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LETTER OF TRANSMITTAL

WASHINGTON, D.C.,
January 15, 1962.

MY DEAR MR. PRESIDENT:

I have the honor to transmit herewith the Annual Report for Fiscal Year 1961 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.

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THE DIRECTOR'S STATEMENT

Anyone who follows world developments is struck by the growing realization on the part of all countries that their future is strongly dependent upon the advancement of their own science and technology, and that, because many problems are the common concern of many nations some can be most effectively solved through international collaboration.

What is not yet fully realized is the rate of acceleration in the direction of scientific and technological progress. The term, "rate of acceleration," is used deliberately in its scientific sense, i.e., the rate of the trend is not steady but is itself rising. In the case of the United States, a few simple statistics suffice to illustrate the point: The population has doubled in the past 50 years. The gross national product has doubled in the last 20 years. The percent of an age group attaining baccalaureate degrees in our colleges and universities is doubling every 18 years. Of all people who reach "doctoral age" each year, the percent who earn doctorates in science and engineering is doubling every 12 years. (Incidentally, the output of baccalaureates and doctorates has maintained this rate for about 40 years despite fluctuations in wars and depressions.) The total labor force is increasing about 1.4 percent per year, while the number of professional scientists and engineers is increasing about four times as fast, or 6 percent. Finally, the research and development in dollars have approximately doubled in the past 5 years. Doubtless the relative progress in these various categories is similar in most industrialized countries.

A recent study by the National Science Foundation, "Investing in Scientific Progress," produced several highly significant conclusions, as follows:

(1) The output of scientists and engineers is expected to double by 1970. The steadiness of this increasing trend

in output of scientific manpower seems to indicate real interest and purpose on the part of the population—certainly on the part of the younger generation—in the values of scientific and engineering careers. Because of the growing importance of scientific and technical achievements and the extent to which these are publicized, this trend may be expected to increase.

(2) This trend must be maintained and possibly accelerated to provide the estimated number of scientists and engineers who will be needed during this decade.

(3) The desired number of scientists and engineers can be realized without reducing the numbers required for other professional careers. More precisely, the output of scientists and engineers is expected to tap only about 4 percent of the country's top talent in IQ. Thus there should be plenty of opportunity to develop talents other than science.

On the face of it, this would appear to be reassuring. However, further analysis discloses the alarming fact that we are not coming close to making adequate provision for these essential increases in trained manpower—not even for the numbers involved, to say nothing of maintaining the quality of training. Simple estimates of the cost of needed equipment and facilities for academic research and education in science indicate that we are already in arrears to the tune of $1.5 billion. Adequate provision for the expected ten-year expansion in these same items will require an estimated $10 billion more.

Nor is this all. When we consider the growing number and variety of large-scale and expensive programs in research and development that are judged to be important, we observe that increases in the number of these huge and costly efforts will make correspondingly large drains on both dollars and trained manpower. The scientific and technological effort in these large ventures will require even larger numbers of technicians and other skilled labor and run the risk of bringing about major dislocations in a host of other occupations.

Thus, barring some major disaster or other drastic change in circumstances, the country is headed steadily toward an accelerating general activity in science and technology, without adequate provision for the magnitude and the cost of the effort.

Even under the best circumstances, it is difficult enough to keep pace with an acceleration of this kind; if one falls behind, the cause is well nigh hopeless.

Perhaps this is being unduly pessimistic. One may well ask, does not the continuing upward trend in the numbers of trained scientific manpower mean that the country will indeed make the effort—that our citizens are already convinced? Superficially, such would appear to be true but actually it is the coming generation that has so decided. As always, it is the older generation that must make provision. It is here that efforts are thus far inadequate. There have been increasing signs of improvement, to be sure, but it is also clear that the rate of improvement is far less than the rate of expansion which is taking place. Those who point the finger at the Government must realize, moreover, that the Government cannot undertake to commit itself to any such large undertaking unless it has a clear mandate from the people. In the last analysis, then, provision for this apparently inevitable and essential trend must take place in an atmosphere of public understanding and public backing.

But let us look further ahead. The trends that have been mentioned obviously cannot continue indefinitely. There are obvious limiting factors: the national wealth; the gross cost of other national endeavors; the limit in number of those with capacity for higher education, for special advanced training, and for leadership. These are all factors worthy of study—indeed we need to know much more about the interplay of science and technology with the economy, and the degree to which technological innovations, such as automation, may aid progress. Even if we succeed in providing funds and facilities for maintaining only the present quality of instruction and training, we shall need to determine priorities of effort which are necessary to attain our objectives. And most important and baffling of all perhaps—a more precise determination of our goals. The excellent report of the President's Commission on National Goals published in 1960 makes this point very clearly.

For the long term, the educational process itself must be regarded as fundamental within this complicated framework. It is not sufficient merely to improve the quality of our present system. Recent studies of the content of elementary science and mathematics courses and certain other fields have shown, on the one hand, that much of the traditional instruction in these subjects is out of date and unnecessary, and, on the other, that young people, especially at an early age, are far more capable of mastering advanced subject matter than had been suspected. If this is true for fields other than mathematics and science, as it probably is, there is room for great improvement in the presentation of fundamental approaches to all disciplines. The conclusion is obvious: The educational process shows promise not only of being improved in quality but also of being accelerated. At the same time, there is a growing realization that the process of higher education and training should concentrate in its early stages on broad fundamentals and provide special training only for those who are unable to assimilate the more fundamental work.

Because of the rapid changes in our way of life and in the activities and associated careers which may become important in the future, it is difficult to anticipate the fields in which specialization will be needed. The rapid growth of the electronics and aerospace industries, for example, and the rise of nuclear engineering, space research, and automation are cases in point. Thus, the best basic education would appear to be a general one designed to enable not only professional groups but the labor force in general to adapt quickly to new situations.

Looking even further ahead: The accelerating pace will ultimately come up against the hard fact that the span of years required for the physical growth and maturing of an individual is still fixed. In order to progress, therefore, we must pay increasing attention to the nature and quality of training in the educational process. Our objectives during this period should be to provide the essentials to enable each individual to travel as far as possible along the path of his chosen career and to achieve an effective place in society. It is of particular importance to find ways of allowing those engaged in highly creative work, such as science, literature, and the arts, to enter upon their professions during their years of greatest creativity, which usually are their early years.

With these projections in mind, the ultimate question is:

Who needs to do what, and how? A first reaction is that science and technology are in need of better overall planning and management. Because these are national issues, the tendency is again to turn to the Federal Government.

One approach that is frequently mentioned is the setting up of some central organization designed to analyze the country's effort in science and come up with specific plans for the research objectives of the future, with special emphasis upon proper apportionment of funds and manpower in the light of necessary and desirable goals and their feasibility. Such a solution is simple in conception but runs at once into formidable difficulties.

In the first place, as related to basic research, such an enterprise tends to rely upon a highly managed form of economy inconsistent with our national policies and practices and one quite foreign to the best interests of progress in science. It is the sort of thing we criticize, in principle at least, in totalitarian countries. The attitude of the scientific community on this issue is specific and emphatic: The progress of science depends upon the personal initiative and independence of the individuals and groups involved in research. It thrives on variety and originality of approach in different environments—educational, governmental, and industrial. Support and a certain amount of leadership are required of the Federal Government, but not centralized direction and control. Diversity in the agencies furnishing support is highly desirable.

In the second place, if such planning is intended to analyze in detail the content of basic research in science and to determine in advance the most significant areas for support, its feasibility may be questioned. A continuing survey for subject content can only be handled effectively in decentralized fashion. To do it in a centralized way is an elaborate job which would require the continuous services of several thousands of persons. By the time such an organization reached its conclusions they would be largely out of date; the practical impossibility of keeping such review current is obvious. The reason for this difficulty is that decisions as to program content and priorities in science are not only continually changing but have to be dealt with in a subjective manner based on the current judgment of active research scientists. In a sense, it would be as unprofitable to attempt such forecasting for basic research as to prescribe for music or art the most promising themes for development. One should avoid at all costs the attempt to dictate for creative work. The best way to ensure intelligent planning in basic research is to provide every encouragement and support for rapid and complete availability and exchange of research information, such as by research publications, abstracts, conferences, and personal contacts.

Of course, in certain respects a degree of management does have to be exercised. Any institution has to plan and, to an extent, manage the programs that it feels it can undertake and even an individual often finds it necessary to choose the most feasible of several research opportunities. The larger the organization, however, the more important it is to broaden and generalize the perspective in order to permit independence of judgment and action; otherwise, planning and policy are in grave danger of becoming rigid and mechanical.

When it comes to development, however, the situation is different. Here it is entirely possible and indeed important to compare needs and priorities with trends and potentialities with respect to manpower, facilities, funds, and research findings. Excellent work of this sort is going on in many technical industries, and the Government has made progress in this direction through studies in the field of science and technology by the National Science Foundation, and in special areas by the President's Science Advisory Committee and the Federal Council for Science and Technology and by other Federal agencies.

It is considerations of this kind which have led the Foundation to undertake intensive, fundamental studies of the country's resources for science and technology—in consultation with the President's Science Advisory Committee and the Federal Council for Science and Technology—in the setting up of its Science Resources Planning Office.

Let us examine how the planning function is presently performed in the U.S. Government. At the highest level, science is now represented in the post of the Special Assistant to the President for Science and Technology and in the President's Science Advisory Committee, which is composed of outstanding scientists from outside the Government. In order to coordinate the research and development activities of the Federal agencies and departments, the President, acting upon the recommendation of the President's Science Advisory Committee, in 1958 created the Federal Council for Science and Technology. Membership on the Council consists of high-ranking officers of each of the agencies with major research and development programs.

The Special Assistant to the President for Science and Technology is available to the President at all times for firsthand advice, and thus he is in a position to know the situations in which science and technology are likely to have important bearing upon national policy. The President can turn to the President's Science Advisory Committee to provide advice on important questions in science and technology that relate to national issues of all kinds.

The function of the Federal Council for Science and Technology is to provide a forum for discussion among the agencies on matters of common interest, to achieve coordination on scientific programs involving more than one agency, and to exercise planning and policy roles in connection with governmentwide science and technology matters. For consideration of overall budgetary problems in research and development, the Federal Council and each individual agency can contribute its advice and counsel to the Bureau of the Budget and the President. Under present circumstances it appears that this administrative arrangement will be able to deal responsibly with the issues that arise, and to do so in a more satisfactory manner than would a single department. In any event, the arrangement has hardly been in operation long enough to permit a judgment as to its ultimate effectiveness or whether further changes may be needed.

The National Science Foundation, through its 24-member National Science Board, consisting of individuals distinguished in research, education, or public affairs, has responsibility for developing national science policy. Its deliberations are especially valuable to the Government in the area of government-university relations.

It should be noted, too, that the Government constantly has available to it on scientific questions the advice and experience of the National Academy of Science-National Research Council. The Academy-Council has always enjoyed close and friendly relations with the Federal Government and has worked cooperatively with it on a wide variety of projects in times of peace as well as war.

The question of central coordination and planning inevitably raises the question of policy—concerning which there has been much discussion. The insistent question is: What is our policy with respect to science and technology? Since one of the statutory functions of the National Science Foundation is the development and recommendations of national science policy, a statement may appropriately be made here regarding policy on the part of the Federal Government.

But, before answering that question, let us examine what is meant by policy.

What is the meaning of a national policy for science? Is it the same as policy for scientific research and education? If not, with what is it concerned? Does national policy mean the policy of the Federal Government, for the country, or in terms of its own activities?

Webster's New International defines policy as "A settled or definite course or method adopted and followed by a government, institution, body, or individual." By extension, this means the principles under which an organized group consciously and deliberately operates or aims to conduct itself and its activities. An essential element is awareness, that is, the planned and purposeful nature of the theory and practice of the activities of the organization. Thus, policy may run all the extremes between complete laissez-faire and rigid autocracy, but neither is policy unless planned and encouraged.

The programs of the National Science Foundation and its recommendations for the Federal Government incorporate policy in this sense; they have received careful and full consideration by the National Science Board, based upon staff studies, with frequent consultation elsewhere in government. A common practice has been to precede policy or program formalities with experimental or pilot projects to determine the most effective approach.

The major policies for the support of research and development are recognized throughout the Federal Government, and the National Science Foundation has taken a leading part in their formulation. For example:

The present policy of the Federal Government with respect to the support of basic research was formally announced in 1954 by Executive Order 10521. This establishes the degree of responsibility of Federal agencies for the conduct and support of basic research; in particular, it specifies that the National Science Foundation shall not be the sole source of support for basic research in the Government. At the same time that it encourages other agencies to conduct and support basic research, however, it limits their activities to basic research related to their missions, i.e., research that can be logically defended in their budgets.

As a next major policy point, responsibility for the planning, organization, and management for research and development is assigned to each Federal agency in line with its mission.

Research and development contracts with industry are clearly designed to assist the supporting agencies in meeting their objectives, but when the support of research at educational institutions is involved, it is general policy to define the research objectives in broad terms and to administer these contracts and grants in such a way as to permit the maximum degree of freedom and initiative on the part of the individuals or groups supported. This is generally true where the support is provided to an integral part of the college or university; it does not apply with the same force to the so-called research centers which are, in general, set up to accomplish a specific mission of interest to the Federal Government and managed by a university or other establishment.

The Foundation is unique in that it has no defined mission other than to support and encourage the progress of science in the national interest. Within the limit of available funds, it has, as a matter of deliberate policy, undertaken to support all the fields of science in a comprehensive way, the criteria for support being primarily the experience and competence of the research investigators and the significance of their research in the overall scientific effort.

In the conviction that most effective progress in science takes place when it is essentially determined by the nation's scientists, the Foundation's policy is to encourage and consider applications from individual scientists or groups of scientists for support in defined areas of research that may be broad or narrow. Then liberal use is made of individual reviewers, advisory panels, together with the statutory Divisional Committees, in order to obtain the best advice from the scientific community regarding the merit of the proposed research. Finally, the recommended projects under consideration are weighed from the standpoint of national interest and the degree of support by other Federal agencies.

In terms of the progress of science and the factors involved in overall planning, the first essential is to provide to the fullest extent possible for the needs of competent research workers in all fields of science and for the increasingly important interdisciplinary areas of science. In addition to advancing the progress of science on all fronts, such provision assures a steady stream of scientific manpower, fully equipped to meet general needs.

Superimposed on this broad coverage, particular areas of science may prove to be critical at a given time, either from the standpoint of progress and national interest in science, or because a more thorough knowledge and understanding of a field is important for planning purposes or for solving important developmental problems. Periodically certain areas of science require special attention in the form of symposia or conferences by research workers in the field, or in critical cases, a special study by leading experts whose purpose is to determine the need, feasibility, and scope of coordinated programs. Such critical areas may form the basis for study and special emphasis by the Foundation or other appropriate agency. Recent illustrations are the fields of oceanography and the atmospheric sciences.

In cases where a number of Federal agencies are involved, reports of such studies come up for consideration by the Federal Council for Science and Technology. The Council may then recommend as to the degree of government interest, the scope of the effort, the apportionment of responsibilities, and budget allocation for collaborative effort in an overall Federal program.

Special emphasis may also be necessary for the exploitation of certain fields in order to further the progress of applied research and possible development.

In the latter category belong, for example, the scientific research that underlies the development of weapons and devices of war, provision for the care and cure of disease or, possibly, the establishment of a new field of research important to the national economy. However, the problem of establishing priorities throughout all of research is feasible only through the current identification of a limited number of the most critical areas. This type of management planning depends upon such surveys and analyses of data and trends as may be practicable, coupled with a process of selection by scientists and science administrators in their own organizations.

At the present critical stage of our knowledge and understanding, selections have to be made upon a basis that is mainly subjective, i.e., by suitably chosen study groups for critical areas. The process is often most simply carried out by an organization or agency which is continuously occupied in the support of research and in following research accomplishments. Both of these characteristics are possessed in basic research by the Foundation and, also, in their fields of interest, by other agencies which support research.

The subject of national science policy and its supporting organization is and will continue to be a most important and challenging problem. A number of devices, including careful study methods for improving the speed and accuracy of survey analysis, modern techniques for dealing with masses of detailed information, and the use of methodology borrowed from statistics and communication theory, offer promise of even more effective solutions for the future.

Considerations of this nature have led the Foundation to set up an Office of Science Resources Planning which, in addition to coming to grips with short-range objectives, will start concentrated studies directed toward a solution of the more general problem. The objective is to determine what bits of information concerning science research activities, such as research in progress and the disposition of scientific manpower, are required and how these can be analyzed and presented in optimum form to serve as the basis for planning decisions. Such a system must include as an essential element provision for individual and local initiative and independence within appropriately restricted areas of research, and—in the realm of industrial activity—allowance for private initiative and competition.

CONCLUSION

Viewed in broad perspective, the whole matter of national science policy may be summed up as follows: For any nation, science and technology constitute an essential element of progress and, in particular, of national security and economic strength. For this country to exercise leadership in a competitive world, it is essential that policies and practices be developed along the following lines:

(1) The vigorous cultivation of science not only along the paths of foreseen objectives but also throughout its breadth and depth. In particular, this means thorough attention to the education and training of the scientists and engineers that will be needed. Fortunately, the present trend indicates that this goal is realizable, but only if as a nation we are prepared to provide funds and whatever is essential for the task.

(2) Among the possible developments that may result from science, careful attention must be paid to those that offer greatest promise in the accomplishment of our objectives. Such selectivity is important in maintaining a sound economy.

(3) A strong effort should be undertaken to educate our people to a general understanding of the purposes of science and technology, their potentialities, and their limitations in order that wise and intelligent use may be made of these capabilities.

But we cannot stop here. In an age where science has given us the key to unlock the energy of the atomic nucleus and has shown us the feasibility of escaping our planet and exploring the universe, we must understand that the capital discoveries of science are only just beginning and that science and technology will inevitably raise issues of the deepest social significance. All nations are convinced that their future is bound up closely with their progress and capability in science and technology. Among modern nations this capability is becoming general. Grim competition has developed along both military and economic lines. Onto this scene there enters a host of emerging nations, small and large, impatient to acquire the standards of living and the independence associated with science and technology. To solve these major problems and maintain any kind of equilibrium will require the utmost of all participants. Whether future developments take the form of stupendous power over nature's resources, of influence and control over life or over man's minds, or of traffic with our sister planets, they will certainly create problems of such concern to the human race that mankind must learn to cooperate in their solution.

Outstanding breakthroughs should not be permitted to become the subject of hostile competition nor to be exploited without adequate study of the possible consequences. The emphasis that has been given to nuclear development foreshadows potentialities of other possible undertakings, such as the ability to alter climate materially or to apply genetic research findings without proper safeguards and control. Although these developments have not yet been realized, they are well within the realm of possibility. This nation and all nations have a solemn obligation to maintain an awareness of such possibilities and to make certain that new developments are used constructively and in the interests of mankind.

ALAN T. WATERMAN,
Director, National Science Foundation

NATIONAL SCIENCE FOUNDATION

Program Activities

of the

National Science Foundation

SUPPORT OF SCIENTIFIC RESEARCH

Although the course of scientific progress cannot be predicted with much accuracy, we do know that it is dependent on the performance of research by competent scientists and engineers. Science supplies not only the information needed to solve specific problems but, more importantly, it opens up new opportunities which usually cannot be foreseen until the new knowledge is obtained. To insure such new opportunities, research support is required for the acquisition of new fundamental knowledge across the entire spectrum of the physical, life, and social sciences—basic research.

The National Science Foundation has as a primary function the promotion of basic research through providing the scientist with the support necessary to carry out his creative work—the equipment, the assistance, and the time.

Historically, the National Science Foundation has supported basic research primarily through grants to colleges and universities for projects proposed by the scientist, who would carry out the research. These projects include not only specific scientific problems, but also projects in coherent areas of science—extremely broad in scope. The latter may involve the work of a number of investigators in several related disciplines.

Funds for this kind of support increased in the 1961 fiscal year to $69 million from $62 million in 1960. However, requests for support increased much more rapidly to $256 million from the 1960 figure of $163 million.

This increase in applications reflected not only the expanding national effort in research and the higher cost levels, but also three other significant factors.

1. More scientists are turning to the Foundation for support.
2. The Foundation is being asked to support a higher proportion of the actual cost of performing research.
3. Scientists are no longer satisfied with inadequate equipment and assistance, but request support which will make their research efforts as efficient as possible.

The Foundation endeavors to keep informed of those areas of science which become critical because of major breakthroughs or because of national needs. In consequence, increased support has been made available for oceanography and atmospheric sciences. Among the most recent areas being surveyed are tropical biology and forestry research.

The Foundation has been assigned Government-wide responsibility for a number of national research programs. These are programs that are best planned, coordinated, and funded on a national basis and include weather modification, Antarctic research, and Project Mohole—the effort to drill through the earth's crust, into the mantle.

It has been apparent for several years that a "facilities gap" was developing in the national research effort because Federal funds have been channeled primarily into research operations, but have not usually been available for buildings and other permanent facilities. The Foundation in fiscal year 1961 therefore, made available $15 million for research facilities, including $8.5 million for construction and modernization of graduate research laboratories. This represents an increase over 1960 of about $3 million. Funds were provided for university computing facilities, oceanographic research vessels, specialized biological facilities, and the Hawaii Institute of Geophysics.

Although National Science Foundation policy in general calls for support of research in existing institutions, especially in universities, there have been three national research centers established, each a Government-owned facility operated under contract with a nonprofit corporation. These are the National Radio Astronomy Observatory, at Green Bank, W. Va.; the Kitt Peak National Observatory, at Tucson, Ariz.; and the National Center for Atmospheric Research, at Boulder, Colo. Support for the Centers totaled approximately $8 million in 1961.

The Foundation's programs for support of scientific research are administered through the Division of Biological and Medical Sciences, Division of Mathematical, Physical, and Engineering Sciences, Division of Social Sciences, Office of Antarctic Programs, and the Office of Institutional Programs.

Research Programs

BIOLOGICAL AND MEDICAL SCIENCES

CURRENT RESEARCH SUPPORT

The purpose of basic research in the biological and medical sciences is to gain an understanding of living processes which are to be found in both plant and animal materials. Historically, field observation, the dissecting scalpel, taxonomic analyses, and other classical biological and medical science techniques made it possible to describe the structure and function of living creatures on a macroscopic scale. In purpose, modern biological and medical research is similar to that which characterized classical biology, but it is vastly different in outlook, techniques, and procedures.

Current trends in the basic biological sciences relate to many factors, two being particularly significant: (a) a recognition that organic evolution is but a part of cosmic evolution, with the corollary interest in the history of living organisms and the origin of life as a part of cosmic evolution; and, (b) a fundamentally and drastically changed subject matter, with biological science inevitably moving in the direction of finer and finer units of living matter until it is now routine to deal with processes at the molecular level.

Of these two factors affecting biology, the first is important in that it establishes the setting and stakes out the extent of modern biological and medical science. The second factor, the study of processes at the molecular level, has recast the entire content of life science, has profoundly modified its techniques, tools, and research procedures and has restructured its relationship to other natural sciences. In dealing with processes at the molecular level, it has been necessary to develop the techniques of electron microscopy, micromanipulation and ultracentrifugation. For its experimental material, modern biological research requires preparations *in situ,* within the cell itself. As a result of these developments it has become possible to attack new problems by performing experiments of a type which could not have been envisaged a few decades ago, as for example, the study of successive links in cellular metabolism or the molecular structure of genetic material.

In performing its primary function of supporting basic biological and medical science, the Biological and Medical Sciences Division of the Foundation is organized in a manner which reflects this evolution in life science areas. From its inception the Division has been oriented toward research problems in contrast to orientation toward classical teaching disciplines. The Division encompasses the following eight areas: *molecular biology, genetic biology, developmental biology, metabolic biology, regulatory biology, environmental biology, psychobiology,* and *systematic biology.* This structure, when taken together, covers the total spectrum of basic biological and medical science on a "functional level" basis, ranging from "classical" biology to the most modern experimental problems.

Molecular Biology

The Molecular Biology program is concerned with studies of the molecular structure and function of living substances and the physical and chemical changes which occur in these substances within the life processes. The limits are difficult to define because molecular biology is the connecting link between the two broad disciplines of biology and the physical sciences. In physiological terms, the program is concerned with aspects of muscle activity, transport, membrane and bioelectric phenomena, replication, photobiology, immunochemistry, perception, secretion, biogenesis, and geochemical influences, all on the molecular level.

Theoretical and technical advances in physics and chemistry have been of prime importance in the development of this area. Electron microscopy, X-ray diffraction analysis, mass spectrometry, ultraviolet and infrared spectroscopy, radioactive measurements, nuclear magnetic and electron spin resonance, and ultrasonic techniques represent a few of the practical contributions of physical sciences to molecular biological studies.

The major portion of the program deals with molecular structure, the biokinetics and thermodynamics of such compounds as proteins, polysaccharides, and the nucleic acids. The complexity of the proteins, due to the number, size, and arrangement of the amino acids, has presented formidable problems. Recently several biologically active polypeptides containing up to 23 amino acids have been chemically synthesized. Similarly, relatively large molecules such as ribonuclease have been degraded and analyzed chemically by the techniques of Singer so that now we at least know one amino acid sequence. Research in this field consists largely in examining parts of the molecules, probable arrangements of these parts in individual proteins, and the chemical and physical behavior of the intact protein.

Polysaccharides comprise another large group of macromolecules; they consist of the carbohydrates, cellulose, starches (both plant and animal), the dextrans of yeast and bacteria, the levans, galactoses, and mannoses, and many others widely distributed in nature. Many polysaccharides are immunologically specific to man and studies are underway to find out more about antibody formation in reactive sites, chemical interactions, and molecular configuration. The nucleic acids include desoxyribonucleic acid (DNA), the stuff of heredity, contained in the nucleus and thought to bring about the synthesis of ribonucleic acid (RNA) molecules which contain the specific genetic configurations. The mechanisms in the transfer of the genetic or hereditary material is the central theme of molecular biology. One investigator recently has determined that one strand of DNA, a double helix molecule, can form a hybrid helix with one strand of RNA, suggesting a possible transfer mechanism. The chemical likeness or differences of the basic composition of DNA of various organisms from simple to the more complex is another type of study being carried out. Systematic knowledge such as this should provide fundamental information on organic evolution and on the way the basic genetic components are put together.

Next in area of concentration are the investigations dealing with bioenergetics, biosynthesis, photobiology, and immunochemistry. All living matter depends upon electron transport systems for converting energy into a chemically utilizable form. Energy conversion systems all have in common a series of oxidation-reduction reactions. Free radicals obviously play a significant role in these reactions. Studies of how they do so and the determination of substrates involved are being pursued. Photobiological studies include the role of vitamin A in vision, the function of the photosynthetic pigments in plants, and the mechanisms of bioluminescence and fluorescence. Immunochemistry deals with studies of the antigen-antibody reaction, of the forces involved in the very specific interactions, and of the autoimmune response.

There are significant studies in enzyme conjugates, viruses, and membrane structure. All cells contain units called mitochondria which contain many enzymes, enzymes mostly concerned with converting food energy to a form the cells can use. These conjugates are being studied cytochemically to determine the sites of action for oxidative enzyme activities. Other investigations underway include the origin of new mitochondria, their interrelations with other cell structures, their role in the synthesis of proteins, and in electron transport. Viruses are being studied not only because they are composed of the "basic units" of life and so may shed light on structure of life matter but also because such studies may supply information about the mechanism of replication. Membrane structures of such organelles as mitochondria, microsomes (RNA-carrying particles), and cell walls are all basic to studies of the unit particle of life substance. There are a few scattered studies dealing with the electrical charges involved in membrane transport, the phenomena involving locomotion, the origin of life, biological coding, molecular morphology, replication, and theoretical biology. The program shades off into such areas as geochemical influences, nerve condition, sensory perception, and neurosecretion.

Genetic Biology

The Genetic Biology program is charged with the support of studies on the nature and organization of the genetic material and its replication, mutation, recombination, and transmission; the nature of the genetic code and the transfer of coded information to primary gene products; gene action and its regulation; gene interaction; origin of somatic cell differences; genetic processes in populations and the operation of evolutionary mechanisms; and the analysis of continuous variation.

Scope of the research support is illustrated by the following areas in which research projects have received new or continuing support during the past year.

Among the most challenging problems of present day genetics are those of unorthodox inheritance in higher organisms. Grants have been made for continued support of work on the phenomenon of paramutation and for the study of exceptional (noncrossover) derivatives of a complex locus in maize. Other work on complex loci includes the study of the "dumpy" locus in Drosophila. Fine structure is being mapped and attention is being given to the processes of recombination with regard to "conversion" and "negative interference." Parallel studies compare chemical and radiation mutagenesis at this locus.

Projects directed at improving our understanding of chromosome structure and stability have been supported by grants to investigators making a broad attack on the problems of metabolic control of mutation processes, the organization of the genetic material at the chromosomal level, the relationship between DNA and protein in the chromosome, and mechanisms of replication and recombination.

Support has been provided for work on the molecular basis of chemical mutagenesis in bacteriophage, for studies on the relationships between genetic changes and changes in the structure of viral protein, and for studies on episomic elements in bacteria in relation to the control of enzyme synthesis; also for the very promising work on nuclear, cytoplasmic, and environmental control of immobilization antigens of Paramecium, and on the nature of the structural changes which alter the biological properties of these proteins.

Grants have been awarded for developmental genetic studies on the control of pattern in various mutants affecting the development of sex combs in Drosophila and on sex differentiation in vertebrates.

In the areas of evolutionary and population genetics, continued support is being given to a productive project, studying evolution in the genus Gossypium (cotton). Another project, using data collected in Hawaii, is concerned with the estimation of genetic load in first and subsequent generations following racial outcrossings in humans; it is also studying the contribution of lethals and detrimentals to genetic load in a laboratory population of Drosophila.

Of the work that is being supported in quantitative genetics, particular note may be given to a project using two systems of selection for a quantitative trait, involving different levels of inbreeding. These studies will provide a basis for predicting the results of selection for quantitative characteristics under various conditions, and will add to the understanding of the nature and stability of gene complexes under selection. Another project aims at the development of sampling plans that will enable the investigator to evaluate the possible effects of interaction between loci and the effects that linkage may have on quantitative characters being subjected to genetic analysis.

The support of work in mammalian cytogenetics includes two projects—one concerned with mammalian heterochromatin and with trisomy in mammalian cells in tissue culture, the other with sex-determining mechanisms in mammals.

Research in behavioral genetics is also supported through this program. Grants have been made in this area for the continuation of promising studies of genetically determined variation in alcohol preference in mice and for a conference on behavioral genetics to help the behavioral geneticists bring the problems of their emerging field into sharp focus.

Two other grants of special interest may be mentioned. One is assisting in the development of Chlamydomonas as a genetically useful organism for studies of problems of recombination, gene action, etc.; the other is assisting a Nobel-laureate physicist in undertaking research in molecular genetics.

Developmental Biology

Research supported by the Developmental Biology program has as its objective understanding the principles governing the processes of cell division, growth, and tissue transformation, as these are involved in development. To accomplish this, studies on differentiation, defined as any regularly predictable protoplasmic change, are undertaken in all forms of life, exploiting technical advances made in many scientific disciplines. These studies inevitably involve the interactions of the intrinsic machinery of the cell with its genetic endowment and with extrinsic factors in the cellular environment.

Developmental biology at the organismal level includes microscopic and macroscopic changes in morphology during the life history of the organism, starting with the zygote and ending either with fully differentiated germ cells (from which originate a new generation of zygotes) or with *ante mortem* changes (terminating a generation). For example, development of individual muscles in closely related species of amphibia is being studied in an effort to demonstrate evolutionary and taxonomic relationships. Detailed descriptions of a parasitic trematode demonstrate striking cellular transformations during a single complex life cycle. Growth of leaf primordia at the tips of developing plant stems has been analyzed numerically and a model has been programed for testing in a computer. Development of asymmetry in the wing of the chicken has shown that a 12-hour determination period plus a 3-day latent period precedes cellular morphogenesis. Study of plant cells indicates that unique orientation of cellulose fibers deposited inside the walls apparently explains expansion of this rigid system during growth.

Developmental biology at the cellular level includes tissue and cellular changes that can often be causally associated with cellular interactions or morphological effects of products of one cell type upon cells of a different type. Characteristics of the induction phenomena are commonly studied on the basis of metabolic interdependency of cells. For example, cells of different types when put into a prepared mixture of cells appear to be capable of correctly assorting and adhering to those of their own type. Prior to this, however, cells have an alternative type of behavior, i.e., cells of a given type in mixed culture can become transformed into an alternate type. Patterns of movements of cells in the early, two-layered stages of development of the chick have shown that the anterior-posterior axis and bilateral symmetry of the embryo is established during the first few cell divisions of the fertilized egg. Tissue interactions (induction) have shown that (a) morphogenesis of prospective cartilage cells is directed by an influence emanating from the dorsal neural tube, (b) to be effective, the responding cells must have at least 14 hours of exposure, and (c) morphogenesis into cartilage cells occurs 3 days after the exposure.

Developmental biology at the subcellular level hopes to delineate intermediary biochemical pathways associated with differentiation. Developmental biologists today study fine structure, subcellular particles, macromolecular compounds, cytoplasmic duplications, chromosomal differentiation, immunological specialization, enzyme patterns, DNA-RNA-protein relations and synthesis of proteins. Biochemistry, intermediary metabolism, and ultrafine structure have become particularly active areas for investigating developmental biology.

Illustrative of the research being supported at the subcellular level are cytochemical studies on proliferation and synthesis of DNA in cells of the onion root tip that have shown that during irradiation, DNA synthesis is actually stimulated in spite of mitotic inhibition. Such studies on cytochemical deviations during development will enable scientists to make distinctions between synthesis, replication, and mitosis. Nucleic acid metabolism during early development of the frog has shown that both the nucleus and the cytoplasm of the frog egg contain hundreds of times more DNA and RNA than ordinary diploid liver nuclei. Furthermore, there is more than one type of RNA in the egg, as determined by solubility studies and by base ratios. Discovery of the relation of these unusual nucleic acids to early development will be most enlightening. Studies on cell division are exploiting a plant tissue in which cell divisions are predictable and synchronized. A hypothesis is being tested that deoxyribosides serve as active components of metabolic processes during preparation for cell division before the ribosides are passively incorporated into duplicated DNA for the daughter cell. The inductive influence of the nervous tissue on differentiation of precartilage cells has shown that a small nucleotide complex has the specific capability of transforming the responding cells. This is one of the best examples of progress being made on detecting the chemical basis of an embryonic inductor. Experiments with RNA have shown that labile cells can be converted to the type from which the RNA was taken. Although the interpretations have been questioned, the basic finding remains unchallenged and these studies have far-reaching implications concerning the chromosomal control of differentiation.

Electrophoresis of embryonic tissues has shown that certain proteins, although classifiable as a single enzyme, can be separated both by electrophoresis and by reactions with substrate analogues. These enzymes, labeled "isozymes," differ from tissue to tissue in the animal and change with time during development indicating genetic control of changing isozymes during differentiation. Nuclear control of enzyme synthesis is being studied as a sequel to the classical experiments on morphogenesis in Acetabularia. Species differences exist with respect to phosphatase enzymes found within the cells, and in at least one species the synthesis of this protein enzyme remains under control of the cytoplasm irrespective of the type of nucleus in the cell.

Metabolic Biology

The object of research in the Metabolic Biology program is learning to understand the processes by which the materials that living things are composed of are built up and broken down. Enzymes are the so-called living catalysts which carry out these processes. All information concerning control of the rate of enzyme function, and the conditions under which these catalysts work, fall within the province of metabolic biology. Thus, studies of carbohydrate and lipid metabolism, nucleic acids and protein synthesis, hormone synthesis and metabolic action, immunology and infection, role of cofactors in metabolism, bioenergetics, photosynthesis, amino acid synthesis, and virus-host relationships.

Examples of current research are investigations of the role of nucleic acids in specifying the synthesis of proteins. One such project involves the use of pyrimidine analogues as a means of altering the coding pattern during the synthesis of nucleic acids. Another area of research which promises to enhance substantially our understanding of the relationship between enzyme sequence and structure involves the reconstitution of the complex enzyme systems which occur as morphological entities in most living systems.

Other promising areas of research are those attempting to elucidate the synthesis and mechanisms of actions of antibodies, complements, and related substances which are fundamental to a genuine understanding of the basis of resistance to infection, allergic reactions, and tissue transplantation problems.

Research is also being supported on control and regulation of enzyme synthesis and activity. One grantee is investigating control of penicillinase synthesis by examining conditions affecting formation of a repressor of the enzyme.

Regulatory Biology

Regulatory Biology deals primarily with research on whole organisms and their organ systems and on the regulatory systems which control their behavior. It includes most of what may be termed classical plant and animal physiology, as well as, considerable research in pathology, nutrition, and transport of materials. Research in endocrinology, plant hormones, and neurophysiology forms an important part of the program. Organisms studied vary in size and complexity from bacteria and one-celled algae to birds, camels, and humans, and the methods used are equally diverse. Perhaps the scope of research can be shown most clearly by some examples of projects being supported.

Aid is being provided for work on the regulation of intake of food (eating), breathing, and body temperature in animals. Attempts are being made to localize the region of the brain which controls eating and drinking by stimulating or destroying certain areas and observing the effects on intake of food and water. Apparently the control center is located in the hypothalamus. Another investigator is attempting to learn how changes in carbon dioxide concentration of the blood produce signals in the brain which affect muscles of the chest and diaphragm and regulate the rate of breathing. A study also is being made of control of breathing at low and high altitudes to learn how adjustments are made to exercise at high altitudes.

There is continued interest in the factors controlling migration of birds and the methods by which homing pigeons and other birds orient themselves in flight. Research is underway on the physiology of salmon and other fish that migrate to certain streams to spawn. Several studies of the structure and endocrinology of the reproductive organs of birds and animals also are being supported.

Research on nutritional problems of both animals and plants continues to be active. Several investigators are attempting to grow such diverse organisms as nematodes, rotifers, and snails in axenic cultures (cultures of known composition). Another investigator is attempting to grow mites (red spiders) on artificially prepared media to learn more about their nutritional requirements. The existence of a previously unrecognized growth factor for guinea pigs in leafy vegetables was established and its exact nature is now being investigated. A number of interesting studies of feeding habits of insects are in progress. Some are intended to learn why a certain kind of plant is eaten while another kind is avoided; one study involves an attempt to change the feeding habits of the insects by selection through several generations.

There is increased interest in pathology, particularly plant pathology. Several investigators are attempting to learn why some varieties and species of plants are more resistant to pathogenic fungi than others. This problem has been studied for at least 75 years without much success, but the development of modern biochemical methods has renewed interest in the problem and raised hopes of more rapid progress. Causes of resistance to nematodes and other parasites are also under study.

There has been a definite increase in proposals dealing with research on plants during the past year, especially research on trees. Currently supported research on trees includes investigation of the effects of water supply on growth and cell structure, effects of water balance on photosynthesis, dormancy, and geotropism. Some progress is being made in explaining differences in cold and drought resistance among various species of plants. The mechanism by which length of day controls flowering is under study and attempts are being made to isolate a flower-inducing hormone.

Several new projects were supported on transport of materials in plants and animals and the uptake of ions by cells. Among the numerous other projects being supported are studies of salt secretion by animals, water and heat balance of camels, diseases of insects, symbiotic relationships between bark beetles and associated fungi, relation of composition of guttation liquid to fungus spore germination, response of algae to gibberellins, diurnal rhythms in photosynthesis, and biolectric potentials in plant cells.

A number of the projects supported by this program make use of single cells or bits of tissue, merely as a means to an end. The general objective of such research is to increase our understanding of the regulatory mechanisms which integrate the complex of processes and transform an aggregation of cells and tissues into an organism.

Environmental Biology

Living plants or animals, including man, are sometimes defined as being self-regulating and self-perpetuating physicochemical organisms striving to attain equilibrium with their environment. Everything and every force external to the organism must, in the final analysis, be considered to constitute its environment; none can escape from an environment, each is influenced by it throughout the entire life period, and, in turn, each has an influence upon its environment.

The gross relationship between the environment and the organism is quite evident in almost every field of biology. Energy, without which life cannot exist, is derived from the environment; physiological processes are influenced, directly or indirectly, by environmental fluctuations; factors of the environment influence growth and development; external forces and substances affect the sensory mechanisms of animals and plants; genetic systems of organisms are influenced by environmental isolation; behavior reflects a response to factors of the environment; variations in environmental conditions have produced the present distribution of animal and plant life; and, various features of the environment have influenced the survival of organisms, thus forming the natural selection basis for the evolution of living systems. Thus, the field is broad and covers or impinges upon a number of inter-related areas of biological interest.

One area of investigation supported through the Environmental Biology program is that associated with the interdependent phenomena of energy systems and biological productivity. The efficiency of an aquatic system, as measured by the level at which energy of sunshine is utilized by plant life (primary producers) and transferred to the first groups of animal consumers, is illustrative of currently active studies of this nature. Another investigation of energy systems is concerned with the primary productivity and nutrient cycle of a grassland ecosystem as related to variations in rainfall, temperature, and length of growing season.

The largest single category of research efforts supported by the program continues to include those pertaining to the biological and physical factors in the fresh water or marine environment which influence the distribution, abundance, growth, and reproduction of all life forms contained therein.

Because certain organisms are identical or closely related to fossil forms, analyses of the relationship of modern plants and animals to existing environmental conditions permit us to speculate with some assurance relative to the conditions under which the earlier forms lived. The use of pollen chronology to interpret the vegetation and, thus, the climate of earlier geological periods may be subject to several sources of error. A study initiated recently is expected to reduce one type of error and lead to the development of a new and more readily interpretable method for expressing the frequency of fossil pollen in sediments. The research is also expected to provide considerable information on the relationship between present vegetation and the quantity and nature of pollen now being deposited in sediments under certain conditions.

Another very dynamic and challenging area of research receiving the attention of the program is that involving population ecology. Of special interest are the studies involving the use of mathematical models to demonstrate population theory and to predict population growth, a necessary intermediate step in the application of such theories to situations in the field. These introductory investigations may lead to the use of advanced electronic computer techniques for the analysis of population control mechanisms.

Although the taxonomic positions of many organisms have been well established, the details of their life histories are frequently not as well known. The program, therefore, continues to provide aid for life history analyses of a variety of animal forms, including mollusks, insects, fish, and turtles.

Studies of animal behavior and orientation have been greatly assisted in recent years by the utilization of electronic techniques. The use of miniature radio transmitters for continuous identification and location of animals has made possible the collection of information on heretofore obscure aspects of life history, behavior patterns, and population phenomena. Quantitative analysis of nocturnally migrating birds using radar techniques are being made in order to establish the course, speed, and numbers of such birds at different times of the year and to ascertain their responses to different weather conditions.

A large part of the program is devoted to general studies of the responses of animals and plants to their external environments. One group of these projects involves a study of the physiological mechanisms underlying the relationship of the organism to its environment, for example, the organism's response to magnetic and other physical fields, photosynthesis and respiration of alpine plant communities, and the climatic stress effects on desert vertebrates.

