26,680
AMERICAN INSTITUTE OF PHYSICS, New York, N.Y.; Elmer Hutchisson; *Program of Visiting Scientists in Physics to High Schools;* 1 year; $29,730
AMERICAN PSYCHOLOGICAL ASSOCIATION, Washington, D.C.; John G. Darley; *Program of Visiting Lecturers in Psychology;* 1 year; $25,030
ARKANSAS ACADEMY OF SCIENCE, ARKANSAS STATE TEACHERS COLLEGE, Conway, Ark.; John W. Keesee; *Visiting Scientists Program for the High Schools in Arkansas;* 1 year; $10,730
COLORADO-WYOMING ACADEMY OF SCIENCE, UNIVERSITY OF WYOMING, Laramie, Wyoming; Richard G. Beidleman; *Colorado-Wyoming Visiting Science Lectureship Program;* 1 year; $3,480
INDIANA ACADEMY OF SCIENCE, PURDUE UNIVERSITY, Lafayette, Ind.; Howard M. Michaud; *Visiting Scientists Program for High Schools;* 1 year; $17,150
MARYLAND ACADEMY OF SCIENCES, Baltimore, Md.; Thomson King; *Visiting Scientists Program;* 1 year; $1,220
MINNESOTA ACADEMY OF SCIENCE, ST. OLAF COLLEGE, Northfield, Minn.; Harold W. Hansen; *Visiting Scientists Program and Science Teachers Institute;* 1 year; $22,700
MONTANA ACADEMY OF SCIENCES, MONTANA STATE COLLEGE, Bozeman, Mont.; E. W. Anacker; *Visiting Scientists Program for High Schools;* 1 year; $12,830
NEBRASKA ACADEMY OF SCIENCES, INC., CONCORDIA COLLEGE, Seward, Nebr.; James A. Rutledge; *Visiting Scientists Program;* 1 year; $15,550
NEW MEXICO ACADEMY OF SCIENCE, NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY, Socorro, N. Mex.; Burrell L. Wood; *Visiting Scientist Program for the High Schools in New Mexico;* 2 years; $5,110
OHIO ACADEMY OF SCIENCE, Columbus, Ohio; Kenneth B. Hobbs; *Visiting Scientists Program for the Public and Private Schools of Ohio;* 1 year; $21,970

SOCIETY OF AMERICAN FORESTERS, Washington, D.C.; Henry Clepper; *A Visiting Scientists Program;* 1 year; $15,730

SOCIETY OF WOOD SCIENCE AND TECHNOLOGY, UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Fred B. Dickinson, University of California; *Program of Visiting Scientists in Wood Science and Technology;* 3 years; $13,720

TEXAS ACADEMY OF SCIENCE, TEXAS INSTRUMENTS, INC., Dallas, Tex.; Addison E. Lee; *Texas Academy of Science Visiting Scientists Program;* 1 year; $25,300

UTAH ACADEMY OF SCIENCE, ARTS AND LETTERS, UNIVERSITY OF UTAH, Salt Lake City, Utah; Orson A. Young; *Visiting Scientist Program for the High Schools in Utah;* 1 year; $7,570

VIRGINIA ACADEMY OF SCIENCE, WASHINGTON AND LEE UNIVERSITY, Lexington, Va.; John C. Forbes; *Visiting Scientists Program;* 1 year; $4,890

WEST VIRGINIA ACADEMY OF SCIENCE, FAIRMONT STATE COLLEGE, Fairmont, W. Va.; John C. Wright, West Virginia Wesleyan College; *Visiting Scientists Program for West Virginia High Schools;* 1 year; $5,880

VISITING FOREIGN SCIENTIST PROGRAM

AMERICAN ASTRONOMICAL SOCIETY, New York, N.Y.; Joseph M. Chamberlain; 1 year; $28,875

Joseph M. Chamberlain; 2 years; $56,090

AMERICAN CHEMICAL SOCIETY, Washington, D.C.; Samuel P. Massie, 7 months; $25,000

Donald J. Cook; June 30, 1961; $35,000

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Washington, D.C.; Hiden T. Cox; 1 year; $50,300

AMERICAN INSTITUTE OF PHYSICS, New York, N.Y.; Elmer Hutchisson; 1 year; $27,270

AMERICAN MATHEMATICAL SOCIETY, Providence, R.I.; Gordon L. Walker; 1 year; $25,000

Kenneth C. Spengler; 1 year; $46,800

ENGINEERS JOINT COUNCIL, New York, N.Y.; Josef Wischeidt, Jr.; 7 months; $25,000

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL, Washington, D.C.; Robert C. Stephenson, American Geological Institute; 2 years; $57,000

COURSE CONTENT IMPROVEMENT

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Washington, D.C.; John R. Mayor; *Study of the Feasibility of a Major Effort to Improve Science Courses in Elementary and Junior High School Grades;* 1 year; $58,310

AMERICAN ASSOCIATION OF PHYSICS TEACHERS, DARTMOUTH COLLEGE, Hanover, N.H.; F. W. Sears; *Conference in Three Meetings to Develop a National Program for the Improvement of College Physics Courses;* 6 months; $69,000

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Washington, D.C.; H. Bentley Glass; *Continuation of the Secondary Program of the Biological Sciences Curriculum Study;* 1 year; $1,280,000

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, New York, N.Y.; F. J. Van Antwerpen; *Study of Curricula in Chemical Engineering;* 16 months; $23,150

AMERICAN INSTITUTE OF PHYSICS, New York, N.Y.; Elmer Hutchinsson; *Apparatus Drawings Project;* 1 year; $31,280

AMERICAN METEOROLOGICAL SOCIETY, Boston, Mass.; K. C. Spengler; *Development of Educational Motion Pictures and Lantern Slides in Meteorology;* 1 year; $89,700

Kenneth C. Spengler; *Development of a Monograph Series in Meteorology;* 1 year; $14,950

BUCKNELL UNIVERSITY, Lewisburg, Pa.; Bennett R. Willeford, Jr.; *Conference on the Undergraduate Training of Chemistry Majors;* 1 week; $14,190

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Robert Karplus, and Leo Brewer; *Continuation of a Study of Course Content Improvement in Elementary-School Science;* 1 year; $51,750

A. L. Kroeber and S. A. Barrett; *Documentary Sound Color Films and Sound Systems and for Student Training in This Specialized Work;* 1 year; $76,000

David G. Mandelbaum; *Conference on Educational Resources in Anthropology;* during the spring of 1961; $13,750

Donald M. Reynolds; *Production of Short Motion Picture Films for University Level Instruction in Microbiology;* 1 year; $38,590

Glenn T. Seaborg: *Organization of a Chemical Education Materials Study;* 7 months; $125,000

Glenn T. Seaborg; *Preliminary Conference of the Steering Committee of the Proposed Chemical Education Materials Study (CHEM);* 3 days; $9,775

Glenn T. Seaborg; *Organization of a Chem-Chemical Education Materials Study;* 1 year; $475,000

E. G. Sherburne; *Production of Eight Thirty-Minute Films on the Nature of Viruses;* 1 year; $109,980

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; James R. Hooper, Jr.; *Workshop on Materials in Electrical Engineering Education;* 5 days; $3,300

UNIVERSITY OF CONNECTICUT, Storrs, Conn.; J. T. Stock; *Development of Apparatus for Chemical Analyses and Preparations on the Micro- and Semimicro-Scale;* 5 years; $13,460

COOPER UNION FOR THE ADVANCEMENT OF SCIENCE AND ART, New York, N.Y.; F. A. Wallace; *A Study of the Scope and Content of Undergraduate Curricula in Civil Engineering;* 1 year; $43,410

DARTMOUTH COLLEGE, Hanover, N.H.; John W. Dewdney; *Development of a Basic Mass Spectrometer;* 1 year; $5,930

UNIVERSITY OF DAYTON, Dayton, Ohio; Raymond J. Stith; *Development of Inexpensive, Transparent, Flexible Models for Observation and Demonstration of Internal Deformation Patterns, for Courses in Mechanics of Materials;* 1 year, $4,170

DUKE UNIVERSITY, Durham, N.C.; F. W. Woods; *Laboratory Exercises for the Study of Stratification in Forest Microclimates;* 1 year; $5,630

EARLHAM COLLEGE, Richmond, Ind.; Laurence E. Strong; *An Introductory Chemistry Course Based on the Chemical Bond Approach;* 9 months; $443,550

EDUCATIONAL SERVICES INCORPORATED, Watertown, Mass.; Jerrold R. Zacharias; *Extension of PSSC Films to 45 Minutes for TV and Classroom Use;* 1 year; $87,500

Jerrold R. Zacharias; *The Development of a Secondary-School Physics Course by the Physical Science Study Committee;* 1 year; $350,000

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; Raymond R. Fox; *Development of a Vortex Tank-Tunnel, Visual Pipe Network, Dynamic Model and Portable Vibration Simulator as Civil Engineering Teaching Aids;* 10 months; $1,960

HARVARD UNIVERSITY, Cambridge, Mass.; J. O. Brew, Peabody Museum; *Visual Anthropology;* 3 years; $110,170

George Wald; *Introductory College Course in Biology;* 3 years; $59,100

UNIVERSITY OF HOUSTON, Houston, Tex.; T. N. Hatfield; *Development of Apparatus for Experiments on Momentum in Introductory Physics Courses;* 1 year; $6,210

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.; B. S. Swanson; *The Development of Equipment and a Manual for Laboratory Instruction in Automatic Process Control;* 1 year; $15,520

UNIVERSITY OF ILLINOIS, Urbana, Ill.; David A. Page; *Experimental Motion Pictures for Mathematics Teachers;* 1 year; $57,240

J. Myron Atkin and Stanley P. Wyatt, Jr.; *Elementary-School Science Course Content Improvement Project;* 1 year; $40,600

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Lloyd M. Bates; *Development of a Model X-ray Circuit;* 1 year; $4,660

LEHIGH UNIVERSITY, Bethlehem, Pa.; James B. Hartman; *Development of Educational Aids in Mechanical Engineering;* 2 years; $21,670

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Rolf Eliassen; *A Study Conference on Sanitary Engineers and Scientists on the Improvement of Graduate Curricula for Sanitary Engineers;* 2 days; $15,000

Kurt S. Lion; *Development Program for a Laboratory Course in Instrumentation;* 1 year; $24,500

MATHEMATICAL ASSOCIATION OF AMERICA, UNIVERSITY OF WASHINGTON, Seattle, Wash.; R. C. Buck; *Committee on the Undergraduate Program in Mathematics;* 2 years; $350,000

MICHIGAN STATE UNIVERSITY, East Lansing, Mich.; F. B. Dutton; *Development of Large-Scale Lecture-Table Thermometer and Voltmeter;* 1 year; $5,980

MINNESOTA ACADEMY OF SCIENCE, St. Paul, Minn.; Paul C. Rosenbloom; *Summer Television Program for Teachers of Mathematics;* 7 months; $105,800

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Lorenz G. Straub; *Production of Instructional Motion Pictures in Fluid Mechanics;* 1 year; $19,750

MISSOURI BOTANICAL GARDEN, St. Louis, Mo.; F. W. Went; *Design of a Simple Classroom Plant Growth Chamber;* 1 year; $8,400

MONTANA STATE COLLEGE, Bozeman, Mont.; William B. Cook; *Conference on Course Content and Philosophy of General Chemistry for Nonscience Majors;* 1 week; $11,580

NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS, Washington, D.C.; Frank B. Allen, Lyons Township High School and Junior College, La Grange, Ill.; *Regional Conferences on School Supervisors of the New Curriculum in Mathematics;* 1 year; $48,350

NEW MEXICO HIGHLANDS UNIVERSITY, Las Vegas, N. Mex.; G. W. Ewing; *Equipment Development for College and University Courses in Instrumental Methods in Chemical Analysis, Physical Chemistry and Related Fields;* 2 years; $20,320

NEW YORK UNIVERSITY, New York, N.Y.; Isidor Auerbach; *Development of a Fluorescent Lamp System for Teaching Alternating Current Circuits in High School and College Physics;* 1 year; $5,860

Louis Auerbach; *Development of New Types of Christiansen Filters and a Spectrophotometer Based Upon Them;* 1 year; $7,650

NORTH CAROLINA STATE COLLEGE, Raleigh, N.C.; John F. Lee; *Disciplinary Study and Revision of the Content of Courses in Experimental Mechanical Engineering;* 2 years; $65,200

NORTHWESTERN UNIVERSITY, Evanston, Ill.; D. D. DeFord; *Development of Multipurpose Instrument for Quantitative Analysis and Quantitative Chemical Measurements;* 3 years; $37,790

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; Robert S. Eikenberry; *The Design of an Educational Smoke Tunnel for Air-Flow Visualization;* 1 year; $4,790

V. P. Goddard; *Development of Supersonic Streamline Visualization;* 1 year; $9,410

OHIO STATE UNIVERSITY, Columbus, Ohio; Alfred Lande; *A New Approach to the Teaching of Quantum Mechanics;* 6 months; $2,000

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; Melvin S. Newman and William N. White; *Study Aimed at Improvement of Laboratory Causes in Organic Chemistry;* 1 year; $8,240

OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Stillwater, Okla.; Scott T. Poage; *Development of a Mechanical Model of the Binary Adder;* 7 months; $2,390

Scott T. Poage; *Development of a Waiting Line Simulator;* 1 year; $3,900

OREGON COLLEGE OF EDUCATION, Monmouth, Oreg.; Allen L. Fulmer; *Development of Inexpensive Digital Computers and Logical Building Blocks;* 2 years; $18,160

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; John A. Fox; *Design and Construction of a Small Laboratory and Demonstration Hypersonic Wind Tunnel;* 1 year; $12,520

POLYTECHNIC INSTITUTE OF BROOKLYN, Brooklyn, N.Y.; Paul R. DeCicco; *Design and Construction of a Portable Electronic Analog Simulator-Computer Demonstrator;* 14 months; $13,050

PRINCETON UNIVERSITY, Princeton, N.J.; Hubert N. Alyea; *Projection Techniques for Lecture Demonstrations in Science;* 18 months; $11,110

QUEENS COLLEGE, Flushing, N.Y.; Morris B. Abramson; *Development of Apparatus and an Instructional Manual for Classroom Demonstrations and Laboratory Experiments in Simple Harmonic Motion, Vibration of the Spring, Formation of Sine Waves, A.C. Voltages and Propagation of Waves;* 1 year; $7,550

REED COLLEGE, Portland, Oreg.; F. D. Tabbutt; *Development of Equipment and Experiments for Teaching Instrumental Chemical Analysis;* 1 year; $6,080

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; Walter Eppenstein; *Demonstrations for Use With the Overhead Projector in Physics Lectures;* 1 year; $5,750

Heinrich Medicus; *Workshop for Demonstration Lectures in Physics;* 6 months; $20,350

Robert Resnick; *Summer Program for the Study of Introductory Physics Courses in Colleges;* 1 year; $29,900

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; William M. Harlow; *Production of a Motion Picture on the Mechanism of Moisture Movement in Wood;* 2 years; $14,210

UNIVERSITY OF ROCHESTER, Rochester, N.Y.; Everett M. Hafner; *Development of Equipment for Lecture Demonstrations, Laboratory Instruction and Corridor Demonstrations for Undergraduate Physics Courses;* 14 months; $9,550

SACRAMENTO STATE COLLEGE FOUNDATION, Sacramento, Calif.; G. N. Beaumariage, Jr.; *Aids, Models, Overlays and Laboratory Furnaces for Demonstrating Atomic and Molecular Relationships in the Study of Phase, Crystal and Other Properties of Engineering Materials;* 1 year; $8,920

SOCIETY OF WOOD SCIENCE AND TECHNOLOGY, UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Stephen B. Preston; *Study of Education in Wood Science and Technology;* 2 years; $29,900

SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.; Frank W. Tippitt; *Design and Development of Small-Scale Demonstration Tape-Control Unit for a Machine Tool;* 1 year; $4,780

SOUTHWESTERN AT MEMPHIS, Memphis, Tenn.; Jack Conrad; *Development of a Basic Slide Collection for Anthropology Courses;* 4 months; $4,400

STATE UNIVERSITY OF IOWA, Iowa City, Iowa; T. R. Porter; *Production of Instructional Films on "Slime Molds" and "Teacher Materials on Slime Molds";* 2 years; $7,420

Hunter Rouse; *Production of Instructional Motion Pictures in Fluid Mechanics;* 1 year; $14,000

UNIVERSITY OF VIRGINIA, Charlottesville, Va.; Clifford M. Siegel; *Development of Laboratory Aids for the Teaching of Electrical Engineering;* 1 year; $6,590

WEST VIRGINIA UNIVERSITY, Morgantown, W. Va.; Charles C. Boyer and T. Walley Williams; *Development of Stereophotomicrography and Other Methods for the Study and Teaching of Submacroscopic Anatomy;* 1 year; $8,170

YALE UNIVERSITY, New Haven, Conn.; E. G. Begle; *School Mathematics Study Group;* 1 year; $1,750,000

A. D. Patterson, Jr. and David G. Anderson; *A Film Program for Courses in General Chemistry at Advanced Secondary School and College Levels;* 3 years; $150,000

YESHIVA UNIVERSITY, New York, N.Y.; Roman Vishniac, Albert Einstein College of Medicine; *Living Biology, Film Series;* 18 months; $112,840

OTHER EDUCATION IN THE SCIENCES GRANTS

ACADEMY OF SCIENCE OF ST. LOUIS, St. Louis, Mo.; Murl Deusing; *Science Careers Program;* 1 year; $17,850

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station, Tex.; E. B. Middleton; *Secondary School Science Teacher Training Program for Retired Military Personnel;* 30 months; $22,435

K. M. Rae; *Supplementary Training for Teachers;* 4 weeks; $27,185

Melvin C. Schroeder; *Four-Week College Workshop in Rocks and Minerals for Junior High School and Elementary School Teachers;* 1 year; $25,400

AGRICULTURAL RESEARCH SERVICE, U.S. DEPARTMENT OF AGRICULTURE, Washington, D.C.; H. A. Rodenhiser; *Animal Husbandry Exchange Mission to the USSR;* 6 weeks; $1,500

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Washington, D.C.; Hilary J. Deason; *Traveling High School Science Library Program;* 1 year; $248,000

Dael Wolfle; *Traveling Science Libraries;* 1 year; $248,090

William P. Viall; *Study of Qualifications and Teaching Loads of Secondary Teachers of Science and Mathematics;* 14 months; $56,000

AMERICAN CHEMICAL SOCIETY, Washington, D.C.; R. E. Henze; *Preparation, Printing and Distribution of a Career Information Booklet on Chemistry;* 1 year; $11,250

AMERICAN FOUNDATION FOR CONTINUING EDUCATION, Chicago, Ill., Jerome M. Ziegler; *Program of Citizen Education in Science;* 2 years; $96,900

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Washington, D.C.; Hiden T. Cox; *Preparation of a Biological Science Career Manuscript;* 1 year; $5,980

Harold F. Osborne, Biology News Bureau; *Conference on Science Information;* 3 days; $15,000

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, New York, N.Y.; F. J. Van Antwerpen; *One-Day Special Lecture Program in Advanced Engineering Concepts Pertaining to Process Development by Statistical Methods;* 1 day; $3,100

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, New York, N.Y.; Grant C. Riggle; *New Challenges to Electrical Engineers from Medical and Biological Problems;* 1 day; $450

AMERICAN INSTITUTE OF PHYSICS, New York, N.Y.; Sanborn C. Brown; *International Conference on Physics Education;* 1 year; $14,000

Elmer Hutchisson; *Career Information Literature in Physics;* 1 year; $9,430

Elmer Hutchisson; *Three Seminars for Science Writers;* 1 day each; $8,450

Wallace Waterfall; *Translation of Russian Physics Lecture Demonstration Manuals;* 1 year; $9,000

AMERICAN MATHEMATICAL SOCIETY, Providence, R.I.; Gordon L. Walker; *Four-Week Special Field Institute in Modern Physical Theories and Associated Mathematical Developments;* 4 weeks; $18,250

AMERICAN METEOROLOGICAL SOCIETY, Boston, Mass.; Vincent J. Schafer; *Supplementary Student Science Project;* 6 weeks; $9,280

Kenneth C. Spengler; *Career Guidance Literature in Meteorology;* 1 year; $8,740

AMERICAN PHYSIOLOGICAL SOCIETY, Washington, D.C.; Ray G. Daggs; *Two Week Workshop on the Teaching of Physiology in Undergraduate Colleges During the Month*

of August in the Summers of 1961–62–63; 3 years; $23,745

AMERICAN SOCIETY OF LIMNOLOGY AND OCEANOGRAPHY, INC., Woods Hole, Mass.; Bostwick H. Ketchum; *Education and Recruitment Committee;* 1 year; $13,000

AMERICAN SOCIETY OF ZOOLOGISTS, STATE UNIVERSITY OF IOWA, Iowa City, Iowa; S. J. Segal, The Rockefeller Institute; *Refresher Course in Metamorphosis in the Animal Kingdom;* 2 days; $4,900

AMERICAN SOCIETY OF ZOOLOGISTS, STANFORD UNIVERSITY, Stanford, Calif.; Victor C. Twitty; *Printing and Distributing a Brochure "Careers in Animal Biology";* 1 year; $2,456

ARIZONA ACADEMY OF SCIENCE, Phoenix, Ariz.; Howard K. Gloyd; *Traveling Science Institute;* 1 year; $21,110

ASIA FOUNDATION, San Francisco, Calif.; William L. Eilers; *Travel of Foreign Participants in 1960 Summer Institutes;* 3 months; $10,400

BOSTON COLLEGE, Chestnut Hill, Mass.; Stanley J. Bezuszka, S. J.; *Correspondence Course in Elementary Algebra Treated From the Standpoint of Modern Algebra;* 10 months; $10,500

BOTANICAL SOCIETY OF AMERICA, INC., New York, N.Y.; Harold C. Bold; *Career Information Booklet in the Field of Botany;* 1 year; $5,000

BRANDEIS UNIVERSITY, Waltham, Mass.; Kenneth W. Ford; *Special Field Institute in Theoretical Physics;* 6 weeks; $32,860

BUFFALO SOCIETY OF NATURAL SCIENCES, BUFFALO MUSEUM OF SCIENCE, Buffalo, N.Y.; Fred T. Hall; *Supplementary Science Program in Biology;* 1 year; $12,380

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Jerzy Neyman; *Young Scholars to Attend the Fourth Berkeley Symposium on Mathematical Statistics and Probability;* 6 weeks; $8,540

Charles T. Singleton; *Study Program in Public Education in Science and Technology;* 1 year; $29,925

Myron Tribus, Los Angeles; *Special Field Institute on Information Theory Applied to Modern Physics and Engineering;* 2 weeks; $5,820

CANISIUS COLLEGE, Buffalo, N.Y.; Herman A. Szymanski; *Institute and Symposium on Gas Chromatography;* 3 days; $3,220

CARLETON COLLEGE, Northfield, Minn.; Bruce Pollock; *Seminar on Science and the News;* 3 days; $10,150

CENTRAL STATE COLLEGE, Wilberforce, Ohio; B. H. Johnson; *Laboratory Training Program for Secondary School Teachers;* 3 months; $16,215

CENTRO BRASILEIRO DE PESQUISAS FISICAS, Rio de Janeiro, Brazil; J. Leite Lopes; *Support of U.S. Participants at the Latin American School of Physics;* 6 months; $5,500

CHICAGO ACADEMY OF SCIENCES, Chicago, Ill.; William J. Beecher; *Science Club and Workshop Project;* 1 year; $11,040

UNIVERSITY OF CHICAGO, Chicago, Ill.; Francis S. Chase; *Six Day Special Program of Participation by Selected High School Teachers of Science as a Part of the Darwin Centennial Celebration;* 6 days; $14,000

CLEVELAND MUSEUM OF NATURAL HISTORY, Cleveland, Ohio; Daniel E. Snow; *Symposium on the Educational Use of Planetariums;* 3 days; $5,575

UNIVERSITY OF COLORADO, Boulder, Colo.; Wesley E. Brittin; *Special Field Institute for Theoretical Physics;* 10 weeks; $88,720

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; Walter R. Benson; *Laboratory Training Program for Secondary School Teachers;* 3 months; $12,670

Herman M. Weisman; *Science News Writing Seminar;* 6 days; $13,660

COOPER UNION, New York, N.Y.; James N. Eastham; *The Mathematics Speakers' Bureau for Providing Speakers for High School Student Groups and Staffs;* 1 year; $4,110

CORNELL UNIVERSITY, Ithaca, N.Y.; Philip G. Johnson, New York State College of Agriculture; *Academic Year Research Participation Program;* 10 months; $14,370

COUNCIL OF CHIEF STATE SCHOOL OFFICERS, Washington, D.C.; Edgar Fuller; *Project for Production of a Supplement to the Purchase Guide to Assist in the Wise Purchase and Use of Materials and Apparatus in Science, Mathematics, and Modern Foreign Languages;* 1 year; $9,700

DAVIDSON COLLEGE, Davidson, N.C.; W. G. McGavock; *Nonresident Summer Institute in Mathematics for High School Teachers;* 6 weeks; $1,000

UNIVERSITY OF DENVER, Denver, Colo.; Byron E. Cohn; *Coordinating Program of 1960 National Science Foundation Summer Institutes Visiting Foreign Staff Projects;* 10 months; $15,550

DUKE UNIVERSITY, Durham, N.C.; J. J. Gergen; *Experimental Program in the Retraining of Armed Services Officers for Teaching Mathematics;* 1 year; $11,600

EAST TEXAS STATE COLLEGE, Commerce, Tex.; J. H. Clements; *Laboratory Training Program for Secondary School Teachers;* 3 months; $7,730

EDUCATIONAL SERVICES, INC., Watertown, Mass.; Gilbert Oakley, Jr.; *One Week Training Conference for the Instructional Staffs of Institutes Dealing With the Physics Course Prepared by the Physical Science Study Committee;* 1 week; $25,225

Jerrold R. Zacharias; *Activities of the Physical Science Study Committee Relating to the Use or Adaptation of PSSC Materials by Foreign Governments or Foreign Educational Institutions;* 1 year; $24,800

EMORY UNIVERSITY, Atlanta, Ga.; Charles T. Lester; *Program Involving a Television Course on Science for Elementary School Teachers;* 1 year; $60,320

ENGINEERS JOINT COUNCIL, New York, N.Y.; H. K. Justice; University of Cincinnati; *U.S. Mission to the Upadi Pan American Congress on Engineering Education;* 1 year; $11,350

Robert M. Mahoney; *U.S. Exchange Mission to Study the Utilization of Engineers and Engineering Technicians and Their Interrelationship in the Industrial Composite of the USSR;* 6 months; $26,500

William H. Miernyk, Northeastern University; *Analysis of 1960 Salary and Other Professional Earnings of Engineering Faculty Members;* 9 months; $7,460

UNIVERSITY OF FLORIDA, Gainesville, Fla.; Per-Olov Lowdin; *Special Field Winter Institute in Quantum Chemistry and Solid-State Physics;* 5 weeks; $65,500

Rae O. Weiner; *Southern Regional Science Seminar;* 3 days; $19,175

GEORGE PEABODY COLLEGE FOR TEACHERS, Nashville, Tenn.; Bennie Carmichael; *Cooperative College School Program;* 6 weeks; $53,090

HAWAIIAN ACADEMY OF SCIENCES, Honolulu, Hawaii; Donald C. McGuire, University of Hawaii; *Hawaiian Science Clubs Service;* 1 year; $19,650

James Moomaw; *Teachers' Science Seminar Series;* 1 year; $1,370

IDAHO ACADEMY OF SCIENCE, UNIVERSITY OF IDAHO, Moscow, Idaho; Elmer K. Raunio; *Program To Encourage Science Education in Idaho High Schools;* 1 year; $15,650

ILLINOIS STATE ACADEMY OF SCIENCE, Jacksonville, Ill.; Robert C. Wallace, MacMurray College; *Illinois Junior Academy of Science Program;* 1 year; $15,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.; Samuel Schrage; *Chemistry High School-College Teachers Conference;* 1 day; $300

INDIANA ACADEMY OF SCIENCES, INDIANA UNIVERSITY, Bloomington, Ind.; J. Crawford Polley; *Program of the Indiana School and College Committee on Mathematics;* 1 year; $13,710

IOWA ACADEMY OF SCIENCE, GRINNEL COLLEGE, Grinnel, Iowa; T. R. Porter, University High School, State University of Iowa; *Visiting Scientist Program and Publication of Selected Scientific Papers;* 1 year; $25,690

JUNIOR ENGINEERING TECHNICAL SOCIETY, East Lansing, Mich.; J. D. Ryder, Michigan State University; *Preparation and Distribution of Sixteen Academic Units Pertaining to Vocational Guidance Toward Engineering and Technology;* 1 year; $17,590

KANSAS ACADEMY OF SCIENCE, KANSAS STATE COLLEGE OF PITTSBURG, Pittsburg, Kans.; J. M. Jewett, State Geological Survey, University of Kansas; *Science Teaching Improvement Program;* 1 year; $31,350

KANSAS STATE UNIVERSITY, Manhattan, Kans.; Ralph R. Lashbrook; *Public Understanding of Science;* 5 days; $9,960

KANSAS STATE TEACHERS COLLEGE, Emporia, Kans.; Otto Smith; *Conference of Principals, Supervisors and School Board Members of the Science and Mathematics Teachers Enrolled in the 1960 Summer Institute;* 1 day; $1,200

UNIVERSITY OF KANSAS, Lawrence, Kans.; George R. Waggoner; *Conference on Special Programs in Science for the Gifted Undergraduate Student in Large Public Universities;* 2 days; $11,040

KENTUCKY RESEARCH FOUNDATION, Lexington, Ky.; Douglas W. Schwartz, Museum of Anthropology; *Institute in Kentucky Archaeology;* 2 Saturdays; $650

LOUISIANA ACADEMY OF SCIENCE, LOUISIANA STATE UNIVERSITY, Baton Rouge, La.; Harry J. Bennett; *Expansion and Implementation of Junior Academies of Science;* 1 year; $27,750

UNIVERSITY OF LOUISVILLE, Louisville, Ky.; William J. McGlothlin; *Science Reporting Workshop;* 2 days; $4,500

MARYLAND ACADEMY OF SCIENCES, Baltimore, Md.; Thomson King; *Course in Astronautics for Teachers of Science in High Schools of Maryland;* 1 year; $3,160

Thomson King; *The Creation and Circulation of Mobile Science Exhibits Among the Schools of Maryland;* 1 year; $15,900

UNIVERSITY OF MARYLAND, College Park, Md.; Joshua R. C. Brown; *Visiting Foreign Staff Project for 1960 Summer Institutes in Biological Sciences;* 2 months; $30,000

MATHEMATICAL ASSOCIATION OF AMERICA, UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Edward A. Cameron, University of North Carolina; *Conference for Summer Institute Teachers of Mathematics;* 3 days; $49,000

MATHEMATICAL ASSOCIATION OF AMERICA, TEACHERS COLLEGE, Columbia University, New York, N.Y.; Howard F. Fehr; *Survey of European Mathematical Education—Part II;* 1 year; $9,200

MATHEMATICAL ASSOCIATION OF AMERICA, UNIVERSITY OF BUFFALO, Buffalo, N.Y.; John R. Mayor, American Association for the Advancement of Science; *Program of Visiting Lecturers to Secondary Schools in Mathematics;* 2 years; $100,000

METALLURGICAL SOCIETY OF AIME, New York, N.Y.; John Chipman; *Careers in Metallurgy;* 1 year; $7,500

MICHIGAN ACADEMY OF SCIENCE, ARTS, AND LETTERS, MUSEUM OF PALEONTOLOGY, UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Wayne Taylor; *Project To Improve the Status of Science and Mathematics Education in the State of Michigan;* 1 year; $20,990

MICHIGAN COLLEGE OF MINING AND TECHNOLOGY, Houghton, Mich.; M. E. Volin; *Laboratory Training Program for Secondary School Teachers;* 3 months; $2,720

MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing, Mich.; F. B. Dutton; *Traveling Science Demonstration Lecture Program;* 1 year; $225,655

E. D. Devereux; *Workshop in Microbiology for Secondary School Teachers;* 2 weeks; $8,300

MISSISSIPPI ACADEMY OF SCIENCES, INC., DELTA STATE COLLEGE, Cleveland, Miss.; Clyde Q. Sheely; *Program To Encourage and Improve Science Education in the High Schools;* 1 year; $34,730

UNIVERSITY OF MISSOURI, Columbia, Mo.; R. E. Peck; *Conference on College Science Teachers;* 1 day, $1,600

MUSEUM OF ART, SCIENCE AND INDUSTRY, Bridgeport, Conn.; Earle W. Newton; *Mobile Exhibit Trailer Project;* 1 year; $8,000

MUSEUM OF NEW MEXICO, Santa Fe, N. Mex.; Fred Wendorf; *Special Field Institute in Archaeology;* 8 weeks; $7,840

NASSON COLLEGE, Springvale, Maine; Roger C. Gay; *Supplementary Student Science Projects Program;* 6 weeks; $18,000

NATIONAL ACADEMY OF SCIENCE–NATIONAL RESEARCH COUNCIL, Washington, D.C.; S. S. Wilks; *Printing and Distributing 500,000 Copies of a Pamphlet Entitled "Careers in Mathematics";* 30 months; $21,000

NATIONAL MERIT SCHOLARSHIP, Evanston, Ill.; John M. Stalnaker; *Study of Institutional Characteristics Related to College Productivity;* 2 years; $50,000

NATIONAL OPINION RESEARCH CENTER, Chicago, Ill.; Peter H. Rossi; *Planning Statement on Post Enumeration Studies of the 1960 Census of Population;* 3 months; $2,500

NEW HAMPSHIRE ACADEMY OF SCIENCE, DARTMOUTH COLLEGE, Hanover, N.H.; Allen L. King; *Program To Assist Science Teachers and Students in the Secondary*

Schools in New Hampshire; 1 year; $6,040
UNIVERSITY OF NEW HAMPSHIRE, Durham, N.H.; M. Evans Munroe; *Special Field Institutes;* 1 month; $3,500
NEW YORK STATE SOCIETY FOR MEDICAL RESEARCH, INC., New York, N.Y.; Brian F. Hoffman; *Summer Workshop on Laboratory Experiments in Physiology;* 6 weeks; $13,150
NEW YORK UNIVERSITY, New York, N.Y.; Hillier Krieghbaum; *Science Writers Seminar;* 2 weeks; $13,400

Hillier Krieghbaum; *Seminary for Science Writers;* 2 weeks; $16,600
NORTH CAROLINA ACADEMY OF SCIENCE, Raleigh, N.C.; Herbert E. Speece; *Short-Term Science Institutes for High School Teachers in North Carolina;* 1 year; $19,390
NORTH CAROLINA STATE COLLEGE, Raleigh, N.C.; T. E. Maki; *Special Field Institute in Forest Biology;* 4 weeks; $27,500
UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; Norval Neil Luxon; *Science Writers Institute;* 8 days; $25,000

Robert G. Carson, Jr.; *North Carolina State College—Other College Cooperative Association for Science Teachers;* 1 year; $24,770
NORTH TEXAS STATE COLLEGE, Denton, Tex.; L. F. Connell, Jr.; *Radiological Science Conference for Summer Institute Instructors;* 6 months; $9,400
OAK RIDGE INSTITUTE OF NUCLEAR STUDIES, INC., Oak Ridge, Tenn.; W. W. Grigorieff; *Traveling Science Demonstration Lecture Program;* 1 year; $296,300
OBERLIN COLLEGE, Oberlin, Ohio; Wade Ellis; *Visiting Foreign Staff Project for 1960 Summer Institutes in Mathematics;* 10 months; $29,750
OHIO ACADEMY OF SCIENCE, Columbus, Ohio; Gerald Acker, Bowling Green State University; *The Development and Operation of Science Days in the State of Ohio;* 1 year; $6,800
OKLAHOMA ACADEMY OF SCIENCE, UNIVERSITY OF OKLAHOMA, Norman, Okla.; Robert C. Fite; *Oklahoma Junior Academy of Science Program;* 1 year; $2,320

J. Teague Self; *Consultation Service for Community Sponsored Improvement Programs in Science Education;* 1 year; $30,010
OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Stillwater, Okla., Robert C. Fite; *Traveling Science Demonstration Lecture Program;* 1 year; $250,890
OREGON MUSEUM OF SCIENCE AND INDUSTRY, Portland, Oreg.; Raymond E. Barrett; *Field Research Program for Teachers;* 1 year; $6,180
OREGON STATE COLLEGE, Corvallis, Oreg.; Vernon H. Cheldelin; *Biology Colloquium;* 1½ days; $6,000
UNIVERSITY OF OREGON, Eugene, Oreg.; E. G. Ebbighausen; *Traveling Science Demonstration Lecture Program;* 1 year; $221,750

John L. Hulteng; *Conference on Interpreting Modern Science to the Public;* 3 days; $8,500
ORGANIZATION OF AMERICAN STATES, Washington, D.C.; Jesse D. Perkinson; *Cooperative Program for an Inter-American Exchange of Scientists;* 2 years; $65,000

Jesse D. Perkinson; *Travel of Foreign Participants in 1960 Summer Institutes;* 2 months; $700
ORGANIZATION FOR EUROPEAN ECONOMIC COOPERATION, Paris, France; L. Vincent, *Travel of Foreign Participants in 1960 Summer Institutes;* 2 months; $6,500
PACIFIC SOUTHWEST ASSOCIATION OF CHEMISTRY TEACHERS, San Mateo, Calif.; James A. Ice; *Conference on Recent Advances in Chemistry;* 6 days; $10,825
PEMBROKE STATE COLLEGE, Pembroke, N.C.; Henry Tamar, *Laboratory Training Program for Secondary School Teachers;* 3 months; $11,695
PENNSYLVANIA ACADEMY OF SCIENCE, Pittsburgh, Pa.; Charles L. Bikle; *Program of the Junior Academy of Science in Pennsylvania;* 1 year; $5,910
UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Hsuan Yeh; *Six-Day Special Field Institute on Fluid Mechanics in Engineering;* 6 days; $9,000
PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; William H. Powers; *Three-Day Conference of Teachers in 1960 Summer Institutes Devoted to the Earth and Space Sciences;* 3 days; $3,000
POLYTECHNIC INSTITUTE OF BROOKLYN, Brooklyn, N.Y.; John J. Dropkin; *Extension of a Project for the Preparation of Foreign-Trained Engineers to Teach Engineering Mathematics, Physics and Chemistry;* 6 months; $5,750
UNIVERSITY OF PUERTO RICO, Rio Piedra, P.R.; Herminio Lugo Lugo; *Traveling Lecture Program;* 1 year; $10,700
PURDUE UNIVERSITY, Lafayette, Ind.; George A. Hawkins; *Symposium on Engineering Applications of Probability;* 2 days; $6,000

H. A. Smith; *Program To Prepare Retired Armed Service Personnel To Teach Basic Collegiate Mathematics;* 14 months; $10,680
UNIVERSITY OF RHODE ISLAND, Kingston, R.I.; James E. Casey; *Program of Saturday Seminars for Selected High School Students;* 6 months; $6,325
UNIVERSITY OF ROCHESTER, Rochester, N.Y.; Norma D. Miller; *Conference on Graduate Training for Research in the Processes of Vision;* 7 days; $22,510
ST. LAWRENCE UNIVERSITY, Canton, N.Y.; Donald C. Peckham; *Conference for College Teachers of Physics To Stimulate Research in the Physics of Elastic Constants;* 5 days; $6,350
ST. MARY'S COLLEGE, Winona, Minn.; Brother Charles, F.S.C.; *Laboratory Training Program for Secondary School Teachers;* 3 months; $15,700

Brother Charles, F.S.C.; *Summer Field Course in Biology;* 2 weeks; $11,800
SCANDINAVIAN COUNCIL OF APPLIED RESEARCH, Blindern, Norway; Elin Tornudd; *United States Participation in the Second Year of the Growing Points Program in the Scandinavian Countries;* 1 year; $15,125
SCIENCE SERVICE, Washington, D.C.; Watson Davis; *National Science Youth Program;* 1 year; $25,000
SOCIETY OF AMERICAN BACTERIOLOGISTS, UNIVERSITY OF WISCONSIN, Madison, Wis.; L. S. McClung; *Career Information Literature in Bacteriology;* 1 year; $9,690
SOUTH DAKOTA ACADEMY OF SCIENCE, AUGUSTANA COLLEGE, Sioux Falls, S. Dak.; F. E. Kelsey; *State Academy of Science Project;* 1 year; $15,770
STANFORD UNIVERSITY, Stanford, Calif.; Lawrence R. Blinks, Hopkins Marine Station, Pacific Grove; *Summer Field Institute for Marine Biology;* 10 weeks; $20,050

Motion Picture Depicting the Nature and Importance of Basic Research; 1 year; $40,000

SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.; W. R. Le Page; *Conference on Electrical Engineering Education;* 2 days; $4,880

SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Collendale Campus, Syracuse, N.Y.; Alfred T. Collett; *Visiting Foreign Staff Project for Academic Year Institutes During 1960–61;* 1 year; $51,500

TEMPLE UNIVERSITY, Philadelphia, Pa.; Elmer L. Offenbacher; *Visiting Foreign Staff Project for 1960 Summer Institutes in Physical Sciences;* 10 months; $34,950

TENNESSEE ACADEMY OF SCIENCE, VANDERBILT UNIVERSITY, Nashville, Tenn.; Myron S. McCay; *Expansion and Implementation of the Program of Science;* 1 year; $10,000

Arlo I. Smith; *Short Term Science Institutes for High School Teachers;* 1 year; $16,870

TEXAS ACADEMY OF SCIENCE, UNIVERSITY OF TEXAS, Austin, Tex.; Charles La Motte, A & M College of Texas; *Research Conference for Promising Science Students in the Junior and Small Senior College of Texas;* 1 year; $10,750

UNIVERSITY OF TEXAS, Austin, Tex.; Howard T. Odum, Institute of Marine Science; *Special Field Institute;* 2 months; $4,000

UNIVERSITY OF UPPSALA, Uppsala, Sweden; Per-Olov Lowdin; *1960 International Summer Institute in Quantum Chemistry;* 6 months; $9,000

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, Washington, D.C.; Lawrence S. Derthick; *1960 Students Enrolled for Advanced Degrees;* 1 year; $18,000

UNIVERSITY OF VERMONT, Burlington, Vt.; Howard M. Smith, Jr.; *Symposium on Educational Frontiers in Biomedical Engineering;* 2 days; $7,000

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Joseph L. McCarthy; *Program for College-University Association in the Teaching of Science;* 1 year; $50,360

WESTERN KENTUCKY STATE COLLEGE, Bowling Green, Ky.; Kelly Thompson; *Conference on Teacher Participation in Science;* 2 days; $3,750

WHEELING COLLEGE, Wheeling, W. Va.; Joseph A. Duke; *Monthly One-Day Workshop in Chemistry for Science Teachers;* 7 months; $2,875

UNIVERSITY OF WISCONSIN, Madison, Wis.; Donald M. Bucklin; *Two-Day Special Meeting of 1959–60 High School Teacher Research Participants;* $450

R. D. Wagner; *In-Service Program of Studies of Basic Concepts of Mathematics by Directed Group and Individual Study Using Correspondence Study Materials;* 1 year; $40,700

WOODS HOLE OCEANOGRAPH INSTITUTION, Woods Hole, Mass.; W. V. R. Malkus; *Three Month Summer Program of Theoretical Studies in Geophysical Fluid Dynamics;* 3 months; $13,450

WASHINGTON ACADEMY OF SCIENCES, Washington, D.C.; John K. Taylor; *Science Education Program;* 1 year; $34,990

WASHINGTON STATE UNIVERSITY, Pullman, Wash.; William W. Elmendorf; *Field School in Ethnography;* 8 weeks; $5,665

POLICY STUDIES

COMMISSION OF LABOR STATISTICS, Washington, D.C.; Ewan Clague; *Cost Index Applicable to Research and Development Budgets;* 7 to 8 months; $18,000

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL, Washington, D.C.; S. D. Cornell; *Activities of the Committee on Atmospheric Sciences;* 1 year; $36,800

U.S. BUREAU OF THE CENSUS, DEPARTMENT OF COMMERCE, Washington, D.C.; Robert W. Burgess; *Study of 250 Industrial Firms Reporting More Than $50,000 in Basic Research During 1957 to Determine Extent of Publications of Research;* 1 year; $4,900

Robert W. Burgess; *Survey of Research and Development Costs of Industry—Oriented Organizations—During 1958;* 1 year; $11,000

Max R. Conklin; *Survey of Research and Development Costs of Industry-Oriented Organizations;* 1 year; $75,000

SCIENTIFIC MANPOWER

ENGINEERS JOINT COUNCIL, New York, N.Y.; William H. Miernyk; *Analysis of 1960 Salary and Other Professional Earnings of Engineering Faculty Members;* 9 months; $7,460

LIBRARY OF CONGRESS, Washington, D.C.; Leo Orleans; *Study of Communist China's Scientific Technical Manpower;* fiscal year 1960–61; $500

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL, Washington, D.C.; M. H. Trytten; *Continuation of Revision of Study on Soviet Professional Manpower;* 6 months; $12,125

NATIONAL SCIENCE TEACHERS ASSOCIATION, Washington, D.C.; Robert H. Carleton; *Registry of High School Science and Mathematics Teachers;* 6 months; $21,500

Robert H. Carleton; *1960–61 Registry of High School Science and Mathematics Teachers;* 1 year; $31,000

U.S. BUREAU OF LABOR STATISTICS, DEPARTMENT OF LABOR, Washington, D.C.; Ewan Clague; *1960 Survey of Industrial Employment of Scientific and Technical Personnel;* 1 year; $85,000

U.S. OFFICE OF EDUCATION, DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, Washington, D.C.; Clayton D. Hutchins; *Federal Funds for Science Education;* $38,000

U.S. WEATHER BUREAU, Washington, D.C.; Roy L. Fox, National Weather Records Center, Asheville, N.C.; *Computing Program for the 1956–59 National Register of Scientific and Technical Personnel Data;* 1 year; $9,000

FOREIGN SCIENCE EVALUATION SURVEYS

CARL O. SAUER, Berkeley, Calif.; *Survey of Geography in Western Germany, Switzerland and Austria;* 3 months; $3,500

UNIVERSITY OF TEXAS, Austin, Tex.; Jackson W. Foster; *Review of Microbiology in Japan;* 4 months; $5,358

A. D. WALLACE, TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; *Preparation of a Report on Mathematical Activity in Poland;* 3 months; $100

CONFERENCES IN SUPPORT OF SCIENCE

AMERICAN INSTITUTE OF NUTRITION, Washington, D.C.; Milton O. Lee; *Fifth International Congress on Nutrition;* 6 days; $20,000

AMERICAN MATHEMATICAL SOCIETY, Providence, R.I.; Gordon L. Walker; *Conference on Differential Geometry;* 2 days; $6,500

Gordon L. Walker; *Directors of University Computing Laboratories;* June 1960; $18,100

AMERICAN PHYSICAL SOCIETY, Princeton, N.J.; Shirley L. Quimby; *Conference on Plasma Physics;* 3 days; $600

AMERICAN SOCIETY OF ZOOLOGISTS, STATE UNIVERSITY OF IOWA, Iowa City, Iowa; Emil Witschi; *Regional Developmental Biology Conferences;* 1 year; $4,000

UNIVERSITY OF ARIZONA, Tucson, Ariz.; A. R. Kassander; *Conference on the Surface Chemistry of Ice Nucleation;* 18 months; $12,500

BERNICE P. BISHOP MUSEUM, Honolulu, Hawaii; Alexander Spoehr; *Tenth Pacific Science Congress;* 2 years; $53,300

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Kenneth L. Downes, Jr.; *Second International Symposium on Rarefied Gas Dynamics;* 4 days; $6,500

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; J. J. Nassau; *Conference on Astronomical Observations From Above the Earth's Atmosphere;* 1 day; $1,400

UNIVERSITY OF CHICAGO, Chicago, Ill.; T. R. Hogness; *Symposium on Optical Spectrometric Measurements of High Temperatures;* 1 year; $7,500

N. Rashevsky; *International Symposium Mathematical Theories of Biological Phenomena;* 1 year; $5,500

Eric R. Wolf; *Conference on Archaeological Research in the Valley of Mexico;* 4 months; $2,000

UNIVERSITY OF COLORADO, Boulder, Colo.; Frank Kreith; *Heat Transfer Conference at the Annual ASME Meeting (1960);* 1 year; $4,600

COLUMBIA UNIVERSITY, New York, N.Y.; George K. Smelser; *The Structure of the Eye;* 1 week; $9,900

GEOCHEMICAL SOCIETY, GEOPHYSICAL LABORATORY, Washington, D.C.; Robert M. Garrels, Massachusetts Institute of Technology; *Conference on Geochemistry of Carbonate Minerals and Rocks;* 5 days; $4,980

GORDON RESEARCH CONFERENCES, UNIVERSITY OF RHODE ISLAND, Kingston, R.I.; W. George Parks; *Gordon Conference on Photonuclear Reactions;* 5 days; $6,000

HARVARD UNIVERSITY, Cambridge, Mass.; L. L. Engel and C. A. Villee, Massachusetts General Hospital, Boston; *Conference on Mechanisms of Action of Steroid Hormones;* 3 days; $6,800

Wassily W. Leontief; *International Conference on Input-Output Analysis;* 7 days; $20,400

HIGH ALTITUDE OBSERVATORY OF THE UNIVERSITY OF COLORADO, Boulder, Colo.; Walter Orr Roberts; *International Cross-Field Seminar on Solar-Weather Relationships;* 8 days; $13,000

HISTOCHEMICAL SOCIETY, WASHINGTON UNIVERSITY, St. Louis, Mo.; Oliver H. Lowry; *Symposium on the Histochemistry of the Nervous System;* 1 year; $800

HISTORY OF SCIENCE SOCIETY, Ithaca, N.Y.; Henry Guerlac; *10th International Congress of the History of Science;* Summer, 1960; $40,000

HISTORY OF SCIENCE SOCIETY, CORNELL UNIVERSITY, Ithaca, N.Y.; Nathan Reingold; *Conference on Science Manuscripts;* 2 days; $5,000

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; William D. McElroy, Merganthaler Laboratory for Biology; *Symposium on Light and Life;* 4 days; $7,000

LONG ISLAND BIOLOGICAL ASSOCIATION, Cold Spring Harbor, N.Y.; Arthur Chovnick; *Symposium on Biological Clocks and Animal Navigation;* 10 days; $7,635

LOWELL OBSERVATORY, Flagstaff, Ariz.; J. S. Hall; *Conference on Polarization of Starlight;* 1 day; $2,400

MANHATTAN COLLEGE, New York, N.Y.; W. Wesley Eckenfelder, Jr.; *Third Biological Waste Treatment Conference;* 3 days; $5,200

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Walter A. Rosenblith; *The Role of Computer Techniques in Research on Brain Functions and Behavior;* 2 days; $10,000

METALLURGICAL SOCIETY OF AIME, New York, N.Y.; John Chipman; *Conference on Response of Materials to High Velocity Deformation;* 1 year; $3,500

Kempton H. Roll; *First International Powder Metallurgy Conference;* 1 year; $3,000

MIDWEST RESEARCH INSTITUTE, Kansas City, Mo.; Bruce Daniel; *1960 International Conference on the Nature of Solid Friction;* September 1960; $5,300

MISSOURI BOTANICAL GARDEN, Saint Louis, Mo.; Robert L. Dressler; *A Conference on Systematics at the Missouri Botanical Garden;* 1 year; $1,800

UNIVERSITY OF MISSOURI, Columbia, Mo.; G. B. Clark; *Sixth Annual Symposium on Mining Research;* 1 week; $7,000

NATIONAL ACADEMY OF SCIENCES–NATIONAL RESEARCH COUNCIL, Washington, D.C.; Frank L. Campbell; *Symposia (1) On Mutations (Fall 1960) and (2) On Statistics (Spring 1961) In Genetics;* $15,000

Frank L. Campbell; *Symposium on Comparative Studies of Ionizing, Ultraviolet, and Visible Radiation;* 4 days; $15,500

Frank L. Campbell; *Tropical Botanical Problems of Concern to the United States;* 3 days; $9,100

John S. Coleman; *Committee on Symbols, Units and Nomenclature (Sun);* 2 years; $5,000

John S. Coleman; *Conference on Atomic Masses;* $3,000

John S. Coleman; *Survey of the Transportation Problem, Woods Hole, Massachusetts;* 1 year; $35,000

John S. Coleman; *Symposium on Magneto-Fluid Dynamics;* 7 days; $10,000

John S. Coleman; *U.S. Committee of the International Union of Pure and Applied Physics;* 2 years; $5,000

John S. Coleman; *Third Astrometric Conference; Argentina;* 1 week; $7,000

G. D. Meid; *Support of COSPAR;* 1 year; $5,000

Richard C. Vetter; *Support to the Special Committee on Oceanic Research of the International Council of Scientific Unions;* 1 year; $47,400

UNIVERSITY OF NEW MEXICO, Albuquerque, N. Mex.; Guido H. Daub; *Organic Scintillation Detectors;* 3 days; $4,400

NEW YORK STATE VETERINARY COLLEGE, CORNELL UNIVERSITY, Ithaca, N.Y.; Morley

R. Kare; *Physiological and Behavioral Aspects of Taste;* 1 year; $1,000

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; N. E. Wagman; *Symposium on Subdwarf Stars;* 1 day; $2,680

PROVISIONAL INTERNATIONAL COMPUTATION CENTRE, Roma-Zona dell'E.U.R., Italy; *Symposium—Numerical Treatment of Ordinary Differential, Integral and Integro-Differential Equations;* 5 days; $7,000

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Solomon Gartenhaus; *Midwest Conference on Theoretical Physics;* 2 days; $2,000

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Michael Heidelberger and Otto J. Plescia; *Immuno-Chemical Approaches to Problems in Microbiology;* 3 days; $12,250

Leslie A. Stauber; *Conference on the Physiology of Parasitism;* 2 days; $1,600

SOCIAL SCIENCE RESEARCH COUNCIL, New York, N.Y.; Joseph H. Greenberg; *Conference on Language Universals;* 1 year; $10,900

SOCIETY FOR THE STUDY OF DEVELOPMENT AND GROWTH, BRANDEIS UNIVERSITY, Waltham, Mass.; Edgar Zwilling; *Nineteenth Growth Symposium;* 3 days; $5,000

SOILS SCIENCE SOCIETY OF AMERICA, Madison, Wis.; Emil Truog; *General Support of the VII International Soil Science Congress;* 6 months; $10,000

STANFORD RESEARCH INSTITUTE, Menlo Park, Calif.; Nevin K. Hiester; *International Symposium on High Temperature Technology;* 3 days; $8,500

UNIVERSITY OF TEXAS, Austin, Tex.; T. C. Hsu, M. D. Anderson Hospital and Tumor Institute; *Support of a Symposium on the Cell Physiology or Neoplasia;* 3 days; $6,700

WASHINGTON UNIVERSITY, St. Louis, Mo.; Herman N. Eisen; *Continuing Workshop on Antibody Synthesis;* 1 year; $8,400

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Ernst Florey; *International Symposium on Nervous Inhibition;* 7 days; $18,000

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; Arthur G. Steinberg; *A Symposium on Genetics;* 1 month; $20,900

WORCESTER POLYTECHNIC INSTITUTE, Worcester, Mass.; Arthur B. Bronwell; *Conference on Research Goals; 2 days;* $8,600

ATTENDANCE AT INTERNATIONAL MEETINGS

Advanced Study Institute Sponsored by the North Atlantic Treaty Organization, Corfu, Greece:
- Jules de Launay, Naval Research Laboratory, Washington, D.C.
- J. Robert Schrieffer, Universitetets Institut for Teoretisk Fysk, Copenhagen, Denmark

All-Union Conference on Organic Catalysis, Moscow, Russia:
- Robert L. Burwell, Jr.; Northwestern University, Evanston, Ill.

Carbon-14 Conference, Groningen, Netherlands:
- Meyer Rubin, Geochemistry and Petrology Branch, United States Geological Survey, Washington, D.C.

Colloquium of the Research Film Section of the International Scientific Film Association, Roscoff, France:
- Leslie P. Greenhill, Pennsylvania State University, University Park, Pa.

Colloquium on Thin Shell Structures, Delft, Holland:
- Nicholas John Hoff, Stanford University, Stanford, Calif.

Committee on International Pharmaceutical Documentation, Zurich, Switzerland:
- Winifred Sewell, Librarian, Squibb Institute for Medical Research, New Brunswick, N.J.

Conducting Lectures at the Universities of Hamburg and Erlandeen, Hamburg and Erlandeen, West Germany:
- Otton M. Nikodym, Kenyon College, Gambier, Ohio

Conference on Computing Methods and the Phase Problem in X-ray Crystal Analysis, Glasgow, Scotland:
- William N. Lipscomb, Harvard University, Cambridge, Mass.
- Yoshiharu Okaya, Pennsylvania State University, University Park, Pa.
- Raymond Pepinsky, Pennsylvania State University, University Park, Pa.
- Vladimir Vand, Pennsylvania State University, University Park, Pa.

Conference on Functional Analysis, Warsaw, Poland:
- Richard F. Arens, University of California, Los Angeles, Calif.
- Edwin Hewitt, University of Washington, Seattle, Wash.
- Robert C. James, Harvey Mudd College, Claremont, Calif.
- Ernest A. Michael, University of Washington, Seattle, Wash.
- B. J. Pettis, University of North Carolina, Chapel Hill, N.C.
- Elias M. Stein, University of Chicago, Chicago, Ill.
- Marshall H. Stone, University of Chicago, Chicago, Ill.

Conference on Magnetism of the British Institute of Physics, Scheffield, England:
- Richard M. Bozorth, Bell Telephone Laboratories, Murray Hill, N.J.

Conference on Metabolism and Synthesis of DNA, Liege, Belgium:
- Frederick H. Kasten, Texas Agricultural and Mechanical College, College Station, Tex.

Conference on Sensory Anomalies in Strabismus, Berne, Switzerland:
- Hermann N. Burian, State University of Iowa, Iowa City, Iowa

Conference of the Society on Biological Rhythms, Siena, Italy:
- Franz Halberg, University of Minnesota Medical School, Minneapolis, Minn.
- Colin S. Pittendrigh, Princeton, N.J.

Course on Mathematics, Programing and Technical Aspects of Electronic Computing Installations, Technical University, Darmstadt, Germany:
- Ross H. Flenner, Digital Computer Laboratory, University of Illinois, Urbana, Ill.
- Donald A. Ludwig, New York University, New York, N.Y.

Course for Physics Teachers in Secondary Schools, Vienna and Salzburg, Austria:
- William S. Burton, George School, Bucks County, Pa.
- Robert Lagemann, Munchen, Germany
- Uri Haber-Schaim, Education Services, Inc., Cambridge, Mass.

Delivering a Series of Lectures in Polish Universities:
Mark Kac, Cornell University, Ithaca, N.Y.

Dynamic Systems and Ergodic Theories, Varenna, Italy:
Paul R. Halmos, The University of Chicago, Chicago, Ill.

Ecological Symposium on Productivity of Plant Communities, Stuttgart-Hohenheim, Germany:
Lawrence C. Bliss, University of Illinois, Urbana, Ill.

Eighteenth General Assembly, International Pharmaceutical Federation, Copenhagen, Denmark:
Anne McCann, Squibb Institute for Medical Research, New Brunswick, N.J.

Eighth Congress of the International Society of Hematology, Tokyo, Japan:
International Society of Hematology, Brookline, Mass.

Eighth International Grassland Congress, Reading, England:
Arthur L. Brundage, Alaska Agricultural Experiment Station, Palmer, Alaska
Marvin P. Bryant, Agricultural Research Center, Beltsville, Md.
Douglas S. Chamblee, North Carolina State College, Raleigh, N.C.
Lorin E. Harris, Utah State University, Logan, Utah
Wilton W. Heinemann, Washington State University, Prosser, Wash.
Donald F. Hervey, Colorado State University, Fort Collins, Colo.
Carl Soren Hoveland, Auburn University, Auburn, Ala.
Horton M. Laude, University of California, Davis, Calif.
Henry L. Lucas, Jr., North Carolina State College, Raleigh, N.C.
Marshall E. McCullough, Georgia Experiment Station, Experiment, Ga.
Gerald O. Mott, Purdue University, Lafayette, Ind.
Charles E. Olmsted, University of Chicago, Chicago, Ill.
Maurice L. Peterson, University of California, Davis, Calif.
J. Thomas Reid, Cornell University, Ithaca, N.Y.
Damon C. Shelton, West Virginia University, Morgantown, W. Va.
Edwin W. Tisdale, University of Idaho, Moscow, Idaho.
John B. Washko, Pennsylvania State University, University Park, Pa.

Eighth Plenary Meeting of ISO/TC 46-Documentation, International Organization for Standards, London, England:
Henry J. Dubester, Library of Congress, Washington, D.C.

XIth International Congress of Entomology, Vienna, Austria:
Entomological Society of America, Washington, D.C.

Eleventh International Congress of Historical Sciences, Stockholm, Sweden:
Pedro Armillas, University of Michigan, Ann Arbor, Mich.

Enzyme Commission, Cambridge, England and Paris, France:
Sidney P. Colowick, Vanderbilt University, Nashville, Tenn.
Albert L. Lehninger, Johns Hopkins School of Medicine, Baltimore, Md.

Evaluation of the Soviet Research and Training Program in Geography, Association of American Geographers, Army Research Officer, OCRD, Department of the Army, Washington, 25, D.C.:
Francis L. Friedman, Physical Science Study Committee, Educational Services Incorporated, Cambridge, Mass.

Exchange of Scientists Between the U.S. and U.S.S.R.:
National Academy of Sciences—National Research Council, Washington, D.C.

Exchange Visit—Russia; East-West Contacts Program:
Richard M. Bosorth, Bell Telephone Laboratories, Murray Hill, N.J.

Executive Committee and Bureau of the International Union on Pure and Applied Chemistry, Leningrad, Russia:
William Albert Noyes, Jr., University of Rochester, Rochester, N.Y.

Faraday Society Conference on Cell Nucleus, Cambridge, England:
Walter S. Vincent, Marine Biological Laboratory, Woods Hole, Mass.

Faraday Society Discussions on "Oxidation-Reduction Reactions in Ionizing Solvents," Newcastle-on-Tyne, England:
Rudolph A. Marcus, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.
W. K. Wilmarth, University of Southern California, Los Angeles, Calif.

Faraday Society Discussions on the Physical Chemistry of Aerosols, Bristol, England:
Frank T. Gucker, Indiana University, Bloomington, Ind.

Federation Internationale de Documentation, Warsaw, Poland:
Karl F. Huemann, Office of Scientific Documentation, National Academy of Sciences—National Research Council, Washington, D.C.
Milton O. Lee, Federation of American Societies for Experimental Biology, Washington, D.C.

Fifth Austrian Congress of Mathematicians, Innsbruck, Austria:
Victor L. Klee, Jr., Matematisk Institut, Copenhagen, Denmark
Erwin Kleinfeld, Ohio State University, Columbus, Ohio

Fifth International Conference on Semiconductors, Prague, Czechoslovakia:
Ephrain Banks, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.
Raymond Bowers, Cornell University, Ithaca, N.Y.
Ralph Bray, Purdue University, Lafayette, Ind.
Frederick C. Brown, University of Illinois, Urbana, Ill.
Joseph Callaway, University of Miami, Coral Gables, Fla.
Arnold Honig, Syracuse University, Syracuse, N.Y.
Stefan Machlup, Western Reserve University, Cleveland, Ohio

Fifth International Congress of Biochemistry, Moscow, Russia:
U.S. National Committee for the International Union of Biochemistry, University of Utah, Salt Lake City, Utah

First All-Union Congress on Theoretical and Applied Mechanics, Moscow, Russia:
Wallace D. Hayes, Princeton University, Princeton, N.J.
Nicholas J. Hoff, Stanford University, Stanford, Calif.

First Congress, International Federation of Automatic Control, Moscow, Russia:
Sheldon S. L. Chang, New York University, New York, N.Y.
Manfred E. Clynes, Rockland State Hospital, Orangeburg, N.Y.
Robert Lien Cosgriff, Ohio State University, Columbus, Ohio
Arthur M. Hopkin, University of California, Berkeley, Calif.
Richard W. Jones, Northwestern University, Evanston, Ill.
Louis Frank Kazda, University of Michigan, Ann Arbor, Mich.
Ralph J. Kochenburger, University of Connecticut, Storrs, Conn.
Shih-Ying Lee, Massachusetts Institute of Technology, Cambridge, Mass.
Yao Tzu Li, Massachusetts Institute of Technology, Cambridge, Mass.
James M. Mozley, Johns Hopkins Hospital, Baltimore, Md.

First International Congress of Endocrinology, Copenhagen, Denmark:
Endocrine Society, Oklahoma City, Okla.

First South American Congress of Zoology, La Plata, Argentina:
James Arthur Peters, San Fernando Valley State College, Northridge, Calif.

48th Annual Meeting of the International Council for the Exploration of the Sea, Moscow, Russia:
Donald P. de Sylva, University of Delaware, Newark, Del.
Edward C. Raney, Cornell University, Ithaca, N.Y.

47th Session of Indian Science Congress, Bombay, India, and the Pakistani Science Conference, Sind, Pakistan:
Elbert Payson Little, Physical Science Study Committee, Educational Services Incorporated, Cambridge, Mass.
Arnold B. Grobman, Biological Sciences Curriculum Study, University of Colorado, Boulder, Colo.

Fourth International Congress, European Organization of Quality Control, London, England:
George E. P. Box, University of Wisconsin, Madison, Wis.
Ellis R. Ott, Rutgers, The State University, New Brunswick, N.J.

Fourth International Symposium on the Reactivity of Solids, Amsterdam, Netherlands:
Joseph A. Pask, University of California, Berkeley, Calif.

Fourth Symposium on Cosmical Gas Dynamics, Varenna, Italy:
Leverett Davis, Jr., California Institute of Technology, Pasadena, Calif.
Armin J. Deutsch, Carnegie Institution of Washington, Pasadena, Calif.
Robert B. Leighton, California Institute of Technology, Pasadena, Calif.
Hans W. Liepmann, California Institute of Technology, Pasadena, Calif.
Mahinder S. Uberoi, University of Michigan, Ann Arbor, Mich.
Olin C. Wilson, Carnegie Institution of Washington, Pasadena, Calif.

Fourth Symposium on Virus Diseases of Fruit Trees in Europe, Copenhagen, Denmark:
John A. Milbrath, Oregon State College, Corvallis, Oreg.
Daniel F. Millikan, University of Missouri, Columbia, Mo.
George Nyland, University of California, Davis, Calif.
Gilbert L. Stout, Bureau of Plant Pathology, State of California, Sacramento, Calif.

Glossary Subcommittee of the International Committee of Coal Petrology, Madrid, Spain:
Gilbert Haven Cady, Illinois State Geological Survey, Champaign-Urbana, Ill.
William Spackment, The Pennsylvania State University, University, Pa.

Hungarian Academy of Science and the Mathematics Department of Charles University, Prague, Czechoslovakia:
Jacob Wolfowitz, Cornell University, Ithaca, N.Y.

International Association of Geomagnetism and Aeronomy, Copenhagen, Denmark:
Francois N. Frenkiel, David Taylor Model Basin, Washington, D.C.
Morris Neiburger, Lutry, Switzerland

International Colloquium on Biochemistry of Glucosides, Paris, France:
David S. Feingold, University of California, Berkeley, Calif.
Dexter French, Iowa State College, Ames, Iowa
William Zev Hassid, University of California, Berkeley, Calif.
Jack L. Strominger, Washington University Medical School, St. Louis, Mo.
Annamaria Torriani Gorini, Massachusettts Institute of Technology, Cambridge, Mass.
Henry M. Tsuchiya, University of Minnesota, Minnneapolis, Minn.
Roy L. Whistler, Purdue University, Lafayette, Ind.
Melville L. Wolfrom, The Ohio State University, Columbus, Ohio

International Colloquium on Differential Geometry and Topology, Zurich, Switzerland:
Louis Auslander, Indiana University, Bloomington, Ind.
Raoul Bott, Harvard University, Cambridge, Mass.
John W. Milnor, The University of California, Berkeley, Calif.
Hans Samelson, University of Michigan, Ann Arbor, Mich.
Shiing-shen Chern, University of Chicago, Chicago, Ill.
Stephen Smale, Instituto de Mathematica Pura e Aplicada, Rio de Janeiro, Brazil

International Colloquium on the Evolution of Lower and Nonspecialized Mammals, Brussels, Belgium:
Everett C. Olson, University of Chicago, Chicago, Ill.
Bryan Patterson, Harvard University, Cambridge, Mass.
Alfred S. Romer, Harvard University, Cambridge, Mass.

International Colloquium on Fast Reactions, Hahnenklee, Germany:
Stanley Ainsworth, University of Illinois, Urbana, Ill.

George H. Czerlinski, University of Pennsylvania, Philadelphia, Pa.

International Colloquim on Function Theory, Bombay, India:
Lipman Bers, Institute of Mathematical Sciences, New York University, New York, N.Y.
Louis Nirenberg, Institute of Mathematical Sciences, New York University, New York, N.Y.

International Commission for the Nomenclature of Cultivated Plants, Cambridge, England:
George H. M. Lawrence, Cornell University, Ithaca, N.Y.
Martin G. Weiss, Plant Industry Station, Beltsville, Md.

International Conference on Functional Analysis, Warsaw, Poland:
Victor L. Klee, Jr., Matematisk Institut, Copenhagen, Denmark

International Conference on Hail Storms, Verona, Italy:
Louis J. Batten, The University of Arizona, Tucson, Ariz.
Horace R. Byers, The University of Chicago, Chicago, Ill.
Robert D. Elliott, North American Weather Consultants, Goleta, Calif.
Charles L. Hosler, Jr., The Pennsylvania State University, University Park, Pa.
Heinz W. Kasemir, Neptune, N.J.
Paul B. Mac Cready, Jr., Atmospheric Research Group, Altadena, Calif.
Vincent J. Schaefer, American Meteorological Society, Schenectady, N.Y.
Richard A. Schleusener, Colorado State University, Fort Collins, Colo.

International Conference on Many-Body Problems, Utrecht, the Netherlands:
A. E. Glassgold, The University of California, Berkeley, Calif.
Abraham Klein, University of Pennsylvania, Philadelphia, Pa.
Joaquin M. Luttinger, University of Pennsylvania, Philadelphia, Pa.
David Pines, University of Illinois, Urbana, Ill.
J. Robert Schrieffer, University of Illinois, Urbana, Ill.
Harry Suhl, Bell Telephone Laboratories, Murray Hill, N.J.

International Conference on Physics Education, Paris, France:
Melba Phillips, Washington University, St. Louis, Mo.

International Conference on Science in the Advancement of New States, Rehovoth, Israel:
Louis J. Battan, The University of Arizona, Tucson, Ariz.
Lloyd V. Berkner, Associated Universities, Inc., New York, N.Y.
W. C. Lowdermilk, Berkeley, Calif.
Alvin M. Weinberg, Oak Ridge National Laboratory, Oak Ridge, Tenn.
Jerrold R. Zacharias, Massachusetts Institute of Technology, Cambridge, Mass.

International Conference on the Teaching of Anthropology, Burg Wartenstein, Austria:
Ethel M. Albert, University of California, Berkeley, Calif.

International Congress of Embryology, Italy:
National Academy of Sciences—National Research Council, Washington, D.C.

International Congress on Histochemistry, Paris, France:
National Academy of Sciences—National Research Council, Washington, D.C.

International Congress on Microwave Tubes, Munich, Germany:
Walter R. Beam, Rensselaer Polytechnic Institute, Troy, N.Y.
Abraham Bers, Research Laboratory of Electronics, Cambridge, Mass.
Charles K. Birdsall, University of California, Berkeley, Calif.
Karl R. Spangenberg, Stanford University, Stanford, Calif.

International Congress on Photobiology, Copenhagen, Denmark:
National Academy of Sciences—National Research Council, Washington, D.C.

International Federation for Documentation Conference, Rio de Janeiro, Brazil:
Brian C. Vickery, Herts, England

International Information Theory Meeting, London, England:
Murray Eden, Massachusetts Institute of Technology, Cambridge, Mass.
Merrill M. Flood, University of Michigan, Ann Arbor, Mich.
Edmund M. Glaser, The Johns Hopkins University, Baltimore, Md.
David M. Green, Massachusetts Institute of Technology, Cambridge, Mass.
Robert G. Grossman, Walter Reed Army Institute of Research, Washington, D.C.
Kenneth E. Iverson, Harvard University, Cambridge, Mass.
F. Reza, Syracuse, N.Y.
Sze-Hou Chang, Electrical Engineering Department and Electronic Research Laboratories, Boston, Mass.

International Institute of Refrigeration, Commission 2; Commission 9 and Technical Board, Belgrade, Yugoslavia:
Carl F. Kayan, Columbia University, New York, N.Y.

International Kolloquim Uber Endliche Gruppen, Oberwolfach, West Germany:
William W. Boone, University of Illinois, Urbana, Ill.
John Griggs Thompson, Institute for Defense Analyses, Princeton, N.J.

International Meeting on Veterinary Education, London, England:
Mark Whittier Allam, University of Pennsylvania, Philadelphia, Pa.
Glenn C. Holm, Oklahoma State University, Stillwater, Okla.

International Mineralogy Association, Zurich, Switzerland:
Brian H. Mason, The American Museum of Natural History, New York, N.Y.

International Organization for Standards—Fourth Plenary Meeting, Technical Committee ISO/TC37—Terminology, West Berlin, Germany:
Jerrold Orne, The University of North Carolina, Chapel Hill, N.C.

International Summer Institute in Quantum Chemistry, Uppsala, Sweden:
Norman W. Bazley, University of Maryland, College Park, Md.
David W. Fox, University of Maryland, College Park, Md.

International Symposium on the Chemistry of Natural Products, Melbourne, Canberra, and Sydney, Australia:

Roger Adams, University of Illinois, Urbana, Ill.
Klaus Biemann, Massachusetts Institute of Technology, Cambridge, Mass.
William B. Cook, Montana State College, Bozeman, Mont.
William C. Dauben, The University of California, Berkeley, Calif.
Carl Djerassi, Stanford University, Stanford, Calif.
Jerome F. Eastham, University of Tennessee, Knoxville, Tenn.
Theodore A. Geissman, The University of California, Los Angeles, Calif.
Robert E. Ireland, University of Michigan, Ann Arbor, Mich.
S. Morris Kupchan, The University of Wisconsin, Madison, Wis.
Nelson J. Leonard, University of Illinois, Urbana, Ill.
Carl R. Noller, Stanford University, Stanford, Calif.
S. William Pelletier, The Rockefeller Institute, New York, N.Y.
Paul J. Scheuer, University of Hawaii, Honolulu, Hawaii
George H. Stout, University of Washington, Seattle, Wash.

International Symposium on Drugs Affecting Lipid Metabolism, Milan, Italy:

Roslyn B. Alfin-Slater, The University of California, Los Angeles, Calif.
Nicholas R. DiLuzio, University of Tennessee, Memphis, Tenn.
James F. Mead, The University of California Medical Center, Los Angeles, Calif.
Erwin H. Mosbach, Columbia University Research Service, New York, N.Y.
David A. Turner, Biochemistry Research Division, Baltimore, Md.

International Symposium on Macromolecular Chemistry, Moscow, Russia:

Werner W. Brandt, Illinois Institute of Technology, Chicago, Ill.
Paul Doty, Harvard University, Cambridge, Mass.
Frederick R. Eirich, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.
Paul J. Flory, Mellon Institute, Pittsburgh, Pa.
Jan Hermans, State University, College of Forestry at Syracuse University, Syracuse, N.Y.
Maurice Higgins, Stanford Research Institute, Menlo Park, Calif.
Carl S. Marvel, University of Illinois, Urbana, Ill.
Robert Simha, University of Southern California, Los Angeles, Calif.
Robert Ullman, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.

International Symposium on Macromolecules, Wiesbaden, Germany:

Gaetano F. D'Alelio, University of Notre Dame, Notre Dame, Ind.
Walter H. Stockmayer, Massachusetts Institute of Technology, Cambridge, Mass.

International Symposium on *Pseudomonas/Achromobacter*, Bangor, Wales:

John C. Ayres, Iowa State University, Ames, Iowa

International Symposium on Vitamins, Poznan, Poland:

B. Connor Johnson, University of Illinois, Urbana, Ill.

International Union of Crystallography, Cambridge, England:

Sidney C. Abrahams, Brookhaven National Laboratories, Upton, N.Y.
Leroy E. Alexander, Mellon Institute, Pittsburgh, Pa.
Masao Atoji, Iowa State University, Ames, Iowa
Harry Brumberger, Syracuse University, Syracuse, N.Y.
Martin J. Buerger, Massachusetts Institute of Technology, Cambridge, Mass.
Lawrence F. Dahl, University of Wisconsin, Madison, Wis.
J. C. Grosskreutz, Midwest Research Institute, Kansas City, Mo.
David Harker, Roswell Park Memorial Institution, Buffalo, N.Y.
Edward W. Hughes, California Institute of Technology, Pasadena, Calif.
George A. Jeffrey, University of Pittsburgh, Pittsburgh, Pa.
James D. McCullough, The University of California, Los Angeles, Calif.
Lynne L. Merritt, Jr., Indiana University, Bloomington, Ind.
A. L. Patterson, The Institute for Cancer Research, Philadelphia, Pa.
Benjamin Post, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.
Paul W. Schmidt, University of Missouri, Columbia, Mo.
Martin E. Straumanis, University of Missouri, Rolla, Mo.
Bertram E. Warren, Massachusetts Institute of Technology, Cambridge, Mass.
Jurg Waser, California Institute of Technology, Pasadena, Calif.
Elizabeth A. Wood, Bell Telephone Laboratories, Murray Hill, N.J.
Ralph W. G. Wyckoff, University of Arizona, Tucson, Ariz.
W. H. Zachariasen, The University of Chicago, Chicago, Ill.

International Volcanological Asssociation, International Union of Geodesy and Geophysics, Paris, France:

Gordon A. Macdonald, Volcano, Hawaii

Lectures on Molecular Quantum Mechanics, Sao Paulo, Rio de Janeiro, Brazil, and Buenos Aires, Argentina:

Martin Karplus, University of Illinois, Urbana, Ill.

Lecture at Several Universities in Poland During the Month of June 1960:

John P. Miller, Harvard University, Cambridge, Mass.

Meeting of the Bureau (Officers and Council) of the Federation Internationale de Documentation, Paris, France:

Milton O. Lee, Federation of American Societies for Experimental Biology, Washington, D.C.

Meeting of the Commission on Pharmacy Abstracts, Copenhagen, Denmark:

Winifred Sewell, Squibb Institute for Medical Research, New Brunswick, N.J.

Meeting of the Federation International de Documentation, Warsaw, Poland:

Fred R. Cagle, Research Coordinator, Tulane University of Louisiana, New Orleans, La.

Meeting of the International Society of Horticulture Science, Rotterdam, Holland:
H. B. Tukey, Michigan State University, East Lansing, Mich.

Mathematical Institute of the Polish Academy of Sciences, Warsaw, Poland:
Antonio Zygmund, The University of Chicago, Chicago, Ill.

NATO Advanced Study Institute, Breukelen, The Netherlands:
Robert Alden Fish, Chicago, Ill.
John Eldon Gaustad, Princeton University, Princeton, N.J.
George Richard Huguenin, Cambridge, Mass.
John McKim Malville, University of Colorado, Boulder, Colo.
Dimitri M. Mihalas, California Institute of Technology, Pasadena, Calif.
Robert A. R. Parker, California Institute of Technology, Pasadena, Calif.
Peter Oliver Vandervoort, National Radio Astronomy Observatory, Greenbank, W. Va.
Andrew Tipton Young, Harvard College Observatory, Cambridge, Mass.

NATO Advanced Study Institute, Edinburgh, Scotland:
Michael J. Moravcsik, University of California, Livermore, Calif.
William C. Ramsay, University of California, Los Angeles, Calif.

NATO Advanced Study Institute, Les Houches, France:
Thomas Laurence Trueman, Chicago, Ill.

NATO Advanced Study Institute, Manchester, England:
Charles T. Prewitt, Massachusetts Institute of Technology, Cambridge, Mass.
Richard H. Stanford, Jr., California Institute of Technology, Pasadena, Calif.
Bernhardt John Wuensch, Massachusetts Institute of Technology, Cambridge, Mass.

NATO Advanced Study Institute, Varenna, Italy:
John T. Lyman, The University of California, Berkeley, Calif.
Jan Polissar, Harvard University, Boston, Mass.

Natural Rubber Research Conference, Kuala Lumpur, Malaya:
Howard J. Teas, University of Florida, Gainesville, Fla.

Nineteenth International Geographical Congress, Stockholm, Sweden:
Wallace E. Akin, Drake University, Des Moines, Iowa
Carleton P. Barnes, U.S. Department of Agriculture, Washington, D.C.
Lloyd D. Black, U.S. Department of Commerce, Garrett Park, Md.
David J. M. Hooson, University of Maryland, College Park, Md.
Peirce F. Lewis, The Pennsylvania State University, University Park, Pa.
Duane F. Marble, University of Pennsylvania, Philadelphia, Pa.
E. Willard Miller, The Pennsylvania State University, University Park, Pa.
Peter H. Nash, University of Cincinnati, Cincinnati, Ohio
Laurence H. Nobles, Northwestern University, Evanston, Ill.
Theodore Shabad, American Geographical Society, New York, N.Y.
John C. Sherman, University of Washington, Seattle, Wash.
David A. Smith, The Pennsylvania State University, University Park, Pa.
David D. Smith, Coastal Studies Institute, Manteo, N.C.
Edwin N. Thomas, State University of Iowa, Iowa City, Iowa
Edward L. Ullman, Washington University, Saint Louis, Mo.
James E. Vance, Jr., University of California, Berkeley, Calif.

Phase Transitions and Anomalous Dispersion, Osaka, Japan:
Thomas H. Doyne, Department of Chemistry, Villanova University, Villanova, Pa.

Photonuclear Conference, Karlsruhe, Germany:
Heinrich A. Medicus, Rensselaer Polytechnic Institute, Troy, N.Y.
Paul F. Yergin, Rensselaer Polytechnic Institute, Troy, N.Y.
Daniel J. Zaffarano, Iowa State University, Ames, Iowa

Physical Chemistry of Aerosols, Bristol, England:
Frank T. Gucker, Indiana University, Bloomington, Ind.

Preliminary Field Survey and Planning of Nubian Archaeology, Los Angeles, California to Nubia, Egypt:
Clement W. Meighan, the University of California, Los Angeles, Calif.

Preparation of a Volume of Mathematical Tables Required by Statisticians, London, England:
Herman Otto Hartley, Iowa State University, Ames, Iowa

Scientific Conference of the Department of Fluid Mechanics, Augustow, Poland:
Frederick Sterling Sherman, the University of California, Berkeley, Calif.

Second All-Union Conference on Nuclear Reactions at Low and Intermediate Energies, Moscow, Russia:
R. V. Pound, Harvard University, Cambridge, Mass.

Second Hungarian Mathematical Congress, Budapest, Hungary:
Einar Hille, Yale University, New Haven, Conn.
Victor L. Klee, Jr., Matematisk Institut, Copenhagen, Denmark

Second International Congress of Bioclimatology and Biometeorology, London, England:
A. Nelson Dingle, the University of Michigan, Ann Arbor, Mich.
Edwin W. King, Clemson College, Clemson, S.C.
Frederick Sargent, II, University of Illinois, Urbana, Ill.
Richard David Schein, the Pennsylvania State University, University Park, Pa.
John A. Sealander, Jr., University of Arkansas, Fayetteville, Ark.
Gerald B. Spurr, the University of Tennessee College of Medicine, Memphis, Tenn.
George G. Zabka, State University of Iowa, Iowa City, Iowa

Second International Congress on Catalysis, Paris, France:
John E. Benson, the Pennsylvania State University, University Park, Pa.
Robert L. Burwell, Jr., Northwestern University, Evanston, Ill.
John J. Chessick, Lehigh University, Bethlehem, Pa.
Joseph D. Danforth, Grinnell College, Grinnell, Iowa
H. E. Farnsworth, Brown University, Providence, R.I.
Joseph A. Feighan, Saint Joseph's College, Philadelphia, Pa.
Gwan Kim, Princeton University, Princeton, N.J.
Knut Axel Krieger, University of Pennsylvania, Philadelphia, Pa.
Ernest M. Loebl, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.
Giuseppe Parravano, the University of Michigan, Ann Arbor, Mich.
Herman Pines, Northwestern University, Evanston, Ill.

Second International Course of Lyophilization, Lyon, France:
John W. McTigue, Washington, D.C.

Second World Conference on Earthquake Engineering, Tokyo and Kyoto, Japan:
Glen V. Berg, University of Michigan, Ann Arbor, Mich.
Ray William Clough, the University of California, Berkeley, Calif.
C. Martin Duke, the University of California, Los Angeles, Calif.
Donald E. Hudson, California Institute of Technology, Pasadena, Calif.
Richard L. Jennings, University of Illinois, Urbana, Ill.
Frank Neumann, University of Washington, Seattle, Wash.
Joseph Penzien, Massachusetts Institute of Technology, Cambridge, Mass.
Karl V. Steinbrugge, the University of California, Berkeley, Calif.
William T. Thomson, the University of California, Los Angeles, Calif.
Merit P. White, University of Massachusetts, Amherst, Mass.

Seminar on Aerial Survey Methods and Equipment Economic Commission for Asia and the Far East (ECAFE), Bangkok, Thailand:
Shirley V. Griffith, Executive Office of the President, Bureau of the Budget, Washington, D.C.

Seminar on the Status and Development of the Teaching of Chemistry:
Robert Rice, Berkeley High School, Berkeley, Calif.
J. Arthur Campbell, Harvey Mudd College, Claremont, Calif.
Laurence E. Strong, Earlham College, Richmond, Ind.
Paul Westmeyer, University of Illinois, Urbana, Ill.

Seventh International Conference on Coastal Engineering, The Hague, Netherlands:
Donald R. F. Harleman, Massachusetts Institute of Technology, Cambridge, Mass.
Douglas Lamar Inman, the University of California, La Jolla, Calif.
Joe W. Johnson, the University of California, Berkeley, Calif.
Robert L. Wiegel, the University of California, Berkeley, Calif.

Seventeenth International Congress of Pure and Applied Science, Munich, Germany:
John C. Bailar, Jr., University of Illinois, Urbana, Ill.

Sixteenth International Congress of Psychology, Bonn, Germany:
R. C. Davis, Indiana University, Bloomington, Ind.
Richard deCharms, Washington University, St. Louis, Mo.
Donelson E. Dulany, Jr., University of Illinois, Urbana, Ill.
Horace B. English, Ohio State University, Columbus, Ohio
Joshua A. Fishman, University of Pennsylvania, Philadelphia, Pa.
Edwin A. Fleishman, Yale University, New Haven, Conn.
Donald G. Forgays, Rutgers, The State University, New Brunswick, N.J.
Jacob L. Gewirtz, The Hebrew University, Jerusalem, Israel
Eleanor J. Gibson, Cornell University, Ithaca, N.Y.
J. C. Gilchrist, University of Wisconsin, Madison, Wis.
Albert E. Goss, University of Massachusetts, Amherst, Mass.
Harold Gulliksen, Princeton University, Princeton, N.J.
Davis H. Howes, Massachusetts Institute of Technology, Cambridge, Mass.
Eugene Jacobson, Michigan State University, East Lansing, Mich.
Tracy S. Kendler, Columbia University, New York, N.Y.
Nathan Kogan, Educational Testing Service, Princeton, N.J.
Sheldon J. Korchin, National Institute of Mental Health, Bethesda, Md.
Herschel W. Leibowitz, University of Wisconsin, Madison, Wis.
Kenneth MacCorquodale, University of Minnesota, Minneapolis, Minn.
William J. McGill, Columbia University, New York, N.Y.
Walter Mischel, Harvard University, Cambridge, Mass.
Alvin John North, Southern Methodist University, Dallas, Tex.
Carl Pfaffman, Brown University, Providence, R.I.
Bertram H. Raven, The University of California, Los Angeles, Calif.
Harold Schlosberg, Brown University, Providence, R.I.
Arnold M. Small, Jr., State University of Iowa, Iowa City, Iowa
John S. Stamm, Institute of Living, Hartford, Conn.
Joseph Charles Stevens, Harvard University, Cambridge, Mass.
John W. Thibaut, The University of North Carolina, Chapel Hill, N.C.
Wilse B. Webb, University of Florida, Gainesville, Fla.
Philip G. Zimbardo, Yale University, New Haven, Conn.

Sixth International Congress of Anthropological and Ethnological Sciences, Paris, France:
Joseph B. Casagrande, Social Science Research Council, New York, N.Y.
Donald Collier, Chicago Natural History Museum, Chicago, Ill.
Henry B. Collins, Smithsonian Institution, Washington, D.C.

Edward P. Dozier, Baguio City, Philippines
Gordon F. Ekholm, American Museum of Natural History, New York, N.Y.
Emil W. Haury, University of Arizona, Tucson, Ariz.
E. Adamson Hoebel, University of Minnesota, Minneapolis, Minn.
John J. Honigmann, University of North Carolina, Chapel Hill, N.C.
Alfred Kidder II, University of Pennsylvania, Philadelphia, Pa.
Keith R. Porter, Cytology Department, The Rockefeller Institute, New York, N.Y.

Sixth National Conference of the Czechoslovakian Society for Electron Microscopy, Smolenice, Czechoslovakia:
Betty J. Meggers, American Anthropological Association, Washington, D.C.
Carlyle Shreeve Smith, Museum of Natural History, Lawrence, Kans.
William C. Sturtevant, Smithsonian Institution, Washington, D.C.
Richard B. Woodbury, University of Arizona, Tucson, Ariz.
Leslie A. White, University of Michigan, Ann Arbor, Mich.

Structure of Graphite and Kinetics of Its Reactions, Paris, France:
Stanislaw Mrozowski, University of Buffalo, Buffalo, N.Y.

Summer Institute of Physics, San Carlos de Bariloche, Argentina:
Donald W. Connor, Argonne National Laboratory, Lemont, Ill.

Support of Travel of American Scientists to the University of Oxford Symposium on the History of Science, Oxford, England:
I. B. Cohen, Harvard University, Cambridge, Mass.

Survey of Biometeorology in Europe:
Helmut E. Landsberg, U.S. Weather Bureau, Washington, D.C.

Symposium on the Biology of Space Travel, London, England:
Harlow Shapley, Peterborough, N.H.

Symposium on Linear Spaces, Jerusalem, Israel:
Richard F. Arens, the University of California, Los Angeles, Calif.
Leon Ehrenpreis, Yeshiva University, New York, N.Y.
Henry Helson, the University of California, Berkeley, Calif.
Victor L. Klee, Jr. Mathematisk Institut, Kobehavn, Denmark
Peter Lax, New York University, New York, N.Y.
Wilhelmus A. J. Luxemburg, California Institute of Technology, Pasadena, Calif.
George W. Mackey, Harvard University, Cambridge, Mass.
Ralph S. Phillips, the University of California, Los Angeles, Calif.
Angus E. Taylor, the University of California, Los Angeles, Calif.
John Wermer, Brown University, Providence, R.I.

Symposium on Macromolecular Structure and Biological Function, Stockholm, Sweden:
Vincent G. Allfrey, the Rockefeller Institute, New York, N.Y.
Daniel I. Arnon, the University of California, Berkeley, Calif.
Erwin Chargaff, Columbia University, New York, N.Y.
Albert Dorfman, University of Chicago, Chicago, Ill.
Albert W. Frenkel, University of Minnesota, Minneapolis, Minn.
David E. Green, the University of Wisconsin, Madison, Wis.
F. Edmund Hunter, Jr., Washington University Medical School, Saint Louis, Mo.
Andre T. Jagendorf, the Johns Hopkins University, Baltimore, Md.
Martin D. Kamen, Brandeis University, Waltham, Mass.
Henry A. Lardy, the University of Wisconsin, Madison, Wis.
Albert L. Lehninger, the Johns Hopkins School of Medicine, Baltimore, Md.
George E. Palade, the Rockefeller Institute, New York, N.Y.
Gertrude E. Perlmann, Rockefeller Institute, New York, N.Y.
Keith R. Porter, the Rockefeller Institute, New York, N.Y.
Maynard E. Pullman, the Public Health Research Institute, New York, N.Y.
Thomas P. Singer, Edsel B. Ford Institute for Medical Research, Detroit, Mich.
Birgit Vennesland, University of Chicago, Chicago, Ill.
Christophe Henri Werner, Brookhaven National Laboratory, Upton, N.Y.

Symposium on Membrane Transport and Metabolism, Prague, Czechoslovakia:
Emil Aschheim, New York, N.Y.
Halvor N. Christensen, the University of Michigan, Ann Arbor, Mich.
Vincent Paul Cirillo, Seton Hall College of Medicine and Dentistry, Jersey City, N.J.
Robert K. Crane, Washington University Medical School, Saint Louis, Mo.
Robert E. Davies, University of Pennsylvania, Philadelphia, Pa.
George Eisenman, Eastern Pennsylvania Psychiatric Institute, Philadelphia, Pa.
Ernest C. Foulkes, the May Institute for Medical Research, Cincinnati, Ohio
H. O. Halvorson, College of Agriculture, Madison, Wis.
Lowell E. Hokin, University of Wisconsin, Madison, Wis.
Bernard L. Horecker, New York University College of Medicine, New York, N.Y.
Alexander Leaf, Harvard Medical School, Boston, Mass.
Charles R. Park, Vanderbilt University Medical School, Nashville, Tenn.
Robert L. Post, Vanderbilt University Medical School, Nashville, Tenn.
Howard V. Rickenberg, University of Washington, Seattle, Wash.

Symposium on the Methodics of the Mammalia Investigation, Brno, Plotni, Czechoslovakia:
E. Raymond Hall, University of Kansas, Lawrence, Kans.

Symposium on Metrology (Standardization) of Radionuclides, Vienna, Austria:
George G. Manov, Technical Director, Tracerlab, Incorporated, Richmond, Calif.
Brian David Pate, Washington University, Saint Louis, Mo.

Symposium on the Numerical Treatment of Ordinary Differential Equations, Integral and Integro-Differential Equations, Rome, Italy:

H. A. Antosiewicz, University of Southern California, Los Angeles, Calif.
Richard Courant, New York University, New York, N.Y.
Joaquin B. Diaz, University of Maryland, College Park, Md.
Jim Douglas, Jr., Rice Institute, Houston, Texas
Paul R. Garabedian, New York University, New York, N.Y.
Jurgen Moser, New Rochelle, N.Y.
John Todd, California Institute of Technology, Pasadena, Calif.

Symposium of Polarization of Nucleons, Basel, Switzerland:

Fred H. Schmidt, University of Washington, Seattle, Wash.

Symposium on Protein Biosynthesis, Amsterdam, Netherlands:

James Bonner, California Institute of Technology, Pasadena, Calif.
Fritz Lipmann, the Rockefeller Institute, New York, N.Y.
Alfred E. Mirsky, the Rockefeller Institute, New York, N.Y.
George C. Webster, the Ohio State University, Columbus, Ohio
Paul C. Zamecnik, Harvard University, Cambridge, Mass.

Symposium on Scientific Problems of Plant Protection, Budapest, Hungary:

Robert N. Goodman, University of Missouri, Columbia, Mo.

Symposium on the Visual System, Freiburg, Germany:

Russell L. De Valois, Indiana University, Bloomington, Ind.
Robert W. Doty, the University of Michigan, Ann Arbor, Mich.
Dorothea J. Hurvich, New York University, New York, N.Y.
Edward F. MacNichol, Jr., the Johns Hopkins University, Baltimore, Md.

Symposium at the Weizmann Institute, Rohovoth, Israel and Lecture Series in Utrecht, Holland:

S. M. Ulam, Los Alamos Scientific Laboratory, Los Alamos, N. Mex.

Tenth International Astrophysical Symposium, Liege, Belgium:

Joseph Wyan Chamberlain, the University of Chicago, Williams Bay, Wis.
Thomas Gold, Cornell University, Ithaca, N.Y.
Leo Goldberg, the University of Michigan, Ann Arbor, Mich.
William Liller, the University of Michigan, Ann Arbor, Mich.
A. E. Lilley, Harvard University, Cambridge, Mass.
William A. Rense, University of Colorado, Boulder, Colo.
Fritz Rohrlich, State University of Iowa, Iowa City, Iowa
Edward P. Todd, University of Colorado, Boulder, Colo.

Tenth International Congress of Applied Mechanics, Stresa, Italy:

Ferdinand P. Beer, Lehigh University, Bethlehem, Pa.
Maurice A. Brull, University of Pennsylvania, Philadelphia, Pa.
Stephen H. Crandall, Massachusetts Institute of Technology, Cambridge, Mass.
Yuan Cheng Bertram Fung, California Institute of Technology, Pasadena, Calif.
Werner Goldsmith, the University of California, Berkeley, Calif.
George H. Handleman, Rensselaer Polytechnic Institute, Troy, N.Y.
Robert M. Haythornthwaite, the University of Michigan, Ann Arbor, Mich.
Rudolf Herman, University of Minnesota, Minneapolis, Minn.
Miklos Hetenyi, Northwestern University, Evanston, Ill.
Stephen Juhasz, Southwest Research Institute, San Antonio, Tex.
Martin Lessen, University of Pennsylvania, Philadelphia, Pa.
Geoffrey S. S. Ludford, University of Maryland, College Park, Md.
Joseph Marin, The Pennsylvania State University, University Park, Pa.
Ernest F. Masur, The University of Michigan, Ann Arbor, Mich.
Julius Miklowitz, California Institute of Technology, Pasadena, Calif.
John W. Miles, University of California, Los Angeles, Calif.
Paul R. Paslay, Rice Institute, Houston, Tex.
Milton S. Plesset, California Institute of Technology, Pasadena, Calif.
Shan-fu Shen, University of Maryland, College Park, Md.
Walter W. Soroka, University of California, Berkeley, Calif.
Walter G. Vincenti, Stanford University, Stanford, Calif.
Jerome Harris Weiner, Columbia University, New York, N.Y.
Alexander Weinstein, University of Maryland, College Park, Md.
Max L. Williams, Jr., California Institute of Technology, Pasadena, Calif.

Tenth International Congress for Cell Biology, Paris, France:

National Academy of Sciences—National Research Council, Washington, D.C.

Third International Conference on Medical Electronics, London, England:

A. L. Hopkins, Western Reserve University, Cleveland, Ohio

Third Symposium on Gas Chromatography, Edinburgh, Scotland:

Warren W. Brandt, Purdue University, Lafayette, Ind.
Henry Freiser, The University of Arizona, Tucson, Ariz.

Thirteenth General Assembly, International Scientific Radio Union, London, England:

Nicolaas Bloembergen, Harvard University, Cambridge, Mass.
Rufus G. Fellers, University of South Carolina, Columbia, S.C.
Roy Walter Gould, California Institute of Technology, Pasadena, Calif.
Edward C. Jordan, University of Illinois, Urbana, Ill.
Laurence A. Manning, Stanford University, Stanford, Calif.
Nathan Marcuvitz, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.
Arthur A. Oliner, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.
Allan M. Peterson, Stanford University, Stanford, Calif.
Samuel Silver, The University of California, Berkeley, Calif.

Louis D. Smullin, Masachusetts Institute of Technology, Cambridge, Mass.
John Bridges Smyth, Smyth Research Associates, San Diego, Calif.
Aldert van der Ziel, University of Minnesota, Minneapolis, Minn.
Alan T. Waterman, Jr., Stanford University, Stanford, Calif.
Arthur H. Waynick, Pennsylvania State University, University Park, Pa.

Thirteenth Congress of the International Scientific Film Association, London and Oxford University, England:
Robert Eugene Green, Advisory Board on Education, National Academy of Sciences, Washington, D.C.
Willard Webb, Reader and Stack Division, the Library of Congress, Washington, D.C.

Thirty-second International Congress of Industrial Chemistry, Barcelona, Spain:
Eugene G. Rochow, Harvard University, Cambridge, Mass.

Thirty-second Session International Statistical Institute, Tokyo, Japan:
Leo Katz, Office of Naval Research, New York, N.Y.

Twelfth General Assembly, International Union of Geodesy and Geophysics, Helsinki, Finland:
William C. Ackermann, Illinois State Water Survey, Urbana, Ill.
Carl I. Aslakson, Bethesda, Md.
Werner A. Baum, the Florida State University, Tallahassee, Fla.
Bruce B. Benson, Amherst College, Amherst, Mass.
George S. Benton, the Johns Hopkins University, Baltimore, Md.
Jacob Bjerknes, the University of California, Los Angeles, Calif.
William E. Bonini, Princeton, N.J.
Wallace S. Broecker, Columbia University, Palisades, N.Y.
Horace R. Byers, the University of Chicago, Chicago, Ill.
D. E. Caritt, the Johns Hopkins University, Baltimore, Md.
Jule G. Charney, Massachusetts Institute of Technology, Cambridge, Mass.
Samuel Epstein, California Institute of Technology, Pasadena, Calif.
Rhodes W. Fairbridge, Columbia University, New York, N.Y.
Donald R. Fitzgerald, the University of Chicago, Chicago, Ill.
Robert G. Fleagle, University of Washington, Seattle, Wash.
Francois N. Frenkiel, David Taylor Model Basin, Washington, D.C.
Irving Friedman, U.S. Geological Survey, Washington, D.C.
Paul W. Gast, University of Minnesota, Minneapolis, Minn.
Richard M. Goody, Harvard University, Cambridge, Mass.
Donald R. F. Harleman, Massachusetts Institute of Technology, Cambridge, Mass.
Bernhard Haurwitz, University of Colorado, Boulder, Colo.
Bruce C. Heezen, Columbia University, Palisades, N.Y.
Seymour L. Hess, the Florida State University, Tallahassee, Fla.
Charles L. Hosler, Jr., the Pennsylvania State University, University Park, Pa.
Benjamin F. Howell, Jr., the Pennsylvania State University, University Park, Pa.
Roman K. C. Johns, Baird-Atomic, Inc., Cambridge, Mass.
F. F. Koczy, University of Miami, Virginia Key, Miami, Fla.
Heinz H. Lettau, the University of Wisconsin, Madison, Wis.
Ray K. Linsley, Stanford University, Stanford, Calif.
Joanne S. Malkus, Woods Hole Oceanographic Institution, Woods Hole, Mass.
John F. Mink, Honolulu, Hawaii
W. Bradley Myers, Rome, Italy
Morris Neiburger, Lutry, Switzerland
Gerhard Neumann, New York University, New York, N.Y.
Alfred O. C. Nier, University of Minnesota, Minneapolis, Minn.
Sverre Pettersen, the University of Chicago, Chicago, Ill.
George W. Platzman, the University of Chicago, Chicago, Ill.
D. W. Pritchard, the Johns Hopkins University, Baltimore, Md.
Colin S. Ramage, University of Hawaii, Honolulu, Hawaii
Joseph L. Reid, Jr., Scripps Institution of Oceanography, La Jolla, Calif.
Walter Orr Roberts, University of Colorado, Boulder, Colo.
Zdenek Sekera, the University of California, Los Angeles, Calif.
Verner Edward Suomi, the University of Wisconsin, Madison, Wis.
David K. Todd, the University of California, Berkeley, Calif.
Karl K. Turekian, Yale University, New Haven, Conn.
Willem van der Bijl, Kansas State University, Manhattan, Kans.
Robert C. Wentworth, University of Maryland, College Park, Md.
James T. Wilson, the University of Michigan, Ann Arbor, Mich.
Warren S. Wooster, the University of California, Los Angeles, Calif.
James H. Zumberge, the University of Michigan, Ann Arbor, Mich.

Twelfth General Assembly International Union of Geodesy and Geophysics:
K. Aki, California Institute of Technology, Pasadena, Calif.
C. R. Allen, California Institute of Technology, Pasadena, Calif.
R. G. Bader, Agricultural and Mechanical College of Texas, College Station, Tex.
C. R. Bentley, Antarctic Research Center, Madison, Wis.
J. N. Brune, Lamont Geological Observatory, Palisades, N.Y.
K. C. Clark, University of Washington, Seattle, Wash.
P. C. Dalrymple, Quartermaster Research and Engineering Command, Natick, Mass.
T. N. Davis, University of Alaska, College, Alaska
H. J. Dorman, Lamont Geological Observatory, Palisades, N.Y.
D. B. Ericson, Lamont Geological Observatory, Palisades, N.Y.
C. T. Fray, Lamont Geological Observatory, Palisades, N.Y.

Twelfth General Assembly International Union of Geodesy and Geophysics—Continued

R. C. Haymes, New York University, New York, N.Y.
J. F. Hennion, Lamont Geological Observatory, Palisades, N.Y.
D. W. Hood, Agricultural and Mechanical College of Texas, College Station, Tex.
R. Howard, University of Massachusetts, Amherst, Mass.
J. W. Kenwisher, Woods Hole Oceanographic Institute, Woods Hole, Mass.
J. A. Knauss, University of California, La Jolla, Calif.
W. B. Kreb, California Institute of Technology, Pasadena, Calif.
E. R. LaChapelle, University of Washington, Seattle, Wash.
M. G. Landismen, Lamont Geological Observatory, Palisades, N.Y.
H. Leinbach, University of Alaska, College, Alaska
S. Matsushit, University of Colorado, Boulder, Colo.
R. P. Meyer, University of Wisconsin, Madison, Wis.
F. O. Ostopoff, Department of Commerce, Washington, D.C.
E. C. Ray, State University of Iowa, Iowa City, Iowa
M. H. Rees, University of Alaska, College, Alaska
R. O. Reid, Agricultural and Mechanical College of Texas, College Station, Tex.
M. K. Robinson, University of California, La Jolla, Calif.
R. L. Shreve, University of California, Los Angeles, Calif.
W. Stander, Department of Geophysics and Geophysical Engineering, St. Louis, Mo.
T. Takahashi, Box 1164, Alfred, N.Y.
E. Thiel, University of Wisconsin, Madison, Wis.
S. B. Treves, University of Nebraska, Lincoln, Nebr.
W. W. Vickara, Ohio State University, Columbus, Ohio
V. Herzon, Scripps Institution of Oceanography, La Jolla, Calif.
L. Wallace, University of Chicago, Williams Bay, Wis.