Psychobiology

The Psychobiology program embraces the biological aspects of psychology and many of the behavioral aspects of zoology. Its focal point is behavior. Some investigators seek neurological correlates of behavior; others study uniformities of behavior in such areas as learning, without regard to neurological aspects. Some concentrate on psychological responses to stimulation; others seek to link these responses to sense-organ structure and function. Some confine themselves to laboratory studies; others concentrate on field observations of behavior. These varied approaches to behavior reflect a variety of traditions within psychology and zoology. Each has developed a substantial body of information and of research techniques. Equally important are the many efforts to adapt the findings and techniques of a number of approaches to specific problems.

Approximately one-fifth of the grant awards in the Psychobiology program involve some field work in animal behavior (usually with some laboratory experimentation as well). The remaining four-fifths are laboratory studies, about equally divided between human and nonhuman subjects.

Four examples suggest the kinds of research being supported in the general area of animal behavior. One study deals with the genetic basis of behavior and the effects of experience on the development of behavior in the African Parrot genus Agapornis. Another study is concerned with the evolution of structure and behavior patterns of nyssonine digger wasps. An experimental analysis of homing behavior in field mice is being made in the hope that the findings will contribute to the understanding of the physiological basis of homing behavior in a wider variety of forms. Advanced techniques of sound recording and analysis are being used in a study of Galapagos finches.

Among the laboratory investigations, work on operant behavior and reinforcement continues to be prominent, both as a direct object of study and as a technique for exploring such problems as the sensory capacities of animals. One investigator will seek to determine which reinforcement patterns lead to the most efficient learning and retention. He will also examine the extent to which performance schedules and interactions among them will explain "choice" and "decision making." Another investigator is continuing his work on reinforcement and resistance to extinction, concentrating attention on the licking response, which has proved to be a productive research tool. In a new pilot project, instrumental conditioning techniques will be used to determine the feasibility of obtaining comparable data on color and brightness vision for several species of fish.

Within the general area of physiological psychology, one investigator is examining neurophysiological mechanisms of attention and learning by recording from implanted electrodes and by studying the effects of the removal of critical areas of brain tissue. He hopes to gain further insight into such problems as the modifications induced in sensory information arriving at the cortex due to repetition without reinforcement, to reinforcement by combination with new sensory input, or to reinforcement by activation of hippocampus and/or brain stem. Another investigator is studying the major characteristics of aversive autonomic nervous system conditioning, using a curarization technique which allows him to study autonomic conditioning in dogs whose skeletal musculature is immobilized. The function of taste cells is being examined with special attention to the effects of growth, aging, and degeneration on sensory functioning. Other studies deal with biological clocks, self-regulatory functions, and the relations between thalamic connections of the auditory system and behavior.

A substantial number of investigators are studying problems of human learning, perception, and thinking. Illustrative projects include research on mediated generalization in human conditioning and performance, experiments on the consolidation time or development time of a visual percept, an examination of context effects in relation to auditory and visual perception, an approach to problems in the visual perception of shape in terms of communication theory, and a series of studies within the framework of information theory to investigate some implications of the generalization that choice reaction time is proportional to transmitted information. Several research workers at one university are exploring the basic processes of human learning, seeking to extend and refine the methods used in investigating human learning, and to develop increasingly close links between the psychology of human learning and neighboring disciplines such as psycholinguistics and statistics.

Systematic Biology

In his recent book, PRINCIPLES OF ANIMAL TAXONOMY, G. G. Simpson points out that "Systematics is the scientific study of the kinds and diversity of organisms and of any and all relationships among them." The program for Systematic Biology provides support for research in the systematics of numerous kinds of plants and animals, both living and extinct, that occur in widely diverse habitats. Research activities are not limited by geographic or national boundaries; they extend to remote areas of the world and treat a wide variety of subjects. As is evident from the description of the Division's program, which follows, subjects investigated range from fishes of the South Atlantic to small mammals of the Scilly Isles, from the land flora of the Antarctic continent to the flora of southern Brazil, from Carboniferous bryozoans of the Ukraine to Pleistocene mammals of Colorado.

No living or fossil organism is excluded from systematic attention. Studies by 170 or more specialists, reported in the TREATISE ON INVERTEBRATE PALEONTOLOGY, are making available to paleontologists, zoologists, and geologists a comprehensive and up-to-date treatment of fossil invertebrates, including their phylogeny, morphology, ecology, and distribution. Investigations on the growth stages of extinct Mesozoic tree ferns are helping to clarify the taxonomy of this group as well as to give a dynamic picture of "fossil life." Morphologic evidence from the flowerlike cones of these plants may indicate whether the tree ferns are ancestral to more advanced plants. Rocks of the Beaufort series of the Karroo region of South Africa yield one of the best fossil records in the world of later Permian and Triassic terrestrial vertebrate life. Recent field work in the Beaufort series has resulted in an outstanding collection of at least 188 specimens of mammal-like reptiles. This collection will be available in the United States for study and comparative purposes. These specimens will allow further consideration of diversity and adaptation among these reptiles, as well as serve for anatomical reference in studies of other reptiles or of mammals.

As man penetrates more deeply into the oceans and ocean floor and as interest in the atmosphere grows greater, the systematist finds an ever increasing need for his knowledge and skills. Research on zooplankton and other marine invertebrates, marine bacteria, and algae becomes increasingly significant. The snapping shrimps are among the most commonly occurring crustaceans on coral reefs of the central Pacific. They have attracted considerable attention in recent years, not only for the sound they produce but more importantly for their interference with submarine radar. Some of these occur in a diversity of habitats and others are limited to extremely narrow ecological niches, making them excellent subjects for studies of distribution and speciation. Field and laboratory investigations, including study of the reproductive apparatus and embryo sporophyte, are helping to clarify relationships among marine algae of South Africa. More complete information on these algae will contribute to research studies on seaweeds throughout the world by facilitating comparative investigations.

Systematists are constantly striving to achieve a natural basis for classification rather than an artificial grouping of organisms that tends to obscure relationships, and they employ many different approaches to this end. The classical approach usually involves studies of morphology and distribution. Monographic treatments and revisions of families, genera, and species of plants and animals are a culmination of such studies. Sample research projects of this sort are in progress on Embioptera, web spinners of tropical Asia; caddisflies of the world; North American species of mushrooms; marine red algae of Pacific Mexico; and Orthoptera of North America.

Knowledge of life cycles also may be of systematic value. Except for a few incomplete investigations, the observed facts about eggs of various orders of insects have not been correlated with systematics. Examination of moth eggs of 50 species, representing 10 families, shows distinct differences and that evidence from the eggs can be utilized in determining relationships among moths. Behavorial characteristics have a use in systematics. Relationships among the New World tyrant flycatchers, which are morphologically rather uniform but extremely varied adaptively, are being investigated through behavior patterns.

Biochemical techniques also offer much in the way of clarifying certain phylogenetic problems. Early serological studies showed that the degree of similarity between the proteins of animal species can be of value in determining relationships. Electrophoretic and other chromatographic studies on egg-white proteins are now under way in an attempt to determine relationships among various groups of birds. Considerable attention is being focused on the hawks, eagles, and their allies, and on the passeriforms (perching birds). Often the protein studies confirm evidence for relationships based on anatomical and other findings, but where other evidence is equivocal, they may throw light on the true relationships. Chromatographic approaches of phylogenetic importance are being applied also to plants. The biochemical constituents of legumes of the genus *Baptisia* are being correlated with morphological characters. Some hybrids between species of *Baptisia* show a recombination of the biochemical constituents of each parent. In the case of these hybrids the biochemical expression is quantitative. Genetic studies on biochemical inheritance are being correlated with the systematic approach, and possible environmental effects on the biochemical constituents of the plants are being considered.

A major trend in evolutionary research has been an increasing recognition of the importance of the population as opposed to the individual as a basic unit for systematic study. This recognition has led to emphasis on the study of variability in populations. Wild and laboratory populations of small mammals are studied in attempts to estimate the relative contribution of genetic and nongenetic factors in variation. The variation in a large sample of Pleistocene rodents from Florida is being compared with that in living rodents. The studies are contributing to an understanding of the taxonomic position of the Pleistocene forms as well as to a determination of the rates of evolution of selected traits and of modes of speciation.

The use of digital computers has entered systematics as well as many other fields of endeavor. Pioneering work in numerical taxonomy has been undertaken in order to establish the methodology and gain the experience necessary to make the methods reliable. Although early studies have dealt mostly with taxonomic problems in insects, the methods being developed should prove more general in application. This new numerical approach to taxonomy is controversial, but it will lead to a re-examination and re-evaluation of all methods used in systematics. Further, it may become accepted as an additional tool in determining the relationships among organisms and in understanding their evolutionary development.

Short-Term Research by Medical Students

Under this program grants are made on a merit basis to medical schools for the purpose of providing stipends to support the research of appropriate students during their free summer (or other) periods. The objective of this program is to give capable and well-motivated students an opportunity to undertake basic research and thus to assess first hand their interest in research careers. Criteria for evaluating proposals submitted by the various medical schools include initiative of the school in developing and seeking support for its student research program and in encouraging basic research among its staff, quality and effectiveness of student programs now in operation, and demand for stipends in relation to local funds available.

During the 7 years in which this program has been in existence more than 2,000 stipends have been provided through 116 grants to 70 different medical schools. The size and vigor of student research programs have increased markedly during this period as has the number of medical schools undertaking such special training for their students.

SIGNIFICANT RESEARCH DEVELOPMENTS IN THE BIOLOGICAL AND MEDICAL SCIENCES

AMINO ACID SEQUENCE OF TOBACCO MOSAIC VIRUS PROTEIN DETERMINED—Tobacco Mosaic Virus or TMV is made up solely of RNA and protein. The RNA contains all the biochemical information necessary for replication and synthesis of the structural protein. The amino acid sequence of TMV has recently been determined by an investigator working under a Foundation research grant. This protein is made up of subunits consisting of 158 amino acids and except for a few minor details the order of these residues in the protein molecule has been determined. This is the first viral protein whose amino acid sequence has been worked out. It is also the longest.

It should now be comparatively easy to study the effects which alterations in the RNA structure have on the amino acid sequence of the protein. This type of approach will help to solve the problem of how nucleic acids code information and thus control the genetic makeup of living cells.

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GUTTATION WATER HAS EFFECT ON SPORE GERMINATION—There is little or no correlation between differences in disease resistance among plant species and growth of the causal organisms on extracts prepared from tissues of resistant and nonresistant plants. However, recent experiments have shown that spores of the ergot fungus germinate readily in guttation (droplet) liquid from rye which is susceptible to the fungus, but do not germinate or grow well in guttation water from wheat which is resistant to the ergot fungus. The guttation liquid, which exudes through pores at the tips of grass blades and along the margins of other types of leaves, is water forced out of the xylem by root pressure. This liquid seems to be more representative of the environment encountered by germinating spores as they penetrate leaves than extracts prepared from ground leaf tissue. If the differences in resistance to the fungus can be correlated with differences in composition of the guttation liquid a significant advance will be made in our knowledge of the biochemistry of disease resistance.

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UNBROKEN DNA MOLECULES PHOTOGRAPHED SUCCESSFULLY FOR THE FIRST TIME—The study of the detailed structure of deoxyribonucleic acid (DNA) is one of the central problems of molecular biology. Previous attempts to obtain clear-cut pictures of DNA molecules by electron microscopy failed because of two technical problems in the preparation of specimen material. Both have been overcome by an NSF grantee and his coworkers. The first, the obtaining of whole length specimens, was accomplished by passing a plastic film with weakly basic ion exchange properties through a solution of DNA. The technique produced long and parallel unbroken molecules stretched out on a supporting membrane. The second, a suitable staining method to make the molecules distinguishable, was done by interaction of Uranyl salts with DNA. This produces a much more faithful representation of the DNA molecule than "shadowing" has been able to do. As a result of this study, unbroken DNA molecules have been photographed successfully. Heretofore, scientists have been able to determine when mutations occur in genetic materials but have been unable to pinpoint the sites of such defects. This development may well hold the answer.

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SUCCESSFUL SYNTHESIS OF ACTH-LIKE COMPOUND—For the past 10 years hundreds of chemists have been trying to solve one of organic chemistry's most difficult problems—the chemical synthesis of a compound with all the biological properties of ACTH (adrenocorticotropic hormone). An NSF-supported investigator succeeded in this task.

ACTH is produced by the pea-sized pituitary gland at the base of the brain and seems to be a hormone's hormone. When it is carried by the blood to the adrenal cortex it stimulates the production of many other hormones that regulate vital functions of the body. The great difficulty in its chemical synthesis has been that ACTH is a protein, a long chain of amnio acid groups linked together like a phrase in telegraphic code, which had to be reproduced in proper sequence and special arrangement. The synthetic copy has only 23 amino acid groups as opposed to 39 of the natural ACTH, but this part of the chain seems to function biologically as well as the whole.

Knowing how to synthesize ACTH will make possible a clarification of the role of the pituitary gland in stimulating the adrenal cortex to produce cortisone and other steroids. Also, the structure can be changed more easily to obtain different biological properties. Finally, the synthesis techniques employed may be used to make other complex polypeptide molecules.

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LIGHT-EMITTING COMPOUND IN FIREFLIES SYNTHESIZED—Bioluminescence is an enzyme-catalyzed chemiluminescence in which oxygen acts as an electron acceptor. So far as an NSF-supported group of investigators can determine, the requirements for bioluminescence are an ionizable substrate (luciferase) which can form a peroxide addition, molecular oxygen, and presumably a fluorescent product molecule (luciferan). In the examination of the light-emitting system of the firefly attempts have been made to isolate and purify the reacting components, to identify the end products and possible intermediates, and to understand the mechanism of the conversion of chemical energy into light energy. The group recently has been able to establish definitely the chemical structure of luciferan and has completed the synthesis in the laboratory. The ease of acquiring this compound will allow an extensive quantitative study of these substances during light activation.

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NUCLEOTIDES PLAY KEY ROLE IN CELL DIFFERENTIATION—Conspicuous features of the early vertebrate embryo are the mesodermal segments or somites that form as a parallel row on each side of the spinal cord. Most of the cells within the somites have alternative fates, they or their daughter cells are destined to differentiate into either muscle or cartilage cells. It is known that the embryonic spinal cord is capable of directing these cells to forego their muscle-forming potentiality and to become cartilage cells. This directive influence of the spinal cord has been carefully studied and, for example, one can now state when and for how long this influence must be exerted in order to bring about differentiation into cartilage. Recently a cartilage-inducing factor specific to the spinal cord has been isolated by a National Science Foundation grantee through chromatography and found to be a relatively small nucleotide complex. The exciting feature of this and comparable research is that we are getting close to understanding one of the enigmas of modern biology—although embryologists have noted the similarities of different kinds of embryos and embryonic processes, no data exist to explain the mechanism by which two similar embryos are made to diverge so that one invariably becomes a mouse and the other a man. The fact that nucleotides may play key roles in embryology, as well as in genetics of determination, constitutes a major advancement in basic knowledge.

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COBALT ESSENTIAL FOR GROWTH OF NITROGEN-FIXING BACTERIA FOUND IN LEGUMES—Biological nitrogen fixation is a fundamental phenomenon and is important either directly or indirectly in the maintenance of all living organisms. Most of the world's nitrogen supply is maintained by this phenomenon. Data indicating the contribution of free living nitrogen-fixing bacteria to the world's supply of nitrogen is lacking, but it is believed to be very insignificant when compared with the amount fixed by legumes through their symbiotic nitrogen-fixing bacteria. In a series of experiments the effect of cobalt and other elements on the growth, nitrogen fixation, and partial chemical composition of leguminous plants was investigated by an NSF grantee. These experiments proved beyond any doubt that cobalt is essential for the growth of soybean plants under symbiotic conditions. Further investigations confirmed that cobalt is necessary for the growth of the symbiotic bacteria. These organisms apparently require the element either in or out of legume nodules. This seems to be the first clear cut demonstration of a cobalt requirement for bacteria and for nitrogen fixation.

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ALDER TREES SIGNIFICANTLY INCREASE NATURAL PRODUCTIVITY OF LAKES—One of the many puzzling features of the exceedingly complex relationships associated with the dynamics of a lake is the seeming lack, in some instances, of a recognizable source of the nutrient materials required by primary producer organisms in the aquatic food chain. Such materials are commonly said to enter the lake in runoff water from the adjacent watershed but this explanation is inadequate in instances where the nutrients available in the lake are far higher than the fertility level of the watershed soil. Although alder trees (nonleguminous, nitrogen-fixing plants) have been demonstrated to provide nitrogen for other terrestrial plants, various factors resulted in an underestimation of their role in the primary productivity of certain lakes.

After preliminary work on Alaskan lakes located in volcanic ash watersheds, an NSF-supported investigator initiated a more intensive study of a California lake located in an area of similarly deficient fertility. His efforts have demonstrated that even a few alder trees can play a major role in providing nutrient materials for lakes. The nitrogen-fixing activities of alder roots were found to contribute significantly to the fertility of soils on lake and feeder-spring banks. Equally interesting, however, was the investigator's discovery that leaf fall from alders contained more than four times as much nitrogen as defoliation from other species. Thus, the hitherto unexplained productivity of some mountain lakes and of those in other regions where watershed fertility is deficient may be due to nutrient materials provided by alder trees through direct nitrogen-fixation and decomposition of leaf litter in restricted watershed soils; by alder leaves blown directly into the lake; and, to some extent, by rain or dew drip from living alder leaves. Aside from the very interesting scientific aspects of this research, the results may have rather substantial practical implications in our efforts to improve the natural productivity in certain lakes which are too infertile to support adequate populations of fish or other living forms.

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CAROTENOIDS PROTECT CELL FROM PHOTO-OXIDATION DAMAGE—Carotenoids are orange pigments which occur widely in plants, fungi, and photosynthetic and nonphotosynthetic bacteria. When consumed by animals they serve as precursors of vitamin A and as such function in the photochemistry of vision. An NSF grantee has now discovered that their primary function in the photosynthetic apparatus is to protect the cell from chlorophyll-catalyzed photooxidative damage. He found that a "blue-green mutant" of a certain purple bacterium which lacks carotenoids completely exhibited great sensitivity when exposed simultaneously to light and air, as did cells of another species of photosynthetic bacterium when rendered 90 percent carotenoid-free by an inhibitor of carotenoid synthesis. The sensitivity was manifested both by destruction of chlorophyll and by cell death. It was further found that carotenoids play a similar role in nonphotosynthetic bacteria and fungi, where such nonchlorophyll pigments as the porphyrins are potentially capable of producing photo-oxidations.

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New Information Obtained On the Structure and Function of Mitochondria—Mitochondria are biochemically active macromolecules occurring in the cytoplasm at the rate of approximately 100 per cell. They are composed of ribonucleic acids, lipids, and proteins, and carry enzyme systems essential for the functioning of the organism. Among these enzyme systems is the one which makes biological energy available to the living cell for the synthesis of vital constituents by means of the coupling mechanism between oxidation (electron transport) and phosphorylation.

A Foundation grantee has obtained new information on the structure and function of mitochondria by first degrading the particulates and then reconstituting some of their major metabolic processes in stepwise fashion. He isolated an electron transport particle (ETP) from beef heart mitochondria which contains all the enzymes and structural elements necessary to transport electrons from the substrate, succinic acid, to molecular oxygen. Further fractionation of the ETP resulted in parts, each carrying a short sequence of the electron transport chain. The investigator was then able to recombine these fractions so that the whole electron chain transport was reconstituted. For the first time it became possible to determine not only new steps in the chain, but also the precise order in which the known steps occur.

Analytical studies of the mitochondria and mitochrondrial fractions have indicated the presence in them of a protein which combines with mitochondrial lipids and certain of the respiratory enzymes to form stable complexes. It is concluded that this protein acts as a "cement" in the structure of intact mitochondria.

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MATHEMATICAL, PHYSICAL, AND ENGINEERING SCIENCES

CURRENT RESEARCH SUPPORT

The mathematical, physical, and engineering sciences deal with the various aspects of man's physical environment. They encompass a wide variety of disciplines with greatly different requirements for facilities, research skills and specialties, and research tools. Research support is provided for studies ranging from subnuclear particles to the cosmos, from the ocean to the atmosphere, from the center of the earth to outer space, from reactions taking place at temperatures close to absolute zero to those at a temperature of many millions of degrees. Facilities and equipment used may range from a desk calculator to the most complex computer, from a simple Geiger counter to a high energy accelerator, and from a small miscroscope to a huge radio telescope.

The Mathematical, Physical, and Engineering Sciences Division is organized into seven programs—astronomy, atmospheric sciences, chemistry, earth sciences, engineering sciences, mathematical sciences, and physics.

Astronomy Program

The Astronomy program is concerned with research on the physical universe—planets and their satellites, comets and meteors, sun, stars and clusters of stars, interstellar gas and dust, and the system of the Milky Way and the other galaxies that lie beyond the Milky Way. By observing the radiations coming from the stars and other material in interstellar space our understanding and knowledge of the universe is substantially increased, and this indeed is the principal technique used by the astronomer and the astrophysicist to study the universe. In the past few years, several major developments have greatly strengthened the astronomer's ability to observe the universe—for example, the development of radio astronomy, the use of high-altitude balloons for observation, the use of space vehicles, the development of electronic image intensification, and the establishment of the two national observatories (National Radio Astronomy Observatory at Green Bank, W. Va., and Kitt Peak National Observatory near Tucson, Ariz.). In many of these developments the Foundation has played a prominent role. In the case of the two observatories, the Foundation gives sole support, and these observatories make their facilities available not only to their own permanent research staff but to all qualified astronomers, many of whom are also engaged in other research supported by the Foundation.

The largest single effort of the Astronomy program outside the National Observatories continues to be in the field of balloon astronomy. One such project—Stratoscope I, a 12-inch solar telescope (reported in the 9th and 10th Annual Reports) was so successful that design and development of a 36-inch stellar telescope, Stratoscope II, is now underway by the same team of astronomers.

International attention has been attracted by the recent work at Burbank, Calif. This work, supported by the Foundation, concerns high time-resolution cinematography of solar flares, and resulted in the discovery of extensive wavelike disturbances traveling outward from the explosive flares. The progress of these disturbances along the sun's surface, at a speed of between 1,000 and 2,500 km/sec, can be followed on photographs taken at intervals of 10 seconds in the light of the hydrogen alpha line. It is thought that these disturbances are plasma clouds guided by local magnetic fields, similar to the ones which cause geomagnetic storms, aurorae and slow-drift solar radio bursts. More than a dozen of these phenomena have been studied; they frequently travel distances equal to the radius of the sun and disturb distant prominence filaments. Occasionally, a disturbance was seen to be reflected by strongly magnetic areas, indicating that the magnetic bottle effect may have been observed for the first time. These new observations seem to represent the first direct evidence of solar corpuscular streams, and may greatly increase our knowledge of the physical processes on the sun as well as contributing to interpretation of solar-terrestrial phenomena.

Atmospheric Sciences

The Foundation's Atmospheric Sciences program, established 3 years ago, is broad in concept and not confined solely to studies of the lower atmosphere. Because the field of atmospheric sciences is so far-ranging, the program touches oceanography and earth sciences on the one hand, and astronomy and space research on the other. In particular, the program stresses research on the physics of the upper atmosphere, cloud physics, atmospheric dynamics, solar-terrestrial relations, energy exchange processes and weather modification.

A decade ago it was commonly believed that the hydrostatically supported atmosphere of the earth decreased in density to very low values within a few hundred kilometers of the earth's atmosphere. This view was based on assumed thermodynamic temperatures of only a few hundred degrees, applied to the oxygen and nitrogen atoms which are dominant at these heights. Similar considerations indicated a corresponding confinement of the overlying esosphere—the region where the constituent neutral atoms are free from significant collisions with one another, and where instead their motions follow ballistic trajectories. As a result of these conclusions, the total extent conceived for the earth's sensible gaseous mantle was limited to heights of a few thousand kilometers at most. These views have, in the past few years, been drastically revised, and regions of the earth's atmosphere out to several earth radii are currently the subject of intensive study by a wide variety of techniques by several Foundation grantees.

An interesting feature of research on the upper atmosphere is the way in which various experiments interlock. Because of this and as a result of improved technology, progress has been rapid. For example, whistler-mode propagation studies lead to improved models of outer ionospheric electron density, which in turn, together with satellite radiation belt measurements and both satellite and ground-based magnetic field measurements, greatly enhance the understanding of auroral and of cosmic ray temporal variations.

The general area of solar-upper atmosphere interactions and of modes of coupling for vertical energy transfer in the terrestrial atmosphere have made good progress during the past year with several Foundation grantees active in this area. However, the problem of coupling between the upper and lower atmosphere is one in which more progress must be made before a really complete understanding of the linkage between solar activity and terrestrial weather is obtained.

Progress in the field of meteorology in recent years has not been spectacular, but technological developments of new instruments which will spark the next advances in the understanding of meteorological phenomena have been breathtaking. A few examples of recent instrumental breakthroughs will show why meteorologists have high hopes for the future. The advent of meteorological satellites, TIROS I and II and the projected NIMBUS series, has given an unparalleled view of both local and planetary scale cloud and radiation patterns. This at first proved to be an embarrassingly abundant wealth of information, but during this past year encouraging progress has been made in learning how to process and use this data. The influence of the TIROS data and results—in which the Foundation played no active part—is already evident in the research proposals being received.

The Weather Modification program of the National Science Foundation continues to support a full range of theoretical studies, laboratory research, field experimental work, and evaluation studies. The research is in the main characterized by its long-term fundamental approach; however, field tests and engineering studies are encouraged as new opportunities for such work are presented.

The interpretation of weather modification experiments is hampered by high meteorological variability which also accounts for the difficulty of designing scientifically sound experiments. Most field experiments need to be operated on a well-planned basis for several years in order to produce enough information to be conclusive. So far very few have had sufficient duration and continuity, and it is a major objective of the Foundation's Weather Modification program to ensure the necessary continuity of support to the best of the field experiments and to the associated laboratory studies.

The largest single research program in Weather Modification includes both laboratory and field studies. The laboratory portion of this program deals with nearly every aspect of the water resources of clouds, including particles, the ice nucleation process, and the growth of ice crystals and water droplets. The field portion of the program is a study of the physical effects of cloud seeding in the Great Plains using silver iodide as the seeding material. Over the flat terrain of the Great Plains measurable increases in precipitation as a result of seeding have not yet been shown. In this study, therefore, silver iodide nuclei are released from aircraft and the resultant physical changes in the clouds themselves are investigated rather than the statistical departures in precipitation. Radar, cloud cameras, and specially instrumented aircraft are employed in the research.

The past year or so has seen an increase of interest on the part of meteorologists in problems of the interactions of the atmosphere and the oceans. This is because a proper understanding of climate and long-period fluctuations in the atmosphere circulation requires a consideration of the atmosphere and the oceans as a coupled dynamic system. Several studies supported by the Atmospheric Sciences program are concerned, in part, with this aspect. Others deal with the constant interchange of matter (water, carbon dioxide, and salt) between the ocean and the atmosphere. All of these studies should help to unravel some of the complexities of the ocean-atmosphere system.

The National Center for Atmospheric Research, which is supported through this program, was established in the past year (see National Research Center, page 59).

Chemistry

Chemistry has made many significant contributions to the general welfare and the economy of the Nation. Many basic problems remain; basic research in chemistry will provide the knowledge required. One of the current tasks of chemistry is to understand how molecules are synthesized, what their basic structure is, how these molecules interact with each other, and what are the mechanisms responsible for the interaction or reaction. Considerable progress has been made in these areas—experimentally in the use of extreme conditions of environment including high pressures and both very high and very low temperatures, and theoretically in the use of certain aspects of quantum mechanical and molecular field theory to predict and interpret molecular events. But much more remains to be done.

The Chemistry program has continued to provide support for research in the four classical subdisciplines of organic, physical, inorganic, and analytical chemistry. In addition, limited support of research instruments, such as nuclear magnetic resonance spectrometers, mass spectrometers, and ultraviolet and infrared spectrophotometers, was resumed during fiscal year 1961. Assistance provided in the purchase of modern research instruments for chemistry departments of educational institutions throughout the country represents an effective means for the support of research in chemistry.

During the past year a new development occurred in the magnetic cooling problem associated with the production of very low temperatures. By adiabatic demagnetization of metallic copper from fields of 15 kilogauss and starting at 0.01 °K, temperatures of 10^{-4} and 10^{-5} °K were obtained reproducibly by two Foundation grantees. Thermodynamic measurements are now being carried out on hydrogen adsorbed on palladium, and attempts are being made to use the adsorbed hydrogen for nuclear cooling in a new approach to adiabatic demagnetization.

The structure of liquids and liquid solutions is the subject of active research by several Foundation grantees. One group has initiated a program in the X-ray determination of the structure of quaternary salt hydrates, which contain up to 70 percent water. These hydrates have a dodecahedral structure, and extension of this work should provide useful information concerning the structure of liquid water and, perhaps, liquids in general. The use of high speed computers in structure determination work has proved to be of enormous help since it has performed the necessary, complicated and tedious calculations in a minute fraction of the time previously devoted to this, thus freeing the researcher for more productive tasks.

In this present era of space exploration, it has become all too apparent that little basic information is available on the chemical and physical properties of substances at high temperatures. Thus, the density of iron, one of our most important structural materials, was not known at temperatures above its melting point of 1805 °K. During this past year, a

Foundation grantee measured its density from its melting point up to 2200 °K as well as measuring the electrical conductivity, surface tension, and density over a wide temperature range on liquid alumina and on a number of liquid alkali earth metal fluorides. Another interesting high temperature inorganic chemistry study is the use of a nitrogen plasma for synthetic purposes. Mixing a nitrogen plasma with oxygen produces various oxides of nitrogen, particularly nitrogen dioxide. The introduction of titanium and magnesium powder into the nitrogen plasma produces crystals of titanium nitride and magnesium nitride. This unique method of crystal growing can be expected to be of great importance in studying materials at high temperatures.

An area of research of particular interest to chemists as well as biologists and physicists concerns the determination of the mechanism of energy transfer, and a number of Foundation grantees are active in this area. Both theoretical and experimental approaches are being used in systems of gases, liquids, and solids. Allied to this research is the problem of conductivity in organic systems. Here the interest is to elucidate the mechanism of the flow of carriers through solid, single crystal, organic compounds with and without photoelectric effects being present.

Earth Sciences

The Earth Sciences program supports basic research in the geological and oceanographic fields ranging in area from the core of the earth to the surface of the land or water and from Alaska to New Zealand. All of the fields of solid earth science are included—geology in its more conventional sense, geochemistry, geophysics, and all their subdisciplines—plus oceanography. The increased emphasis on the marine sciences during the past few years has resulted in a large growth in the support of oceanography including physical oceanography, marine geology, chemical oceanography, and submarine geophysics. During the past year, grants have been made in subjects ranging from the chemical composition of meteorites to the study of fossil plants found in old coal balls, and from the laboratory study of processes by which igneous rocks and magmas are formed to the charting of deep sea currents by the use of deep floating buoys. In one grant, the principal investigator proposes to attack the problem of the salinity of the oceans a half a billion years ago by studying the boron content of rocks of this age. In another, the investigator hopes to evaluate climates of the recent past by means of the chemical composition of the soils. In still another, the use of a phenomenon known as thermoluminescence is being tested as a means of dating ancient pottery and geologically recent lava flows. Other than oceanography, the field receiving largest support is geochemistry, a relatively young addition to the geological sciences, which is enabling students of the earth's history and process to learn more about how the crust and mantle of the earth have been formed. Other major portions of the program's budget have been devoted to the studies of seismic propagation, gravity and magnetic studies, and the measurement of electrical conductivity and magnetic properties of rocks.

During the past year new and important results in the measurement of deep sea currents were reported by two Foundation grantees. One investigator working near Bermuda and the other in the North Pacific have charted deep sea currents using the buoys developed previously by one of them. The results in the Atlantic showed that currents are more complicated and variable than previously thought, and that an equatorial under-current existed in the Atlantic similar to the one in the Pacific Ocean. The work in the Pacific by the Foundation grantee clearly demonstrated irregular turbulent motions at various depths in latitudes between 50° N. and 15° N. Yet at 28° N. the motion is quite regular, primarily rotary and clockwise with a 25-hour period. The rotary motion is probably the coincidence of the inertial period (25.4 hours at this latitude) with the tidal periods of 24 and 24.8 hours. An important confirmation of the turbulent nature of the current at 29° N. was made during the test drilling in the early stages of Project Mohole. Direct current measurements from buoys at different depth levels at the site showed current vectors varying randomly in both time and direction.

In the area of geochemistry, a Foundation grantee recently showed that with appropriate amounts of fluxing agents and a reasonable amount of water, rocks with the chemical composition of most granites can partially melt at temperatures as low as 560° C under pressures equivalent to those found at about 15 miles deep within the earth's crust. This suggests that most of the sediments deeply buried within a geosynclinal belt are subject to partial melting. This melting is at once a source of granite instrusions (so commonly associated with the deformation of geosynclines) and also an aid to the mobility of geosynclinal belts during times of compressional stress.

The largest and by far the most dramatic of all projects supported by this program is Project Mohole, which has as its goal drilling through the crust of the earth into the mantle. During this past year, Phase I of the project was successfully completed and proof provided that drilling from a floating barge in very deep water is feasible. The project is now being reorganized for an assault on the longer-range objectives. (See page 39 for a review of the accomplishments of Phase I.)

Engineering Sciences

The National Science Foundation's program in the engineering sciences is exceptionally broad in scope, encompassing the classical subdisciplines of engineering, such as electrical, mechanical, and chemical engineering, as well as the newer concepts in engineering such as systems engineering. As such, it attempts to undergird and balance the national effort in this field by supporting research which seeks knowledge and understanding that is directly needed in the design of new and improved technological systems. Thus, basic research in the engineering sciences provides the essential information and methods with which existing problems may be solved and new opportunities for advancement may be recognized.

An important research area, supported through this program, is emerging from cooperation between research electrical engineers and scientists in other disciplines, such as experimental psychology, neurophysiology, and linguistics. The area, becoming known as communication science, is concerned with the generation, processing, and transmission of information in its various forms. The theoretical foundations of communication science are largely the basic work of Norbert Wiener on random processes, their prediction and filtering, and on the mathematical theory of communication developed by Claude Shannon. Important also is the development of a theory of the logic of automata and computing devices, switching circuits, and relay circuits. Knowledge in this field is applicable to problems of coding, of efficient transmission of information, of cryptography, of design of computers and automata, in the analysis of speech and language, in the transmission of signals through the nervous system, and in the study of the behavior of groups and of learning itself. Support in communication science has been provided for research in statistical communication theory, processing and transmission of information, communication biophysics, neuropsysiology, linguistics, speech communication, experimental psychology, automata and artificial intelligence, sensory aids, physical acoustics, circuit theory and network synthesis, and modulation theory.

The past two decades have witnessed many far-reaching developments in the fields of communication, control, and machine computation. The high level of sophistication in systems incorporating such functions as prediction of time series, recognition of patterns, choosing between alternatives, and adapting to changes in environment has created an acute need for methods of analysis and synthesis of complex systems containing nonlinear, non-deterministic, and incompletely characterized components. This is likely to be even more true of the systems of tomorrow involving space-relay communication links and large-scale man-machine systems.

It has long been recognized that systems of widely different physical forms may have similar mathematical structures. Thus, from the viewpoint of system analysis what is important about a system is not its physical form but its input-output relationships. This fact is responsible for the growing trend toward abstraction in the methodology of system design and analysis. This trend, coupled with the need for effective means of analysis of the complex systems characteristic of modern technology, has given an impetus to the development of a new scientific discipline, system theory—in effect a general theory of systems irrespective of their physical form.

Support is being provided for research on problems in system analysis that are system-theoretic in nature. A wide variety of problems in adaptive, sampled-data, digital, competitive, and linear time-varying control are being studied, including stability and optimization considerations.

While these rather substantial grants permit a concerted research effort in important, newly developing fields, the program has maintained support of smaller research projects that are usually directed by one faculty member and involve one or two graduate students. This effort is regarded as the heart of the program's activity and covers all areas at the forefront of the engineering sciences. A notable feature has been the exploitation of the digital computer. The research referred to does not merely use the computer in a routine fashion but through its use permits one to solve important complex problems that could not otherwise be attacked in a physically meaningful way.

One of the more interesting engineering achievements which is expected to aid considerably in the solving of some of the problems associated with the Nation's space effort occurred in the field of molecular beams. One group has constructed a high energy beam facility using a supersonic nozzle source to develop high material fluxes. Heavy molecules are accelerated by lighter ones during the expansion of a binary gas mixture, and thus high energies are obtained. Preliminary results have indicated that this facility is capable of generating an intense beam of fast molecules with translational energies in the 0.5 to 10 electron-volt range. This will make it possible to investigate momentum and energy transfer, and scattering and reactive collisions in a region of energies heretofore unexplored.

Another Foundation grantee has been studying fundamentals of adhesion. He has shown that syneresis (the separation of liquid or semiliquid impurities from a solid during its cooling) involving impurities present in the adhesive play a part in determining the breaking stress of adhesive joints made with "adhesionable" polyethylene. When these impurities concentrate along the interface between adherent and adhesive a zone of weakness forms and rupture proceeds along this zone. There are many applications where adhesive joining is attractive, and this understanding of the adhesive mechanism should lead to more efficient joining procedures.

During the past year an NSF grantee has developed a new approach to engineering analysis which has attracted international attention. In studying nonlinear, two-degrees-of-freedom systems, the grantee has rigorously defined the term "normal mode" for linear or nonlinear systems. This permits a determination of the normal modes independent of the natural frequencies; the natural frequencies being found afterwards in terms of the normal modes. This procedure is the reverse of the usual approach and yields results of great simplicity which have not been discovered before. The grantee has extended his work to a system of n degrees of freedom. An infinite class of systems, of which the linear system is a member, has been isolated for which the frequency-amplitude curves can be found in closed form.

Another grantee has been studying the use and control of solar energy. The directional spectral reflectances of a number of materials, which could be used as spacecraft surfaces, have been measured, and average solar absorptances of elementary geometrics have been determined. It was found that significant error can be introduced into the analysis and design of temperature control systems if the angular dependence of radiation characteristics is neglected. In addition, measurements of the normal spectral reflectance and of the normal total emittance of a number of materials have been made, and studies on the radiation characteristics in the optimization of solar heat-power conversion systems have been made. The optimization studies showed that when a concentrator is used, the optimum temperature and irradiation of the collector are usually sufficiently high so that the use of selective radiation characteristics can offer only an insignificant advantage over a black body collector.

Mathematical Sciences

One unifying feature in all of the physical sciences is undoubtedly mathematics. Mathematics is the basic language common to all the disciplines which go to make up what is termed the physical sciences, and many of the problems which one confronts in these disciplines are really mathematical in nature. Generally speaking many of these problems require the most advanced techniques available to modern mathematics. The continued development of mathematics is essential to growth and progress in science and technology.

Progress in mathematics has been tied to the discovery of convenient notation. As a trivial example, one notes how much more difficult arithmetic manipulations are with Roman as compared with Arabic numerals. Unfortunately, the development of intricate notation suited to mathematical needs has made communication with the nonexpert very difficult. Another obstacle in the path of easy communication is the trend to abstraction and generalization. This trend has contributed significantly to progress in mathematics, but has also made mathematics a subject intelligible only to the expert. Despite these difficulties an attempt will be made to give the flavor of current research in mathematics by describing recent important developments in group theory—a subject which has had considerable impact in modern physics and chemistry in addition to mathematics as a whole.

Groups are a primitive type of number system based on a single operation for combining numbers. The totality of ordinary integers relative to the operation of addition forms a group, the main ideas being that the sum of any two integers is again an integer, and for each pair of integers there exists an integer which when added to the first member of the pair produces the second. Other examples of groups are: (1) the totality of real numbers relative to addition; (2) the totality of nonzero numbers relative to multiplication; (3) the totality of positive real numbers relative to multiplication. These illustrate the fact that groups occur commonly as part of the structure of almost every type of number system.

However, groups need not consist of what are ordinarily recognized as numbers. Consider, for example, n stones arranged in a line and numbered from 1 to n for purposes of distinguishing one from another. The line of stones may be permuted; that is, rearranged as to the order in which the various stones appear in the line. Each permutation may be regarded as a process, and two such processes may be combined to give a third in the following way. Perform the first of the two given permutations and follow it with the second. The final result is clearly obtainable by a single process, and this latter is called the product of the first two. Relative to this operation the collection of all permutations of n given objects forms a group.

There are many other ways in which groups appear with members which are not ordinary numbers. This provides an indication of the value of the abstract study of groups. The results obtained are applicable to each particular instance in which a group arises. The subject got its first big impetus in the work of Galois on solvability of equations by use of radicals, wherein certain groups of permutations of the roots are significant. Group theory has been useful in many other parts of algebra as well as geometry and topology. Outside of pure mathematics, group theory has been used in the study of molecular structure, crystallography, and quantum mechanics.

Recently, a remarkable result concerning groups has been proved. Many investigations in group theory lead to a type of group called simple, but these have proven difficult to analyze or construct. The importance of a complete understanding of simple groups rests upon the fact that many types of groups can be represented as products of simple groups. It is a trivial fact that every group whose order (the number of elements in the group) is a prime is a simple group. It is conjectured that all finite, simple groups other than those of prime order have even order. Thus, for example, the order of a simple group might be 7 or 2x7, but not 3x7, according to this conjecture. The importance of simple groups and the relative paucity of knowledge about them would make a proof of the conjecture a great milestone in algebra. Recently, two Foundation grantees have proved a theorem very close to the conjecture, and there is hope that their result may lead quickly to a proof of the conjecture itself. Two other Foundation grantees have discovered some new simple groups of finite order. This is a major contribution, since known examples of such groups are rare. Many of these recent developments have received Foundation support.

Physics

In recent years much of the research in physics has centered on nuclear and elementary particles and on systems composed of many atoms such as solids. Today these areas continue to be probably the most challenging ones in physics, and while much has been accomplished already, much more remains to be learned. Considerable progress has been made in our understanding of the various forces which hold the nucleus together and of the interactions between elementary particles. A great deal of this understanding has come as a result of pushing experiments to exceedingly high energies—in some cases to as high as 30 billion electron-volts. The results obtained have answered many questions, but at the same time many other questions have been raised. And as very often happens, some of the theories which have pointed the way to a better understanding in one area of physics have helped unravel some of the perplexing problems in other areas of physics. For example, theories which have been able to account for some of the aspects of superconductivity are being used to great advantage now in certain parts of low-energy nuclear physics, particularly on problems on nuclear structure. This is, of course, one of the great benefits of research—this interchange of ideas between disciplines in science.

For several years intense activity has been centered about the dispersion theory of elementary particle interactions—with particular emphasis on the "Mandelstam representation." Despite the fact that the status of this highly important Mandelstam conjecture experienced ups and downs and finished the year somewhat more precarious than before, it can be said fairly that owing to the efforts of a group of theoretical physicists, many of them supported by the Foundation, the assumptions, methods, and objectives of dispersion theory were perceptibly clarified. The world-wide interest in this branch of theoretical physics is mirrored in the complexion both of the new and of the continuing NSF Physics grants program.