Twenty-fifth International Congress of Orientalists, Moscow, Russia:

Fred Adelman, University of Pittsburgh, Pittsburgh, Pa.
Richard K. Beardsley, the University of Michigan, Ann Arbor, Mich.
Morton H. Fried, Columbia University, New York, N.Y.
Lawrence Krader, American University, Washington, D.C.

Twenty-first International Geological Congress, Copenhagen, Denmark:

Victor T. Allen, Saint Louis University, St. Louis, Mo.
Orville L. Bandy, University of Southern California, Los Angeles, Calif.
Herman F. Becker, the New York Botanical Garden, New York, N.Y.
Carl S. Benson, University of Alaska, College, Alaska
William B. N. Berry, University of California, Berkeley, Calif.
D. L. Blackstone, Jr., University of Wyoming, Laramie, Wyo.
William F. Brace, Massachusetts Institute of Technology, Cambridge, Mass.
Wallace M. Cady, Montpelier, Vt.
Kenneth E. Caster, University of Cincinnati, Cincinnati, Ohio
Charles W. Chessman, California State Department of Natural Sciences, San Francisco, Calif.
Alvin J. Cohen, Mellon Institute, Pittsburgh, Pa.
Byron N. Cooper, Virginia Polytechnic Institute, Blacksburg, Va.
Dwight F. Crowder, U.S. Geological Survey, Denver, Colo.
Richard V. Dietrich, Virginia Polytechnic Institute, Blacksburg, Va.
J. Thomas Dutro, Jr., U.S. Geological Survey, Washington, D.C.
Gordon P. Eaton, University of California, Riverside, Calif.
D. Jerome Fisher, University of Chicago, Chicago, Ill.
Clifford Frondel, Harvard University, Cambridge, Mass.
Julian R. Goldsmith, University of Chicago, Chicago, Ill.
Warren B. Hamilton, U.S. Geological Survey, Denver, Colo.
Cornelius S. Hurlbut, Jr., Harvard University, Cambridge, Mass.
Thor N. V. Karlstrom, U.S. Geological Survey, Washington, D.C.
Benjamin F. Leonard, III, U.S. Geological Survey, Denver, Colo.
Grover E. Murray, Louisiana State University, Baton Rouge, La.
Robert B. Neuman, U.S. Geological Survey, Washington, D.C.
Willard H. Parsons, Wayne State University, Detroit, Mich.
Troy L. Pewe, University of Alaska, College, Alaska
Ralph K. Roberts, U.S. Geological Survey, Menlo Park, Calif.
Francis P. Shepard, Scripps Institution of Oceanography, La Jolla, Calif.
E. H. Timothy Whitten, Northwestern University, Evanston, Ill.
Harry B. Whittington, Harvard University, Cambridge, Mass.

Twenty-sixth Conference, International Federation for Documentation, Rio de Janeiro, Brazil:

Allen Kent, Western Reserve University, Cleveland, Ohio

UNESCO Arid Lands Symposium, Paris, France:

William D. Schorger, the University of Michigan, Ann Arbor, Mich.

Visit and Lecture at the Czechoslovakian Academy of Biological Sciences, Prague, Czechoslovakia:

Paul H. Maurer, University of Pittsburgh, Pittsburgh, Pa.

Visiting European Centers of Child Research:

Paul H. Mussen, University of California, Berkeley, Calif.

Visiting Soviet Laboratories, U.S.S.R.:

Richard M. Foose, Stanford Research Institute, Menlo Park, Calif.

Visiting and Working in Laboratories in the U.S.S.R. During the Summer of 1960, Leningrad and Moscow, Russia:

Jack Frumin, Basle, Switzerland

SCIENTIFIC INFORMATION SERVICE

ACTA METALLURGICA, Schenectady, N.Y.; *Translation and Publication of Five Russian Journals; Doklady Akademi Nauk SSSR; Obogashchnie (Ore Beneficiation); Ogneupory (Refractories); Metallovedenie I Obrabotka Metallov (Metal Science and Treatment); and Metallurg;* 1 year; $60,787

The Translation and Publication of the 1959 Issues of the Physics of Metals and Metallography and the Journal of Abstracts Metallurgy, Parts A and B; 1 year; $49,213

Translation and Publication of Three Russian Books and/or Monographs From Scientific Literature of the Soviet Union Related to Materials Science and Engineering; 1 year; $23,046

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Washington, D.C.; *Symposium on the Sciences in Communist China;* 7 months; $29,925

AMERICAN AUTOMATIC CONTROL COUNCIL, PURDUE UNIVERSITY, Lafayette, Ind.; *Partial Support for Publication of the Proceedings of the First International Federation of Automatic Control;* 1 year; $20,000

AMERICAN CERAMIC SOCIETY, INC., Columbus, Ohio; *Translation and Publication of the Russian Journal, "Glass and Ceramics";* 4 years; $19,960

AMERICAN DOCUMENTATION INSTITUTE, Bethesda, Md.; *Full-Time Executive Secretariat at the American Documentation Institute;* 3 years; $49,500

AMERICAN FISHERIES SOCIETY, Ann Arbor, Mich.; *Publication of a List of Common and Scientific Names of Fishes From the United States and Canada;* 1 year; $4,775

AMERICAN GEOGRAPHICAL SOCIETY, New York, N.Y.; *Translation and Dissemination of "Soviet Geographical Literature";* 1 year; $38,042

AMERICAN GEOPHYSICAL UNION, Washington, D.C.; *English Edition of the Russian Bulletin of the U.S.S.R., 1959 Geophysics Series;* 1 year; $53,360

Preparation and Publication of Reviews of U.S. Geophysics for the Twelfth General Assembly of IUGG; 6 months; $9,400

Translation and Publication of the Russian Journal, "Geodesy and Cartography" Beginning With the 1959 Issues; 1 year; $25,466

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Washington, D.C.; *Basic Problems of Biological Aging;* 1 year; $9,100

Continued Support of the Translation and Publication of an English Edition of the 1959 Issues of the Russian Journal "Entomological Review"; 1 year; $32,293

Preparation of a Supplement to the "Bibliography of Eastern Asiatic Botany," by E. D. Merrill and E. H. Walker; $25,130

Study of the Feasibility of Establishing a Joint Editorial-Business Managerial Office for Certain Biological Periodicals; 1 year; $9,100

Supplementary Support of the Translation of Publication of the Russian Journal, "Soil Science"; 3 months: $42,654

Translation and Publication of the 1959 Issues of "Doklady" (Biological Sciences and Botanical Sciences Sections), "Microbiology," and "Plant Physiology"; 1 year; $75,133

Translation and Publication of the 1959 Issues of the Russian Journal, "Soil Science"; 1 year; $49,464

AMERICAN INSTITUTE OF PHYSICS, New York, N.Y.; *Partial Support of a Decennial Index to "The Journal of the Acoustical Society of America";* 1 year; $31,800

Study of Physics Publishing Problems; 3 years; $108,700

Support of an English Edition of the 1960 Issues of the Russian Journal of Acoustics; 1 year; $6,900

Support of the 1960 Issues of an English Edition of the Russian Journal of Technical Physics; 1 year; $17,600

Support of the 1960 Issues of the Translation and Publication of the Physics Section of the Russian Journal, Doklady; 1 year; $23,700

Support for the Translation and Publication of the 1960 Issues of the Russian Journal of Experimental and Theoretical Physics; 1 year; $52,500

The 1959 Issues of an English Edition of the Russian Journal "Crystallography"; 1 year; $15,725

The Translation and Publication of the 1959 Issues of the Russian Journal "Astronomy"; 1 year; $28,650

Translation and Publication of the 1959 Issues of a New Russian Journal "Solid State Physics"; 1 year; $50,860

Translation and Publication of the Russian Journal, "Progress of Physical Sciences"; 1 year; $39,000

AMERICAN MATHEMATICAL SOCIETY, Providence, R.I.; *Continued Partial Support for the Publication of "Mathematical Reviews";* 1 year; $54,800

Emergency Support of the Transactions of the American Mathematical Society; 1 year; $13,400

Extension of the Translation of Selected Russian Mathematical Articles Project; 1 year; $25,576

Survey of Contemporary Chinese Mathematical Research To Study Translation Needs and the Preparation of Reviews of Chinese Mathematical Articles; 1 year; $43,105

Translation and Publication of Three Russian Books: "Some Applications of Functional Analysis in Mathematical Physics;" "Some Questions in the Theory of Moments;" and "Theory of Analytic Functions of Several Complex Variables;" 1 year; $13,105

Translation of the Pure Mathematics Section of "The Proceedings of the U.S.S.R. Academy of Science—Doklady;" 5 months; $11,887

AMERICAN METEOROLOGICAL SOCIETY, Boston, Mass.; *Preparation and Publication of a Backlog of Abstracts and a Decennial Index for "Meteorological Abstracts and Bibliography";* 2 years; $155,250

AMERICAN MICROSCOPICAL SOCIETY, MONTANA STATE COLLEGE, Bozeman, Mont.; Harold W. Manter; *Partial Support for Reprinting Back Issues of the Transactions of the American Microscopical Society;* 3 years; $11,250

AMERICAN MICROSCOPICAL SOCIETY, THE UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; *Preparation and Publication of a Cumulative Index to Volumes 1–80 of the "Transactions of the American Microscopical Society;"* 2 years; $10,000

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; *Publication of Two Monographs on Texas Permian Invertebrates;* 1 year; $6,000

AMERICAN PHILOSOPHICAL ASSOCIATION, NEW YORK UNIVERSITY, New York, N.Y.; *Translation and Critique of Selected Works of Some Leading Polish Logicians;* 1 year; $8,500

AMERICAN ROCKET SOCIETY, INC.; New York, N.Y.; *Selected Translation of Russian Material in the Field of Astronautics;* 1 year; $55,408

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, New York, N.Y.; *Continued Support for the Translation and Publication of the Russian Journal "Applied Mathematics and Mechanics, 1960 Series;"* 1 year; $33,000

Partial Support for the Publication of a "Bibliography on Gas Turbines 1896–1948;" 1 year; $4,500

Translation and Publication of the 1958 Issues of the Russian Journal, "Trenie I Iznos V Mashinak" (Friction and Wear in Machinery); 1 year; $6,300

AMERICAN STATISTICAL ASSOCIATION, Washington, D.C.; *Publication of an Analytical Index to the "Journal of the American Statistical Association, Volumes 35–50 (1940–55)*; 1 year; $13,000

ARCTIC INSTITUTE OF NORTH AMERICA, Washington, D.C.; *Translation and Publication of Russian Language Publications in Anthropology;* 1 year; $38,734

ASSOCIATION FOR ASIAN STUDIES, Ann Arbor, Mich.; *A Study of Publishing and Information Services in the Social, Natural and Applied Sciences in Mainland China for the Period 1949–59;* 2 years; $25,530

ASSOCIATION OF SPECIAL LIBRARIES AND INFORMATION BUREAUS, London, England; *Comparative Efficiency of Indexing Systems;* 18 months; $16,700

BERNICE P. BISHOP MUSEUM, Honolulu, Hawaii; *Establishment of a Pacific Science Information Center;* 1 year; $8,500

BIOLOGICAL ABSTRACTS, UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; *Continued Expansion of Coverage of "Biological Abstracts;"* 1 year; $150,000

BOISE JUNIOR COLLEGE, Boise, Idaho; *A Study of Reproductive Cycles in California Acmaeidae;* 6 months; $300

BOSTON UNIVERSITY, Boston, Mass.; *Publication of "A Study of Navaho Windway;"* 2 years; $4,000

BUREAU OF THE CENSUS, Washington, D.C.; *Bibliography of Social Science Periodicals and Monographs Published in Selected Difficult Languages;* 1 year; $45,000

CALIFORNIA BOTANICAL SOCIETY, SAN FRANCISCO STATE COLLEGE, San Francisco, Calif.; *"Index to Plant Chromosome Numbers;"* 2 years; $3,150

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; *Preparation of Illustrations for Volume II of "Catalogue of Galaxies and Clusters of Galaxies";* 1 year; $5,750

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; *Completion of the Manuscript "The Nervous System in Invertebrates;"* 20 months; $15,000

CAMBRIDGE LANGUAGE RESEARCH UNIT, Cambridge, England; *New Logico-Mathematical Methods for the Analysis of Languages for Machine Translation;* 1 year; $5,500

New Techniques for Classification: The Theory of Clumps; 1 year; $14,800

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; *Compilation of a Bibliography of Statistical Computer Routines;* 1 year; $12,700

An Operations-Research Study of the Scientific Reading Practices of Chemists and Physicists and an Analysis of Economics of Publication of Leading Chemical Journals; 3 months; $5,000

Research on Measurement of Value of Recorded Scientific Information; 6 months; $16,800

CHEMICAL ABSTRACTS SERVICE, THE OHIO STATE UNIVERSITY, Columbus, Ohio; *Research on Chemical Documentation—Project I;* 1 year; $69,800

Research on the Semantic Content of Chemical Literature; 1 year; $57,900

Study of a New Publication "Key Work in Chemical Context," KWICC; 1 year; $150,000

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; *Study Leading to the Establishment of an Abstracting Service Covering Soil and Water;* 9 months; $22,000

CORNELL UNIVERSITY, Ithaca, N.Y.; *Continued Support of the Bibliography of Extraterrestrial Radio Noise;* 16 months; $18,500

ENGINEERS JOINT COUNCIL, New York, N.Y.; *An Investigation, Evaluation, and Report on the Current Availability of Polytechnical Dictionaries and Technical Glossaries, and an Examination of the Need for Additional Dictionaries in Engineering and Scientific Fields;* 5 months; $175

ENTOMOLOGICAL SOCIETY OF AMERICA, College Park, Md.; *Partial Support for the Compilation of Noncurrent Volumes of the "Index to the Literature of American Economic Entomology;"* 2 years; $26,300

FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY, Washington, D.C.; *Partial Support for the Office of Biological Handbooks;* 2 years; $40,000

FORDHAM UNIVERSITY, New York, N.Y.; *Preparation of a Book on the Chemistry and Biochemistry of Lignin;* 1 year; $4,000

FREE UNIVERSITY OF BRUSSELS, Brussels, Belgium; *Continued Support for the Physico-Chemical Constants of Binary Systems in Concentrated Solutions;* 2 years; $15,000

GEOCHEMICAL SOCIETY, Washington, D.C.; *Publication of Geobotanical Methods for Geological Investigations;* 1 year; $1,510

Translation of Five Russian Monographs on Earth Sciences; 1 year; $18,500

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; *The Biology of the Clostridia;* 6 months; $5,925

UNIVERSITY OF GEORGIA, Athens, Ga.; *Publication of a World Monograph of the Genus Hypoxylon;* 1 year; $5,200

HARVARD UNIVERSITY, Cambridge, Mass.; *Preparation and Publication of a "Reference Catalogue of Bright Galaxies;"* 1 year; $8,880

Publication of "Index Nominum Lichenum Annis 1954–58 Vulgatorium;" 1 year; $11,850

Research on Automatic Translation of Russian Into English; 1 year; $200,000

UNIVERSITY OF ILLINOIS, Urbana, Ill., *Publication of the Monograph "Sex and Age Ratios in North American Ducks;"* 1 year; $4,600

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; *Symposium Concerning a National Program for the Systematic Evaluation, Selection, Abstracting, and/or Translation, Publication, and Dissemination of Russian and East European Linguistic Literature;* 1 year; $6,325

INSTITUTE FOR THE ADVANCEMENT OF MEDICAL COMMUNICATION, New York, N.Y.; *Extension and Completion of a Previously Initiated Survey Entitled "Metabolism of New Scientific Information;"* 1 year; $2,500

INSTITUTE OF MATHEMATICAL STATISTICS, Princeton, N.J.; *Preparation and Publication of an Index-Guide to Volumes 1–30 of the "Annals of Mathematical Statistics;"* 2 years; $22,550

INSTRUMENT SOCIETY OF AMERICA, Pittsburgh, Pa.; *1959 Issues of Four Russian Journals: "Automation and Remote Control;" "Measurement Techniques;" "Instruments and Experimental Techniques;" and "Industrial Laboratory;"* 1 year; $112,981

IOWA STATE UNIVERSITY, Ames, Iowa; *Revision of Handbook of Freshwater Fishery Biology;* 1 year; $12,900

IOWA STATE UNIVERSITY PRESS, Ames, Iowa; *Publication of "Flora of Missouri" by Julian A. Steyermark;* 1 year; $15,000

JOURNAL OF CHEMICAL EDUCATION, Wooster, Ohio; *Preparation and Publication of a Ten-Year Cumulative Index;* 1 year; $8,000

LIBRARY OF CONGRESS, Washington, D.C.; *Assembling of a Union Card Catalog of Oriental Vernacular Serials in the U.S. and Canadian Libraries;* 1 year; $11,000

Preparation and Publication of a Guide to International Information Facilities in Science, Technology, Medicine and Agriculture; 1 year; $27,730

Publication of Part I of a Monthly "World List of Future International Meetings;" 1 year; $18,500

Publication of the Monthly Index of Russian Accessions and East European Accessions Index; 1 year; $66,000

Reference Center for Reports on Government-Supported Scientific Research; 1 year; $22,000

LINGUISTIC SOCIETY OF AMERICA, UNIVERSITY OF CALIFORNIA AT LOS ANGELES, Los Angeles, Calif.; *Partial Support of the Ninth International Congress of Linguists;* 3 months; $25,000

LLOYD LIBRARY AND MUSEUM, Cincinnati, Ohio; *Publication of Bibliography of American Paleobotany: 1952–57;* 1 year; $500

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; *Basic Research on Methods of Translating Languages by Machine;* 1 year; $126,000

Continued Support for the Translation and Publication of 1959 Issues of English Editions of Three Russian Journals; Radio Engineering; Radio Engineering and Electronics; and Telecommunications; 1 year; $71,000

Study Into the Dissemination of Scientific and Technical Information in the U.S.S.R.; 2 years; $44,217

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; *Publication of "Essays in the Science of Culture" Edited by Dole and Carneiro;* 1 year; $4,675

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; *Partial Support for the Preparation of Annual Critical Reviews of Heat Transfer Research;* 2 years; $8,000

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL, Washington, D.C.; *Office of Documentation;* 1 year; $86,920

Publication of Biological and Ecological Study of Rats on Pacific Islands; 1 year; $3,000

Study of Scientific Information and Communication; 1 year; $26,134

Publication of the Journal, "International Geology Review;" 1 year; $55,825

Support of Office of Documentation; 1 year; $41,400

Translation of the "Doklady Geology Series—1959 Volume Year;" 1 year; $33,130

Translation and Publication of an English Edition of the 1959 Issues of the Russian Bulletin (Izvestiya) of the Academy of Sciences of the U.S.S.R.: Geology Series; 1 year; $49,000

NATIONAL BUREAU OF STANDARDS, Washington, D.C.; *Research Information Center and Advisory Service on Information Processing;* 1 year; $50,000

NATIONAL DIET LIBRARY, Tokyo, Japan; *Translation and Printing of Quarterly "Index to Periodical Articles, Natural Sciences Section Into English;"* 1 year; $16,000

NATIONAL FEDERATION OF SCIENCE ABSTRACTING AND INDEXING SERVICES, Philadelphia, Pa.; *Visit to the Soviet All-Union Institute of Scientific and Technical Information;* 1 month; $4,880

NEW YORK BOTANICAL GARDEN, New York, N.Y.; *Pilot Study of Application of Electronic Data Processing Devices to Systematic and Economic Botany;* 4 months; $4,750

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; *Preparation and Publication of "Bibliography of Hydrometry;"* 1 year; $25,000

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; *Preparation and Publication of "An Anthropological Bibliography of the Eastern Seaboard," Volume II;* 2 years; $12,800

OLOF LARSELL, Portland, Oreg.; *Completion of the Manuscript of a Monograph "The Cerebellum From Myxinoids to Man;"* 1 year; $1,500

OPERATIONS RESEARCH SOCIETY OF AMERICA, Cambridge, Mass.; *Preparation of an Annotated Bibliography on Operations Research 1958–60;* 2 years; $53,300

OPTICAL SOCIETY OF AMERICA, Washington, D.C.; *Translate and Publish the 1960 Issues of an English Edition of the Russian Journal "Optics and Spectroscopy;"* 1 year; $50,000

OREGON STATE COLLEGE, Corvallis, Oreg.; *Preparation for Publication of Revised Edition of "A Manual of the Higher Plants of Oregon;"* 1 year; $3,000

ORGANIC ELECTRONIC SPECTRAL DATA, INC., Rensselaer, N.Y.; *Preparation for Publication of Organic Electronic Spectral Data 1956–57 (Volume III);* 1 year; $4,000

ORGANIZATION OF AMERICAN STATES, Washington, D.C.; *A Cooperative Study of the Resources, Services and Potential for Expansion of Documentation Centers of Latin America;* 2 months; $1,362

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; *Compilation and Publication of an Illustrated "Catalog of Fossil Spores and Pollen;"* 1 year; $21,800

Publication of "Underwater Acoustics Handbooks;" 1 year; $7,300

ROSCOE B. JACKSON MEMORIAL LABORATORY, Bar Harbor, Maine; *Continued Support for a Subject-Strain Bibliography and a Gene*

Bibliography of the Mouse; 2 years; $9,200

SAINT LOUIS UNIVERSITY, Saint Louis, Mo.; *Compilation of Part IV of the "Bibliography on the Genetics of Drosophila;"* 4 years; $3,750

SCIENCE SERVICE, Washington, D.C.; *Editing, Printing, and Mailing a 16-Page Supplement to the Science News Letter on Mainland Chinese Science;* 3 months; $4,236

SMITHSONIAN INSTITUTION, Washington, D.C.; *Classification and Multiplicity of Growth Layers in the Branches of Trees;* 1 year; $4,500

Operating Expenses of the Biosciences Information Exchange; 1 year; $45,000

Partial Support for the Mechanization of the Biosciences Information Exchange; 1 year; $40,000

SOCIAL SCIENCE RESEARCH COUNCIL, New York, N.Y.; *Project to Enable the Joint Committee on Contemporary China of the American Council of Learned Societies and the Social Science Research Council to Assist U.S. Research Libraries to Obtain Those Materials Relating to Mainland China Which Are Currently Being Produced by the U.S. Joint Publications Research Service;* 3 years; $15,000

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; *Preparation of Bibliography of the Geology and Mineral Resources of California, 1937 to 1959;* 1 year; $11,500

SPECIAL LIBRARIES ASSOCIATION, New York, N.Y.; *Continued Support for the Operation of the Scientific Translation Center;* 1 year; $24,000

Survey of Translation Activities in Technology; 1 year; $34,105

STANFORD UNIVERSITY PRESS, Stanford, Calif.; *Preparation for Publication of a Revised, English Edition of "Hydrodynamics of Lubrication" by N. Tipei;* 1 year; $15,400

Translation of "Hydroaerodynamics of Lubrication," by N. Tipei from Romanian to English; 1 year; $3,625

STANFORD UNIVERSITY, Stanford, Calif.; *Proposed Translation and Publication of Dr. E. M. Savitsky's Book Entitled "The Influence of Temperature on the Mechanical Properties of Metals and Alloys";* 6 months; $5,980

TEXAS RESEARCH FOUNDATION, Renner, Tex.; *Publication of Part VI (the Salicaceae and Index) of Volume 3 of "Flora of Texas";* 1 year; $2,600

UNIVERSITY OF TOLEDO, Toledo, Ohio; *Completion of the Manuscript for a New Edition of "The Physical Chemistry of the Silicates";* 2 years; $11,000

U.S. DEPARTMENT OF AGRICULTURE, Washington, D.C.; *A Study of the Availability and Utilization of Oriental Scientific Publications in the USDA Library;* 2 years; $25,000

U.S. DEPARTMENT OF COMMERCE, Washington, D.C.; *Dissemination of Government Scientific Reports;* 1 year; $55,000

Reproduction and Distribution of Air Information Division (AID) Abstracts; 6 months; $38,762

U.S. DEPARTMENT OF STATE, Washington, D.C.; *Employment of a Polish National at the United States Embassy in Warsaw, Poland;* 8 months; $460

U.S. JOINT PUBLICATIONS RESEARCH SERVICE, New York, N.Y.; *Translation of "Referativny Zhurnal Biologiia";* 1 month; $38,374

WASHINGTON STATE UNIVERSITY, Pullman, Wash.; *Publication of a Monograph on the Genus Tilletia;* 1 year; $3,400

UNIVERSITY OF WASHINGTON, Seattle, Wash.; *A Chinese-English Mechanical Translation Project for Research in the Lexicographical and Structural Problems of the Chinese Language;* 1 year; $53,700

WAYNE STATE UNIVERSITY, Detroit, Mich.; *Partial Support of a Working Conference on Mechanical Translation During July 1960, at Princeton, New Jersey;* 4 days; $5,000

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; *Test Program To Evaluate Notation Systems for Chemical Structural Formulas;* 1 year; $5,600

Test Program for Evaluating Procedures for the Exploitation of Literature of Interest to Metallurgists; 1 year; $159,200

UNIVERSITY OF WISCONSIN, Madison, Wis.; *Translation and Foreign Scientific Center in the Fields of Geophysics, Glaciology and Geology (Polar Research)*; 2 years; $42,936

APPENDIX E

Fellowship Awards Offered

National Science Foundation Fellowship Awards, by Type and Field, Fiscal Year 1960

Field	Graduate	Cooperative graduate	Graduate teaching assistants	Postdoctoral regular	Postdoctoral senior	Science faculty	Secondary teachers	Total
Life Sciences:								
Agriculture	4	17	8	1	1	4	0	35
Anthropology	19	4	7	6	1	0	0	37
Biochemistry	40	36	4	18	8	3	5	114
Biophysics	13	2	0	3	1	1	0	20
Botany	15	19	19	4	2	13	9	81
General Biology	5	12	1	0	0	8	134	160
Genetics	15	22	9	2	7	1	0	56
Medical Sciences	19	10	0	17	0	8	0	63
Microbiology	9	6	6	5	1	1	1	29
Psychology	32	67	23	7	2	1	1	133
Zoology	62	59	57	11	5	22	23	239
Subtotal	233	254	143	74	28	62	173	967
Physical Sciences:								
Astronomy	12	9	2	5	1	3	0	32
Chemistry	192	237	145	35	7	31	39	686
Earth Sciences	24	43	47	9	5	9	1	188
Engineering Sciences	202	268	76	9	5	86	0	646
Mathematical Sciences	168	171	99	25	11	63	226	703
Physics	298	173	51	20	18	31	15	606
General	0	0	0	0	0	0	0	0
Subtotal	946	901	420	103	47	223	281	2,931
Social Sciences	21	35	17	3	0	0	0	76
Natural Sciences:								
General	0	0	0	0	0	0	46	46
Total	1,200	1,190	580	180	75	285	500	4,010

Names, Residences, and Fields of Study of Individuals Offered National Science Foundation Fellowships

ALABAMA

Graduate

BURGESS, EDWARD M., Birmingham, Chemistry.
COULTER, CLAUDE A., Phoenix City, Physics.
GUNTER, THOMAS E., Tallahassee, Physics.
HOLMES, CHARLES H., Lafayette, Engineering.
JONES, LAWRENCE H., Mobile, Biochemistry.
MACNAMARA, JOHN P., Mobile, Zoology.
MAGUIRE, JOHN A., II, Birmingham, Chemistry.
MILLER, EDWARD J., Mobile, Zoology.
MORAN, MARTIN T., Mobile, Physics.
SANDERSON, JACK T., Birmingham, Physics.

Cooperative Graduate

ALLEN, LEON H., Jr., Opelika, Agriculture.
BENTLEY, WILLIAM H., Huntsville, Engineering.
COGGINS, JAMES L., Brundidge, Engineering.
COOPER, GARY P., Springhill, Medical Sciences.
COULTER, PHILIP W., Phenix City, Physics.
CUTCHEN, JOHN T., Dothan, Physics.
FLOYD, THOMAS D., Birmingham, Engineering.
GARRETT, WILLIAM R., Birmingham, Physics.
MCKERLEY, HOYT W., Jr., Anniston, Chemistry.
MULLINS, PEGGY J., Huntsville, Mathematics.
PROPST, FRANKLIN M., Anniston, Physics.
SMITH, CLOYD V., Jr., Sylacauga, Engineering.

Postdoctoral

HILL, PAUL D., Dadeville, Mathematics.

Science Faculty

PARKER, JEAN T., Florence, Mathematics.
WHITTEN, KENNETH W., Dawson, Chemistry.

ALABAMA—Continued

Summer Fellowships for Graduate Teaching Assistants

BROWN, JULIA D., Trussville, Mathematics.
FRANCIS, ROBERT C., Jr., Hartselle, Engineering.
GILBERT, JIMMIE D., Auburn, Mathematics.
MANLEY, LILLIAN C., Demopolis, Zoology.
SHEPPARD, ALBERT P., Tuscaloosa, Physics.
WHITT, RICHARD E., Auburn, Engineering.

Summer Fellowships for Secondary School Teachers

BARKLEY, MARK ERNEST, Autaugaville, Mathematics.
GLENN, MOSES LEONARD, Montgomery, Mathematics.
HUMPHREYS, DOUGLAS D., Helena, Mathematics.
JONES, ERNEST L., Orrville, General Sciences.
NANCARROW, DOROTHY V., Birmingham, Biology.
NORRIS, CHARLES W., Andalusia, Mathematics.
SABOL, SR. M. TERESITA, Montgomery, Chemistry.

ALASKA

Science Faculty

JOHNSON, ALBERT W., Fairbanks, Botany.
KNIGHT, GEORGE R., Fairbanks, Engineering.

ARIZONA

Graduate

ANDERSON, LORAN C., Page, Botany.
BISSETT, DAVID H., Prescott, Earth Sciences.
COOK, DON B., Scottsdale, Chemistry.
DOLE, JIM W., Phoenix, Zoology.
LANGE, ROBERT V., Phoenix, Physics.
LEWIS, RICHARD B., Douglas, Physics.
NEVILLE, MELVIN K., Tucson, Chemistry.
NOYES, ROY B., Tucson, Engineering.
WEXLER, JONATHAN D., Tempe, Mathematics.

Cooperative Graduate

BARTZ, ALBERT E., Tucson, Psychology.
BROWN, KEITH S., Jr., Amado, Chemistry.
BRYANT, MARTHA, L., Tucson, Chemistry.
COSTA, BARBARA M., Tucson, Engineering.
FENWICK, CHARLES A., Phoenix, Psychology.
FENWICK, ROBERT B., Phoenix, Engineering.
GREGORY, BOB L., Phoenix, Engineering.
MOORES, ELDRIDGE M., Globe, Earth Sciences.
O'CONNELL, CONSTANCE J., Tucson, Psychology.
PEAKE, EDMUND J., Jr., Phoenix, Mathematics.
ROTH, RICHARD L., Tucson, Mathematics.
WAIT, JOHN V., Tucson, Engineering.

Postdoctoral

CONRAD, DAVID A., Tucson, Engineering.

Science Faculty

HOSHAW, ROBERT W., Tucson, Botany.
MEES, QUENTIN M., Tucson, Engineering.

Summer Fellowships for Graduate Teaching Assistants

MONROE, JAMES E., Prescott, Zoology.
VANEK, POLLY H., Tucson, Astronomy.
WALTER, EVERETT L., Mesa, Mathematics.

Summer Fellowships for Secondary School Teachers

DAVY, ROGER H., Phoenix, Zoology.
SHOWLEY, DEVON LEE, Scottsdale, Physics.
TOOHEY, JACK V., Phoenix, Biology.

ARKANSAS

Graduate

ARNOLD, RICHARD C., Fayetteville, Physics.
CHRISTIE, JOE H., Magnolia, Chemistry.
HILL, JOHN W., Fayetteville, Chemistry.
RUSSELL, CHARLES D., El Dorado, Chemistry.

Cooperative Graduate

ATTERBERRY, PHILIP R., Van Buren, Physics.
CHILDS, WILLIAM V., Magnolia, Chemistry.
DMUCHOVSKY, BASIL, Fayetteville, Chemistry.
HALPERN, LYNDA S., Fayetteville, Genetics.
ISGRIG, FREDERICK A., Little Rock, Psychology.
SEAY, BILLY M., Magnolia, Psychology.
WEAR, JAMES O., Fayetteville, Chemistry.

Science Faculty

IMHOFF, JOHN L., Fayetteville, Mathematics.
RADLEY, EDWARD T., Conway, Chemistry.
WEBB, BRYAN JR., Fayetteville, Engineering.

Summer Fellowships for Graduate Teaching Assistants

BLASKOVICS, KAY H., Stuttgart, Mathematics.
FREEMAN, THOMAS J., Jr., Little Rock, Earth Sciences.
GALLOWAY, LOUIE A. III, Pine Bluff, Physics.
MACE, KENNETH D., North Little Rock, Botany.
SPARKS, BRYAN, Fayetteville, Chemistry.

Summer Fellowships for Secondary School Teachers

BLEVINS, EULA L., North Little Rock, Biology.
BOZONE, DAISY LOUISE, Junction City, Mathematics.
DOBSON, JACK T., Lonoke, Biology.
GARNER, BERNICE L., Norphlet, Biology.
JORDAN, CHESTER L., Fort Smith, General Science.
MCDERMOTT, CECIL W., Little Rock, Mathematics.
MILLER, MARIE WARD, McCrory, Biology.
NEWTON, MCKINLEY, Tuckerman, General Science.
PURTLE, IDA M., Prescott, Biology.

CALIFORNIA

Graduate

ABERS, ERNEST S., San Francisco, Physics.
AITKEN, DONALD W., Jr., Palo Alto, Physics.
ALBINI, FRANK A., Altadena, Engineering.
ALBRIGHT, NORMAN W., Pasadena, Physics.
ANDERSON, DONALD W., Van Nuys, Mathematics.
ARNQUIST, CLIFFORD W., Playa Del Rey, Mathematics.
AUGUST, GERALD, Berkeley, Engineering.
AWBREY, FRANK T., Riverside, Zoology.
BACHER, ANDREW D., Pasadena, Astronomy.
BANKS, PHILIP O., Sacramento, Earth Sciences.
BAUER, ANDREW B., Palo Alto, Engineering.
BERNICK, ROBERT L., Los Angeles, Physics.
BLANDFORD, ROBERT R., Pasadena, Earth Sciences.
BLOOMFIELD, VICTOR A., Cotati, Chemistry.
BORGMAN, LEON E., Los Angeles, Mathematics.
BOULWARE, DAVID G., Lafayette, Physics.
BOYD, ROBERT G., Riverside, Physics.
BRONZAN, JOHN B., Los Angeles, Physics.
BROWN, LOWELL S., Visalia, Physics.

Brown, Stephen L., Palo Alto, Physics.
Burnett, Donald S., Berkeley, Chemistry.
Chong, Delano P., San Francisco, Chemistry.
Clark, Alan R., San Jose, Physics.
Cohen, Julia H., Menlo Park, Zoology.
Crichton, James H., Berkeley, Physics.
Dashen, Roger F., Redding, Physics.
Daybell, Melvin D., Pasadena, Physics.
Dolby, Ray M., Cupertino, Physics.
Douglass, Roger L., Albany, Physics.
Dragt, Alex J., Berkeley, Physics.
Duke, Michael B., Los Angeles, Earth Sciences.
Enderton, Herbert B., San Jose, Mathematics.
Enright, James T., San Diego, Zoology.
Erskine, Melville C., Jr., San Jose, Earth Sciences.
Evensen, David A., Pasadena, Engineering.
Fish, Robert A., Los Altos, Chemistry.
Gage, Donald H., Durham, Engineering.
Gibson, Edward G., Pasadena, Engineering.
Gillespie, Barbara C., Los Altos, Botany.
Goddard, William A., Los Angeles, Engineering.
Graham, Ronald L., Berkeley, Mathematics.
Griffiths, Robert B., Stanford, Physics.
Grimes, Charles C., Berkeley, Physics.
Griswold, Ralph E., Palo Alto, Engineering.
Grzesik, Jan A., Inglewood, Physics.
Gunckel, Thomas L. II, Pomona, Engineering.
Hagadorn, Irvine R., Albany, Zoology.
Hales, Alfred W., Pasadena, Mathematics.
Hardman, Martha J., Palo Alto, Anthropology.
Harrington, David M., Los Angeles, Mathematics.
Hassler, Frances J., Los Angeles, Anthropology.
Hayler, Donald A., Belmont, Physics.
Hearst, John E., Pasadena, Chemistry.
Heilbron, John L., Berkeley, Social Sciences.
Hendricks, Tereah J., Berkeley, Physics.
Hermsen, Robert W., Berkeley, Engineering.
Herrmann, Leonard R., Albany, Engineering.
Holdaway, Michael J., Berkeley, Earth Sciences.
Hone, Daniel W., San Francisco, Physics.
Hudson, Doherty B., San Francisco, Medical Sciences.
Hultgren, Glen O., Berkeley, Chemistry.
Hundley, Richard O., San Gabriel, Physics.
Irvine, William M., Beverly Hills, Physics.
Janssens, Thomas J., Santa Clara, Physics.
Johnson, Dean M., Pasadena, Earth Sciences.
Johnson, Harmon W., Santa Clara, Engineering.
Jorgensen, Norman E., Oakland, Physics.
Keesing, Roger M., Stanford, Anthropology.
Keightley, Willard O., Pasadena, Engineering.
Kennedy, Kenneth A. R., San Francisco, Anthropology.
Kent, William L., San Diego, Mathematics.
King, Jack L., Antioch, Genetics.
Kirk, William L., Jr., Los Angeles, Psychology.
Klotz, Eugene A., Costa Mesa, Mathematics.
Kohl, Elizabeth N., Arcadia, Chemistry.
Konrad, Michael W., Berkeley, Biophysics.
Krasne, Franklin B., Sausalito, Psychology.
Kruse, Robert L., Upland, Mathematics.
Lamarche, Valmore C., Jr., Berkeley, Earth Sciences.
Landgrebe, John A., San Francisco, Chemistry.
Landsberg, Arne, National City, Engineering.
Layman, William E., Wicovina, Engineering.
Lebovitz, Norman R., Van Nuys, Physics.
Leitner, Philip, Orinda, Zoology.
Levine, Ira N., Van Nuys, Chemistry.
Lewis, Francis H., Menlo Park, Physics.
Libby, William J., Berkeley, Genetics.
Lindsay, Sandra L., Walnut Creek, Genetics.
Lindquist, Evert E., Berkeley, Zoology.
Linson, Lewis M., Oakland, Physics.
MacIntyre, Ferren, Riverside, Chemistry.
Marshall, J. Howard, III, Pasadena, Physics.
Matchett, Mary D., San Carlos, Biophysics.
Matthews, June L., Altadena, Physics.
McIvor, Ivor K., Stanford, Engineering.
McLean, Norman, Jr., Berkeley, Zoology.
McManigal, Paul G. M., South Pasadena, Physics.
Mihalas, Dimitri M., Los Angeles, Astronomy.
Milder, David M., N. Hollywood, Physics.
Mock, William L., Santa Ana, Chemistry.
Muffler, Leroy J. P., Claremont, Earth Sciences.
Muirbrook, Newell K., Ogden, Engineering.
Munson, John H., Burbank, Physics.
Murray, Bettie E., Fontana, Biochemistry.
Nearing, James C., Hawthorne, Physics.
Neighbor, James E., Walnut Creek, Physics.
Nelson, Keith B., Berkeley, Zoology.
Nelson, Wayne B., Pasadena, Physics.
Neville, Donald E., Los Angeles, Physics.
Ng, Judith, Oakland, Mathematics.
Oglesby, Larry C., Atascadero, Zoology.
Palmer, Leigh H., Sacramento, Physics.
Paolillo, Dominick J., Jr., Davis, Botany.
Parker, Peter D. M., Monterey Park, Physics.
Paulikas, George A., Berkeley, Physics.
Pearson, Gerald A., Redondo Beach, Chemistry.
Peck, Charles W., Pasadena, Physics.
Peekema, Richard M., Gridley, Chemistry.
Pierce, William H., Los Altos, Engineering.
Pitzer, Russell M., Berkeley, Chemistry.
Rabinowitz, Lawrence, Berkeley, Medical Sciences.
Ralls, Kenneth M., Stanford, Engineering.
Rapaport, Seymour A., Los Angeles, Medical Sciences.
Rapier, Jerry L., Baldwin Park, Physics.
Reneau, Leon R., San Mateo, Engineering.
Rothkopf, Michael H., Beverly Hills, Social Sciences.
Royce, Edwin B., Pasadena, Physics.
Schultz, Claude H., Davis, Physics.
Schweitzer, Glenn E., Los Angeles, Engineering.
Searles, Richard B., Berkeley, Botany.
Seielstad, George A., Corte Madera, Physics.
Simpson, Paul G., Wilmington, Chemistry.
Sinoff, William A., Los Angeles, Engineering.
Smith, David H., Alhambra, Social Sciences.
Smith, Earnest E., Sepulveda, Physics.
Snively, Frank T., Pasadena, Physics.
Sokol, Otto M., Palo Alto, Zoology.

CALIFORNIA—Continued

SOULES, GEORGE W., Jr., Van Nuys, Mathematics.
SPARKS, MARSHALL S., Jr., Berkeley, Physics.
STREET, ROBERT L., San Diego, Engineering.
SWEENEY, DARYL C., El Cerrito, Zoology.
THIEBAUX, MARTIAL L., Jr., Whittier, Physics.
THOE, DALE W., Sunnyvale, Mathematics.
THOMASSEN, KEITH I., Stanford, Engineering.
THORNTON, MELVIN C., San Diego, Mathematics.
TRAFTON, LAURENCE M., Los Angeles, Astronomy.
VALERGA, ANTONE J., Oakland, Chemistry.
VIDAVER, WILLIAM E., San Mateo, Botany.
VLASES, GEORGE C., Pasadena, Engineering.
WAGNER, TERRY J., Albany, Engineering.
WATERS, JAMES F., Santa Barbara, Zoology.
WEILL, DANIEL F., Berkeley, Earth Sciences.
WEINSTEIN, JOSEPH M., Oakland, Mathematics.
WEISBERG, HOWARD L., Los Angeles, Physics.
WERTHAMER, NATHAN R., Berkeley, Physics.
WIGLEY, NEIL M., Albany, Mathematics.
WILLEMSEN, ELEANOR W., Palo Alto, Psychology.
WILLIAMSON, ROBERT E., Jr., Berkeley, Mathematics.
WILLIS, EDWIN O., Berkeley, Zoology.
WILSON, DONALD R., Los Angeles, Chemistry.
WOLLMER, RICHARD D., Los Angeles, Mathematics.
WRIGHT, JOHN M., Pasadena, Chemistry.
WULFF, DANIEL L., Arcadia, Chemistry.
YOUNG, LAEL M., Mentone, Mathematics.
YURA, HAROLD T., Pasadena, Physics.
ZISK, STANLEY H., Stanford, Engineering.

Cooperative Graduate

AHLERS, GUENTER, Berkeley, Chemistry.
ALLEN, WILLIAM V., Palo Alto, Biology.
BAHR, ALFRED J., Redwood City, Engineering.
BALL, GEOFFREY H., Bell, Engineering.
BARBER, MARY L., Los Angeles, Biochemistry.
BECK, MYRL E., Jr., Beaumont, Earth Sciences.
BELKIN, DANIEL A., Los Angeles, Zoology.
BLACK, NEVILLE A., Los Angeles, Physics.
BLAKELY, LAWRENCE M., San Marcos, Botany.
BOHN, ROBERT K., Sebastopol, Chemistry.
BOND, FREDERICK T., Berkeley, Chemistry.

Cooperative Graduate

BOWMAN, THOMAS E., Burlingame, Engineering.
BOWSER, CARL J., Pomona, Earth Sciences.
BOYLE, RICHARD P., Spring Valley, Social Sciences.
BROWN, MELANCTHON S., Palo Alto, Chemistry.
BURCHFIEL, BURRELL C., Long Beach, Earth Sciences.
CALFEE, ROBERT C., Los Angeles, Psychology.
CARLYLE, JACK W., Berkeley, Engineering.
CARTER, NEVILLE L., Culver City, Earth Sciences.
CAULEY, JOSEPH M., Pasadena, Physics.
CHAPPLE, WILLIAM M., La Jolla, Earth Sciences.
COCIVERA, MICHAEL, Los Angeles, Chemistry.
DANFORTH, CHARLES G., Glendale, Medical Sciences.
DAVIS, GREGORY A., Berkeley, Earth Sciences.
DELEY, GARY W., Altadena, Engineering.
FELDMAN, MARTIN R., Los Angeles, Chemistry.
FLYGARE, WILLIS H., Berkeley, Chemistry.
FRITSCHE, ALBERT E., Los Angeles, Earth Sciences.
GIANCOLI, DOUGLAS C., Berkeley, Physics.
GLUSKOTER, HAROLD J., Berkeley, Earth Sciences.
GROSS, FLETCHER I., La Canada, Mathematics.
HAINLINE, LYDIA J., San Bernardino, Anthropology.
HAMILTON, GORDON W., Berkeley, Physics.
HARTMANN, RICHARD W., Santa Monica, Agriculture.
HEEGER, ALAN J., Berkeley, Physics.
HEINRICHS, DONALD F., Bakersfield, Earth Sciences.
HILLIER, FREDERICK S., Palo Alto, Engineering.
HOLLAND, WILLIAM R., Gardena, Earth Sciences.
HOWARD, CHARLES M., Los Angeles, Mathematics.
KAHN, PAUL M., Fairfax, Mathematics.
KEISLER, H. JEROME, Pasadena, Mathematics.
KENNEDY, ROBERT P., La Canada, Engineering.
KLEIN, WILLIAM M., Jr., Claremont, Botany.
KOCH, KAY F., Berkeley, Chemistry.
LANE, CHARLES A., Berkeley, Chemistry.
LANG, SIDNEY B., San Francisco, Engineering.
LENDARIS, GEORGE G., Albany, Engineering.
LOCKARD, ROBERT B., Bakersfield, Psychology.
MAGEE, PATRICK M., Los Angeles, Engineering.
MANDELL, RICHARD L., Rosemead, Engineering.
MULLIGAN, JAMES A., Oakland, Zoology.
NAZAROFF, GEORGE V., San Francisco, Chemistry.
OUELLETTE, ROBERT J., Berkeley, Chemistry.
PARKER, ROBERT A., Monterey Park, Astronomy.
PATTERSON, JOHN D., Santa Rosa, Engineering.
PENE, JACQUES J., Los Angeles, Genetics.
PRICE, KENDALL O., San Francisco, Psychology.
RAND, JOAN E., Santa Barbara, Mathematics.
RIGGS, ARTHUR D., San Bernardino, Biochemistry.
RODIN, BURTON, Los Angeles, Mathematics.
ROE, ARNOLD, Los Angeles, Engineering.
ROELOF, EDMOND C., Granada Hills, Physics.
RONY, PETER R., Los Angeles, Engineering.
SELTZER, EDWIN C., Encino, Physics.
SHAIN, STEPHEN A., Albany, Engineering.
SHIER, JOHN S., Pasadena, Physics.
SIMMONS, JERRY L., Rosemead, Engineering.
SMITH, RICHARD G., St. Glendora, Engineering.
SMITH, ROBERT B., Berkeley, Chemistry.
STELMAN, DAVID, Berkeley, Chemistry.
STEVENS, DAVID F., Los Angeles, Mathematics.
STONE, CHARLES J., Van Nuys, Mathematics.
STRATTON, ROBERT A., Alturas, Chemistry.
SWINEHART, JAMES H., Covina, Chemistry.
THEIOS, JOHN M., San Bernardino, Psychology.
THOREN, VICTOR E., Los Angeles, Social Sciences.
TOCHER, JAMES L., Albany, Engineering.

WAGNER, WILLIAM G., South Pasadena, Physics.
WEISS, ROBERT J., Empire, Mathematics.
WERNER, NEWTON D., Los Angeles, Chemistry.
WYMAN, MELVIN J., Los Angeles, Psychology.

Postdoctoral

BENNYHOFF, JAMES A., Quincy, Anthropology.
BONIC, ROBERT A., Los Angeles, Mathematics.
CANTOR, DAVID G., Van Nuys, Mathematics.
CARTERETTE, EDWARD C., Studio City, Physics.
CHAN, SUNNEY I., San Francisco, Physics.
CLEMENS, WILLIAM A., Jr., Berkeley, Earth Sciences.
CRAWLEY, PETER L., Alhambra, Mathematics.
CZAMANSKE, GERALD K., Palo Alto, Earth Sciences.
DEMPSEY, WALTER B., San Francisco, Biochemistry.
EMERY, THOMAS F., San Anselmo, Biochemistry.
FELDMAN, JACOB, Berkeley, Mathematics.
GARRIOTT, OWEN K., Mountain View, Physics.
GHELARDI, RAYMOND J., La Jolla, Zoology.
GOLDENBERG, HAROLD M., Los Angeles, Physics.
GOLDSBOROUGH, JOHN P., Stanford, Physics.
HANNA, MELVIN W., Pasadena, Chemistry.
HILL, ELGIN A. III, Pasadena, Chemistry.
JORDAN, PETER C., Los Angeles, Chemistry.
LAU, FRANCIS Y., Hayward, Medical Sciences.
LUBLINER, JACOB, Los Angeles, Engineering.
LYSER, KATHERINE M., Lafayette, Zoology.
MARSHALL, ALBERT W., Palo Alto, Mathematics.
MCCONKEY, EDWIN H., Berkeley, Biochemistry.
MECHANIC, ARNOLD, Berkeley, Psychology.
MICHEL, FRANCIS W., Palo Alto, Medical Sciences.
PARIS, OSCAR H., Jr., Albany, Zoology.
PICKERING, RANARD J., Mountain View, Earth Sciences.
RAVEN, PETER H., Los Angeles, Botany.
ROSOWSKY, ANDRE, Beverly Hills, Chemistry.
VOGEL, MARTIN, Los Angeles, Chemistry.
WILDE, DOUGLASS J., Berkeley, Engineering.
ZWANZIGER, DANIEL E., San Diego, Physics.

Senior Postdoctoral

CROWELL, JOHN C., Los Angeles, Earth Sciences.
FOWLER, CHARLES A., Jr., Claremont, Physics.
FRETTER, WILLIAM B., Berkeley, Chemistry.
KARLIN, SAMUEL, Stanford, Mathematics.
KNOPOFF, LEON, Los Angeles, Earth Sciences.
OPPENHEIM, ANTONI K., Berkeley, Engineering.
STENT, GUNTHER S., Berkeley, Biophysics.

Science Faculty

ALLEN, C. FREEMAN, Claremont, Biochemistry.
ARMIN, L. CLAIR, Reedley, Zoology.
BAILEY, WARREN H., Redding, Botany.
BOURNE, HENRY C., Jr., Berkeley, Engineering.
BOYER, WILLIAM E., Upland, Physics.
BURGY, ROBERT H., Davis, Engineering.
BUSSELL, BERTRAM, Los Angeles, Engineering.
COOPER, GRANT S., Walnut, Chemistry.
DAVIS, WARD B., Whittier, Biochemistry.
DOUGLAS, ALLAN G., Chico, Zoology.
FISCHER, EGBERT D., Glendale, Physics.
HARTESVELDT, RICHARD J., San Jose, Agriculture.
HILEMAN, JACK C., El Camino College, Chemistry.
HUNZIKER, RODNEY W., Chico, Astronomy.
KABAT, HERBERT R., San Luis Obispo, Physics.
KRAUSKOPF, KONRAD B., Stanford, Chemistry.
MACH, GEORGE R., San Luis Obispo, Mathematics.
NEWKIRK, GAIL A., Lancaster, Zoology.
PARKE, EDWARD C., Jr., Arcata, Physics.
PIPKIN, BERNARD W., El Camino College, Earth Sciences.
RATTERMAN, BREEN, San Mateo, Medical Sciences.
RENARD, ROBERT J., Monterey, Earth Sciences.
VENUTI, WILLIAM J., San Jose, Engineering.
VOSS, Sr., ANNA, Belmont, Biology.
WILLIG, WARREN C., Chanoga Park, Mathematics.

Summer Fellowships for Graduate Teaching Assistants

ANDELIN, JOHN P., Jr., Los Angeles, Physics.
BEUS, STANLEY S., Los Angeles, Earth Sciences.
BLANKS, ROBERT F., Berkeley, Engineering.
BURTON, GILBERT W., Temple City, Chemistry.
CARTER, NEVILLE L., Culver City, Earth Sciences.
CLARKE, WILLIAM C., Berkeley, Earth Sciences.
COLONELL, JOSEPH M., San Diego, Engineering.
DODGE, HARRY W., Jr., Los Angeles, Earth Sciences.
EISELEN, EVERETT T., Stockton, Engineering.
HAMBERGER, KIMBALL L., Berkeley, Engineering.
HOLMES, ROBERT E., Castro Valley, Chemistry.
JUNKER, HANS H., Oakland, Engineering.
KLUGE, ARNOLD G., Los Angeles, Zoology.
KOHLER, JOSEPH, Pasadena, Mathematics.
KREPS, THEODORA C., Palo Alto, Anthropology.
LAETSCH, WATSON M., Stanford, Botany.
LEDER, HANS H., Los Altos, Anthropology.
LINDQUIST, EVERT E., Berkeley, Zoology.
LLOYD, JAMES R., Cucamonga, Engineering.
LUMPKIN, OSCAR J., Los Angeles, Physics.
LYTTON, JACK L., Berkeley, Engineering.
MCKEE, EDWIN H., Berkeley, Earth Sciences.
MIER, MILLARD G., Los Angeles, Physics.
MULLIGAN, JAMES A., Oakland, Zoology.
NASATIR, DAVID, Berkeley, Social Sciences.
NEUMAN, ROBERT C., Jr., Whittier, Chemistry.
NG, JUDITH, Oakland, Mathematics.
PADGETT, WELDON M. II, Berkeley, Chemistry.
PENE, JACQUES J., Los Angeles, Genetics.
PRICE, KENDALL O., San Francisco, Psychology.
RICHMOND, RUTH J., Los Angeles, Microbiology.
RUMSEY, HOWARD C., Jr., Alhambra, Mathematics.

CALIFORNIA—Continued

RUPPERT, RICHARD W., Pasadena, Social Sciences.
RYFF, JOHN V., Palo Alto, Mathematics.
SCHULTZ, CLAUDE H., Davis, Physics.
SHELLHAMMER, HOWARD S., Woodland, Zoology.
SIBLEY, MURRAY J., Stanford, Chemistry.
SIEGEL, JAMES T., Berkeley, Anthropology.
SPILERMAN, SEYMOUR, Los Angeles, Mathematics.
SPILLERS, WILLIAM R., Fresno, Engineering.
SPIRO, THOMAS G., Los Angeles, Chemistry.
STERNLICHT, HIMAN, Pasadena, Chemistry.
TAYLOR, CHARLES M., Pasadena, Earth Sciences.
TUCKER, VANCE A., Los Angeles, Zoology.
WERNER, NEWTON D., Los Angeles, Chemistry.
WERTHEIM, GEORGE A., Menlo Park, Psychology.
WITKOVSKY, PAUL, Los Angeles, Zoology.
WYDEVEN, THEODORE, Jr., Modesto, Chemistry.
YENGOYAN, ARAM A., Fresno, Anthropology.

Summer Fellowships for Secondary School Teachers

ANSON, HERBERT F., Ventura, Mathematics.
BERMAN, ROBERT DAVID, Walnut, Zoology.
BLOSSER, JOHN E., San Diego, General Sciences.
BREHMER, ROGER B., Oakland, General Sciences.
BRENNAN, Sr., M. ELAINE, San Rafael, General Sciences.
BRYANT, HARRY DELWYN, Davis, Zoology.
CLARK, BURNICE V., Bakersfield, Mathematics.
COMMINS, Sr., M. VICTORIA, San Francisco, Biochemistry.
DAVID, IRA A., Brea, General Sciences.
ENYART, JESSIE JAMES, Dorris, Mathematics.
FASSELL, GERALD N., Culver City, Botany.
FELDMAN, BERNARD, Canoga Park, Mathematics.
GAFFNEY, Sr., ELEANOR M., Belmont, Zoology.
GUNSTREAM, STANLEY E., Pasadena, Biology.
HAINLINE, VAN KEITH, San Bernardino, Biology.
HARDEN, WILLARD W., El Segundo, Zoology.
HEGJI, RONALD R., REDDING, Mathematics.
HERMSMEIER, KENNETH R., Bakersfield, Mathematics.
HYATT, HERMAN R., Los Angeles, Mathematics.
JOHNSON, VIRGINIA MAE, Monterey, Mathematics.
KARLIN, SOL ALLEN, Reseda, Botany.
KIFER, JACK RUDOLPH, Van Nuys, Mathematics.
KILPATRICK, JEREMY, Berkeley, Mathematics.
LAURENZANA, LOUIS G., San Diego, Biology.
MAGNUSSON, LLOYD N., La Mirada, Chemistry.
NELSON, CARL C., Sanger, Biology.
PARKER, JOHN O., Palo Alto, Mathematics.
RASHFORD, Sr., M. ROSE D., Oakland, Mathematics.
SEARCEY, BERNARD E., San Bernardino, Zoology.
SIEBERT, MERLE M., Fresno, Mathematics.
TREITMAN, STANLEY S., Colton, General Sciences.
WARD, HARRY JOHNSON, Bakersfield, Mathematics.
WILSON, CHARLES ORIN, Manhattan Beach, Zoology.
WOODHEAD, ROBERT JAMES, Sutter, General Sciences.

COLORADO

Graduate

CORNWALL, JOHN M., Denver, Physics.
HUTSON, RICHARD L., Boulder, Earth Sciences.
IRWIN, HENRY J., Denver, Anthropology.
MCKINNIS, RALPH W., Boulder, Mathematics.
NEEPER, DONALD A., Monte Vista, Physics.
O'CONNOR, JOSEPH T., Boulder, Earth Sciences.
PICKEN, JAMES S., Loveland, Engineering.
SHARP, JOHN V., Grand Junction, Earth Sciences.
STONE, GEORGE T., Cowdrey, Earth Sciences.
WEBB, GEORGE D., Denver, Medical Sciences.
WILSON, ALLEN M., Colorado Springs, Agriculture.

Cooperative Graduate

BIRKY, CARL W., Jr., Fort Collins, Genetics.
ELSEY, Sr., MARGARET G., Loretto, Mathematics.
GILLESPIE, JOHN R., Denver, Physics.
KOMMA, DONALD J., Nunn, Genetics.
OHL, ARDEN W., Greeley, Social Sciences.
SHAW, MARION L., Colorado Springs, Physics.
SHOTWELL, DAVID A., Boulder, Mathematics.
WILCOX, RALPH M., Boulder, Physics.

Postdoctoral

NATHENSON, STANLEY G., Denver, Medical Sciences.

Science Faculty

FECHNER, GILBERT H., Fort Collins, Genetics.
GATELEY, WILSON Y., Boulder, Mathematics.
JOHNSON, DONALD L., Canoga Park, Engineering.
MURPHY, BETH, Canyon City, Medical Sciences.

Graduate Teaching Assistants

BECKETT, ROBERT L., Golden, Earth Sciences.
BUSH, PATRICIA E., Longmont, Mathematics.
CONNOR, JON J., Boulder, Earth Sciences.
LOTT, LAYMAN A., Fort Collins, Physics.
STONE, GEORGE T., Cowdrey, Earth Sciences.

Summer Fellowships for Secondary School Teachers

BAKER, CLAUDE KENNETH, Englewood, General Sciences.
BLUBAUGH, HAROLD E., Aurora, Chemistry.
JEFFRYES, JAMES A., Denver, Mathematics.
MORRISON, ROBERT G., Denver, Physics.
STEEN, MARSHALL T., Meeker, Earth Sciences.

CONNECTICUT

Graduate

BALDWIN, DAVID E., West Hartford, Physics.
BRISTOL, MELVIN L., Collinsville, Genetics.
CRAMPTON, STUART B., Greenwich, Physics.
DOLLARD, JOHN D., Hamden, Physics.
FISHER, GEORGE W., Hamden, Earth Sciences.
FLEISCHER, EVERLY B., Branford, Chemistry.
FLYNN, GEORGE W., Jr., Hartford, Chemistry.
FOOTE, CHRISTOPHER S., West Hartford, Chemistry.
GAUTHIER, HOWARD L., Jr., Meriden, Social Sciences.
JOHNSTON, JOAN E., Ansonia, Zoology.

KLEY, RONALD J., New Britain, Earth Sciences.
MASSO, JOSEPH F., Darien, Physics.
MATTHYSSE, STEVEN W., Danbury, Physics.
MERMIN, JOEL L., New Haven, Mathematics.
MERMIN, N. DAVID, New Haven, Physics.
PEASE, ROGER W., Jr., New Britain, Biology.
PLANK, DONALD L., Rockville, Mathematics.
SIMPSON, JAMES E., New Haven, Mathematics.
STEPHENSON, ROBERT R., Mount Carmel, Engineering.
TURRO, NICHOLAS J., Jr., Middletown, Chemistry.
YOUNG, DAVIDA M., Wilton, Psychology.

Cooperative Graduate

AVERY, DONALD H., West Hartford, Earth Sciences.
BERKNER, KLAUS H., Stratford, Physics.
BRANDT, RICHARD G., Bristol, Physics.
CHAMBERS, DONALD S., Colchester, Zoology.
DIMMOCK, JOHN O., Branford, Physics.
DOOLITTLE, RUSSELL F., North Haven, Biochemistry.
HIRTH, HAROLD F., Rockville, Zoology.
KOWALEWSKI, ALEXANDER J., Norwich, Engineering.
KRAUSS, JEAN C., Norwich, Biology.
PARIZEK, RICHARD R., West Willington, Earth Sciences.
PERKINS, FRANCIS W., Jr., West Hartford, Physics.
SWEET, MERRILL H., Storrs, Zoology.
TOTH, LOUIS E., Easton, Engineering.

Postdoctoral

BRIGGS, THOMAS, South Norwalk, Biochemistry.
BRUNER, EDWARD M., New Haven, Anthropology.
GROSS, LEONARD, New Haven, Mathematics.
HAJIAN, ARSHAG B., New Haven, Mathematics.
MEIGS, ROBERT A., Newington, Medical Sciences.
REPPY, JOHN D., New Haven, Physics.

Science Faculty

HOUSE, LAWRENCE C., Storrs, Mathematics.
SLOWINSKI, EMIL J., Jr., Storrs, Chemistry.

Summer Fellowships for Graduate Teaching Assistants

CHAMBERS, DONALD S., Colchester, Zoology.
CHRISTENSEN, RICHARD M., New Haven, Engineering.
GRAHAM, JOHN D., New Haven, Chemistry.
LIPMAN, PETER W., Cannondale, Earth Sciences.
MACLACHLAN, JAMES A., Jr., New Haven, Physics.
PROVOST, PHILIP J., Bristol, Microbiology.
READ, MARY E., Fairfield, Anthropology.
SIMPSON, TRACY L., New Haven, Zoology.
STANLEY, ROLFE S., Cheshire, Earth Sciences.

Summer Fellowships for Secondary School Teachers

BERUBE, Sr., CLAIRE P., New London, Biology.
CAPPEL, DAN, Wilton, Botany.
CARLOW, CHESTER D., Branford, Mathematics.
DI BLASI, Sr., ST. M. ANTH, Stamford, Biology.
GUILBAULT, Sr., ST. LUCILL, Stamford, Mathematics.
POWELL, JOHN J., Clinton, General Science.
STONE, GEORGE NORTON, Lakeville, Mathematics.

DELAWARE

Graduate

DAY, BENJAMIN D., Newark, Physics.
GALT, JAMES C., Newark, Engineering.
KING, MERRILL K., Claymont, Engineering.
LORAND, JOHN P., Wilmington, Chemistry.

Cooperative Graduate

BOLLINGER, ROBERT E., Newark, Engineering.
FOSTER, GAIL E., Seaford, Mathematics.
JORDAN, DAVID M., Wilmington, Chemistry.
MCGRATH, PAUL A., Wilmington, Chemistry.
WEBER, CAROLYN J., New Castle, Zoology.
YELLIN, TOBIAS O., Wilmington, Medical Sciences.

Senior Postdoctoral

KWART, HAROLD, Newark, Chemistry.

Summer Fellowships for Graduate Teaching Assistants

ARCHER, ROBERT A., Wilmington, Chemistry.
THORNTON, ROGER L., New Castle, Chemistry.

Summer Fellowships for Secondary School Teachers

MAHAN, RALPH EUGENE, Seaford, Mathematics.
MITCHELL, MO. FRAN DES, Wilmington, Biology.

DISTRICT OF COLUMBIA

Graduate

ELIOT, FRANK C., Engineering.
HACKMAN, MORTON M., Mathematics.
HOFFMAN, FREDERICK, Mathematics.
MUCKENTHALER, FLORIAN A., Zoology.
MYERS, GARDINER H., Chemistry.
OLIVER, DAVID W., Physics.
QUACKENBUSH, WILLIAM L., Engineering.
RINEHART, GEORGE S., Mathematics.
TRUESDELL, ALFRED H., Earth Sciences.
WILSON, KENT R., Chemistry.

Cooperative Graduate

COURTNEY, JOHN C., Engineering.
DEHN, JAMES T., Physics.
INGLEY, JOHN S., Engineering.
JUMONVILLE, PRESTON C., Psychology.
MARLOW, ADDICKS R., Astronomy.
YOUNG, FRANK C., Physics.

Postdoctoral

RENKIN, BARBARA Z., Medical Sciences.

Senior Postdoctoral

FAUL, HENRY, Earth Sciences.
PIEN, PAO C., Engineering.
RENKIN, EUGENE M., Zoology.

Science Faculty

HENDERSON, RALPH S., Physics.
WHITE, DAVID G., Chemistry.

Summer Fellowships for Graduate Teaching Assistants

O'NEILL, BERNARD V., Mathematics.
SCOTT, THOMAS M., Engineering.
WALSH, JOSEPH H., Chemistry.

DISTRICT OF COLUMBIA—Continued

Summer Fellowships for Secondary School Teachers

FRITSCH, Sr., MARY CLARE, Biology.
MAURY, MARGARET H., General Sciences.
MCKEON, BRO. EUGENE PETE, Chemistry.
MCNABB, Sr. M. DESALES, Mathematics.

FLORIDA

Graduate

BORROR, ARTHUR C., Tallahassee, Zoology.
COBB, JOHN I. III, Tallahassee, Mathematics.
ECHOLS, RONALD J., Naples, Earth Sciences.
FOGEL, JOSEPH S., Pompano Beach, Chemistry.
FOX, EVELYN, North Miami Beach, Physics.
JOHNSON, BEN L., Lake Worth, Engineering.
KAUFMAN, MYRON J., North Miami Beach, Physics.
KUHN, HARLAND L., Hawthorne, Engineering.
LAMBERT, JERRY R., Live Oak, Engineering.
RAMSPOTT, LAWRENCE D., Neptune Beach, Earth Sciences.
ROBERTS, CHARLES S., Miami, Chemistry.
SHAFFER, CHARLES V., Gainesville, Engineering.
SHOLTES, ROBERT S., Gainesville, Engineering.

Cooperative Graduate

BAKER, MICHAEL B., Gainesville, Astronomy.
CROUCH, HARRY R., Jr., Port Orange, Physics.
DEEDS, JOSEPH B., Sarasota, Mathematics.
GOODMAN, ROE W., Lakeland, Mathematics.
HUDSON, FREDERICK M., Miami, Chemistry.
LUNDBERG, GAIL K., Orlando, Social Sciences.
MCKINLEY, MARVIN D., Gainesville, Engineering.
MOOS, HENRY W., Gainesville, Physics.
NEALY, DAVID L., Sarasota, Chemistry.
SAPPENFIELD, DALE S., Miami, Chemistry.
SCHUCKMAN, HAROLD, Tallahassee, Psychology.
SEGRAVES, WILLIAM A., Jacksonville, Engineering.
VANN, BRYANT K., Jr., Jacksonville, Engineering.
WHITTEN, JERRY L., Bartow, Chemistry.
WORTH, ROY E., Jacksonville, Mathematics.

Science Faculty

COOLEY, IRWIN D., Gainesville, Engineering.

Summer Fellowships for Graduate Teaching Assistants

HELLIER, THOMAS R., Jr., Jensen Beach, Zoology.
HERBST, LAURENCE J., North Miami Beach, Mathematics.
HOOKS, JAMES E., Tallahassee, Earth Sciences.
LUTZ, RAYMOND P., Jupiter, Chemistry.
MACINNIS, AUSTIN J., Tallahassee, Zoology.
MEACHEM, ANNE, Daytona Beach, Zoology.
SMITH, PAULINE C., Jacksonville, Social Sciences.

Summer Fellowships for Secondary School Teachers

ARDOIN, BRO. MICHAEL D., Miami, Biology.
BROUSE, BETTY JEAN, Vero Beach, Biology.
CAMPBELL, ROY F., Ft. Lauderdale, Biology.
EINEM, GERALD EUGENE, Melbourne, Biochemistry.
FARMER, JOE ALLEN, Panama City, Botany.
HAYGOOD, AUSTIN NIMROD, Sarasota, Mathematics.
MARTIN, JOEL MANN, Key West, Biology.
MOHR, PAUL B., St. Petersburg, Mathematics.
OBRIEN, LELAND M., Summerfield, Biology.
WHITTON, ETTA MAE, Tallahassee, Mathematics.
WOOLEVER, JOHN D., Sarasota, Biology.
WORTHINGTON, CAROLYN B., Miami, Mathematics.

GEORGIA

Graduate

EICHBERG, JOSEPH, Jr., Atlanta, Medical Sciences.
GREENE, MYRON T., Adairsville, Physics.
HOLLEY, EDWARD R., Jr., Atlanta, Engineering.
JOHNSON, CHARLES S., Jr., Albany, Chemistry.
MCLAIN, DAVID K., Buford, Physics.
MORGAN, WILLIAM J., Savannah, Physics.
NESS, SANDRA G., East Point, Mathematics.
TIDWELL, THOMAS T., Atlanta, Chemistry.

Cooperative Graduate

ALVAREZ, LAURENCE R., Valdosta, Mathematics.
ANDERSON, WYATT W., Brunswick, Zoology.
BOUTWELL, GORDON P., Jr., Albany, Engineering.
COVINGTON, DALE W., Marietta, Mathematics.
GASKINS, HENRIANNE, Griffin, Zoology.
HOBGOOD, RICHARD T., Jr., Calhoun, Chemistry.
PHILP, ROBERT H., Jr., Rabun Gap, Chemistry.
PROSSER, FRANKLIN P., Atlanta, Chemistry.
ROBERTS, CHARLES D., Atlanta, Mathematics.
SACKER, ROBERT J., Doraville, Mathematics.
SEYMOUR, ROSALIE, Atlanta, Mathematics.
SHARP, HOMER F., Jr., Covington, Zoology.
WILSON, RAYMOND B., Decatur, Chemistry.

Postdoctoral

MURR, BROWN L., Jr., Atlanta, Chemistry.
O'TOOLE, JAMES T., Columbus, Chemistry.

Science Faculty

BALL, WILFRED R., Athens, Zoology.
FINCHER, JAMES R., Atlanta, Engineering.
JEWETT, JOHN W., Athens, Mathematics.
MODER, JOSEPH J., Atlanta, Mathematics.
PURDY, KENNETH R., Atlanta, Engineering.
YOUSE, BEVAN K., Emory University, Mathematics.

Summer Fellowships for Graduate Teaching Assistants

DOWNING, ROCHELLE D., Athens, Chemistry.
MOUNT, ROBERT H., Albany, Zoology.
SPADAFINO, LEONARD P., Athens, Chemistry.
WILLIAMS, BRITAIN J. III, Athens, Mathematics.
WOROZBYT, THEODORE S., Columbus, Physics.

Summer Fellowships for Secondary School Teachers

DELOACH, JESSIE C., Folkston, Mathematics.
FLEMING, MYRTLE M., Franklin Spring, Zoology.
POLLER, FRANCINE I., Waycross, Mathematics.
SHARROCK, RUTH Y., Smyrna, Mathematics.
WILSON, MONTINE C., Cartersville, General Sciences.

HAWAII

Graduate

FURUMOTO, AUGUSTINE S., Honolulu, Earth Sciences.
STORY, ALFRED E., Puunene, Engineering.

Cooperative Graduate

DEVERILL, ROBERT S., Hilo, Chemistry.
JAY, BARBARA K., Honolulu, Physics.
KITAMURA, MORRIS Y., Honolulu, Physics.
NISHIMURA, JOYCE S., Honolulu, Biochemistry.
TAKASHIMA, HERBERT T., Lahaina Maui, Chemistry.

Science Faculty

DALTON, PATRICK D., Jr., Oahu, Agriculture.

Summer Fellowships for Graduate Teaching Assistants

PLUCKNETT, DONALD L., Honolulu, Agriculture.

IDAHO

Graduate

BURDICK, GLENN A., Pocatello, Physics.
MACKI, JACK W., Mullan, Mathematics.
MURPHY, RICHARD A., Twin Falls, Zoology.

Cooperative Graduate

CONANT, DONALD R., Caldwell, Chemistry.
JONES, LEON L., Caldwell, Chemistry.
KRUEGER, KENNETH, W., Coeur d'Alene, Botany.
VERNER, JARED, Moscow, Zoology.

Science Faculty

CROWLEY, WARD, Moscow, Mathematics.
WEEKS, OWEN B., Moscow, Microbiology.

ILLINOIS

Graduate

ALBERTS, BRUCE M., Glencoe, Biochemistry.
ANDRES, RONALD P., Elmhurst, Engineering.
ASH, MICHAEL E., Winnetka, Mathematics.
AUST, RICHARD B., Elmhurst, Engineering.
AUVIL, PAUL R., Jr., Wayne, Physics.
BACON, PHILIP, Wheaton, Mathematics.
BALDWIN, JOHN E., Oak Park, Chemistry.
BARNES, WILLIAM C., Glen Ellyn, Earth Sciences.
BERTONI, HENRY L., Chicago, Engineering.
BLISS, JAMES C., Chicago Heights, Engineering.
BOURGIN, MARCIA A., Urbana, Biophysics.
BROOKS, PHILIP R., Hazel Crest, Chemistry.
BUCCINO, ALPHONSE, Chicago, Mathematics.
BURDICK, BOYCE, Evanston, Physics.
BUSHNELL, JAMES C., Urbana, Physics.
CARHART, RICHARD A., Evanston, Physics.
CARR, WAYNE E., Freeburg, Physics.
COLEMAN, SIDNEY R., Chicago, Physics.
COPPOLA, PATRICIA T., Greenville, Zoology.
CUSHING, JAMES T., Chicago, Physics.
DAVIS, MICHAEL M., Peoria, Astronomy.
DOMROESE, KENNETH A., Chicago, Zoology.
DONAHUE, JACK D., West Chicago, Earth Sciences.
DOUGLAS, ROY R., Northfield, Mathematics.
DOVE, WILLIAM F., Jr., Oak Park, Biochemistry.
ECKSTEIN, SHULAMITH G., Chicago, Physics.
EDIDIN, MICHAEL A., Chicago, Zoology.
EHLERT, DAVID L., Bellwood, Mathematics.
FRAENKEL, DAN G., Urbana, Medical Sciences.
FRYXELL, REDWOOD T. W., Rock Island, Earth Sciences.
GLADISH, YVONNE C., Waukegan, Biochemistry.
GOLIN, STUART J., Chicago, Physics.
GUSTAFSON, ROBERT D., Elmhurst, Engineering.
HALPERN, HERBERT P., Chicago, Mathematics.
HUMPHREYS, TOM D. II., Chicago, Zoology.
KERMICLE, JERRY L., Dundas, Genetics.
KEYSER, LEON F., Waukegan, Chemistry.
KLEMENT, WILLIAM, Jr., Bensenville, Engineering.
KRAMER, SHELDON J., Chicago, Engineering.
KRAWCZYK, GERALD R., Carbondale, Agriculture.
LEDERER, CHARLES M., Chicago, Chemistry.
LELAND, KENNETH O., Chicago, Mathematics.
LEVINE, MICHAEL, J., Chicago, Physics.
MARKS, SUZANNE C., Edwardsville, Zoology.
MASSEY, JAMES L., Ottawa, Engineering.
MCCRIMMON, KEVIN M., Urbana, Mathematics.
MIKULECKY, DONALD C., Berwyn, Medical Sciences.
MILGRAM, RICHARD J., Chicago, Mathematics.
MULLIN, MICHAEL M., Mount Carroll, Zoology.
NEFF, CAROL J., Chicago, Zoology.
NORTON, KARL K., Urbana, Mathematics.
OLSON, KENNETH E., Chicago, Engineering.
PAV, PETER A., Berwyn, Physics.
PRICE, JOHN C., Deerfield, Physics.
READEY, DENNIS W., Aurora, Engineering.
REINTS, ROBERT E., Jr., Sycamore, Engineering.
RIPPERGER, WILLIAM C., Bensenville, Mathematics.
ROWND, ROBERT H., Chicago, Medical Sciences.
RUDNICK, STANLEY J., Berkeley, Physics.
SACKETT, JAMES R., Northbrook, Anthropology.
SANDEL, VERNON R., Evanston, Chemistry.
SCHERTZ, DONALD R., Lowpoint, Engineering.
SHANKS, WESLEY L., Northlake, Physics.
SHEPARD, HARVEY K., Chicago, Physics.
SHREFFLER, DONALD C., Kankakee, Genetics.
SIEGEL, DANIEL M., Chicago, Physics.
SIMON, NANCY J., La Grange, Physics.
SWANK, ROBERT K., Urbana, Physics.
SWENTON, LYDIA, Chicago, Chemistry.
SWIDER, ANNA M., Chicago, Physics.
TINKLER, JACK D., Lansing, Engineering.
TREDWELL, JOHN, Chicago, Engineering.
UEBBING, JOHN J., Chicago, Engineering.
VOLZ, RICHARD A., Woodstock, Engineering.
WEINER, JOHN L., Chicago, Earth Sciences.
WILKINS, JOHN W., Oak Park, Physics.
ZIMMERMAN, JOHN L., Champaign, Zoology.

Cooperative Graduate

ACKERMAN, BERNICE, Chicago, Earth Sciences.
AHRENKIEL, RICHARD K., Athens, Physics.
ALLEN, RICHARD R., Belleville, Physics.
BEUSCHLEIN, MURIEL L., Chicago, Zoology.
BLUS, LAWRENCE J., Tilden, Zoology.
BRANDON, RONALD A., Champaign, Zoology.
BROWN, BERNARD T., O'Fallon, Engineering.
BRYA, WILLIAM J., Chicago, Engineering.
CARLSON, DONALD E., Tampico, Engineering.
CHLOUPEK, FRANK J., Berwyn, Chemistry.

ILLINOIS—Continued

CLAUSING, ARTHUR M., Palatine, Engineering.
CLERON, VICTOR, Urbana, Chemistry.
COATES, ROBERT M., Palatine, Chemistry.
CURRIE, NEVA L., Loda, Zoology.
DAMMANN, JAMES E., Wood River, Social Sciences.
DORN, GORDON L., Chicago, Genetics.
DUDLEY, RICHARD M., Flossmoor, Mathematics.
FELDMAN, ALBERT, Chicago, Physics.
FITZGERALD, THOMAS J., Chicago, Engineering.
FOX, WILLIAM T., Evanston, Earth Sciences.
GRADY, LEE T., Chicago, Chemistry.
GRAFF, GEORGE C., Urbana, Mathematics.
GRIEVES, ROBERT B., Chicago, Engineering.
GRIFFIN, JOHN R., Du Quoin, Engineering.
GROSSMAN, NATHANIEL, Aurora, Mathematics.
GWYNN, DONALD E., Urbana, Chemistry.
HAGEN, CARL R., Chicago, Physics.
HANNON, WILLARD J., Elk Grove Vill, Earth Sciences.
JOHNSON, GLENN R., Genesco, Agriculture.
JONES, ROBERT M., Urbana, Engineering.
KASER, JOHN D., Lemont, Engineering.
KERRISK, JERRY F., Chicago, Engineering.
KIRBY, DAVID B., Urbana, Engineering.
KLEIN, HARVEY S., Chicago, Chemistry.
LAPP, DOUGLAS M., Springfield, Physics.
LARSON, JOHN G., Knoxville, Chemistry.
LASAINE, ALFRED D., Chicago, Mathematics.
LEE, KATHARINE W., Chicago, Biochemistry.
LYDY, DAVID L., Wilmington, Chemistry.
MALVICK, ALLAN J., Oak Lawn, Engineering.
MATHEWS, WESLEY N., Jr., Champaign, Physics.
MCCLAUGHRY, JOHN T., Paris, Engineering.
MCCORMICK, NORMAN J., Normal, Engineering.
MERCIER, JOHN A., Oak Lawn, Engineering.
MEYER, JOHN S., Lamoille, Mathematics.
MEYER, MARSHALL D., Beardstown, Engineering.
MORAN, DANIEL A., Chicago, Mathematics.
MORRISON, JAMES D., Evanston, Chemistry.
MORSE, THEODORE F., Evanston, Engineering.
NUTTALL, RONALD L., Downers Grove, Psychology.
O'CONNELL, EDWARD J., Jr., Evanston, Psychology.
PERLMUTTER, DAVID M., Glencoe, Social Sciences.
PERONE, SAM P., Rockford, Chemistry.
REED, WILLIAM A., Evanston, Physics.
REHM, RONALD G., Glen Ellyn, Engineering.
REISS, LEWIS P., Urbana, Engineering.
ROSENKRANTZ, WALTER A., Chicago, Mathematics.
RUTLEDGE, ROBERT B., III, St. Louis, Mathematics.
SATER, VERNON E., Chicago, Engineering.
SATHER, NORMAN F., Elmhurst, Engineering.
SCHMALFELD, HAROLD W., Schiller Park, Agriculture.
SMITH, HARRIET J., Chicago, Botany.
SPITTLER, THOMAS M. Chicago, Chemistry.
STEINMETZ, RICHARD, Evanston, Earth Sciences.
SWENSON, GEORGE W., Chicago, Chemistry.
SWOFFORD, HAROLD S., Jr., Champaign, Chemistry.
SYLVESTER, RAYMOND M., Chicago, Chemistry.
TEETS, DAVID W., Champaign, Biochemistry.
TRAPP, CHARLES A., Chicago, Chemistry.
TURNER, FRED A., Chicago, Chemistry.
VILLAREJO, MERNA R., Chicago, Biochemistry.
WADE, DAVID C., Champaign, Engineering.
WALLER, DAVID W., Bellwood, Zoology.
WATSON, HOWARD L., Jr., Arlington Heights, Mathematics.
WEINER, HOWARD J., Chicago, Physics.
WIEDEMANN, ALFRED M., Naperville, Agriculture.
WILLIAMS, GLENN F., Chicago, Psychology.
WINNICK, JACK, Chicago, Engineering.
WITT, GERALD L., Alton, Physics.
WOOD, ALLEN D., Palos Heights, Engineering.
WYSOCKI, ALLEN J., Chicago, Chemistry.

Postdoctoral

BAKER, ROBERT H., Jr., Evanston, Biochemistry.
BECK, JAMES R., Champaign, Chemistry.
BISCHOFF, KENNETH B., Chicago, Engineering.
BJORKEN, JAMES D., Park Ridge, Physics.
COONEY, DAVID P., Evanston, Medical Sciences.
GALLAGHER, JAMES J., Champaign, Psychology.
GOLDBERG, JAY M., Chicago, Psychology.
HAGER, EDWARD B., Hubbard Woods, Medical Sciences.
HARRIS, BRUNO, Evanston, Mathematics.
HARRIS, SAMUEL M., Chicago, Physics.
KATOH, ARTHUR K., Urbana, Zoology.
KINZEY, WARREN G., Chicago, Anthropology.
KLEIN, MILES V., Chicago, Physics.
MATCHETT, WILLIAM H., Elgin, Genetics.
MINN, FREDRICK L., Waukegan, Chemistry.
MORRILL, RICHARD L., Evanston, Social Sciences.
OLOFSON, ROY A., Chicago, Chemistry.
SCHLESSINGER, DAVID, Chicago, Biochemistry.
STEINHART, JOHN S., Chicago, Earth Sciences.
TALBOTT, RICHARD L., Elmhurst, Chemistry.
WARD, HAROLD R., Mt. Vernon, Chemistry.
WEISS, GUIDO L., Chicago, Mathematics.
WOLF, NORMAN S., Chicago, Medical Sciences.

Senior Postdoctoral

ATWOOD, KIMBALL C., Chicago, Genetics.
BOGORAD, LAWRENCE, Chicago, Biochemistry.
LASHOF, RICHARD K., Chicago, Mathematics.
YANKWICH, PETER E., Urbana, Chemistry.

Science Faculty

BEACH, NEIL W., Lake Forest, Zoology.
BERGSTROM, ROBERT C., Cicero, Earth Sciences.
CARNEY, ROSE A., Lisle, Physics.
CLARK, HELEN M., Evanston, Mathematics.
EMBREE, EARL O., Alton, Mathematics.
HARMET, KENNETH H., De Kalb, Botany.
LANDIN, JOSEPH, Urbana, Mathematics.
LINDBECK, WENDELL A., De Kalb, Chemistry.
MARK ABRAHAM M., Carbondale, Mathematics.
MILLER, ROBERT L., Urbana, Chemistry.
MOSBORG, ROBERT J., Urbana, Engineering.
MURPHY, KENNETH H., Urbana, Mathematics.
MURPHY, KENNETH W., Macomb, Physics.
PALTER, ROBERT M., Chicago, Physics.
SILBER, JACK, Chicago, Mathematics.
STOECKER, WILBERT F., Urbana, Engineering.

WIESINGER, FREDERICK P., Urbana, Engineering.

Summer Fellowships for Graduate Teaching Assistants

BAER, WALTER S., Glencoe, Physics.
BARKER, JOHN L., Jr., Chicago, Chemistry.
BAUMAN, STEVEN F., Urbana, Mathematics.
BIELLER, LARRY G., East Carondelet, Earth Sciences.
BLINN, WALTER C., Chicago, Zoology.
BURDI, ALPHONSE R., Chicago, Medical Sciences.
CARL, JAMES D., Centralia, Earth Sciences.
CHITTENDEN, DAVID H., Hazel Crest, Engineering.
DEMARR, RALPH A., Jacksonville, Mathematics.
DERWENT, JOHN E., Chicago, Mathematics.
DYBVIG, DOUGLAS H., Champaign, Chemistry.
FISHER, WILLIAM L., Marion, Earth Sciences.
FOELL, WESLEY K., Elgin, Physics.
FORD, JAMES A., Glenview, Engineering.
FRAEMBS, FRANK A., Urbana, Zoology.
GABEL, NORMAN W., Chicago, Chemistry.
GERMANAS, DALIA, St. Charles, Chemistry.
GOLDMAN, JACK L., Chicago, Chemistry.
GURNEY, DONALD P., Jr., Chicago, Engineering.
HAYNES, LEROY W., Urbana, Chemistry.
HREN, JOHN A., Glen Ellyn, Engineering.
IWASYK, JOHN M., Bellwood, Engineering.
JOESTEN, MELVIN D., Rochelle, Chemistry.
KENT, JOHN C., Arlington Heights, Engineering.
LANGBERG, GEORGE, Champaign, Mathematics.
LARSON, CARL S., Urbana, Engineering.
LEAF, GARY K., Champaign, Mathematics.
LIBER, TED, Chicago, Engineering.
LYDY, DAVID L., Wilmington, Chemistry.
NEALE, ROBERT S., Champaign, Chemistry.
NEMETH, EDWARD M., S.J., Chicago, Chemistry.
NEWCOMER, RICHARD J., Princeton, Zoology.
O'BRIEN, RONALD J., Chicago, Physics.
O'NEIL, JAMES R., Chicago, Chemistry.
PETERS, JOSEPH A., Urbana, Mathematics.
PINTER, ROBERT B., Evanston, Engineering.
PRANGER, WALTER A., Jr., Cicero, Mathematics.
RIGGS, ELLIOTT A., Urbana, Earth Sciences.
SARLES, HARVEY B., Chicago, Anthropology.
SNITKER, MARTHA L., Ohlman, Chemistry.
STEINMETZ, RICHARD, Evanston, Earth Sciences.
STOCKMAN, DAVID L., Charleston, Chemistry.
STUEBEN, EDWIN F., Chicago, Mathematics.
SWOFFORD, HAROLD S., Jr., Champaign, Chemistry.
TIPTON, CHARLES M., Champaign, Medical Sciences.
WAHL, ARNOLD C., Chicago, Chemistry.
WALLER, THOMAS R., Elmwood Park, Earth Sciences.
WARD, HAROLD R., Mt. Vernon, Chemistry.
WEINER, HOWARD J., Chicago, Physics.
WITTHOFT, WILLIAM G., Chicago, Mathematics.

Summer Fellowships for Secondary School Teachers

BAUER, Sr. M. DARIA, Chicago, Biology.
BUCKLER, WILLIAM F., Aurora, Mathematics.
BURNS, ROBERT BYRON, Peoria, General Sciences.
BURROW, GEORGE IRVING, Port Byron, General Sciences.
CHRISTIAN, RAYMOND E., Chicago, Chemistry.
DEVINE, DONALD F., Park Forest, Mathematics.
EGOLF, THOMAS HENRY, Belleville, Physics.
HALL, RICHARD LOWELL, Evanston, Chemistry.
HART, HUGH E., Evanston, Mathematics.
HELM, HERBERT WOOLF, Chicago, Mathematics.
HIMES, EDWARD N., Maywood, Mathematics.
HOOVER, JAMES M., Batavia, Botany.
JAMES, BRUCE P., Winnetka, Mathematics.
KOHLEY, Sr. EVANGELISTA, Lagrange Park, Biology.
KRYCH, Sr. M. ANNELDE, Chicago, Biology.
LADD, NORMAN ELMER, Des Plaines, Mathematics.
LEATHERS, LEO J., Northbrook, Biology.
LINDHORN, ROBERT C., Berwyn, Mathematics.
MCNEAL, MOTH. MATTHIAS, Decatur, Biology.
MUCKERMANN, Sr. M. ALPHON, Breese, Biology.
MUELLER, PAUL NEAL, Arlington Heights, General Sciences.
MUNSON, NORMA F., Libertyville, Biology.
ROYE, JAMES PAUL, Dongola, Biology.
RUD, Sr. BERNARD MARY, Chicago, Biology.
RUDOLPH, EARL S., Decatur, Chemistry.
RUEFF, LAWRENCE E., Decatur, Biology.
SCHERER, ROBERT HOWELL, Decatur, Biology.
STRETTON, WILLIAM C., Lagrange, Mathematics.
TENNEY, ARTHUR EDWARD, Winnetka, Mathematics.
WALKER, ELISABETH M., Hinsdale, Mathematics.
ZALOKAR, RONALD S., Roseville, Biology.
ZBOROWSKI, RICHARD A., Riverside, Mathematics.
ZIMMERMAN, ROBERT M., East Moline, Mathematics.

INDIANA

Graduate

BELINFANTE, JOHAN G., W. Lafayette, Physics.
COLEMAN, WILLIAM II, Vincennes, Social Sciences.
FISCH, MICHAEL H., Indianapolis, Chemistry.
FISHER, THORNTON R., Indianapolis, Physics.
KOKINDA, JOHN J., Gary, Engineering.
KOVATS, THOMAS A., Ft. Wayne, Physics.
LARNER, DANIEL M., Indianapolis, Social Sciences.
LEGG, JAMES C., Windfall, Physics.
MARTIN, EDWARD S., Terre Haute, Chemistry.
MILES, GLEN A., Cloverdale, Engineering.
NADING, LEWIS K., Indianapolis, Genetics.
NEUMANN, HOLM W., Bloomington, Anthropology.
PARR, JAMES T., Lebanon, Mathematics.
PETERS, PHILIP C., Chesterton, Physics.
POHL, WILLIAM F., Michigan City, Mathematics.
PURSLEY, STEPHEN A., Indianapolis, Engineering.
RAGLAND, THOMAS E., North Salem, Biochemistry.
RIGG, ROBERT G., Hammond, Engineering.
ROOT, FORREST K., Bedford, Earth Sciences.
SANDERS, WILLIAM A., Oxford, Chemistry.
SCHERER, KIRBY V., Jr., Evansville, Chemistry.

INDIANA—Continued

SCHMALBERGER, DONALD C., Bloomington, Astronomy.
SHERWOOD, BRUCE A., W. Lafayette, Physics.
SIMS, CHARLES C., Elkhart, Mathematics.
VANDEVELDE, JOSEPH R., West Baden Springs, Mathematics.

Cooperative Graduate

BLACKWELL, FREDERICK W., Elkhart, Mathematics.
BOEHMAN, LOUIS I., St. Meinrad, Engineering.
BROSHAR, WAYNE C., Crawfordsville, Physics.
BRUNNER, PHILIP W., Ossian, Engineering.
CHIDDISTER, JERRY L., Goshen, Engineering.
COLE, MICHAEL, Bloomington, Psychology.
CORK, MAX J., Terre Haute, Engineering.
DAVIDSON, ERNEST R., Bloomington, Chemistry.
DAY, GEORGE W., W. Lafayette, Mathematics.
DEHAAN, FRANKLIN P., W. Lafayette, Chemistry.
DERUDDER, RONALD D., Bloomington, Earth Sciences.
DILLING, WENDELL L., W. Lafayette, Chemistry.
EMMERSON, JOHN L., Owensville, Medical Sciences.
FULLER, RAY W., W. Lafayette, Biochemistry.
GROSSMAN, RICHARD F., Marion, Chemistry.
KELLAM, JOHN M. Jr., Indianapolis, Engineering.
KENDALL, STEPHEN B., Marion, Psychology.
KNILL, RONALD J., Notre Dame, Mathematics.
LAWVERE, FRANCIS W., Jr., Upland, Mathematics.
LINDLEY, WILLIAM T., Ft. Wayne, Engineering.
MCCARTY, CHARLES B., Lawrenceburg, Engineering.
MOSBY, JAMES F., Indianapolis, Engineering.
O'NEILL, RONALD C., Lafayette, Mathematics.
PEALE, STANTON J., Indianapolis, Engineering.
RHODE, JASPER I., Lafayette, Physics.
THOMPSON, MAYNARD D., Michigan City, Mathematics.
WHEELER, JOSEPH D., W. Lafayette, Engineering.

Postdoctoral

WILLIAMS, ROBERT F., W. Lafayette, Mathematics.
ZEPS, VALDIS J., Bloomington, Social Sciences.

Senior Postdoctoral

AXELROD, BERNARD, Lafayette, Biochemistry.
ROSS, MARC H., Bloomington, Physics.
TRUESDELL, CLIFFORD A., Bloomington, Mathematics.

Science Faculty

BRETSCHER, MIRIAM E., Valparaiso, Mathematics.
DOEDEN, GERALD E., Muncie, Chemistry.
EMERY, ALDEN H., Jr., Lafayette, Engineering.
MARTIN, Sr. M. CELINE, Fort Wayne, Biology.
MURPHY, FR. MICHAEL J., Notre Dame, Earth Sciences.
PASCHALL, HOMER D., Muncie, Zoology.
SCHAAP, WARD B., Bloomington, Chemistry.
TELFAIR, DAVID, Richmond, Physics.
TRESSLER, JOHN B., Angola, Physics.

Summer Fellowships for Graduate Teaching Assistants

BURLINGTON, ROY F., W. Lafayette, Zoology.
COLEMAN, WILLIAM H., Vincennes, Social Sciences.
DENISE, RICHARD W., W. Lafayette, Engineering.
DERUDDER, RONALD D., Bloomington, Earth Sciences.
GREEN, JOHN W., Garrett, Chemistry.
HANSON, GEORGE P., Bloomington, Genetics.
JOHNSON, LOWELL B., W. Lafayette, Botany.
KEITH, JAMES E., Plymouth, Chemistry.
KELSEY, CHARLES A., South Bend, Physics.
KIRK, WILLIAM A., Reelsville, Mathematics.
MAXON, MARSHALL S., Bloomington, Physics.
MCDOWELL, JOHN W., Jr., Bloomington, Chemistry.
MENOLD, ERNEST R., South Bend, Engineering.
RICKTER, DONALD O., W. Lafayette, Chemistry.
UECKER, FRANCIS A., Fort Wayne, Botany.
WILDIN, MAURICE W., W. Lafayette, Engineering.
WILSON, HOWARD L., Bloomington, Physics.
YAQUB, FAWZI M., W. Lafayette, Mathematics.

Summer Fellowships for Secondary School Teachers

ALLEN JESSE BYRON, Whiting, Mathematics.
BUDENSIEK, RONALD KEITH, Muncie, Chemistry.
CRABILL, L. DELMAR, Logansport, Mathematics.
DEHNE, GILBERT, Michigan City, Biology.
DEYOUNG, PETER J., W. Lafayette, Mathematics.
FLANSBURG, GLENN E., Hammond, Mathematics.
FREDERICK, TERRY JOE, Vincennes, Mathematics.
GOODNIGHT, FREDRICK H., North Judson, Biology.
KINCAID, WAYNE H., Indianapolis, General Sciences.
PAYNE, KENNETH EARL, Terre Haute, Biology.
RAMSEY, VIOLA ALICE, Indianapolis, Mathematics.
RICE, JACK ALLEN, Logansport, Mathematics.
SCHILLING, ROBERT G., Frankfort, Mathematics.
SMITH, MARVIN DELBERT, Indianapolis, Biology.
SMITH, MARY CAROLYN, Hoagland, Mathematics.
WHITE, STANLEY A., Clarksville, Mathematics.

IOWA

Graduate

ANDERSON, JAMES R., Ames, Physics.
BERGE, GLENN L., Decorah, Astronomy.
BIERY, JOHN C., Ames, Engineering.
EGGER, CARL T., Monticello, Engineering.
HALL, GRACE W., Iowa City, Chemistry.
HANDY, Sr. M. ANTONIA, Dubuque, Genetics.
HANSON, FRANK E., Jr., Hawarden, Zoology.
KOHLMAN, DAVID L., Lamoni, Engineering.

LANDWEBER, PETER S., Iowa City, Mathematics.
LILLEHOJ, EIVIND B., Kimballton, Botany.
NICOLSON, DAN H., Shenandoah, Botany.
POLKING, JOHN C., Breda, Mathematics.
PULLEY, ARDEN O., Ames, Biochemistry.
SARGEANT, PETER B., Cedar Rapids, Chemistry.
STUDIER, FREDERICK W., Waverly, Biophysics.
SUNDBERG, RICHARD J., Linn Grove, Chemistry.
THOMAS, BRUCE R., Guthrie Center, Physics.
TOGEAS, JAMES B., Fort Dodge, Chemistry.
WEIDLER, DONALD J., New Hampton, Zoology.

Cooperative Graduate

BERGESON, JOHN E., Sioux City, Physics.
BOVBJERG, ANN M., Iowa City, Zoology.
CARLSON, CLARENCE A., Jr., Ames, Zoology.
CHASE, JOHN W., Council Bluffs, Chemistry.
COONCE, HARRY B., Ames, Mathematics.
DAHM, ARNOLD J., Pella, Physics.
DANKLEFF, MARY A., Cedar Falls, Chemistry.
DILLMAN, NORMAN G., Ames, Engineering.
DIVELBISS, JAMES E., Iowa City, Genetics.
DIXON, CHRIST D., Corning, Mathematics.
FRANK, LOUIS A., Fort Madison, Physics.
GABRIELSON, JAMES E., Cedar Rapids, Engineering.
GOBEN, CHARLES A., Charlton, Engineering.
GOODMAN, MAJOR M., Des Moines, Genetics.
GURALNIK, GERALD S., Cedar Falls, Physics.
HAENSEL, HUBERT D., Ames, Botany.
HOFFMAN, LARRY R., Sigourney, Botany.
HORNOCKER, MAURICE G., Allerton, Zoology.
HOVERSTEN, ESTIL V., Ames, Engineering.
HOWREY, EUGENE P., Fairfield, Social Sciences.
JOHNSON, KENT E., Davenport, Earth Sciences.
KLEESE, ROGER A., Ames, Agriculture.
KRISTIANSON, BRYANT N., Ogden, Engineering.
LIGON, JAMES T., Ames, Engineering.
MARSHALL, MARILYN E., Iowa City, Psychology.
MARTIN, JOSEPH M., Keokuk, Mathematics.
MATHRE, DONALD E., Ames, Botany.
PETRO, JOHN W., Iowa City, Mathematics.
RATLIFF, LOUIS J., Jr., Marion, Mathematics.
RIDDELL, NANCY C., Ames, Zoology.
SAYLOR, LEROY C., Cedar Rapids, Genetics.
SMALLEY, KATHERINE N., Iowa City, Zoology.
SMITH, KEITH P., Boone, Mathematics.
TRAPOLD, MILTON A., Iowa City, Psychology.
WATSON, GEORGE A., Knoxville, Engineering.
WAUER, JOHN C., Sioux City, Engineering.
WOODY, ROBERT W., Newton, Chemistry.

Postdoctoral

ROBERTS, WALDEN K., Lamoni, Biochemistry.

Senior Postdoctoral

GOOD, ROLAND H., Jr., Iowa City, Physics.
THORNE, ROBERT F., Iowa City, Botany.

Science Faculty

ANDERSON, PAUL M., Iowa City, Engineering.
HAGAN, Sr. MARY M., Dubuque, Chemistry.
KENNELLY, Sr. MARY M., Dubuque, Chemistry.
STREIB, WILLIAM J., Iowa City, Engineering.

Summer Fellowships for Graduate Teaching Assistants

BATHIE, WILLIAM W., Ames, Engineering.
BIRKENHOLZ, DALE E., Prairie City, Zoology.
BUEKER, ROBERT C., Ames, Mathematics.
CLAMPITT, PHILIP T., Des Moines, Zoology.
GORTLER, LEON B., Des Moines, Chemistry.
JOHNSON, BRUCE L., Ames, Engineering.
KLAPPER, GILBERT J., Iowa City, Earth Sciences.
LUTHER, NORMAN Y., Iowa City, Mathematics.
MARTIN, JOSEPH M., Keokuk, Mathematics.
MCINTOSH, THOMAS H., Ames, Agriculture.
MITCHELL, ROGER L., Grinnell, Agriculture.
MULFORD, CHARLES L., Iowa Falls, Social Sciences.
RICHARDSON, WILLIAM H., Ames, Mathematics.
ROISEN, BENJAMIN A., Northwood, Mathematics.
SCHMITZ, FRANCIS J., Jesup, Chemistry.
SMALLEY, KATHERINE N., Iowa City, Zoology.
SMITH, KEITH P., Boone, Mathematics.
THOMAS, ROBERT W., Jr., Ames, Social Sciences.

Summer Fellowships for Secondary School Teachers

CROSSWHITE, F. JOE, Keokuk, Mathematics.
EBERT, WAYNE E., Clarion, Biology.
FETT, GORDON F., Aurelia, Mathematics.
HOHLFELD, JOSEPH F., Cedar Falls, Mathematics.
MAUSETH, HARRY A., Iowa City, Biology.
OHL, LLOYD EUGENE, Fort Madison, Biology.
OSHER, ROBERT ELMER, Marshalltown, Mathematics.
SCHAUB, RUSSELL E., Titonka, Mathematics.
SNYDER, JOHN D., Carroll, Mathematics.
TRUMP, RICHARD F., Ames, Zoology.

KANSAS

Graduate

BERRY, WILLIAM H., Kansas City, Mathematics.
CEDERBERG, JAMES W., Herndon, Physics.
DAVIS, JOHN A., Jr., Topeka, Engineering.
ENOS, PAUL P., Perry, Earth Sciences.
FEIOCK, FRANK D., Lawrence, Physics.
FRITZE, BERNARD H., Emporia, Zoology.
HARMS, CLARENCE E., Hillsboro, Zoology.
HAYS, BYRON G., Wichita, Chemistry.
JOHNSON, MILFORD A., Jr., Iola, Engineering.
KEVAN, LARRY J., Kansas City, Chemistry.
MANTEY, JOHN P., Sharon Springs, Engineering.
ONTJES, DAVID A., Hutchinson, Medical Sciences.
RAMSAY, ARLAN B., Dodge City, Mathematics.
REYNOLDS, WYNETKA A., Emporia, Zoology.
RICHERT, ANTON S., Wichita, Physics.
ROOT, JOHN W., Shawnee, Chemistry.
SETSER, DONALD W., Hudson, Chemistry.
SINKHORN, RICHARD D., Wichita, Mathematics.
TEMPLIN, ANNETTE, St. John, Microbiology.
UNRUH, WESLEY P., Lawrence, Physics.
WHITEHEAD, C. THOMAS, Columbus, Engineering.
ZIMMERMAN, JOHN F., Lawrence, Chemistry.

Cooperative Graduate

BRYAN, DAVID R., Elkhart, Mathematics.
BUTLER, RONALD D., Manhattan, Chemistry.
DAVIS, ELMER E., Haviland, Mathematics.
DEALY, JOHN M., Wichita, Engineering.
FOULKE, LARRY R., Kiowa, Engineering.
HANNA, JOSEPH F., Dighton, Mathematics.