Support for solid state physics has continued to grow in a most invigorating way, and this now represents a prominent portion of the Physics program. As a matter of fact, NSF support for this field ranks high among the Federal research-supporting agencies. Solid state physicists at our smaller colleges and universities, as well as solid state physicists at the country's leading institutions, now receive support from the Foundation.

Perhaps one of the more interesting developments in this field during the past year concerned the discovery at one of the leading industrial research laboratories of superconducting magnets. This discovery has stimulated a great deal of interest at low-temperature and solid-state laboratories, and some of our grantees are actively looking into the possibilities exhibited by and the problems associated with superconducting magnets. It can be logically expected that activity in this field will increase even more, especially since the rewards are so great, and that the Foundation will be receiving more requests for support of research directly or indirectly associated with this phenomenon.

Low-temperature physics involving the study of superfluidity and certain aspects of superconductivity has continued to receive strong support from the Foundation. In addition to providing continued assistance for outstanding scientists working in this field, the Foundation has been instrumental in assisting younger investigators in becoming established, thereby strengthening the overall field of low-temperature physics in a significant way.

In spite of the increasing emphasis on large projects, the Physics program has attempted to maintain its practice of broadening the physics research base of the country by supporting many inexpensive but promising projects at smaller institutions. One eminent physicist, who had originally shown some doubt concerning one of these projects, commented on its general success and stated, "During my frequent visits I have seen the exciting change this research program has wrought in the atmosphere of the department." The Physics program has attempted throughout the fiscal year to maintain a proper balance between large and small research projects.

The high cost and limited facilities in elementary particle physics resulted, in November 1960, in an announcement of a Bev Accelerators Users Program (BAUP). The purpose of this program is to enable universities which do not have large accelerators to do research and train their students at one of the big centers. Four BAUP grants were made this year. These grants will provide for the construction of special equipment, travel and support for extended visits to the accelerator site, and time and equipment for analysis of data obtained.

The program was pleased to learn that one of its grantees had been awarded this year's Nobel Prize; this was particularly gratifying since the NSF grant made in 1954 was the first Government aid given for this research.

SIGNIFICANT RESEARCH DEVELOPMENTS IN THE MATHEMATICAL, PHYSICAL, AND ENGINEERING SCIENCES

First Deep Penetration of the Earth's Suboceanic Crust Establishes Feasibility of Deep-Ocean Drilling (Project Mohole)—Probably the most spectacular of all projects supported by the Foundation during the past year was Project Mohole. A joint venture of the Foundation and the National Academy of Sciences, Project Mohole aims ultimately at drilling through the crust of the earth and into the mysterious mantle, the substance that lies below the crust and of which little is known. During the past year, Phase I of the project, an engineering experiment to prove the feasibility of drilling from a floating barge in very deep water, was successfully completed and will be described in detail.

There is probably no project within the scope of current technical ability that will yield as much new information in geology and geophysics as drilling the so-called Mohole. The crust is a relatively thin film over the earth's interior, averaging only about 10 miles in thickness. Beneath the crust lies the mantle, a layer some 1,500 miles thick that constitutes the bulk of our earth. Separating the crust from the mantle is the "mohorovicic discontinuity" (commonly called the "Moho"), a zone at which the velocity of earthquake waves changes abruptly. Our knowledge about the deep layers of the crust and the mantle is almost entirely from indirect geophysical methods. Actual samples of these materials will be invaluable in the attack on many key problems, such as the actual chemical and mineralogical composition of the deep crust and the top of the mantle, an explanation for the anomalously high heat flow from the floor of the ocean, a possible answer to the continental drift controversy, the original isotopic composition of the primordial lead and uranium, and the early history of the earth itself.

During the spring of 1961 the first experimental drilling project for Project Mohole was undertaken, off La Jolla, Calif., and Guadalupe Island, Mexico. Cores were taken from under 3,000 feet of water at La Jolla, with the drill bit reaching a maximum depth of 1,035 feet beneath the ocean floor. After five tests holes were dug at this site, the *CUSS I* drilling barge was moved to the site off Guadalupe Island for the first major deep-water drilling test. At this site five holes were dug in 11,700 feet of water, reaching a maximum of 601 feet below the ocean bottom.

At the La Jolla site, punch and rotary cores were obtained ranging from consolidated fine sands to coarse silts with scattered fossil content. At 760 feet the drill encountered carbonate-cemented rock, which X-ray analysis showed to be dolomitic.

Scientific results of the Guadalupe site drilling indicated that the soft section is 560 feet thick and consists predominantly of grey-green ooze. Some of the ooze beds are primarily (as much as 80 percent) microscopic shells of plants and animals (about half siliceous, half calcareous) mixed with volcanic glass shards, ash, and clays. Other beds consist predominantly of clay and volcanic ash. Most of this section was deposited during late Miocene time (12–20 million years ago).

The greenish-gray color of these sediments, and the lack of alteration of the pyroclastic material contrast markedly with the highly oxidized character of a typical pelagic clay. These features of the Guadalupe sediments suggest a rapid rate of accumulation—about 1 centimeter per thousand years. Since about half of the material is clay, the rate seems to be several times higher than the estimated average for Pacific pelagic clays. The higher proportion of biogenous components apparently reflects a higher rate of organic production during this period than found in more recent sediments.

The second layer of the earth's crust (as recognized by seismologists) was reached and penetrated, for the first time, to a depth of 41 feet. It was found to be a common type theoleitic basalt—at least in this place. The higher ratio of Fe_2O_3/Fe O and the higher than normal total water of the basalt may reflect its emplacement in watery muds at or near the interface with ocean water. Its age is, as yet, unknown, but is probably Miocene.

Two important geophysical measurements were made. First, the seismic velocity (i.e. the velocity at which primary seismic waves travel through a medium) of the sediments of layer I was determined at 1.6 km/sec by actual measurements in the hole. This is a sharp reduction from the 2.2 km/sec previously estimated for these sediments, and may lead to revisions of the thickness of layer I. Second, temperature measurements were made at different depths, so that for the first time we have a geothermal gradient through several hundred feet of the oceanic crust. Prior to this the only data available on sub-oceanic temperatures were the heat flow measurements made on the floor of the sea, from which a temperature gradient was inferred. The actual in-hole measurements at Guadalupe indicate a slightly higher temperature than had been inferred, but one that was close enough to give confidence that the ocean floor measurements are fairly reliable.

Another "first" was the simultaneous measurement of deep ocean currents at four levels simultaneously. These measurements were made with internal recording rotor-type meters suspended on wires from the barge and from a deep-moored buoy. They extended over a period of 3 to 12 hours. Water at the surface, at 50 feet, at 5,000 feet, and at 10,000 feet drifted to the northward for this period of measurement, except during the maximum ebb of the tide. The velocity of drift was about 7 cm/sec near the surface and about half that at depth. Superimposed on this slow general drift is a complicated pattern of eddies with water velocities of 30 cm/sec and local reversals of direction in intervals of as little as 2 minutes.

In addition to the scientific findings the project yielded a great amount of technical experience necessary for the prosecution of the ultimate objective—to reach the Mohorovicic Discontinuity. The feasibility of holding a drilling vessel on station in deep water by dynamic positioning was established. This method combines electronic position sensing and constant maneuvering by means of four omnidirectional propellers operated by pilots at a central control console. The vessel was held to a maximum distance from a point directly above the hole of 3 percent of the depth of water (i.e. 360 feet in 12,000) even in winds of 25 mph and waves 12 feet high. The standard rotary method of drilling was used with only minor modifications. It was possible to recognize the touchdown and to drill into the bottom with safety by paying careful attention to the weight placed upon the bit during rotation in shallow water and, at great depths, to the pressure of the water forced down the pipe during drillings to remove material cut by the bit. Rotation of 40 rpm caused no observable pipe whip (transverse vibration), and heaving of the drilling vessel caused no observable vertical vibration in the pipe. Although no attempt was made at destructive testing of drill pipe and other components, the deep sea operations appear to confirm the earlier theoretical studies of strength.

* * *

EXTRA-GALACTIC COSMIC PARTICLE DETECTED WITH ENERGY 500 MILLION TIMES THAT GENERATED BY LARGEST ACCELERATOR—Since the discovery of cosmic rays, physicists have been puzzled as to where they come from and how they obtain their tremendous energies. This year a group of scientists working at Volcano Ranch in New Mexico, under an NSF grant, concluded that at least some cosmic rays must come from outside of our own galaxy. This important finding resulted from data obtained at a rather unique facility built in the New Mexico desert, an array of particle counters covering 600 acres.

What was believed to be the largest cosmic ray shower ever observed was recorded this year. The shower of 10 billion atomic particles rained on the station in a period of 10 one-millionths of a second. Analysis of this shower by a large digital computer indicated that the primary particle must have had an energy of 10^{19} electron volts, 500 million times the energy that physicists have been able to generate in their largest accelerator.

Reasoning that the magnetic field of the galaxy, $3x10^{-6}$ gauss, would have caused the primary proton to move in a radius of curvature five times the diameter of the galaxy, the scientists concluded that this particle must have come from space beyond our galactic boundary.

* * *

TIME STANDARD ACCURACY RAISED 100,000 FOLD BY NEW ATOMIC HYDROGEN MASER—Physicists with NSF support have constructed an atomic hydrogen maser 100,000 times more accurate than the best time standard yet known.

According to the quantum theory every atom or molecule has certain natural vibrations which occur at sharply defined frequency. Although most of the time atoms and molecules exist in nonradiating states, there is always some interchange due to thermal and other motions which cause the atoms to absorb energy and move to higher energy states, then decay back by giving off energy at specific frequencies.

Physicists have made considerable progress in their attempts to use the natural electromagnetic oscillations occurring in atomic or molecular configurations. In 1955 it was demonstrated that the molecules of ammonia in the higher energy states could be separated from those in the lower states so that a usable output wave could be generated. The device which used this principle is called the maser and has proved to be important as a time standard and as an amplifier of very high frequencies.

Up to this year it was not possible to produce maser oscillations with gaseous atoms due to the weakness of the magnetic dipole radiation and the difficulty in separating high-energy states from lower ones. However, Foundation grantees have achieved an atomic hydrogen maser by retaining the atoms within a storage box with suitable walls. This atomic maser, operating at 1420.405 megacycles, will not only allow determination of the hyperfine splitting of the hydrogen isotope to a much greater precision than is now possible, but may also make possible a time standard with greater stability than any yet known.

* * *

EXPERIMENT CONFIRMS QUANTIZATION OF MAGNETIC FLUX IN SUPERCONDUCTORS—According to the quantum theory some effects which appear to be essentially continuous are in reality increased or decreased only in discrete steps, that is, quantized. Several years ago theoretical physicists suggested that the magnetic flux trapped in a superconducting ring should be such a quantized entity. This year, an NSF grantee actually measured this effect.

At temperatures near absolute zero (273° below zero Centigrade) many materials are superconducting (they have the property of maintaining the flow of electric current without the need of external sources). In a particular experiment by the NSF grantee, a current was induced in a hollow superconducting cylinder about ½ inch long and $\frac{1}{1000}$ of an inch in diameter. Measurements of the magnetic field in the tube showed that its magnitude was always an integral multiple of a certain quantity—quantized.

However, the effect was only half of what had been predicted theoretically. A satisfactory theoretical explanation of this phenomenon has now been given by a recent Nobel laureate which is based on the pairing of electrons in a superconductor.

* * *

SEVENTEEN NEW EXPLODING SUPERNOVAE DISCOVERED—During the past year a Foundation grantee discovered 17 new supernovae. Most of these were found with the 48-inch Schmidt telescope on Palomar Mountain. Supernovae are cosmic explosions which, at maximum brightness, radiate as much energy per day as the sun does in a hundred million years. Such a star at maximum luminosity frequently is several times as luminous as the entire galaxy in which it occurs. Study of the phenomenon is of great importance for a number of reasons, but so far very little is known about the physics of an exploding star. Statistically it appears that one supernova flares up in a normal galaxy only about once every 360 years. There are two main types: those of type I are the brightest, with spectra consisting of ill-defined bands which have so far completely defied identification of even one single feature; those of type II are less bright, with spectra showing emission lines of hydrogen, helium

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and carbon, which gases are being expelled in great quantities at velocities of about 6,000 km per second.

It is conjectured that a supernova explodes as the result of instability caused by a stupendous nuclear chain reaction at a late stage in a star's evolution when most nuclear fuel has been exhausted. The explosion may serve to re-seed interstellar space with new matter out of which future stars may be formed. A better calibration of the intrinsic luminosity of supernovae of various types would serve as a powerful new tool for determining the highly uncertain distance scale of the universe, because these objects can be seen at distances where galaxies are too faint to register on the photographic plate.

Theoretical astrophysicists are currently developing theories which attempt to explain the enormous output of radio radiation from certain galaxies on the basis of multiple supernova explosions. Accurate data on the rate of occurrence of such explosions can give valuable information on the basis of which these theories can be tested.

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SOCIAL SCIENCES

CURRENT RESEARCH SUPPORT

The Office of Social Sciences was reconstituted as the Division of Social Sciences during fiscal year 1961. This action was an endorsement of the careful and gradual development of a program of basic research support which has stressed imaginative, well-designed investigation of general problems of human behavior and society.

The Foundation has thus indicated its serious and sincere interest in the continued encouragement of fundamental research in the social sciences and its commitment to the support of the kind of social scientist and the type of research career that has hitherto lacked support. The uniformly favorable response of the scientific community to the organizational change has been most gratifying.

The Division is presently organized into four programs: *anthropological sciences*—including ethnology, archaeology, linguistics, and physical anthropology; *economic sciences*—including econometrics, economic and social geography, the economics of research and innovation and those areas of general economics which lend themselves to scientific treatment; *sociological sciences*—including demography, social psychology, psycholinguistics and the sociology of science; and a program of support of the *history and philosophy of science*. The research grants program has emphasized the support of basic research that meets the highest scientific standards of conceptual and methodological rigor.

Anthropological Sciences

The program for basic research grants in the anthropological sciences offers support for investigations into man's cultural and biological development and variation. During 1961 support has been provided for basic research in all phases of the discipline—linguistics, ethnography and social anthropology, physical anthropology, and prehistoric archaeology. Increasing recognition of culture as a dynamic synthesis of social and physical environmental variables is exemplified by several anthropological grants. One study of this kind is being conducted in the Philippines and is a comprehensive ecological and ethnographic approach to the problems of how complex agricultural systems in humid tropical environments have developed and are maintained. This study will elucidate the effects of methods of permanent cultivation on soils, terrain, vegetation, and fauna, as well as on social and cultural patterns. A second example is an integrated research project, planned by the Committee on New Guinea Studies (an organization of six Pacific coast universities), which is a long term study of native groups in interior New Guinea in terms of language and other aspects of culture, the natural environment, and the biological characteristics of the people. This research is of particular urgency owing to the rapid disappearance of societies relatively untouched by Western civilization.

Studies of change through time of social structure, economic behavior, and other social attributes have been planned or are in progress for several African tribes, villages in India, the Hopi Indians of Arizona, mountain groups in Nepal, and other societies or subsocieties. In several cases the principal investigators are returning to societies which they have previously studied to make a direct analysis of the degree and direction of change associated with economic and other innovations which have appeared since the time of the first study.

Because of the impending threat to the historic and prehistoric archaeological sites which will be innundated when the Aswan High Dam on the Nile River is completed, the United Nations Educational, Scientific, and Cultural Organization launched a worldwide campaign and appeal on March 8, 1960, to obtain offers for salvage archaeology in the Nubian region of Egypt and the Sudan. Because of the interest of the Foundation in prehistoric archaeology, it has been called upon by the State Department to provide coordination of the United States effort. Nubia offers a nearly virgin field for the investigation of Paleolithic and Neolithic cultures as well as of geological, geomorphological, and climatological problems. No comprehensive geological or prehistorical studies have ever been undertaken in this area. A team consisting of an archaeologist and a geologist has mounted an expedition for a two-pronged investigation of the problems of prehistoric culture and environment. Archaeological and geological data will correlate the early human industries of the Sudanese Nubia with the relatively better known sequences of east and central Africa to the south and the Sahara and Egypt to the west and north.

Among archaeologists increasing interest centers on the adaptation of the discoveries and technologies of the sciences to archaeological exploration and analysis. Instruments using electrical and seismic waves are being developed to detect underground features of archaeological interest. Similar machines to discover buried structures through the detection of magnetic anomalies are being tested. Soil and pollen analyses and the identification of prehistoric plant and animal remains will help to determine early settlement patterns as well as aid climatological inquiry.

One of the most significant events bearing on the problems of the origin and spread of agriculture in the New World was the discovery this year of wild maize in Tehuacan in Puebla, Mexico. The development of agriculture is basic to the development of civilization and consequently the problem of the origins of agriculture is of great importance to cultural anthropology. Corn cobs discovered in a deep deposit in Coxcatlan Cave have been dated by radiocarbon analysis, stratigraphy, and obsidian hydration at about 3,600 B.C. and are the oldest known corn in the world. This discovery will throw light on the beginnings of civilization in Mesoamerica where the cultivation of corn was the mainstay of the great Indian civilization.

Much of the NSF-supported archaeology undertaken in 1961 in the New World has been concentrated in the Mississippi River Valley, the northern portion of Mexico, and Alaska. The American Bottoms area of the Mississippi Valley was probably the largest aboriginal population center north of Mexico, and, for the first time, a large-scale excavation program has been undertaken to deal with this area in a unified fashion. Perhaps because of the vastness of the task, very little archaeological work has been done in the American Bottoms before initiation of the present project despite its central importance in midwestern prehistory.

Also of signal importance is the long-term integrated program of five alternating and overlapping field projects aimed at discovering the locations, fluctuations, and influences of the northern border of the Mesoamerican high cultures in pre-Columbian times. Special attention is being given to the investigation of ecological and other causal factors involved in the development and vacillations of the frontier and to their implications for problems of similar frontier situations throughout the world.

The rapidly growing interest in uncovering the prehistoric cultural connections between Eurasia, Alaska, and other areas of North America and the inherent value of the Arctic as an anthropological laboratory is reflected in the increasing number of investigations—archaeological, linguistic, and cultural—being pursued in arctic Alaska. Several expeditions in the area are excavating for data on proto-Eskimo cultures, while others are working on aspects of linguistic and ethnographic problems.

A study is being made of the anthropological problem of geographical variation in culture through a systematic investigation of one aspect of culture, language. Linguistic analysis of distinct cultures sharing a common territorial matrix will serve to verify or disprove the "cultural barrier" concept so frequently called upon to explain cultural differences where no obvious geographical barriers exist.

In addition to the examples mentioned, the wide variety of research is illustrated by studies on the effects of enforced upright posture on the physiology of quadrupeds, the ethnohistory of an African Kingdom, the analysis of prehistoric Peruvian fabric remains, and the effects of culture on personality formation in Japan and Burma.

Economic Sciences

The Foundation's program in support of basic research in economics is still at the beginning phases of growth and development. The primary emphasis remains on econometrics and mathematical economics, but an increasing number of proposals is being supported in economic theory, in economic geography, and in the economics of science and technology. The total number of proposals received, and grants made, is small in relation to the other programs of the Division, but it is expected that research support in economics will expand considerably in the next year or two. Not only is the number of economists large, but their research horizons are constantly broadening.

One of the grants made this year involves 15 of the leading econometricians in the United States who are concerned with the construction of econometric models of our economy. It is now felt that major progress can be made by coordinated studies of particular sectors of the economy to establish a common basis for a generally acceptable model. Under a committee of the Social Science Research Council, the group of economists have met to establish a common framework within which each member can pursue the development of data and concepts to feed into the formation of an overall model. Working seminars will be held periodically, and it is hoped that an adequate model can be developed by the summer of 1962. The success of such an effort will assist in the advance of econometric methods and increase our ability to explain and predict the behavior of the United States economy.

The Foundation's particular interest in the economic impact of science and technology is reflected in several grants. One is for the study of the effects of technological development on the allocation of economic resources and on productivity. Another is concerned with an empirical investigation of the extent to which research undertaken for national defense purposes has actual or potential nonmilitary applications. Since expenditures for research and development play a major role in the expansion of the American economy, and since much of the Federal Government's expenditure is devoted to national defense purposes, knowledge about the actual processes whereby the results of the military research and development effort are introduced into the civilian economy would be of great importance for stimulating economic growth.

Other grants in economics are focused on the development and refinement of methods for measuring economic phenomena at the level of the individual household, the firm, and the economy at large.

In the area where economics and geography converge there has been interest in problems of metropolitan structure and growth. This is an example of a situation in which social problems of current national concern provide a good setting for the pursuit of basic research. The rapid growth of metropolitan regions, both in size and number, has created immediate and specific problems and has strikingly demonstrated the inadequacy of our theoretical knowledge of the economics of urban structures. The reality of complex metropolitan areas and modern transportation developments have shown the gaps in existing theory. An NSF-supported project is concentrating on the refinement and testing of linear programming models of urban location and transportation to bring them into closer conformity to reality.

Econometric models have been constructed for the purpose of studying the allocation of economic and residential activities in urban areas, allowing for such complex factors as the conflicting importance of accessibility and amenity values of sites, and individual travel behavior. Actual behavior and preferences will be built into theory which has hitherto assumed, of necessity, simple and rational behavior on the part of consumers. This assumption is known to be unrealistic and it is hoped that the models of increased realism which are being developed will be general and powerful tools useful to the study of metropolitan area and land use and transportation problems.

Three significant trends in sociology and social psychology have received special attention: the development of programs for high speed computers that permit the simulation of social or interpersonal processes, the extension of laboratory experimental techniques to more powerful and complex situations, and the construction of mathematical models of social processes and the invention of mathematical techniques for their analyses.

It is perhaps misleading to label the study of social processes on a computer as "simulation," especially if the term suggests an attempt to mirror in detail the actual dynamics of a social system. Rather, "simulation" allows a set of theoretical processes to be tried out with different parametric values to determine what sort of behavior system results. One investigator is developing computer programs that permit the simulation of complex social processes such as interaction in a three-person group; the relationship between rewards and constraints and participation in an organization; and the processes occurring in human networks of communication and inter-personal influence. The next stage of research involves the conducting of "experiments" on the computer by varying elements of the process being simulated and comparing terminal or stable states (if any) reached after a run through the machine.

Laboratory studies on role-specialization in groups and of parameters in risk-taking allow for precise formulation of the experimental situation, theoretically complex designs, and for control of relevant variables. Yet they do not approach in verisimilitude and power the experiments currently being planned under a recent grant. The grantee began the design of his experiments by first studying natural groups of teen-age boys in various socioeconomic strata of two cities. The data on group organization and individual member interaction (obtained by observation of the natural situation) will form the basis for the controlled experiment. The experimental groups will be studied, however, not in a university laboratory but in a boys' summer camp, a situation in which the investigator previously and successfully conducted similar research.

The application of mathematics and statistics to sociological and psychological problems has received support through a number of grants. These include development of a mathematical model of negotiation as a social process, research in the mathematics of psychophysical scales, and further exploration and testing of two kinds of mathematical models for language learning and use (one based on information theory and one on a theory of grammatical structures). One group of investigators is developing applications of the theory of linear graphs to the analysis of group structures and interpersonal relationships. Their effort is directed toward removing certain current limitations of graph theory that arise from the fact that some of the complex conditions of group behavior cannot be incorporated into the theory because of the present starkness of the mathematical axioms and definitions. Of special importance is the invention of better ways to handle multiple simultaneous relations among individuals, to define opposite relations, and to indicate intensity and probability of bonds between pairs of individuals and substructures.

Finally, in the realm of statistical methods, a grant has been made for the analysis of multiple classification and discrimination problems, which appear in a number of areas of social science (including archaeology, criminology, psychology, and the analysis of content of communication). This general approach also is of interest to natural scientists faced with the necessity of deciding on the sources of signals and has obvious applications to military intelligence. The fundamental problem is to discern, from indirect and related evidence, the source of "authorship" of a series of acts whose individual similarities or differences can only be inferred, initially, from observable characteristics which, in turn, are related to a source in unknown ways. The research has yielded unexpected returns in suggesting some techniques for the statistical analysis of sequences of behavior (e.g. the chain of interaction that one might observe in a decision-making discussion) and has stimulated the formulation of some new problems in nonparametric statistics that will be especially important in the social sciences.

History and Philosophy of Science

The National Science Foundation has taken the lead in the support of research in the history and philosophy of science as separate disciplines although recognizing their essential interrelationships with the various natural sciences. The program is increasing in size, although it remains smallest of the social sciences programs—a reflection of the number of scholars engaged in these studies.

The largest grant in the history of the program was awarded for the collection of data on the quantum revolution. The research will be conducted by a team composed of a historian of science and senior physicists which will interview men who were active in the 1898–1939 period of development of quantum physics. Collection of unpublished notebooks, manuscripts, and other informal materials will be pursued concurrently with the interviewing. An immediate result of the project will be an organized body of written materials and transcribed oral data which future researchers can use for studies of the psychology and sociology of human creative processes, as well as of the history of physics.

Proposals for research in the history of science were, as always, divided between studies of individual scientists and broader studies of the development of fundamental scientific ideas. Examples of the former type are the study of Isaac Newton and the investigation into the relationship between the nineteenth century naturalist, Richard Owen, and the followers of Darwin. Because of the central importance of Sir Charles Lyell's work in the development of uniformitarian geology, palaeontology, and the Darwinian concept of evolution, a grant has been awarded for the collection and editing of the scattered and unpublished correspondence of Lyell and his scientific contemporaries in order to throw new light on the development of his thought. Throughout the 17 years from 1660 that Henry Oldenburg held the office of Secretary of the Royal Society of London, he maintained a voluminous correspondence with the entire European scientific community. His letters are one of the largest sources of material bearing on scientific activity during the 17th century and they are being prepared for publication.

The recovery of the mathematical models of planetary systems devised before the time of Copernicus and the physical observations on which they were based will be a useful contribution to the study of Islamic planetary theory and to the history of medieval science. Other studies of early foundations of later scientific thought deal with 17th century chemistry and its influence on modern medicine and the relationship of pre-Newtonian physics to the development of physical oceanography.

The philosophical basis of physical science offers one of the most fruitful areas of modern philosophical research. The attempt to formulate known areas of physical theory into one deductive theory is intended to give a deeper understanding of what has been accomplished thus far, uncover unjustified assumptions, and suggest new methods for the solution of problems of physics. A grant has been made to investigate completeness in physical science as it has been applied by mathematical logicians to deductive systems. Elucidation of this problem with regard to quantum physics can have the utmost importance for theoretical foundations of other sciences.

ANTARCTIC RESEARCH

PROGRAM OPERATIONS

General

The National Science Foundation administers a national program of scientific research in Antarctica covering investigations in the earth sciences, atmospheric sciences, biological sciences, and related fields of study. By direction of the President, the Bureau of the Budget, in Circular A–51, instructed the Foundation "to exercise the principal coordinating role in the development and carrying out of an integrated United States scientific program for Antarctica." In keeping with this responsibility, the Foundation looks after the Antarctic research interests of other Government agencies as well as those of private institutions.

The United States Antarctic Research program continues a scientific activity in Antarctica inaugurated for the International Geophysical Year (1957–1958). This international cooperative scientific effort proved so successful in enhancing the knowledge of the geographical and geophysical aspects of this region that the 12 nations cooperating since the IGY signed the Antarctic treaty in June 1961. This treaty provides that the Antarctic shall be used only for peaceful purposes and that freedom of scientific investigation shall continue in this spirit of international cooperation. The treaty calls for the continued exchange of scientific personnel and information between the cooperating nations. In the spirit of this treaty, the United States participates specifically with Argentina, Chile, The United Kingdom, Australia, New Zealand, and the U.S.S.R. in programs of scientific exchange and in mutual scientific assistance. These cooperative activities further United States scientific objectives by providing access to larger areas of the continent and by making available to United States scientists the results and experience of scientific personnel of other countries.

Program Administration

The National Science Foundation established during 1958 the United States Antarctic Research program under the Office of Special International Programs to undertake the detailed problems of coordinating a broad program of Antarctic research. On May 26, 1961, as a result of the increased international importance of the program and enlarged Foundation responsibilities in this area, a separate office, the Office of Antarctic Programs was established.

Serving in an advisory capacity to the Foundation is the Committee on Polar Research of the National Academy of Sciences. This committee considers broad program objectives for the United States in Antarctica and proposes them to the Foundation as representing the opinions of the scientific community and its interests in certain areas of Antarctic research. This committee is also representative to the Special Committee for Antarctic Research (SCAR) of the International Council of Scientific Unions.

The Department of Defense has been designated the agent to provide the logistic support to the scientific program in Antarctica. To carry out these support activities, responsibilities for the detailed logistic planning were assigned to the Commander, Naval Support Force, Antarctica. Assisting the Commander, Naval Support Force, Antarctica, in discharging these responsibilities are units of the Navy, Coast Guard, Military Sea Transportation Service, and the Air Force.

The scientific program of the Office of Antarctic Programs is responsible for the development of long-range and immediate program plans and for the evaluation of research proposals. In carrying out these responsibilities the program calls upon the advice and services of the members of the Committee on Polar Research and its panels, specialists in the field at universities and in other Government agencies, and NSF program directors knowledgeable in the particular fields of research. Since each grant awarded by the Foundation for field research in Antarctica must include the assurance that facilities required to support each research activity will be available, each proposal is reviewed by the Field Requirements and Coordination Program of the Office of Antarctic Programs. This program, in close consultation with representatives of the U.S. Navy, draws upon its experience in coordinating scientific field activities in Antarctica to review research proposals for feasibility in terms of available logistic support.

The United States Antarctic Research program includes research activities of interested Government agencies, educational institutions, and other private organizations. Dollar support has been divided about equally between Government and non-Government groups; by number of grants—20 percent to Government agencies, 80 percent to non-Government groups.

The United States Antarctic Research program utilizes in the field a basic network of four stations in Antarctica: Byrd, Hallett, Pole, and McMurdo Stations. In addition to these stations, the National Science Foundation, through agreement with the Military Sea Transportation Service will begin in 1962 to maintain a research vessel in Antarctic waters. These stations serve primarily as locations from which to make observations of geophysical phenomena, while at the same time they serve as staging points for scientific field parties active in the austral summer months. Since the conclusion of the IGY, greater emphasis has been placed in this program on new areas of study such as biology, geology, and mapping which are best carried out in the field in summer months.

International Activities

The United States continues to work with Australia and Argentina in the maintenance of two cooperative scientific stations—Wilkes and Ellsworth—originally built by the United States for the IGY. The custody of these stations has been transferred to Australia and Argentina, respectively.

The practice of exchanging scientists, carried on during the IGY, has been continued. The United States and the Soviet Union maintain an exchange of scientific personnel annually. One American scientist joins the Soviet expedition to winter at their Mirnyy Station, while one Soviet scientist takes part in the American scientific program at a United States station.

During the past year, several cooperative oceanographic and glaciological programs were undertaken with Argentina and Chile in the region of the Drake Passage between the tip of South America and the Antarctic Peninsula. The United States also provided a geomagnetic technician for the Chilean scientific base to assist scientists of that country in installing a magnetic apparatus and in training Chilean observers to use this apparatus.

Through the U.S. Weather Bureau, the United States is participating in the International Antarctic Analysis Center in Melbourne, Australia. This center replaces the IGY Weather Central originally located at the Little America Station, and carries out daily weather analysis of Antarctic data, as well as some research activities.

CURRENT RESEARCH SUPPORT

Investigations are being carried out under the United States Antarctic Research program in the fields of the biological and medical sciences, cartography, geology, glaciology, gravity, meteorology, oceanography, seismology, and upper atmospheric physics.

Among the many biological studies undertaken in Antarctica as part of the last year's program were the continued collection of airborne insects, limnological investigations of fresh-water lakes, studies of the ecology and physiology of McMurdo Sound marine life, research on the water metabolism of the Adelie penguin, and an investigation of the effects of the earth's rotation on the "biological clocks" of plants and insects.

Of particular significance was the discovery of the remains of fish, some estimated to have been at least two meters long, on the surface of the Ross Ice Shelf in the vicinity of the Dailey Island. It is believed these had been trapped below the ice and subsequently brought to the surface through a continual process of melting from the top and freezing from the bottom. In the collections of airborne organisms, free-living insects and mites were found at elevations of 6,000 feet above sea level, perhaps the highest altitude at which insect life has so far been encountered in Antarctica. In the course of biological studies on two fresh water lakes in the Taylor Dry Valley, it was found that the water became progressively warmer with depth and in one case approached 72° F at the bottom despite some 10 feet of permanent ice cover over the lake. The stability of the water at the bottom is due to high salinity (several times that of normal sea water), but the high temperatures are as yet unexplained.

Cartographic studies continued, with aerial photography accomplished over about 118,000 square miles from Cape Adare south to the Queen Maud Mountains. The surface control required for the utilization of the photographs in the preparation of maps was accomplished by topographic engineers using new electronic measuring devices.

Geology in the interior of the Antarctic was investigated by three separate parties. One group investigated the central Horlick Mountains, part of the great mountain chain extending across the continent. Here, post-Silurian sedimentary rocks of the Beacon group were found to unconformably overlay the crystalline basement complex. A thick sequence of tillite, a rock formed by the compression and cementing of glacial morainal material, was found in the Beacon group resting on glaciary striated pavement showing that an extensive glaciation took place in the Antarctic during the Late Paleozoic or Early Mesozoic eras and further indicates the connection between the Beacon sediments of Antarctica and the Gondwana sediments of Australia, South Africa, and South America.

Four United States Antarctic seismological stations continued to operate as part of the international seismology network in the Antarctic. These have proven very effective in locating earthquake epicenters throughout the Southern Hemisphere, though the Antarctic Continent itself is not an active seismic region.

Two major over-snow traverses continued the exploration of inland areas that started in 1957 and now total 12,000 miles of surface travel over the Antarctic ice cover. One unit traveled from Byrd Station to the Eights Coast of the Bellingshausen Sea while the second traveled from McMurdo to the Victoria Plateau by way of the Skeleton Glacier, then southwest and south to the Pole Station. The Marie Byrd Land party obtained further information on the large subice channel extending from the Ross Sea towards the Amundsen and Bellingshausen Sea. The McMurdo-Pole traverse found the subice rock to be generally near sea level, checking well the results of the U.S.S.R. traverse from Vostock to the Pole in 1959–60. The thinnest ice located on the traverse was about 6,000 feet.

Meteorological observations, including upper atmosphere soundings by balloon-borne equipment, surface observations, and special studies such as the determination of ozone, carbon dioxide, solar radiation amounts and radioactive fallout continued. At McMurdo in the summer season, special humidity measurements were taken at high altitudes by balloon-borne instruments.

Routine oceanographic data were collected aboard U.S. Navy vessels during the summer supply operations, and a small oceanographic program included observations of ocean currents and water properties throughout the year at McMurdo Station.

Research on the upper atmosphere continued to be one of the major efforts in Antarctica and primarily centered around investigations in geomagnetism, the ionosphere, very-low frequency and extra-low frequency radio propagation, aurora and airglow, and cosmic radiation.

A relatively rare phenomenon, the sudden arrival of solar-produced cosmic radiation of sufficient energy to be detected at ground stations, was observed on November 12, 1960, and again on November 15 by the neutron monitor at McMurdo Station and simultaneously by a similar unit located at Thule, Greenland.

Facilities

SPECIALIZED BIOLOGICAL AND MEDICAL SCIENCES RESEARCH FACILITIES

This program is designed to support installations that are unique in the sense of geographical location, purpose, regional usage, or a combination thereof, and that are not usually a part of the normal departmental organizational structure of colleges or universities. There is no fixed requirement as to the amount of funds which the institution must itself raise before becoming eligible. In some instances the Foundation provides the full cost.

The specialized facilities program provides support in the following general areas. These are: (1) maintenance of research materials, including museum research collections, genetic stock centers, and repositories for special research materials; (2) maintenance and operation of research institutes, including field stations, marine biology stations, special university laboratories or institutes, and other private nonprofit laboratories; and (3) development of new facilities, including unique designs of existing types of facilities, special applications of such complex tools as computers and reactors, and new departures.

Twenty-four grants totaling $3 million were awarded during 1961 in this program. The following examples will provide some notion of the range of grants made. A second Drosophila stock center was established at the Institute for Cancer Research in Philadelphia to complement the only other one existing in this country at the California Institute of Technology. The second center will not only duplicate the entire mutant collections of the first stock center, as a precaution against loss, but will also acquire and maintain many new mutant strains. Support for a barley stock center was also initiated this year. A sizable grant was made to the American Type Culture Collection for new quarters in which to house valuable collections of microorganisms. These materials are distributed to research laboratories throughout the country and abroad for use in a wide spectrum of biological and medical research.

Two grants were made to museums of note, the Museum of Comparative Zoology at Harvard and the Los Angeles County Museum, for renovations and additions to their research quarters. Various facilities requirements of field stations accounted for six more grants. These ranged in size and purpose from a token contribution toward the establishment of an international field station in the Galapagos Islands to a substantial grant for construction of laboratory and living quarters at the Rocky Mountain Biological Laboratory. Other stations aided were the Bear Lake Laboratory of Utah State University, the Vermillion Sea Station of the San Diego Society of Natural History, a small station for animal behavior studies at Duke University, and one associated with Emory University.

In addition to several grants to marine stations for additions and modifications of their shore research facilities, two were made for the acquisition of major oceanographic vessels, one for the Stanford University Hopkins Marine Station, and the other for the Duke University Beaufort Station. (See Oceanographic Research Vessels.)

UNIVERSITY COMPUTING FACILITIES

The Foundation in 1961 continued its program of partial support for the acquisition or rental of high-speed computers of advanced design by universities for use of basic research. Six grants totaling $1,685,000 were made. There were also twenty grants for $796,000 for support of initial operations of computing centers; for procurement of small computers, improvements in existing centers, etc.

OCEANOGRAPHIC RESEARCH VESSELS

Considerable progress was made on the design of the oceanographic vessel for the Woods Hole Oceanographic Institution, and, in September 1961, award of a contract for construction of the 210-foot vessel was announced by the Institution. The new ship, to be named ATLANTIS II after Woods Hole's famous ketch ATLANTIS, will be one of the very few ships ever designed in the United States specifically for oceanographic research. She will be built of steel and will have twin propellers, powered by uniflow reciprocating steam engines for quiet operation, freedom from vibration, and flexibility in maneuvering—all valuable characteristics in a research ship. She will have a waterline length of 195 feet, beam of 44 feet, and displacement of 2,100 tons. Accommodations will be provided for a crew of 28 and scientific party of 25. The Foundation has granted a total of $4.75 million for design and construction of the vessel ($3 million in 1960 and $1.75 million in 1961).

Duke University will construct a biological oceanographic vessel with NSF assistance, one of the first major research vessels to be built with biological oceanography as its prime function. It will permit Duke and other interested universities to cooperate in extending the scope of their research to include the deep ocean as well as the coast line and shallow water areas. Foundation support amounted to approximately $618,000.

Stanford University was awarded a grant to enable the Hopkins Marine Station to convert a two-masted schooner to a modern seagoing marine biological vessel that will be one of the largest sailing ships in the world used for scientific purposes. The grant was for $463,000.

HAWAII INSTITUTE OF GEOPHYSICS

An institute of geophysics is being established in the Hawaiian Islands to take full advantage of the unusual opportunities which the islands offer for geophysical studies in the fields of meteorology, volcanology, seismology, geology, hydrology, astrophysics and cosmic radiation, tropical weathering and erosion, and oceanography.

The general plan is to establish a central laboratory staffed and operated by the University of Hawaii. The main buildings will be constructed on a site presently owned by the University. Smaller buildings will be erected at several outlying sites in order to achieve maximum scientific advantage. The Institute of Geophysics will be administered and supported as an integral part of the University of Hawaii.

An amount of $300,000 was granted by the Foundation during the fiscal year for site development and detailed architectural and engineering studies.

NATIONAL RESEARCH CENTERS

1. National Radio Astronomy Observatory

Construction of all major buildings has been completed; all instruments have been built for which funds have been provided, with the exception of the 140-foot and 300-foot telescopes.

A contract was executed for the construction of a 300-foot parabolic dish to be used initially for studies of neutral hydrogen distribution and motion in the Milky Way. Plans call for completion of this dish during the next year. It will be of the transit type capable of operating between 22° south and 90° north.

A total of $5,404,000 was allocated in 1961 to the contract under which Associated Universities, Inc. operates the observatory at Green Bank, W. Va.

2. Kitt Peak National Observatory

The past year was a fruitful one at the Kitt Peak Observatory with construction moving along rapidly. The dome for the 84-inch reflecting telescope was completed; the mounting is now being constructed; and the grinding and polishing of the mirror is proceeding.

The solar telescope, the largest in the world, is progressing at a satisfactory pace. The 100-foot heliostat tower is in place, and the 300-foot shaft and tunnel have been excavated. Operation of this telescope should begin early in 1963. A solar wing is being added to the headquarters building in Tucson to house offices and laboratories.

The satellite telescope has been actively pushed. A remote-controlled 36-inch telescope has been designed and is out for bids. It will first be mounted in Tucson for evaluation and then moved to Kitt Peak for operation from the city by a microwave link. A cooperative program has been initiated with personnel of NASA's Goddard Space Flight Center who wish to use the remote-controlled facility to test their 36-inch Orbiting Astronautical Laboratory.

On October 1, 1960, Dr. N. U. Mayall officially assumed the position of Director of the Observatory. He succeeded Dr. C. D. Shane, president of AURA, who had served on a temporary basis until Dr. Mayall could assume his new position.

3. National Center for Atmospheric Research

This center, as are the National Observatories, is managed and operated for the Foundation by an association of universities—in this case, the University Corporation for Atmospheric Research. The 1961 allocation was $500,000.

The National Center for Atmospheric Research was established to meet the need for a national center devoted to basic research in the atmospheric sciences. Its purpose is to serve as a focus for intellectual activity bringing together scientists from meteorology and related disciplines and providing research facilities on an appropriate scale to deal with the global nature of meteorological problems. The director, Dr. Walter Orr Roberts; the associate director, Dr. Philip D. Thompson;

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and other top staff people have already been appointed and the early outlines of the NCAR program are beginning to emerge.

Table Mountain, near Boulder, Colo., was selected as the site of the new laboratory because of its central location with respect to research establishments and departments throughout the country, its excellent and growing research environment, and its advantages for the study of particular atmospheric phenomena. Land at the site has been made available by the State of Colorado without cost to the Federal Government.

GRADUATE RESEARCH LABORATORIES

Graduate research laboratories are used principally by faculty members and their research associates in carrying out their research programs. However, they are also of paramount importance in serving the needs of graduate and post-doctoral students pursuing thesis or independent research problems. In fact, graduate-level research cannot proceed without adequate research laboratories.

Existing laboratories are to a great extent outmoded and scarcely able to provide for the increased load being imposed by the continually rising number of graduate students and faculty members needing to use them.

Financial resources of many of these institutions are comprised mainly of the traditional endowments and are already being strained to the utmost to provide for the constantly rising costs associated with the usual educational responsibilities for instruction, particularly at the undergraduate level.