KANSAS—Continued

HOBSON, ARTHUR S., Manhattan, Physics.
HORNE, FREDERICK H., Mission, Chemistry.
JUSTICE, WAYMAN P., Manhattan, Genetics.
MAIER, RICHARD A., Manhattan, Psychology.
MAILEN, JAMES C., Wichita, Engineering.
MANAHAN, STANLEY E., Peabody, Chemistry.
MCCARTY, CHARLES G., Wichita, Chemistry.
PLATT, DWIGHT R., Newton, Zoology.
RUMPEL, MAX L., Ogallah, Chemistry.
SENECAL, REV. GERARD, Atchison, Physics.
SKINNER, JAMES L., Lincoln, Engineering.
STUTH, CHARLES J., Lawrence, Mathematics.
TUCKER, PATRICIA A., Emporia, Mathematics.
WEIDMAN, DONALD R., Kansas City, Mathematics.
ZAHNLEY, JAMES C., Manhattan, Biochemistry.

Science Faculty

CLARKE, ROBERT F., Emporia, Zoology.
LINDLY, EDWIN C., Manhattan, Engineering.
PROPHET, CARL W., Emporia, Zoology.
SIMPKIN, WILLIAM E., Wichita, Engineering.

Summer Fellowships for Graduate Teaching Assistants

BROWN, SHANNON R., Topeka, Social Sciences.
FISH, VERNON R., Parsons, Engineering.
GAUGHAN, EDWARD D., Lawrence, Mathematics.
HISS, WILLIAM L., Phillipsburg, Earth Sciences.
JOHNSON, RALPH T., Jr., Salina, Physics.
JONES, DELBERT M., Great Bend, Physics.
LONG, JOHN B., Topeka, Psychology.
MANUEL, OLIVER K., Wichita, Chemistry.
ROGERS, GARY B., Manhattan, Engineering.
STUTH, CHARLES J., Lawrence, Mathematics.

Summer Fellowships for Secondary School Teachers

ALDRIDGE, BILLY G., Bethel, Physics.
DAVIDSON, JOSEPH G., Bethel, Biology.
EDER, RICHARD LEE, Scott City, Biology.
EISELE, GEORGE ANTHONY, Quinter, Mathematics.
HENDRIX, JULIA C., Kansas City, Mathematics.
HUNT, STANLEY L., Wichita, Biology.
JANDER, JOHN C., Liberal, Mathematics.
MILLS, ROBERT B., Topeka, Biology.
PETERS, WILLARD H., Wichita, Biology.

KENTUCKY

Graduate

ALVERSON, WILLIAM K., Lexington, Engineering.
HARDIN, BOBBY O., Lexington, Engineering.
KONSLER, THOMAS R., Henderson, Biology.
LAYSON, WILLIAM M., Millersburg, Physics.
MELTON, CHARLES G., Jr., Henderson, Biology.
PORTER, MARCELLUS C., Louisville, Engineering.
RIEHM, CHARLES E., Jr., Louisville, Engineering.
SUICH, JOHN E., Louisville, Engineering.
WESSEL, WILLIAM L., Louisville, Physics.
WHITESIDES, GEORGE M., Anchorage, Chemistry.

Cooperative Graduate

ADE, FREDERICK C., Louisville, Engineering.
BEALS, RALPH E., Lexington, Social Sciences.
CAMMACK, FLOYD M., Lexington, Anthropology.
CRAVENS, NORMAN Y., Owensboro, Engineering.
CRAWFORD, THOMAS H., Louisville, Chemistry.
HOCHSTRASSER, DONALD L., Fisherville, Anthropology.
HOHMAN, SR. BENEDICT, Louisville, Chemistry.
INMAN, WILLIAM C., Lexington, Psychology.
KAFESJIAN, RALPH, Louisville, Engineering.
LAMB, RICHARD C., Lexington, Physics.
MATTOX, DONALD M., Lexington, Physics.
MEIMAN, JAMES R., Louisville, Agriculture.
MONROE, BURT L., Jr., Anchorage, Zoology.
MOORE, GEORGE C., Bowling Green, Physics.
RAMEY, KERMIT C., Lexington, Chemistry.
RICHARDS, HUBERT L., Lexington, Chemistry.
SLAUGHTER, GEORGE T., Hardyville, Engineering.
SLEDD, WILLIAM T., Murray, Mathematics.
STAPLES, CODY E., Louisville, Chemistry.
WITTE, C. GAY, Louisville, Psychology.

Postdoctoral

GRAY, HARRY B., Bowling Green, Chemistry.

Science Faculty

CHEATHAM, NELL SUE, Morehead, Zoology.
JENKINS, LEO B., Jr., Louisville, Engineering.
MARSHALL, MAURICE K., Lexington, Engineering.
SMITH, CHARLES G., Paducah, Zoology.
STRICKLER, THOMAS D., Berea, Physics.

Summer Fellowships for Graduate Teaching Assistants

BYRD, DAVID S., Louisville, Chemistry.
COLEMAN, DONALD B., Owensboro, Mathematics.
KING, JERRY P., Murray, Mathematics.
REKER, JOSEPH R., Louisville, Engineering.
SLEDD, WILLIAM T., Murray, Mathematics.
TILFORD, SHELBY G., Clarkson, Chemistry.

Summer Fellowships for Secondary School Teachers

HEMMERLE, SR. M. CAROLINE, Covington, Biology.
KIMBEL, SR. M. EVA, Louisville, Chemistry.
KLINGENBERG, SR. J. M., Covington, Mathematics.
MADDEN, SR. M. CAECILIA, Covington, Physics.
ROSE, VIRGIL UHLAN, Louisville, Biology.
STALLINGS, SR. M. CONSOLA, Springfield, Mathematics.
STURMAN, DOLLY G., Louisville, Mathematics.
SYKES, HARRY N., Lexington, Mathematics.
WARE, WILLA C., Louisville, Mathematics.

LOUISIANA

Graduate

BERGERON, WILLIAM J., Eunice, Engineering.
CARROLL, KEITH J., New Iberia, Physics.
FRICKEN, RAYMOND L., New Orleans, Physics.
GRAHAM, EDWARD W., Natchitoches, Chemistry.
MURRILL, PAUL W., Lake Charles, Engineering.
NIX, JAMES R., Natchitoches, Physics.
PENNEY, DAVID E., New Orleans, Mathematics.

SMITH, WARREN D., Deridder, Engineering.
WILLIS, DONALD E., Baton Rouge, Chemistry.

Cooperative Graduate

BLEICHER, MICHAEL N., New Orleans, Mathematics.
DECK, RONALD J., New Orleans, Physics.
EIDSON, WILLIAM W., New Orleans, Physics.
ELDER, ELEANOR S., Baton Rouge, Chemistry.
GONOR, JEFFERSON J., Lafayette, Zoology.
HOLLAND, WILBUR C., New Orleans, Mathematics.
HUSSEY, ROBERT G., Shreveport, Physics.
MALONE, DAVID H., New Orleans, Social Sciences.
SAY, GEOFFREY R., Baton Rouge, Engineering.
SAY, ROBERT L., Baton Rouge, Engineering.
YOUNG, WARREN L., Eunice, Chemistry.

Science Faculty

AUCOIN, CLAYTON V., LaFayette, Mathematics.
BUSSELL, WILLIAM H., Ruston, Engineering.
CRAIG, WILLIAM W., Baton Rouge, Earth Sciences.
EDWARDS, CHARLES H., Jr., Ruston, Engineering.
ESHELMAN, HOWARD C., LaFayette, Chemistry.
FREDERICK, LAFAYETTE, Baton Rouge, Botany.
TIMON, WILLIAM E., Jr., Natchitoches, Mathematics.

Summer Fellowships for Graduate Teaching Assistants

DARST, RICHARD B., Baton Rouge, Mathematics.
GONOR, JEFFERSON J., LaFayette, Zoology.
LARKIN, JOEL M., New Orleans, Chemistry.
LEWIS, LORALEE I., New Orleans, Zoology.
SHOOP, C. ROBERT, New Orleans, Zoology.
SIMMONS, LEONARD M., Jr., Baton Rouge, Physics.
WHARTON, JAMES H., Monroe, Chemistry.
WILLARD, THOMAS M., New Orleans, Chemistry.

Summer Fellowships for Secondary Schoolteachers

DUNN, EUNICE R., Monroe, Mathematics.
EDNEY, MABEL MORGAN, Duson, Mathematics.
GUILLORY, JERRY LEE, Marksville, Mathematics.
JONES, CURTIS J., Lake Charles, Mathematics.
KILLGORE, JOHN RAY, Haynesville, Mathematics.
KOELSCH, Sr. M. FLORENTIA, Baton Rouge, Biology.
LEE, BRO. EDWARD P., New Orleans, Mathematics.
MCKEE, JOYCE T., New Orleans, Zoology.
RICARDO, RALPH E., Donaldsonville, Mathematics.
SCHAFF, Sr. M. JOANNES, New Orleans, Biology.
THOMAS, JAMES ORELL, Haynesville, Mathematics.
WINTERS, Sr. M. MAJELLA, New Orleans, Biology.

MAINE

Graduate

BURNS, STEPHEN H., Friendship, Physics.
MYHRMAN, MATTS A., Lewiston, Earth Science.
O'CONNOR, BRIAN R., Lewiston, Chemistry.
SCOTT, SARAH V., Bar Harbor, Anthropology.
TURNER, JAMES H., Skowhegan, Physics.

Cooperative Graduate

AGATHOS, LOUIS, Orono, Engineering.
BARON, ROSE M., Orono, Social Sciences.
BROOKS, KARL M., Thomaston, Psychology.
FURROW, STANLEY D., Bangor, Chemistry.
ORCUTT, RONALD H., Rockland, Chemistry.
PERRIN, CARLETON E., Falmouth, Chemistry.
THORPE, JOHN A., Auburn, Mathematics.

Science Faculty

DODGE, CLAYTON W., Orono, Mathematics.
LACASCE, ELROY O., Jr., Brunswick, Physics.

Summer Fellowships for Graduate Teaching Assistants

BARKER, DANIEL S., North Whitefield, Earth Sciences.
HART, JEAN G., Orono, Mathematics.
HARTT, JOHN K., Fort Kent, Physics.
RICH, NATHAN H. III, Old Town, Physics.
SOTTERY, THEODORE W., Orono, Chemistry.

MARYLAND

Graduate

ANDERSON, DON L., Baltimore, Earth Sciences.
BIRDSALL, WILLIAM C., Baltimore, Social Sciences.
BROWN, ROBERT L., Kensington, Chemistry.
BROWN, STANLEY G., Kensington, Physics.
CURTIS, EDWARD B., Annapolis, Mathematics.
DENHARDT, DAVID T., Baltimore, Biophysics.
DOBSON, PETER N., Jr., Baltimore, Physics.
DUNLEAVY, Sr., M. ROSALEEN, Baltimore, Microbiology.
DWYER, THOMAS F., Baltimore, Engineering.
FERGUSON, JOHN D., Bishop Head, Mathemathics.
FOX, WADE H., Jr., Baltimore, Engineering
HAUK, PETER, Chevy Chase, Chemistry.
HOLLAND, NICHOLAS D., Chevy Chase, Zoology.
LICHT, ARTHUR L., Silver Spring, Physics.
MECKEL, LAWRENCE D., Jr., Baltimore, Earth Sciences.
MILLERD, WILLIAM H., Jr., Baltimore, Physics.
MORRIS, JOHN E., Silver Spring, Biochemistry.
SHARNOFF, MARK, Chevy Chase, Physics.
SIGER, ALVIN, Baltimore, Biophysics.
SMITH, DAVID A., Pocomoke City, Mathematics.
VANTREES, HARRY L., Jr., Glen Burnie, Engineering.
WARNER, JONATHAN R., Bethesda, Biophysics.
WELLS, ROBERT, Bethesda, Mathematics.
WHITLOCK, HOWARD W., Jr., University Park, Chemistry.
ZIPF, EDWARD C., Jr., Baltimore, Physics.

Cooperative Graduate

AKS, STANLEY, College Park, Physics.
BERK, KENNETH N., Hyattsville, Physics.
BURSEY, MAURICE M., Baltimore, Chemistry.
DORN, CONRAD P., Jr., Baltimore, Chemistry.
FINK, DONALD L., Baltimore, Engineering.

MARYLAND—Continued

FORMAN, RICHARD T., Easton, Botany.
FULLER, GERALD L., West Hyattsville, Engineering.
JONES, DONALD G., Takoma Park, Chemistry.
KANTOR, PAUL B., Silver Spring, Physics.
LAMPE, DONALD R., Baltimore, Engineering.
LEON, MELVIN, West Hyattsville, Physics.
MADSEN, ERNEST L., District Heights, Physics.
MARTIN, RICHARD L., Baltimore, Engineering.
MULLALLY, JANET J., Bethesda, Mathematics.
QUIN, ROBERT G., Hagerstown, Physics.
RAWLINGS, HOWARD P., Baltimore, Mathematics.
SACKS, ROBERT C., Baltimore, Engineering.
SOMERLOCK, CHARLES R., Baltimore, Engineering.
WEBER, HARRY W., Jr., Baltimore, Chemistry.

Postdoctoral

ADAMS, WILLIAM H., Glen Burnie, Chemistry.
FISKE, RICHARD S., Baltimore, Earth Sciences.
HOFFMANN, LOUIS G., Baltimore, Microbiology.
STOKES, ARNOLD P., Baltimore, Mathematics.

Senior Postdoctoral

AMES, BRUCE N., Bethesda, Biochemistry.
MADANSKY, LEON, Baltimore, Physics.
WASHNITZER, GERARD, Baltimore, Mathematics.

Science Faculty

EMERSON, DON A., LaVale, Zoology.
KERSCHNER, JEAN, Westminster, Medical Sciences.
MUMA, HAROLD E., Baltimore, Zoology.
SCHICK, IRVIN H., Takoma Park, Engineering.

Summer Fellowships for Graduate Teaching Assistants

ADAMS, EDWARD F., Hyattsville, Engineering.
BRIERLEY, GERALD P., Greenbelt, Biochemistry.
BRIODY, ROBERT G., Hagerstown, Chemistry.
FORMAN, RICHARD T., Easton, Botany.
HURLBUTT, HENRY W., College Park, Zoology.
MADSEN, ERNEST L., District Heights, Physics.
STOUT, JOHN F., Takoma Park, Zoology.
WENZINGER, GEORGE R., Chevy Chase, Chemistry.
WRIGHT, THOMAS L., Baltimore, Earth Sciences.

Summer Fellowships for Secondary School Teachers

CAREY, HELEN SIMMONS, Catonsville, Mathematics.
FARLEY, WILLIAM J., Baltimore, Mathematics.
FITZPATRICK, Sr. ANCILLA, Baltimore, Zoology.
GENTRY, Sr. DORIS ANN, Baltimore, Mathematics.
HOFHERR, Sr. MARGARET, Baltimore, Mathematics.
HOPKINS, BELVA H., Beltsville, Mathematics.
JOHNSON, PATRICIA L., Wheaton, Mathematics.
O'NEILL, Bro. GODFREY C., Baltimore, Mathematics.
STARK, WILLIAM DAVID, Silver Spring, General Sciences.

MASSACHUSETTS

Graduate

ALPERIN, JONATHAN L., Newton, Mathematics.
BIRMINGHAM, THOMAS J., Milford, Physics.
BLUMENTHAL, RALPH B., Cambridge, Physics.
BROWN, MARIANNE S., Waltham, Mathematics.
CARROLL, ALAN S., Cambridge, Physics.
CHASE, THEODORE, Jr., Dover, Biochemistry.
CLEARY, RICHARD T., Boston, Biochemistry.
COMLY, JAMES B., Cambridge, Engineering.
COVITZ, FRANK H., Dorchester, Chemistry.
DIAMOND, JARED M., Brookline, Medical Sciences.
DIX, MICHAEL W., Wayland, Zoology.
DOBBINS, ROBERT R., Boston, Physics.
FEDERER, CHARLES A. III, Belmont, Agriculture.
FUCHS, NORMAN H., Boston, Physics.
FULTON, ROBERT L., East Weymouth, Chemistry.
GERSTEIN, IRA S., Cambridge, Physics.
GIBBS, SARAH P., Belmont, Zoology.
GLOWACKI, ELLEN R., Winchester, Biochemistry.
GOLD, LEWIS P., Brockton, Chemistry.
GOODRICH, ROBERT L., Cambridge, Physics.
GUILLEMIN, VICTOR W., Belmont, Mathematics.
HOWLAND, JOHN L., Quincy, Microbiology.
HUNT, THOMAS K., Belmont, Physics.
INGRAHAM, JOHN C., Boston, Physics.
JAMESON, PAUL W., Cambridge, Engineering.
JOLLY, HENRY P., Jr., Boston, Physics.
KNIGHT, WILLIAM S., West Springfield, Chemistry.
LANDE, ALEXANDER, Cambridge, Physics.
LOCKSHIN, RICHARD A., Northampton, Zoology.
MARK, ROGER G., Chestnut Hill, Engineering.
MOORE, CHARLES B., Beverly Farms, Chemistry.
NELSON, RALPH D., Jr., Westboro, Chemistry.
NESSON, MICHAEL H., Brighton, Microbiology.
POULTNEY, SHERMAN K., Leominster, Physics.
ROZIN, PAUL N., Cambridge, Psychology.
SAVIN, HARRIS B., Newton Highland, Psychology.
SCHEINBAUM, MONTE L., Cambridge, Chemistry.
SCHELL, ALLAN C., Medford, Engineering.
SCHOWEN, RICHARD L., Cambridge, Chemistry.
SULLIVAN, JEREMIAH D., Foxboro, Physics.
THORNTON, ROBERT M., Cambridge, Botany.
WARD, HAROLD N., Cambridge, Mathematics.
WAXMAN, NAHUM J., Cambridge, Anthropology.
WHITTIER, DEAN P., Millbury, Botany.
WILLIAMS, DAVID C., Belmont, Chemistry.
YEGIAN, CHARLES D., Amherst, Biophysics.

Cooperative Graduate

ADLER, DAVID, Cambridge, Physics.
AVERNER, MELVIN J., Newtonville, Zoology.
BELL, JERRY A., Cambridge, Chemistry.
BONVINI, GLADYS H., West Medway, Genetics.

BURSTYN, HAROLD L., Cambridge, Social Sciences.
CHIN, GILBERT Y., Boston, Engineering.
CONLEY, BRENDA S., Cambridge, Biology.
DALEY, HENRY O., Jr., Braintree, Chemistry.
DURGIN, CHARLES B., Waltham, Engineering.
ELLETT, MILDRED H., Boston, Biology.
FOGLESONG, GEORGE M., Newtonville, Physics.
FORD, DWAIN L., Lancaster, Biochemistry.
FORSLUND, DONALD C., Norwell, Engineering.
FORSLUND, ROBERT P., Norwell, Engineering.
GOODMAN, NELSON S., Allston, Zoology.
HOHENBERG, PIERRE C., Cambridge, Physics.
HOWE, NORMAN M., Jr., Princeton, Engineering.
KABASAKALIAN, LEVON, Newtonville, Psychology.
KUSIK, CHARLES L., Richmond, Engineering.
LEYON, ROBERT E., Wellesley Hills, Chemistry.
MIDTTUN, OLE H., New Bedford, Engineering.
MILLS, WAYNE A., Natick, Physics.
NORDTVEDT, KENNETH L., Jr., Boston, Physics.
NOSHKIN, VICTOR E., Jr., Worcester, Chemistry.
PASTERCZYK, FRANCIS W., Chicopee Falls, Engineering.
PHILLIPS, E. ALAN, South Lincoln, Physics.
PHILLIPS, ROGER C., Boston, Chemistry.
PLOCKE, DONALD J., Boston, Biophysics.
PLUTA, PHILIP R., Brockton, Engineering.
RHOADES, RICHARD G., Northampton, Engineering.
RUSSELL, ANTHONY P., Boston, Zoology.
SANDERSON, RICHARD B., Cambridge, Physics.
SCHMIDT, JOHN P., Holyoke, Engineering.
SEIDMAN, AARON, Cambridge, Genetics.
SIMON, JOSEPH L., Lexington, Zoology.
SMITH, ALAN B., Belmont, Engineering.
SMITH, KENNETH A., Winthrop, Engineering.
STOLZENBERG, LOUIS G., Boston, Mathematics.
STRAUSS, RICHARD A., Revere, Engineering.
VONSUSICH, STEFANIE, Framingham, Social Sciences.

Postdoctoral

BAYM, GORDON A., Pittsfield, Physics.
HOOD, WILLIAM B., Jr., Boston, Medical Sciences.

Senior Postdoctoral

CALDWELL, DAVID O., Cambridge, Physics.
FRISCH, DAVID H., Cambridge, Physics.
GROSS, EUGENE P., Waltham, Physics.
MOVIUS, HALLAM L., Jr., Cambridge, Anthropology.
POLLACK, IRWIN, Cambridge, Psychology.
RAPER, JOHN R., Cambridge, Genetics.
SHAPIRO, ARNOLD S., Waltham, Mathematics.
TWAROG, BETTY M., Cambridge, Zoology.

Science Faculty

BRAUNER, PHYLLIS A., Boston, Chemistry.
CLAYTON, JOE T., Amherst, Engineering.
FREEMAN, HAROLD A., Cambridge, Mathematics.
GOLDMAN, OSCAR, Waltham, Mathematics.
LIGHT, TRUMAN S., West Roxbury, Chemistry.
MCBRIEN, VINCENT O., Worcester, Mathematics.
SCOTT, WILLIAM T., Northampton, Physics.
SHEINHART, EDNA, Sheffield, Mathematics.
WHITNEY, ROBERT B., Amherst, Chemistry.

Summer Fellowships for Graduate Teaching Assistants

ALPERIN, JONATHAN L., Newton, Mathematics.
BOUTILIER, ROBERT F., North Andover, Earth Sciences.
BURKE, JAMES J., Jr., Northampton, Chemistry.
DERMARDEROSIAN, ARA H., Somerville, Chemistry.
FACTOR, ARNOLD, Mattapan, Chemistry.
KELLIHER, CATHERINE F., Medford, Chemistry.
KNEE, DAVID I., Cambridge, Mathematics.
LIBERA, RICHARD J., Thorndike, Mathematics.
MACKUN, STANLEY, East Walpole, Social Sciences.
MANNIS, FRED, Brookline, Chemistry.
MCCORD, JAMES R. III, Cambridge, Mathematics.
MILLER, MURRAY S., Boston, Zoology.
OLVER, JOHN W., Cambridge, Chemistry.
SAGAL, MATTHEW W., Brookline, Chemistry.
SAUL, FRANK P., Cambridge, Anthropology.
WARD, JEANNE A., Arlington, Chemistry.
YATES, ROBERT A., Southbridge, Engineering.
YOUNG, NANCY, Pittsfield, Genetics.

Summer Fellowships for Secondary School Teachers

ALVES, Sr. M. MENRIC, Boston, Mathematics.
CREIGHTON, WILLIAM A., Milton, Biology.
ECCLES, FRANK M., Andover, Mathematics.
FALLA, Sr. M. ANNATA, Brighton, Mathematics.
HONNEN, Sr. JAMES F., Springfield, Biology.
KELLETT, JEREMIAH J., Weston, Mathematics.
LANDER, ALAN, Avon, Chemistry.
LUX, JOHN R., Andover, Mathematics.
MCDONNELL, Sr. IMMACULATA, Worcester, Mathematics.
MCGARRY, Sr. M. ADRIA, Waltham, Chemistry.

MICHIGAN

Graduate

ANDERSEN, CARL M., Richmond, Physics.
BACHMANN, ROGER W., Ann Arbor, Zoology.
BALL, RICHARD J., Owosso, Psychology.
BALZARINI, DAVID A., Iron Mountain, Physics.
BAYMA, ROBERT W., Detroit, Engineering.
BECK, WILLIAM F., Lansing, Engineering.
BICKEL, THOMAS F., Detroit, Mathematics.
BROWN, ROBERT T., Milan, Physics.
BUFE, CHARLES G., Sault Ste. Marie, Earth Sciences.
BUTCHER, SAMUEL S., Gaylord, Chemistry.
BUYAN, JON R., Detroit, Engineering.
BUZZELLI, DONALD E., Detroit, Engineering.
CARROLL, ROBERT L., Mason, Biology.
CORNWELL, GEORGE W., Three Oaks, Zoology.
DE WITT, CALVIN B., Ann Arbor, Zoology.
DEIBERT, MAX C., St. Johns, Engineering.
DUCMANIS, JOHN A., Kalamazoo, Physics.
EDMONDS, KATHERYN, Kalamazoo, Chemistry.

MICHIGAN—Continued

EVELY, SUSAN J., Grosse Pointe, Mathematics.
FISCHER, PATRICK C., Ann Arbor, Mathematics.
FOX, KENNETH, Detroit, Physics.
FRAYER, DOROTHY A., Detroit, Biochemistry.
GIGNAC, DONALD A., Detroit, Mathematics.
GOODMAN, JOHN M., Dearborn, Physics.
HEISLER, ALAN A., Big Rapids, Mathematics.
HUBER, LEE M., Plymouth, Chemistry.
KESSLER, DAVID P., Ann Arbor, Engineering.
KLANDERMAN, BRUCE H., Grand Rapids, Chemistry.
LAZAROV, CONNOR, Detroit, Mathematics.
LILLYA, CLIFFORD P., Ann Arbor, Chemistry.
LITWIN, GEORGE H., Detroit, Psychology.
MATWIYOFF, NICHOLAS A., Rogers City, Chemistry.
MCBRIDE, DAVID W., Dearborn, Chemistry.
MCILRATH, THOMAS J., East Lansing, Physics.
MITCHELL, LAWRENCE C., Ann Arbor, Chemistry.
MORRISON, BARBARA M., Ann Arbor, Botany.
OWENS, JAMES C., Grosse Pointe, Physics.
PALMER, PAUL, Ann Arbor, Chemistry.
PAYNE, ROBERT B., Niles, Zoology.
PIATKOWSKI, THOMAS F., Ann Arbor, Engineering.
POUTSMA, MARVIN L., Grand Rapids, Chemistry.
REINHARD, DOUGLAS N., Birmingham, Engineering.
ROBERTSON, WAYNE M., Fremont, Engineering.
ROSS, DAVID W., Detroit, Physics.
RUSKIN, ARNOLD M., Ann Arbor, Engineering.
SLOBIN, DAN I., Detroit, Psychology.
SMITH, GENE E., Ann Arbor, Engineering.
SQUIRE, MARY A., Ypsilanti, Psychology.
STENGER, ROBERT A., Midland, Chemistry.
STREET, JAMES R., Detroit, Engineering.
TREADO, PAUL A., Ann Arbor, Physics.
VEECH, WILLIAM A., Pleasant Ridge, Mathematics.
WEBSTER, DALE A., Wynndotte, Biochemistry.
WESTON, ELIZABETH A., Detroit, Biochemistry.
WIDEMAN, JAMES M., Detroit, Medical Sciences.
WIEGERT, RICHARD G., Whitemore Lake, Zoology.
WISER, NATHAN, Detroit, Physics.
WOOD, RODNEY D., Charlotte, Engineering.
ZIER, ROBERT E., Detroit, Physics.

Cooperative Graduate

ALLARD, MARVEL J., Grosse Pte. Wood, Psychology.
ARCHBOLD, NORBERT L., Ann Arbor, Earth Sciences.
AUBEL, JOSEPH L., Lansing, Physics.
BALDWIN, RANSOM L., East Lansing, Agriculture.
BAYS, KENNETH L., Shelby, Engineering.
BECK, JONATHAN M., Lansing, Mathematics.
BENKARD, JOHN P., Ann Arbor, Mathematics.
BETZ, ROBERT S., Huntington Wood, Social Sciences.
BLASS, WILLIAM E., East Lansing, Physics.
BUCKMASTER, MARLIN D., Ann Arbor, Chemistry.
CLIFFORD, LELAND T., Ann Arbor, Psychology.
CROSS, DAVID V., Ann Arbor, Psychology.
DANIELS, EDWARD L., Grand Ledge, Engineering.
DEHARDT, DORIS C., East Lansing, Psychology.
DEJONGH, DON C., Burnips, Chemistry.
DINGLE, RICHARD D. H., Pinckney, Zoology.
DUNLAP, ROBERT W., Farmington, Engineering.
FINNEY, ROSS L., Ann Arbor, Mathematics.
FOULIS, LINDA M., Detroit, Mathematics.
FOULSER, DAVID A., Ann Arbor, Mathematics.
GARLAND, HOWARD, Oak Park, Mathematics.
GELLENBECK, Sr. MARY M., Detroit, Microbiology.
GRAHAM, ROLLYN G., Birmingham, Engineerneering.
GREENMAN, DAVID L., Lansing, Zoology.
GULLAHORN, JEANNE E., East Lansing, Psychology.
HAAS, TERRY E., St. Johns, Chemistry.
HANNA, MARTIN S., Birmingham, Mathematics.
HARACZ, RICHARD D., Dearborn, Psysics.
HESS, CHARLES F., Dearborn, Social Sciences.
HOGH, GOTTFRIED, Detroit, Zoology.
HOOVERMAN, ROGER H., Saginaw, Physics.
HUANG, JUSTIN C., East Lansing, Physics.
HUNT, ROBERT H., Ann Arbor, Physics.
KERR, JOHN P., Ann Arbor, Zoology.
KNUDSEN, KAREL G., Gwinn, Psychology.
KUZMA, DENNIS C., Lincoln Park, Engineering.
LA POINTE, CLAYTON W., Detroit, Engineering.
LINDMAN, HAROLD R., Dearborn, Psychology.
MASON, JOHN L., North Muskegon, Engineering.
PATTERSON, DONALD J., Birmingham, Engineering.
PETERSON, RUTH A., Frankfort, Chemistry.
PLOURDE, GAIL R., Norway, Chemistry.
ROSENFELD, ROBERT L., Jackson, Engineering.
ROTHENBERG, THOMAS J., Detroit, Social Sciences.
SCHUMACHER, CLIFFORD R., Detroit, Physics.
SCHWARTZ, ALAN S., Detroit, Engineering.
SHETLER, STANWYN, G., Ann Arbor, Botany.
SILBAR, RICHARD R., Fenton, Physics.
SMITH, GLEN C., Morenci, Engineering.
SPEAKE, NEAL M., Ann Arbor, Mathematics.
STEVENS, ALDRED L., Brown City, Engineering.
STREET, DAVID P., Ann Arbor, Social Sciences.
TRABASSO, THOMAS R., East Lansing, Psychology.
VANDYKE, JOHN W., Jr., Holland, Chemistry.
WAKELEY, JOHN H., East Lansing, Psychology.
WARNER, HUBER R., Ann Arbor, Biochemistry.
WILSON, CAROL M., Detroit, Chemistry.
WOLSEY, WAYNE C., Battle Creek, Chemistry
ZERBA, ROSE D., Ferndale, Physchology.

Postdoctoral

BROWN, MORTON, Ann Arbor, Mathematics.
CARLSON, EDWARD H., Lansing, Physics.
CLOSSON, WILLIAM D., Pontiac, Chemistry.
DAVENPORT, RICHARD, Battle Creek, Zoology.
SCHLESINGER, MILTON J., Ann Arbor, Biochemistry.

Senior Postdoctoral

ALLEE, LAWRENCE H., Ann Arbor, Astronomy.
BANDURSKI, ROBERT S., East Lansing, Biochemistry.
BERNSTEIN, RICHARD B., Ann Arbor, Physics.
CHAVIN, WALTER, Detroit, Zoology.
STEINER, ERICH E., Ann Arbor, Genetics.

Science Faculty

BRIDGMAN, ROBERT J., Ypsilanti, Mathematics.
CARSON, RALPH S., Belding, Engineering.
CZYZAK, STANLEY J., Detroit, Astronomy.
DIRASIAN, HENRY A., Detroit, Engineering.
GEBBEN, ALAN I., Grand Rapids, Botany.
HAAS, VIOLET, Detroit, Mathematics.
HEDGES, HARRY G., East Lansing, Engineering.
KERWIN, Sr. M. ALICIA, Detroit, Mathematics.
KNELLER, WILLIAM A., Ypsilanti, Earth Sciences.
LEONARD, THOMAS C., Houghton, Engineering.
MACKSON, CHESTER J., East Lansing, Engineering.
METZGER, ROBERT W., Flint, Engineering.
WILCOX, LYLE C., East Lansing, Engineering.

Summer Fellowships for Graduate Teaching Assistants

ALLARD, MARVEL J., Grosse Pointe Woods, Psychology.
BORCHERTS, ROBERT H., Ann Arbor, Engineering.
BOYD, JOHN W., East Lansing, Physics.
BRAGG, ARTHUR E., Ann Arbor, Mathematics.
CALHOUN, ROLAND L., Ann Arbor, Psychology.
DAUGHERTY, NED A., East Lansing, Chemistry.
DAVIS, JAMES H., East Lansing, Psychology.
DEVRIES, DONALD L., Zeeland, Chemistry.
DUBES, RICHARD C., East Lansing, Engineering.
HALPERN, JAMES D., Detroit, Mathematics.
HOOVER, WILLIAM G., Ann Arbor, Chemistry.
KAPLAN, STEPHEN, Ann Arbor, Psychology.
KORFHAGE, ROBERT R., Ann Arbor, Mathematics.
LEININGER, WILLIAM J., Marquette, Social Sciences.
LOUTTIT, RICHARD T., Ann Arbor, Psychology.
MARTENS, HINRICH R., East Lansing, Engineering.
MEYER, VICTOR E., East Lansing, Chemistry.
MOHRIG, JERRY R., Grand Rapids, Chemistry.
NOSSAL, NANCY G., Ann Arbor, Biochemistry.
OBANNON, JAMES Y., Jr., Ann Arbor, Medical Sciences.
PALMER, LIBBY, Ann Arbor, Mathematics.
PHILLIPS, BARRIE M., Jackson, Medical Sciences.
SCHWARTZ, ARTHUR J., Detroit, Mathematics.
SEBASTIAN, LOIS P., Ann Arbor, Psychology.
TRABASSO, THOMAS R., East Lansing, Psychology.
WALDEN, MARVIN E., Troy, Mathematics.
WIRTH, JOHN L., Three Oaks, Engineering.

Summer Fellowships for Secondary School Teachers

BAUER, ERNEST A., Grosse Pointe, Mathematics.
COMISKEY, Sr. JEAN K., Utica, Biology.
CONVERSET, Sr. M. JE. DARC, Grand Rapids, Biology.
HAGER, DAVID L., Mason, Biology.
HAM, JOHN B., Grand Rapids, Biology.
HARMON, MOTH. MARYELLEN, Grosse Pointe, Chemistry.
HAUENSTEIN, JOHN L., Niles, Biology.
KOHLHEPP, JOHN GRAM, Flint, Mathematics.
LABATT, DEE W., Mendon, Biology.
LOYET, CHARLES E., Flint, Mathematics.
MANDOSSIAN, ADRIENNE, Detroit, Botany.
MATSON, WILLIAM F., Montague, Biology.
MICHIELS, BRO. CYRIL LEO, Detroit, Chemistry.
MOORE, CALVIN V., Detroit, Zoology.
MULLINIX, DARREL D., Wayne, Biology.
NYHOFF, VERNON, D., Muskegon, Mathematics.
PHILLIPS, GENE A., Corunna, Mathematics.
RAKOCZY, Sr. M. ANDREETA, Hamtramck, Chemistry.
SHULL, JERRY L., Ann Arbor, Biology.
SMITKA, JOHN M., Jr., Detroit, Biology.
TSCHIRHART, WILLIAM, Warren, Mathematics.
VAN ANTWERP, ALAN E., Big Rapids, Mathematics.
WODETZKI, Sr. CATHERINE, Flint, Chemistry.
ZYLSTRA, GERALD GERBEN, Kalamazoo, Biology.

MINNESOTA

Graduate

AHERN, PATRICK R., St. Paul, Mathematics.
ARNESON, RICHARD M., Minneapolis, Zoology.
BERG, JOHN C., Hopkins, Engineering.
CONE, RICHARD A., St. Paul, Physics.
DARLEY, JOHN M., Minneapolis, Psychology.
DEUTSCHE, CRAIG W., Minneapolis, Chemistry.
DICKELMAN, THEODORE E., Minneapolis, Chemistry.
EFRON, BRADLEY, St. Paul, Mathematics.
FRISTEDT, BERT E., Hopkins, Mathematics.
GAMELIN, THEODORE W., Robbinsdale, Mathematics.
KIRCHNER, ROGER B., Edina, Mathematics.
LOWRY, THOMAS H., Minneapolis, Chemistry.
MCKENZIE, DOUGLAS H., Minneapolis, Anthropology.
MOFFET, ALAN T., Rochester, Astronomy.
NAESETH, ROXANNE, Wanamingo, Mathematics.
OLSON, EDWIN S., Cannon Falls, Chemistry.
OSTBY, CARL M., Jr., McIntosh, Mathematics.
PEIKERT, ERNEST W., Minneapolis, Earth Sciences.
RENSINK, MARVIN E., Austin, Physics.
SOUTHWICK, DAVID L., Rochester, Earth Sciences.
SPANGLER, JOHN D., Atwater, Physics.
SWANSON, STANLEY M., St. Paul, Physics.
SYVERSON, MYRON W., Minneapolis, Mathematics.
TAUER, Sr. RITA J., St. Paul, Mathematics.
THURNAUER, PETER G., St. Paul, Physics.
TORGERSON, RONALD T., Minneapolis, Physics.
WHITE, ROSCOE B., Minneapolis, Physics.
WILDER, STEPHEN P., Minneapolis, Engineering.
WILLETT, ROGER D., Northfield, Chemistry.

Cooperative Graduate

BENT, ANNE M., Minneapolis, Botany.
CAHOON, ELIZABETH J., Minneapolis, Botany.

MINNESOTA—Continued

CARLSON, ROBERT L., Duluth, Chemistry.
CLAYTON, LEE S., Lockhart, Earth Sciences.
CONTOS, RICHARD F., Duluth, Microbiology.
DAWES, CLINTON J., Robbinsdale, Botany.
DUSSERE, PAUL L., Moorhead, Mathematics.
FILLMORE, JAY P., Minneapolis, Mathematics.
FLYNN, PATRICK F., Regal, Engineering.
GAUSTAD, JOHN E., Minneapolis, Astronomy.
HAIGHT, CHARLES H., Minneapolis, Engineering.
HEDIN, ALAN E., St. Paul, Physics.
HELLING, ROBERT B., Madelia, Genetics.
JOHNSON, DONALD C., St. Paul, Chemistry.
JOHNSON, RICHARD R., Minneapolis, Psychology.
JOHNSON, WILLIAM W., Minneapolis, Genetics.
JONES, DUANE A., Northfield, Chemistry.
KEENAN, JOHN R., St. Paul, Chemistry.
KONCOS, ROBERT, Minneapolis, Chemistry.
MAHER, LOUIS J., Jr., Minneapolis, Earth Sciences.
OAKES, THOMAS R., Minneapolis, Chemistry.
ORIEL, PATRICK J., Stillwater, Chemistry.
REAY, NEVILLE W., Jr., Minneapolis, Physics.
REITER, RUSSELL J., Cold Spring, Medical Sciences.
RIES, RICHARD R., New Ulm, Physics.
SCHALEGER, LARRY L., Minneapolis, Chemistry.
SOMMER, DAVID C., St. Paul, Mathematics.
VENNIX, ALAN J., St. Paul, Engineering.
VISTE, ARLEN E., Austin, Chemistry.
YAPEL, ANTHONY F., Jr., Soudan, Chemistry.

Postdoctoral

MUELLER, AUGUST P., Mahnomen, Microbiology.

Senior Postdoctoral

SPITZER, FRANK L., Minneapolis, Mathematics.
YENNIE, DONALD R., Minneapolis, Physics.

Science Faculty

RAMETTE, RICHARD W., Northfield, Chemistry.
RUDD, MILLARD E., Moorhead, Physics.
WOLF, FRANK L., Northfield, Mathematics.

Summer Fellowships for Graduate Teaching Assistants

DOMHOLDT, LOWELL C., Minneapolis, Engineering.
DUSSERE, PAUL L., Moorhead, Mathematics.
EMERSON, KENNETH, Minneapolis, Chemistry.
HELLING, JOHN F., Madelia, Chemistry.
HEUER, CHARLES V., Bertha, Mathematics.
JOHNSON, DONALD C., St. Paul, Chemistry.
JONES, DUANE A., Northfield, Chemistry.
LARSON, HOMER R., Pencer, Zoology.
NORDLIE, FRANK G., New London, Zoology.
PLORDE, DONALD E., Fairmont, Chemistry.
RATZ, JAMES W., Detroit Lakes, Engineering.
SATHER, DUANE P., Minneapolis, Mathematics.
SCHALEGER, LARRY L., Minneapolis, Chemistry.
SILVERMAN, WILLIAM, Minneapolis, Mathematics.
STORMS, HOWARD A., Ada, Chemistry.

Summer Fellowships for Secondary School Teachers

ACQUARD, RICHARD H., Austin, Mathematics.
COULTER, JOHN C., Mound, Biology.
DINGLE, JAMES H., Elk River, Mathematics.
HAUGEN, LYLE J., Pelican Rapids General Science.
HENDRICKSON, ARTHUR D., Tower, Mathematics.
HITI, LUDWIG F., Cloquet, Mathematics.
OLSON, ALLAN L., South St. Paul, Mathematics.
PROUSE, HOWARD LEE, Mankato, Mathematics.
SCHROEDER, DENNIS S., Waseca, Chemistry.
THEIS, SR., JEAN M., Wabasha, Biology.
VAN LOON, RUSSELL JOE, Robbinsdale, Mathematics.

MISSISSIPPI

Graduate

BALGORD, WILLIAM D., Jackson, Earth Sciences.
CERNY, JOSEPH III, University, Chemistry.
NAMKOONG, GENE, Gulfport, Genetics.

Cooperative Graduate

BARRETT, CARL R., Jr., Jackson, Engineering.
BRADOW, JUDITH M., University, Chemistry.
BUNTIN, ROBERT R., Gulfport, Engineering.
EATHERLY, BILLY J., Jackson, Social Sciences.
FAGOT, HACKER J., Pass Christian, Psychology.
FITCH, DAVID C., Gulfport, Engineering.
GILMER, ROBERT W., Jr., Pontotoc, Mathematics.
HOLLINGSWORTH, JOHN G., Decatur, Mathematics.
MANSFIELD, CLIFTON T., Winona, Chemistry.
POUNDS, DONNIE J., Bonneville, Engineering.
RUSSELL, LYNN D., Pontotoc, Engineering.
WALLICK, EARL T., Grenada, Chemistry.

Postdoctoral

DAVIS, JAMES E., State College, Biochemistry.

Science Faculty

AVEN, RUSSELL E., University, Engineering.
BLAKNEY, SIMMIE S., Waynesboro, Mathamatics.
MCKIE, WILL T., Jr., State College, Engineering.

Summer Fellowships for Graduate Teaching Assistants

BRADOW, JUDITH M., University, Chemistry.
BRYAN, EDWARD E., Oxford, Chemistry.
LEWIS, JOHN T. III, Jackson, Psychology.
MCCRONE, ELINOR J., Vicksburg, Genetics.

Summer Fellowships for Secondary School Teachers

AUSTIN, GLADYS, Meridian, Biology.
BEGLEY, GRACE B., Jackson, General Sciences.
DANIEL, ARMY, Jr., Jackson, General Sciences.
GOODGAME, LUCILE H., Laurel, Mathematics.
JONES, DOROTHY LOUISE, Canton, Biology.
LEWIS, ROBERT L., Hattiesburg, Microbiology.
LEWIS, RUTH TODD, Okolona, General Sciences.
TILLMAN, MARGARET H., Bruce, General Sciences.

WILSON, WILLIAM RAY, Port Gibson, Mathematics.

MISSOURI

Graduate

ANDREWS, JAMES S., Columbia, Psychology.
BRIDGER, ROBERT F., Joplin, Chemistry.
CONDON, JOSEPH H., St. Louis, Physics.
CUSHING, EDWARD J., Steelville, Earth Sciences.
DAVID, RICHARD F., St. Louis, Engineering.
DETCHMENDY, DAVID M., St. Louis, Engineering.
ELSON, ELLIOT L., Ladue, Biochemistry.
HARDEBECK, HARRY E., Rolla, Engineering.
PARKHURST, LAWRENCE J., Kansas City, Chemistry.
HARTING, GARY L., Kirkwood, Engineering.
JORDAN, ROBERT W., St. Louis, Chemistry.
JORDAN, THOMAS M., Falcon, Physics.
KORNFELD, ROSALIND H., Olivette, Biochemistry.
KREBS, CHARLES J., St. Louis, Zoology.
KWENTUS, GERALD K., Kirkwood, Engineering.
LEMMON, ALAN V., University City, Mathematics.
MAHONEY, MARY A., Ferguson, Social Sciences.
MCMAHON, LEE E., St. Louis, Psychology.
MIDGLEY, JAMES E., Kansas City, Physics.
MUNCH, JOHN H., Webster Groves, Chemistry.
MUTCHLER, GORDON S., St. Louis, Physics.
NANCE, JON R., Springfield, Physics
NAUMAN, EDWARD B., Kansas City, Engineering.
ROTH, RICHARD F., St. Louis, Physics.
STONE, HAROLD S., Clayton, Engineering.

Cooperative Graduate

ANDALAFTE, EDWARD Z., Springfield, Mathematics.
BARNETT, DONALD L., Hannibal, Mathematics.
BAUMILLER, ROBERT C., St. Louis, Genetics.
BERGER, ROGER L., Webster Groves, Engineering.
BERRY, IVAN L., Columbia, Engineering.
BLACK, ALBERT W. III, Kirkwood, Engineering.
BLAIR, JAMES E., Kansas City, Chemistry.
BLAKE, WILLIAM H., Jr., Clayton, Social Sciences.
BORISON, SIDNEY L., St. Joseph, Physics.
BROBERMAN, JAMES G., St. Louis, Physics.
BROWN, LARRY N., Springfield, Zoology.
CANTWELL, JOHN C., St. Louis, Mathematics.
COOK, ROBERT A., University City, Mathematics.
CURNUTT, JERRY H., Springfield, Social Sciences.
DIETRICH, ROBERT G., St. Louis, Engineering.
ECKERT, CHARLES A., St. Louis, Engineering.
ENGLAND, NOAH C., Myrtle, Agriculture.
FREESE, RAYMOND W., Foristell, Mathematics.
GAVAN, JOHN C., St. Louis, Chemistry.
GUBSER, JOHN L., St. Louis, Engineering.
HAGEN, DAVID C., St. Louis, Engineering.
HANSEN, SPENST M., Rolla, Earth Sciences.
HORTON, HORACE R., Columbia, Biochemistry.
JOHNSON, JAMES W., Rolla, Engineering.
JONES, FRANK N., Carthage, Chemistry.
KOLKER, HAROLD J., University City, Chemistry.
KRONE, WILLIAM J., Normandy, Engineering.
LINDAUER, GUSTAV A., Richmond Heights, Engineering.
MCCOOL, DONALD K., Cameron, Engineering.
MEIER, ALBERT H., Columbia, Zoology.
SCHEU, JOHN E., Hannibal, Engineering.
SCHULTZ, JOHN E., Auxvasse, Chemistry.
WALTMAN, PAUL E., St. Louis, Mathematics.
WEIDMAN, STUART W., St. Louis, Chemistry.
WEINBERG, DAVID S., University City, Chemistry.
WELCH, DAVID O., University City, Engineering.

Postdoctoral

BUTLER, WILLIAM T., Webster Groves, Medical Sciences.
DREITLEIN, JOSEPH F., Ferguson, Physics.

Senior Postdoctoral

DEVINATZ, ALLEN, St. Louis, Mathematics.
MARSHALL, CHARLES E., Columbia, Agriculture.
STALKER, HARRISON D., St. Louis, Genetics.

Science Faculty

AYER, MIRIAM C., Columbia, Mathematics.
BAHN, EMIL L., Jr., Cape Girardeau, Chemistry.
CONNELL, J. BRIAN, St. Louis, Engineering.
DREIFKE, GERALD E., St. Louis, Engineering.
HILL, JOHN J., Kansas City, Physics.
KIPPENHAN, CHARLES J., St. Louis, Engineering.
MILES, JOHN B., Rolla, Engineering.
OSCHWALD, KARAMANEH I., Maryville, Mathematics.

Summer Fellowships for Graduate Teaching Assistants

BAILEY, DENNIS M., St. Louis, Chemistry.
BELL, RONDAL E., Kennett, Biochemistry.
CLINGER, BARBARA A., Strafford, Mathematics.
DRENNAN, OLLIN J., Kirksville, Social Sciences.
GREEN, GEORGE R., Fairfax, Social Sciences.
HANSEN, SPENST M., Rolla, Earth Sciences.
HART, JOHN H., Kansas City, Botany.
KESSLER, NEIL J., Olivette, Engineering.
MEIER, ALBERT H., Columbia, Zoology.
OFTEDAHL, MARVIN L., St. Louis, Chemistry.
SEXTON, CAROL A., Sullivan, Mathematics.
SMITH, DAVID D., Kansas City, Earth Sciences.
SMITH, NANCY L., Kansas City, Biology.
STARR, NORTON L., Kansas City, Mathematics.
STEINER, EUGENE F., St. Louis, Mathematics.
TROY, DANIEL J., Kirkwood, Mathematics.
WELLING, DAN J., Kansas City, Physics.
ZEY, ROBERT L., St. Clair, Chemistry.

Summer Fellowships for Secondary School Teachers

DEALL, LOUIS, St. Louis, Physics.
DREBES, CHARLES B., Chesterfield, Mathematics.
FACETTE, Bro. JAMES L., St. Louis, Physics.
GUNDRUM, Bro. HOWARD, Kirkwood, Mathematics.

MISSOURI—Continued

HIX, Sr. PATRICIA M., St. Louis, Mathematics.
HOGER, CHARLES E., St. Louis, Zoology.
MAGRUDER, WILLIS J., Kirksville, General Sciences.
MCCORMICK, Sr. M. AUSTINA, St. Louis, Biology.
MORRIS, MARY E., Webster Groves, Mathematics.
OSCHWALD, RICHARD A., Maryville, Mathematics.
PARKER, JOHN DOYLE, Herculaneum, Biology.
PIERCE, CORNELL DAVID, Webster Groves, Mathematics.
SPEH, Sr. M. EDWARD PAUL, St. Louis, Chemistry.
TUCKER, Sr. MARGARET E., St. Louis, Biology.
WATSON, ROBERT N., Ferguson, Biology.
WILLIAMS, GEORGE IRVIN, Maryville, General Sciences.

MONTANA

Graduate

BECRAFT, LLOYD G., Billings, Engineering.
CALVERT, JAMES B., Billings, Physics.
VINCELETTE, RICHARD R., Billings, Earth Sciences.
WOODWARD, LEE A., Missoula, Earth Sciences.

Cooperative Graduate

DECKERT, KENNETH L., Richey, Mathematics.
FRITZ, RAYMOND R., Bozeman, Engineering.
HILL, JAMES R., Livingston, Engineering.
LEIBRAND, ROGER J., Bozeman, Chemistry.
MANIS, MERLE E., Missoula, Mathematics.
MCRAE, DANIEL G., Missoula, Mathematics.
MITCHELL, WILLIAM W., Roundup, Botany.
PARKER, RONALD C., Missoula, Earth Sciences.
SWENSON, ROBERT J., Bozeman, Physics.
VANHORN, SARALEE N., Lewistown, Zoology.
YALE, IRL K., Missoula, Mathematics.

Science Faculty

BOOTH, WILLIAM E., Bozeman, Botany.
HOYT, BERNARD W., Bozeman, Engineering.

Summer Fellowships for Secondary School Teachers

COYLE, Sr. PAUL J., Butte, Mathematics.
LEPLEY, JOHN G., Fort Benton, Biology.
STEFFEN, Sr. M. LUCIANA, Ashland, Biology.

NEBRASKA

Graduate

ALLINGTON, ROBERT W., Lincoln, Engineering.
ANDERSEN, JOHN P., Omaha, Mathematics.
CASSEL, DAVID G., Ainsworth, Physics.
JONES, NOEL D., Hastings, Chemistry.
KROTTER, ALISON A., Palisade, Mathematics.
MCARTHUR, DONALD E., Atlanta, Physics.
SHUEY, ELDON W., Lincoln, Biochemistry.
WHEAT, MARY L., Hastings, Mathematics.
WITTE, ALFRED H., Jr., Lincoln, Engineering.

Cooperative Graduate

BOLAR, MARLIN L., Lincoln, Botany.
ERICKSON, LARRY E., Wahoo, Engineering.
GROSS, MILDRED L., Lincoln, Mathematics.
KEZLAN, THOMAS P., Omaha, Mathematics.
LANG, WAYNE W., Lincoln, Physics.
PARK, JOHN T., Lincoln, Physics.
SWANSON, JAMES A., Lincoln, Chemistry.

Science Faculty

HANSEN, PAUL V., Jr., Blair, Chemistry.
MARLETTE, RALPH R., Lincoln, Engineering.

Summer Fellowships for Graduate Teaching Assistants

FLEHARTY, EUGENE D., Hastings, Zoology.

Summer Fellowships for Secondary School Teachers

ADAMY, NICK L., Beaver City, Biology.
ALBERDING, ARTHUR P., Jr., Ord, Mathematics.
GROSS, Sr., M. STEPHANIE, Fremont, Biology.
HEFFNER, Sr., M. CLARETTA, Greeley, Chemistry.
HEISER, MARION S., Omaha, Mathematics.
JOHNSON, DONALD B., Omaha, Mathematics.
STONES, IVAN D., Morrill, Mathematics.
VANOVER, BENJAMIN, Holdrege, Biology.

NEVADA

Graduate

SHANKLAND, THOMAS J., Boulder City, Physics.
SIBBALD, GARTH H., Reno, Social Sciences.

Cooperative Graduate

CROOK, JOSEPH R., Sparks, Chemistry.
HILL, FREDERICK J., Boulder City, Engineering.

Summer Fellowships for Graduate Teaching Assistants

CROOK, JOSEPH R., Sparks, Chemistry.
WISE, WILLIAM S., Carson City, Earth Sciences.

Summer Fellowships for Secondary School Teachers

ANDERSON, HOWARD V., Hawthorne, Mathematics.
STEERE, BOB FARREL, Las Vegas, Biology.

NEW HAMPSHIRE

Graduate

KING, ROBERT B., Rochester, Chemistry.
MARSHALL, ALAN C., Laconia, Engineering.
ROBINSON, PETER, Hanover, Earth Sciences.
WILLIAMS, DONALD J., Jaffrey, Physics.

Cooperative Graduate

BARIL, EARL F., Manchester, Biology.
KIMBALL, RICHARD M., Greenville, Engineering.
O'MALLEY, ROBERT E., Jr., Somersworth, Mathematics.
TUTTLE, ELIZABETH R., Conway, Astronomy.
ZEVOS, NICHOLAS, Manchester, Chemistry.
ZIMMERMAN, CARLE C., Jr., Laconia, Engineering.

Science Faculty

BOWEN, DOUGLAS M., Hanover, Chemistry.
COPENHAVER, JOHN H., Jr., Hanover, Biochemistry.
MURDOCH, JOSEPH B., Durham, Engineering.

Summer Fellowships for Graduate Teaching Assistants

BEAUDOIN, RICHARD L., Nashua, Zoology.
GILMAN, RICHARD A., Concord, Earth Sciences.

Summer Fellowships for Secondary School Teachers

COSTELLO, Sr., M. BEATRICE, Manchester, Biology.
PELLETIER, Sr., MARIE C., Hudson, Biology.

NEW JERSEY

Graduate

ALLYN, JANE E., Stanford, Psychology.
BARTH, ROBERT H., Jr., Ridgewood, Zoology.
BENNETT, JAMES H., Princeton, Mathematics.
BERNER, ROBERT A., Leonia, Earth Sciences.
BRANT, DAVID A., Summit, Chemistry.
BRAULT, JAMES W., Princeton, Physics.
CALDWELL, DENNIS J., Penns Grove, Chemistry.
CARLSMITH, JAMES M., Summit, Psychology.
CHAIKEN, JAN M., Rahway, Physics.
COBURN, STEPHEN P., Summit, Biochemistry.
COHEN, WILLIAM D., Weehawken, Zoology.
CONDON, PAUL E., Princeton, Physics.
CONRAD, PETER W., East Rutherford, Engineering.
DAVIS, BRIAN T., Princeton, Earth Sciences.
FAHRNEY, DAVID E., Fort Lee, Biochemistry.
FRENCH, BEVAN M., Nutley, Earth Sciences.
FREUND, ROBERT S., Maplewood, Chemistry.
FRIEDMAN, KENNETH A., Highland Park, Physics.
GLUCK, HERMAN R., Princeton, Mathematics.
GRAF, RONALD E., Passaic, Physics.
GREENLEAF, NEWCOMB, Short Hills, Mathematics.
GRIFFIN, DAVID H., Oakland, Botany.

Graduate

HALL, DANIEL N., Princeton, Chemistry.
HAND, BRYCE M., Jersey City, Earth Sciences.
HAYS, JAMES F., Short Hills, Earth Sciences.
HOLZWARTH, GEORGE M., Westfield, Biophysics.
HUBER, DAVID L., Toms River, Physics.
JOHNSON, JOSEPH L., Jr., Upper Montclair, Mathematics.
KAYSER, BORIS J., Lakewood, Physics.
KEENAN, EDWARD M., East Orange, Mathematics.
KENNELL, JOHN G., Point Pleasant, Physics.
KOCH, JOHN F., Oakhurst, Physics.
KOVER, WARNER B., Rochelle Park, Chemistry.
KOWAL, NORMAN E., Rochelle Park, Botany.
KOWAL, ROBERT R., Rochelle Park, Botany.
KREPS, RODNEY E., Princeton, Physics.
LARSEN, DAVID M., Hawthorne, Physics.
MATHER, WILLIAM B., Jr., Princeton, Chemistry.
MERRILL, DEANE W., Jr., South Orange, Physics.
MILLMAN, MICHAEL G., Summit, Physics.
MOLLOW, BENJAMIN R., Union, Physics.
OCH, ROSEMARY P., Madison, Engineering.
PILLA, MICHAEL A., Trenton, Engineering.
POLLOCK, WILLIAM A., Lincoln Park, Engineering.
RICHTER, WAYNE H., Leonia, Mathematics.
SEYBOLD, PAUL G., Collingswood, Physics.
SILVERS, STUART J., South Orange, Biochemistry.
SOVERS, OJARS J., Princeton, Chemistry.
STEVENS, RICHARD M., Audubon, Chemistry.
TRETIAK, OLEH J., Passaic, Engineering.
VILMS, JURI, Seabrook, Engineering.
WALDRON, SIDNEY R., Ringwood, Anthropology.

Cooperative Graduate

ABRAHAM, BARBARA W., Madison, Physics.
BRADEN, ROBERT T., Princeton, Physics.
BUNYAN, MARY W., Highland Park, Mathematics.
CAMPBELL, NEIL C., Teaneck, Engineering.
CANN, ROSS S., Ridgewood, Earth Sciences.
CHARLAP, LEONARD S., Penns Grove, Mathematics.
COHEN, EDWARD M., East Orange, Chemistry.
DAMATO, ANNE, Jersey City, Mathematics.
DEDOMINICIS, ALEX J., Union City, Chemistry.
DOUGHTY, KAY M., Indian Mills, Chemistry.
FEDORS, ROBERT F., Bayonne, Chemistry.
GERRISH, JOHN B., Orange, Engineering.
GILL, HELEN K., West Englewood, Biochemistry.
GOLD, HARRY S., Pennsauken, Engineering.
GOODWIN, ELIZABETH B., Hopewell, Psychology.
GOULD, EDWIN, Short Hills, Zoology.
HALPERN, GERALD M., Jersey City, Physics.
HERSH, MICHAEL S., Newark, Engineering.
HOPKINS, PAUL D., Wenonah, Chemistry.
HUTCHINSON, JOHN W., Bridgeton, Engineering.
JEFFERSON, JAMES W., Westwood, Medical Sciences.
JONES, WILLIAM R., Haddon Heights, Mathematics.
KOROS, ROBERT M., Haddonfield, Engineering.
LASIEWSKI, ROBERT C., Maywood, Zoology.
MINERO, RICHARD H., Clifton, Engineering.
MULLER, ROBERT A., Rutherford, Earth Sciences.
MURPHY, JAMES J., River Edge, Physics
NISHIMURA, RUTH, New Brunswick, Psychology.
O'NEILL, JOHN J., Jersey City, Chemistry.
PEPPER, STEPHEN V., Margate City, Physics.
PERRY, CLARK W., Ridgefield, Chemistry.
POAGE, JAMES F., Morristown, Engineering.
RIEGER, PHILIP H., Teaneck, Chemistry.
ROSENTHAL, ELI, Newark, Chemistry.
ROTH, SHIRLEY H., Lakewood, Chemistry.
SEITCHIK, JEROLD A., Merchantville, Physics.
SILVESTRI, ANTHONY J., Glassboro, Chemistry.
SMITH, DONALD E., Bergenfield, Chemistry.
TURNER, ROBERT E. L., Montclair, Mathematics.
VILL, JOHN J., Highland Park, Chemistry.
WILL, THEODORE A., Montclair, Physics.
WIMER, CYNTHIA C., New Brunswick, Psychology.
WORMSER, HENRY C., Vineland, Chemistry.
WRIGHT, RICHARD T., Haddonfield, Biology.

Postdoctoral

DHEEDENE, ROBERT N., New Vernon, Mathematics.
KIMMEL, DONALD L., Jr., Woodbury, Medical Sciences.
SHUSTER, CHARLES W., Glen Rock, Biochemistry.
SKALAK, RICHARD, Leonia, Engineering.

Senior Postdoctoral

STIX, THOMAS H., Princeton, Physics.

Science Faculty

FANALE, LOUISA P., East Orange, Medical Sciences.
HOYER, HORST W., Lake Hiawatha, Biophysics.

NEW JERSEY—Continued

SCOTT, DONALD A., Madison, Chemistry.
SLABY, STEVE M., Princeton, Engineering.
WHITE, MYRON E., Hoboken, Mathematics.

Summer Fellowships for Graduate Teaching Assistants

BECKER, DOROTHY G., Rahway, Mathematics.
CAMPBELL, NEIL C., Teaneck, Engineering.
CHARLAP, LEONARD S., Penns Grove, Mathematics.
DEITZ, ROBERT J., New Brunswick, Zoology.
DEKORTE, ART, Prospect Park, Chemistry.
FORREST, HELEN F., Upper Montclair, Zoology.
FRANKE, CHARLES H., Bloomfield, Mathematics.
FRIEDMAN, EDWARD A., Bayonne, Physics.
GIBSON, DANIEL M., Jr., Trenton, Engineering.
HOPKINS, PAUL D., Wenonah, Chemistry.
HORROCKS, WILLIAM D., Jr., Moorestown, Chemistry.
KALLENBACH, NEVILLE R., West New York, Chemistry.
KOWAL, NORMAN E., Rochelle Park, Botany.
KUMPEL, PAUL G., Jr., Delanco, Mathematics.
KUPELIAN, ROBERT H., Bridgeton, Botany.
MANNING, ROBERT E., Paramus, Chemistry.
MATLACK, LOUIS R., Princeton, Chemistry.
O'NEILL, JOHN J., Jersey City, Chemistry.
ORNA, MARY V., Nutley, Chemistry.
PERRY, CLARK W., Ridgefield, Chemistry.
PORTER, GERALD J., Rahway, Mathematics.
SEMBER, JOHN J., Phillipsburg, Mathematics.
STEWART, CHARLES G., Jr., Chatham, Psychology.
STRUZYNSKI, RAYMOND E., Jersey City, Physics.
VEZZETTI, DAVID J., Hoboken, Physics.
VILL, JOHN J., Highland Park, Chemistry.

Summer Fellowships for Secondary School Teachers

BARBARITO, EDWARD R., Paterson, Chemistry.
COLLARD, ARTHUR L., Hackensack, Mathematics.
DARLINGTON, C. LEROY, Maplewood, Chemistry.
DAVIDOWSKI, ANTHONY F., Mountain Lakes, Mathematics.
DRISCOLL, Bro. MICHAEL P., Newark, Physics.
FIAMINGO, MARGARET, Vineland, Mathematics.
FOX, B. MERLDENE, Tenafly, Mathematics.
HEROLD, VINCENT R., Ramsey, Biology.
KELLER, Sr. PAUL M., North Wildwood, Biology.
LAJEWSKI, Sr. M. FIRMINA, Sparta, Mathematics.
LUTZKE, HARRY, Newark, Biology.
MCDONNELL, Sr. M. PHILOTH, Bayonne, Biology.
MCGUINNESS, ROBERT A., Jersey City, Mathematics.
SALERNO, SALVATORE W., Newark, Mathematics.
SCHOEN, Sr. M. MYRONA, North Plainfield, Mathematics.
SELTZER, MORTON, Newark, Mathematics.
WALDSTEIN, MORRIS, Paterson, Physics.

NEW MEXICO

Graduate

BERGSTRESSER, THOMAS K., Los Alamos, Physics.
DIEBOLD, ROBERT E., Los Lunas, Physics.
DOWDLE, JOHN R., Deming, Mathematics.
LUNSFORD, JAMES S., Albuquerque, Engineering.
ROEDER, DAVID W., Albuquerque, Mathematics.
WALSH, JOSEPH M., Santa Fe, Biochemistry.
WELLCK, ROBERT E., Albuquerque, Mathematics.

Cooperative Graduate

DEAN, RAYMOND H., Sandia Base, Engineering.
MUNSON, DIANA H., Las Cruces, Zoology.
NEWMAN, DAVID S., Albuquerque, Mathematics.
ROBINSON, JOHN P., Carlsbad, Engineering.
SPERRY, PAUL L., Santa Fe, Mathematics.
SPIEGEL, ZANE, Santa Fe, Earth Sciences.
SPRUIELL, ROY O., Las Cruces, Mathematics.

Senior Postdoctoral

WABER, JAMES T., Los Alamos, Engineering.

Summer Fellowships for Graduate Teaching Assistants

CARVER, ALFRED C., Silver City, Mathematics.
JONES, CLYDE J., Albuquerque, Zoology.
KEYES, CONRAD G., Jr., Las Cruces, Engineering.
POORBAUGH, JOHN H., Roswell, Zoology.
WILLIAMS, FRANK M., University Park, Mathematics.

Summer Fellowships for Secondary School Teachers

BONHAGEN, FREDERICK H., Santa Fe, Mathematics.
CLEEK, NATHAN H., Sr., Hagerman, Mathematics.
MCCRARY, OLLIE W., Silver City, Botany.
MITCHELL, ROBERT C., Anthony, Physics.

NEW YORK

Graduate

ALFF, CYNTHIA E., Long Island City, Physics.
AMORUSO, MICHAEL J., Flushing, Physics.
ANDERSON, CHARLES H., Briarcliff Manor, Physics.
ARNUSH, DONALD, New York, Physics.
AUER, HENRY E., New Rochelle, Biochemistry.
BARAFF, GENE A., Elmhurst, Physics.
BARTLETT, DAVID F., New York, Physics.
BATT, RUSSELL H., Jamestown, Chemistry.
BATTERMAN, STEVEN C., Brooklyn, Engineering.
BECK, BERNARD, Bronx, Social Sciences.
BERGER, ROBERT, Freeport, Engineering.
BLOOM, DAVID M., New York, Mathematics.
BOYLAN, EDWARD S., New York, Mathematics.
BRANCAZIO, PETER J., Long Island City, Engineering.
BRAUER, HERBERT J., New York, Earth Sciences.
BRESLAU, MICHAEL, Troy, Engineering.
BRUSH, JOAN O., Sidney, Chemistry.
BUHRER, CARL F., Hempstead, Chemistry.
BUTENSKY, MARTIN, Brooklyn, Engineering.
CARROLL, VERN, Patchogue, Anthropology.
CASEY, KENNETH P., Jackson Heights, Mathematics.

COHEN, NATALIE S., Floral Park, Medical Sciences.
CONE, ALBERT A., Shrub Oak, Physics.
CONN, CAROLYN, Syracuse, Chemistry.
CONRATH, DAVID W., Rye, Social Sciences.
COOK, DAVID M., Troy, Physics.
COTTLER, RHEA J., Brooklyn, Zoology.
DAWSON, ROBERT L., Rochester, Chemistry.
DESSAU, RALPH, Far Rockaway, Chemistry.
DJORUP, FRANS M., Jr., Ithaca, Mathematics.
DOLEN, RICHARD, New York, Physics.
DOUGHERTY, HARRY W., Brooklyn, Biochemistry.
DRISCOLL, MICHAEL J., Buchanan, Engineering.
DWORIN, LOWELL, Brooklyn, Physics.
EASTON, PAUL D., New York, Physics.
ECKHART, WALTER, Yonkers, Biophysics.
EINBINDER, HERBERT M., Far Rockaway, Physics.
EISENBERG, JUDAH M., Forest Hills, Physics.
ENGELS, JOAN C., Malverne, Earth Sciences.
FELDMAN, MARTIN, Brooklyn, Physics.
FINE, TERRENCE L., New York, Engineering.
FRANCO, VICTOR, New York, Physics.
FREED, JACK H., Brooklyn, Chemistry.
FREY, JEFFREY I., Brooklyn, Engineering.
FRUCHTBAUM, HAROLD, Brooklyn, Social Sciences.
GALLANT, JONATHAN A., Mount Vernon, Genetics.
GEORGE, ALBERT R., Jr., Carle Place, Engineering.
GILBERT, IRA H., Jamaica Physics.
GINSBERG, EDWARD S., New York, Physics.
GOLDBERG, CHARLES H., Brooklyn, Mathematics.
GOLDREICH, PETER M., New York, Physics.
GOLUB, ROBERT, New York, Engineering.
GRAPPEL, SARAH F., Brooklyn, Microbiology.
GREET, RICHARD J., Johnson City, Engineering.
GREIBACH, SHEILA A., New Rochelle, Mathematics.
GRELICK, ARTHUR E., New York, Engineering.
GROSS, LUCY M., Williamsville, Chemistry.
GRUHN, RUTH E., Cornwall Hudson, Anthropology.
GUNTHER, LEON, Brooklyn, Physics.
HALPERN, ALVIN M., Bronx, Physics.
HANDEL, DAVID, Brooklyn, Mathematics.
HARMAN, MARY E., Brooklyn, Zoology.
HARRINGTON, DAVID R., North Tonawanda, Physics.
HARRIS, CHARLES S., Great Neck, Long Island, Psychology.
HECKEL, PHILIP H., Rochester, Earth Sciences.
HENSON, CARL P., Snyder, Biochemistry.
HERZOG, STANLEY, New York, Engineering.
HILL, CHARLES G., Jr., Elmira, Engineering.
HOFF, MARCIAN E., Jr., Rochester, Engineering.
HOLTZMAN, ERIC, Bronx, Zoology.
HORTMANN, ALFRED G., Woodside, Chemistry.
ISAACS, I. M., Bronx, Mathematics.
KAHN, DANIEL S., Brooklyn, Mathematics.
KAHN, PETER J., Forest Hills, Mathematics.
KAHN, ROBERT E., Flushing, Engineering.
KAPLAN, LEONARD, Bronx, Chemistry.
KARG, GERHART M., New York, Chemistry.
KENDALL, ROBERT L., Rochester, Zoology
KENNISON, JOHN F., St. Albans, Mathematics.
KORENMAN, VICTOR, Brooklyn, Physics.
KRANTZ, DAVID H., Buffalo, Psychology.
KRIEGER, JOSEPH B., Brooklyn, Physics.
KRIPKE, BERNARD R., Scarsdale, Mathematics.
KUBIS, JOSEPH J., Brooklyn, Physics.
LAMPORTE, LESLIE B., New York, Mathematics.
LANFORD, OSCAR E. III, New York, Physics.
LARRABEE, ALLAN R., Great Neck, Biochemistry.
LEERMAKERS, PETER A., Rochester, Chemistry.
LEVY, JEROME F., Mount Vernon, Chemistry.
LEVY, PETER M., New York, Engineering.
LEWIN, RUTH L., New York, Chemistry.
LICHTENBAUM, STEPHEN, Brooklyn, Mathematics.
LIEBLING, GERALD R., Brooklyn, Chemistry.
LOWENTHAL, FRANKLIN, New York, Physics.
LUBKIN, SAUL, Brooklyn, Mathematics.
LUKS, EUGENE M., Brooklyn, Mathematics.
LYNCH, BEN E., Horseheads, Physics.
MAGID, RONALD M., Rego Park, Chemistry.
MARIANO, CHARLES F., Long Island City, Physics.
MASTERS, MILLICENT R., Flushing, Biochemistry.
MAYER, ALAN L., Flushing, Mathematics.
MCLEOD, DONALD W., Ithaca, Physics.
MEININGHAUS, ARLYN R., Lancaster, Chemistry.
MEYER, WERNER F., Bronx, Mathematics.
MONSKY, PAUL, Queens, Mathematics.
MYERS, ROBERT A., Mount Vernon, Physics.
NIBLACK, WALTER K., Buffalo, Physics.
NICOL, MALCOLM F., Briarcliff Manor, Chemistry.
OFFENHARTZ, PETER O., Bronx, Chemistry.
PALKA, JOHN M., Jackson Heights, Zoology.
PANKIWSKYJ, KOST A., Larchmont, Earth Sciences.
PARSEGIAN, VOZKEN A., Troy, Biophysics.
PASSMAN, DONALD S., Bronx, Mathematics.
PEDERSEN, CHARLES R., Brooklyn, Engineering.
PELTZMAN, SAM, Brooklyn, Social Sciences.
PENNISTEN, JOHN W., Kenmore, Mathematics.
PERRIN, ROBERT P., New York, Physics.
PHINNEY, ROBERT A., Rochester, Earth Sciences.
POLLACK, JAMES, B., Woodmere, Long Island, Physics.
REYNOLDS, BRO. JOSEPH, Troy, Engineering.
ROSE, RICHARD M., Port Washington, Psychology.
ROSEN, ALLAN J., New York, Chemistry.
RUBENFELD, FRANK A., New York, Psychology.
RUNG, ROBERT, College Point, Engineering.
RUSSIN, BRENDA S., Brooklyn, Psychology.
SACKS, GERALD E., Ithaca, Mathematics.
SALTHE, STANLEY N., Brooklyn, Zoology.
SAXE, BERNHARD D., Flushing, Chemistry.
SCHEELE, GEORGE F., Yonkers, Engineering.
SCHIFF, LEONARD, Brooklyn, Engineering.
SCHILDKRAUT, CARL L., Woodmere, Long Island, Chemistry.
SCHULMAN, JEROME M., New Rochelle, Chemistry.
SCHULTZ, JONAS, New York, Physics.

SCHWARTZ, ALAN W., Brooklyn, Biochemistry.
SCHWEITZER, PAUL A., Pelham, Mathematics.
SEGAL, JOHN S., Valley Stream, Chemistry.
SEGRE, GINO C., Peekskill, Physics.
SHARP, DAVID H., Buffalo, Physics.
SHELUPSKY, DAVID I., Brooklyn, Physics.
SHEPP, LAWRENCE A., Brooklyn, Mathematics.
SIGMAN, DAVID S., Rego Park, Chemistry.
SILVER, BETTE, New York, Social Sciences.
SILVERSTONE, HARRIS J., Harrison, Chemistry.
SNELLGROVE, RICHARD A., Mt. Vernon, Chemistry.
SOCOLOW, ROBERT H., New York, Physics.
SPIVAK, MICHAEL D., Jamaica, Mathematics.
ST. GEORGE, JOHN P., New York, Chemistry.
STOLLER, GERALD S., Brooklyn, Mathematics.
STRAHS, GERALD, Elmhurst, Chemistry.
STRAUSS, WALTER A., Kew Gardens, Mathematics.
SUSSMAN, RUTH P., New York, Biochemistry.
SUTHERLAND, IVAN E., Scarsdale, Engineering.
TANNENBAUM, MICHAEL J., Bronx, Physics.
THOMPSON, PHILIP A., Berlin, Engineering.
TOWELL, DAVID G., Fillmore, Earth Sciences.
WAHLIG, MICHAEL A., Woodside, Physics.
WATSON, GEORGE E. III, New York, Biology.
WEBB, JULIAN P., Rochester, Physics.
WEINMAN, ROBERT W., Brooklyn, Physics.
WEISS, GERALD, Far Rockaway, Anthropology.
WIGGIN, ROBERT T., Feura Bush, Mathematics.
WOLLMAN, HERBERT B., Flushing, Engineering.
WORTIS, MICHAEL, New York, Physics.
ZIMMERMAN, SETH I., New York, Mathematics.
ZVENGROWSKI, PETER D., Bronx, Mathematics.

Cooperative Graduate

ACTON, NANCY V., Baldwin, Chemistry.
AKEY, ALICE L., Great Neck, Biology.
ALEXANDER, ALEXANDER A., Buffalo, Biology.
ALLISON, SUSAN V., Yonkers, Biology.
AMBROGI, RAYMOND R., Brooklyn, Engineering.
AX, JAMES B., New York, Mathematics.
BAIERLEIN, RALPH F., Hartsdale, Physics.
BALCH, MICHAEL S., Brooklyn, Mathematics.
BARBOUR, DAVID, Patchogue, Engineering.
BEDNAREK, ALEXANDER R., Buffalo, Mathematics.
BEHRENS, EARL W., Rensselaer, Eath Sciences.
BELL, HOWARD E., Medusa, Mathematics.
BELLCOURT, SR. KATHLEEN, Troy, Mathematics.
BERGER, CHARLES A., Brooklyn, Mathematics.
BERGLAS, HILDA, Spring Valley, Medical Science.
BERNOLD, STANLEY, Flushing, Earth Sciences.
BLEISTEIN, NORMAN, Jamaica, Mathematics.
BLOCH, GENE E., Buffalo, Mathematics.
BOLKER, ETHAN D., Brooklyn, Mathematics.
BOOKER, JOHN F., Ithaca, Engineering.
BRAGG, LINCOLN E., Orchard Park, Mathematics.
BRANDSTEIN, ALFRED G., Brooklyn, Mathematics.
BRIGGS, JAMES E., Glen Cove, Engineering.
BRONIWITZ, LAURENCE E., Fredonia, Engineering.
COHEN, SHELDON M., Bronx, Psychology.
CORNER, MICHAEL A., New York, Biology.
CRUICE, WILLIAM J., Brooklyn, Chemistry.
CURRIE, DOUGLAS G., Rochester, Physics.
CURRY, VIRGINIA A., White Plains, Biology.
DE NEUFVILLE, RICHARD L., Nyack, Engineering.
DELESSIO, NOEL, Brooklyn, Engineering.
DENNER, BRUCE, Riverdale, Psychology.
DIAMENT, PAUL, Brooklyn, Engineering.
DICARLO, JAMES A., Buffalo, Physics.
DIETZ, RUSSELL N., Wantagh, Engineering.
DUHL, DAVID, Staten Island, Engineering.
EIDSON, JOHN C., Scarsdale, Engineering.
FADEN, ARNOLD M., Bronx, Social Sciences.
FALK, THEODORE J., Dryden, Engineering.
FAWCETT, JAMES T., Yonkers, Psychology.
FEINLEIB, JULIUS, Brooklyn, Physics.
FELDMAN, PAUL D., Floral Park, L.I., Physics.
FINKLER, PAUL, Brooklyn, Physics.
FINLEY, KAY T., Penfield, Chemistry.
FINNERTY, ANTHONY E., Brooklyn, Chemistry.
FLACKS, RICHARD, Brooklyn, Psychology.
FLEISCHER, HENRY, Jackson Heights, Chemistry.
FOSTER, EDWARD J., Syracuse, Physics.
FOX, JOEL S., Brooklyn, Engineering.
FRAIR, WAYNE, Briarcliff Manor, Microbiology.
FRANK, ERNEST C., Astoria, Agriculture.
FRANKLIN, ALLAN D., Brooklyn, Physics.
FRASCATORE, ROBERT C., Amsterdam, Mathematics.
FREUND, ISAAC, New York, Chemistry.
FRIEDMAN, DAVID H., Long Beach, Engineering.
FRIEDMAN, JOSEF N., Brooklyn, Physics.
FUCHS, EDWARD, Jamaica, Engineering.
GARDNER, LAURENCE T., Jr., New York, Mathematics.
GARRELL, MARTIN H., Brooklyn, Physics.
GARROD, CLAUDE, New York, Physics.
GEISS, GUNTHER R., Richmond Hill, Engineering.
GELMAN, HARRY, New York, Physics.
GERSHENSON, HILLEL H., New York, Mathematics.
GLICKFELD, BARNETT W., New York, Mathematics.
GOLD, PHILLIP J., New York, Mathematics.
GOLDSTEIN, ROBERT P., Binghamton, Engineering.
GOODE, ROBERT P., New York, Zoology.
GREEN, MICHAEL E., Brooklyn, Biochemistry.
GREENBLATT, ROBERT, Brooklyn, Mathematics.
GREENE, SAMUEL L., Syracuse, Physics.
HAMMER, ROBERTA E., Brooklyn, Chemistry.
HARD, JOHN S., Red Hook, Zoology.
HARRINGTON, JOSEPH J., Brooklyn, Engineering.
HAYNIE, CHARLES A., Douglas, Mathematics.
HERMAN, HARVEY B., Brooklyn, Chemistry.
HERZBERG, NORMAN P., Brooklyn, Mathematics.
HILL, DAVID B., Brooklyn, Engineering.
HOUCK, DAVID J., Buffalo, Biology.

JOHNSON, STANLEY L., Ithaca, Biochemistry.
JORDAN, THOMAS F., Rochester, Physics.
KALANTAR, ALFRED H., Ithaca, Chemistry.
KATZPER, MEYER, Bronx, Physics.
KENNEY, DONALD M., Endicott, Chemistry.
KLAWANSKY, SIDNEY, Brooklyn, Physics.
KNIGHT, LONNIE W., New York, Chemistry.
KNOBE, PEARL A., Bronx, Psychology.
KRAMER, BARRY F., New York, Mathematics.
KRUMBEIN, SIMEON J., Brooklyn, Chemistry.
KUBY, GEORGE H., Bronx, Mathematics.
LASHER, RICHARD J., Germantown, Engineering.
LAUFER, KENNETH S., Queens, Zoology.
LEVINE, IRENE S., New York, Psychology.
LEVINE, JAMES L., Neponsit, Physics.
LEVY, HAROLD, New York, Engineering.
LEVY, PAUL F., Bronx, Biochemistry.
LIFF, ALLAN I., New York, Engineering.
LINDZEN, RICHARD S., New York, Mathematics.
LINTON, FRED E., New York, Mathematics.
LOGCHER, ROBERT D., Scarsdale, Engineering.
LOSTAGLIO, VINCENT J., Elmhurst, Long Island, Chemistry.
LUBIN, JONATHAN D., Staten Island, Mathematics.
LUTOMIRSKI, RICHARD F., Brooklyn, Engineering.
LUTZ, CHARLES A., West Hempstead, Chemistry.
MAHONEY, JAMES R., Syracuse, Earth Sciences.
MAZO, JAMES E., Syracuse, Physics.
MCINERNEY, THOMAS J., New York, Mathematics.
MCLAUGHLIN, JOHN P., Bronx, Psychology.
MEYER, RICHARD M., Snyder, Mathematics.
MIGLIORE, JOSEPH J., New York, Zoology.
MILSTEIN, SANDRA, New York, Psychology.
MINKUS, JEROME B., Brooklyn, Mathematics.
MOSHER, ROBERT E., Larchmont, Mathematics.
MOSS, ROBERT A., Brooklyn, Chemistry.
MULDOON, JAMES F., Brooklyn, Engineering.
NAGER, JOEL A., Jamaica, Mathematics.
NEWMAN, STEVEN S., Baldwin, Physics.
NIEDERCORN, JOHN H., Pearl River, Social Sciences.
NOE, RALPH W., New York, Chemistry.
NOVICK, AARON J., Brooklyn, Physics.
OLSHAKER, ARNOLD E., Brooklyn, Engineering.
O'MALLEY, THOMAS F., New York, Physics.
PARKER, ALFRED B., Jamestown, Earth Sciences.
PARMENTER, CHARLES S., Rochester, Chemistry.
PENCHINA, CLAUDE M., New York, Physics.
PEREL, JAMES M., Bronx, Chemistry.
PERRY, FREDERICK W., Holley, Engineering.
PETERSON, SUZANNE C., Jamestown, Chemistry.
PINCUS, EDWARD R., New York, Social Sciences.
PITTARO, MAURO J., Jr., Long Island, Engineering.
RADER, CHARLES M., Brooklyn, Engineering.
RADINSKY, LEONARD B., Staten Island, Earth Sciences.
RAFFEL, HELEN, New York, Social Sciences.
RAND, GEORGE, Bronx, Psychology.
REIFENBERG, GERALD H., Brooklyn, Chemistry.
REILLY, Sr. MARGUERITE, Hoosick Falls, Zoology.
REPETSKI, JAMES E., Buffalo, Engineering.
RIBNER, AARON, Brooklyn, Chemistry.
RICKERT, RICHARD M., Brooklyn, Engineering.
ROSE, ROBERT M., Flushing, Engineering.
ROSEN, ERWIN S., New York, Psychology.
ROST, ERNEST S., New Paltz, Physics.
ROTHENBERG, RONALD I., Bronx, Engineering.
ROTHLEDER, STEPHEN D., Bronx, Engineering.
ROTHSCHILD, WALTER G., New York, Chemistry.
SALKIND, JEANNETTE, Bronx, Mathematics.
SALOMONE, RAMON A., New York, Chemistry.
SAMARITANO, JOHN, Elmhurst, Engineering.
SCHARFF, RAYMOND, Brooklyn, Zoology.
SCHULZE, ARTHUR W., Forest Hills, Chemistry.
SIBNER, ROBERT J., Brooklyn, Mathematics.
SILVERT, WILLIAM L., New York, Physics.
SLADE, EDWIN, Riverdale, Engineering.
SNOW, WOLFE, Brooklyn, Mathematics.
SNYGG, JOHN M., Oswego, Mathematics.
SOBEL, ALAN, Brooklyn, Physics.
SOLOVAY, ROBERT M., Brooklyn, Mathematics.
STELL, GEORGE R., New York, Mathematics.
SWEENEY, DONALD R., Floral Park, Psychology.
TEIGER, MARTIN L., Brooklyn, Physics.
TIERNEY, MYLES, New York, Mathematics.
TILSON, SEYMOUR, New York, Earth Science.
TONRA, PATRICK J., Brooklyn, Mathematics.
VANDERSTOUW, GERALD G., Rochester, Chemistry.
WALTON, DANIEL C., Syracuse, Botany.
WARTEN, RALPH M., Levittown, Mathematics.
WEINGOLD, HARRIS D., Bronx, Engineering.
WEISS, ETHEL, New York, Psychology.
WEISS, JONAS, New York, Chemistry.
WIRTENSON, MARY E., Nyack, Zoology.
WORTIS, ROCHELLE P., New York, Psychology.

Postdoctoral

BARLAND, PETER, Forest Hills, Medical Sciences.
BOEZI, JOHN A., Binghamton, Microbiology.
BRAY, RICHARD C., New York, Biochemistry.
CEBRA, JOHN J., New York, Biochemistry.
CHOROVER, STEPHEN L., New York, Psychology.
DOLLIVER, JAMES S., Ithaca, Botany.
ECKERT, ROGER O., New York, Zoology.
GOLDBERG, ABRAHAM, Staten Island, Physics.
GREENDLINGER, MARTIN, Brooklyn, Mathematics.
KADANOFF, LEO P., New York, Physics.
LONG, LEON E., Palisades, Earth Sciences.
NASS, MARGIT M., Long Beach, Zoology.
NOVIN, DONALD, Brooklyn, Psychology.
PASTO, DANIEL J., Erin, Chemistry.
RICKARD, CHARLES G., Ithaca, Agriculture.
STRAUSS, HERBERT L., Kew Gardens, Chemistry.
TSANG, WING, Forest Hills, Chemistry.
TULLY, EDWARD J., Jr., Mastic Beach, Mathematics.
VINCOW, GERSHON, Brooklyn, Chemistry.
WENDT, RICHARD H., West Henrietta, Medical Sciences.

Senior Postdoctoral

BARKSDALE, W. LANE, New York City, Microbiology.
DE WIRE, JOHN W., Ithaca, Physics.

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NEW YORK—Continued

GREGORY, JOHN D., New York City, Biochemistry.
HOLZ, GEORGE G., Jr., Syracuse, Zoology.
KOLCHIN, ELLIS R., New York, Mathematics.
MARCUS, RUDOLPH A., New York, Mathematics.
MEINWALD, JEROLD, Ithaca, Chemistry.
OSTER, GERALD, New York, Chemistry.
ROSS, ARCHIBALD F., Ithaca, Botany.
SALPETER, EDWIN E., Ithaca, Astronomy.
SRB, ADRIAN M., Ithaca, Genetics.
SUNYAR, ANDREW W., Long Island, Physics.

Science Faculty

ALLARD, Sr., MARY J., Buffalo, Chemistry.
BATTIN, WILLIAM J., Jr., Potsdam, Engineering.
BRAISTED, PAUL W., Syracuse, Engineering.
CALHOON, STEPHEN W., Jr., Houghton, Chemistry.
DORATO, PETER E., Brooklyn, Engineering.
EISENSTADT, RAYMOND, Schenectady, Engineering.
JACOBSON, EUGENE D., New York, Physics.
KOCHERSBERGER, ROBERT C., Jamestown, Zoology.
LANNI, ROBERT P., New York, Physics.
LARSSON, ROBERT D., Potsdam, Mathematics.
MIKOCHIK, STEPHEN T., Brooklyn, Engineering.
NANGERONI, LOUIS L., Ithaca, Agriculture.
POMILLA, FRANK R., Brooklyn, Physics.
POURING, ANDREW A., Farmingdale, Engineering.
PRENOWITZ, WALTER, Brooklyn, Mathematics.
SEELY, NATHAN T., Jr., Mamaroneck, Mathematics.
SIGLER, LAURENCE E., New York, Mathematics.
SOEHNGEN, HENRY F., Brooklyn, Engineering.
STOTZ, KERWIN C., Troy, Engineering.

Summer Fellowships for Graduate Teaching Assistants

BALLARD, KAITH E., New York, Social Sciences.
BARILE, RAYMOND C., New York, Chemistry.
BARTLETT, JEANNE S., Troy, Chemistry.
BASILE, DOMINICK V., Yonkers, Botany.
BIESTERFELDT, HERMAN J., Woodhaven, Mathematics.
BLEYMAN, LEA K., New York, Zoology.
BOOKER, JOHN F., Ithaca, Engineering.
BOTTOMLEY, CHARLES G., Ithaca, Chemistry.
BURTON, DONALD J., Ithaca, Chemistry.
CARR, ROBERT W., Rochester, Chemistry.
CASSIDY, MARTIN M., Pleasantville, Earth Sciences.
CHILTON, BRUCE L., Tonawanda, Mathematics.
DITTRICK, JOHN W., Great Neck, Chemistry.
ESRIG, IRMA B., Brooklyn, Mathematics.
FINK, RICHARD D., New Rochelle, Chemistry.
GARDNER, ALBERT H., Syracuse, Psychology.
GARDNER, LAURENCE T., Jr., New York, Mathematics.
GOICHBERG, ASHER D., Rochester, Psychology.
GORMAN, ANTHONY L. F., Rochester, Psychology.
GRAFF, ROBERT A., New York, Engineering.
GRIERSON, JAMES D., Jr., Ithaca, Botany.
HAPKE, BRUCE W., Ithaca, Engineering.
HETZEL, HOWARD R., Webster, Zoology.
HUMPHREY, HOWARD T., Buffalo, Mathematics.
ISAACSON, ROBERT B., New York, Chemistry.
KATZ, MAURICE J., New York, Physics.
KAUFMAN, SHELDON E., Bronx, Physics.
KINLOCH, JOHN, New York, Mathematics.
KONZ, MARVIN J., Naples, Chemistry.
KOVAL, LESLIE R., Ithaca, Engineering.
KRAMER, BARRY F., New York, Mathematics.
LAPALME, DONALD W., Valley Stream, Chemistry.
MARSHALL, PATRICIA A., Whitestone, Chemistry.
MAZO, JAMES E., Syracuse, Physics.
MCKEON, BRENDA C., Brooklyn, Mathematics.
MCMANUS, LAWRENCE R., Ithaca, Zoology.
MEGAHAN, WALTER F., Merrick, Agriculture.
MILLER, EDWARD G., Ithaca, Chemistry.
MORSE, J. EDWIN, Brooklyn, Agriculture.
NIXON, JAMES, Ithaca, Chemistry.
OTREMBA, EDWARD D., Lackawanna, Chemistry.
PETERSON, BRUCE B., Syracuse, Mathematics.
PIERCE, FELIX J., Ithaca, Engineering.
PUTZ, HERBERT B., Brooklyn, Mathematics.
RHOADES, RICHARD W., Port Washington, Botany.
RIEFFEL, MARC A., Manhasset, Mathematics.

Graduate Teaching Assistants

ROZYCKI, EUGENE P., Cheektowaga, Mathematics.
RUSZKAY, RICHARD J., New York, Engineering.
SANDVIK, ERIK I., Rochester, Chemistry.
SCHER, HARVEY, Syracuse, Physics.
SCHWARTZ, BRIAN B., Brooklyn, Physics.
SCHWARTZ, LEONARD H., New York, Chemistry.
STUBER, JOAN E., Yonkers, Chemistry.
TEICHMAN, PAUL, Brooklyn, Physics.
TILSON, SEYMOUR, New York, Earth Sciences.
TOMLINSON, PERCIVAL A. S., Brooklyn, Psychology.

Summer Fellowships for Secondary School Teachers

BADER, ABRAM, Brooklyn, Physics.
BECHTOLD, CHARLES A., New York, Mathematics.
BLUM, HAMILTON S., Farmingdale, Mathematics.
BOROWSKY, NATHAN, New York, Physics.
BROOKS, LUCILE E., Marcellus, Psychology.
CISM, FRANKLYN P., Harpursville, Chemistry.
DODES, IRVING ALLEN, New York, Mathematics.
DRILLING, ELMO V., Buffalo, Mathematics.
FEIT, JULIUS, North Bellmore, Physics.
FRANKEL, BELLA R., New York, General Sciences.
GAFFNEY, Sr., KATHERINE B., Bardonia, Chemistry.
GERLOCK, FRANK GEORGE, Nyack, Biology.
GESLAK, FRANK W., Chateaugay, General Sciences.
GIANTURCO, ANGELO J., Buffalo, General Science.
GLICKSMAN, ABRAHAM M., New York, Mathematics.
GRELL, EINAR F., Huntington Station, Biology.
GROSSMAN, ISRAEL, New Rochelle, Mathematics.
HALSEY, ANNE E., Hyde Park, General Sciences.
JAFFE, BENJAMIN, New York, Mathematics.
KELLNER, Sr., MARIA, Rochester, Chemistry.

KLEIN, MELVIN PHILIP, New York, Mathematics.
LENCHNER, GEORGE, Franklin Square, Mathematics.
LESTER, WELLINGTON F., Hancock, Biology.
LOEHR, Sr., M. RAYMOND, Brooklyn, Mathematics.
MAGDALIN, ROBERT S., Queens, Mathematics.
MALONEY, SR. JOANNE T., New York, Mathematics.
MCINTYRE, PATRICK J., New Hyde Park, Chemistry.
MCGOWAN, LAURENCE J., White Plains, Biochemistry.
MICHEL, ROBERT H., New York, Mathematics.
MILLER, ROBERT R., Sr., Plattsburgh, Zoology.
ORTNER, SR. M. CONRAD, New York, Chemistry.
PARVER, HARRY, Brooklyn, Chemistry.
POELKER, SR. M. LEONARD, New York, Mathematics.
REMERY, SR. FRANCES A., Auburn, Biology.
RITZ, WILLIAM C., Snyder, Biology.
RUDERMAN, RUTH M., New York, Mathematics.
SAKS, NORMAN MARTIN, Brooklyn, Biology.
SCHMEER, SR. M. ROSARII, New York, Biology.
SKLAR, SAMUEL E., New York, Mathematics.
SKLENARIK, ROBERT F., Unadilla, Biology.
SMITH, JOHN E., Nyack, Chemistry.
SONEN, RALPH PAUL, Northport, Biology.
STEDMAN, EARL D., Glen Head, Chemistry.
TAFT, MARJORIE LANG, Woodmere, Mathematics.
WAGNER, DANIEL, New Rochelle, Biology.
WALTER, ROGER W., Clyde, General Sciences.
WEISS, EMANUEL, New York, Physics.
WEISS, RICHARD, New York, Zoology.
WEISSMAN, SIMON A., Brooklyn, Chemistry.
YONIS, LEONARD, New York, Mathematics.
ZIMMERMAN, ROBERT F., Dewitt, Biology.

NORTH CAROLINA

Graduate

BLAKE, ROY B., Jr., Winston-Salem, Engineering.
BYRANT, DAVID R., Greensboro, Chemistry.
CARLTON, TERRY S., Reidsville, Chemistry.
CONRY, MURPHY B., Rockwell, Chemistry.
DAVIS, HOWARD T., Hendersonville, Chemistry.
GIBBS, HYATT M., North Wilkesboro, Physics.
GRIFFITHS, PHILLIP A., Raleigh,, Mathematics.
HAPPER, WILLIAM, Lenoir, Physics.
HUBBARD ROBERT L., Chapel Hill, Physics.
LOHR, LAWRENCE L., Jr., Kings Mountain, Chemistry.
NANNEY, CECIL A., Black Mountain, Physics.
NORSWORTHY, DAVID R., Chapel Hill, Social Sciences.

Cooperative Graduate

CARROLL, FRANK I., Chapel Hill, Chemistry.
COWARDIN, ROBERT L., Raleigh, Engineering.
DABBS, JAMES M., Jr., Mayesville, Psychology.
FALLAW, WALLACE C., Hillsboro, Earth Sciences.
HALL, ELIZABETH A., Salisbury, Chemistry.
HILLS, FRANCIS A., Battleboro, Earth Sciences.
KIMEL, JACOB D., Jr., Winston-Salem, Physics.
OWEN, GORDON, N., Jr., Raleigh, Engineering.
SCHUTZ, WILFRED M., Raleigh, Genetics.
STONECYPHER, ROY W., Raleigh, Genetics.
WORK, STEWART D., Durham, Chemistry.

Postdoctoral

KING, HARRY F., Greensboro, Chemistry.
KORNEGAY, WADE M., Mount Olive, Chemistry.
WESSELS, NORMAN K., Winston-Salem, Zoology.

Senior Postdoctoral

OKUN, DANIEL A., Chapel Hill, Engineering.
PALMATIER, EVERETT D., Chapel Hill, Physics.

Science Faculty

BEATTY, OZELL K., Salisbury, Botany.
ELLER, JAMES G., Cullowee, Zoology.
HARRELL, JOHN D., Jr., Greensboro, Mathematics.
HARRISBERGER, LEE EDGAR, Raleigh, Engineering.
MANN, WILLIAM R., Chapel Hill, Mathematics.
SHUFORD, FLORENCE V., Hickory, Mathematics.
VICK, ALPHONSO R., Winston-Salem, Botany.

Summer Fellowships for Graduate Teaching Assistants

ADAMS, DAVID A., Raleigh, Botany.
ASHBROOK, BETTY J., Cullowhee, Mathematics.
BRUCE, RICHARD C., Durham, Zoology.
CROWDER, BILLY L., Greensboro, Chemistry.
DOVE, LEWIS D., Durham, Botany.
GARCIA, BERTRAM H., Jr., Raleigh, Engineering.
GOFORTH, SAMUEL T., Jr., Raleigh, Engineering.
LOVEN, ANDREW W., Crossnore, Chemistry.
PEARSON, JOSEPH T., Jr., Raleigh, Engineering.

Summer Fellowships for Secondary School Teachers

CHEEK, WILLIAM E., Matthews, Chemistry.
DRAKE, REUBEN C., Concord, Mathematics.
HAGAMAN, WALTER H., Mooresville, Mathematics.
LAVINDER, ELIZABETH E., Henderson, Mathematics.
SCHULTZ, NANCY W., Winston-Salem, Biology.
TESTER, JOEL CALAWAY, Gastonia, Biology.
YONGUE, WILLIAM H., Charlotte, Biology.

NORTH DAKOTA

Graduate

SPANDE, THOMAS F., Mayville, Chemistry.
UTGAARD, JOHN E., Minot, Earth Sciences.

Cooperative Graduate

LUNSETTER, WAYNE B., Fargo, Biochemistry.
MCHOSE, JAMES H., Fargo, Psychology.
MUNRO, JANE A., Fargo, Zoology.
ONSAGER, JEROME A., West Fargo, Zoology.

Postdoctoral

THOMAS, PAUL E., Fargo, Mathematics.

Science Faculty

OLSON LLOYD D., State College, Mathematics.
YEAGER, VERNON L., Grand Forks, Medical Sciences.

NORTH DAKOTA—Continued

Summer Fellowships for Graduate Teaching Assistants

BARES, WILLIAM A., Beach, Engineering.
BEATTY, JAMES W., Jr., Fargo, Chemistry.
BERGER, THOMAS J., Fargo, Zoology.
NELSON, DELBERT R., Ellendale, Medical Sciences.
PETERSON, CARL M., Backoo, Engineering.
SOBOLIK, RONALD C., Grand Forks, Mathematics.

Summer Fellowships for Secondary School Teachers

JACOBSON, ROBERT L., Grand Forks, Mathematics.
OLLENBURGER, ALVIN W., Wimbledon, Mathematics.

OHIO

Graduate

ARGUS, CAROL J., Columbus, Physics.
BARGER, JAMES E., Toledo, Engineering.
BEISNER, HENRY M., Tiffin, Physics.
BERNDT, DONALD C., Toledo, Chemistry.
BRABSON, BENNET B., Findlay, Physics.
CARROLL, TOM W., Cincinnati, Engineering.
CHANEY, ROBIN W., Columbus, Mathematics.
COOPER, PAUL D., Worthington, Earth Sciences.
DEUTSCH, ELIZABETH J., Shaker Heights, Zoology.
DOUGLAS, RONALD G., Cincinnati, Mathematics.
ELLIS, DAVID G., Marietta, Physics.
FARISON, JAMES B., McClure, Engineering.
FETTIS, HENRY E., Dayton, Mathematics.
FROMMER, GABRIEL P., Cincinnati, Psychology.
GANS, DANIEL J., University Heights, Physics.
GIESY, DANIEL P., Columbus, Mathematics.
GLESER, LEON J., Cincinnati, Mathematics.
GORDON, ALICE M., Columbus, Psychology.
GREENBERG, WILLIAM M., Toledo, Physics.
HEMPFLING, WALTER P., Cincinnati, Microbiology.
HORN, WILLIAM A., Cincinnati, Mathematics.
KEHOE, JAC S., Dayton, Psychology.
KRAPP, PAUL J., Springfield, Chemistry.
KREIMER, HERBERT F., Jr., Cincinnati, Mathematics.
KUEMPEL, PETER L., Cincinnati, Biochemistry.
KUTCHER, JAMES W., East Cleveland, Physics.
LAZDINS, DAGNIJA, Delaware, Chemistry.
LEBOR, ANDREW S., Cincinnati, Physics.
LEVY, RICHARD M., Cincinnati, Chemistry.
MACMAHON, JAMES A., Dayton, Zoology.
MCDONOUGH, JOSEPH A., Cincinnati, Engineering.
MENGERT, PETER H., Painesville, Physics.
MENNINGER, JOHN R., Dayton, Biophysics.
MILLER, STEVEN R., Bay Village, Chemistry.
MYERS, ALAN L., Cincinnati, Engineering.
NETTING, ROBERT M., Cincinnati, Anthropology.
PATTY, RICHARD R., Columbus, Physics.
PRICE, ELLEN J., East Cleveland, Chemistry.
REILLY, BERNARD E., Cleveland, Genetics.
RIX, JOHN R., Bay Village, Physics.
SHAFER, DAVID M., Cincinnati, Mathematics.
SORRELL, CHARLES A., Hamilton, Earth Sciences.
SUGAR, ROBERT L., Beachwood, Physics.
SWEENEY, THOMAS L., Cleveland, Engineering.
TAYLOR, LYNN J., Cuyahoga Falls, Chemistry.
TSCHANZ, JOHN F., Lima, Physics.
VANDENEYNDEN, CHARLES L., St. Bernard, Mathematics.
VERDERBER, JOSEPH A., Cleveland, Engineering.
WEBB, DAVID K., Jr., Chillicothe, Earth Sciences.
WILKINS, CORNELIUS K., Jr., Bedford, Chemistry.
WILLIAMS, FRANCIS D., Columbus, Mathematics.