The Foundation, therefore, initiated in the 1960 fiscal year a program of support to help alleviate the critical need for graduate research laboratories with primary emphasis, of necessity, on renovation and equipping of existing laboratories with fixed equipment. This was done in order to provide a maximum number of grants to accomplish immediate improvement in the largest possible number of graduate research laboratories.

Grants awarded under this program require the recipient institution to provide from non-Federal sources at least 50 percent of the cost of the project being supported. This requirement assures that the requesting institution will be prudent and will carefully evaluate the project in terms of its own overall research programs prior to submitting a request for funds.

Only university departments having on-going graduate training programs leading to the doctoral degree in science or engineering were eligible to apply for support during the past fiscal year. Support was further restricted to laboratories used for basic research.

A total of 87 grants were awarded in fiscal year 1961 at a cost of $8.5 million—43 in the life sciences for $3.1 million, 44 in the physical sciences for $5.4 million.

During 1961, responsibility for the operation of this program was transferred from the research divisions to the Office of Institutional Programs.

Research-Related Activities

SCIENTIFIC CONFERENCES AND SYMPOSIA

The Foundation during 1961, sponsored and provided partial support for 47 conferences and symposia (listed below). These meetings provided a forum for the exchange of information and ideas among scientists who are pioneering in new or incompletely explored fields. They also furnished opportunity in many cases for younger scientists to learn and obtain advice from some of the world's outstanding senior scientists. Frequently the subject matter was interdisciplinary, of interest to scientists in several fields. In most cases, sponsorship was shared with one or more private or public agencies, including universities and scientific societies.

Response of Materials to High Velocity Deformation—Estes Park, Colo., July 11–12, 1960; Chairman: Dr. H. W. Paxton, Carnegie Institute of Technology, Pittsburgh, Pa.; Cosponsor: Metallurgical Society of the American Institute of Mechanical Engineers.

Second International Symposium on Rarified Gas Dynamics—University of California, Berkeley, Calif., Aug. 3–6, 1960; Chairman: Dr. Immanuel Estermann, Office of Naval Research, Washington, D.C.; Cosponsors: Office of Naval Research, Air Force Office of Scientific Research, National Aeronautics and Space Administration, and University of California.

International Conference on Organic Scintillation Detectors—University of New Mexico, Albuquerque, N. Mex., Aug. 15–17, 1960; Chairman: Dr. Guido H. Daub, Department of Chemistry, University of New Mexico; Cosponsors: Atomic Energy Commission, University of New Mexico.

VII International Soil Science Congress—University of Wisconsin, Madison, Wis., Aug. 15–23, 1960; Director: Emil Truog, Chairman, Finance Committee, Soil Society of America; Cosponsors: Rockefeller Foundation, Atomic Energy Commission and Soil Science Society of America.

Conference on Function Algebras—Dartmouth College, Hanover, N.H., Aug. 15–31, 1960; Chairman: Dr. Hazelton Mirkil, Department of Mathematics and Astronomy, Dartmouth College; Cosponsors: U.S. Air Force and Dartmouth College.

International Symposium on Immunochemical Approaches to Problems in Microbiology—New Brunswick, N.J., Sept. 1–3, 1960; Chairmen: Michael Heidleberger and Ottor J. Plescia, Institute of Microbiology, Rutgers University, New Brunswick, N.J.; Cosponsor: Rutgers University.

Survey of the Transportation Problem—Woods Hole, Mass., Aug. 1–Sept. 3, 1960; Director: John S. Coleman, Executive Secretary, National Academy of

Sciences-National Research Council, Division of Physical Sciences, Washington, D.C.; Cosponsor: National Academy of Sciences-National Research Council.

INTERNATIONAL CONFERENCE ON ATOMIC MASSES—McMaster University, Hamilton, Ontario, Canada, Sept. 12–16, 1960; President: Professor J. Mattauch, Max Planck Institute for Chemistry, Mainz, Germany; Cosponsors: International Union of Pure and Applied Physics, National Research Council of Canada, Province of Ontario, Canadian Association of Physicists, National Academy of Sciences-National Research Council, and private industry.

NUMERICAL TREATMENT OF ORDINARY DIFFERENTIAL INTEGRAL AND INTEGRO-DIFFERENTIAL EQUATIONS—Rome, Italy, Sept. 20–24, 1960; Coordinator: Professor Aldo Ghizzetti, Deputy Director, Instituto Nazionale per le Applicazioni del Calcolo, Rome, Italy; Cosponsors: Provisional International Computation Center, Rome, Italy, Italian Ministry of Education, and private industry.

INTERNATIONAL CONFERENCE ON THE NATURE OF SOLID FRICTION—Midwest Research Institute, Kansas City, Mo., Sept. 26–28, 1960; Director: Dr. Bruce Daniel, Physics Section, Mathematics and Physics Division, Midwest Research Institute; Cosponsors: Army Office of Ordnance Research, Office of Naval Research, and Wright Air Development Division.

NINTH NATIONAL CLAY CONFERENCE—Purdue University, Lafayette, Ind., Oct. 5–8, 1960; Chairman: Dr. Joe L. White, Department of Agronomy, Purdue University; Cosponsor: National Academy of Sciences-National Research Council.

SYMPOSIUM ON HUMAN GENETICS—Cleveland, Ohio, Oct. 10–12, 1960; Chairman: Arthur G. Steinberg, Department of Preventive Medicine, Western Reserve University, Cleveland, Ohio; Cosponsor: Western Reserve University.

MATHEMATICAL OPTIMIZATION TECHNIQUES—Santa Monica, Calif., Oct. 18–20, 1960; Directors: Dr. Robert M. Oliver and Dr. Raymond C. Crassi, Engineering and Sciences Extension, University of California; Cosponsors: Office of Naval Research, National Space and Aeronautics Administration, University of California, and the Rand Corporation.

SYMPOSIUM ON DECOMPOSITION OF AUSTENITE—Philadelphia, Pa., Oct. 19, 1960; Director: Victor F. Zackay, Chairman, Ferrous Metallurgy Committee, AIME: Cosponsor: The Metallurgy Society of the American Institute of Mechanical Engineers.

IMPACT OF FEEDBACK CONTROL CONCEPTS IN THE STUDY OF ECONOMIC AND BUSINESS SYSTEMS—New York, N.Y., Oct. 28, 1960; Moderator: Dr. Cuthbert C. Hurd, Program Manager, Advanced Systems Development Division, International Business Machines, Inc.; Cosponsors: Foundation for Instrumentation Education and Research and the Institute of Management Sciences.

GAS CHROMATOGRAPHY—University of California, Los Angeles, Calif., Jan. 26–28, 1961; Chairman: Dr. Robert L. Pecsok, Department of Chemistry, University of California; Cosponsor: University of California, Los Angeles.

GEODESY IN SPACE AGE—Ohio State University, Columbus, Ohio, Feb. 6–8, 1961; Chairman: Dr. W. A. Heiskanen, Director, Institute of Geodesy, Photogrammetry and Cartography, Ohio State University; Cosponsor: Ohio State University.

CONFERENCE ON BRAIN AND BEHAVIOR—Los Angeles, Calif., Feb. 19–22, 1961; Chairmen: H. W. Magoun, School of Medicine, University of California, Los Angeles, Calif. and Frank Fremont-Smith, AIBS; Cosponsor: University of California, Los Angeles.

SIXTH ANNUAL SYMPOSIUM ON MINING RESEARCH—University of Missouri, Rolla, Mo., Feb. 22–25, 1961; Chairman: Dr. G. B. Clark, Chairman, Department of Mining, University of Missouri School of Mines and Metallurgy; Cosponsors: University of Missouri and Department of Interior, Bureau of Mines.

SYMPOSIUM ON STRUCTURE, CONFORMATION, AND FUNCTION OF NUCLEIC ACIDS AND PROTEINS—M. D. Anderson Hospital and Tumor Institute, Houston, Tex., Feb. 23–25, 1961; Chairman: Saul Kit, University of Texas, M. D. Anderson Hospital and Tumor Institute, Houston, Tex.; Cosponsor: University of Texas.

DIRECT OBSERVATION OF DEFECTS IN CRYSTALS—St. Louis, Mo., Feb. 26–Mar. 2, 1961; Directors: J. B. Newkirk, Research Metallurgist, General Electric Research Laboratory, Schenectady, N.Y. and J. H. Wernick, Bell Telephone Laboratories, Murray Hill, N.J.; Cosponsor: The Metallurgical Society of the American Institute of Mechanical Engineers.

CONFERENCE ON NEUROSPORA—La Jolla., Calif., Mar. 2–4, 1961; Chairman: Frank L. Campbell, NAS–NRC, Division of Biology and Agriculture, Washington, D.C.; Cosponsors: University of California, Atomic Energy Commission and National Academy of Sciences-National Research Council.

FIVE REGIONAL DEVELOPMENTAL BIOLOGY CONFERENCES—Gambier, Ohio, Mar. 16–17, 1961; Wakulla, Fla., May 18–19, 1961; Ames, Iowa, May 1–2, 1961; Lake Arrowhead, Calif., May 25–27, 1961; Chairman: Emil Witschi, Department of Zoology, State University of Iowa, Iowa City, Iowa; Cosponsors: Kenyon College, Florida State University, State University of Iowa and Division of Developmental Biology of the American Society of Zoologists.

SYMPOSIUM ON STATISTICAL GENETICS AND PLANT BREEDING—Raleigh, N.C., Mar. 20–29, 1961; Chairman: Frank L. Campbell, NAS–NRC, Division of Biology and Agriculture, Washington 25, D.C.; Cosponsors: Atomic Energy Commission, National Institutes of Health, North Carolina State College and National Academy of Sciences-National Research Council.

SYMPOSIUM ON ELECTRONIC REARRANGEMENTS AND ENERGY TRANSFER IN BIOLOGICAL SYSTEMS—St. Louis, Mo., Mar. 29, 1961; Chairman: Leroy Augenstine, Biology Department, Brookhaven National Laboratory, Upton, N.Y.; Cosponsor: American Chemical Society.

FOURTH SYMPOSIUM ON ROCK MECHANICS—Pennsylvania State University, University Park, Pa., Mar. 30–Apr. 1, 1961; Chairman: Howard L. Hartman, Head, Department of Mining, Pennsylvania State University; Cosponsors: University of Minnesota, Colorado School of Mines and Pennsylvania State University.

SURFACE CHEMISTRY OF ICE NUCLEATION—University of Arizona, Tucson, Ariz., Apr. 6–8, 1961; Chairmen: James E. McDonald and Myron L. Corrin, University of Arizona; Director: Dr. A. Richard Kassander, Director, Institute of Atmospheric Physics, University of Arizona; Cosponsor: University of Arizona.

SYMPOSIUM ON MATHEMATICAL PROBLEMS IN BIOLOGICAL SCIENCES—New York, N.Y., Apr. 6–8, 1961; Chairman: Dr. S. M. Ulman, Los Alamos Scientific Laboratory, University of California; Cosponsors: American Mathematical Society and the Army Office of Ordnance Research.

INTERNATIONAL SYMPOSIUM ON AGGLOMERATION—Philadelphia, Pa., Apr. 12–14, 1961; Chairman: Dr. W. B. Stephenson, President, Allen-Sherman-Hoff Pump Co.; Cosponsor: American Institute of Mechanical Engineers.

SYMPOSIUM ON CHEMICAL REACTIONS IN THE LOWER AND UPPER ATMOSPHERE—San Francisco, Calif., Apr. 18–20, 1961; Chairman: Dr. Richard D. Cadle, Manager, Atmospheric Chemical Physics, Stanford Research Institute, Menlo Park, Calif.; Cosponsors: Department of Defense Advanced Research Projects Agency, National Institutes of Health, Atomic Energy Commission, Air Force Office of Scientific Research, and private industry.

SYMPOSIUM ON INVERTEBRATE CONTROL MECHANISMS—Lexington, Ky., Apr. 20, 1961; Chairman: D. G. Humm, Department of Zoology, University of North Carolina, Chapel Hill, N.C.; Cosponsors: Society of General Physiologists and the University of North Carolina.

SYMPOSIUM ON MATRIX COMPUTATION—Gatlinburg, Tenn., Apr. 23–30, 1961; Chairman: Dr. A. S. Householder, Chief, Mathematics Panel, Oak Ridge National Laboratory, Oak Ridge, Tenn.; Cosponsors: Society for Industrial and Applied Mathematics, Atomic Energy Commission, and Oak Ridge National Laboratory.

Record of Patterns of Water Movement in Recent and Ancient Sediments—Denver, Colo., Apr. 24–26, 1961; Chairman: R. N. Ginsberg, SEPM; Cosponsor: The Society of Economic Paleontologists and Mineralogists.

Fluid Dynamics and Applied Mathematics—University of Maryland, College Park, Md., Apr. 28–29, 1961; Director: Dr. J. M. Burgers, Acting Director, Institute for Fluid Dynamics and Applied Mathematics, University of Maryland. Cosponsor: Institute for Fluid Dynamics and Applied Mathematics, University of Maryland.

Symposium on Modern Electrochemical Instrumentation—Indianapolis, Ind., Apr. 30–May 3, 1961; Chairman: C. W. Tobias, Department of Chemistry and Chemical Engineering, University of California; Cosponsor: The Theoretical Division of the Electrochemical Society, Inc.

Symposium on Mathematical Theories of Biological Phenomena—Chicago, Ill., May 8–10, 1961; Chairman: N. Rashevsky, Committee on Mathematical Biology, University of Chicago, Chicago, Ill.; Cosponsor: University of Chicago.

Midwest Conference on Theoretical Physics—University of Minnesota, Minneapolis, Minn., May 12–13, 1961; Chairman: Dr. Warren B. Cheston, School of Physics, University of Minnesota; Cosponsor: University of Minnesota.

Symposium on Oceanography in the Midwest—University of Wisconsin, Madison, Wis.; May 15–16, 1961; Director: Dr. Lewis M. Cline, Department of Geology, University of Wisconsin; Cosponsors: ONR, Committee on Institutional Cooperation and the University of Wisconsin.

Symposium on Chromosomes and Congenital Malformations—Cincinnati, Ohio, May 26–27, 1961; Chairman: F. Clarke Fraser, McGill University, Montreal, Canada; Cosponsors: Teratology Society and the University of Cincinnati.

Symposium on Quantitative Biology—Cold Spring Harbor, N.Y., June 4–6, 1961; Chairman: Arthur Chovnick, Long Island Biological Association, Cold Spring Harbor, N.Y.; Cosponsors: Cold Spring Harbor Biological Association, National Institutes of Health and Rockefeller Foundation.

Regional Conference of Comparative Endocrinology—Oisa, Japan, June 6–10, 1961; Chairman: Emil Witschi, Department of Zoology, State University of Iowa, Iowa City, Iowa; Cosponsors: American Society of Zoologists and the Zoological Society of Japan.

Twentieth Growth Symposium—Williamstown, Mass., June 12–14, 1961; Chairman: Edgar Zwilling, Brandeis University, Waltham, Mass.; Cosponsors: Society for the Study of Development and Growth and Williams College.

Conference in Elementary Particle Theory—University of California, La Jolla, Calif., June 14–16, 1961; Chairman: Dr. Keith A. Bruecker, Department of Physics, University of California; Cosponsors: Atomic Energy Commission, Office of Naval Research, International Union of Pure and Applied Physics.

Symposium on Biological Innovations and Geologic Record—Washington, D.C., June 14–16, 1961; Chairman: Philip Abelson, Carnegie Institution of Washington; Cosponsor: Carnegie Institution of Washington.

Symposium on Comets—Maria Mitchell Observatory, Nantucket, Mass., June 18–21, 1961; Chairman: Dr. Dorrit Hoffleit, Director, Maria Mitchell Observatory; Moderator: Dr. Gerhard Herzberg, National Research Council of Canada; Cosponsors: Maria Mitchell Observatory and American Astronomical Society.

Cytology of Bacteria and Other Microorganisms—Meriden, N.H., June 19–25, 1961; Chairman: Richard B. Roberts, Department of Terrestrial Magnetism, Carnegie Institution of Washington; Cosponsors: Gordon Research Conferences and Kimball Union Academy.

Desalination Research Study—Woods Hole, Mass., June 19–July 14, 1961; Chairman: Dr. Dayton E. Carritt, Woods Hole Oceanographic Institute, Woods Hole, Mass.; Cosponsors: National Academy of Sciences-National Research Council.

SUPPORT OF TRAVEL TO INTERNATIONAL MEETINGS

Personal contact between highly competent scientists from all over the world, conducting similar types of research, is one of the most important means by which ideas are exchanged. The cross-fertilization of ideas is vital to the advancement of scientific knowledge. The Foundation, therefore, partially defrays travel costs for a limited number of American scientists to attend selected international meetings and congresses abroad. The grant to the scientist generally provides for a round-trip air-tourist fare between the home institution and the location of the meeting. In fiscal year 1961, 539 scientists received such awards at a cost of approximately $506,000.

TRAINING ASPECTS OF RESEARCH GRANTS

A significant adjunctive contribution of the research grant programs of the Foundation is the training opportunity it provides for predoctoral and postdoctoral research assistants and associates. During 1961, approximately 6,700 individuals received the highest level of training through participation in research projects under the supervision of many of this country's most able scientists.

When this number is added to the 4,200 awards made under formal fellowship programs of the Foundation, the result represents a total of almost 11,000 persons—all of whom have been given the opportunity to further their scientific education and laboratory training under the most favorable and productive conditions.

PATENTS RESULTING FROM NSF-SUPPORTED RESEARCH

The Foundation, during the 1961 fiscal year, has received notification of the issuance of four patents by the U.S. Patent Office covering inventions arising out of Foundation-supported activities.

1. Patent No. 2,986,563 entitled "Certain Cycl[3.3.2]azines" was issued to Richard J. Windgassen, Jr., holder of a predoctoral fellowship at the University of Rochester, and to Virgil Boekelheide. It is for a new class of heterocyclic compounds containing carbon and nitrogen in the rings. Besides the support given Mr. Windgassen by the Foundation fellowship, the research which resulted in the invention was also supported by the Army Office of Ordnance Research.

2. Three patents were issued to Dr. R. G. Herb, of the Physics Department of the University of Wisconsin, on inventions made during the course of research supported by Foundation grants:

   (a) Patent No. 2,888,189, entitled "Vacuum Pump," relates to improvements in vacuum pumps which are capable of producing and maintaining a high vacuum. Patent applications have also been filed in France, Germany, the Netherlands, Switzerland, and the United Kingdom.

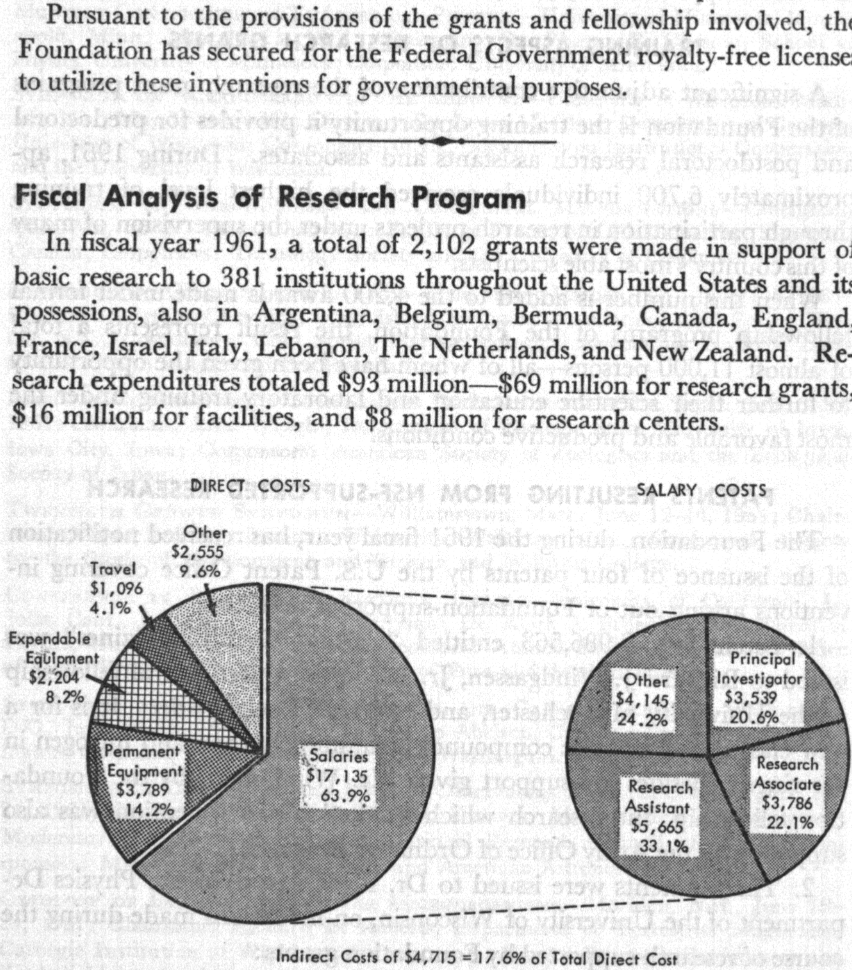
(b) Patent No. 2,913,167, entitled "Vacuum Pump," also relates to improvements in vacuum pumps which are capable of producing and maintaining a high vacuum, and particularly to improvements useful in pumps of small physical size. Patent applications have also been filed in Canada, France, Germany, and Switzerland.

(c) Patent No. 2,967,223, entitled "Feeder Mechanism," relates to apparatus for feeding an elongated member such as a wire to a heated surface on which the wire is to be evaporated.

Pursuant to the provisions of the grants and fellowship involved, the Foundation has secured for the Federal Government royalty-free licenses to utilize these inventions for governmental purposes.

Fiscal Analysis of Research Program

In fiscal year 1961, a total of 2,102 grants were made in support of basic research to 381 institutions throughout the United States and its possessions, also in Argentina, Belgium, Bermuda, Canada, England, France, Israel, Italy, Lebanon, The Netherlands, and New Zealand. Research expenditures totaled \$93 million—\$69 million for research grants, \$16 million for facilities, and \$8 million for research centers.



Note: Based on Average grant of \$31,494.

Figure 1. ***Distribution of Research Grant Funds, by Type of Expenditure, Fiscal Year 1961***

The average 1961 research grant was for $31,494 for a period of slightly more than 2 years. Grants in the mathematical, physical, and engineering sciences averaged $37,714; in the biological and medical sciences, $27,000; and in the social sciences, $20,557.

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 1. *National Science Foundation Grants, by Fields of Science, Fiscal Year 1961*

Field	Number	Amount
Biological and medical sciences:		
Developmental biology	94	$2, 395, 300
Environmental biology	133	3, 039, 100
Genetic biology	86	2, 338, 300
Metabolic biology	100	3, 007, 200
Molecular biology	117	4, 587, 600
Psychobiology	78	2, 284, 540
Regulatory biology	118	3, 474, 060
Systematic biology	178	2, 680, 825
General biology	51	2, 745, 980
Total	955	26, 552, 905
Mathematical, physical, and engineering sciences:		
Astronomy	54	2, 150, 770
Atmospheric sciences (includes weather modification)	60	3, 910, 840
Chemistry	213	6, 317, 730
Earth sciences	137	4, 653, 795
Engineering sciences	164	7, 403, 796
Mathematical sciences	140	4, 566, 531
Physics	141	6, 184, 200
Total	909	35, 187, 662
Social sciences:		
Anthropology	84	1, 397, 300
Economics	16	600, 500
History and philosophy of science	20	210, 000
Sociology	40	1, 245, 700
Total	160	3, 453, 500
Antarctic research (life and physical sciences)	78	3, 841, 770
Grand total	2, 102	69, 035, 837

INSTITUTIONAL GRANTS

The Federal Government provides each year a substantial amount of funds to our universities and colleges for the direct support of scientific research projects, facilities, and science training. However, the full cost of these scientific activities is not provided through the grants and contracts awarded to provide this support, and the institutions have provided, from their own limited resources, the additional funds necessary to fulfill the total support needs.

In addition, the Foundation recognizes that the scientific strength of our Nation rests in part upon the diversity and autonomy of the institutions that contribute to this strength. It also recognizes that imbalances in the financial structure of scientific activities at educational institutions have been created by the large amount of Federal money that they utilize for their scientific research.

In view of these factors, therefore, NSF created, in July 1960, an institutional grants program, conducted through Office of Institutional Grants, to assist institutions to strengthen their general research and training functions without specifying the precise research or related scientific activity to be undertaken. Its purpose is to provide optimum flexibility and simplicity of administration for the colleges and universities concerned, to enable them better to fulfill their diverse and autonomous roles.

Funds from this program may be used to employ additional scientific staff, to purchase research supplies, to satisfy emergency needs for equipment—for anything required by the institution to help maintain or improve the general quality and environment of the institution in its conduct of scientific activities.

The following formula was used for computing grants made during 1961:

Five percent of NSF basic research grant payments made to the institution during the period July 1, 1960—March 31, 1961, with no grant to exceed $50,000 in any one year. (Because the base period covered only nine months, the maximum grant during this first year was for $37,500.)

Grants totaling $1,496,604 were made to 248 institutions in 1961. More than half the awards (to 141 institutions) amounted to $2,000 or less; 10 institutions received the maximum grant.

NATIONAL SCIENCE FOUNDATION

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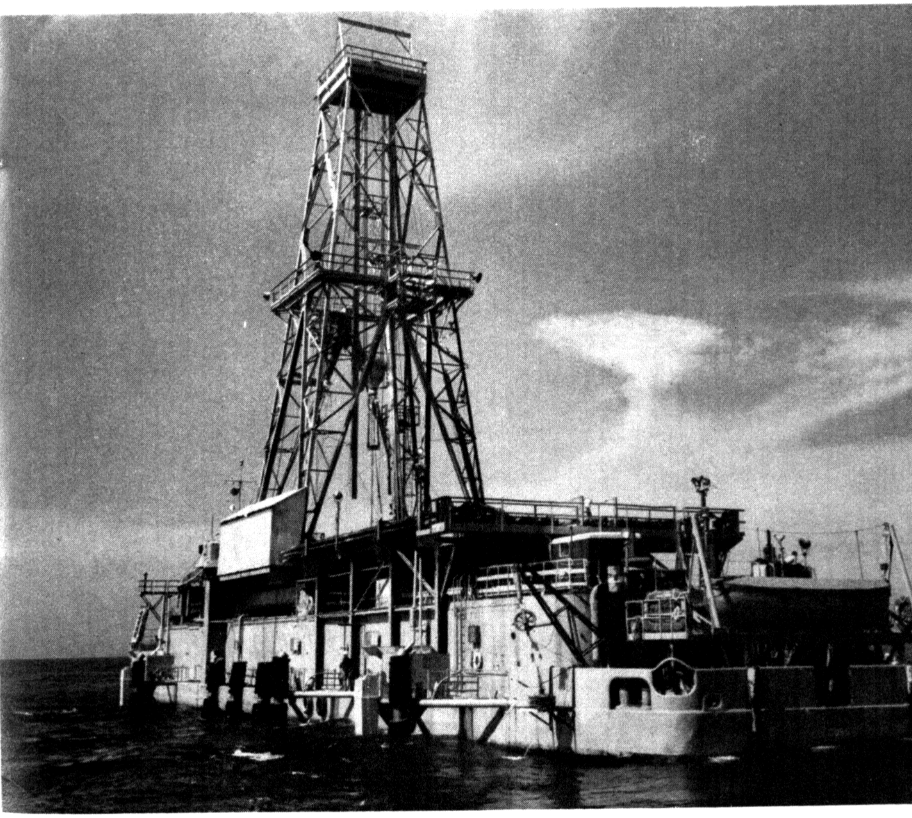
First Operational Phase of Project Mohole Proves Feasibility of Deep-Sea Drilling and Provides New Technique for Sediment Studies

The world's first deep-sea drilling operation was carried out during March and April 1961, at sites 16 miles west of La Jolla, Calif., and 50 miles east of Guadalupe Island off the west coast of Mexico, using the drilling barge CUSS I under an NSF contract. The drilling, under the technical direction of the AMSOC Committee of the National Academy of Sciences-National Research Council, was a test of equipment and techniques for further planning of Project Mohole. Its success provided oceanographers with a technique for coring deep ocean sediments at appreciable distances below the bottom. For the first time the second layer of the earth's crust was sampled, and cores of basalt brought up from as deep as 601 feet below the ocean floor in 11,700 feet of water at the Guadalupe site. The drilling barge, owned by Global Marine Exploration Co., Los Angeles, is shown below. (See p. 39.)



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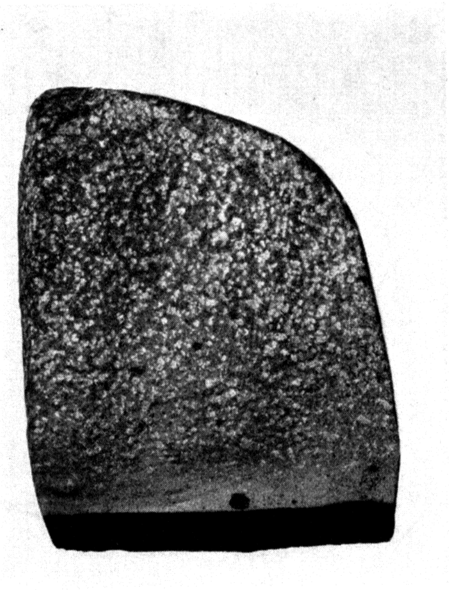
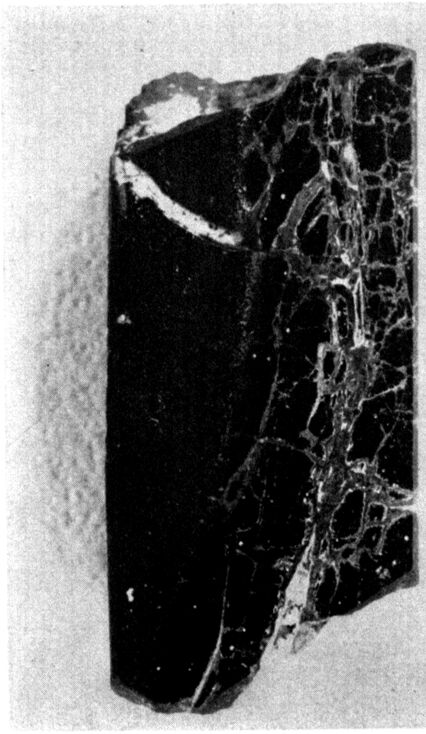
Preliminary Examination of Sediment Cores

A Scripps Institution of Oceanography research geologist (left) and the NAS–NRC Project Director examine one of the first cores taken aboard CUSS I. Preliminary examination of sediment cores was accomplished by scientists from many institutions and Government agencies cooperating in the project; detailed analysis will be carried on for a long period of time in laboratories throughout the country.

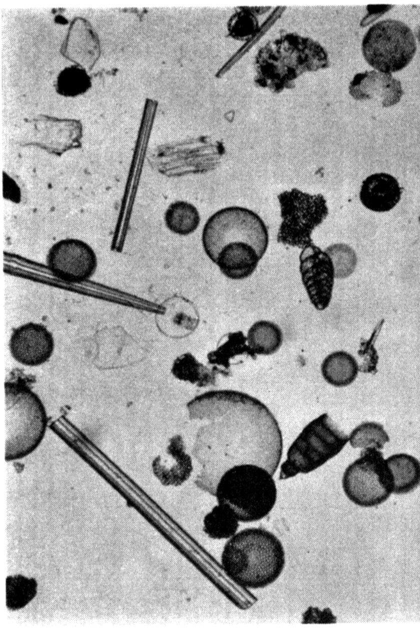




Mohole Cores

Cores shown above were taken from about 560 feet below the ocean floor. Specimen at upper left shows a light-colored layer of dolomite above a dark layer of basaltic glass. Above, right, is a cut and polished section of basalt; the left side is crystallized, the right side is basaltic glass. This suggests that the drill penetrated the edge of a pillow lava flow, a form of lava flow that occurs under water, resulting in the extrusion and rapid chilling of large blobs or "pillows" of lava.

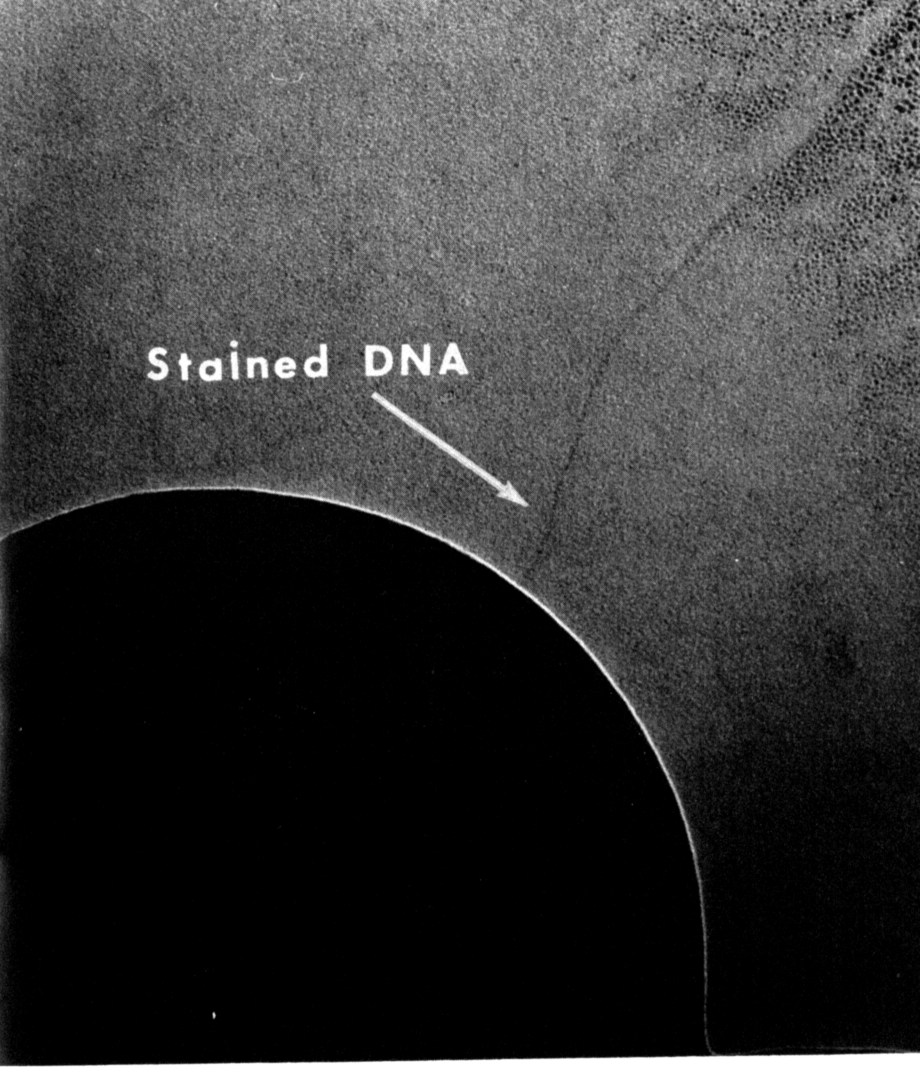
The photo at lower right shows 80x magnification of coccolithophorids and radiolarians sieved from a sediment sample taken about 320 feet below the sea floor.



Pre-Hispanic Wall Paintings Found in New Mexico

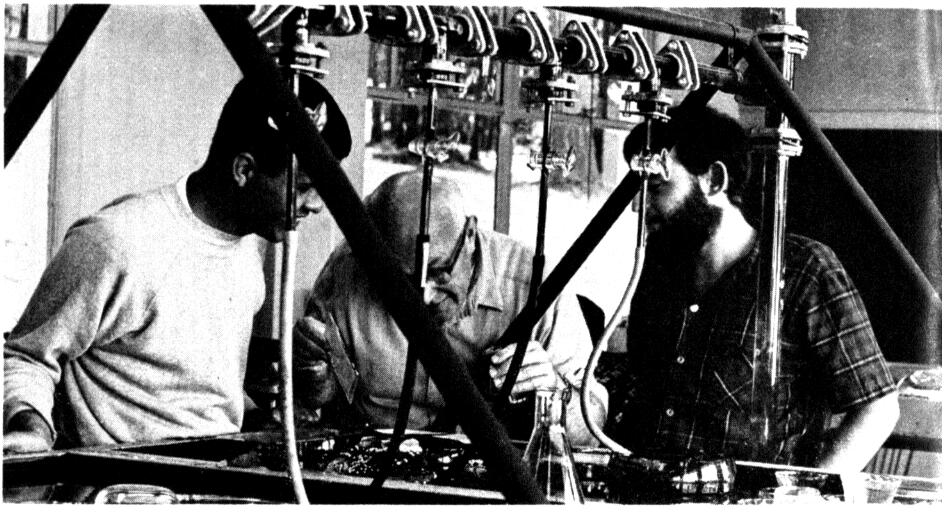
Excavations begun in 1954 by the University of New Mexico Summer Field School, and continued during 1960 with NSF support, uncovered eight subterranean kivas (ceremonial rooms), used by Indians living from about 1300 to 1450 A.D. All eight rooms have pre-Hispanic wall paintings, which is quite rare in the American southwest. At this site, Pottery Mound, approximately 200 paintings have been found. The murals are rendered in *fresco secco* on thin layers of finely prepared adobe plaster, in varied colors—eight shades of red are distinguishable, three shades of yellow, two of blue, and two of green.

The above photograph shows the excavation site, with canvas covering a kiva (foreground). Below (left) is a painting from one of the kivas, and at the right, a copy of the same painting executed so as to bring out the features as it is believed they originally appeared.



Electron Micrograph of Unbroken DNA Molecule

A significant development in research on DNA has taken place with the development by a Johns Hopkins group of a technique for making electron micrographs of DNA molecules. Conventional shadowing of DNA molecules has been replaced by a staining technique using uranyl nitrate, which highlights the negatively-charged, stretched-out molecule, previously attracted to a positively charged plastic film. The photograph above shows the faithful reproduction achieved through this technique, with a 400,000 magnification. (See p. 21.)

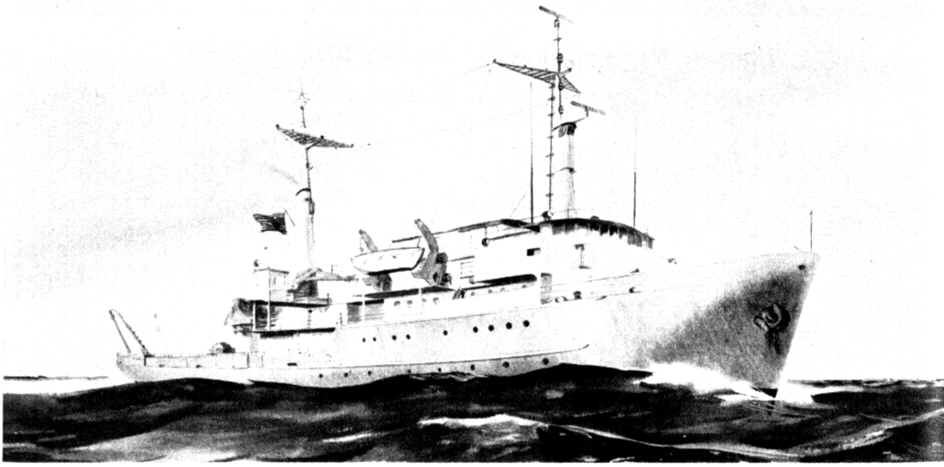


Wide Variety of Oceanographic Projects Under Way

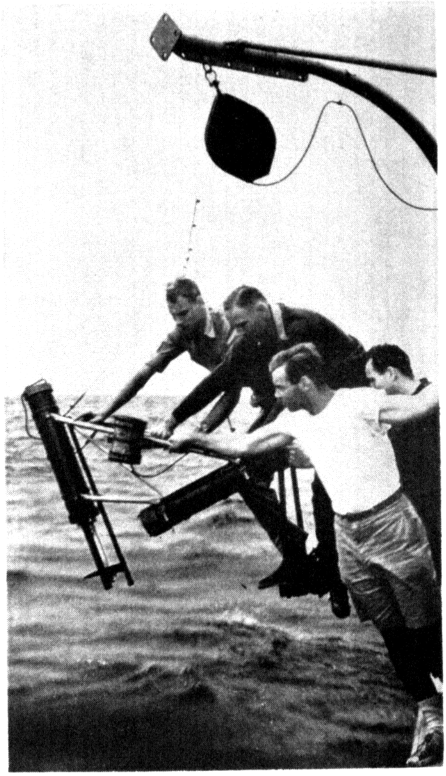
The Foundation has given increased support to oceanography, including basic oceanographic research (both physical and biological), oceanographic facilities, and science education projects in oceanography.

Shown above is a laboratory course in invertebrate embryology at the Friday Harbor Marine Laboratories of the University of Washington, where two students are working with a senior visiting scientist. About 75 percent of the students at this laboratory are on graduate research program grants that assist them to complete their work in marine biology and physical oceanography.

Shown below is an artist's conception of the new Woods Hole Oceanographic Institution vessel ATLANTIS II, now under construction at the Maryland Shipbuilding & Drydock Co., Baltimore. She will have an overall length of 209 feet, 8,000-mile cruising range, and accommodations for 28 crew members and 25 scientists.



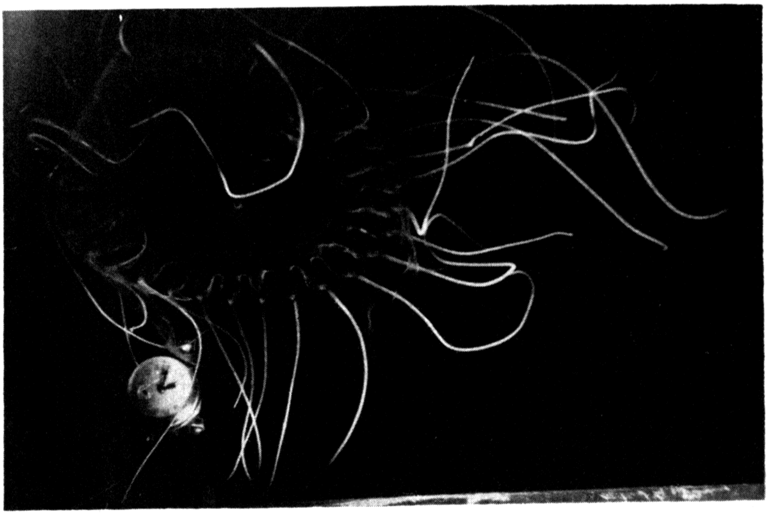
Bioluminescence Examined With Underwater Camera

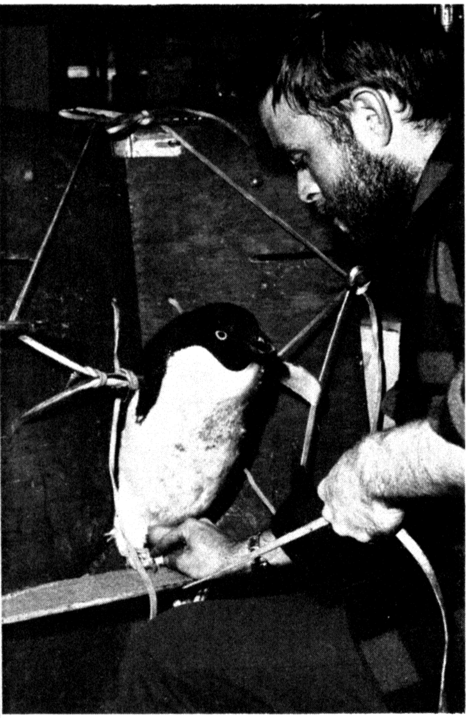


Extensive measurements of light conditions in the sea made with photomultiplier photometers have revealed the widespread occurrence of bioluminescence. Indeed, luminescent flashing has been detected in every locality and at every depth investigated below the levels at which light from the surface interfered.