Cooperative Graduate

ADAM, WALDEMAR, Cincinnati, Chemistry.
ALMONEY, JUDY A., Dayton, Zoology.
ANDERSON, CHARLES T., Columbus, Mathematics.
BEARD, JAMES B., Bradford, Agriculture.
BESHINSKE, RAYMOND J., Cleveland, Chemistry.
BLOOM, SANFORD G., Columbus, Engineering.
BROWN, THOMAS A., Dayton, Mathematics.
BRUECKNER, DAVID A., Miamisburg, Microbiology.
BRUNNER, CARL A., Cincinnati, Engineering.
CARPENTER, RICHARD N., Cleveland, Chemistry.
CONNOLLY, JOHN W., Cincinnati, Chemistry.
CORIELL, SAM R., Greenfield, Chemistry.
CORNELL, DOUGLAS W., Bowling Green, Chemistry.
CORNELL, ROSS H., Bowling Green, Mathematics.
CRANO, JOHN C., Euclid, Chemistry.
CRUDEN, ROBERT W., Berea, Botany.
DAUGHERTY, PATRICIA A., Columbus, Genetics.
DAWSON, WALLACE D., Jr., Columbus, Genetics.
FALB, RICHARD D., Columbus, Chemistry.
FINZEL, JEAN E., Westlake, Zoology.
FREVERT, PETER W., Utica, Social Sciences.
FRIIHAUF, EDWARD J., Burton, Chemistry.
GIFFORD, PHILLIP H. II, Worthington, Engineering.
GOULD, ROBERT L., Shaker Heights, Engineering.
HABERMAN, CAROL B., Cleveland Heights, Chemistry.
HERBERT, NICHOLAS C., Columbus, Physics.
HOFFMAN, RALPH B., Washington Court House, Engineering.
HOLMES, FREDERIC L., Cincinnati, Social Sciences.
JACOBS, GERALD D., Perrysburg, Chemistry.
JOYCE, WILLIAM B., Columbus, Physics.
JULYAN, FREDERICK J., Columbus, Zoology.
KEHOE, BRANDT, Dayton, Physics.
KELLEY, FRANK N., Suffield, Chemistry.
KRAUSE, DANIEL J., Columbus, Engineering.
KULINSKI, EDMUND S., Cleveland, Engineering.
KVARDA, BETTY L., Lakeside, Mathematics.
LARSEN, ARTHUR B., Parma Heights, Engineering.
MARCUS, JULIUS L., Cleveland, Engineering.
MCGAUGHY, ROBERT E., Cleveland, Physics.
MILLER, HARRY G., Defiance, Physics.
MURZYN, DOROTHY P., Parma, Chemistry.
PFLIEGER, WILLIAM L., Columbus, Zoology.
POLITZER, PETER A., Cleveland, Chemistry.
POOS, WILMA J., Eaton, Biochemistry.

ROBINSON, DAVID P., Cincinnati, Chemistry.
SCHOEN, THOMAS A., Dayton, Mathematics.
SCHROEER, DIETRICH, Enon, Physics.
SECOY, DIANE M., Troy, Zoology.
SKAATES, JAMES M., Worthington, Engineering.
SOPKOVICH, NICHOLAS J., Canfield, Physics.
THOMAS, DAVID T., Barnesville, Engineering.
WAGNER, PHILIP L., Cleveland Heights, Chemistry.
WALTERS, VIRGINIA F., Cleveland, Physics.
WAMPLER, DALE, L., Lima, Chemistry.
WEINGERBER, DAVID W., Delphos, Chemistry.
WHITLOCK, RICHARD T., Cleveland, Physics.
WIEGAND, KARL L., Columbus, Psychology.
WILCOX, JOHN P., Columbus, Engineering.
WILLIAMS, ROBERT L., Coshocton, Engineering.
ZERLA, FREDRIC J., Dillonvale, Mathematics.

Postdoctoral

CARRUTHERS, PETER A., Middletown, Physics.
CHATO, JOHN C., Dayton, Engineering.
EGGERT, DONALD A., Parma, Botany.
FOOTE, JOEL L., Cleveland, Biochemistry.
KOENIG, DONALD F., Cuyahoga Falls, Biophysics.
SAUER, KENNETH H., East Cleveland, Chemistry.
WOOLLEY, DOROTHY E., Wapakoneta, Medical Sciences.
ZWOLENIK, JAMES J., Cleveland, Chemistry.

Senior Postdoctoral

GOLDBERG, JOSHUA N., Trotwood, Physics.
UTTER, MERTON, F., Cleveland, Biochemistry.
ZEISS, HAROLD H., Dayton, Chemistry.

Science Faculty

BRUMBAUGH, JOE H., Greenville, Biology.
CONLON, HOWARD E., Cleveland, Engineering.
DILLON, THADDEUS III, Youngstown, Mathematics.
GOLDBERG, SAMUEL, Oberlin, Mathematics.
LOEHR, RAYMOND C., Cleveland, Engineering.
LUDEMAN, JOHN F., New Concord, Psychology.
LUTZ, ARTHUR L., Springfield, Physics.
MAJOR, JOHN K., Cleveland, Physics.
MILLER, WILLIAM R., Cleveland, Engineering.
ROGERS, KAY T., Oberlin, Medical Science.
SHIVELY, RALPH L., Cleveland, Mathematics.
STEVENS, RICHARD H., Cincinnati, Mathematics.
TRANSUE, WILLIAM R., Gambier, Mathematics.
VANCE, ELBRIDGE P., Oberlin, Mathematics.
WEBSTER, ELEANOR R., Cleveland, Chemistry.
YOZWIAK, BERNARD J., Youngstown, Mathematics.

Summer Fellowships for Graduate Teaching Assistants

BACHOP, WILLIAM E., Columbus, Zoology.
BRANDTS, JOHN F., Celina, Chemistry.
CASTLE, RICHARD T., Urbana, Physics.
CHERRY, ROBERT H., Jr., Columbus, Engineering.
COPPAGE, WILLIAM E., Columbus, Mathematics.
CORIELL, SAM R., Greenfield, Chemistry.
DAUGHERTY, PATRICIA A., Columbus, Genetics.
FINEGAN, JOEL D., Cleveland, Physics.
FREVERT, PETER W., Utica, Social Sciences.
GLASER, FREDERIC M., Fostoria, Chemistry.
GRUNDER, JOHN R., Minerva, Chemistry.
GUSTAFSON, LEWIS B., Lakewood, Earth Sciences.
HUBSCHMAN, JERRY H., Columbus, Zoology.
MAHIG, JOSEPH, Columbus, Engineering.
MARTIN, FRANK B., Berea, Mathematics.
MCEWEN, MICHAEL C., Toledo, Earth Sciences.
MCMENNAMIN, MARGARET A., Wadsworth, Biochemistry.
MERRYMAN, EARL L., St. Clairsville, Chemistry.
MILLER, STEVEN R., Bay Village, Chemistry.
MURPHY, CHARLES T., Oberlin, Physics.
PATTEE, PETER A., Columbus, Microbiology.
POLT, JAMES M., Lancaster, Psychology.
RITZ, HARRY L., Columbus, Genetics.
ROBERTSON, ANDREW E., Toledo, Microbiology.
SHIELDS, ROBERT J., Columbus, Zoology.
SMITH, DONALD E., Columbus, Zoology.
STRUGAR, DANIEL, Cleveland, Chemistry.
WILLKE, THOMAS A., Columbus, Mathematics.
ZEPF, THOMAS H., Cincinnati, Physics.

Summer Fellowships for Secondary Schoolteachers

BAIRD, Sr. THOMAS MORE, Columbus, Biology.
BARGER, JACK HAROLD, Delaware, General Sciences.
BARKER, WILLIAM W., Avonlake, Biology.
BARNES, JAMES N., Wickliffe, Biology.
BENESH, Bro. JOHN JAMES, Akron, Mathematics.
BROWNSON, WALTER M., Nova, Biology.
CAITO, Sr. M. GEMMA, Columbus, Biology.
CONDIT, JOHN M., Columbus, Zoology.
COSTA, ROBERT R., Youngstown, Biology.
CYGNAR, Bro. ADRIAN, Gates Mills, Biology.
DECHANT, Sr. M. JEANMARIE, South Euclid, Chemistry.
FLOOD, WILLIAM G., Canton, Chemistry.
FRANCOEUR, Rev. ROBERT T., Steubenville, Biology.
GRAVES, CHARLES B., Trotwood, Biology.
HOLOBINKO, PAUL, Cleveland, Biology.
LATA, ALFRED JOHN, Shaker Heights, Chemistry.
METCALF, ZUBIE WEST, Dayton, Biology.
MILLS, DONALD H., Euclid, Mathematics.
NEMANN, Sr. M. EDWINA, Cincinnati, Chemistry.
NEUENDORF, EDWARD J., Cincinnati, Mathematics.
NIKLAS, Sr. M. JOHANNA, Piqua, Mathematics.
OLIVE, JOHN HENRY, Chagrin Fall, Zoology.
PRIMMER, MERL, Logan, Biology.
SCHROER, Sr. M. MICHEL, Norwood, Biology.
SELWAY, KENNETH, Cleveland Heights, Mathematics.
SHURLOW, HAROLD J., Columbus, Mathematics.
WELLINGER, Sr. M. LEONARD, Rocky River, Biochemistry.
WILSON, MARILYN A., Hayesville, Mathematics.

OKLAHOMA

Graduate

ADAMS, ROY B., Wewoka, Physics.
BARNES, ROBERT F., Jr., Enid, Mathematics.
BLADE, RICHARD A., Bartlesville, Mathematics.
BUTLER, LARRY G., Ochelata, Biochemistry.
COOPER, JANE E., Tulsa, Genetics.
FRETWELL, LYMAN J., Jr., Tulsa, Physics.
GARLAND, JOHN K., Ponca City, Chemistry.
GILBERT, M. CHARLES, Lawton, Earth Sciences.
GOLDWYN, ROGER M., Tulsa, Engineering.
HURST, GERALD L., Oklahoma City, Chemistry.
JONES, WILLIAM B., Tulsa, Mathematics.
KIRMSE, DALE W., Alva, Engineering.
KRUGER, ROBERT A., Oklahoma City, Engineering.
LIPE, WILLIAM D., Bristow, Anthropology.
PAUL, JOHNNY C., Fairview, Engineering.
PONSOR, KENNETH C., Oklahoma City, Engineering.
ROBINSON, ROBERT L., Jr., Muskogee, Engineering.
SANMANN, EVERETT E., Geronimo, Physics.
SHOVER, EDWARD F., Tulsa, Earth Sciences.
TECH, JACK L., Oklahoma City, Astronomy.
WOOD, DAVID E., Seminole, Chemistry.
ZAVODNY, EUGENE N., Red Rock, Engineering.

Cooperative Graduate

BATH, THOMAS D., Midwest City, Engineering.
BODINE, JOHN J., Oklahoma City, Anthropology.
CRAWFORD, JOHN C., Ponca City, Physics.
DAVIS, ALLEN S., Oklahoma City, Mathematics.
DUGGER, HARRY A., Oklahoma City, Chemistry.
EDWARDS, JIMMIE G., Stillwater, Chemistry.
FRIEDRICH, HENRY B., Clinton, Chemistry.
FULTON, JAMES W., Norman, Engineering.
GREEN, DON W., Tulsa, Engineering.
HOWELL, MERLIN B., Guymor, Biochemistry.
JEFFREY, JOHN R., Bartlesville, Chemistry.
MCCORMICK, BAILIE J., Stillwater, Chemistry.
MCCRACKEN, CURTIS W., Vici, Astronomy.
SANDERS, DONALD C., Stillwater, Biochemistry.
SLAUGHTER, EUGENE E., Jr., Durant, Mathematics.

Science Faculty

CALVERT, FLOYD O., Norman, Engineering.
DEAL, ROY B., Jr., Stillwater, Mathematics.
LOVE, TOM J. Jr., Norman, Engineering.
POOL, RICHARD B., Norman, Engineering.
SMITH, GORDON G., Stillwater, Engineering.

Summer Fellowships for Graduate Teaching Assistants

CECIL, DAVID R., Tulsa, Mathematics.
CRONOBLE, WILLIAM R., Bartlesville, Earth Sciences.
DAVIS, KENNETH J., Lawton, Engineering.
FINLEY, RICHARD D., Tahlequah, Mathematics.
FRIDAY, JOHN R., Cleveland, Engineering.
GARLAND, JOHN K., Ponca City, Chemistry.
GILBERT, M. CHARLES, Lawton, Earth Sciences.
MCCROSKEY, JACK E., Stillwater, Agriculture.
SEELY, DONALD R., Norman, Earth Sciences.
WHITWORTH, WALTER R., Stillwater, Zoology.
WILLIAMS, CURTIS, Allen, Agriculture.
WILLIAMS, DONALD R., Morrison, Mathematics.

Summer Fellowships for Secondary School Teachers

BOTTOMS, GERALD DOYLE, Holdenville, Biology.
BRANDENBURG, ROBERT L., Alva, Zoology.
CROOKS, THOMAS C., Lindsay, Mathematics.
DAVIS, JOHN F., Muskogee, General Sciences.
DUFFER, WILLIAM R., Stratford, Botany.
EPPERSON, DONALD M., Claremore, Mathematics.
GUTHRIE, BENNETT M., Sr., Tahlequah, Zoology.
JOBE, JOHN MARSHALL, Ponca City, Mathematics.
JOHNSTON, RICHARD M., Tulsa, Mathematics.
TROUT, VERDINE E., Sand Springs, Biology.
WEITNER, W. CLEO, Davidson, Mathematics.

OREGON

Graduate

AMMANN, EUGENE O., Portland, Engineering.
BROWN, ROBERT B., Portland, Mathematics.
BURROUGHS, JOHN D., Salem, Engineering.
DIXON, RICHARD W., Woodburn, Engineering.
DURYEE, FRANCES L., North Bend, Microbiology.
EMRICH, ROBERT L., Eugene, Anthropology.
KERR, JAMES R., Portland, Engineering.
MACINTYRE, ROSS J., Yachats, Zoology.
MAHAN, GERALD D., Portland, Physics.
MCNEAL, BRIAN L., Corvallis, Agriculture.
MOURSUND, DAVID G., Eugene, Mathematics.
ORNDUFF, ROBERT, Portland, Botany.
PERSON, JAMES C., Salem, Chemistry.
RUSSELL, DALE A., Enterprise, Earth Sciences.
STOUT, EDGAR L., Grants Pass, Mathematics.
WETHERELL, CLYDE E., Hood River, Earth Sciences.

Cooperative Graduate

BIEBER, ALLAN L., Corvallis, Biochemistry.
GEORGE, MARJORY C., Tillamook, Chemistry.
GRITTON, GEORGE V., Corvallis, Chemistry.
HINRICHS, LOWELL A., Portland, Mathematics.
LEONETTI, FRED R., Portland, Engineering.
LOREE, THOMAS R., Vancouver, Physics.
LOWE, JAMES N., McMinnville, Chemistry.
LYNN, ELIZABETH, Eugene, Psychology.
MADDEN, JAMES P., Malin, Social Sciences.
ODEN, LAURANCE L., Nyssa, Chemistry.
PARKER, JERALD V., Portland, Physics.
PEARSON, GARY A., Portland, Physics.
PETERSEN, ROBERT J., Hillsboro, Chemistry.
PRAG, ARTHUR B., Portland, Physics.
SILVERMAN, ROY S., Portland, Mathematics.

Senior Postdoctoral

HILL, TERRELL L., Eugene, Physics.

Science Faculty

BOND, CARL E., Corvallis, Biology.
DAWSON, JAMES R., Ashland, Botany.
WEBER, LEONARD J., Corvallis, Engineering.
WICKS, CHARLES E., Corvallis, Engineering.

Summer Fellowships for Graduate Teaching Assistants

BAILEY, DUANE W., Creswell, Mathematics.
GOEBEL, JACK B., Corvallis, Mathematics.
HERMAN, WILLIAM S., Portland, Zoology.
MALKMUS, WILLIAM, Eugene, Physics.
NEUMANN, HERSCHEL, Eugene, Physics.
WILLIAMS, PETER S., Corvallis, Engineering.
WILSON, JIM D., Wecoma Beach, Agriculture.
WITCRAFT, DON A., Corvallis, Mathematics.

Summer Fellowships for Secondary School Teachers

BIEDERMAN, ARTHUR A., Tigard, General Sciences.
MCCORD, WILLIAM M., Portland, General Sciences.
OVERTON, VEARL H., Lakeview, Mathematics.
ROGERS, JAMES V., Portland, Mathematics.
STAPLETON, CHRISTOPHER, Portland, General Sciences.

PENNSYLVANIA

Graduate

ADLER, RONALD J., Pittsburgh, Physics.
ANDERSON, ANSEL C., North Warren, Physics.
ANDERSON, JAMES B., State College, Engineering.
BARR, MICHAEL, Drexel Hill, Mathematics.
BEALS, RICHARD W., Erie, Mathematics.
BERMON, STUART, Philadelphia, Physics.
BOOK, DAVID L., Norristown, Physics.
BRAINERD, WILLIAM R., Newtown Square, Physics.
BRAUMAN, JOHN I., Pittsburgh, Chemistry.
BRODSKY, ALAN R., Philadelphia, Mathematics.
CARROLL, CLARK E., Pittsburgh, Physics.
CHILTON, WILLIAM S., Lansdowne, Chemistry.
DAVIES, KENNETH T., Pittsburgh, Physics.
DOLUISIO, JAMES T., Bethlehem, Chemistry.
EARLE, CLIFFORD J., Jr., Abington, Mathematics.
FENSELAU, ALLAN H., Norristown, Biochemistry.
FETTER, ALEXANDER L., Philadelphia, Physics.
FLIEGEL, HENRY F., Havertown, Astronomy.
FRASER, MALCOLM D., Pittsburgh, Engineering.
GEISSINGER, LADNOR D., Zionsville, Mathematics.
GRAY, DONALD M., Milton, Biophysics.
GREAVES, JAMES R., Pittsburgh, Physics.
GREEN, JOHN P., Jr., Philadelphia, Engineering.
GROOM, DONALD E., Turtle Creek, Physics.
HALLIDAY, ROBERT P., Pittsburgh, Medical Sciences.
HARTENBAUM, BRUCE, Philadelphia, Engineering.
HARTSHORNE, ROBERT C., Pittsburgh, Mathematics.
HOROWITZ, DANIEL H., State College, Earth Sciences.
HOUGHTON, DAVID D., Media, Earth Sciences.
HUDOCK, GEORGE A., Norristown, Genetics.
HUGUENIN, GEORGE R., Buck Hill Falls, Astronomy.
HUNT, RICHARD L., Doylestown, Chemistry.
INFANGER, Sr. ANN M., Greensburg, Genetics.
JOHNS, LEWIS E., Jr., Pittsburgh, Engineering.
JOSEPH, PETER M., Chester, Physics.
KAUFFMAN, JOEL M., Huntingdon Valley, Chemistry.
KAUFMANN, HARRY, Clifton Heights, Psychology.
KEVLES, DANIEL J., Philadelphia, Social Sciences.
KRALL, ALLAN M., State College, Mathematics.
LAISON, GARY B., Philadelphia, Mathematics.
LARKIN, FRANCIS P., Middletown, Mathematics.
LEITH, JOHN D., Jr., Bethlehem, Zoology.
LEWIS, RONALD M., State College, Earth Sciences.
LUDWIG, OLIVER G., Philadelphia, Chemistry.
MANDELBAUM, ELI M., Philadelphia, Mathematics.
MCNUTT, DOUGLAS P., Philadelphia, Physics.
MITCHEL, BARRY J., Pittsburgh, Engineering.
MITRONOVAS, WALTER, Erie, Earth Sciences.
MORAN, PAUL R., Coudersport, Physics.
MOYER, ROBERT D., Allentown, Mathematics.
NOBLE, ROBERT W., Jr., Ardmore, Biochemistry.
OSTERHOLTZ, FREDERICK D., Drexel Hill, Chemistry.
PHILIPS, THOMAS O., Lansdowne, Physics.
PUSEY, WALTER C. III, Springfield, Earth-Sciences.
RICE, ALAN W., Bridgeville, Engineering.
ROSENBERG, RONALD C., Philadelphia, Engineering.
RYSZ, WALTER R., Old Forge, Chemistry.
SCHICK, WILLIAM C., Jr., Pittsburgh, Physics.
SCHNABEL, GEORGE A., Ambler Post Office, Engineering.
SEIDERS, VICTOR M., York, Earth Sciences.
SEKERKA, ROBERT F., Pittsburgh, Physics.
SHABAKER, ROBERT H., Media, Engineering.
SHAFFER, RUSSELL A., Philadelphia, Physics.
SHANAHAN, PATRICIA A., Bethel Park, Psychology.
SHORT, JAMES J., Philadelphia, Social Sciences.
SMITH, ALLAN L., Jenkintown, Chemistry.
SQUIRES, ROBERT G., Ambridge, Engineering.
STIENING, RAE F., Pittsburgh, Physics.
STONER, JOHN O., Berlin, Physics.
SUNA, ANDRIS, Broomall, Physics.
TELLER, DAVID C., Wilkes-Barre, Biology.
THORINGTON, RICHARD W., Wynnewood, Biology.
TRAHANOVSKY, WALTER S., Conemaugh, Chemistry.
TRUEMAN, THOMAS L., Media, Physics.
WEISS, CHARLES, Jr., Philadelphia, Biochemistry.
WHINSTON, ANDREW B., Pittsburgh, Social Sciences.
WILLIAMS, DEBORAH C., Moylan, Zoology.
WILMOT, WILLIAM H. II, Pittsburgh, Chemistry.
WOLL, EDWIN J., Jr., Pittsburgh, Physics.
WOOD, DON J., Corry, Engineering.
WRIGHT, ARTHUR W., Broomall, Social Sciences.
YOST, PATRICIA A., Sugarloaf, Psychology.
YOUNG, FREDERICK D., Marianna, Engineering.
ZARTMAN, ROBERT E., Lititz, Earth Sciences.

PENNSYLVANIA—Continued

Cooperative Graduate

AARON, RONALD, Philadelphia, Physics.
ANGSTADT, CAROL N., Ardmore, Biochemistry.
BARRETT, JOSEPH J., Scranton, Physics.
BATCHELLOR, ROBERT W., Glenside, Chemistry.
BEAN, RALPH J., Pittsburgh, Mathematics.
BETZ, JOHN V., Bala-Cynwyd, Microbiology.
BLUM, ROBERT A., Wynnewood, Engineering.
BROGAN, MARIANNE C., Jim Thorpe, Chemistry.
BURRAS, FAY B., York, Mathematics.
CAMPBELL, MARY K., Havertown, Chemistry.
CAREY, FRANCIS A., Philadelphia, Chemistry.
CARMAN, ROBERT A., Pittsburgh, Psychology.
CAWLEY, ROBERT G., Dunmore, Physics.
CRAVER, GLENN P., Barnesboro, Chemistry.
CRISTOFALO, VINCENT J., Philadelphia, Zoology.
DARDENNE, WALTER H., Jenkintown, Engineering.
DEYRUP, JAMES A., West Chester, Chemistry.
DIENER, DAVID A., West Reading, Engineering.
DORNSEIFER, THEODORE P., Huntingdon Valley, Biochemistry.
DUTKO, MICHAEL P., State College, Mathematics.
FERNELIUS, NILS C., State College, Physics.
FISCH, FRED J., Bethlehem, Engineering.
FLEMING, GORDON N., Philadelphia, Physics.
FONDY, THOMAS P., Pittsburgh, Biochemistry.
FRIED, IRVING M., Philadelphia, Chemistry.
FRIEDMAN, GILBERT H., State College, Engineering.
GALLAGHER, WILLIAM P., Pittsburgh, Chemistry.
GOLDMAN, AARON S., Red Lion, Mathematics.
GREEN, MELVIN H., Pittsburgh, Biochemistry.
GREENLEAF, FREDERICK P., Allentown, Mathematics.
GRINAWAY, GEORGE, Shamokin, Biochemistry.
HARMAN, GILBERT H., Philadelphia, Social Sciences.
HARRISON, PAUL C., Jr., Montrose, Psychology.
HAY, JAMES E., Pittsburgh, Physics.
HAYWEISER, LOIS J., Pittsburgh, Psychology.
HEINDEL, NED D., Red Lion, Chemistry.
HENNRICH, CARL W., Havertown, Engineering.
HILL, DAVID G., Tarentum, Physics.
HORSTMAN, CLIFFORD C., Jr., Sharpsville, Engineering.
HOYLAND, JAMES R., Pittsburgh, Chemistry.
IBANEZ, MANUEL L., University Park, Microbiology.
IFFT, EDWARD M., Butler, Physics.
KAFRISSEN, EDWARD, Philadelphia, Engineering.
KAPLAN, RICHARD E., Upper Darby, Engineering.
KORSH, JAMES F., Upper Darby, Engineering.
LANDY, RICHARD A., State College, Earth Sciences.
LEBOY, PHOEBE S., Bryn Mawr, Biochemistry.
LONG, MORGAN A., Sugarloaf, Mathematics.
MALINAUSKAS, ANTHONY P., Ashley, Chemistry.
MARIK, ROBERT H., Pittsburgh, Engineering.
MASTASCUSA, EDWARD J., Pittsburgh, Engineering.
MAYER, RAYMOND A., Jr., Philadelphia, Mathematics.
MICHEL, GERTRUDE M., Radnor, Zoology.
MILLER, MELVYN H., Philadelphia, Engineering.
MORRIS, CLIFTON, Fredericktown, Botany.
MUDD, SAMUEL A., Gettysburg, Psychology.
NIILER, PEARN P., Fombell, Engineering.
NYSTROM, WILLIAM A., Emporium, Engineering.
PACHMAN, JEROLD M., State College, Earth Sciences.
PERRIN, CHARLES L., Pittsburgh, Chemistry.
PIERCE, RUSSELL D., Homer City, Physics.
POWIDSKI, MARCIA J., Reading, Chemistry.
RANCK, JOHN P., St. Thomas, Chemistry.
REINER, THOMAS A., Philadelphia, Social Sciences.
RICHMAN, FRED, Philadelphia, Mathematics.
RIPSOM, GEORGE A., Weatherly, Engineering.
ROVNYAK, JAMES L., Ford City, Mathematics.
SCHELL, KERRY F., Pine Grove Mill, Agriculture.
SCHULTZ, ALBERT B., Philadelphia, Engineering.
SEYLER, RICHARD G., Dubois, Physics.
SHERWOOD W. CULLEN, Bethlehem, Earth Sciences.
SKEATH, JAMES E., Williamsport, Mathematics.
SLATER, JOHN G., Stoneboro, Social Sciences.
SWEET, EDWARD E., Jr., Pittsburgh, Genetics.
TABAK, MARK D., Wyncote, Engineering.
TAYLOR, BARRY N., Philadelphia, Physics.
TEMIN, PETER, Philadelphia, Social Sciences.
TIETJEN, JAMES J., State College, Engineering.
TORRENCE, ROBERT J., Pittsburgh, Physics.
WAGNER, ROBERT G., Johnstown, Engineering.
WANNER, JAMES F., Philadelphia, Astronomy.
WARDEN, ROBERT B., Swarthmore, Engineering.
WILLIAMS, JOHN E., Clarion, Zoology.
WINTER, WILLIAM H., Drexel Hill, Engineering.

Postdoctoral

BLACK, SAMUEL H., Hershey, Microbiology.
FAITH, CARL C., University Park, Mathematics.
GRIM, SAMUEL O., Dallastown, Chemistry.
HARE, CURTIS R., Clifton Heights, Chemistry.
JONES, RICHARD H., Ridley Park, Mathematics.
MCFADDEN, JAMES T., State College, Zoology.
VON, FRANKENBERG CARL A., Philadelphia, Chemistry.

Senior Postdoctoral

TUTTLE, O. FRANK, University Park, Earth Sciences.

Science Faculty

BORTREE, ALFRED L., University Park, Agriculture.
DEMOTT, HOWARD E., Selinsgrove, Botany.
FABIAN, MICHAEL W., Beaver Falls, Zoology.
FULTON, PAUL F., Pittsburgh, Engineering.
HEIMER, RALPH T., University Park, Mathematics.
JACOBS, ALAN M., University Park, Physics.
LEMONICK, AARON, HAVERFORD, Physics.

LESTZ, SAMUEL S., University Park, Engineering.
MANGELSDORF, CLARK P., Swarthmore, Engineering.
MCLENNAN, JAMES A., Jr., Bethlehem, Physics.
MOORE, JOSEPH H., University Park, Engineering.
MOTT, THOMAS E., University Park, Mathematics.
POLAK, EMIL J., Lewisburg, Astronomy.
PRAGER, PHILIP C., Swarthmore, Engineering.
SMITH, MANNING A., Lewisburg, Chemistry.
SNYDER, ROBERT D., Lancaster, Mathematics.
STAVSETH, RICHARD M., Philadelphia, Physics.
TOBIN, THOMAS V., Wilkes-Barre, Biology.
WALTER, ROBERT I., Haverford, Chemistry.
WESTERN, DONALD W., Lancaster, Mathematics.
WISNER, ROBERT J., Haverford, Mathematics.

Summer Fellowships for Graduate Teaching Assistants

BACHMAN, JERALD G., Philadelphia, Psychology.
BRIMHALL, JAMES E., Pittsburgh, Physics.
BROGAN, MARIANNE C., Jim Thorpe, Chemistry.
CHARLESWORTH, LLOYD J., Allentown, Earth Sciences.
COLEBOB, CAROLE J., Pittsburgh, Mathematics.
DEPUE, ROBERT H., Jr., Swarthmore, Microbiology.
DERSARKISSIAN, MICHAEL, State College, Physics.
DETIG, ROBERT H., Pittsburgh, Engineering.
DIEFENDERFER, ALFRED J., North Braddock, Chemistry.
DIMEO, FRANK N., Philadelphia, Engineering.
DUNCAN, ROBERT L., Bellefonte, Mathematics.
FORSMAN, WILLIAM C., Lansdowne, Chemistry.
GORDON, ALBERT M., New Brighton, Physics.
GRIFFIN, RODGER W., Jr., Verona, Chemistry.
GRIM, SAMUEL O., Dallastown, Chemistry.
GUBER, ALBERT L., Bridgeville, Earth Sciences.
HAGER, ROBERT B., Huntingdon Valley, Chemistry.
HARRISON, PAUL C., Jr., Montrose, Psychology.
HOROWITZ, DANIEL H., State College, Earth Sciences.
JENNINGS, STEPHEN O., Allison Park, Engineering.
KELLER, GEORGE E., II, State College, Engineering.
LONEY, LAURA L., Havertown, Chemistry.
MALINAUSKAS, Anthony P., Ashley, Chemistry.
MATSEN, JOHN M., Lincoln University, Engineering.
MAY, JON R., Bainbridge, Medical Sciences.
MEIER, JOSEPH F., Sharon, Chemistry.
MILLER, HARVEY I., Philadelphia, Medical Sciences.
MORRIS, JOHN R., II, Harrisburg, Chemistry.
MOTT, THOMAS E., Bellefonte, Mathematics.
NICHOLAS, ROBERT D., Reading, Chemistry.
OPLINGER, CARL S., Walnutport, Zoology.
REBER, LARRY H., Pittsburgh, Physics.
SENNETT, ROBERT E., Lansdowne, Engineering.
SJOBERG, BERNARD M., Jr., McKeesport, Psychology.
SWEET, EDWARD E., Jr., Pittsburgh, Genetics
TORRENCE, ROBERT J., Pittsburgh, Physics.
VON FRANKENBERG, CARL A., Philadelphia, Chemistry.
WELSH, ROBERT E., Pittsburgh, Physics.
WIER, KAREN E., Bryn Mawr, Earth Sciences.
WITOWSKI, JOHN J., Olyphant, Microbiology.
WUNDERLICH, FRANCIS J., Narberth, Chemistry.

Summer Fellowships for Secondary School Teachers

ACKERMAN, Sr. M. ALICE I., Philadelphia, Biology.
AMMERMAN, EDWARD G., Philipsburg, General Sciences.
ANSELMO, SHIRLEY M., New Castle, Biology.
ARTHUR, ROBERT S., Pittsburgh, Mathematics.
ATTY, ALEX G., Windber, General Sciences.
BEAM, Sr. M. ALEXINE, Pittsburgh, Biology.
BENDER, EARL ARTHUR, Slatington, Biology.
BONNER, Sr. M. CATHERINE, Philadelphia, General Sciences.
CALLANAN, MO. DOLORES M., Philadelphia, Mathematics.
DEMITRAS, BRO. GREGORY C., Philadelphia, Chemistry.
DOTTERER, STANLEY S., Elizabethtown, Mathematics.
DOUBET, M. MARK, Sr., Erie, Mathematics.
EVANS, EDWARD WILLIAM, West Lawn, Mathematics.
HERMAN, RICHARD P., Hatboro, Mathematics.
HOUGH, RAYMOND EARLE, Monongahela, Mathematics.
JONES, DOROTHY LOIS, St. College, Mathematics.
KEISER, RICHARD L., Jim Thorpe, Mathematics.
KNOCK, Sr. MARTIN DE. P., Altoona, Biology.
KUHN, RALPH EDWARD, Emmaus, Mathematics.
LATHAM, WILLIAM S., Philadelphia, Biology.
MALESKEY, PAUL E., Allentown, Chemistry.
MAMARY, ALBERT, Shillington, Mathematics.
MARKLEY, FRED ALLEN, Shippensburg, General Sciences.
MCLAUGHLIN, JANE ANN, Harrisburg, Mathematics.
MOYER, STUART F., York, Mathematics.
PATTERSON, Bro. D. STEPHE, Pittsburgh, Mathematics.
PETRARCA, Sr. M. JEAN, Greensburg, Mathematics.
SAUKAITIS, Sr. M. P., Corapolis, Zoology.
SCHILLINGER, Sr. M. J., Pittsburgh, Biology.
SCHRODER, KENNETH E., Geo. School, Zoology.
SHARKAN, WILLIAM W., Allentown, Chemistry.
SNELL, JANIS ROSE, York, Mathematics.
SPILLANE, DANIEL PAUL, Pittsburgh, Mathematics.
TATE, GLADYS, Erie, Mathematics.
WEISS, Sr. M. OLIVETTE, Lancaster, General Sciences.
ZICCARDI, VINCENT, New Hope, Biology.
ZIMMERMAN, PATRICIA V., Elkins Park, Mathematics.

RHODE ISLAND

Graduate

ALMGREN, FREDERICK J., Jr., Providence, Mathematics.
BEAUDET, ROBERT A., Woonsocket, Chemistry.
DUCKETT, STEVEN W., Providence, Physics.
FINE, ARTHUR D., Providence, Mathematics.
NAVAS, JUDITH I., Riverside, Botany.
PIKE, ARTHUR C., Warwick, Earth Sciences.

Cooperative Graduate

BROCHU, RONALD L., Narragansett, Engineering.
CRETELLA, JOHN P., Providence, Engineering.
MOORHOUSE, ARNOLD S., Westerly, Agriculture.
SALTZMAN, RICHARD M., Providence, Engineering.
SCARBEL, MARCEL P., Providence, Engineering.

Senior Postdoctoral

BUCHSBAUM, DAVID A., Providence, Mathematics.

Science Faculty

KLINE, JACOB, Kingston, Engineering.
NACCI, VITO A., Kingston, Engineering.

Summer Fellowships for Graduate Teaching Assistants

ALMGREN, FREDERICK J., Jr., Providence, Mathematics.
CAPOTOSTO, AUGUSTINE, Jr., Cranston, Chemistry.
DIPIPPO, ASCANIO G., Providence, Chemistry.
SHERMAN, EDWARD O., Jr., North Providence, Chemistry.

Summer Fellowships for Secondary School Teachers

SCHUMANN, MO. VIRGINIA M., Providence, Mathematics.
WALSH, SR. M. TERENCE, Riverside, Mathematics.

SOUTH CAROLINA

Graduate

ARRINGTON, CHARLES A., Jr., Clemson, Chemistry.
COLEMAN, EDMUND B., Jr., Abbeville, Psychology.
CONNOR, LAURENCE N., Jr., Barnwell, Engineering.
PERKINS, HAROLYN KING, Marion, Chemistry.
PYRON, RAYMOND S., Taylors, Chemistry.

Cooperative Graduate

BARTON, KENNETH R., Spartanburg, Chemistry.
BOWERS, KERRY W., Columbia, Chemistry.
FOLEY, JOHN M., Anderson, Psychology.
GETTYS, WILLIAM E., Union, Physics.
HASKELL, PETER L., West Columbia, Engineering.
JONES, EDWIN R., Jr., Dillon, Physics.
KELLETT, JAMES C., Jr., Spartanburg, Chemistry.
OVERBECK, JAMES W., Aiken, Physics.
OVERTON, JAMES R., Columbia, Chemistry.
RUGHEIMER, JOHN H., Charleston, Physics.
STANLEY, WILLIAM D., Columbia, Engineering.
STRICKLAND, ERASMUS H., Columbia, Biophysics.
WENGROW, HENRY R., Columbia, Engineering.
WHITE, HAROLD M., Clemson, Chemistry.

Science Faculty

KING, DONALD A., Clemson, Mathematics.
NOLAND, J. HUBERT, Jr., Columbia, Engineering.
SNELL, ABSALOM W., Clemson, Engineering.

Summer Fellowships for Graduate Teaching Assistants

BARTON, KENNETH R., Spartanburg, Chemistry.
CATHEY, WADE T., Jr., Campobello, Engineering.
DREHER, THAD W., Jr., Columbia, Engineering.
FARMER, LARRY B., Travelers Rest, Chemistry.
PARNELL, JAMES F., Timmonsville, Zoology.
TILLER, WILLIAM E., Anderson, Physics.

Summer Fellowships for Secondary School Teachers

JENKINS, FAYE E., Anderson, Mathematics.
KURTZ, MARGARET G., Columbia, Mathematics.

SOUTH DAKOTA

Graduate

BUSWELL, LINDA M., Aberdeen, Psychology.
HURWITZ, CHARLES E., Sioux Falls, Engineering.
KRETSINGER, ROBERT H., Pickstown, Medical Sciences.
MINEHART, RALPH C., Mitchell, Physics.
RASMUSSON, GARY H., Clark, Chemistry.
RAYMOND, LEE R., Watertown, Engineering.

Cooperative Graduate

BENSON, ROBERT H., Vermillion, Mathematics.
FISCHBACH, THOMAS J., Rapid City, Social Sciences.
FULLER, ALBERT W., Madison, Mathematics.
JOHNSON, PATRICIA E., Raymond, Mathematics.
NELSON, ALLAN D., Dallas, Mathematics.
PIERCE, ROBERT L., Huron, Mathematics.
RAPP, DELVIN G., Brookings, Engineering.

Science Faculty

ALLUM, MARVIN O., Vermillion, Zoology.
DORNBUSH, JAMES N., Vermillion, Engineering.
SHAW, ROSS F., Wessington Springs, Zoology.

Summer Fellowships for Graduate Teaching Assistants

DUGLE, DAVID L., Vermillion, Chemistry.
FANSLOW, DONALD J., Yankton, Zoology.
MATSON, ARTHUR J., Hetland, Social Sciences.
MYERS, GERALD A., Brookings, Botany.
ROBINSON, THOMAS A., Hot Springs, Chemistry.

Summer Fellowships for Secondary School Teachers

CONKLIN, AUGUST, Aberdeen, Biology.
CONWAY, JOHN V., Yankton, Mathematics.
HILLS, CARROLL L., Mitchell, Biochemistry.

TENNESSEE

Graduate

BACH, GALE R., Gatlinburg, Physics.
BANKS, THOMAS H., Nashville, Earth Sciences.
BLOOMER, JAMES L., Knoxville, Chemistry.
CAMPBELL, ALPHEUS N., Martin, Biochemistry.
CARMICHAEL, HALBERT H., Oak Ridge, Chemistry.
DIETRICH, FRANK S., Memphis, Physics.
GOTTO, ANTONIO M., Jr., Nashville, Biochemistry.
HINTON, DON B., Savannah, Mathematics.
KLOW, JANET S., Memphis, Biochemistry.
MCCALL, JOHN T., Jr., Nashville, Mathematics.
MCCALLUM, CHARLES E., Memphis, Mathematics.
RITTENBERG, ALAN, Nashville, Physics.
THOMPSON, JAMES R., Memphis, Mathematics.

Cooperative Graduate

BEAUCHAMP, NICHOLAS A., Nashville, Physics.
BURT, PHILIP B., Memphis, Physics.
DORMAN, ED S., Memphis, Physics.
HAMM, ROBERT N., Ramer, Physics.
HEIMBERG, LAURA K., Nashville, Psychology.
JENSEN, DONALD R., Goodlettsville, Agriculture.
JOHNSON, JOSEPH A. III, Nashville, Physics.
KERCE, ROBERT H., Nashville, Mathematics.
KOEN, FRANK M., Nashville, Psychology.
MCCLURE, JOSEPH A., Jr., Nashville, Physics.
MCDANIEL, WILLIAM L., Jefferson City, Social Sciences.
RADER, CHARLES P., Knoxville, Chemistry.
SMITH, ALPHONSO L., Memphis, Mathematics.
TERRY, CLAUDE E., Jr., Cleveland, Genetics.
TODD, AARON W., Murphreesboro, Chemistry.
WALLER, JOHN W., Johnson City, Engineering.
WOODY, CHARLES O., Jr., Somerville, Agriculture.

Postdoctoral

COOK, CLARENCE E., Jefferson City, Chemistry.

Senior Postdoctoral

LINDSLEY, DAN L., Oak Ridge, Genetics.
SCHWARTZ, DREW, Oak Ridge, Genetics.
SMITH, LAWTON H., Oak Ridge, Zoology.
THOMAS, DAVID G., Oak Ridge, Engineering.

Science Faculty

BOND, LORA, Knoxville, Biology.
GEORGE, TED M., Murray, Physics.
JOHNSON, CARROLL D., Memphis, Engineering.
KRUPP, Bro. ROBERT H., Memphis, Physics.
RAWLS, JOHN M., Clarksville, Medical Sciences.
THIGPEN, CHARLES C., Knoxville, Mathematics.
WILSON, ROBERT L., Chattanooga, Earth Sciences.

Summer Fellowships for Graduate Teaching Assistants

DOWNING, ROLAND G., Nashville, Chemistry.
GINTER, DOROTHY E. S., Nashville, Chemistry.
HARRIS, ROY H., Nashville, Medical Sciences.
NORRIS, DANIEL H., Knoxville, Botany.
PURCELL, WILLIAM P., Memphis, Chemistry.
SUTHERLAND, IAN D. W., Jefferson City, Zoology.

Summer Fellowships for Secondary School Teachers

FORTUNE, JIMMIE C., Bartlett, Mathematics.
SWEITZER, MAURINE W., Maryville, Biology.
TORRENCE, MARTHA W., Antioch, Mathematics.

TEXAS

Graduate

ANDERSON, JOHN E., Austin, Engineering.
BARBIN, ALLEN R., Beaumont, Engineering.
BARNES, VIRGIL E. II, Austin, Physics.
BECHTEL, NORBERT G., Jr., Groves, Engineering.
BERKMAN, MARTIN R., Dallas, Engineering.
BEYERS, ROBERT J., Austin, Zoology.
BOTT, JERRY F., Tyler, Engineering.
CLARK, BARRY G., Canyon, Astronomy.
COLLIER, ROBERT J., Fort Worth, Microbiology.
COLLINS, FRANCIS A., Austin, Physics.
DAHM, DAVID M., Dallas, Mathematics.
DOLGOFF, ABRAHAM, Houston, Earth Sciences.
DORROH, JAMES R., Kingsville, Mathematics.
DOUGHARTY, NEIL A., Jasper, Engineering.
DREWRY, GEORGE E., Austin, Zoology.
GRABINER, SANDY, Pharr, Mathematics.
GROSS, MEREDITH G., Jr., Amarillo, Earth Sciences.
HALE, LEONARD A., Lubbock, Engineering.
HANES, HAROLD B., Jr., Fort Worth, Mathematics.
HYDER, MONTE L., Rockdale, Chemistry.
JAMES, ROBERT L., El Paso, Engineering.
JOHNSON, CLAIBORNE H., Jr., Dallas, Mathematics.
JONES, BENJAMIN F., Houston, Mathematics.
MANUEL, THOMAS A., Austin, Chemistry.
MOORE, EDWIN N., Dallas, Physics.
MOORE, ROBERT E., Austin, Zoology.
MYERS, RALPH L. II., Wichita Falls, Earth Sciences.
NISBET, ALEX R., San Angelo, Chemistry.
RANDOL, BURTON S., San Antonio, Mathematics.
SIMMONS, MARVIN G., Carrollton, Earth Sciences.
STOVER, HARRY L., Dallas, Physics.
STUBBLEFIELD, TRAVIS E., Denton, Medical Sciences.
VAN AUKEN, THOMAS V., Alpine, Chemistry.
WILLEY, FREDERICK G., Garland, Chemistry.
WILSON, ROBERT W., Houston, Astronomy.
WISDOM, NORVELL E., Jr., Crane, Chemistry.

Cooperative Graduate

ABLES, PAULA R., Dublin, Biochemistry.
AMES, WILLIAM A., Longview, Chemistry.
BAGBY, ROLAND M., Texas City, Medical Sciences.
BARLOW, CARL A., Jr., San Antonio, Physics.
BOEHME, HOLLIS C., Mabank, Physics.
BROWN, JUDITH C., Bryan, Chemistry.
CHESNUT, DWAYNE, A., Houston, Chemistry.
COLLINS, CARL B., Jr., San Antonio, Physics.
COOPER, JOHN N., San Antonio, Chemistry.
CRAMER, JOHN G., Jr., Houston, Physics.
CUBBINGTON, AARON M., Bryan, Engineering.
CYPRUS, JOEL H., Houston, Engineering.

TEXAS—Continued

DARBY, RONALD, Dallas, Engineering.
DAVENPORT, MONTY, E., Lubbock, Engineering.
ELLISON, TOMMY R., Dallas, Chemistry.
FINCH, RAY N., Bay City, Engineering.
FORT, JAMES G., San Antonio, Physics.
FRITZ, ROSE M. Mc., Houston, Chemistry.
GOLDSBERRY, TOMMY G., Jacksonville, Mathematics.
HAASE, DONALD J., Nixon, Engineering.
HARVEY, JERRY B., Austin, Psychology.
HASTY, ROBERT A. II, Dallas, Chemistry.
HOLDEN, MARETTA P., San Antonio, Chemistry.
KIMBALL, AUBREY P., Houston, Biochemistry.
LADNER, SIDNEY J., Houston, Chemistry.
LEE, WILLIAM J., Sweetwater, Engineering.
LYTTON, ROBERT L., San Antonio, Engineering.
MCGUIRE, MICHAEL L., College Station, Chemistry.
MOTT, DAVID L., El Paso, Physics.
OTTMERS, DELBERT M., San Marcos, Engineering.
PERRY, PATRICIA L., Corpus Christi, Psychology.
QUADE, CHARLES R., Dallas, Physics.
REYNA, EDDIE, Bryan, Physics.
REYNOLDS, TOM D., Austin, Engineering.
RICHARDSON, RICHARD H., Mexia, Agriculture.
RUCHELMAN, MARYON W., Bellaire, Chemistry.
RUNNELS, LYNN K., Houston, Chemistry.
SALZMAN, PAUL K., Austin, Engineering.
TOMBRELLO, THOMAS A., Dallas, Physics.
TUCKER, RICHARD L., Hereford, Engineering.
WILLIAMS, MARTHA S., Austin, Psychology.
ZUMWALT, ROBERT E., Hallettsville, Engineering.

Postdoctoral

OSBORNE, WEYMAR Z., Pampa, Physics.
VANDUZER, THEODORE, Corpus Christi, Engineering.

Senior Postdoctoral

ADAMS, JOHN A. S., Houston, Earth Sciences.
RIGGS, AUSTEN F. II, Austin, Biochemistry.

Science Faculty

ALBRITTON, OSCAR W., College Station, Engineering.
BARTEL, HERBERT H., Jr., Dallas, Engineering.
EADS, EWIN A., Beaumont, Chemistry.
EPPES, BILL G., Austin, Engineering.
HARMON, GERALD S., College Station, Physics.
MARMION, KEITH R., Lubbock, Engineering.
MASCH, FRANK D., Jr., San Antonio, Engineering.
MORELAND, ROBERT A., Jr., Lubbock, Mathematics.
POLLARD, JAMES J., Austin, Engineering.
SYBERT, JIM R., Denton, Physics.
WESTBURY, JOHN E., Houston, Mathematics.
WOOD, JOHN W., Lubbock, Earth Sciences.

Summer Fellowships for Graduate Teaching Assistants

ATCHISON, THOMAS A., Richland Spring, Mathematics.
AVERITT, ROBERT T., Austin, Social Sciences.
COFFMAN, JOHN E., Nederland, Engineering.
CRAM, IRA H., Jr., Houston, Earth Sciences.
DALTON, CHARLES, Pasadena, Engineering.
FRANKENY, JULIUS L., Houston, Engineering.
HOPKINS, OTHO N., Jr., Waco, Earth Sciences.
HUBBARD, WILLIAM M., Houston, Physics.
MCCRADY, WILLIAM B., Forreston, Genetics.
NESBITT, LYLE E., Lubbock, Chemistry.
PERRYMAN, JOHN K., Austin, Mathematics.
POZZI, ANTHONY L., Jr., Victoria, Engineering.
RAMSEY, JERRY D., College Station, Engineering.
STEPHENSON, ROBERT W., Austin, Engineering.
WHITE, JOHN T., Austin, Mathematics.
WILHELM, PAUL E., Austin, Engineering.
YOES, M. G. Jr., Waco, Social Sciences.

Summer Fellowships for Secondary School Teachers

ALLEN, Sr. M. BOSCO, Wichita Falls, Mathematics.
BALL, FRED, Jr., San Antonio, Mathematics.
BENNETT, NORMAN J., Sherman, Mathematics.
BREHONY, Sr. M. CATHERINE, Corpus Christi, Mathematics.
CONTRERAS, JOE, Falfurrias, Mathematics.
DAUNIS, GERALDINE, Fort Worth, Mathematics.
GIBBS, SARAH M., Houston, Mathematics.
HAVERTY, Sr. VINCENT, Bellaire, Mathematics.
HERNANDEZ, MATILDE L., Corpus Christi, Mathematics.
HUDMAN, JOHN T., Beeville, Physics.
LUCAS, BENNY WAYNE, Seminole, Mathematics.
MAHAN, EARL RAPHAEL, El Paso, Mathematics.
MATTHEWS, WILMOTH C., El Paso, Chemistry.
MINNER, Sr. JEANNE, Corpus Christi, Biology.
OREAR, NOLAN LARRY, Alice, Mathematics.
SANSOM, IRA R., Kerrville, Mathematics.
SCHULZ, HERBERT W., Waller, General Sciences.
TITUS, Bro. GILBERT R., San Antonio, General Sciences.
WALKER, SHERRELL G., Gladewater, Mathematics.

UTAH

Graduate

BERGESON, HAVEN E., Salt Lake City, Physics.
BREWER, JOHN M., Salt Lake City, Biochemistry.
EVERETT, GLEN E., St. George, Physics.
FOOTE, ARIEL, Moab, Chemistry.
GILES, EUGENE, Salt Lake City, Anthropology.
IVIE, EVAN L., Ogden, Engineering.
LAWRENCE, GEORGE M., SALT LAKE CITY, Physics.
MORTIMER, ROBERT G., Logan, Chemistry.
RUNNELLS, DONALD D., Salt Lake City, Earth Sciences.
TOLMAN, CHADWICK, A., Salt Lake City, Chemistry.

Cooperative Graduate

ALLEN, ROBERT L., Ogden, Engineering.
ANDERSEN, TERRELL N., Salt Lake City, Chemistry.

BOYACK, JAMES R., Salt Lake City, Chemistry.
BRYNER, JOHN C., Salt Lake City, Physics.
HEMPEL, JOHN P., Salt Lake City, Mathematics.
JOHNSON, OWEN W., Salt Lake City, Physics.
PETERSON, ELLIS R., Ephraim, Chemistry.
WAGNER, RICHARD L., Jr., Salt Lake City, Physics.
WOODBURY, ELROD T., Monroe, Engineering.

Postdoctoral

JOHNSON, HOLLIS R., Garland, Astronomy.

Senior Postdoctoral

VERNON, LEO P., Provo, Biochemistry.

Science Faculty

HANSEN, AFTON M., Ephraim, Zoology.

Summer Fellowships for Graduate Teaching Assistants

ALBRECHTSEN, RULON S., Emery, Genetics.
BEST, MYRON G., Salt Lake City, Earth Sciences.
BRYNER, JOHN C., Salt Lake City, Physics.
LAMBERT, VIRGINIA M., Roosevelt, Social Sciences.
MOYLE, RICHARD W., American Fork, Earth Sciences.
MUSSER, ROSEMOND, J., Salt Lake City, Zoology.
SMITH, KAY H., Provo,, Psychology.
TEERLINK, WILFORD J., Salt Lake City, Chemistry.
WAGNER, RICHARD L., Jr., Salt Lake City, Physics.

Summer Fellowships for Secondary School Teachers

KING, A. LAVELL, Orem, Zoology.

VERMONT

Graduate

GUILMETTE, LEE M., Richford, Mathematics.

Cooperative Graduate

CARPENTER, JAMES E., Springfield, Engineering.
GIBBS, GERALD V., Windsor, Earth Sciences.
SARGENT, GEORGE D., Barre, Chemistry.

Postdoctoral

ABRAHAM, RALPH H., Burlington, Mathematics.

Science Faculty

WEBB, MARTIN L., Northfield, Engineering.