Flashes have been recorded at depths as great as 2⅓ miles in the region of the Gulf Stream about 200 miles southeast of New York. Because the intensity of luminescence on some occasions approaches that of moonlight and because as many as 100 flashes per minute may be recorded, bioluminescence apparently plays a significant role in the lives of many marine organisms.

The recently constructed "luminescence camera" (shown above being lowered from an oceanographic vessel) is activated when the flash of an animal that swims or drifts into the sensitive region of the instrument is picked up by the shielded photomultiplier tube. The large and rather rare medusa shown below was photographed at a depth of 1,000 meters off the eastern tip of Georges Bank.

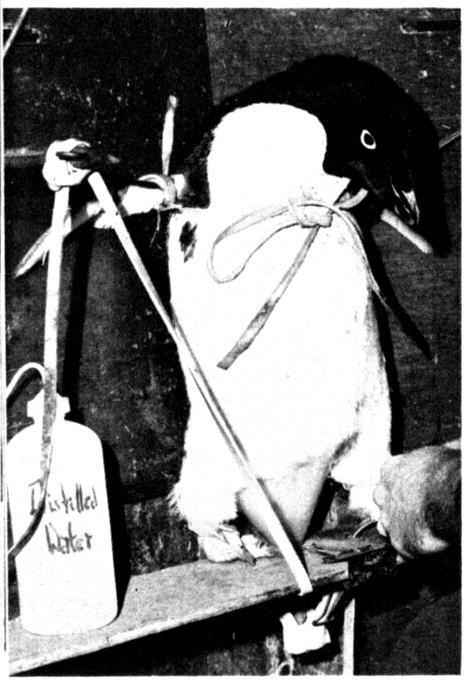




Salt and Water Metabolism of Adelie Penguins Studied

A Duke University project designed to find out how birds that consume food high in salt content, and drink salt water, rid themselves of excess salt sent an investigator to Hallett Station, Antarctica, for two summers as part of NSF's Antarctic research program. In addition to showing that Adelie chicks have well-developed salt glands that can function immediately after hatching, the investigation has thrown light on the physiological mechanisms for renal and extrarenal salt elimination and on changes in salt and water balance of adult birds during the breeding season.

These photographs show the penguin in an apparatus designed to keep the bird firmly in place without injury. After strapping the bird in (left), the investigator taps a vein in the foot for blood sample (lower left), and injects a 5 to 10 cc saline solution. Within 60 seconds of injection a salty excretion drips from the beak; this is collected (lower right) for analysis.

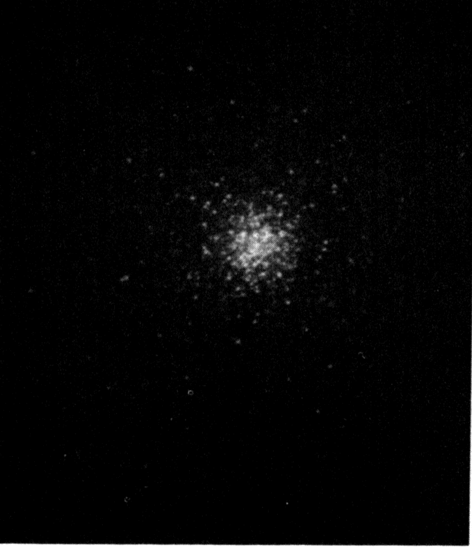


Topographic Surveys of Antarctica

As a key to geographical and geological studies of Antarctica, topographic engineers of the U.S. Geological Survey are conducting an extensive program for mapping portions of the continent, under NSF grants. Tellurometers and theodolites, such as that being used by the U.S.G.S. personnel in the photo at right, are used to establish control for the extensive detailed work to follow. The American Geographical Society and the U.S. Department of the Interior also participate in mapping and nomenclature activities in the Antarctic.

Ice Shelf Theory Supported by Discovery of Fish Remains

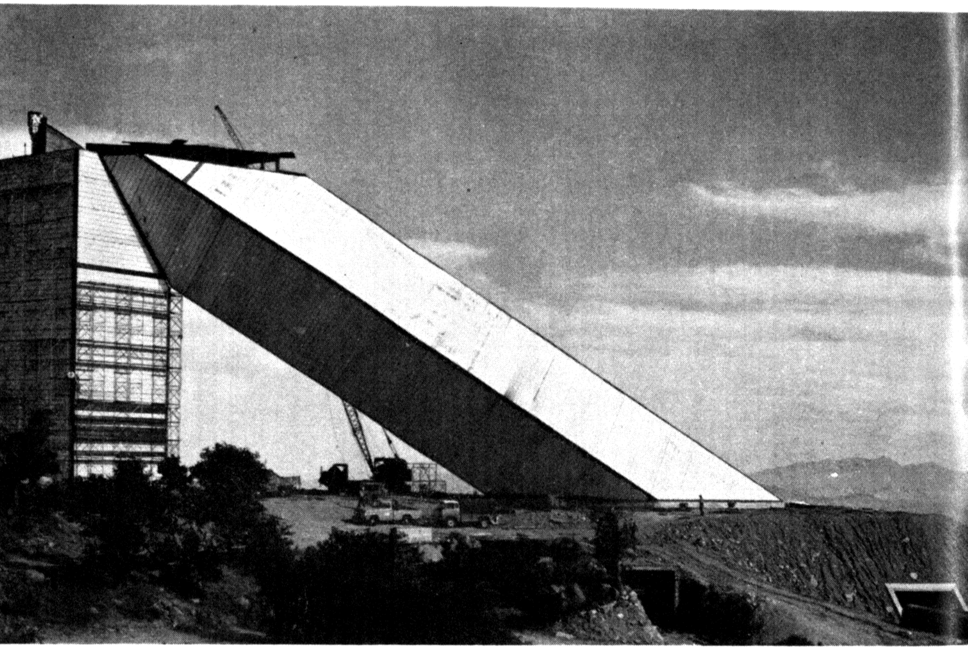
Scientists from the University of Michigan and Stanford University examine an area of the Ross Ice Shelf where the remains of many large fish were found. One of the fish can be seen in the foreground. The specimens are being analyzed; radiocarbon dating by the Institute of Nuclear Sciences, Lower Hutt, New Zealand, confirmed that the remains were about 1,100 years old. The find lent weight to a 50-year-old theory of Frank Debenham, a geologist with Capt. Robert Falcon Scott's British Antarctic expedition of 1910–13, concerning growth and nourishment of the ice shelf. It was indicated that the fish had been frozen into the bottom of the shelf and worked their way up gradually through the years as the shelf melted on top during the summer months, and froze again on the bottom.

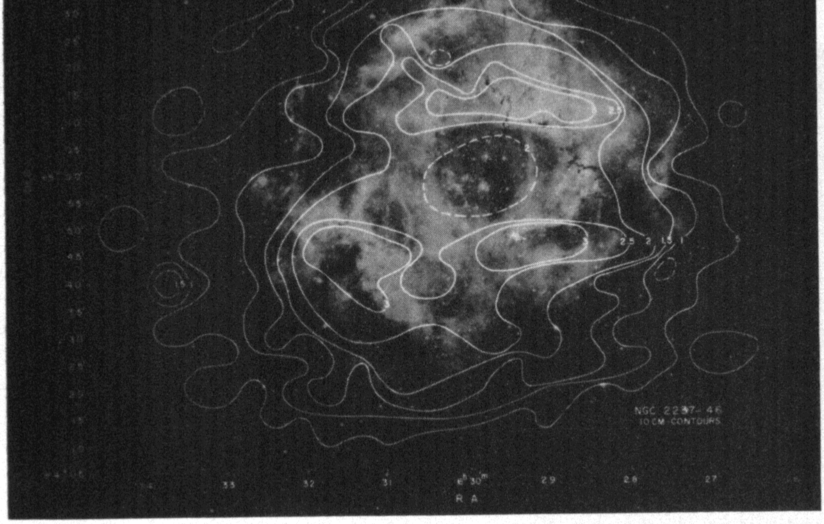


Kitt Peak Scientific Program Begins as Facility Expansion Continues

Two photographs of the globular cluster M3 (above) demonstrate the advantage of the image orthicon tube now in use on the 36-inch telescope at Kitt Peak National Observatory. At left is a 1-minute exposure made through the McDonald 82-inch reflecting telescope; at right, a 1-second exposure made through the Kitt Peak instrument equipped with an image orthicon. The speed gain of the image tube is about 300.

The photograph below shows the solar telescope now under construction at Kitt Peak. This will be the largest solar telescope ever built, with a focal length of 300 feet, and will form images of the sun nearly a yard in diameter. The building stand 110 feet high, and the diagonal shaft extends 280 feet underground beyond the 200 feet visible in the photo. The observing room is also underground.



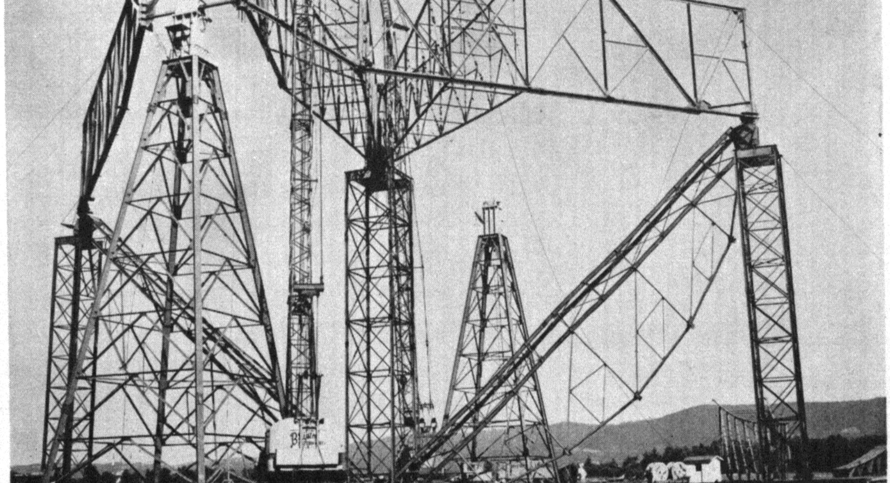


National Radio Astronomy Observatory

A technique for graphically combining the results of optical astronomy observations with those of radio astronomy has been used with increasing success by personnel of the National Radio Astronomy Observatory, Green Bank, W. Va. Radio "contour" lines—signal strength measurements at a selected wave length—are superimposed over an optical photograph of the same region in the sky. In this way the similarities and differences of strength of radiation observable optically and by radio can be readily understood.

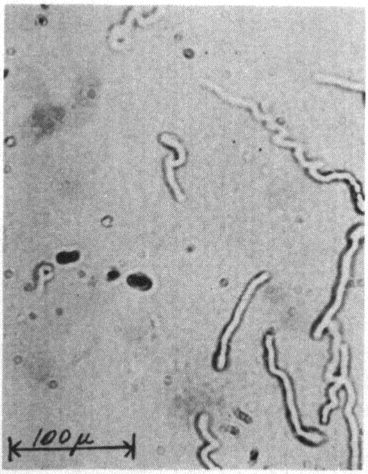
In the above example, the radio contours at 10 cm. wave length of a gaseous nebula have been plotted on an optical photograph of the nebula.

The photograph below shows the new 300-foot transit telescope at NRAO under construction. Ground was broken for the instrument on April 27; completion is expected early in 1962. The telescope will be a special purpose instrument of economical design, movable in elevation only at angles from 30° above the southern horizon through the zenith to 30° above the northern horizon.



Fungus Spores Germinate Readily in Guttation Water

Guttation water—often mistaken for dew—is the water forced out of the tips of grass blades, and along the margins of other types of leaves, by root pressure. It can often be seen early in the mornings.



Recent experiments have shown that spores of the ergot fungus germinate readily in guttation water from rye (above), which is susceptible to the fungus, but do not germinate readily in guttation water from wheat, which is resistant. The electron micrograph (left) shows such spores after a 24-hour germination period. (See p. 21.)

EDUCATION IN THE SCIENCES

The programs of the Division of Scientific Personnel and Education have, since the establishment of the Foundation, sought to improve science education throughout the Nation as rapidly and effectively as possible. Specifically, they are directed toward the following goals:

1. Furthering the scientific training of advanced scholars in highly specialized areas of science, so that they may enhance their ability to apply their special talents and skills to problems emerging at the ever-changing frontiers of knowledge; also, furthering the training of graduate students and teachers of science, mathematics, and engineering, who represent an important contribution to the future scientific manpower resources of the Nation.
2. Improving the quality and effectiveness of teachers of science, mathematics, and engineering by making available to them training opportunities at all educational levels.
3. Enhancing undergraduate science education through special courses for the high-ability undergraduate student and through other educational opportunities that permit him to proceed with his scientific education at the speed and the level of which he is intellectually capable.
4. Strengthening science education for secondary school students by providing special courses and other educational opportunities for the academically talented students who are not fully challenged by the scientific courses and experiences normally available to them in high school.
5. Upgrading course content in science, mathematics, and engineering by securing the active participation and cooperation of expert scientists, engineers, mathematicians, and teachers in designing courses, curricula, and textbooks which meet today's needs in these fields.
6. Collecting and analyzing information on American scientific manpower and education in order to determine national needs and provide information that is vital for planning purposes.

7. Improving the scientific literacy of the American public.

Support for the programs to achieve these goals totaled $70 million in fiscal year 1961—slightly more than in the previous year.

Fellowship Programs

The Foundation's fellowship programs are intended to strengthen the Nation's scientific potential by enabling graduate students, teachers, and advanced scholars of unusually high ability to increase their competence in science, mathematics, and engineering through the pursuit of advanced study or scientific work. Since the inception of NSF fellowship programs in fiscal year 1952, approximately $57 million has been obligated for the support of some 17,000 fellows in the various fellowship programs. The fellows were selected solely on the basis of their ability from among 64,000 applicants.

Table 2.—*NSF Fellowship Programs, 1961*

Program	Number of applicants	Number of awards offered
Graduate fellowships	4, 875	1, 536
Cooperative graduate fellowships	3, 241	1, 100
Summer fellowships for graduate teaching assistants	1, 366	625
Postdoctoral fellowships	656	235
Senior postdoctoral fellowships	275	91
Science faculty fellowships	754	285
Summer fellowships for secondary school teachers	1, 866	324
Totals	13, 033	4, 196

The 4,196 awards offered in fiscal year 1961 at a cost of $14.1 million represent an increase of 187 over the number offered in the previous year.

In addition to the NSF fellowship programs, the Foundation administered two extramural fellowship programs—the North Atlantic Treaty Organization (NATO) Postdoctoral Fellowships in Science and the Organization for European Economic Cooperation (OEEC) Senior Visiting Fellowships.

Program	Number of applicants	Number of awards offered	Number of awards accepted
NATO fellowships	151	67	43
OEEC fellowships	45	20	19

GRADUATE FELLOWSHIPS

Graduate Fellowships, the first type established by the Foundation, provide support to unusually able students to enable them to complete their graduate studies with the least possible delay.

For the fifth consecutive year the number of applicants for these prized fellowships increased with a concomitant increase in the number of awards offered (1,537).

Teaching experience provides a valuable part of the academic training of many graduate students. To encourage graduate fellows to take advantage of teaching opportunities as they arise—indeed, at some institutions, to make such opportunities possible—the National Science Board approved a "teaching for pay" policy in fiscal year 1961. Graduate fellows will be permitted to undertake at their fellowship institutions a limited amount of teaching in any field which the Foundation supports. They may receive for their services up to $600 during a 9- or 12-month tenure.

COOPERATIVE GRADUATE FELLOWSHIPS

These fellowships differ from the Graduate Fellowships only in financial provisions and in administrative aims and procedures. A greater degree of institutional participation is involved, especially with respect to the initial evaluation and the recommendation of applicants.

The number of awards offered under this program in fiscal year 1961 totaled 1,100, distributed among 129 (of the 161) participating institutions.

SUMMER FELLOWSHIPS FOR GRADUATE TEACHING ASSISTANTS

These awards make it possible for graduate teaching assistants in science, mathematics, and engineering to devote full summer periods to their own academic pursuits. In fiscal year 1961, 625 awards were offered.

POSTDOCTORAL FELLOWSHIPS (REGULAR)

During fiscal year 1961 this program continued to enable persons who have recently obtained their doctorates to undertake additional advanced training as investigators in their specialized fields. A total of 235 were offered awards.

This year an allowance to the fellowship institution was introduced. For each postdoctoral fellow with a tenure of 9 or 12 months, the host institution receives $200, expendable at its discretion, to assist in meeting the costs of providing the fellow with space, supplies, and equipment.

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SENIOR POSTDOCTORAL FELLOWSHIPS

Senior Postdoctoral Fellowships are designed to offer 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, mathematics, and engineering.

The number of applicants in fiscal year 1961 increased slightly over that of the previous year, and the 91 awards offered represented a new high.

In fiscal year 1961 a renewal policy became effective. It is now specified that 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

These fellowships provide an opportunity for college and university teachers of science, mathematics, and engineering with at least 3 years of science teaching experience at the collegiate level to improve their competence as teachers by obtaining additional advance training in their own or related fields.

The procedure established in fiscal year 1960 of having separate evaluations for applicants possessing the Ph.D. degree and those not possessing that degree was continued. A total of 215 awards went to non-Ph.D.'s and the balance of 70 to persons holding the Ph.D. degree. In proportion, the distribution of awards approximated the corresponding division of the applicant population.

SUMMER FELLOWSHIPS FOR SECONDARY SCHOOL TEACHERS OF SCIENCE AND MATHEMATICS

In fiscal year 1960 this fellowship program was reoriented to emphasize work by the fellows at a level acceptable by their fellowship institutions toward the traditional advanced degrees in science and mathematics. Additional progress toward accomplishing this objective was made in fiscal year 1961. Awards totaled 324.

EXTRAMURAL FELLOWSHIP PROGRAMS

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

For the third consecutive year the Foundation administered, in behalf of the Department of State, the program of NATO Postdoctoral Fellowships in Science. These awards enable United States citizens and nationals to study abroad primarily in the NATO countries. Other NATO member nations select fellows from among their own nationals. Of the 43 awards accepted this year, 10 were for study and research in the life sciences, and 33 in the physical sciences, including 12 in chemistry.

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

These fellowships permit institutions in the United States, its Territories and Possessions to nominate senior scientists, mathematicians, and engineers on their staffs to study new techniques and developments at advanced educational and research institutions primarily in the OEEC member countries or in countries cooperating with that organization. The program is intended to strengthen the scientific work of the nominating institutions. Of the 19 awards accepted in fiscal year 1961, 9 were in the life sciences and 10 in the physical sciences, including 5 in engineering.

SPECIAL REPORT ON THE COOPERATIVE GRADUATE FELLOWSHIP PROGRAM

The Foundation, in planning for its fiscal year 1959 fellowship programs, determined that it should substantially increase its graduate-level fellowship support in science, mathematics, and engineering. The possibility of doubling the number of awards in the existing Graduate Fellowship program was considered. An alternative, however, was the introduction of a new program, one which would involve the fellowship institutions more intimately in the evaluation and nomination of applicants and at the same time accomplish a broader distribution of National Science Foundation fellows at the many excellent institutions of higher education in the United States. This alternative was adopted and resulted in establishment of the Cooperative Graduate Fellowship Program, a program which has met with wide approval.

Under this program the Foundation invites the participation of all United States institutions of higher education that confer the doctoral degree in at least one of the fields supported by the Foundation. Emphasis is placed upon cooperation with participating institutions in identifying and supporting graduate students of high ability. Applicants apply through the participating institution which they expect to attend as fellows. They are screened and evaluated initially by the faculty of that institution solely on the basis of their ability. Each institution is authorized to recommend a specified number of awards, this number being determined by a formula which takes into account the institution's recent productivity in awarding advanced degrees in science, mathematics, and engineering. All applications are forwarded to the Foundation for final evaluation; the institutions are subsequently notified of those persons selected for awards by the Foundation. Funds are provided to the schools to cover stipends for fellows and a standardized $1,800 cost-of-education allowance for each fellow, in lieu of tuition and fees.

Since the inauguration of the Cooperative Graduate Fellowship Program the Foundation's position has been that the ability levels to be supported, insofar as human judgments permit, will be comparable to those supported in the Graduate Fellowship Program. In the fall of 1960 a statistical comparison was made of Cooperative Graduate Fellowship applicants and awardees with their counterparts in the Graduate Fellowship program for fiscal year 1960 which produced some very interesting and significant data. The study revealed that, although the *applicants'* mean scores on various objective criteria were remarkably similar for the two programs, Graduate Fellowship *awardees* had consistently higher mean scores than Cooperative Graduate Fellowship winners. Without question, the Cooperative Graduate Fellowship awardees were individuals of high ability, but a comparison with the Graduate Fellowship awardees, by level of study, indicated statistically significant differences. Partial explanations of these differences lie in the greater variability in the ability levels of the Graduate Fellowship applicants and in the lower percentage of applicants offered awards in that competition. Consequently, prior to the fiscal year 1961 evaluation of Cooperative Graduate Fellowship applicants by the central panels, the NSF re-emphasized its position concerning the maintenance of comparable standards for its two predoctoral-level programs. It is hoped that the resulting evaluations have achieved, more closely than previously, the Foundation's objective of comparable ability levels between corresponding quality groups of the two programs.

The steps which the Foundation will undertake toward encouraging more high-ability individuals to apply for Cooperative Graduate Fellowships in fiscal year 1962 are: (a) the number of fellowship recommendations assigned to each participating institution will be increased—even institutions with low doctoral and master's degrees production records will be permitted to recommend 20 individuals applying through their schools, and (b) in a series of regional conferences scheduled for the fall of 1961, the Fellowships Section's professional staff plans to review this program with coordinating officials from all participating institutions and to explore ways in which the quality of applicants may be improved. Funds available for predoctoral-level fellowships, will be apportioned between the two programs in such a manner that individuals of comparable ability will be supported in each program.

Institute Programs

The primary objective of the Foundation's institute programs is to improve the effectiveness of the teaching of science, mathematics, and engineering in the Nation's schools by increasing the subject-matter competence of teachers through training in specially designed group programs. These programs are not only aimed at helping teachers obtain information concerning new developments in their fields—increasingly difficult because of the rapid growth in scientific knowledge—but are also aimed at those teachers who have had inadequate basic training. Institutes provide supplemental training for high school, college, and elementary school personnel, as well as for faculty of technical institutes.

There are three major types of institutes, each especially designed to conform to the time patterns available to teachers for work and study: (1) Summer Institutes, which provide 4 to 12 weeks of full-time study during the summer period when schools usually are not in session; (2) Academic Year Institutes, which provide full-time study during the regular school session for a relatively small number of teachers who take a leave of absence for 1 year; (3) In-Service Institutes, which provide part-time study opportunities for teachers holding full-time positions in the schools.

The basic time-patterns are repeated from year to year, but there is continual experimentation with the subject-matter training offered in individual institutes. Conferences of shorter duration are also used for special purposes.

Since teachers have somewhat different objectives—and usually quite different backgrounds—from those of professional students in scientific fields, institutes are commonly based upon specially planned classes and group activities. A secondary objective of the program is, therefore, to encourage colleges and universities to establish courses or curricula that more effectively meet the subject-matter needs of teachers in areas of science, mathematics, and engineering. These are usually subject matter courses with emphasis on fundamental principles and recent scientific advances.

Experience gained over the years since the beginning of the institute programs has shown that many institute programs could be materially improved and financial savings achieved if plans could be made for more than one session at a time. This practice would permit more realistic planning for a reasonable staff workload and more efficient use of institutional facilities. In addition, a study of the academic background of applicants indicates that more recent programs have been changing toward the acceptance of less well-prepared teachers to participate in institutes. It has been found, for example, that a significantly larger percentage of the 1960 applicants than of the 1957 applicants had no bachelor's degree. Thus, for many teachers a longer period of training is now needed than earlier experience suggested.

A significant development in the evolution of the Foundation's institute program is the pilot step toward providing multiterm support—that is, continuing support from year to year—for some institutes, a procedure highly favored by the colleges and universities. On this basis, the Foundation will now accept proposals for programs planned for 2 or 3 years, as well as a single year; the multiterm type may consist of a series of summer or in-service programs or some combination of both.

Since this program's inception in 1953 the Foundation has made grants for the support of 2,436 institutes, which have provided over 116,000 opportunities for study in science, mathematics, and engineering. Funds obligated in fiscal year 1961 provided support for 771 institutes, an increase of 122 over the number supported in fiscal year 1960. Of this number, 56 percent were held during the summer; 38 percent were for part-time study during the school year; and 6 percent were for full-time study during the regular school year. These institutes made provision for some 34,985 opportunities for study.

SUMMER INSTITUTES

Summer Institutes for High School and College Teachers

The Summer Institute program continues to be of great interest to both the colleges and teacher participants. Of a total of approximately 706 proposals received in this program, available funds permitted the awarding of grants for 396 institutes in 1961, the result being that many worthy proposals had to be denied. The number of high school and college teachers who apply to these institutes continues to increase and it is estimated that more than 60,000 individual teachers filed applications for the institutes conducted in the summer of 1961.

Of the 396 institutes, 333 were for high school teachers, 42 for college teachers, and 21 for both high school and college teachers. The distribution by fields of study was as follows:

Fields	High school teachers	College teachers	High school and college teachers
Anthropology	1	1	....
Biology	28	5	2
Radiation biology	13	6	2
Chemistry	23	3	4
Earth sciences	16	2	....
General science	16	....	....
Mathematics	90	4	7
Physics	16	2	1
Engineering	....	11	....
Isotope technology	....	5	....
Psychology	1	....	....
History and philosophy of science	....	2	....
Multiple fields	129	1	5
Totals	333	42	21

About 21,000 high school and college teachers received stipend support in the summer institutes conducted during 1961.

The geographical distribution of the institutes covers all 50 States, the District of Columbia, and Puerto Rico. As in the past, a wide variety of types of institutions are represented among host colleges and universities.

Summer Institutes for Elementary School Supervisors and Teachers

The pilot-study program of institutes for elementary school supervisors and teachers continued with a very small but gradually increasing number of institutes. Proposals received totaled 121, but available funds permitted only 19 grants to be made, providing stipends for 644 teachers. The number of applicants for this type of institute is enormous. Individual institutes received as many as 1,400 applications.

Summer Institutes for Technical Institute Personnel

Two institutes for teachers who are on technical institute faculties were supported in fiscal year 1961. One of these was conducted at the University of Illinois and the other at the University of Houston. Approximately 80 teachers participated.

Summer Conferences for College Teachers

There were 23 short conferences for college teachers supported in the summer of 1961 with places for 687 participants. These conferences included 4 in biological sciences, 10 in physical sciences and engineering, 6 in mathematics, and 3 in computer science. Of the programs in mathematics, 4 were specifically designed for college teachers involved in training secondary school mathematics teachers Essentially like summer institutes but of shorter duration, conferences are designed to offer science instruction to college faculty members whose duties in the summer permit them to undertake such training for only 1 to 4 weeks.

ACADEMIC YEAR INSTITUTES

The Academic Year Institute program provides opportunities for full-time study for the academic year to a relatively small number of experienced teachers of science and mathematics who can take a year's leave from their regular duties.

Thirty-three institutes were supported during the 1960–61 academic year, providing training opportunities for 1,534 participants. During 1961–62, about 1,570 teachers will participate in 43 NSF-supported institutes. The increased number of institutes in 1961–62 was principally the result of a decrease in the number of participants per program (47 to 37, on the average) in order to get such programs underway in more institutions.

A recent innovation in institute programs, conducted at one institution on an experimental basis, included the training of 12 pre-service certificated secondary school teachers along with 24 experienced in-service secondary school teachers.

At another institution a small number of participants were offered an advanced program—beyond the master's level—designed to prepare experienced teachers as secondary school supervising teachers. The number of science and mathematics supervising teachers is increasing sharply as a result of the National Defense Education Act, and it is essential that such persons be competent in their subjects.

The Foundation made 9 grants in 1961–62 to support institutes for 75 college teachers, as compared with 5 grants made in 1960–61 which provided training for 43 college teachers. In eight of these institutes the emphasis was on upgrading "teachers of teachers," whereas the last of this group offered training at the master's level in chemistry for teachers in junior colleges. Three institutes planned exclusively for college teachers represented an additional innovation in the 1961–62 program. Among these three, one is an institute in radiation biology for college teachers conducted as a cooperative project of the National Science Foundation and the Atomic Energy Commission.

In-Service Institutes for Secondary School Teachers

In-Service Institutes offer instruction for teachers of science and mathematics during the academic year at times so chosen that the participants may attend while still teaching full time—e.g., late afternoons, evenings, or Saturdays. These institutes provide an excellent opportunity for the sponsoring colleges and universities to help secondary school teachers who live within commuting distance.

During academic year 1960–61 a total of 191 In-Service Institutes for Secondary School Teachers, offering instruction for approximately 8,900 participants, received support from the Foundation. In the 1961–62 school year, approximately 11,500 secondary school teachers will participate in 253 In-Service Institutes. This expanded program provides support for promising new projects as well as substantial support for the continuation of institutes which have already established working relationships with the teachers and schools in their areas. The program reaches many teachers who are not able, for various reasons, to attend summer or academic year institutes.

Approximately half of the course work offered in these institutes during the past year was in the field of mathematics, while the remainder covered the range of the biological, physical, and earth sciences.

In the 1961–62 In-Service Institutes program, about one-fourth of the grants are for sequential-type programs. Noteworthy among these sequential institutes are four located in large metropolitan areas which offer teachers the opportunity to complete, on a part-time basis, master's degree programs essentially equivalent to those developed in academic year and summer institutes.

About two-fifths of the institutes are directed toward subject matter which closely relates to new course content developments in the fields of mathematics, biology, chemistry, and physics. Three institutes in radiation biology will receive joint support from the Atomic Energy Commission and the National Science Foundation.

In-Service Institutes for Elementary School Personnel

In-Service Institutes for Elementary School Supervisors and Teachers provide part-time study in the sciences and mathematics during the academic year. Courses offered have been especially designed by colleges and universities to meet the need for informed instruction and supervision in the sciences and mathematics at the elementary school level.

In academic year 1960–61 the Foundation supported 13 institutes of this type, with approximately 400 teachers, supervisors, and principals participating. The 1961–62 program has been increased to 35 institutes, with training opportunities for approximately 1,030 elementary school personnel. Need for expanding this program was more than adequately demonstrated by the many local studies cited in the proposals received and by the lack of formal science instruction in the training of the majority of elementary school teachers.

Because of the very small number of participants who receive training as compared with the number of elementary teachers who need it, the institutes usually emphasize work with "key" teachers, specialists, or supervisors who may in turn help other teachers. Many institutes also serve as active centers for developing new materials and lesson plans for elementary schools. Several institute programs correlate their instruction with newly developed curriculum materials in mathematics.

Special Projects in Science Education

Special Projects in Science Education activities are concerned principally with experimental testing and development of promising new ideas for improving science instruction, and with new and more effective methods of increasing the understanding of science on the part of our young people. In a sense, many of these activities are research studies designed to answer the question, "How can we improve science education?" and are therefore somewhat analogous to the Foundation's activities in support of basic research. To meet these objectives, programs have been developed for secondary school students, college undergraduates, high school and college teachers, as well as for the public to increase its understanding of science.

PROGRAMS FOR SECONDARY SCHOOL STUDENTS

Programs directed toward the secondary school level are planned by universities, colleges, scientific societies, research organizations, and other groups. Some attempt to interest secondary school students broadly in science; others, to provide additional educational opportunities to students who show special talent for science.

Visiting Scientists (Secondary Schools)

Outstanding scientists and engineers are enabled to visit secondary schools to make personal contacts with students and teachers, to acquaint them with the sciences as vital activities, and to offer such counsel concerning careers and educational matters as may be appropriate. These visits stimulate an interest in science on the part of students and, at the same time, offer professional assistance to the secondary school teacher.

Scientific societies in various disciplines plan, establish, and administer the associated projects.

In fiscal year 1961, two grants were made. These grants, along with one grant made in 1960 and continuing in 1961, will provide for 1,060 days of visits.

Traveling Science Libraries

The Traveling Science Library has been organized and circulated by the American Association for the Advancement of Science (AAAS) for the primary purpose of making available to secondary and elementary school students, on a loan basis, carefully selected books on science and mathematics.

In conjunction with the operation of the libraries, the AAAS has prepared and annually revised various lists of books on science, mathematics, and engineering suitable for elementary school and high school students. For a number of States, these lists currently influence the standards and serve as official guides for the purchase of science books.

In fiscal year 1961, a grant was made to the American Association for the Advancement of Science to provide for the following activities:

1. The Traveling Science High School Library to serve a maximum of 1,600 secondary schools with a total of 480,000 students.
2. The Traveling Science Elementary School Library to serve 800 schools with a total of 240,000 students.
3. The preparation and distribution of various booklets to be of assistance to students, teachers, and librarians.

   AAAS Science Book List for High School Students—60,000
   Inexpensive Science Library—50,000
   Elementary School Book List—65,000
   Annotated Catalogs of the two Traveling Science Libraries—30,000
   Career Guidance Publication—10,000

Summer Science Training for Secondary School Students

The Summer Science Training Program for High-Ability Secondary School Students is designed to provide academically talented secondary school students with educational experiences in science and mathematics beyond those normally available in high school courses. The objectives are to help:

a. Identify high-ability secondary school students who have excellent potential for becoming creative scientists—and to help these students identify their own interests, abilities, and limitations.

b. Accelerate their scholarly development by providing opportunity for instruction in scientific content and methods by scientists of recognized stature.

c. Develop cooperation between colleges and high schools in increasing the quality of education in the sciences.

Programs offered are of two main types. The type most frequently encountered stresses lectures, quizzes, supervised study periods, laboratory work, and field trips centered around one or more areas of science, though there is some variation with the discipline being studied. The other program type gives the student real research experience by enabling him to work on a project of appropriate scope under the guidance of experienced scientists. Some programs combine elements of both types.

The 168 grants made in fiscal year 1961 to colleges, universities, and nonprofit research organizations provided summer science training experience for about 6,400 high-ability secondary school students in various disciplines in the mathematical, biological, physical, and engineering sciences.

Cooperative College-School Science Program

The Cooperative College-School program is designed to help develop cooperation between colleges and secondary schools in increasing the quality of education in the sciences; to provide scientifically talented secondary school students with experiences in advanced course work or research participation; and to include selected high school teachers of a high degree of competence in programs specifically planned and coordinated for dual participation of student and teacher. Formal cooperation of the public school system in the development and support of the programs is encouraged.

The 23 grants made in fiscal year 1961 will involve approximately 3,000 participants.

This new summer science training program differs from previous programs for secondary school students in that it involves both teachers and high-ability students and thus is designed to have greater effect upon participating schools than is possible when only an occasional student participates on an unplanned basis.

State Academies of Science

State Academies of Science have diversified organizational structures and resources, and present a wide variety of programs for support, depending upon the scientific requirements of the various States and the facilities of the Academies. Three major areas are currently supported: (1) Visiting Scientists program—similar to that sponsored by the national scientific societies but more local in scope. It operates primarily at the State level through the professional scientific body of the State; (2) Junior Academies of Science—these operate in close liaison with senior scientists of the State in executing science projects and research with an opportunity to meet annually with the senior Academy to present the results of their research studies and to hear the presentation of scientific papers of the Senior Academy; (3) Collegiate Sections of the Academy—these afford undergraduate college students opportunities to execute research studies and present their results at State Academy meetings, and in some cases, publish findings in the Proceedings of the Academy.

Short-term conferences for college undergraduates, seminars and workshops for teachers, and science curriculum studies are among other activities conducted by the various State Academies of Science with National Science Foundation support.

The 52 grants made in fiscal year 1961 to 30 State Academies of Science, 1 large museum with strong scientific and science education staffs, 2 municipal Academies of Science, and 3 other organizations provides support for 23 Visiting Scientists programs, 10 Junior Academies, and 18 miscellaneous, one-of-a-kind projects.

Supplementary Science Projects for Students

This program complements and supplements the regular summer science program for secondary school students. It provides, primarily through grants to colleges and universities, for special extracurricular science activities. Some are for science programs conducted during evenings or weekends, or for unique experimental projects which do not fit clearly into the defined programs. Support is provided for the preparation and publication of career guidance booklets, national science journals to permit the publication of research papers by college undergraduates and high school students, the educational science activities of museums and planetaria, a program in basic science orientation and research by the 4–H Foundation, and for conferences where selected high school teachers and students sponsored by appropriate scientific agencies can present current research results and training opportunities.

Under this program a wide variety of diverse and highly individual projects were considered. Only those of unusual merit, eight in number, amounting to about 20 percent of the total number requested, were supported in 1961.

UNDERGRADUATE SCIENCE EDUCATION PROGRAMS

Undergraduate Science Education programs make possible, at colleges, universities, and nonprofit research institutions, a number of activities designed to provide special opportunities for the scholarly development of outstanding undergraduates. The programs are aimed at developing new and broader means for able undergraduates to advance, through research participation or independent study, in their understanding of science and in their ability to employ effective investigative procedures.

The wholehearted acceptance of these programs by the academic community is evidenced by the continual increase in the number of proposals received each year, of grants awarded, and of participants supported. One indication of the success of the programs is the growing list of scientific publications with one or more undergraduate "alumni" as principal author(s).

During 1961 grants were made under two separate programs, Undergraduate Research Participation and Undergraduate Independent Study, each designed to meet particular needs of outstanding undergraduates.

Undergraduate Research Participation

The Undergraduate Research Participation program recognizes the value of bringing able undergraduates into direct contact with research and research scientists. It 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 the participant to pursue graduate work in science.

The 364 grants made in the Undergraduate Research Participation program in fiscal year 1961, together with the 173 extensions of grants made in fiscal year 1960, provide approximately 4,500 undergraduates with a research experience in a variety of scientific disciplines, including certain of the social sciences and experimental psychology.

Undergraduate Independent Study

The Foundation established the Undergraduate Independent Study program in 1961 by awarding 11 grants to institutions proposing novel approaches to fostering independent study by individuals or small groups of undergraduates. The grants enable 147 high-ability undergraduates to participate in independent study programs.

This program recognizes that the undergraduate of high ability may, by working independently or with a small group of peers, find his way to fuller accomplishment and understanding than are attained through more formal academic course work. The student may be ready for studies of a level and variety not offered routinely in regular undergraduate courses. He may well learn rapidly with a minimum of guidance if given time, freedom to explore, and access to reference materials.

ADVANCED SCIENCE EDUCATION PROGRAMS

Programs in this area cover a wide range of activities directed toward the development of projects of special interest to predoctoral and postdoctoral scientists and toward the improvement of the scientific background of science teachers. These goals are accomplished through research experiences, contact with leaders in scientific thought afforded by advanced subject-matter institutes, conferences and campus visits, and through opportunities for study and discussion of problems in science education.

During fiscal year 1961 the Research Participation for Teacher Training program was divided into two programs—Research Participation for College Teachers and Research Participation for High School Teachers—with the result that more appropriate proposals for each group were received.

Research Participation for College Teachers

This program provides opportunities for college teachers (including those of junior college level) to gain research experience during the summer. Teachers with adequate subject-matter knowledge, but limited opportunity for research during the academic year, are afforded the chance to obtain the stimulation and identity with science and the excitement of discovery that only research can provide.

A new feature included in the 1961 program was the opportunity extended to a few teachers to continue their summer research programs into the academic year with some guidance from their research supervisors.

The 54 grants awarded in this program and the 6 extensions into the academic year will help provide 408 college science teachers at both the predoctoral and postdoctoral levels with research experience in many scientific fields.

Research Participation for High School Teachers

This program provides opportunities for high school and junior college teachers of science and mathematics to obtain research experience with outstanding research scientists at colleges, universities, and nonprofit research organizations. Teachers participate in research by actually working on an individual basis in the laboratory or in the field. This experience should improve the teacher's understanding of science and of the scientific method and thus contribute to raising the level of his classroom instruction. The closer relationships between colleges and high schools resulting from this program should lead to better preparation of high school students for college.

In general, a teacher applying for this program is required to have a master's degree in the scientific subject matter, or an academic background including sufficient advanced science courses to qualify him for admission to candidacy for such a degree, although actual candidacy for the degree is not a requirement. "Graduates" of institute programs are a prime target group. As in the college-level program, some participants will continue in the academic year.

The 51 grants made in this program in 1961 provide support for 367 summer participants and 102 academic-year participants in a variety of disciplines in the mathematical, biological, physical, and engineering sciences, and in psychology.

Supplementary Training for Science Teachers

The Supplementary Training for Science Teachers program is aimed at improving the quality of science teaching at all educational levels through a number of individual activities of a nonprogrammatic nature. In fiscal year 1961, 20 grants were made for such unique programs as:

1. A short regional conference on new curriculum developments for high school science teachers in the Midwest.
2. A conference for high school physics teachers on scientific frontiers and their interaction with society.
3. A television course for elementary school teachers.
4. A workshop on advanced course planning for twelfth grade science teachers.
5. A conference on aerospace science for high school physics teachers.
6. A symposium on frontiers in bio-medical engineering for high school science teachers.
7. A summer workshop for science supervisors.

Advanced Subject-Matter Institutes

Advanced Subject-Matter Institutes either focus on fields of science of a highly specialized nature or are based on an advanced treatment of subject matter. They are institutes for specialists and frequently deal with so-called "derived fields," in which the subject matter commonly transcends the limits of the usual academic departmental offerings; for example, programs involving oceanography, space navigation, and materials research.

Such institutes often draw upon the resources of several academic departments, including industrial, governmental and, frequently, foreign scientists of unique competence. They may convene for periods ranging from one week to an academic year and may be held at field stations, aboard oceanographic research vessels, or even at foreign sites where demonstrations and field studies can be carried out most effectively.

The 28 Advanced Subject-Matter Institutes funded in fiscal year 1961 were devoted to such fields as theoretical astronomy, quantum chemistry, shallow-water oceanography, numerical analysis, kinematics, transport phenomena in chemical engineering, re-entry dynamics, and theoretical physics. Two institutes took American scientists to foreign sites for special study of tropical biology in Costa Rica and classical stratigraphy in the British Isles.

Inter-Institutional Cooperative Associations

The prime objective of the Inter-Institutional Cooperative Associations program is to encourage and aid collegiate institutions to share their strengths in an endeavor to raise the general level of the academic community of science. Though at its inception this program was envisaged as one primarily for fostering relationships between large universities and adjacent small colleges, it has been broadened to include cooperative undertakings between widely separated universities as well as groups of small colleges. Any "association" of collegiate institutions which together present a program that shows promise of increasing the effectiveness of teaching and scholarship in the sciences in their region, may submit a proposal for support. "Association" in this context, however, does not imply the necessity for any corporate or legal entity. Plans to achieve this end may properly include staff visits, conferences, and seminars; exchange of professors and library materials; loans of equipment; and joint use of physical facilities and other related activities.

Four grants were made in fiscal year 1961.

Visiting Scientists Program

The Visiting Scientists program provides a valuable link between graduate schools and research laboratories and the undergraduate institutions and between foreign research centers and our graduate schools. It fosters an exchange of information through the more informal medium permitted by personal contacts, a type of exchange essential to the continued growth and development of advanced science education.

The program consists of groups of projects: (a) the visiting American scientists projects, which provide opportunities for small colleges, junior colleges, and developing universities to obtain the advice and guidance of distinguished scientists in this country in the development of their science programs; and (b) the visiting foreign scientists projects, which provide opportunities for broadening the perspective of faculties and graduate students in science at our major academic institutions through interchange of scientific knowledge and research concepts with prominent foreign scientists. These objectives are primarily implemented through special lectures, seminars, and conferences with faculty members and students in the fields of their specialties.

In the projects involving American scientists, 15 grants were made to professional societies which will provide for 3,320 days of visits annually. In the foreign scientists group, 6 grants were made to professional societies which will provide for 1,360 days of visits annually.

PUBLIC UNDERSTANDING OF SCIENCE

This experimental program provides support to colleges and universities, professional scientific societies, and other interested groups for selected activities which are designed to increase the quality and quantity of science information that reaches the general public. Experimental projects have been conducted along several approaches, including conferences between scientists and mass-media executives to stimulate interest in science reporting; seminars and workshops to improve the scientific competence of science news writers; support for professional scientific societies in the dissemination of science information to the mass media; preparation of science materials for community discussion groups; adult education in the sciences; development of science exhibits for public exhibition; and support for educational television and radio persentations on science subjects.

A total of 13 grants were made during fiscal year 1961.

Course Content Improvement Program

The long-range objective of the Course Content Improvement program is to help bring about a major modernization of elementary school, high school, and college course-content materials in mathematics, science, and engineering.

Several important generalizations can already be drawn from experience with the program:

First, since education should be a continuum for the learner, balanced and coordinated attention must be given to a sequential science program for all educational levels. Better preparation in elementary schools enable secondary schools to provide a broader and more thorough program. High school improvements make it possible for colleges and universities to devise more stimulating courses taught at a higher level.

Colleges and universities, in turn, can then produce more teachers equipped to do a better job in the schools.

Second, although good teaching is characterized by personal innovation and individual teachers and institutions must bear the ultimate responsibility for deciding what to give students, all teachers at all levels can do a better job if they have first-class model courses and aids to learning and teaching. The better the materials, the more likely will it be that all students receive good educations irrespective of the inevitable variation in knowledge and skill of teachers.

Third, the creation of model courses and materials of high quality demands the best talent the country affords and the collaboration of leading research scholars with outstanding teaching scholars.

Fourth, research and development on school and college instructional programs requires substantial investment; a single cycle of building a better course or series of courses in one discipline for a particular level requires the efforts of several hundred people over 4 or 5 years at a cost of several million dollars. Judged against its potential value for the Nation, however, this investment is small indeed.

Finally, the task is an unending one. Continuing effort is needed to incorporate the fruits of the explosive growth of knowledge into the educational experience of our youth.

COURSE CONTENT IMPROVEMENT STUDIES IN SCIENCE AND ENGINEERING

A review of highlights of projects concerned with science and engineering is followed by a fuller report on mathematics as an example of a profession-wide effort to devise superior, up-to-date instructional materials.

Elementary and Junior High Schools

Under the auspices of the American Association for the Advancement of Science nearly 200 scientists, teachers, and school administrators participated in a feasibility study of science for the kindergarten through ninth grades. The study group concluded that science should be part of the total curriculum in every grade and recommended in strongest terms that a massive effort must be undertaken to develop materials, investigate the psychological bases of learning science, and provide better preparation in science for elementary-school teachers, both prospective and in-service. It is expected that a major program will be initiated in this area during the next year. Highly interesting work is already being done by pilot projects conducted by scientists and teachers at the University of California at Berkeley and the University of Illinois.

Secondary Schools

Large projects concerned with high schools are making important progress. The textbook, laboratory guide and apparatus, teacher's guide, films, monographs and examinations for the physics course prepared by the Physical Science Study Committee became available through commercial distributors in the fall of 1960. Some 50,000 students throughout the country used the materials in 1960–61. Current work includes additional films; supplementary text, experiments, and films for a college version of the course; preparation of longer films designed for use in situations where well-qualified teachers are not available; and continuing collection of feedback to direct future revisions. Overseas, teachers' institutes and studies on the adaptation of this approach to other settings have been carried out in Western Europe, Israel, New Zealand, and South America.

In chemistry, preliminary versions of the high school courses developed by the Chemical Bond Approach Project and the Chemical Education Material Study were tried by several thousand students and work began on substantially revised versions which will receive even more extensive trial during the next year. Definitive editions of texts, laboratory guides, films, and other aids are scheduled for distribution for the 1963–64 school year.

Three different approaches to high school biology, together with the block laboratory projects providing several weeks investigation of a topic in depth, research projects for gifted students, and other materials being developed by the Biological Sciences Curriculum Study were tried by some 13,000 students. This experience enabled the BSCS to prepare substantially improved second versions during the summer of 1961 for experimental use in more than 360 schools the following academic year. This trial will lead to a final revision, and materials will be available to all interested schools by the fall of 1963.

Preparation of a sourcebook on earth sciences for teachers in elementary and secondary schools was completed by the Teaching Resources Development Project of the American Geological Institute. The book will be published early in 1962. Work has gone forward on films and monographs in meteorology sponsored by the American Meteorological Society. Discussions have begun on projects for developing full earth sciences courses and preparing source materials on anthropology.

Colleges and Universities

Support has been granted for a Commission on College Physics to serve as a group to coordinate course content improvement projects, stimulate additional studies, and help disseminate results. The American Geological Institute has received funds for a comparable group concerned with curricula in the geological sciences. A conference of leaders in engineering held in the summer of 1961 developed a broad program for course improvement and related endeavors in this field. Support has also been awarded for studies of engineering graphics, theoretical and applied mechanics, systems engineering in the electrical engineering curriculum, laboratory programs in mechanical engineering, and technical institute education. Specific course developments in college physics are under way at Washington University and the Massachusetts Institute of Technology, in biology at Harvard, in physiology under the American Physiological Society, and in analytical chemistry at Hollins College and the University of Illinois.

SUPPLEMENTARY TEACHING AIDS

Wide interest has developed in a program for the design and development of prototypes of new science equipment. The 378 proposals submitted in 1961, requesting a total of $7 million, represented a five-fold increase over the number for the preceding year: 57 grants were awarded for such projects as equipment for measuring the relativistic mass of the electron, for experiments in psychology, for demonstrating kinship relationships, for illustrating aspects of formal, deductive, and symbolic logic, for meteorological experiments, and for studies on automation and process control.

Interest in the production of educational film and television presentations is also burgeoning. Partial support was provided for a course on modern biology to be shown nationally on the Columbia Broadcasting System's College of the Air and on other stations, under sponsorship of the Learning Resources Institute. The University of Wisconsin will prepare a telerecorded course in mathematics for grades 5 and 6, to be used for teacher education, as well as for direct instruction. Films on United States archeological sites will be made by the University of Texas and films on customs, technology, and ceremonies of Amerindians by the University of California. Through the Graduate School of the U.S. Department of Agriculture outstanding biologists produced a series of five lectures on "The Promise of Life Sciences." The American Psychological Society and the National Television and Radio Center will prepare a series of films reporting current research in experimental psychology.

Every informed person now knows that science is reshaping the world. The explosion in mathematical, scientific, and technological knowledge has brought about an educational dilemma, for science has far outstripped the slow pace of change in school programs. By the end of World War II mathematicians realized that the times urgently demanded new approaches. Mathematics in elementary and secondary schools had not changed, except in details of pedagogy, since 1900; indeed the mathematics itself was virtually all known by 1700. Similarly, most undergraduate programs revealed little of the dramatic mathematical discoveries of the past hundred years. Two things had to be done: to help teachers at all levels attain much greater knowledge of basic mathematics, and to develop model new courses and instructional materials to aid and guide teachers.

Mathematicians then began studies of the problem and a variety of experiments in designing courses, with support from private foundations, universities, professional societies, and other sources. Particularly influential were the University of Illinois Committee on School Mathematics project to invent fundamentally new high school courses, the Committee on the Undergraduate Program of the Mathematical Association of America (MAA) which suggested more modern courses for colleges and prepared sourcebooks on content, and a careful study of content for grades 9–12 carried out by the Commission on Mathematics of the College Entrance Examination Board.

In 1954–58 the National Science Foundation began to support exploratory projects in course content improvement, including, in mathematics, a committee study of educational implications of manpower requirements in mathematics, summer writing projects to prepare source materials for courses for teachers, and production of different kinds of filmed presentations. These exemplify one aspect of the Foundation's program—readiness to consider many kinds of promising ideas offered by competent scientists for upgrading education in the sciences.

By 1958 the imperative need for, and the feasibility of, a major effort to devise modernized courses were clear. Also by this time, in response to a parallel need in high school physics, the Physical Science Study Committee had shown the importance of a "critical mass" of talent, personnel, and financial resources in carrying out such a task. Leading mathematicians meeting in NSF-supported conferences urged, in the strongest terms, a large-scale effort. The result was the organization of the School Mathematics Study Group (SMSG). Dr. E. G. Begle became director of SMSG, with headquarters at Yale University (since moved to Stanford), and some 25 college and university mathematicians, high school teachers, experts in education, and representatives of science and technology were appointed to an advisory committee. The National Science Foundation awarded its initial grant to SMSG, and a 4-week writing and planning session was held in the summer of 1958.

During the following 3 years, aided by NSF grants totaling $4 million, the SMSG has undertaken a series of integrated projects to improve course content in elementary and secondary schools, encourage students to study mathematics, and help teachers prepare to give the new courses. Projects are supervised by panels which operate under basic policy set by the advisory committee. This work has involved hundreds of research mathematicians, university and college mathematicians, elementary and scondary school teachers, experts in testing, psychologists, and other specialists. In developing courses the typical procedure is to prepare experimental versions of sample textbooks and associated commentaries for teachers, try them in schools, revise them in light of experience and further reflection on content, conduct additional trials as needed, and, finally, publish definitive editions for use by all interested schools, teacher education programs, and authors of textbooks. In the fall of 1961 definitive editions of textbooks and commentaries for grades 7–12 were published by the Yale University Press. Experimentation is going forward on materials for grades 1–6 and modification of basic courses for less able students.

Another project will produce short expository monographs published as paperbacks which will bring good supplementary mathematics to secondary schools and to the general public. Study guides and special books have been written for teachers. Added to this are materials for talented students, trial of correspondence courses for gifted students, inquiry into effects of the sample textbooks on attitudes toward mathematics, a long-range study of the performance of students using SMSG materials, and investigation of the potentialities of programmed learning.

While mathematicians agree on the broad direction for improving school mathematics, there is ample room for healthy divergence of views on specific content, sequence, and approach. A number of smaller study groups, with support from several agencies, are exploring these. For elementary school mathematics, much experimentation is particularly needed to find out how children learn mathematical concepts and skills, define desirable content, and develop instructional aids for pupils and teachers. Such NSF-supported studies are going on at Stanford University, the University of California, the University of Minnesota, and the University of Illinois.

Mathematics projects illustrate the ground rules for NSF support in course content improvement. For elementary and secondary schools three main types of projects are considered: (1) committee and conference explorations of problems; (2) small-scale, experimental content-development efforts; and (3) projects involving large teams in the design of new courses and materials. In all cases the initiative lies with responsible mathematicians, and the work is led by outstanding mathematicians, who collaborate with teachers and such other specialists as may be required. Support is provided only for research and development; the final products must make their way on their merits.

Progress in school mathematics provides rich opportunities to change college programs, both to build upon school developments and to effect reforms long overdue. Four categories of projects are involved: (1) national committees and conferences which define problems and provide guidelines for course content improvement; (2) planning and coordinating bodies consisting of top-flight scientists drawn from the Nation as a whole, organized to plan course improvement efforts, encourage specific groups to undertake special projects, provide liaison, and aid in disseminating results; (3) projects for preparing actual courses and materials by groups drawn from several institutions, and (4) intra-institutional course development.

In mathematics the first type of project is represented by such groups as the MAA Committee on the Undergraduate program. Late in 1958 this Committee asked some 60 outstanding mathematicians to review the college problem and recommend future activities. As a result, a reconstituted Committee on the Undergraduate Program in Mathematics (CUPM) was established in 1959 and awarded a Foundation grant of $350,000 in 1960. CUPM exemplifies the second type of project. Its aim is a professionwide effort to improve undergraduate mathematics. Under the chairmanship of R. Creighton Buck (University of Wisconsin), with Robert J. Wisner (Michigan State University Oakland) as executive director, the 12-member committee has established panels—each including committee members, other mathematicians, and leaders in other disciplines—to make studies and recommend mathematics programs in four areas: (1) for students planning to teach mathematics in elementary and secondary schools, junior colleges, and colleges and universities; (2) for students in physical sciences and engineering; (3) for students in the biological and social sciences; and (4) for students planning graduate study in mathematics. Committee recommendations will be distributed to all interested persons and institutions; CUPM also hopes to stimulate qualified groups to develop courses which take account of its findings and suggestions. The Foundation expects to support several such projects which represent the third and fourth types of college study.

Support is also granted for the development of learning and teaching aids; examples are the MAA films mentioned previously, film courses for in-service preparation of teachers produced by the Minnesota National Laboratory in cooperation with the Minnesota Academy of Science and the University of Minnesota, and equipment being developed at the University of Michigan for teaching mathematics in elementary schools.

As the organization of CUPM shows, mathematics course improvement cannot be divorced from needs and developments in other disciplines. Liaison and cooperation among study groups in different fields are encouraged; thus, SMSG has asked groups in biology, chemistry, and physics to supply problems and examples illustrating applications of mathematics.

Nor is the United States alone in the need for better instruction in mathematics. We can learn from other countries and they from us. Expert expositions by Polish and Russian mathematicians are being translated by a University of Chicago project, the Survey of East European Mathematics. U.S. mathematicians have participated in several conferences arranged by the Organization for Economic Cooperation and Development to consider such problems as secondary school mathematics, design of new syllabi, and mathematics for engineering and technology. Materials produced by such teams as SMSG have elicited lively interests in all parts of the Free World. A recent conference in England strongly recommended that a similar project be launched in the United Kingdom, and in 1961 some 200 Latin American teachers of mathematics in secondary schools attended an institute in Peru to learn about new developments in mathematics itself and efforts to utilize these developments in improving school programs.

Scientific Personnel and Education Studies

The general objectives of the Scientific Personnel and Education Studies programs are to meet the needs of the Foundation, other Government agencies, and the public generally for information on scientific and technical personnel as required for the management, operation, and evaluation of substantive programs in this area. These objectives are described in the National Science Foundation Act of 1950 as the maintenance of "a register of scientific and technical personnel and in other ways provide a central clearinghouse for information covering all scientific and technical personnel . . ."

THE NATIONAL REGISTER OF SCIENTIFIC AND TECHNICAL PERSONNEL

The National Register, operated by the Foundation since 1953, is a comprehensive program designed to provide detailed information about the characteristics of the Nation's scientists and to insure the prompt location of science-trained persons on whom the Government might call in time of national emergency. Scientists are currently circularized at 2-year intervals by cooperating national professional societies, and registration records are centrally maintained at the National Register Records Center at Raleigh, N.C.

Fiscal year 1961 was principally a period of recircularization in order to establish registration data on a current basis and to increase coverage ratios. The cooperating scientific societies[1] mailed out over 350,000 questionnaires shortly before the beginning of the fiscal year and by the end of June 1960 about 120,000 returns had been processed at the Records Center. These returns served as the basis of a preliminary analysis of the characteristics of scientific manpower. This analysis, published as *Scientific Manpower Bulletin No. 12,* was first released at the American Association for the Advancement of Science annual meeting in December 1960. For the first time in the Register's history, data on the income and professional characteristics of scientists were released during the same year in which they were collected. (See table 3 and figure 2.) Other analyses from these preliminary returns, including geographic distribution and foreign language proficiency of registrants, are being prepared for publication.

The recircularization continued throughout the year with the societies conducting follow-up mailings to nonrespondents. As the fiscal year drew to a close, 237,000 returns had been received by the societies, with an anticipation that more than 200,000 individual registrants would be included eventually in the 1960–61 National Register.

The volume of requests for information from the National Register continued to increase throughout the fiscal year. These requests may be categorized in the following areas:

1. Statistical information related to salaries, educational level, work activities, age distribution, employers of scientific and technical personnel, etc.

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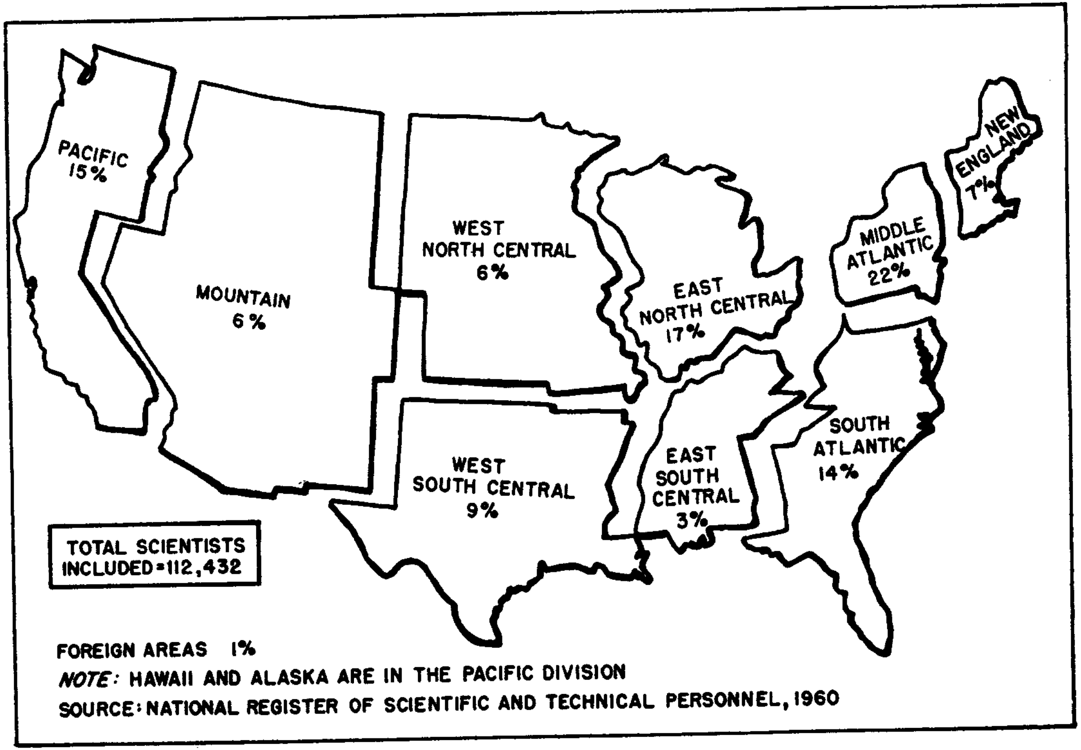
[1] Cooperating societies include the: American Chemical Society, American Geological Institute, American Institute of Biological Sciences, American Institute of Physics, American Mathematical Society, American Meteorological Society, American Psychological Association, and Federation of American Societies for Experimental Biology, and through these organizations about 200 specialized societies. The U.S. Public Health Service cooperates in the registration of sanitary engineers.



Note: Hawaii and Alaska are in the Pacific division.
Source: National Register of Scientific and Technical Personnel, 1960.

Figure 2. ***Distribution of Scientists in the National Register, by U.S. Geographic Division, 1960***

2. Numbers of registrants located in specific geographical areas, i.e., State, county, or metropolitan area.
3. Information on the techniques of establishing rosters for use by industrial establishments, educational institutions, and foreign countries.
4. Identification of individual scientists for foreign translation activities, international teaching assignments, and special studies to be conducted by scientific societies and others.

Table 3.—*Median 1960 Salary Rates and Median 1959 Gross Professional Income Reported by Scientists*

	1959 median gross income	1960 median salary
Total, all scientists	$10, 000	$9, 000
Men	10, 000	9, 000
Women	7, 000	7, 000
Highest Degree		
No degree	9, 000	8, 000
Bachelor's	9, 000	9, 000
Master's	9, 000	8, 000
Medical degree	14, 000	12, 000
Ph. D. or equivalent	10, 000	10, 000
Age Groups		
20–29	6, 000	7, 000
30–39	9, 000	9, 000
40–49	11, 000	10, 000
50–59	12, 000	11, 000
60 and over	12, 000	11, 000
Professional Experience		
1 year or less	5, 000	6, 000
2–4 years	7, 000	7, 000
5–9 years	8, 000	8, 000
10–14 years	10, 000	10, 000
15–19 years	11, 000	10, 000
20 or more years	12, 000	12, 000
Type of Employer		
Educational institutions	9, 000	8, 000
Federal Government	9, 000	9, 000
State and local government	8, 000	8, 000
Nonprofit organizations	10, 000	10, 000
Business, industry, and self-employed	10, 000	10, 000
Commissioned Corps, PHS	10, 000	9, 000
Military service	8, 000	7, 000
Other employers	10, 000	9, 000

Table 3.—*Median 1960 Salary Rates and Median 1959 Gross Professional Income Reported by Scientists*—Continued

	1959 median gross income	1960 median salary
Work Activity		
Management or administration	$12,000	$12,000
Research, development or design	9,000	9,000
Teaching	9,000	8,000
Production and inspection	8,000	8,000
Other activities	9,000	8,000

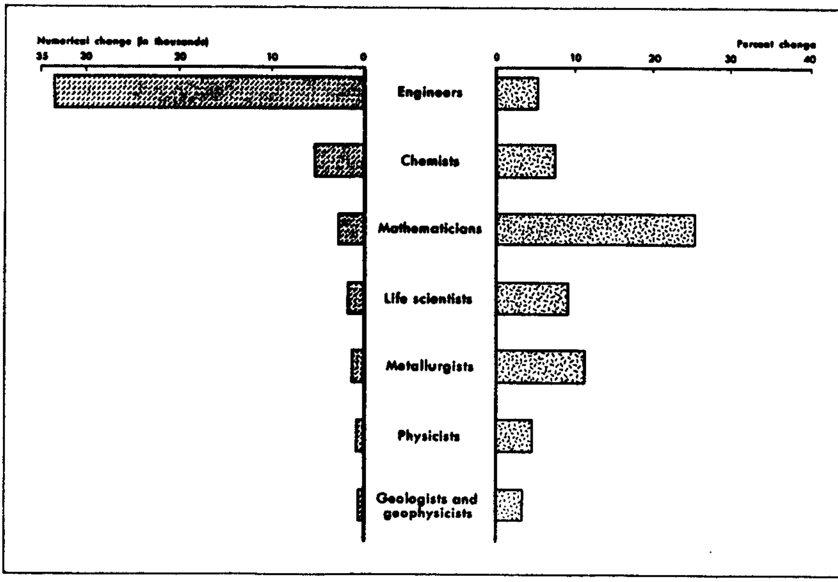
Source: National Register of Scientific and Technical Personnel, 1960.

Discussions with other Government agencies concerned with the recruitment and utilization of manpower under emergency conditions have led to a better understanding of National Register functions under such conditions. In view of the manpower mobilization functions assigned to the National Science Foundation, the National Register can be expected to assume an increasing importance as serious manpower shortages develop in scientific and technical occupations.

SCIENTIFIC MANPOWER STUDIES

The Scientific Manpower Studies program relates to 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 the Foundation, other Government agencies, private organizations, and the public in general. Information on the supply, demand, utilization, education, and other 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 during fiscal year 1961 encompassed a wide range of studies: some initiated this year; others continued as a part of an annual series, and still others underway from previous years. Among the more important studies in progress were: studies of scientific, engineering, and technician employment in private industry (see accompanying table for some of the results of the 1960 survey), colleges and universities, and the Federal Government; studies of students enrolled for advanced degrees; the registry of high school teachers of science and mathematics; a study of career plans of college seniors (in cooperation with the National Institutes of Health and the U.S. Office of Education); research studies of high-ability youth; studies



Source: National Science Foundation.

Figure 3. ***Growth in Scientific and Engineering Employment in Industry, for Selected Occupational Groups, January 1959 to January 1960***

of equipment requirements to improve undergraduate science instruction in selected fields; analysis of information on high school backgrounds of science doctorates; a study of Federal funds for science education; studies on the identification of creative scientific talent; the development of a plan for a series of studies of professional personnel and college graduates based on the 1960 Census of Population; and a study of needs for, and supply of, science manpower for high energy physics programs.

These projects conform to the general series of studies recommended in "A Study of Scientific and Technical Manpower" (a report on the collection, tabulation, and analysis of scientific manpower data submitted by the Foundation to the House Committee on Science and Astronautics) and in the Foundation's report, "A Program for National Information on Scientific and Technical Personnel." One of the recommendations of the latter report resulted in the designation of the Foundation to act as a "focal agency" for the coordination of studies of scientific manpower within the Federal Government. The Foundation has been fulfilling this responsibility in connection with studies of several Federal agencies.

In November 1960 the Foundation convened a conference of university, industry, and Government representatives to consider alternative methods of measuring demand for scientific and technical personnel. A Foundation-supported study carried out by the Bureau of Labor Statistics provided a basis of discussion for the conference, which was composed of a panel of experts in science and economics. The Bureau of Labor Statistics report, "A Long Range Study of Demand for Scientific and Technical Personnel," will be published in the near future. On the basis of recommendations by conferees and consultations with other personnel knowledgeable in the field, the Foundation will undertake further studies of the demand for scientific and technical personnel.

The Foundation was responsible for coordinating and preparing the U.S. Government's response to two surveys of the Organization for European Economic Cooperation (OEEC): "The Supply, Recruitment, and Training of Science Teachers" and "The Third International Survey of Demand for, and Supply of, Scientific and Technical Personnel." Both assignments required the cooperation of several other Government agencies.

During fiscal year 1961 the manpower studies publications issued by the Foundation included:

Scientific and Technical Personnel in American Industry, Report on a 1959 Survey, NSF 60–62—First in a series on the employment of scientific and technical personnel in industry. It presents information on the number of industrial concerns employing such personnel; the number of engineers and scientists (by major field of science) and technicians employed by industry; and the number of such persons engaged in research and development and other functions.

The Science Doctorates of 1958 and 1959—Presents information on the employment plans and characteristics of persons who earned doctorates in science and engineering fields in 1958 and 1959. It is based on data obtained from these doctorate holders through the Doctorate Records Study of the National Academy of Sciences—National Research Council, under Foundation support. The report concludes that roughly half of all new doctorates planned to work for colleges and universities, more than one-quarter for industrial concerns, less than one-tenth for Government organizations, and about one-eighth for other employers. The report also includes information on the geographical origins of new doctorate holders, the regional location of the bachelor degree institutions and high schools attended, lapse of time between bachelor's degree and doctorate, and data on personal characteristics such as age, sex, citizenship, and marital status.

Scientific Manpower, 1960—Includes papers presented at the Ninth Conference on Scientific Manpower, held in conjunction with the annual meeting of the American Association for the Advancement of Science in

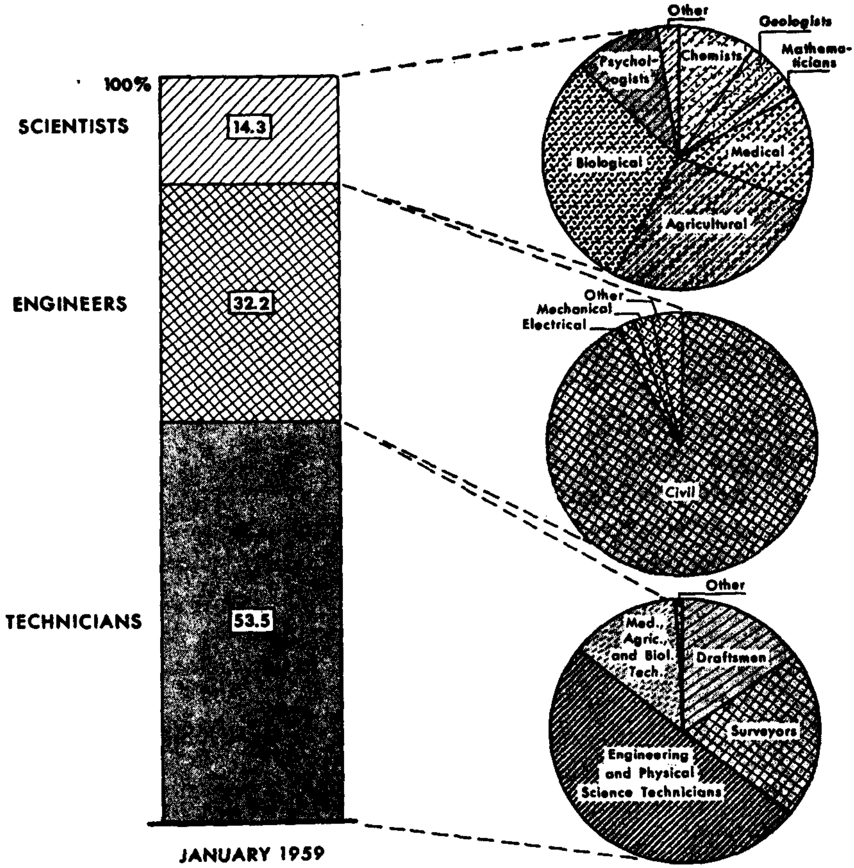
New York, December 1960. The conference theme was "Developing Student Interest in Science and Engineering."

Table 4.—*Baccalaureate to Doctorate Time Lapse and Years of Professional Experience, by Fields of Science, 1958 and 1959 Doctorates Combined*

Field of doctorate	Mean time lapse in years	Median years of predoctoral professional experience	Time lapse minus years of experience
All sciences	8.1	3.2	4.9
Physical sciences	7.5	2.7	4.8
Geology	8.6	4.0	4.6
Mathematics	8.1	3.8	4.3
Physics	7.5	2.6	4.9
Chemistry	6.5	1.5	5.0
Engineering	8.3	4.4	3.9
Behavioral sciences	9.4	4.0	5.4
Psychology	9.3	4.1	5.2
Anthropology	10.7	3.3	7.4
Life sciences	8.6	3.6	5.0
Physiology and related	8.6	3.4	5.2
Microbiology	8.5	3.6	4.9
Genetics	8.5	3.2	5.3
Zoology	9.0	3.5	5.5
Botany and phytopathology	8.2	3.6	4.6
Agriculture and related	8.4	4.1	4.3
Biochemistry	7.7	2.7	5.0
Medical sciences	9.3	5.4	3.9
Miscellaneous life sciences	9.0	3.9	5.1

Scientific and Technical Personnel Employed by State Governments, 1959—Reports the first comprehensive survey of employment of scientists, engineers, and technicians by State government agencies. The survey, which covered more than 3,000 separate State agencies, revealed a total of almost 41,000 employed scientists and engineers and 47,000 technicians. Nearly 97 percent of the scientists, engineers, and technicians covered by the survey were employed in three broad agency groupings—public works and highways, health and welfare, and agriculture and conservation. Nearly 70 percent of the scientists and engineers were in engineering specialties.

Professional Manpower and Education in Communist China—This publication reports that the number of highly qualified personnel capable of advanced scientific research in China is small, with major research emphasis on immediate application. Rather than conducting high-level



Source: National Science Foundation

Figure 4. *Scientists, Engineers, and Technicians Employed by State Governments, January 1959*

research, the Chinese scientist finds it far more expedient "to borrow existing knowledge from the more advanced nations and convert it to the special needs and the present level of Chinese technology."

A serious qualitative lag exists in education on all levels in China. The report foresees only a gradual rise in the current standards. "As the numbers at the various educational levels become stabilized, additional emphasis will be placed on quality; this will coincide with an increase in the number of more qualified teachers. At all levels, but especially in higher education, the quality of the graduate will be closely related to the degree of emphasis on labor and the time that students will be expected to contribute to actual production work."

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DISSEMINATION OF SCIENTIFIC INFORMATION

The ultimate goal of the Foundation's program in the scientific information field has been, and continues to be, the development of integrated systems, national in scope, designed to give every U.S. scientist and engineer effective access to the significant results of the research conducted by all other scientists and engineers. NSF, through its Office of Science Information Service, has followed two fundamental approaches in carrying out its responsibilities in this area.

1. Promoting development of new and better techniques for handling scientific information.
2. Improving the existing methods for the dissemination of scientific information.

The total 1961 fiscal-year effort along these lines has been conducted primarily within the administrative framework of four specific programs. There are, however, certain major problem areas which are of overall concern and are, therefore, discussed separately.

Major Problem Areas

GRANTS AND PROPOSALS

In the 1961 fiscal year, the Foundation made 166 grants totaling $5,379,940 for improving the dissemination of scientific information. Prior to this year, funds were available to support almost all worthwhile scientific information proposals that came in. Now the point has been reached where requests that, under present NSF criteria, would be considered worthy of support, require funds substantially greater than those that are available. In the area of scientific publication support, for example, acceptable proposals actually on hand at the end of the fiscal year involved funds in excess of the total 1961 allotment for that purpose. Little evidence is in sight of any levelling off in the receipt of scientific information proposals.

This situation poses a serious problem. Continually expanding direct Federal subsidy of the dissemination of scientific information would seem bound eventually to transfer a major fraction of the control of the Nation's information system out of the hands of the scientific community into those of Government. The only feasible alternative seems to be realistic recognition and implementation by those who administer research funds of the principle that dissemination of the results of experimentation is an integral element of the total research sequence and, as such, should receive an appropriate fraction of the research dollar. The Foundation has increasingly emphasized the wisdom of this method as the proper approach to supporting the normal media through which scientific information is exchanged. During 1961, this emphasis has been particularly strong in, but not limited to, the publication field. The use of page charges by primary journals, as one means to this end, was increasingly urged.

COORDINATION OF SCIENTIFIC INFORMATION ACTIVITIES

A major—perhaps the principal—responsibility of OSIS is to provide leadership in coordinating existing scientific information activities, whether they be wholly within Government, totally outside of Government, or of mixed public and private origin. The Foundation's conduct of its coordinating role takes two basic forms—one of which has received insufficient emphasis in past reports on the program. This aspect is the coordinating effect inherent in almost everything it does. For example, before the Foundation awards a grant for documentation research or publication, its action typically is preceded by a series of discussions with the proposing group to make the request compatible with an effective, integrated overall system. Similarly, in the case of proposals for the conduct of studies and experiments, NSF tries during pre-grant discussions to insure that the proposed project fits into a unified total program and promises to produce results applicable beyond its immediate objective.

The Foundation's other approach in this area is explicit. In this phase, NSF calls together representatives of operating organizations to work out mutually beneficial, cooperative solutions to common problems; it supports studies and experiments to develop information essential to intelligent cooperation; it sponsors conferences intended to achieve improved integration of the efforts of the numerous U.S. private and public groups concerned with scientific information; and it participates in pertinent conferences called by other organizations.

The principal national problems in this area undoubtedly stem from the enormous complexity of the existing scientific information system and the natural reluctance of any organization to give up some of the known benefits of autonomy for the hoped-for advantages of a cooperative effort. NSF has basic responsibility for developing a well-coordinated national scientific information system, but has no administrative authority over any groups whose activities are to be coordinated. Therefore, it must work by persuading agencies and organizations involved that cooperation and coordination of effort will benefit them individually and will advance science as a whole. Although this limitation undoubtedly reduces the speed with which at least superficial coordination might be achieved, it has the very great advantage that cooperative efforts that do result are supported wholeheartedly by those involved and, therefore, are likely to be lasting.

One important Foundation approach to coordination has been to counsel with scientific societies, providing temporary financial assistance where necessary, to work out ways for them to take increasing responsibility for developing a unified, overall, U.S. scientific information system. It is NSF's firm conviction that such expansion of the role of these societies is necessary if the basic control of the dissemination of the results of research is to remain with the scientific community where it belongs.

Among the most significant 1961 advances in the promotion of coordination have been those involving the availability of information stemming from Government-supported research. These and other examples are described later.

In the area of international coordination, the Foundation participated actively in the overall planning of the International Federation of Documentation; it worked closely with, and partially supported, the Abstracting Board of the International Council of Scientific Unions; and it was intimately associated with various scientific information activities of UNESCO. To insure continuing, effective coordination of U.S. and foreign planning in this field, NSF is providing support for the Office of Documentation of the National Academy of Sciences-National Research Council. In addition, NSF has participated in various international conferences concerned with the worldwide dissemination of the results of research.

OVERALL FEDERAL SCIENTIFIC INFORMATION PATTERN

Closely related to the coordination problem within Government is the lack of a consistent total Federal pattern in the scientific information field. The fact that over 60 percent of all U.S. scientific research is directly or indirectly funded by Government indicates that the total

Federal stake in scientific information is very large. For the most part, the concern of Government agencies in this field has taken the same form as that of any large-scale producer and user of the results of research. Consequently, over the years, each agency's scientific information program quite naturally has evolved in response to its own particular needs, largely without regard to whether any kind of consistent national pattern was being developed. With the accelerating flood of scientific information in recent years, resulting from the many-fold expansion of research, has come an increasingly imperative need for such a national plan.

During 1961, the Foundation has focused increasing attention on this problem and, particularly, on certain prerequisites to the development of an effective overall Government system of which the separate agency programs will be logical components. One extremely important prerequisite is that each agency's own scientific information activities be well and effectively organized. Working through interdepartmental committees and informal discussion groups, NSF, aided by the Federal Council on Science and Technology, has been vigorously promoting action toward this objective.

EDUCATION AND TRAINING

Three factors that obviously affect the influence of scientific information upon the advancement of research are: (1) the skill with which the information is presented, (2) the appreciation that scientists and engineers have of its potential value, and (3) the competence of those involved in making it available to research people. Greatly increased educational and training emphasis is needed in all of these areas.

Scientific curricula in U.S. colleges and universities are seriously lacking in emphasis on good writing and the effective presentation of research results in reports and papers. Similarly, undergraduate and graduate training in many sciences largely ignores instruction in the use of scientific literature and bibliographic tools in general; in no technical subject field are these powerful scientific assets sufficiently emphasized. Also, almost no universities or other institutions in the U.S. are equipped to give librarians and information specialists adequate training in modern methods of processing, storing, and retrieving scientific data, and in new approaches to the complex problems resulting from the explosive growth in technical literature in recent years.

More immediate problems prevented NSF from embarking upon a vigorous program in this area prior to 1961. During the past year, however, study of these problems was begun with educational groups, scientific organizations, research librarians, and the Foundation's Division of Scientific Personnel and Education. These exploratory conversations have been directed toward defining the problem and determining what should be the role of OSIS in working for improvement in the presentation of scientific material, in training scientists and engineers in its more effective use, and in developing well-trained scientific information specialists. Although, by its nature, such a program necessarily is somewhat long range, significantly increased emphasis is planned for 1962.

Documentation Research

The Documentation Research program stimulates and supports studies, research, and experiments directed toward (1) new and more effective systems—mechanized where possible—for processing, storing, and searching large volumes of scientific information, and (2) mechanized production of accurate and readable translations of foreign language materials into English. The program is also concerned with the extent to which the information needs of the scientific community are being met by existing publications and information services, or could be met by proposed new methods.

Every indication points to the fact that scientific and technical information is growing in total volume and diversity of form and subject matter at a rate faster than it can be effectively collected, organized, and disseminated. There is, in addition, a large and growing body of important research reported in languages not commonly used by American scientists and engineers. The program was established to support research seeking at least partial resolution of these scientific information problems by the development of systems using high-speed electronic and mechanical equipment for organizing and searching information and for translating scientific texts from one language into another.

STUDIES OF INFORMATION NEEDS OF SCIENTISTS

Continued emphasis was placed in 1961 on analyses of the present patterns of scientific communication, the ways in which scientists and engineers use existing publications and information services, and their needs for new and improved services.

Exploratory studies on the possibilities of developing measures of the value of recorded scientific information and on a proposed theory of human communication were carried out by Case Institute of Technology.

A grant was made to the American Psychological Association for an analysis of the total system of scientific communication in psychology, including studies of psychologists' use of information, the functions and effectiveness of journal and abstracting/indexing publications, and the role of nonwritten scientific communication and meetings. The study will provide for experimentation with a searching service to be operated with the assistance of experts in psychology.

INFORMATION ORGANIZATION AND SEARCHING

Continuing projects supported by the Foundation are concerned with methods for the analysis, ordered arrangement, encoding and searching of scientific subject matter, theoretical studies of information storage and searching, and evaluation of procedures and systems.

The Itek Corp., under a 2-year Foundation contract, has made considerable progress on the development of a normalized language for information searching systems and the development of procedures for selecting indexable information from documents and for converting the information from the language of the documents into the normalized language, which is more amenable to coding for mechanized storage and retrieval. The work is covered in a series of reports.

A pioneering effort in controlled comparison of four indexing and classification systems has been carried out by the Cranfield Project of the Association of Special Libraries and Information Bureaux of Great Britain. Two reports on the project were issued during the year.

A large-scale test program to determine the effectiveness of procedures for analyzing, coding, and searching the subject content of scientific literature has been supported at Western Reserve University. A comprehensive experimental searching service for metallurgists is being operated there with the joint support of the American Society for Metals and the Foundation. Responsibility for planning tests of the procedures and for evaluating the results is in the hands of an ad hoc committee of metallurgists and information specialists established by the National Academy of Sciences-National Research Council at the Foundation's request. Upon the recommendation of this committee, the Foundation has let two contracts to the Stanford Research Institute and Arthur Andersen & Co. for exploratory work on the development of objective criteria for the evaluation of information searching systems.

A thorough analysis of the characteristic use of notation systems for structures of chemical compounds has been launched by the NAS–NRC. The study will consider similarities and differences among various chemical notation systems, the uses now being made of them, criteria which led to their adoption and development, and the purposes that might be served by agreement among chemists on the use of one or more standardized systems.

Before machines can process texts of documents for either mechanized information searching systems or mechanical translation systems, more precise knowledge of syntax, semantics, and other aspects of language is needed. Consequently, a considerable portion of current research supported by this program is directed toward extending knowledge of language.

In this field as a whole, the efforts of groups working on Russian-to-English mechanical translation, including a number supported by the Foundation, have resulted in several sizable automatic dictionary programs for such scientific fields as electronics, mathematics, physics, chemistry, and biochemistry. Several approaches to the automatic parsing of Russian texts have met with partial success.