VIRGINIA

Graduate

ADAMS, JOHN B., Charlottesville, Physics.
ADELBERGER, ERIC G., Arlington, Physics.
BARKER, ROBERT G., Charlottesville, Mathematics.
CHILTON, FRANK M., Jr., Arlington, Physics.
DOUGHTY, WILLIAM C., Willis Wharf, Physics.
EVERAGE, THOMAS B., Big Stone Gap, Engineering.
GARRICK, MICHAEL D., Hampton, Biochemistry.
GRAY, FRANCES E., Richmond, Chemistry.
HALEY, JOSEPH A., Ashland, Mathematics.
HARTMAN, RICHARD L., Norfolk, Physics.
LOUTZENHEISER, CARL B., Arlington, Engineering.
MONTGOMERY, CHARLES G., Hollins College, Physics.
MURRAY, JOSEPH J., Jr., Lexington, Genetics.
O'BRIEN, WALTER F., Jr., Roanoke, Engineering.
RENNINGER, GEORGE H., Fredericksburg, Physics.
STEPHENS, STEPHEN V., Falls Church, Physics.

Cooperative Graduate

BAIRD, HUGH R., Christiansburg, Medical Sciences.
BAKER, THOMAS N., III, Petersburg, Chemistry.
BARNARD, MARLENE B., Richmond, Chemistry.
BECKER, PHILIP M., Falls Church, Engineering.
DAVIS, HAWTHORNE A., Quinton, Physics.
GIBERT, ANNE J., Falls Church, Zoology.
GIBSON, ROBERT H., Charlottesville, Psychology.
HUDSON, CECIL I., Jr., Charlottesville, Physics.
HUMMON, MARGARET R., Oakton, Botany.
HUNT, LOIS T., Hopewell, Zoology.
JEFFREY, JACKSON E., Richmond, Medical Sciences.
MCCLANAHAN, CHARLENE, Grundy, Genetics.
MCDIARMID, ROBERT C., Vienna, Engineering.
NORDQUIST, PAUL E. R., Jr., Arlington, Chemistry.
PLEASANTS, BEVERLY A., Richmond, Genetics.
THAXTON, GEORGE D., Richmond, Physics.
TOLBERT, CHARLES R., Richmond, Astronomy.
WALKER, WILLIAM S., Charlottesville, Physics.

Postdoctoral

LIGHT, ROBLEY J., Roanoke, Biochemistry.

Science Faculty

BAUM, PARKER B., Williamsburg, Chemistry.
HALL, ANITA B., Hampton, Zoology.
HOPKINS, MANSELL H., Jr., Blacksburg, Engineering.
MONAHAN, IRENE P., Blacksburg, Mathematics.
PALMER, VIOLA G., Hampton, Medical Sciences.
PINSCHMIDT, W. C., Jr., Charlottsville, Biology.
STEWART, ROBERTA A., Hollins College, Chemistry.

Summer Fellowships for Graduate Teaching Assistants

ALBERT, EUGENE, Charlottesville, Mathematics.
BERRY, JAMES W., Abingdon, Zoology.
BOWEN, LAWRENCE H., Lynchburg, Chemistry.
NORDQUIST, PAUL E. R., Jr., Arlington, Chemistry.
RUSSELL, STEPHEN M., Abingdon, Zoology.
TOLBERT, CHARLES R., Richmond, Astronomy.
WADDILL, MARCELLUS E., Meherrin, Mathematics.

Summer Fellowships for Secondary School Teachers

BAKER, LOUIS CALVIN, Arlington, Biology.
HAACK, LOUISE B., Annandale, Mathematics.

568169—61——21

VIRGINIA—Continued

HAUSER, Sr. M. ANN JOSEPH, Alexandria, Mathematics.
MILLIKEN, HAROLD ROY, New Market, Biology.
RION, JAMES W., Manassas, Mathematics.
STINE, MARY E., Alexandria, Mathematics.
TISINGER, CLAUDE G., Dayton, General Sciences.

WASHINGTON

Graduate

ALVORD, RICHARD P., Centralia, Earth Sciences.
ARMSTRONG, RICHARD L., Seattle, Earth Sciences.
BIRKELAND, PETER W., Bellevue, Earth Sciences.
BROOKS, FLOYD L., Jr., Seattle, Chemistry.
BROWN, RONALD E., Everett, Physics.
CRASWELL, KEITH J., Port Orchard, Mathematics.
ESPER, HILDEGARD, Seattle, Zoology.
FARIS, WILLIAM G., Seattle, Mathematics.
GERBRACHT, ROBERT J., Seattle, Physics.
HENDRICKSON, ALICE J., Seattle, Psychology.
JENKINS, DAVID A., Seattle, Engineering.
KARLINSEY, KURTLEE J., Jr., Tacoma, Engineering.
KROON, JOHN D., Seattle, Mathematics.
LANPHERE, MARVIN A., Spokane, Earth Sciences.
LARSON, DONALD C., Seattle, Engineering.
LAWLER, RONALD G., Seattle, Chemistry.
LEPSE, PAUL A., Seattle, Chemistry.
LUBAN, MARSHALL, Seattle, Physics.
MACLAREN, MALCOLM D., Seattle, Mathematics.
MCNEILL, DALE A., Tacoma, Physics.
MILLER, RONALD E., Seattle, Social Sciences.
RUSTAD, NORMAN E., Poulsbo, Chemistry.
SHACKLEFORD, WILLIAM L., Seattle, Engineering.
TOBLER, WALDO R., Edmonds, Social Sciences.
WRIGHT, JON A., Tacoma, Physics.

Cooperative Graduate

ALLEY, EARL G., Hooper, Chemistry.
ATKINSON, REILLY, Medina, Physics.
CALVO, JOSEPH M., Seattle, Biochemistry.
CURRENT, JERRY H., Seattle, Chemistry.
DAVIS, JAMES W., Winslow, Engineering.
DRAKE, DARRELL M., Seattle, Physics.
GERHOLD, GEORGE A., Seattle, Chemistry.
HARDY, ROBERT J., Port Angeles, Physics.
HENDRIE, DAVID L., Seattle, Physics.
HODGE, ROBERT W., Port Angeles, Social Sciences.
MALOFSKY, BERNARD M., Seattle, Chemistry.
MATHEWS, WILLIAM G., Wenatchee, Astronomy.
MOORE, GARY L., Gig Harbor, Earth Sciences.
PERENSINI, ANTHONY L., Pullman, Mathematics.
PIERSON, STUART O., Seattle, Social Sciences.
PILKEY, ORRIN H., Richland, Earth Sciences.
UPPER, CHRISTEN D., Kent, Biochemistry.
WAKE, DAVID B., Parkland, Zoology.

Postdoctoral

FRITZ, WILLIAM H., Cathlamet, Earth Sciences.
GEARING, FREDERICK O., Seattle, Anthropology.
HODGE, PAUL W., Snohomish, Astronomy.
JANS, JAMES P., Seattle, Mathematics.

Senior Postdoctoral

ANDERSON, ARTHUR G., Jr., Seattle, Chemistry.
FAREWELL, GEORGE W., Seattle, Physics.
HEWITT, EDWIN, Seattle, Mathematics.
WAGNER, EDWARD L., Pullman, Chemistry.

Science Faculty

FORD, JAMES M., Mount Vernon, Biology.
HAZLET, STEWART E., Pullman, Chemics.
JOPPA, ROBERT G., Seattle, Engineering.
LADD, ARTHUR F., Ellensburg, Physics.
MANLEY, DONALD L., Walla Walla, Physics.
RICHEY, EUGENE P., Seattle, Engineering.
SMITH, LYNWOOD S., Bremerton, Zoology.
VIGGERS, ROBERT F., Seattle, Engineering.

Summer Fellowships for Graduate Teaching Assistants

HARDY, ROBERT J., Port Angeles, Physics.
LARSEN, JOHN H., Jr., Tacoma, Zoology.
MEREDITH, FARRIS R., Pullman, Botany.
MERWIN, HARRIET J., Seattle, Zoology.
PARMENTER, VADEN R., Pullman, Botany.
ROBBERS, JAMES E., Everett, Medical Sciences.

Summer Fellowships for Secondary School Teachers

CALLOW, WALLACE G., Seattle, Mathematics.
JACOBSON, RICHARD W., Sunnyside, Mathematics.
LASLEY, CORNELIA B., Tacoma, Mathematics.
MARTINSEN, WESLEY D., Ferndale, General Sciences.
MAYER, NORMAN WILLIAM, Tacoma, Zoology.
PERCY, LOYD RAY, Tacoma, Mathematics.
POST, RICHARD LINN, Aberdeen, Mathematics.
SMITH, JOHN MARTIN, Aberdeen, General Sciences.
UNDEM, ROY MARTIN, Aberdeen, Mathematics.

WEST VIRGINIA

Graduate

CAMPBELL, LAURENCE J., Huntington, Physics.
FRIEDLY, JOHN C., Jr., Moundsville, Engineering.
HIRST, LESTER L., Jr., Morgantown, Physics.
LILLY, JULIUS Q., Montgomery, Engineering.
MANN, JAMES E., Jr., Bluefield, Engineering.
TICE, RUSSELL L., Huntington, Biochemistry.

Cooperative Graduate

BALL, EDWIN D., Philippi, Physics.
BONAR, DANIEL D., Murraysville, Mathematics.
LONG, ANDREW F., Jr., Morgantown, Mathematics.
PRICE, ALSON K., South Charleston, Chemistry.
RAY, JAMES P., Princeton, Mathematics.
THOMAS, KEITH S., Weyers Cave, Physics.
WRIGHT, CARL L., Morgantown, Chemistry.

Science Faculty

BAER, CHARLES H., Morgantown, Botany.
BAUSERMAN, THOMAS, Huntington, Mathematics.
HAMILTON, JAMES F., Morgantown, Engineering.

La Rue, James A., Fairmont, Mathematics.
Smith, Nelson S., Jr., Morgantown, Engineering.

Summer Fellowships for Graduate Assistants

Chambers, William L., Morgantown, Engineering.
Gonano, John R., Hedgesville, Physics.
Miller, Frank D., Morgantown, Psychology.

Summer Felolwships for Secondary School Teachers

Adalis, Dorothy, Weirton, Biology.
Bird, Ralph Sidney, Matonka, Chemistry.
Nunley, Robert Gray, Williamsburg, Biology.
Schell, Delmar L., Petersburg, Biology.

WISCONSIN

Graduate

Fay, Robert C., Kenosha, Chemistry.
Frea, James I., Sturgeon Bay, Microbiology.
Gaggioli, Richard A., Madison, Engineering.
Gottlieb, Judith A., Madison, Medical Sciences.
Harriman, John E., Appleton, Chemistry.
Hartman, Thomas F., Madison, Psychology.
Hoben, Allan, Milwaukee, Anthropology.
Hundhausen, Arthur J., Wausau, Physics.
Imhof, Violet I., South Milwaukee, Chemistry.
Jacobs, Stanley J., Hartland, Mathematics.
Jeannotte, Dexter A., Milwaukee, Engineering.
Kadlec, Robert H., Racine, Engineering.
Kestner, Neil R., Muskegon, Chemistry.
Knuth, Donald E., Milwaukee, Mathematics.
Krubsack, Arnold J., Clintonville, Chemistry.
Link, John K., Madison, Physics.
Mahowald, Anthony P., Milwaukee, Zoology.
Makous, Walter L., Wauwatosa, Psychology.
Miller, Gerald R., Milwaukee, Chemistry.
Morzenti, Virginia M., Montreal, Biology.
Pfeiffer, Russell R., Milwaukee, Engineering.
Pomraning, Gerald C., Oshkosh, Engineering.
Roesler, Frederick L., Milwaukee, Physics.
Smith, Douglas L., Madison, Chemistry.
Smith, Timothy A., Milwaukee, Psychology.
Sutton, Paul W., Sparta, Chemistry.
Treichel, Paul M., Jr., Madison, Chemistry.
Wagner, Curtis A., Monroe, Physics.
Wagner, Eugene R., Madison, Chemistry.

Cooperative Graduate

Banaszak, Leonard J., Milwaukee, Biochemistry.
Berman, Neil S., Milwaukee, Engineering.
Bjerke, Conrad C., Osseo, Engineering.
Brinkman, Gail L., Colfax, Biochemistry.
Brinkman, Leonard W., Jr., La Crosse, Social Sciences.
Bronikowski, Thomas A., Milwaukee, Chemistry.
Bruening, George E., South Milwaukee, Biochemistry.
Cannon, Lawrence O., Madison, Mathematics.
De Groot, Rodney C., Union Grove, Botany.
Druffenbrock, Sr. Madelei, Milwaukee, Mathematics.
Gillman, David S., Madison, Mathematics.
Grimm, Robert A., Two Rivers, Chemistry.
Johnson, Ronald C., Milwaukee, Chemistry.
Krause, Eugene F., Kenosha, Mathematics.
Mandelker, Mark W., Milwaukee, Mathematics.
Marten, Gordon C., Wausau, Agriculture.
May, Daniel S., Racine, Biochemistry.
McClure, Charles W., Beloit, Engineering.
Meyer, Sr. Gregory M., Milwaukee, Mathematics.
Pitterle, Thomas A., Milwaukee, Engineering.
Poppe, Carl H., Madison, Physics.
Riedl, John O., Jr., Milwaukee, Mathematics.
Seguin, Charles P., Madison, Mathematics.
Sether, Lowell A., Iola, Zoology.
Soulen, Thomas K., Madison, Biochemistry.
Vanryzin, John R., Milwaukee, Mathematics.
Verette, Ralph M., Wauwatosa, Engineering.
Whatley, Malcolm C., Madison, Physics.
Widmier, John M., Madison, Earth Sciences.
Zawadzki, Joseph F., Withee, Chemistry.

Postdoctoral

Austin, Samuel M., Columbus, Physics.
Brandt, John C., Williams Bay, Astronomy.
Sagan, Carl E., Madison, Astronomy.
Spencer, Thomas A., Jr., Madison, Chemistry.
Suttie, John W., Madison, Biochemistry.
Vandervoort, Peter O., Williams Bay, Astronomy.

Senior Postdoctoral

Archer, E. James, Madison, Psychology.

Science Faculty

Doemland, Harvey H., Madison, Engineering.
Greene, Jack B., Milwaukee, Physics.
Kunny, Bartholomew K., Beloit, Zoology.
Mezger, James P., Milwaukee, Engineering.
Stewart, James C., Appleton, Mathematics.
Vanderlin, Carl J., Jr., Whitewater, Mathematics.

Summer Fellowships for Graduate Teaching Assistants

Carlson, David H., Madison, Mathematics.
Gibson, Thomas G., Wauwatosa, Earth Sciences.
Hicks, George P., Madison, Chemistry.
Hutchins, James P., Madison, Engineering.
Meisters, George J., Milwaukee, Chemistry.
Nash, Allan J., Wauwatosa, Psychology.
Nordman, James E., Madison, Engineering.
Novotny, Donald W., Madison, Engineering.
Piehl, Martin A., Medford, Botany.
Pontrelli, Gene J., McFarland, Chemistry.
Sargent, Theodore D., Madison, Zoology.
Sorauf, James E., Wauwatosa, Earth Sciences.
Spink, Charles H., Platteville, Chemistry.
Tischer, Thomas N., Milwaukee, Chemistry.
Tremaine, Doris E., Clinton, Mathematics.
Vanryzin, John R., Milwaukee, Mathematics.
White, Keith L., Madison, Botany.
Zawadzki, Joseph F., Withee, Chemistry.

WISCONSIN—Continued

Summer Fellowships for Secondary School Teachers

ASHENFELTER, JOHN R., Janesville, Biology.
BATHA, JOHN VINCENT, Muskego, Biology.
BRADWAY, KENNETH W., Edgar, Mathematics.
BRUNNER, VINCENT F., Milwaukee, Mathematics.
GROMME, ROY O., Glendale, Biology.
LANDIS, JOHN R., Appleton, Mathematics.
LEEMAN, HARRY WARREN, Casco, Botany.
LONG, JOHN W., Menasha, Mathematics.
MCCLOSKEY, DONALD G., Madison, Mathematics.
O'MALLEY, Sr. M. LORAN, Madison, Mathematics.
PATTERSON, Sr. M. ADELBER, Wilwaukee, Biology.
REINHOLZ, HARVEY H., Appleton, Biology.
TREBATOSKI, Sr. M. GABR, Stevens Point, Biology.
WEINBERGER, F. RICHARD, Muskego, Mathematics.
WOLFF, HARRY LUDWIG, Janesville, Mathematics.
ZWENG, MARILYN J., Madison, Mathematics.

WYOMING

Graduate

DODSON, WILLIAM H., Casper, Engineering.
SADLER, JOHN R., Riverton, Biochemistry.

Cooperative Graduate

BEATTY, DAVID D., Laramie, Zoology.
GUYTON, JAMES W., Laramie, Earth Sciences.

Science Faculty

BEATTY, RICHARD L., Laramie, Mathematics.
BOYD, DONALD W., Laramie, Biology.
LAMB, DONALD R., Laramie, Earth Sciences.

Summer Fellowships for Graduate Teaching Assistants

GUYTON, JAMES W., Laramie, Earth Sciences.

Summer Fellowships for Secondary School Teachers

NIELSEN, LENUS A., Sheridan, General Sciences.

PUERTO RICO

Science Faculty

WEHMHOEFER, Sr. MARIE C., Santa Maria. Botany.

Institutes Chosen by Fellowship Awardees

[Key to table: A. Cooperative Graduate Fellowship Program. B. Graduate Fellowship Program. C. Postdoctoral Fellowship Program. D. Senior Postdoctoral Fellowship Program. E. Science Faculty Fellowship Program. F. Summer Fellowships for Secondary School Teachers Program. G. Summer Fellowships for Graduate Teaching Assistants Program.]

	A	B	C	D	E	F	G
Adelphi College, Garden City, N.Y.	1						
Akron, University of, Akron, Ohio	3						1
Alabama, University of, University, Ala.	3					3	3
American University, Washington, D.C.						2	
Appalachian State Teachers College, Boone, N.C.						2	
Arizona State College, Flagstaff, Ariz.						3	
Arizona State University, Tempe, Ariz.						3	
Arizona, University of, Tucson, Ariz.	6	2			2	2	1
Arkansas, University of, Fayetteville, Ark.	6	1				7	4
Atlanta University, Atlanta, Ga.						2	
Auburn University, Auburn, Ala.	3						4
Baylor University, Waco, Tex.							2
Boston College, Chestnut Hill, Mass.	2					1	
Boston University, Boston, Mass.	4					2	3
Brandeis University, Waltham, Mass.	6	2					2
Brigham Young University, Provo, Utah						1	
Brooklyn, Polytechnic Institute of, Brooklyn, N.Y.	13	1			1	3	2
Brown University, Providence, R.I.	6	6			2		3
Bryn Mawr College, Bryn Mawr, Pa.	4						2
Buffalo, University of, Buffalo, N.Y.	5					3	3
California Institute of Technology, Pasadena, Calif.	15	103	5	2	1		8
California, University of, Berkeley, Calif.	43	106	10		17		19
California, University of, Davis, Calif.		1			2	1	
California, University of, La Jolla, Calif.		1	1				
California, University of, Los Angeles, Calif.	18	8		2	5	5	5
California, University of, San Francisco, Calif.		2					
California, University of Southern, Los Angeles, Calif.	1	2	2		2		1
Carleton College, Northfield, Minn.					1		
Carnegie Institute of Technology, Pittsburgh, Pa.	9	17	1				2
Case Institute of Technology, Cleveland, Ohio	6	1			1		3
Catholic University of America, Washington, D.C.	5	2			1	15	1
Chicago, University of, Chicago, Ill.	21	40	2	1	2	9	10
Cincinnati, University of, Cincinnati, Ohio	3	1					
Claremont College, Claremont, Calif.		1					
Claremont Graduate School, Claremont, Calif.	2				1		
Clark University, Worcester, Mass.	5						1
Clemson Agricultural College, Clemson, S.C.	3	1					2
Colorado School of Mines, Golden, Colo.							1
Colorado State College, Greeley, Colo.						2	
Colorado State University, Fort Collins, Colo.	2					1	4
Colorado, University of, Boulder, Colo.	7	7	1		3	18	4
Columbia University, New York, N.Y.	32	33	2		9	8	16
Columbia University Teachers College, New York, N.Y.						3	
Connecticut, University of, Storrs, Conn.	3				1		1
Cornell University, Ithaca, N.Y.	27	20	1		3		13

Institutes Chosen by Fellowship Awardees—Continued

	A	B	C	D	E	F	G
Creighton University, Omaha, Nebr.						2	
Delaware, University of, Newark, Del.	6	3				1	3
Denver, University of, Denver, Colo.						2	
De Paul University, Chicago, Ill.						1	
Detroit, University of, Detroit, Mich.						4	
Dominican College of San Rafael, San Rafael, Calif.						2	
Duke University, Durham, N.C.	5	7			2	3	4
Duquesne University, Pittsburgh, Pa.	2						1
East Texas State College, Commerce, Tex.						1	
Eastern Pennsylvania Psychiatric Institute, Philadelphia, Pa.			1				
Emory University, Atlanta, Ga.	4					2	
Fairleigh Dickinson College, Rutherford, N.J.						1	
Florida State University, Tallahassee, Fla.	6	2			2	3	2
Florida, University of, Gainesville, Fla.	6	8			2	3	3
Fordham University, New York, N.Y.	4	1			1	3	3
Fresno State College, Fresno, Calif.						1	
George Peabody College for Teachers, Nashville, Tenn.	1					4	2
George Washington University, Washington, D.C.	2						
Georgetown University, Washington, D.C.	3	1					4
Georgia Institute of Technology, Atlanta, Ga.	6				2		1
Georgia, University of, Athens, Ga.	6	1				1	3
Hahnemann Medical College, Philadelphia, Pa.							2
Harvard University, Cambridge, Mass.	21	173	11		4	2	6
Hawaii, University of, Honolulu, Hawaii	3						1
Houston, University of, Houston, Tex.	6						3
Howard University, Washington, D.C.						1	
Hunter College, New York, N.Y.						1	
Illinois Institute of Technology, Chicago, Ill.	5				3		5
Illinois, University of, Urbana, Ill.	48	41	2		12	5	24
Indiana State Teachers College, Terre Haute, Ind.						2	
Indiana University, Bloomington, Ind.	8	7			3	2	5
Institute for Advanced Study, Princeton, N.J.			12	4	2		
Iowa State University of Science and Technology, Ames, Iowa.	21	7			5	3	10
Iowa State, University of, Iowa City, Iowa.	14	5			1	5	7
Iowa State Teachers College, Cedar Falls, Iowa.						1	
John Carroll University, Cleveland, Ohio.						1	
Johns Hopkins University, Baltimore, Md.	8	20	2				3
Kansas State Teachers College, Emporia, Kans.						6	
Kansas State University, Manhattan, Kans.	7					1	3
Kansas, University of, Lawrence, Kans.	8	9				5	5
Kent State University, Kent, Ohio.						2	
Kentucky, University of, Lexington, Ky.	6						4
Lehigh University, Bethlehem, Pa.	5		1		2	1	3
Long Beach State College, Long Beach, Calif.						1	
Louisiana Polytechnic Institute, Ruston, La.						3	
Louisiana State University and Agricultural and Mechanical College, Baton Rouge, La.	9	6			1		5
Louisville, University of, Louisville, Ky.	3					1	2
Loyola University, Chicago, Ill.	6						4
Madison College, Madison College, Tenn.						1	
Maine, University of, Orono, Maine	6						4
Marquette University, Milwaukee, Wis.						4	
Maryland, University of, College Park, Md.	11	3			4	5	7
Massachusetts Institute of Technology, Cambridge, Mass.	46	114	3		5		23
Massachusetts, University of, Amherst, Mass.						1	
Medical College of Virginia, Richmond, Va.	3						
Miami University, Oxford, Ohio.						1	
Miami, University of, Coral Gables, Fla.		1				2	
Michigan College of Mining and Technology, Houghton, Mich.		1					
Michigan State University, East Lansing, Mich.	20	1			5	6	11
Michigan, University of, Ann Arbor, Mich.	42	34	2		20	14	21
Minnesota, University of, Minneapolis, Minn.	28	10	1		3	12	14
Mississippi College, Clinton, Miss.						1	
Mississippi Southern College, Hattiesburg, Miss.						1	
Mississippi State University, State College, Miss.	6						
Mississippi, University of, University, Miss.	1					3	3
Missouri, University of, Columbia, Mo.	10	1			3	1	6
Montana State College, Bozeman, Mont.	4	1					
Montana State University, Missoula, Mont.	6				1	1	
Montclair State College, Upper Montclair, N.J.						1	
Nebraska, University of, Lincoln, Nebr.	6	4			3	2	4
New Hampshire, University of, Durham, N.H.	3					1	2
New Mexico Institute of Mining and Technology, Socorro, N. Mex.	1		1				
New Mexico State University, State College, N. Mex.	5					3	4
New Mexico, University of, Albuquerque, N. Mex.		2			1	1	3
New School for Social Research, New York, N.Y.	2						
New York State, University of, Syracuse, N.Y.	5						2
New York State, University of, Teachers College at New Paltz, N.Y.						1	
New York University, New York, N.Y.	30	5	1	1	2	13	

	A	B	C	D	E	F	G
North Carolina State College of Agriculture and Engineering, Raleigh, N.C.	7	3			1	1	4
North Carolina, University of, Chapel Hill, N.C.	7	4			5	2	1
North Carolina, Woman's College of the University, Greensboro, N.C.						1	
North Dakota Agricultural College, State College, N. Dak.	5						
North Dakota, University of, Grand Forks, N. Dak.	3					3	4
North Texas State College, Denton, Tex.						1	
Northeast Missouri State Teachers College, Kirksville, Mo.						1	
Northern Illinois University, Dekalb, Ill.						3	
Northwestern State College of Louisiana, Natchitoches, La.						1	
Northwestern University, Evanston, Ill.	15	12	1		3	7	6
Notre Dame, University of, Notre Dame, Ind.	6	2			3	35	3
Ohio State University, Columbus, Ohio.	27	8			4	7	15
Ohio University, Athens, Ohio.	2						1
Ohio Wesleyan University, Delaware, Ohio.						1	
Oklahoma State University of Agriculture and Applied Sciences, Stillwater, Okla.	8	3			2	7	5
Oklahoma, University of, Norman, Okla.	7	2			2	6	5
Oregon State College, Corvallis, Oreg.	9	2			3	7	6
Oregon, University of, Eugene, Oreg.	6	2			1		4
Pacific, College of the, Stockton, Calif.	1						1
Pennsylvania State University, University Park, Pa.	20	7	1		6	22	11
Pennsylvania, University of, Philadelphia, Pa.	14	12	1			6	6
Peter Bent Brigham Hospital, Boston, Mass.			1				
Philadelphia College of Pharmacy and Science, Philadelphia, Pa.	1						
Pittsburgh, University of, Pittsburgh, Pa.	10	1			6	4	6
Princeton University, Princeton, N. J.	12	87	5	1	4		7
Purdue University, Lafayette, Ind.	34	10			15	19	17
Radcliffe College, Cambridge, Mass.	4	9					
Redlands, University of, Redlands, Calif.						6	
Rensselaer Polytechnic Institute, Troy, N.Y.	7	2			2		4
Rhode Island, University of, Kingston, R.I.	6						3
Rice Institute, Houston, Tex.	6	6					2
Rochester, University of, Rochester, N.Y.	8	2					5
Rockefeller Institute, New York City, N.Y.			1				
Rutgers, The State University, New Brunswick, N.J.	9	2			1		6
St. Bonaventure University, St. Bonaventure, N.Y.	1					1	
St. Johns University, Jamaica, N.Y.	3					3	3
St. Louis University, St. Louis, Mo.	6	1			1	5	3
St. Mary College, Xavier, Kans.						1	
San Francisco State College, San Francisco, Calif.						2	
San Francisco, University of, San Francisco, Calif.		1					
Smith College, Northampton, Mass.	1						
South Carolina, University of, Columbia, S.C.	5					1	2
South Dakota State College of Agriculture and Mechanical Arts, Brookings, S. Dak.	1					1	1
South Dakota, State University of, Vermillion, S. Dak.	3					2	2
Southern Illinois University, Carbondale, Ill.	1	1			1	1	
Southern Methodist University, Dallas, Tex.						1	
Southern University, Baton Rouge, La.						1	
Southwestern Louisiana Institute, Lafayette, La.						2	
Stanford University, Stanford, Calif.	22	60	8		12	6	12
Stevens Institute of Technology, Hoboken, N.Y.	7						2
Syracuse University, Syracuse, N.Y.	7	1			2	3	4
Temple University, Philadelphia, Pa.	3						
Tennessee, University of, Knoxville, Tenn.	8	6			4	1	3
Texas, Agricultural and Mechanical College of, College Station, Tex.	3	1			3	1	3
Texas Christian University, Fort Worth, Tex.						1	
Texas Southern University, Houston, Tex.						2	
Texas Technological College, Lubbock, Tex.		1				1	1
Texas, University of, Austin, Tex.	18	7		1	4	6	10
Toledo, University of, Toledo, Ohio.		2					
Trinity University, San Antonio, Tex.						1	
Tufts University, Medford, Mass.							1
Tulane University, New Orleans, La.	6	1			1		4
Utah State University, Logan, Utah.	4				2		
Utah, University of, Salt Lake City, Utah.	7	1					4
Vanderbilt University, Nashville, Tenn.	6				3		4
Villanova University, Villanova, Pa.						9	
Virginia Polytechnic Institute, Blacksburg, Va.	3	1			2		1
Virginia, University of, Charlottesville, Va.	6	2			1		1
Washington State University, Pullman, Wash.	4	1			1	1	4
Washington University, St. Louis, Mo.	7	2	1		5	3	3
Washington, University of, Seattle, Wash.	14	10		1	5	7	4
Wayne State University, Detroit, Mich.	6					2	4
Wesleyan University, Middletown, Conn.						1	
West Virginia University, Morgantown, W. Va.	4				1	5	3
Western Illinois University, Macomb, Ill.						1	
Western Michigan University, Kalamazoo, Mich.						3	
Western Reserve University, Cleveland, Ohio.	6	1				3	2
Western Washington College of Education, Bellingham, Wash.						2	

Institutes Chosen by Fellowship Awardees—Continued

	A	B	C	D	E	F	G
Wisconsin, University of, Madison, Wis.	41	40	3	------	9	18	21
Worcester Polytechnic Institute, Worcester, Mass.	2	------	------	------	------	------	------
Wyoming, University of, Laramie, Wyo.	2	------	------	------	------	4	1
Xavier University, Cincinnati, Ohio	------	------	------	------	------	4	------
Yale University, New Haven, Conn.	20	34	4	------	6	------	9
Yeshiva University, New York, N.Y.	2	------	1	------	------	------	------

Foreign Institutions

Foreign institutions	Graduate	Post doctoral	Senior post-doctoral	Science faculty
Athens National University, Greece	----------	1	----------	----------
Australian National University, Australia	----------	1	1	----------
Basel, University of, Switzerland	----------	1	----------	----------
Bern, University of, Switzerland	----------	----------	1	----------
Birmingham, University of, England	----------	----------	1	----------
Bologna, University of, Italy	----------	----------	1	----------
Bonn, University of, Germany	----------	1	----------	----------
Bordeaux, University of, France	----------	----------	1	----------
Bristol, University of, England	----------	----------	2	----------
Brussels, University of, Belgium	----------	2	----------	----------
Cambridge, University of, England	5	9	9	1
Carlsberg Foundation, Denmark	----------	----------	2	----------
Centre Nationale de la Recherche Scientifique, France	----------	2	----------	----------
Centre Nationale de Transfusion Sanguine, France	----------	1	----------	----------
Cern, Switzerland	----------	1	3	----------
Chalmers Tekniska Hogskola, Sweden	----------	----------	----------	1
College de France, France	----------	1	----------	----------
Cologne, University of, Germany	----------	----------	2	1
Copenhagen, University of, Denmark	----------	6	----------	----------
Council of Scientific and Industrial Research, India	1	----------	----------	----------
Dublin Institute for Advanced Study, Ireland	----------	1	----------	----------
Durham, University of, England	----------	1	----------	----------
Ecole Polytechnique, France	----------	1	1	----------
Edinburgh, University of, Scotland	----------	1	----------	----------
Federal Research Institute for Virus Diseases of Animals, Germany	----------	1	----------	----------
Fourah Bay College, British West Africa	----------	1	----------	----------
Ghent, University of, Belgium	----------	1	----------	----------
Glasgow, University of, Scotland	----------	----------	----------	1
Gottingen, University of, Germany	----------	1	----------	1
Grenoble, University of, France	----------	1	----------	----------
Hebrew University, Israel	----------	----------	2	----------
Heidelberg, University of, Germany	----------	2	2	----------
Institut Fourier, France	----------	----------	1	----------
Institut Henri Poincare, France	----------	1	----------	----------
Institut Pasteur, France	----------	2	----------	----------
Institute for Theoretical Physics, Denmark	----------	----------	2	----------
Institute for Theoretical Physics, Naples, Italy	----------	1	----------	----------
Instituto Superiore de Sanita, Italy	----------	1	----------	----------
International Training Centre for Aerial Survey, Netherlands	----------	----------	----------	1
Karolinska Institute, Sweden	----------	1	1	----------
Leeds, University of, England	----------	----------	1	----------
Leiden, University of, Netherlands	----------	2	1	----------
Lima, University of, Peru	1	----------	----------	----------
London, University of, England	4	5	3	1
Lund, University of, Sweden	----------	1	----------	1
Marburg, University of, Germany	----------	1	----------	----------
Maudsley Hospital, England	----------	1	----------	----------
Medical Biological Laboratory, National Defense Research Council, Netherlands	----------	----------	1	----------
Melbourne, University of, Australia	----------	1	----------	----------
Munich, University of, Germany	----------	2	----------	----------
Museum National d'Histoire Naturelle, France	----------	----------	1	----------
Nagoya University, Japan	----------	1	----------	----------
Nancy, University of, France	----------	1	----------	----------
National Institute for Medical Research, England	----------	1	----------	----------
New Zealand, University of, New Zealand	----------	1	----------	----------
Nigeria, University College of, Nigeria	1	----------	----------	----------
Nobel Medical Institute, Sweden	----------	----------	2	----------
Norges Tekniske Hogskole, Norway	----------	----------	----------	1
Observatoire de Paris, France	----------	2	----------	----------
Osaka University, Japan	----------	----------	1	1
Oslo, University of, Norway	----------	1	----------	1
Oxford, University of, England	7	6	3	3
Paris, University of, France	3	3	5	2
Pavia, University of, Italy	----------	----------	1	----------

Foreign Institutions—Continued

Foreign institutions	Graduate	Post doctoral	Senior postdoctoral	Science faculty
Pisa, University of, Italy		1		
Queensland, University of, Australia			1	
Rome, University of, Italy		1	2	1
Royal Botanical Gardens, England		1		
Royal Institute of Technology, Sweden		1		
Royal Veterinary College, Sweden		1		
Saar, University of, Germany	1			
Sao Paulo, University of, Brazil			1	
St. Thomas' Hospital, England		1		
Stockholm, University of, Sweden		2		
Swiss Federal Institute of Technology, Switzerland		1		1
Sydney, University of, Australia			1	
Technische Hochschule, Aachen, Germany		1		
Technische Hochschule, Darmstadt, Germany		1		
Technische Hochschule, Munich, Germany				2
Technische Hochschule, Stuttgart, Germany		2		
Technische Hochschule, Vienna, Austria		1		
Technische Hogeschool, Delft, Netherlands		1	1	2
Tokyo, University of, Japan		1	1	
Uppsala, University of, Sweden		1	2	
Vienna, University of, Austria	1		1	
Weizmann Institute of Science, Israel		1	1	

Present or Most Recent Institutional Affiliation of Individuals Offered Science Faculty, Senior Postdoctoral, and Postdoctoral Fellowships

	Science faculty	Senior postdoctoral	Postdoctoral
Adelaide, University of, Adelaide, Australia			1
Air Force Research Center, Cambridge, Mass		1	
Alabama Polytechnic Institute, Auburn, Ala			1
Alaska, University of, College, Alaska	2		
Alcorn Agricultural and Mechanical College, Alcorn, Miss	1		
Amherst College, Amherst, Mass	1		
Antelope Valley Junior College, Lancaster, Calif	1		
Arizona, University of, Tucson, Ariz	2		
Arkansas, University of, Fayetteville, Ark	2		
Austin Peay State College, Clarksville, Tenn	1		
Ball State Teachers College, Muncie, Ind	2		
Beloit College, Beloit, Wis	1		
Berea College, Berea, Ky	1		
Boston College, Chestnut Hill, Mass	1		
Bowdoin College, Brunswick, Maine	1		
Brandeis University, Waltham, Mass	1	2	
Brigham Young University, Provo, Utah		1	
Brookhaven National Laboratory, New York, N.Y		1	
Brooklyn College, Brooklyn, N.Y	1		
Brown University, Providence, R.I		1	1
Bucknell University, Lewisburg, Pa	2		
California Institute of Technology, Pasadena, Calif			5
California State Polytechnic College, San Luis Obispo, Calif	2		
California, University of, Berkeley, Calif	2	3	16
California, University of, Davis, Calif	1		
California, University of, La Jolla Calif			1
California, University of, Los Angeles, Calif	1	2	6
Calvin College, Grand Rapids, Mich	1		
Carleton College, Northfield, Minn	2		
Case Institute of Technology, Cleveland, Ohio	3		1
Catholic University of Puerto Rico, Ponce, P.R	1		
Central Washington College of Education Ellensburg, Wash	1		
Chattanooga, University of, Chattanooga, Tenn	1		
Chicago, University of, Chicago, Ill	1	3	14
Chico State College, Chico, Calif	2		
Christian Brothers College, Memphis, Tenn	2		
Church College of Hawaii, The, Laie, Oahu, Hawaii	1		
Cincinnati, University of, Cincinnati, Ohio	1		
Clarkson College of Technology, Potsdam, N.Y	2		
Clemson Agricultural College, Clemson, S.C	3		
College of Medical Evangelists, Los Angeles, Calif			1
Colorado College, Colorado Springs, Colo	1		
Colorado State University, Fort Collins, Colo	1		
Colorado, University of, Boulder, Colo			1
Columbia University, New York City, N.Y	1	1	11
Concordia College, Moorhead, Minn	1		

Present or Most Recent Institutional Affiliation of Individuals Offered Science Faculty, Senior Postdoctoral, and Postdoctoral Fellowships—Con.

	Science faculty	Senior postdoctoral	Postdoctoral
Connecticut, University of, Storrs, Conn	2		
Cornell University, Ithaca, N.Y		5	5
Cornell University, New York State Veterinary College, Ithaca, N.Y	1		
Dana College, Blair, Nebr	1		
Dartmouth College, Hanover, N.H	2		
David Taylor Model Basin, Washington, D.C		1	
Delaware, University of, Newark, Del		1	
Detroit, University of, Detroit, Mich	2		
Drew University, Madison, N.J	1		
Drury College, Springfield, Mo	1		
Duke University, Durham, N.C			1
D'Youville College, Buffalo, N.Y	1		
Earlham College, Richmond, Ind	1		
Eastern Michigan University, Ypsilanti, Mich	2		
Eastern Pennsylvania Psychiatric Institute, Philadelphia, Pa			1
El Camino College, El Camino College, Calif	2		
Emory University, Atlanta, Ga	1		
Fairmont State College, Fairmont, W. Va	1		
Florence State College, Florence, Ala	1		
Florida, University of, Gainesville, Fla	1		1
Franklin and Marshall College, Lancaster, Pa	1		
General Motors Institute, Flint, Mich	1		
Geneva College, Beaver Falls, Pa	1		
Geological Survey, U.S., Washington, D.C		1	
George Washington University, Washington, D.C	1	1	
Georgia Institute of Technology, Atlanta, Ga	3		
Georgia, University of, Athens, Ga	1		
Georgetown University, Washington, D.C	1		
Glendale College, Glendale, Calif	1		
Grambling College, Grambling, La	1		
Hampton Institute, Hampton, Va	2		
Harvard University, Cambridge, Mass		3	10
Haverford College, Haverford, Pa	3		
Holy Cross, College of the, Worcester, Mass	1		
Hollins College, Hollins College, Va	1		
Houghton College, Houghton, N.Y	1		
Humboldt State College, Arcata, Calif	1		
Hunter College, New York City, N.Y	1		
Idaho, University of, Moscow, Idaho	2		
Illinois Institute of Technology, Chicago, Ill			1
Illinois, University of, Urbana, Ill	3	1	10
Illinois, University of, Chicago, Ill	3		
Indiana Technical College, Fort Wayne, Ind	1		
Indiana University, Bloomington, Ind	1	2	4
Institute for Advanced Study, Princeton, N.J			1
Iowa State University of Science and Technology, Ames, Iowa	1	1	1
Iowa, State University of, Iowa City, Iowa	1	1	
Jamestown Community College, Jamestown, N.Y	1		
Jefferson Medical College, Philadelphia, Pa			1
Johns Hopkins University, Baltimore, Md		2	7
Kansas State Teachers College, Emporia, Kans	2		
Kansas State University of Agriculture and Applied Science, Manhattan Kans	1		
Kentucky, University of, Lexington, Ky	1		
Kenyon College, Gambier, Ohio	1		
Keuka College, Keuka, N.Y	1		
King's College, Wilkes-Barrie, Pa	1		
Lake Forest College, Lake Forest, Ill	1		
Lamar State College of Technology, Beaumont, Tex	1		
Lawrence College, Appleton, Wis	1		
Lehigh University, Bethleham, Pa	1		
Lenoir Rhyne College, Hickory, N.C	1		
Livingstone College, Salisbury, N.C	1		
Los Alamos Scientific Laboratory, Los Alamos, N. Mex		1	
Louisiana, Northwestern State College of, Natchitoches, La	1		
Louisiana Polytechnic Institute, Ruston, La	2		
Louisville, University of, Louisville, Ky	1		
Maine, University of, Orono, Maine	1		
Marillac Junior College, St. Louis, Mo	1		
Marquette University, Milwaukee, Wis	1		
Marshall College, Huntington, W. Va	1		
Mary Washington College of the University of Virginia, Fredericksburg, Va	1		
Marygrove College, Detroit, Mich	1		
Massachusetts Institute of Technology, Cambridge, Mass	1	2	5
Massachusetts, University of, Amherst, Mass	1		
Medical Nobel Institute, Stockholm, Sweden			1
Memphis State University, Memphis, Tenn	1		
Michigan College of Mining and Technology, Houghton, Mich	1		

Present or Most Recent Institutional Affiliation of Individuals Offered Science Faculty, Senior Postdoctoral, and Postdoctoral Fellowships—Con.

	Science faculty	Senior postdoctoral	Postdoctoral
Michigan State University of Agriculture and Applied Science, East Lansing, Mich	3	1	1
Michigan, University of, Ann Arbor, Mich		3	7
Milwaukee School of Engineering, Milwaukee, Wis	1		
Minnesota, University of, Minneapolis, Minn		2	2
Mississippi State College for Women, Columbus, Miss	1		
Mississippi State University, State College, Miss	1		
Mississippi, University of, University, Miss	1		
Missouri, University of, Columbia, Mo	1	1	
Monsanto Chemical Company, Dayton, Ohio		1	
Montana State College, Bozeman, Mont	2		
Montgomery Junior College, Takoma Park, Md	1		
Morehead State College, Morehead, Ky	1		
Morgan State College, Baltimore, Md	1		
Morton Junior College, Cicero, Ill	1		
Mount San Antonio College, Pomona, Calif	1		
Mundelein College, Chicago, Ill	1		
Murray State College, Murray, Ky	1		
Muskingum College, New Concord, Ohio	1		
National Institutes of Health, Bethesda, Md		1	
Nebraska, University of, Lincoln, Nebr	1		
New Hampshire, University of, Durham, N.H	1		
New York, College of the City of, New York City, N.Y	1		
New York University, New York, N.Y		1	3
North Carolina Agricultural and Technical College, Greensboro, N.C	2		
North Carolina State College of Agriculture and Engineering, Raleigh, N.C	1		
North Carolina, University of, Chapel Hill, N.C	1	2	1
North Dakota Agricultural College, Fargo, N. Dak	1		
North Dakota, University of, Grand Forks, N. Dak	1		
North Texas State College, Denton, Tex	1		
Northern Illinois University, DeKalb, Ill	2		
Northwest Missouri State College, Maryville, Mo	1		
Northwestern University, Evanston, Ill	1		2
Norwich University, Northfield, Vt	1		
Notre Dame, College of, Belmont, Calif	1		
Notre Dame, University of, Notre Dame, Ind	1		1
Oak Ridge National Laboratories, Oak Ridge, Tenn		4	
Oberlin College, Oberlin, Ohio	3		
Oklahoma State University of Agriculture and Applied Science, Stillwater, Okla	2		
Oklahoma, University of, Norman, Okla	3		1
Olympic Junior College, Bremerton, Wash	1		
Oregon State College, Corvallis, Oreg	3		
Oregon, University of, Eugene, Oreg		1	1
Paducah Junior College, Paducah, Ky	1		
Pennsylvania State University, The, University Park, Pa	5	1	2
Pennsylvania, University of, Philadelphia, Pa			2
Phillips University, Enid, Okla	1		
Pittsburgh, University of, Pittsburgh, Pa	1		
Polytechnic Institute of Brooklyn, Brooklyn, N.Y	3	2	
Pomona College, Claremont, Calif	1	1	
Princeton University, Princeton, N.J	1	1	2
Purdue University, Lafayette, Ind	1	1	1
Radcliffe College, Cambridge, Mass			1
Reedley College, Reedley, Calif	1		
Rensselaer Polytechnic Institute, Troy, N.Y	2		
Rice Institute, Houston, Tex		1	
Rhode Island, University of, Kingston, R.I	2		
Rochester, University of, Rochester, N.Y			2
Rockefeller Institute, New York, N.Y		1	1
Rockhurst College, Kansas City, Mo	1		
Roosevelt University, Chicago, Ill	1		
St. Francis College, Fort Wayne, Ind	1		
St. John's University, Jamaica, N.Y	1		
St. Louis University, St. Louis, Mo	2		
St. Procopius College, Lisle, Ill	1		
San Fernando Valley State College, Northridge, Calif	1		
San Jose State College, San Jose, Calif	2		
San Mateo, College of, San Mateo, Calif	1		
Seattle University, Seattle, Wash	1		
Shasta College, Redding, Calif	1		
Simmons College, Boston, Mass	1		
Skagit Valley College, Mount Vernon, Wash	1		
Smith College, Northampton, Mass	1		
Snow College, Ephraim, Utah	1		
South Carolina, University of, Columbia, S.C	1		
South Dakota State College of Agriculture and Mechanic Arts, Brookings, S. Dak	2		

Present or Most Recent Institutional Affiliation of Individuals Offered Science Faculty, Senior Postdoctoral, and Postdoctoral Fellowships—Con.

	Science faculty	Senior postdoctoral	Postdoctoral
Southeast Missouri State College, Cape Gerardeau, Mo	1		
Southern California, University of, Los Angeles, Calif			1
Southern Illinois University, Carbondale, Ill	2		
Southern Methodist University, Dallas, Tex	1		
Southern Oregon College, Ashland, Oreg	1		
Southern University and Agricultural and Mechanical College, Baton Rouge, La	2		
Southwestern Louisiana Institute, Lafayette, La	2		
Stanford University, Stanford, Calif	1	1	10
State Teachers College, Frostburg, Md	1		
State Teachers College, Lock Haven, Pa	1		
State Teachers College at Towson, Baltimore, Md	1		
State University of New York, Albany, N.Y	1		
State University of New York (Agricultral and Technical Institute), Alfred, N.Y	1		
Stevens Institute of Technology, Hoboken, N.J	1		
Susquehanna University, Selinsgrove, Pa	1		
Swarthmore College, Swarthmore, Pa	2		
Syracuse University, Syracuse, N.Y	1	1	
Temple University, Philadelphia, Pa	1		1
Tennessee, University of, Knoxville, Tenn	1		
Texas Southern University, Houston, Tex	1		
Texas Agricultural and Mechanical College, College Station, Tex	2		
Texas Technological College, Lubbock, Tex	3		
Texas, University of, Austin, Tex	2	1	1
Tri-State College, Angola, Ind	1		
Tulane University, New Orleans, La			1
Union College and University, Schenectady, N.Y	1		
United States Naval Postgraduate School, Monterey, Calif	1		
Upland College, Upland, Calif	1		
Upsala College, East Orange, N.J	1		
Utah, University of, Salt Lake City, Utah			2
Valparaiso University, Valparaiso, Ind	1		
Virginia Polytechnic Institute, Blacksburg, Va	1		
Wabash College, Crawfordsville, Ind	1		
Washington State University, Pullman, Wash	2	1	
Washington University, St. Louis, Mo	1	2	3
Washington, University of, Seattle, Wash	2	3	5
Wayne State University, Detroit, Mich	1	1	
Wellesley College, Wellesley, Mass	1		
Wessington Springs College, Wessington Springs, S. Dak	1		
West Virginia University, Morgantown, W. Va	3		
Western Carolina College, Cullowhee, N.C	1		
Western Illinois University, Macomb, Ill	1		
Western Maryland College, Westminster, Md	1		
Western Reserve University, Cleveland, Ohio	2	1	1
Whitman College, Walla Walla, Wash	1		
Whittier College, Whittier, Calif	1		
Wichita, University of, Wichita, Kans	1		
William and Mary, College of, Norfolk, Va	1		
Winston-Salem Teachers College, Winston-Salem, N.C	1		
Wisconsin State College, Whitewater, Wis	1		
Wisconsin, University of, Madison, Wis	1	1	7
Wittenberg University, Springfield, Ohio	1		
Wright-Patterson Air Force Base, Dayton, Ohio		1	
Wyoming, University of, Laramie, Wyo	3		
Yale University, New Haven, Conn			10
Youngstown University, Youngstown, Ohio	2		

APPENDIX F

Publications of the National Science Foundation

This listing includes publications issued by the National Science Foundation during fiscal year 1960. A complete listing of available Foundation publications may be obtained upon request to the Foundation.

The publications marked with a price may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D.C. Other publications are available from the Foundation.

ANNUAL REPORTS

Ninth Annual Report, for fiscal year ending June 30, 1959: NSF 60–1, $1.

First Annual Weather Modification Report 1959 (A yearly report on activities in the field of weather modification): NSF 60–24, $0.35.

MANPOWER AND EDUCATION REPORTS

1. Scientific Manpower—1959 (The latest in a general series which contains the papers of the Conference on Scientific Manpower held in conjunction with the meetings of the AAAS in December of each year): NSF 60–34, $0.30.
2. Scientific Manpower Bulletins
   No. 11. Salary Profile of Scientists in the National Register of Scientific and Technical Personnel, 1956–58: NSF 60–22.
3. Information on Science Scholarships and Student Loans: NSF 60–33.
4. Statistical Handbook on Science Education: NSF 60–13, $0.55.
5. Fellowship, Institute, and Other Education Program Announcements (with instructions for applying).

RESEARCH AND DEVELOPMENT ECONOMIC REPORTS

1. Federal Funds for Science VIII. The Federal Research and Development Budget, Fiscal Years 1958, 1959, and 1960: NSF 59–40, $0.45.
2. Reviews of Data on Research and Development (A series of leaflets devoted to specific aspects of research and development economics):
   No. 20. Funds for Research and Development Performance in American Industry: NSF 60–35, $0.10.
   No. 19. Funds for Research and Development in Colleges and Universities, Fiscal 1959: NSF 60–21, $0.10.
   No. 18. Research and Development Expenditures of Selected Groups of Nonprofit Institutions: NSF 60–7, $0.05.
   No. 17. Funds for Research in Medical Schools, 1957–58: NSF 60–10, $0.10.
   No. 16. Funds for Research and Development in the United States, 1953–59: NSF 59–65, $0.10.
   No. 15. Research and Development Expenditures of Foundations and Health Agencies, 1957: NSF 59–55.
   No. 14. Funds for Research and Development Performance in American Industry, 1957: NSF 59–46.
3. Bibliography on the Economic and Social Implications of Scientific Research and Development: NSF 59–41, $0.25.
4. Methodology of Statistics on Research and Development: NSF 59–36, $0.65.
5. Current Projects on Economic and Other Impacts of Scientific Research and Development, 1959: NSF 59–51, $0.25.
6. Science and Engineering in American Industry, Report on a 1956 Survey: NSF 59–50, $0.70.

SCIENTIFIC INFORMATION EXCHANGE REPORTS

1. Scientific Information Notes (Bimonthly periodical reporting national and international developments in scientific and technical information dissemination): Single copy $0.25, subscription $1.25 per year.
   Vol. 1, No. 4, August–September 1959; NSF 49–48.
   Vol. 1, No. 5, October–November 1959; NSF 59–61.
   Vol. 2, No. 1, February–March 1960; NSF 60–8.
   Vol. 2, No. 2, April–May 1960; NSF 60–23.
   Vol. 2, No. 3, June–July 1960; NSF 60–38.
2. Scientific Information Activities of Federal Agencies (A series of pamphlets describing the policies and procedures of Federal Agencies relative to their scientific activities):
   No. 4. U.S. Government Printing Office: NSF 60–9, $0.05.
   No. 3. Department of Commerce: NSF 59–58, $0.15.

SCIENCE ADMINISTRATION REPORTS

1. NSF Grants for Scientific Research: NSF 60–2.
2. Program Activities of the National Science Foundation: NSF 59–32.

U.S. GOVERNMENT PRINTING OFFICE: 1961