Efforts directed toward methods which may ultimately contribute to complete and accurate translation by machine are being continued at Massachusetts Institute of Technology. In this research program, detailed knowledge of the grammars of several languages is gradually being built up. In addition, the theoretical work has produced certain important insights into the nature of language, the most recent being the "depth hypothesis," which offers a possible explanation of several characteristics of language, based on a limitation of the degree of complexity in sentence structure.

Support was continued for the Harvard University project for research on automatic translation and mathematical linguistics. The project is largely devoted to a program for research on automatic translation of Russian into English.

A project at the University of California, Berkeley, which has been primarily devoted to Russian-English mechanical translation research, has undertaken a smaller but parallel study of Chinese. Two small projects devoted exclusively to the study of Chinese, aimed at Chinese-English translation, have begun; one at the University of Washington, and the other at the Ohio State University.

LINGUISTIC ANALYSIS FOR OTHER PURPOSES

Although approximately 10 groups have been working on the analysis of Russian and other foreign languages in connection with mechanical translation research, only 1, at the University of Pennsylvania, has tackled English. Under Foundation support, a computer program for grammatical analysis of English sentences has been devised, and work is well along on a more complex program for "transformational analysis," the reduction of sentences and their component clauses and phrases into simpler, more uniform constructions.

This work has proved so successful that it has served as the basis of a related research effort at the Radio Corporation of America. The ultimate aim of the University of Pennsylvania effort is the development of procedures for automatic indexing, abstracting, and searching of the analyzed texts.

STATE-OF-THE-ART SURVEYS

During the fiscal year, *A Survey of Computer Programs for Chemical Information Searching* was published by the Research Information Center and Advisory Service on Information Processing at the Bureau of Standards. An extensive report on automatic character recognition also was prepared; a preliminary version has been distributed for comment. The Center, supported jointly by the Foundation, the National Bureau of Standards, and the Council of Library Resources, Inc., assembles and studies publications and reports on information processing research, prepares state-of-the-art papers on various aspects of the research, and furnishes advice on research problems to Federal agencies and other cooperating organizations.

During the past year also, under an NSF contract, Documentation, Inc., has conducted a state-of-the-art survey of coordinate indexing techniques; a report is being prepared.

COORDINATION AND EXCHANGE OF INFORMATION

The seventh and eighth reports in the series *Current Research and Development in Scientific Documentation* were released by the Foundation during fiscal year 1961 to provide a means for coordination and exchange of information among working groups. These reports are international in coverage and contain descriptive statements contributed by investigators conducting research on various aspects of information handling and on potentially related problems. Issue No. 8 covers current activities in the United States and 16 foreign countries; it contains descriptions of 195 projects in 122 organizations, an increase of 36 projects and 23 organizations over Issue No. 7 published 6 months previously.

Members of the Interagency Committee on Mechanical Translation Research, under Foundation chairmanship, met several times during the fiscal year to seek coordination of Federal programs in the field. Agreement was reached on guidelines for the conduct of meetings and for the reporting of research results. During the year, two meetings on mechanical translation research were held, the first being a technical conference sponsored jointly by the Foundation and the Office of Naval Research. The second meeting, sponsored by the Foundation, was held to seek agreement on grammar codes and format for Russian-to-English automatic dictionaries. Two participating organizations are already using an exchange format; further exchanges are anticipated. Use of the Chinese telegraphic code by groups working with Chinese texts has been recommended by the Foundation and adopted by several groups in order to avoid the multiplicity of transliteration systems which has been a difficulty in processing of Russian for mechanical translation research.

Support of Scientific Publications

The Scientific Publication program provides leadership and support for (1) a publication system that will permit scientists to publish promptly, in adequate detail and format, the results of their research and (2) a reference system that will facilitate scientists' access to the great and growing volume of published information produced in the course of striving towards the first objective. Adequate abstracting and indexing is the keystone of this second objective.

Program activities in 1961 were focused upon a number of the problems that must be solved before these two objectives can be achieved. Projects supported may be grouped into two general classes: those assisting present scientific publishing services; and those investigating new or improved systems, providing faster, more comprehensive services at lowest possible cost. Some highlights of the year's activities follow.

CONTINUATION OF CONVENTIONAL PUBLICATION SUPPORT

Foundation activity in this area of scientific communication involved support of several different types of publications. Uses to which these funds were put include: launching new primary journals; eliminating manuscript backlogs; assisting research journals to publish cumulative indexes; enabling abstracting and indexing services to expand their coverage; and publishing a number of significant single items which could not have been published without subsidy, including monographs, symposium proceedings, reviews, data compilations, and bibliographies. As in previous years, emphasis was placed on the temporary nature of publication support. This operating policy is based on two beliefs: that the Federal Government's activities in long-term support of information dissemination should be part of its normal support of research, and that adoption by NSF of research journals as semipermanent wards is both impractical and extremely undesirable.

STRENGTHENING ABSTRACTING AND INDEXING SERVICES

The Foundation continued its program of strengthening existing abstracting and indexing services, while attempting to identify gaps in U.S. coverage of scientific literature.

During the year a grant was made to Biological Abstracts, Inc., to institute a new semimonthly permuted title index and to increase by twenty percent the number of abstracts published annually in *Biological Abstracts*. Publication of the *BASIC* (*Biological Abstracts* Subjects in Context) is the result of efforts to provide a current subject approach to the journal's contents. Indications are that a permuted title index might alleviate the present 18-month index lag. It is hoped that this system will provide a satisfactory interim index for the users of *Biological Abstracts* pending preparation of more exhaustive regular subject indexes.

Appearing during this reporting period was the first issue of another experimental type publication supported initially by the Foundation—*Chemical Titles*. This is also a permuted title index, published semimonthly by Chemical Abstracts, Inc.

With NSF support, the institute of the Aerospace Sciences began publication of a new monthly abstracting journal entitled *International Aerospace Abstracts*. The new periodical replaces several previously available aerospace information services, no longer adequate to meet the needs of workers in this field.

The Foundation continued its support of the National Federation of Science Abstracting and Indexing Services, established in 1959 to coordinate the work of the various services, seek ways to improve them, and provide more complete coverage of scientific literature. During the year the Federation issued a directory, prepared by the Library of Congress, of 492 abstracting and indexing services in the United States, a valuable guide to the literature of science and technology. Compilation of a companion list of foreign services is underway. At its annual meeting in March, the Federation adopted a resolution calling for preparation of a study of a coordinated national program for abstracting and indexing.

SCIENTIFIC COMMUNICATION STUDIES AND EXPERIMENTS

The New York Botanical Garden pilot project for the study of a machine-oriented coding system for plant taxonomy was continued under a new Foundation grant. Included in the expanded study will be the preparation and publication of an International Plant Index by the use of punched cards and data processing machines.

This project is considered as an experiment in methodology and the resulting indices will be evaluated by a group of competent taxonomists. With this in mind, the researchers will provide a report during the study on the possibilities of including additional data on the index cards; they will also investigate the potential use of the indices by other than plant taxonomists. Within the next 18 months it is expected that 10 volumes of 250 pages each will be ready for print out.

For the past several years there have been numerous published and unpublished expressions of the need for a system of organizing citations in scientific literature. As a result of this interest and related staff work dating back to 1957, funds were made available this year for joint support with the National Institutes of Health of an experimental study of citation index methods and the preparation of a Genetics Citation Index. The study, being conducted by the Institute for Scientific Information, Inc., Philadelphia, is designed to ascertain the best methods for preparing such indices and to evaluate the usefulness of a citation index to scientists, using the field of genetics as an example.

A number of the major national scientific societies have been encouraged by the Foundation to conduct comprehensive disciplinewide studies of their own communication "networks," to uncover weaknesses, and to take steps to correct them. With NSF support, the American Institute of Physics has been studying physics communication problems; this project continues.

During this year a grant was made to the American Institute of Biological Sciences for another such study, the first of its kind to be attempted by biologists themselves. This investigation, organized as the Biological Sciences Communication Project, is seeking ways to improve overall effectiveness of the control and dissemination of biological information. First step in the program is an examination of methods for acquiring, indexing, storing, and retrieving scientific literature. Studies will follow of biologists' needs for and use of information. The effectiveness of visiting biologists' programs, conferences, and symposia will also be appraised. At the international level, consideration is to be given to methods for obtaining and disseminating valuable foreign research information gathered by U.S. biologists visiting other countries.

Foreign Science Information

As scientific research carried on abroad continues to increase in both volume and quality, it takes on greater significance to the U.S. scientific community. But this heightened awareness is accompanied by hindrances to ready access because much of the published information on this research is in languages familiar to only a few American scientists. In addition, many foreign-language journals and other publications are not readily available in American research libraries and other reference centers. The extent and sources of foreign scientific information, especially in the Soviet Union, Communist China, southeast Asia, and Latin America, are not widely known.

The Foreign Science Information program promotes the effective availability in the United States of worthwhile scientific research results published in foreign countries and encourages the interchange of scientific information. In striving to meet the growing demand for improved access to foreign research findings, the program staff gives leadership to, and encourages the participation of, some 20 U.S. professional scientific and technical societies, a similar number of U.S. universities, and officials of a dozen or so Federal agencies. This program also administers, on behalf of several Federal agencies, the translation of foreign scientific literature financed by funds accruing to the credit of the United States from the sale of surplus agricultural goods abroad under the provisions of Public Law 480 of the 83d Congress.

TRANSLATION OF SOVIET SCIENTIFIC LITERATURE

The translation of key Soviet journals, selected articles, and books and monographs was continued during the 1961 fiscal year. To inform the scientific community of the availability of translated journals, a revised edition of a list of 48 journals receiving Foundation support was prepared and issued. Journals produced by other agencies are also listed.

Cover-to-cover translation of 40 Soviet scientific journals totaled more than 61,000 pages during 1961, as compared with 31,000 during 1958.

As U.S. scientists become better informed about Russian research, there is an increasing demand for translation of selected articles from Soviet journals, aside from those being translated on a cover-to-cover basis. The number of pages translated on a selective basis has grown from 6,490 in 1960 to 9,660 pages in 1961. The Foundation has also launched a project for the abstracting of Soviet biological literature by *Biological Abstracts.*

Grants were given for the translation of 10 Russian books and monographs totaling 4,064 pages to give another avenue of access to significant scientific research conducted abroad.

TRANSLATION OF OTHER LANGUAGES

Concern has been expressed by American scientists that research published in oriental languages is gaining in significance while still being unavailable in English translation. The Foundation has stimulated the selective translation of scientific papers published in Communist China and the translation and publication of significant scientific journals and monographs published in Japanese. Also, the Foundation is supporting the translation and publication of a monthly list of the tables of contents of all scientific and technical publications originating in Japan which are received by the Japanese Diet Library (the Japanese "Library of Congress").

PUBLIC LAW 480 TRANSLATION ACTIVITIES

Additional foreign currencies credited to the United States under Public Law 480 were obligated by the Foundation during the year for expanding cooperative programs with Israel, Poland, and Yugoslavia for the translation of significant scientific literature published in Russian, Polish, and Serbo-Croatian. During fiscal 1959 and 1961, foreign currencies equivalent to $1,783,000 were obligated; no such funds were obligated during 1960.

The continuing contract with the Israel Program for Scientific Translations, which calls for the translation, editing, and printing of approximately 46,700 pages of scientific and technical literature published in Russian and other European languages, has produced 49 books and 126 individual articles. A printing schedule of approximately 2,000 pages per month has been established for the publication of 30,500 pages of translated material which has already been reviewed by U.S. scientists. Another 16,200 pages are in the process of translation. At the end of the fiscal year, translations of selected Swiss patents were being made available.

In Poland, the contract with the Central Institute for Scientific and Technical Documentation contemplates the translation, editing, and printing of about 19,000 pages of Polish scientific and technical literature. In addition, the abstracting and simultaneous publication in English of Polish scientific and technical periodicals has been started. About 11,500 pages are presently in the process of translation and about 7,500 pages of translated material have been received for editing. Sixty-eight selected articles have been printed.

The translation, editing, and printing of approximately 20,000 pages of Serbo-Croatian scientific and technical literature has been contracted for with the Directorate for Scientific Research of the Yugoslav Federal Executive Council. The printing phase of the program has been initiated, 6,500 pages have been reviewed by American specialists, and another 7,000 pages are in the process of translation.

EXCHANGES AND CLEARINGHOUSES

Establishment and encouragement of working exchange agreements and clearinghouse operations are essential to ensure that information on worthwhile scientific research results occurring in foreign countries is made available to the U.S. scientific community. Examples of such activities are given in the following paragraphs.

Two representatives of the Foundation were assigned in October 1960 to the staff of the American Embassy in Tokyo and are assisting in promoting the exchange of scientific knowledge between scientists and institutions in Japan and the United States. As part of their duties, they encourage the publication in English of reports by Japanese scientists and arrange for the translation and abstracting into English of Japanese scientific documents.

Member countries of the European Productivity Agency have established a European Translation Center in Delft, the Netherlands, to promote broader distribution of translations of Russian and other eastern European scientific literature in the western world. Formation of the center was achieved with the advice, encouragement, and manpower support of the Foundation.

A five-man team representing the National Federation of Science Abstracting and Indexing Services, supported by a Foundation grant, toured Japan late in the fiscal year to investigate Japanese progress and activities in all phases of documentation and information retrieval work with the hope of developing practical means of broadening the exchange of abstracts and publications. This tour corresponded to a similar visit made last year by the Japanese Technical Information Processing Study Team to information centers in the United States.

Support was continued for the Special Libraries Association Translation Center at the John Crerar Library in Chicago, which concentrates on the acquisition of translations from all non-Government sources. This work is closely coordinated with a complementary effort covering Government-produced scientific translations conducted by the Office of Technical Services, U.S. Department of Commerce.

CONFERENCES, AREA STUDIES, AND REFERENCE AIDS

As mentioned in an earlier section of this report, the Foundation stimulates and supports international cooperation in scientific information activities to provide adequate knowledge to U.S. scientists of foreign publications and their acquisition, foreign and international information services, and the availability and coverage of foreign scientific information in the United States.

Publication by the American Association for the Advancement of Science, in June 1961, of the proceedings of the Symposium on Sciences in Communist China was the culmination of months of planning and organization by Foundation staff members of the 2-day symposium conducted as part of the December meeting of the AAAS. The symposium was sponsored by the Foundation and 10 cooperating professional societies. As a direct result of the symposium, as least five major professional societies (American Institute of Physics, American Institute of Biological Sciences, American Geological Institute, American Institute of Chemical Engineers, and American Mathematical Society) are developing programs to examine, monitor, or translate Chinese scientific materials.

During the fiscal year work was virtually completed on organizing the program and arranging for speakers for the Section of Scientific Information as part of the 10th Pacific Science Congress in Hawaii from August 21 to September 2, 1961. The section, organized by the Office of Science Information Service, will deal with communication of scientific research, organization of scientific information and training for information work, resources of research information and exchange of publications, and information activities of international organizations.

A series of conferences was held to develop improved means of disseminating Soviet and Eastern European linguistic literature in the United States.

To provide insight into the extent and nature of the Soviet technical information system, the Massachusetts Institute of Technology undertook a 2-year study, with Foundation support, of the organization, methods, and development of the dissemination of scientific and technical information in the U.S.S.R. A significant first step in the study was the translation and publication of a Russian-authored review of Soviet technical information under the title *Technological Information in the U.S.S.R.*

The resources of scientific information in Czechoslovakia and East Germany, particularly in the natural sciences and engineering, are the subject of critical examination by a Foundation-supported study team from Columbia University.

The results of a survey of the resources, services, and potential for expansion of documentation centers in Latin America were published during the fiscal year in a report entitled *Science Information in Latin America.* The study was cosponsored by the Foundation and the Division of Science Development of the Pan American Union.

Two studies are being supported through the Association of Asian Studies (University of Michigan) and the American Mathematical Society to survey publishing in the natural, social, and applied sciences in Mainland China and to survey contemporary Communist Chinese mathematical research.

Preparation of a guide to Soviet science, intended to fill the needs of U.S. scientists traveling to the Soviet Union or wishing to establish contact with Soviet scientists, was undertaken by Princeton University.

The first in a series of bibliographies of social science periodicals and serial monographs published in Communist bloc and other countries using so-called "difficult" languages was issued during the year by the Foreign Research Office of the Bureau of the Census. The project is being supported by a grant from the Foundation.

In recognition of the need for improved handling of Oriental agricultural publications, the U.S. Department of Agriculture Library published, with Foundation aid, a bibliography of current publications from Japan, Taiwan, Mainland China, North Korea, and South Korea in agriculture and allied sciences.

Research Data and Information Services

The Research Data and Information Services program is primarily concerned with two particularly acute problem areas in scientific information, both of which were given increased attention and financial support during 1961. The first, which is on the whole unsatisfactory, involves dissemination of research results generated under Federal grants and contracts, as well as in Federal laboratories. Scientists and others who can use such information either do not know of its existence or are unable to obtain much of that which is available. The second problem concerns specialized scientific data and reference services, which are rapidly increasing in number and, with few exceptions, independently of one another. There is a real need to improve the compatibility of these services and to coordinate their coverage and activities on a national scale so that no serious gaps or duplications exist.

A number of specific actions, parts of a coordinated program, were taken during the year to attack various phases of these two problems, with particular emphasis on that of Government research information. In the coming months, special attention will also be given to the concept of developing a formal, uniform, Government-wide policy that will facilitate maximum dissemination of Federal scientific information. In essence, recognition must be given scientific information activity as a distinct, definable function of the Government and its various agencies in conducting their research and development programs.

DISSEMINATION OF GOVERNMENT RESEARCH RESULTS

The Foundation has devoted considerable attention to ways of improving the technical report literature of the Federal Government to increase its usefulness and availability to the scientific community. For example, one of its general goals is to achieve more uniformity in the types of technical reports issued by Government agencies and their contractors. At the same time there should be established a uniform

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system of coding and numbering such reports that would reduce multiple identifying numbers to a minimum. As a first step, a contract has been let for a study to identify, define, and analyze various categories of Government technical reports and their code designations. Also to be determined is the practicability of developing and adopting a coordinated Government-wide system of report categories and code designations. This short-term study will help to solve one of the major problems associated with effective use of this material, i.e., adequate identification and organization of the thousands of such reports issued each year.

NSF encouraged the further expansion of the report announcement services of the Office of Technical Services (OTS), Department of Commerce. Beginning in 1962 the OTS announcement journal *U.S. Government Research Reports* will include all unclassified, available reports from the Department of Defense rather than a selected number as was done previously. (This journal also announces AEC and NASA unclassified reports; information is given on how to obtain copies of all documents listed.)

During 1961, as part of a general effort to improve dissemination of research results, the Foundation promoted the establishment of a national network of regional reference centers for U.S. Government technical reports. In cooperation with the Office of Technical Services, efforts were initiated to establish working arrangements and an overall agreement with each of 12 selected institutional libraries strongly oriented to science and technology. This network, when fully operative, will provide access for all regions of the United States to cumulative organized collections of unclassified Government technical reports. It will also provide a means for obtaining loan or purchase copies of such material. The Department of Defense, National Aeronautics and Space Administration, and Atomic Energy Commission, producers of an estimated 90 percent of Government technical reports, are cooperating fully in the project; OTS is coordinating and managing the entire activity. Steps are being taken to induce all other report-producing agencies to participate.

With NSF support and guidance, the Science Information Exchange, a national clearinghouse for information and administrative data on current U.S.-sponsored projects, was formally established in the 1961 fiscal year. In the planning stage for a number of months, the new Exchange, covering physical and biological sciences, is an organizational expansion of the Bio-Sciences Information Exchange (BSIE) established in 1950; it is to be operated by the Smithsonian Institution.

During the year, the Foundation extended its series of surveys of Government agencies with scientific information activities. The purpose of these studies is to describe for each agency the types and subject coverage of the scientific reports it issues, the availability of this material, and the scientific information policies and procedures under which it operates. The data obtained from these surveys are published in a series of bulletins entitled "Scientific Information Activities of Federal Agencies." Included in each bulletin is information on agency research and development activities, names and types of information services provided, documents generated, how they are announced, and how copies may be obtained. In 1961 six new bulletins were published, covering the Tennessee Valley Authority; National Science Foundation; Department of Commerce, Parts II and III; Federal Communications Commission; and Veterans' Administration. Ten of an expected total of 40 have now been published. Others in the series are being prepared and will be issued during the coming year.

SPECIALIZED INFORMATION AND DATA CENTERS

Rising interest in regional scientific information centers has resulted in a number of requests for support of such activities. In an attempt to develop guidelines with which to evaluate these requests, a grant has been awarded to Southern Methodist University for a basic study of the centers. Models of regional centers will be formulated and modes of operation for each will be detailed. Thus, a generalized analysis of such centers will be made, without reference to any particular area or region.

Among other things, the study will determine typical geographical areas which reasonably can be served by information centers. Factors affecting scientific information needs, such as types of industry, extent of research, and growth trends in various technical fields, will be noted and defined. In addition, basic data will be sought on present and future services an information center could provide, and a catalog of potential user needs will be attempted. Possible ways of cooperating with libraries and other information facilities to obtain improved services, will also be investigated.

SPECIAL INTERNATIONAL PROGRAMS

The Office of Special International Programs has been assigned responsibility, within the Foundation, for initiating and developing cooperative and experimental programs in international science and science education, for liaison with other Government agencies involved in such activities, and for providing backstopping service in support of United States participation in selected international organizations.

International Science Program

DEVELOPMENT OF INTERNATIONAL SCIENCE POLICY

The rapidly expanding role of science in international affairs has pointed up the need for a thorough study by the Federal Government of the proper role it should play in world science relationships. The Foundation, because of its responsibilities and experience, has been called upon to assist in: (a) developing national policy for the stimulation and conduct of scientific and technological activities abroad, (b) arranging for cooperation with international scientific and technological activities of the various Government agencies to help evolve a program in science and science education for assisting developing nations.

During the past year, this program participated in studies of engineering aid to Latin America, in examination by an interagency group of the image of U.S. science abroad, and in consideration of appropriate content for U.S. science exhibits to be mounted abroad.

ESTABLISHMENT AND OPERATIONS OF THE NSF-TOKYO OFFICE

Two representatives of the National Science Foundation have been placed within the American Embassy in Tokyo.

This office was established in September 1961 and has a staff of three Americans and three Japanese. It functions as part of the American Embassy and reports to the Foundation through the Office of Special

International Programs. The Office has been active in these principal areas: (1) science liaison and analysis and (2) science information and improvement of science communications generally.

Science Liaison and Analysis

The staff has devoted itself to establishing contact with officials of the Japanese Government responsible for administering and promoting science and technology, with officers of professional scientific organizations, with university and other research organizations, and with individual Japanese scientists, and with such groups as the Science Council of Japan, the Ministry of Education, and the Science and Technics agency.

NSF-Tokyo has served as the liaison office with the Japanese committees planning the Conference on Cosmic Rays and Earth Storms and the Conference on Crystallography and Magnetism held in Kyoto in September 1960.

This office has instituted a program of study of various aspects of Japanese science and technology. A number of varied studies have been completed.

Science Information

NSF-Tokyo has developed close relationships with the Japan Information Center for Science and Technology, the Science Information Office of the Science Council of Japan, the National Diet Library, the Science Information Section of the Ministry of Education, and the Japan Documentation Society. Exploratory discussions have been held with several Japanese scientific societies to see where translations of scientific journals into English are necessary and feasible to improve communication between Japanese and American scientists. Discussions have been held with representatives of the Physical Society of Japan, the Chemical Society of Japan, and the Oceanographic Society of Japan. NSF-Tokyo has also provided assistance to the staff of the National Diet Library responsible for producing the English version of the *Japanese Periodicals Index* under an NSF grant.

Appropriate backstopping has been provided in the Washington headquarters of NSF to assure the effectiveness of its Tokyo operations.

INTERNATIONAL SCIENCE SUPPORT PROJECTS

Foreign Science Evaluation

During the past year, NSF has continued its experimental program of support for surveys in particular fields of science in foreign countries. The purpose of this program is to provide to the Foundation and to the scientific community evaluative reports on the status of research in specific fields of science in foreign countries. A small number of grants have been made to permit outstanding U.S. scientists to spend 2 or 3 months visiting scientific activities in foreign countries for the purpose of preparing research reviews in their special fields. During the past year, grants were made to Dr. Ralph Gerard of the University of Michigan for a survey of some aspects of bio-medical research in India; to Dr. Harlow Shapley, professor emeritus, Harvard College Observatory, for a survey of progress in the field of astronomy in India; and to Dr. A. D. Wallace of Tulane University for a study of mathematical activity in Poland, Hungary, and Yugoslavia.

Cooperative Activities

Under this program, the Foundation is exploring experimental approaches to cooperating in international support of scientific centers in developing areas. During the past year a grant of this type was made to the Comision Nacional de Energia Atomica in Buenos Aires for short-term support of two research projects. The grant was made for Dr. Jorge A. Sabato to study the fabrication of perfect single crystals of alpha-uranium and the relationship between physical and mechanical properties and substances in uranium crystals. The metallurgy group of the Comision Nacional was selected for support because in addition to scientific competence it has shown high potential for leadership as a key scientific group in Latin America. The funds are being used to strengthen the scientific potential of a developing research team which is concerning itself with cooperative interchange of ideas in the Americas.

Another cooperative project is the grant made to Dr. Wallace O. Fenn on behalf of the International Union of Physiological Sciences for an international traveling lecture team in physiology. This grant provides partial support for an international team of scientists in the field of physiology on a tour of India. This project is an experiment in person-to-person scientific communication which should aid in international programs of research in physiology. The team which includes one American is headed by Professor W. D. Patton of Oxford. The project is being supported cooperatively by the Executive Board of the IUPS, the Royal Society of Great Britain, and the National Science Foundation.

U.S.-U.S.S.R. EXCHANGES

In September 1959, the sum of $235,000 was granted to the National Academy of Sciences for the support of an exchange of scientists between the U.S. and the U.S.S.R. This amount was to implement the Bronk-Nesmeyanov Agreement which had been signed in July 1959, by the Academies of Sciences of the two countries, to implement in the scientific area the Lacy-Zaroubin agreement. During the past year the exchanges have been continuing at an accelerated rate.

Of the 44 visits to which each side is entitled under Articles 1, 2, and 3 of the current Exchange Agreement, approximately 52 percent of the American visits and 64 percent of the Soviet visits have been either completed or formally proposed.

International Science Education Program

Within the objective of the National Science Foundation to promote education in the sciences, it is the aim of the International Science Education Program to encourage and support fruitful contacts between U.S. and foreign science educators and scholars. This program has the twofold purpose of (a) making available to U.S. scientists and educators the knowledge and experience of their foreign counterparts and (b) of assisting U.S. science educators to study science training in foreign educational systems and to work in close cooperation with foreign and international groups on current problems of science education improvement. A further program objective is to assure representative U.S. participation in and contribution to deliberations of international bodies concerned with either general or specific questions of science education.

In fiscal year 1961 support was provided to program areas covering course content improvement and science teacher and student training activities.

COURSE CONTENT IMPROVEMENT PROGRAM

In 1961, partial support was given for conferences dealing with current problems and goals of education in the sciences. International conferences were held at the Massachusetts Institute of Technology on Scientific and Engineering Education, at Syracuse University on Electrical Engineering Education, and at the University of Southampton on Mathematical Education. In addition, grants have been made to the International Commission on Mathematical Instruction for an Inter-American Conference on Mathematics Education to be held in Colombia and to the Organization of American States for a Regional Seminar on Educational Problems of Nuclear Energy to be held in Argentina. As in the last fiscal year, grants also were made to enable U.S. educators to participate in the 60th Annual Meeting of the British Science Masters Association and to engage in related activities in Great Britain.

U.S. course content improvement groups were encouraged to establish and maintain communications abroad with analogous groups or with individual foreign science educators with whom the U.S. groups have mutual interests. For this purpose grants were made to the Chemical

Bond Approach project and to Educational Services Inc. In addition, a heightened interchange of ideas and experience in this activity was promoted by awards to Educational Services Inc. for cooperative work in symposia on physics education in three countries abroad and to the Biological Sciences Curriculum Study for foreign cooperation in that group's 1961 Writing Conference.

SCIENCE TEACHER AND STUDENT TRAINING PROGRAMS

One hundred and seven foreign science teachers and educators from 33 countries were placed in 91 NSF Summer Institutes, and 1 in an Academic Year Institute. Nine organizations or agencies with interest in foreign science education cooperated in the nomination and support of these participants who provide a stimulating influence at the institutes they attended. Support was continued for U.S. participation in the Scandinavian Growing Point Program, the NATO Advanced Study Institutes, and a number of other programs for student training.

Liaison and Backstopping Activities

For several years the Foundation has been providing backstopping on behalf of the United States to the science programs of the Organization for European Economic Cooperation, an 18-nation organization of Western European countries, plus the United States and Canada as associate members. Since ICA (International Cooperation Administration) has been the official U.S. respondent to all affairs of this Organization, this backstopping has been provided under an agreement between ICA and NSF. During fiscal year 1961, the Foundation has supplied position papers and staff work on various science matters and has, with funds transferred to it by ICA, recruited 26 representatives to attend meetings of the Committee for Scientific and Technical Personnel and the Committee for Applied Research, the two science committees of OEEC, and to various meetings of specialists arranged within the programs of these two Committees. ICA responsibility for U.S. participation in science matters of the OEEC came to an end on June 30, 1961, and the agreement between ICA and NSF has been terminated.

For the last year preparatory groups from interested nations have been busy in creating a successor organization to the OEEC. This organization is known as the Organization for Economic Cooperation and Development (OECD). Canada and the United States have become members of the new organization, thus making a total of 20 nations. U.S. participation in the new organization is now the responsibility of the Department of State. On June 27, 1961, the Department of State officially requested the National Science Foundation to continue to perform the various specialized functions necessary to backstop the science activities of the new OECD. In the new organization there are again two science committees, the Committee for Scientific and Technical Personnel and the Committee for Scientific Research. The new Committee for Scientific Research will be active in both basic and applied research matters.

In order to provide adequate local backstopping to the science activities of OECD, NSF has arranged for the support of two U.S. persons beginning in fiscal year 1962 in the U.S. Regional Organizations' Office in Paris to provide continuing contact with the two science committees and with the OECD Secretariat serving these committees.

During fiscal year 1961, as in previous years, NSF has continued liaison responsibilities with the State Department's Secretariat for the U.S. National Commission for UNESCO and the NATO Backstopping Committee. It has continued to work closely with the Office of the Science Adviser to the Secretary of State and with the Assistant Secretary of State for Educational and Cultural Affairs, the Soviet and Eastern European Exchanges staff of the State Department, the International Cooperation Administration, the Organization of American States, and the several committees of the National Academy of Sciences that deal with foreign science matters.

MEASURING AND APPRAISING THE NATIONAL INVESTMENT IN SCIENCE

Science and Technology in Relation to Economic Growth

One of the issues of our time is the rate of this Nation's economic growth. Among the major influences that have come under recent intensive study is the role of science and technology as a growth stimulant in the economy.

During World War II and the years immediately following, science and technology were directed mainly toward national defense. However, there were considerable carryover benefits of these military projects to the peace-time economy. Since then there has been an expanding program of research, which has served the civilian as well as the military needs of the Nation. Today, the total research and development effort of the country is at an annual rate of about $14 billion. This amount is estimated as over 2.5 times the R&D expenditures of 1953.

The implications of a research and development effort of this magnitude on the economy are of two kinds: the direct effects in terms of sales and employment generated by these expenditures, and the "feedback" to the economy of the results of research and development in the form of new products and processes. Since much development and subsequent technology have their genesis in basic research, support of this activity is a potential stimulant of economic growth.

During the past year three major policy reports indicated public concern with the effect of research and development on the economy. The report of the President's Committee on National Goals [1] recognized the economic contributions of "increase of knowledge" by calling for "corrective increase in the fraction of our GNP (gross national product) which we devote to basic research" (See fig. 5).

[1] *Goals for Americans,* The American Assembly, Columbia University (1960), Prentice-Hall, Inc.

The President's Science Advisory Committee in a later report stated: [2]

> Ordinary capital investment puts savings to work on labor-saving machinery that is already known and understood; the increased wealth produced is what separates the developed modern society from helpless poverty. But scientific and technological investments are still more powerful tools, since they invest in the discovery of what we do not yet understand. We are only just at the beginning of the use of scientific investment in this large sense, and the returns it can bring in are literally incalculable. Simply in terms of economic self-interest our proper course is to increase our investment in science just as fast as we can, to a limit not yet in sight.

These reports either explicitly or by implication acknowledged that a sound means of achieving scientific progress was to insure that "every young person who shows a desire and capacity to become a scientist should have the opportunity to do so." From this policy position, the Foundation issued in July 1961 a report, *Investing in Scientific Progress.*[3] It attempted to spell out what the needs would be to implement this policy (table 5). The report incorporated a series of projections drawing upon a variety of data from surveys of research and development and other inquiries. It estimated at $3 billion the total 1961 investment, from all sources, for science and engineering education and for basic research in colleges and universities.

The combined investment for education and basic research at academic institutions, the report concluded, on the basis of population and education trends, must grow to more than $8.2 billion in 1970 to meet national needs. Of this sum, about $2.7 billion would be for university basic research.

The current estimates and projections for 1970 contained in the report were based upon the work of the Foundation's Office of Special Studies. This office is engaged in collecting, analyzing, and publishing facts regarding the Nation's scientific resources. (See appendix F for list of reports published during the year.) These activities fulfill the statutory responsibilities of the Foundation to make "comprehensive studies regarding the Nation's scientific effort" and to appraise "the impact of research upon industrial development and upon the general welfare."

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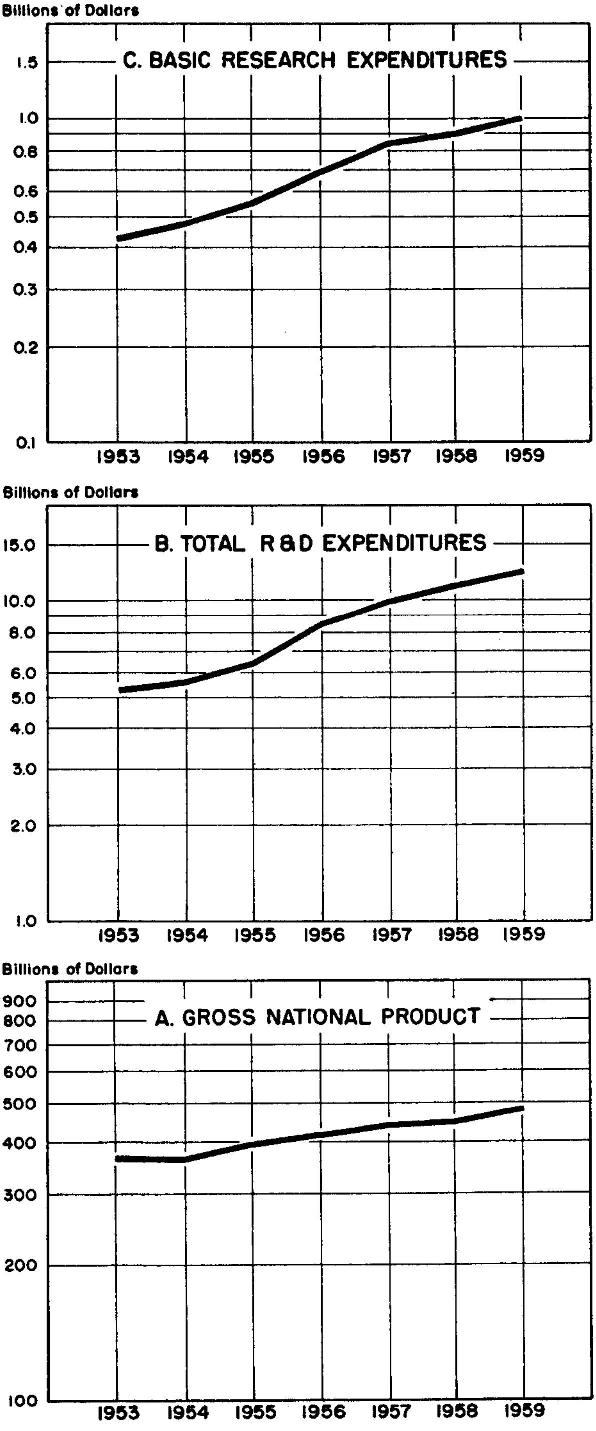
[2] *Scientific Progress, the Universities, and the Federal Government,* The White House (1960), Washington 25, D.C.; Supt. of Documents, U.S. Government Printing Office.

[3] See also part I of this report for other discussions of this publication.



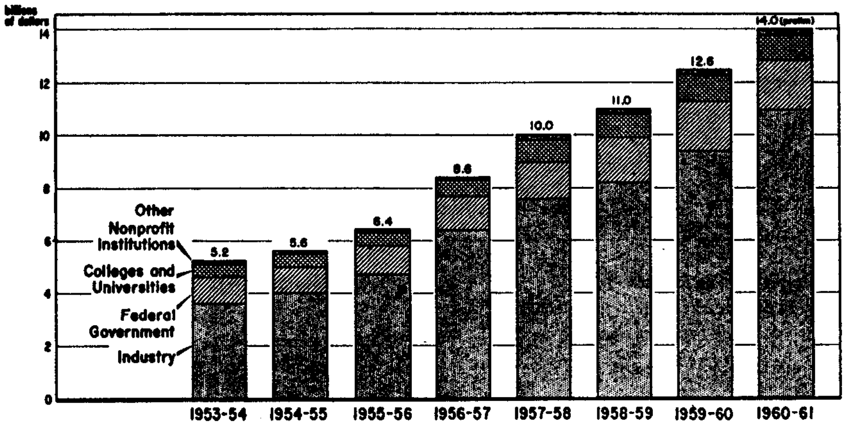
Note: R&D expenditure data refer to hyphenated years beginning with 1953, e.g., 1953–54. The gross national product data refer to calendar years.
Source: National Science Foundation and the U.S. Department of Commerce.

Figure 5. ***Research and Development and the Gross National Product, 1953–59***

Table 5.—Investment in Basic Research and Education in Science and Engineering, 1961 and 1970

	Education in science and engineering		Basic research	
	1961	1970	1961	1970
Colleges and universities:		(Required)		(Required)
Professional staff:				
Full-time equivalent number of personnel	*100,000*	175,000	*45,000*	85,000
	Millions	*Millions*	*Millions*	*Millions*
Salaries	$800	$2,100	$345	$970
Assisting staff:				
Full-time equivalent number of personnel	*100,000*	175,000	*35,000*	65,000
Salaries	$425	$1,100	$158	$450
Operating and overhead expenses	$648	$1,700	$227	$665
Information	$36	$90	$33	$95
Equipment	$80	$200	$30	$180
Facilities	$150	$350	$85	$360
Actual total	$2,139	$5,540	$878	$2,720
	Billions	*Billions*	*Billions*	*Billions*
Rounded total	$2.1	$5.5	$0.9	$2.7
Secondary schools	$2.2	....	....	....
Elementary schools	$0.4	....	....	....
Other nonprofit institutions	....	....	$0.1	....
Industry	....	....	$0.5	....
Federal Government	....	....	$0.3	....
Totals for 1961 (in billions)	$4.7	....	$1.8	....

The studies emphasize the total national scientific effort in terms of input—funds and manpower. They offer trend data beginnnig with 1954 and extending to the current fiscal year. The series shows a rise in current dollars expended for scientific research and development to an estimated $14 billion in 1960–61 from $5.2 billion in 1953–54.



Note: A hyphenated year is employed to take account of the varying fiscal and business years of the many respondents.

Each nongovernmental sector includes funds for Federal contract research centers administered by organizations under contract with Federal agencies.

Source: National Science Foundation.

Figure 6. Funds Used for Performance of Research and Development in the U.S., by Sector, 1953–61

Financing and Performance of Research and Development

These national totals are obtained by adding the totals for each sector of the economy, i.e., the Federal agencies, industrial firms, colleges and universities, and other nonprofit institutions such as private foundations. Thus, the trend data show the financial role which each sector contributes in money or expends in the performance of the effort.

Industrial performers of research and development showed an increase in expenditures over this period of about 190 percent, the largest increase of any of the survey sectors (fig. 6). The sector whose funds for performance increased least was the Federal Government, a rise of over 100 percent, although it was the major financer of research and development in the economy. By comparison, national economic activity as measured by the gross national product increased by 38 percent during the same period.

Information on the role of each sector as performer and as a source of funds for research and development for the year 1959–60 is presented in a transfer table (fig. 7). It portrays the financing underlying the $12.5 billion which was spent in the performance of research and development for that year. On the basis of these reports from performers and similar data from previous years, one can generalize that the relative roles of the sectors as performers and as sources have remained about the same for the past 5 years.

(Millions of Dollars)

SECTORS: Funds Provided by / Funds for Performance of R&D by	FEDERAL GOVERNMENT	INDUSTRY	COLLEGES AND UNIVERSITIES	OTHER NONPROFIT INSTITUTIONS	TOTAL	PERCENT DISTRIBUTION, R&D SOURCES
FEDERAL GOVERNMENT	$1,840	$5,420[a]	$700[a]	$140[a]	$8,100	64
INDUSTRY		$4,020	$50	$50	$4,120	33
COLLEGES AND UNIVERSITIES[b]			$210		$210	2
OTHER NONPROFIT INSTITUTIONS[b]			$40	$60	$100	1
TOTAL	$1,840	$9,440[a]	$1,000[a]	$250[a]	$12,530	100
PERCENT DISTRIBUTION, R&D PERFORMANCE	15	75	8	2	100	

a. Each nongovernmental sector includes funds for Federal contract research centers administered by organizations under contract with Federal agencies.

b. Data include State and local funds received by these institutions and used for research and development.

Note: All data are based on reports by performers.

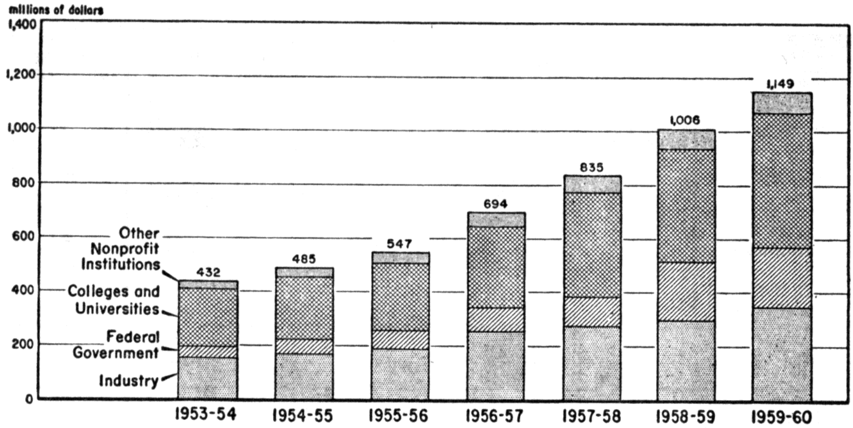
Source: National Science Foundation.

Figure 7. *Intersectoral Transfers of Funds Used for Performance of Research and Development, 1959–60*

In terms of total funds spent on performance of research and development, the nongovernmental sectors accounted for about 85 percent for the year 1959–60—the industry sector spending 75 percent and the two nonprofit sectors together, colleges and universities and other nonprofit organizations, reporting 10 percent of the total. This distribution obviously reflects the great R&D strength and potential of private industry.

Almost two-thirds of the total R&D financing was reported as Federal in origin, with industry supplying almost one-third. Not surprising is the fact that the two nonprofit sectors supplied only 3 percent of the total. These institutions have few means of accumulating funds of their own. Funds from the Federal Government as a source were pervasive, constituting more than one-half of the R&D funds for performance in each of the nongovernmental sectors.

The predominant role of the government or public sector in R&D financing stems not only from the inherent responsibility of the Federal Government for defense research and development but also from the growing importance of its responsibility for the general welfare such as agriculture, health, and the conservation of natural resources. The picture for R&D funds contrasts with that for the economy as a whole in which the decisions and financing generated in the private sectors determine to a greater extent the levels of activity.



Note: A hyphenated year is employed to take account of the varying fiscal and business years of the many respondents.

Each nongovernmental sector includes funds for Federal contract research centers administered by organizations under contract with Federal agencies.

Source: National Science Foundation.

Figure 8. ***Funds Used for Performance of Basic Research in the U.S., by Sector, 1953–60***

Basic Research

Funds used in the performance of basic research have, like those for total research and development, increased in recent years. From 1953–54 to 1959–60, the latest year for which basic research estimates are available, funds rose by more than 165 percent, as indicated in figure 8. Federal agencies as performers showed the largest relative increase and industry, the smallest. Basic research funds were from 8 to 9 percent of total funds for research and development during this period.

The intersectoral flow of funds for basic research is different from that for all research and development. Here, the preeminent role played by the colleges and universities as the home of basic research is reflected in their use of almost one-half of the reported funds. Again, however, the Federal Government is the major source of basic research funds.

Study of All Scientific Activities

This statistical and analytical work, useful not only in the deliberations on science policy but also to the operational program of the Foundation, is being broadened to meet the greater need to view the totality of all scientific activities in relation to the economy. These studies are expanding to consider the relation of the various components of science and technology to each other, such as research and development, the education of scientists and engineers, the utilization of professional and supporting personnel, development of facilities, the dissemination of scientific information, and the organizational aspects of the scientific community.

Data are being developed on expenditures for the dissemination of scientific information within the Government and in other sectors of the economy. Similarly, data are sought in connection with facilities used in research and development and in educational activities. Special studies are underway to relate the educational and manpower aspects of science to other components of science and technology.

As noted, the surveys and analyses of research and development have been oriented toward inputs in terms of dollars and manpower. Preliminary studies are in progress on the measuring of scientific output in terms of patent issuance, scientific publication, and individual and group productivity.

The Foundation is also undertaking the study of science organization and management and their relation to the broad organizational structures of our social and economic institutions. The program includes a study of working conditions favorable to creative scientific activity and the influence of changing technology in the advancement of scientific research.

Policy Implications

The statistics do not indicate the direction in which policy should go but they do reflect, in quantitative terms, some of the intersectoral relationships about which a great deal of public discussion and inquiry have taken place.

For instance, the fact that the single largest transfer of R&D dollars flows to industry from the Federal Government, mostly from the Department of Defense, not only attests to industry's ability to perform research and development but also indicates the fact that, in terms of dollars, almost one-half the industrial research and development facilities are engrossed in work of a military character.

Industry itself, as figure 7 indicates, contributes a substantial amount to the national pool of funds for total research and development. Data from our more detailed industry studies indicate a great variation among industries in the extent to which they finance research and development themselves (fig. 9). Obviously, some industries, such as chemicals, are more research-minded than others, and in any industry some firms are more research-oriented than others. The complex question on which we need greater understanding is what types of economic and technological conditions and managerial motivation lead some industries as a whole or certain firms within an industry to make the risk decisions to invest in research and development while others do not take this step.

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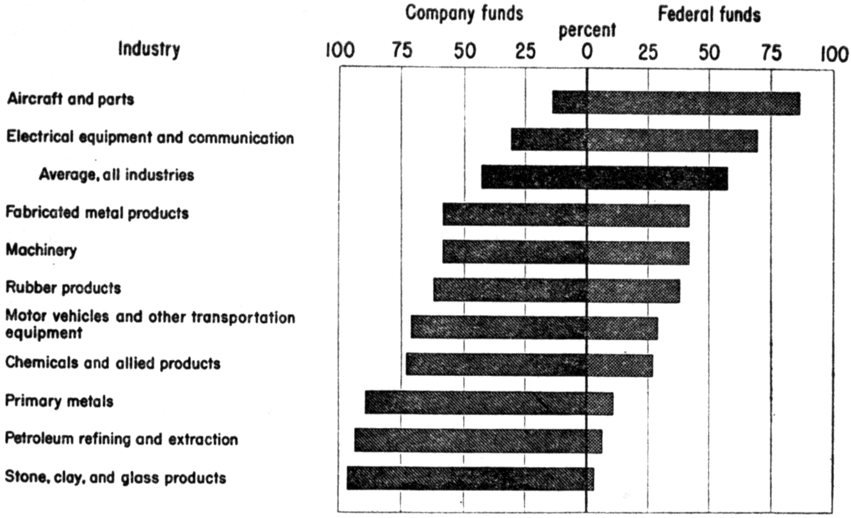
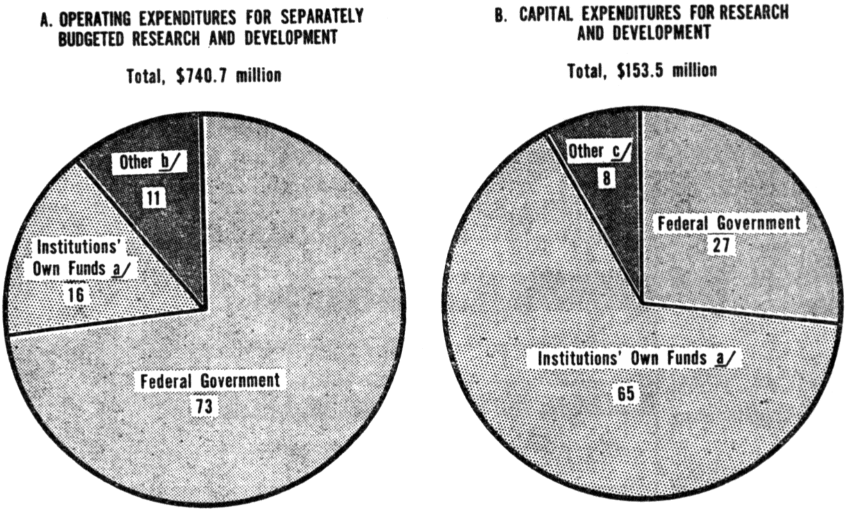


Source: National Science Foundation.

Figure 9. *Company Funds and Federal Funds as Percents of Total R&D Funds, by Industry, 1959*

One relatively small transfer of funds in both the total research and development and basic research analyses is the flow from industry to the colleges and universities sector, reflecting the fact that industry performs most of its own research and development including basic research. Industry has been contributing generously, however, to the support of education in colleges and universities. For industry, as well as the rest of the community, is indebted to the colleges and universities for the education of scientists and engineers. In this area, we need to supplement the data on transfers of funds for research and development with information on industry's support of higher education. This is a part of understanding the entire task of replenishing and expanding the research resources in colleges and universities, a job in which each segment of society must play a part.

Also, of particular interest in the support of colleges and universities is the magnitude of research funds going from the Federal Government to academic institutions. As the statistics indicate, these funds (which include money going to Federal contract research centers administered by the universities) now make up more than 70 percent of the universities' total expenditures for research and development (fig. 10). Although the Federal agencies which provide this support and the schools which perform the research both operate in the public interest, they do not have identical responsibilities. The objectives of the universities are education, research, and community service. Those of the Federal agencies range



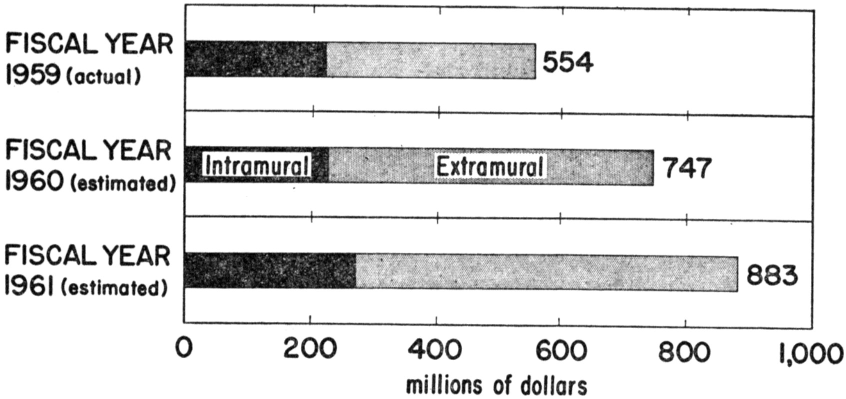
a. Institutions' own funds include State and local government funds.
b. Other sources include foundations (5 percent) and industry (5 percent).
c. Other sources include foundations (2 percent) and industry (1 percent).
Source: National Science Foundation.

Figure 10. ***Percent Distribution of R&D Expenditures in Colleges and Universities, by Source of Support, Fiscal Year 1958***

from provision for the national defense to promotion of the general welfare. As these broad purposes have interacted on one another since World War II—particularly in contract research—there has been mounting debate over the government-university research relationship.

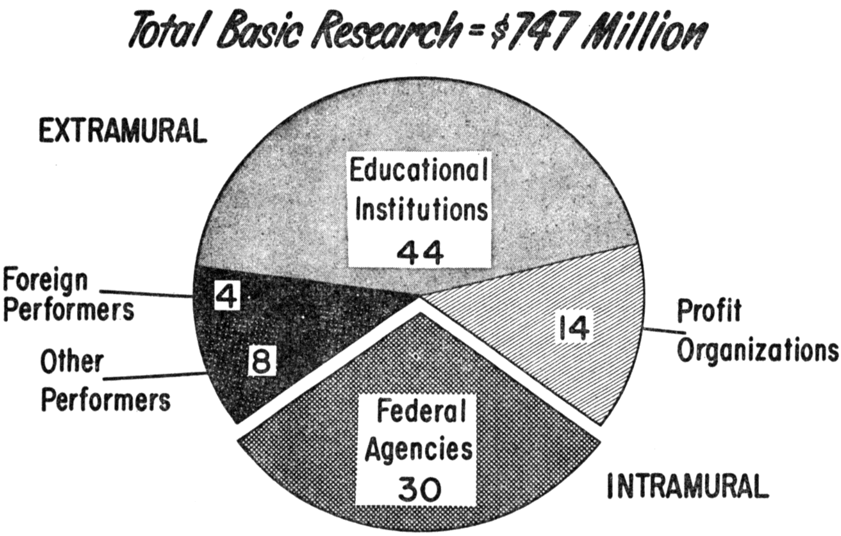
A report by the President's Science Advisory Committee, which explored these difficult questions, has been noted. A few of the questions are mentioned here. First, with respect to the university's broad functions, what effect has the large-scale Federal contract research center had on the traditional activities of education, research, and service? For example, has the presence of such a center hampered the ability of graduate laboratories to serve as the training ground for future scientists? Second, in what ways has responsibility for mission-oriented Federal basic research, as well as the presence of large-scale applied research, altered the traditionally unfettered nature of university basic research? Third, in what ways can the federally supported projects in universities enhance the interdependent objectives of basic research and scientific education?

One other major issue, reflected in the NSF statistics, concerns the Federal responsibility for the conduct of basic and applied research and development within the Government's own laboratories (figs. 11a and b). Some of this work is performed by agencies that possess unique facilities, such as the Bureau of Standards and Bureau of Mines. Other Federal R&D programs are carried on intramurally because they are associated with the larger regulatory and public welfare functions of an agency. In still other cases, research and development are not adaptable to such an administrative arrangement. In the greater emphasis on research in the entire Federal program, what arrangement is best fitted for each type of research is a question which will continue to demand an answer.



Source: National Science Foundation (based on *Federal Funds for Science IX*).

Figure 11a. *Federal Obligations for Basic Research, by Performer, Fiscal Year 1959–61*



Source: National Science Foundation (based on *Federal Funds for Science IX*).

Figure 11b. *Percent Distribution of Federal Obligations for Basic Research, by Performer, Fiscal Year 1960*

Appendices

APPENDIX A

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WALLACE J. ECKERT, Watson Scientific Computing Laboratory, New York, N.Y.
JOHN W. EVANS, Sacramento Peak Observatory, Sunspot, N. Mex.
THOMAS GOLD, Department of Astronomy, Cornell University, Ithaca, N.Y.
JOHN S. HALL (Chairman), Lowell Observatory, Flagstaff, Ariz.
EUGENE N. PARKER, Enrico Fermi Institute, University of Chicago, Chicago, Ill.

Advisory Panel for Atmospheric Sciences

THOMAS F. MALONE, Director of Research, Travelers Insurance Company, Hartford, Conn.
WALTER H. MUNK, Professor of Geophysics, University of California, La Jolla, Calif.
ALAN H. SHAPLEY, Radio Propagation Physics Division, National Bureau of Standards, Boulder, Colo.
VERNER E. SUOMI, Professor of Meteorology, University of Wisconsin, Madison, Wis.
ARTHUR H. WAYNICK (Chairman), Director, Ionosphere Research Laboratory, Pennsylvania State University, University Park, Pa.
E. J. WORKMAN, President, New Mexico Institute of Mining and Technology, Campus Station, Socorro, N. Mex.

Advisory Panel for Course Content Improvement Section

LOUIS T. BENEZET, President, Colorado College, Colorado Springs, Colo.
W. A. BROWNELL, Dean, School of Education, University of California, Berkeley, Calif.
RALPH W. GERARD, Director of Research, Mental Health Research Institute, University of Michigan, Ann Arbor, Mich.
LESLIE SILVERMAN, Professor of Engineering in Environmental Hygiene, Harvard University, Cambridge, Mass.
E. F. OSBORN, Vice President for Research, Pennsylvania State University, University Park, Pa.
CHARLES C. PRICE, Director, John Harrison Laboratory of Chemistry, University of Pennsylvania, Philadelphia, Pa.
FRANK E. MYERS, Associate Director for Education, Argonne National Laboratory, University of Chicago, Argonne, Ill.
DONALD TAYLOR, Department of Industrial Administration, Yale University, New Haven, Conn.
RAYMOND L. WILDER, Department of Mathematics, University of Michigan, Ann Arbor, Mich.

Advisory Panel for Chemistry

A. W. ADAMSON, Department of Chemistry, University of Southern California, Los Angeles, Calif.
GILBERT AYRES, Department of Chemistry, University of Texas, Austin, Tex.
BRYCE L. CRAWFORD, Jr. (Chairman), Dean, The Graduate School, University of Minnesota, Minneapolis, Minn.
DONALD D. DEFORD, Department of Chemistry, Northwestern University, Evanston, Ill.
WILLIAM VON E. DOERING, Department of Chemistry, Yale University, New Haven, Conn.
JOHN D. FERRY, Department of Chemistry, University of Wisconsin, Madison, Wis.
CLYDE A. HUTCHISON, Jr., Department of Chemistry, University of Chicago, Chicago, Ill.

NELSON J. LEONARD, Department of Chemistry, University of Illinois, Urbana, Ill.

M. S. NEWMAN, Department of Chemistry, Ohio State University, Columbus, Ohio

O. K. RICE, Department of Chemistry, University of North Carolina, Chapel Hill, N.C.

GILBERT STORK, Department of Chemistry, Columbia University, New York, N.Y.

HARRY H. SISLER, Department of Chemistry, University of Florida, Gainesville, Fla.

Advisory Panel for Developmental Biology

A. C. CLEMENT, Department of Biology, Emory University, Atlanta, Ga.

ANTON LANG, Division of Biology, California Institute of Technology, Pasadena, Calif.

CLAUDE A. VILLEE, Department of Biological Chemistry, Harvard University, Boston, Mass.

ALFRED J. COULOMBRE, Department of Anatomy, School of Medicine, Yale University, New Haven, Conn.

CLEMENT L. MARKERT, Department of Biology, Johns Hopkins University, Baltimore, Md.

ARTHUR H. WHITELEY, Department of Zoology, University of Washington, Seattle, Wash.

Advisory Panel for Earth Sciences

A. FRANCIS BIRCH, Division of Geological Sciences, Harvard University, Cambridge, Mass.

JULIAN R. GOLDSMITH (Chairman), Department of Geology, University of Chicago, Chicago, Ill.

CHARLES B. HUNT, U.S. Geological Survey, Federal Center, Denver, Colo.

LEON KNOPOFF, Institute of Geophysics, University of California, Los Angeles, Calif.

HENRY W. MENARD, Jr., Scripps Institution of Oceanography, La Jolla, Calif.

FRANCIS J. PETTIJOHN, Department of Geology, Johns Hopkins University, Baltimore, Md.

ROBERT R. SHROCK, Department of Geology and Geophysics, Massachusetts Institute of Technology, Cambridge, Mass.

JOHN VERHOOGEN, Department of Geology, University of California, Berkeley, Calif.

WILLIAM S. VON ARX, Woods Hole Oceanographic Institution, Woods Hole, Mass.

Advisory Panel for Economics

DONALD R. HODGMAN, Department of Economics, University of Illinois, Urbana, Ill.

WALTER ISARD, Wharton School of Economics, University of Pennsylvania, Philadelphia, Pa.

CARL KAYSEN, Department of Economics, Harvard University, Cambridge, Mass.

TJALLING KOOPMANS, Department of Economics, Yale University, New Haven, Conn.

PAUL WEBBINK, Vice President, Social Science Research Council, New York, N.Y.

Advisory Panel for Engineering Sciences

CHARLES F. BONILLA, Department of Chemical Engineering, Columbia University, New York, N.Y.

CHARLES E. CUTTS, Head, Department of Civil Engineering, Michigan State University, East Lansing, Mich.

EDWARD E. DAVID, Jr. (Chairman), Director of Visual and Acoustics Research, Bell Telephone Laboratories, Murray Hill, N.J.

MARIO J. GOGLIA, Associate Dean of Faculties, Georgia Institute of Technology, Atlanta, Ga.

H. B. GOTAAS, Dean, Technological Institute, Northwestern University, Evanston, Ill.

MERK HOBSON, Dean, School of Engineering and Architecture, University of Nebraska, Lincoln, Nebr.

OSCAR T. MARZKE, Vice President for Fundamental Research, United States Steel Corporation, Pittsburgh, Pa.

WILLIAM A. NASH, Department of Engineering Mechanics, University of Florida, Gainesville, Fla.

WILLIAM G. SHEPHERD, Head, Department of Electrical Engineering, University of Minnesota, Minneapolis, Minn.

CYRIL S. SMITH, Institute for the Study of Metals, University of Chicago, Chicago, Ill.

D. W. VER PLANCK, General Atomic Division, General Dynamics Corporation, San Diego, Calif.

WALTER G. VINCENTI, Professor, Aeronautical Engineering, Stanford University, Stanford, Calif.

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Advisory Panel for Environmental Biology

CLIFFORD BERG, Department of Entomology, Cornell University, Ithaca, N.Y.

W. FRANK BLAIR, Department of Zoology, University of Texas, Austin, Tex.

THEODORE BULLOCK, Department of Zoology, University of California, Los Angeles, Calif.

JOHN CANTLON, Department of Botany and Plant Pathology, Michigan State University, East Lansing, Mich.

DAVID G. FREY, Department of Zoology, Indiana University, Bloomington, Ind.

BOSTWICK KETCHUM, Woods Hole Oceanographic Institution, Woods Hole, Mass.

CHARLES E. OLMSTEAD, Department of Botany, University of Chicago, Chicago, Ill.

FRANK A. PITELKA, Museum of Vertebrate Zoology, University of California, Berkeley, Calif.

FREDERICK E. SMITH, Department of Zoology, University of Michigan, Ann Arbor, Mich.

Advisory Panel for Genetic Biology

WILLIAM BAKER, Department of Zoology, University of Chicago, Chicago, Ill.

ROLLIN D. HOTCHKISS, Laboratory of Genetics, Rockefeller Institute, New York, N.Y.

I. MICHAEL LERNER, Department of Genetics, University of California, Berkeley, Calif.

STANLEY G. STEPHENS, Department of Genetics, North Carolina State College, Raleigh, N.C.

H. D. STALKER, Department of Zoology, Washington University, St. Louis, Mo.

CARL P. SWANSON, Department of Biology, John Hopkins University, Baltimore, Md.

ROBERT P. WAGNER, Department of Zoology, University of Texas, Austin, Tex.

Advisory Panel for Graduate-Level Facilities in the Life Sciences

KENNETH E. CLARK, Dean of College of Arts and Sciences, University of Colorado, Boulder, Colo.

JACKSON W. FOSTER, Department of Bacteriology, University of Texas, Austin, Tex.

STERLING B. HENDRICKS, Bureau of Plant Industry, U.S. Department of Agriculture, Beltsville, Md.

JOHN I. LACEY, Fels Research Institute, Antioch College, Yellow Springs, Ohio

GEORGE LEFEVRE, Jr., Director, Biological Laboratories, Harvard University, Cambridge, Mass.

LOUIS LEVIN, Dean of Science and Associate Dean of Faculty, Brandeis University, Waltham, Mass.

ARTHUR W. MARTIN, Jr., Chairman, Department of Zoology, University of Washington, Seattle, Wash.

JOHN A. MOORE, Department of Zoology, Columbia University, New York, N.Y.

AUBREY W. NAYLOR, Department of Botany, Duke University, Durham, N.C.

HOWARD M. PHILLIPS, President, Alabama College, Montevallo, Ala.

C. LADD PROSSER, Department of Physiology, University of Illinois, Urbana, Ill.

ALFRED W. WILHELMI, Department of Biochemistry, Emory University, Atlanta, Ga.

Advisory Panel for Graduate-Level Facilities in the Physical Sciences

STANLEY J. CRISTOL, Department of Chemistry, University of Colorado, Boulder, Colo.

FRANK K. EDMONDSON, Chairman, Department of Astronomy, Indiana University, Bloomington, Ind.

JOHN W. IRVINE, Jr., Department of Chemistry, Massachusetts Institute of Technology, Cambridge, Mass.

THOMAS F. JONES, Jr., Head, School of Electrical Engineering, Purdue University, Lafayette, Ind.

A. RICHARD KASSANDER, Jr., Director, Institute of Atmospheric Physics, University of Arizona, Tucson, Ariz.

E. F. OSBORN, Vice President for Research, Pennsylvania State University, University Park, Pa.

KENNETH G. PICHA, School of Mechanical Engineering, Georgia Institute of Technology, Atlanta, Ga.

FREDERICK D. ROSSINI, Dean, Graduate School, University of Notre Dame, Notre Dame, Ind.

S. TOWN STEPHENSON, Dean of Faculty, Washington State University, Pullman, Wash.

L. C. VAN ATTA, Hughes Research Laboratories, Malibu, Calif.

KURT F. WENDT, Dean, College of Engineering, University of Wisconsin, Madison, Wis.

D. J. ZAFFARANO, Department of Physics, Iowa State University, Ames, Iowa

Advisory Panel for Mathematical Sciences

LIPMAN BERS (Chairman), Institute of Mathematical Sciences, New York University, New York, N.Y.

MAHLON M. DAY, Department of Mathematics, University of Illinois, Urbana, Ill.

EDWIN E. FLOYD, Department of Mathematics, University of Virginia, Charlottesville, Va.

GILBERT HUNT, Department of Mathematics, Princeton University, Princeton, N.J.

NATHAN JACOBSON, Department of Mathematics, Yale University, New Haven, Conn.

IVAN NIVEN, Department of Mathematics, University of Oregon, Eugene, Oreg.

HANS SAMELSON, Institute for Advanced Study, Princeton, N.J.

HENRY SCHEFFE, Statistical Laboratory, University of California, Berkeley, Calif.

I. M. SINGER, Department of Mathematics, Massachusetts Institute of Technology, Cambridge, Mass.

Advisory Panel for Metabolic Biology

EDWARD A. ADELBERT, Department of Microbiology, Yale University, New Haven, Conn.

DANIEL BILLEN, M. D. Anderson Hospital and Tumor Institute, University of Texas, Houston, Tex.

RALPH I. DORFMAN, Worcester Foundation for Experimental Biology, Shrewsbury, Mass.

MARTIN GIBBS, Department of Biochemistry, Cornell University, Ithaca, N.Y.

MANFRED M. MAYER, Department of Microbiology, Johns Hopkins University, Baltimore, Md.

SYDNEY C. RITTENBERG, Department of Bacteriology, University of Southern California, Los Angeles, Calif.

JOHN R. TOTTER (Chairman), Division of Biological Sciences, University of Georgia, Athens, Ga.

I. ZELITCH, The Connecticut Agricultural Experiment Station, New Haven, Conn.

Advisory Panel for Molecular Biology

ANDREW A. BENSON, Department of Agricultural and Biological Chemistry, College of Agriculture, The Pennsylvania State University, University Park, Pa.

WALTER D. BONNER, Jr., Professor of Physical Biochemistry and Plant Physiology, The Johnson Foundation, University of Pennsylvania, Philadelphia, Pa.

JEROME GROSS, Massachusetts General Hospital, Boston, Mass.

MATTHEW S. MESELSON, The Biological Laboratories, Harvard University, Cambridge, Mass.

MANUEL F. MORALES, Cardiovascular Research Institute, Department of Biochemistry, University of California, San Francisco, Calif.

AARON NOVICK, Institute for Molecular Biology, University of Oregon, Eugene, Oreg.

HAROLD A. SCHERAGA, Department of Chemistry, Cornell University, Ithaca, N.Y.

S. JONATHAN SINGER, Department of Physical Chemistry, Yale University, New Haven, Conn.

JONATHAN B. WITTENBERG, Department of Physiology, Albert Einstein College of Medicine, Yeshiva University, New York, N.Y.

Advisory Panel for Physics

TOM W. BONNER, Department of Physics, The Rice Institute, Houston, Tex.

JOHN G. DAUNT, Department of Physics, The Ohio State University, Columbus, Ohio

ROBERT H. DICKE, Department of Physics, Princeton University, Princeton, N.J.

LESLIE L. FOLDY, Department of Physics, Case Institute of Technology, Cleveland, Ohio

W. CONYERS HERRING, Bell Telephone Laboratories, Murray Hill, N.J.

GEORGE E. PAKE, Department of Physics, Stanford University, Stanford, Calif.

ROBERT G. SACHS, Department of Physics, University of Wisconsin, Madison, Wis.

EMILIO G. SEGRE, Department of Physics, University of California, Berkeley, Calif.

ROBERT R. WILSON (Chairman), Department of Physics, Cornell University, Ithaca, N.Y.

Advisory Panel for Psychobiology

CLETUS J. BURKE, Department of Psychology, Indiana University, Bloomington, Ind.

VINCENT G. DETHIER, Department of Zoology, University of Wisconsin, Madison, Wis.
JOHN T. EMLEN, Department of Zoology, University of Wisconsin, Madison, Wis.
NORMAN GUTTMAN, Department of Psychology, Duke University, Durham, N.C.
HAROLD W. HAKE, Department of Psychology, University of Illinois, Urbana, Ill.
HOWARD H. KENDLER, Department of Psychology, New York University, New York, N.Y.
CARL PFAFFMANN, Department of Psychology, Brown University, Providence, R.I.
FLOYD RATLIFF, The Rockefeller Institute, New York, N.Y.

Advisory Panel for Radio Telescopes

RONALD N. BRACEWELL, Department of Electrical Engineering, Stanford University, Stanford, Calif.
BERNARD F. BURKE, Carnegie Institution of Washington, Washington, D.C.
PAUL CHENEA, Division of Engineering Sciences, Purdue University, Lafayette, Ind.
L. J. CHU, Department of Electrical Engineering, Massachusetts Institute of Technology, Cambridge, Mass.
RICHARD M. EMBERSON, Associated Universities, Inc., New York, N.Y.
WILLIAM E. GORDON, Department of Electrical Engineering, Cornell University, Ithaca, N.Y.
DAVID S. HEESCHEN, National Radio Astronomy Observatory, Green Bank, W. Va.
R. MINKOWSKI, Mt. Wilson & Palomar Observatories, Pasadena, Calif.
JOHN R. PIERCE (Chairman), Bell Telephone Laboratories, Inc., Murray Hill, N.J.
GEORGE W. SWENSON, Jr., The Observatory, University of Illinois, Urbana, Ill.
JAMES H. TREXLER, Naval Research Laboratory, Washington, D.C.
JOHN G. BOLTON (Consultant), California Institute of Technology, Pasadena, Calif.

Advisory Panel for Regulatory Biology

ALBERT E. DIMOND, Department of Plant Pathology and Botany, Connecticut Agricultural Experiment Station, New Haven, Conn.
PAUL J. KRAMER, Department of Botany, Duke University, Durham, N.C.
GILBERT H. MUDGE, Department of Pharmacology and Experimental Therapeutics, Johns Hopkins University, Baltimore, Md.
ERLING J. ORDAL, Department of Microbiology, University of Washington, Seattle, Wash.
WILBUR H. SAWYER, Department of Pharmacology, Columbia University, New York, N.Y.
ROBERT D. TSCHIRGI, Department of Physiology, University of California, School of Medicine, Los Angeles, Calif.
WILLIAM VAN DER KLOOT, Department of Pharmacology, New York University, New York, N.Y.

Advisory Panel on Scientific Manpower Information

JAMES W. COLE, Jr., School of Chemistry, University of Virginia, Charlottesville, Va.
HAROLD GOLDSTEIN, Chief, Division of Manpower and Employment Statistics, Bureau of Labor Statistics, U.S. Department of Labor, Washington, D.C.
ALBERT KAY, Director, Office of Manpower Supply, Department of Defense, Washington, D.C.
CHARLES V. KIDD, Associate Director of Institutional Relations, National Institutes of Health, Bethesda, Md.
RAY W. MAYHEW, Owens-Illinois Glass Company, Columbus, Ohio
JAMES C. O'BRIEN, Director of Personnel, Department of Health, Education, and Welfare, Washington, D.C.
PHILIP N. POWERS (Chairman), Head, Department of Nuclear Engineering, Purdue University, West Lafayette, Ind.
M. H. TRYTTEN, Director, Office of Scientific Personnel, National Research Council-National Academy of Sciences, Washington, D.C.
J. FLETCHER WELLEMEYER, (Private Consultant), Washington, D.C.
DAEL WOLFLE, Executive Officer, American Association for the Advancement of Science, Washington, D.C.

Advisory Panel for Short-Term Research by Medical Students

SHERWIN J. COOPERSTEIN, Department of Anatomy, Western Reserve University, Cleveland, Ohio
GEORGE A. FEIGEN, School of Medicine, Stanford University, Stanford, Calif.

Robert A. Moore, President, State University of New York Medical Center, Brooklyn, N.Y.

John L. Patterson, Department of Medicine, Medical College of Virginia, Richmond, Va.

Guy P. Youmans, Department of Bacteriology, Northwestern University, Chicago, Ill.

Advisory Panel for Sociology

Harry Alpert, Dean of the Graduate School, University of Oregon, Eugene, Oreg.

Richard Christie, Department of Psychology, Columbia University, New York, N.Y.

Elihu Katz, Department of Sociology, University of Chicago, Chicago, Ill.

William W. Lambert, Department of Psychology, Cornell University, Ithaca, N.Y.

Frederick F. Stephan, Department of Economics and Social Institutions, Princeton University, Princeton, N.J.

John Thibaut, Department of Psychology, University of North Carolina, Chapel Hill, N.C.

Advisory Panel for Specialized Biological Facilities

H. O. Halvorson, Department of Bacteriology, University of Illinois, Urbana, Ill.

Arthur D. Hasler, Department of Zoology, University of Wisconsin, Madison, Wis.

Carl L. Hubbs, Scripps Institute of Oceanography, La Jolla, Calif.

Emil M. Mrak, Chancellor, University of California, Davis, Calif.

Conrad G. Mueller, Department of Psychology, Columbia University, New York, N.Y.

William C. Steere, Director, New York Botanical Garden, New York, N.Y.

Karl M. Wilbur, Department of Zoology, Duke University, Durham, N.C.

Advisory Panel for Special Projects in Science Education

R. H. Bing, Department of Mathematics, University of Wisconsin, Madison, Wis.

Julian Hill, Executive Secretary, Committee on Fellowships and Grants, E. I. DuPont de Nemours and Company, Wilmington, Del.

Marcus Hobbs, Dean, Duke University, Durham, N.C.

James Jensen, Provost, Iowa State University, Ames, Iowa.

Frederick Lindvall, Division of Engineering, California Institute of Technology, Pasadena, Calif.

Joseph L. McCarthy, Dean, The Graduate School, University of Washington, Seattle, Wash.

Robert MacVicar, Vice-President, Academic Affairs, Dean, Graduate School, Oklahoma State University, Stillwater, Okla.

Howard M. Phillips, President, Alabama College, Montevallo, Ala.

Joseph Platt, President, Harvey Mudd College, Claremont, Calif.

F. W. Sears, Department of Physics, Dartmouth College, Hanover, N.H.

Oswald Tippo, Provost, University of Colorado, Boulder, Colo.

H. Grant Vest, Director, Coordinating Council of Higher Education, Salt Lake City, Utah

Samuel Wilks, Department of Mathematics, Princeton University, Princeton, N.J.

Advisory Panel for Systematic Biology

Lewis E. Anderson, Department of Botany, Duke University, Durham, N.C.

George F. Edmunds, Division of Biology, University of Utah, Salt Lake City, Utah

Charles B. Heiser, Department of Botany, Indiana University, Bloomington, Ind.

Paul L. Illg, Department of Zoology, University of Washington, Seattle, Wash.

Harold W. Manter, Department of Zoology, University of Nebraska, Lincoln, Nebr.

George W. Martin, Department of Botany, State University of Iowa, Iowa City, Iowa

Alden H. Miller, Museum of Vertebrate Zoology, University of California, Berkeley, Calif.

Bobb Schaeffer, American Museum of Natural History, New York, N.Y.

Advisory Panel for University Computing Facilities

Nicholas C. Metropolis, Department of Physics, University of Chicago, Chicago, Ill.

Philip M. Morse, Department of Physics, Massachusetts Institute of Technology, Cambridge, Mass.

Edward Novitski, Department of Biology, University of Oregon, Eugene, Oreg.

J. Barkley Rosser (Chairman), Institute for Defense Analyses, Princeton, N.J.

Herbert A. Simon, Santa Monica, Calif.

Charles V. L. Smith, National Aeronautics & Space Admin., Goddard Space Flight Center, Washington, D.C.

Frederick T. Wall, Dean, Graduate School, University of Illinois, Urbana, Ill.

Advisory Panel for Weather Modification

Eugene Bollay, Borg-Warner Corporation, Goleta, Calif.

Michael Ference, Jr., Executive Director, Scientific Laboratory, Ford Motor Company, Dearborn, Mich.

Reuben G. Gustavson (Chairman), University of Arizona, Tucson, Ariz.

Oscar Kempthorne, Department of Statistics, Iowa State University of Science and Technology, Ames, Iowa

Sverre Petterssen, Department of Meteorology, University of Chicago, Chicago, Ill.

Stephen E. Reynolds, State Capitol, Santa Fe, N. Mex.

APPENDIX B

Financial Report for Fiscal Year 1961

SALARIES AND EXPENSES APPROPRIATION

Receipts

Appropriated for fiscal year 1961	$175,800,000	
Unobligated balance from fiscal year 1960	617,465	
Total availability		$176,417,465

Obligations

Support of science:		
Basic research:		
Biological and medical sciences	$26,314,397	
Mathematical, physical and engineering sciences	34,172,540	
Social sciences	3,407,472	
Subtotal	63,894,409	
Institutional grants	1,496,616	
Basic research facilities:		
Development of graduate research laboratories	8,444,985	
Specialized biological facilities	2,001,876	
University computing facilities	1,685,000	
Hawaii Institute of Geophysics	300,000	
Oceanographic research vessels and facilities	2,586,282	
Subtotal	15,018,143	
National research centers:		
National Radio Astronomy Observatory	5,404,000	
Kitt Peak National Observatory	2,004,269	
National Center for Atmospheric Research	500,000	
Subtotal	7,908,269	
National research programs:		
Antarctic research	5,460,621	
Deep crustal studies of the earth (Project Mohole)	1,364,097	
Weather modification	1,288,082	
Subtotal	8,112,800	
Dissemination of scientific information	6,406,089	
Subtotal, grants and contracts	102,836,326	
Program development, operation and evaluation	2,531,463	
Total obligations—support of science		105,367,789

Support of scientific manpower:		
Fellowships	$13,119,432	
Institutes	34,500,102	
Research participation and scientific activities for teachers	2,647,437	
Science education for undergraduate students	3,387,775	
Science education for secondary school students	3,049,896	
Public understanding of science	326,679	
Course content improvement	6,410,871	
Scientific personnel and education studies	1,018,585	
Subtotal, grants and contracts	64,460,777	
Program development, operation and evaluation	2,363,472	
Total obligations, support of scientific manpower		$66,824,249
Executive direction and management		2,678,712
Total obligations, NSF		174,870,750
Allocations to other Government agencies:		
Department of the Army	$111,838	
Department of Commerce	12,875	
Subtotal		124,713
Total obligations, fiscal year 1961		174,995,463
Unobligated balance carried forward to fiscal year 1962		1,422,002
Total		176,417,465

INTERNATIONAL GEOPHYSICAL YEAR APPROPRIATIONS

Receipts

Total unobligated balance from fiscal year 1960	$47,730	
Total availability		$47,730

Obligations

Technical programs	—$20,429	
Total obligations, fiscal year 1960		—$20,429
Funds withdrawn		28,530
Unobligated balance (not available for obligation in fiscal year 1961)		39,629
Total		47,730

TRUST FUND

Receipts

Unobligated balance from fiscal year 1960	$7,350	
Donations from private sources	80	
Total availability		$7,430

Obligations

Total obligations fiscal year 1961	$2,190	
Unobligated balance carried forward into fiscal year 1962	5,240	
Total		$7,430

APPENDIX C

Grants for Basic Research

ANTHROPOLOGICAL SCIENCES

UNIVERSITY OF ALASKA, College, Frederick Hadleigh-West; *Archaeological Survey of Seward Peninsula;* 1 year; $11,500
Michael E. Krauss; *Aboriginal Languages of Alaska;* 1 year; $15,000

AMERICAN MUSEUM OF NATURAL HISTORY, N.Y., N.Y.; Junius B. Bird; *The Statistical Analysis of Prehistoric Fabrics;* 1 year; $14,400
James A. Ford; *Archaeological Survey in the Mississippi River Valley;* 1 year; $29,900

UNIVERSITY OF ARIZONA, Tucson; Bryant Bannister; *Dendrochronological Study of the Casas Grandes Site;* 1 year; $10,500

UNIVERSITY OF ARKANSAS, Fayetteville; Charles R. McGimsey, III; *An Archeological Appraisal of Arkansas;* 2 years; $16,600

BRANDEIS UNIVERSITY, Waltham, Mass.; Robert A. Manners; *The Changing Culture of the Kipsigis Tribe of Kenya;* 1 year; $14,100

UNIVERSITY OF BRITISH COLUMBIA, Vancouver, Canada; Robert J. Drake; *Animal Remains from Archaeological Sites;* 1 year; $8,300

BROOKLYN COLLEGE, Brooklyn, N.Y.; Robert W. Ehrich; *Excavations at Homolka;* 1 year; $3,600

BROWN UNIVERSITY, Providence, R.I.; J. L. Giddings; *Beach Ridge Dating;* 1 year; $20,400

UNIVERSITY OF CALIFORNIA, Berkeley; S. F. Cook; *Soil Analysis;* 1 year; $9,500
John H. Rowe; *Interpretation of Peruvian Archaeology;* 2 years; $13,200
S. L. Washburn and Irven DeVore; *Analysis of Primate Behavior;* 1 year; $19,700
Joel M. Halpern, Los Angeles; *Cultural Evolution in Peasant Communities;* 2 years; $20,000
H. B. Nicholson, Los Angeles; *Excavations at Cerro Portezuelo;* 1 year; $16,000
Roger C. Owen and Cornelius H. Muller, Santa Barbara; *Floral Environment of the Paipai;* 2 years; $3,100

CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; Svend Frederiksen; *Collection of Eskimo Texts;* 1 year; $12,800
Michael Kenny; *Influence of Spanish Expatriates;* 2 years; $10,800
Gottfried O. Lang; *Culture Change Among the Sukuma;* 1 year; $15,000

CHICAGO NATURAL HISTORY MUSEUM, Ill.; Paul S. Martin; *Cultural Stability in the Upper Little Colorado River Drainage;* 1 year; $12,000

UNIVERSITY OF CHICAGO, Chicago, Ill.; Robert J. Braidwood; *Archaeological Evidence for the Appearance of Food Production;* 2 years; $52,100
F. Clark Howell; *Acheulian Site in Torralba, Spain;* 2 years; $20,800
F. Clark Howell and Maxine R. Kleindienst; *Investigation of Acheulian Site JK 2;* 1 year; $16,800
David M. Schneider; *Comparative Study of Extra-Familial Kinship;* 1 year; $27,000

CLEVELAND MUSEUM OF NATURAL HISTORY, Ohio; Olaf H. Prufer; *Palaeo-Indian Remains;* 1 year; $2,000

UNIVERSITY OF COLORADO, Boulder; Robert H. Lister; *The Prehistory of the Utes;* 2 years; $25,000
Joe Ben Wheat; *The Earl H. Morris Papers;* 1 year; $8,500

COLUMBIA UNIVERSITY, New York, N.Y.,; Harold C. Conklin; *Ethnoecological Study of the Philippines;* 1 year; $40,000
Ralph S. Solecki; *Prehistoric Man in Shanidar Valley;* 1 year; $5,100
Ralph S. Solecki and Rhodes W. Fairbridge; *Prehistoric Man in Nubia;* 2 years; $38,500
Charles Wagley; *Ecological Adaptation in Portuguese Guinea;* 1 year; $19,900
Uriel Weinreich; *Linguistic Distributions in Coterritorial Societies;* 2 yrs.; $51,900

CORNELL UNIVERSITY, Ithaca, N.Y.; Charles F. Hockett; *Field Study of the Fijian Language;* 1 year; $1,500
Morris E. Opler; *A Comparative Study of Village Life;* 2 years; $20,000

DARTMOUTH COLLEGE, Hanover, N.H.; Gordon M. Day; *Abenaki Dialects;* 1 year; $11,600

FLORIDA GEOLOGICAL SURVEY, Tallahassee; Stanley J. Olsen; *Mammal Remains from Archaeological Sites;* 2 years; $8,200

UNIVERSITY OF FLORIDA, GAINESVILLE; John M. Goggin; *Spanish Ceramics in New World Archaeological Sites;* 1 year; $4,600
Clayton E. Ray, John M. Goggin, and William H. Sears; *Post-Pleistocene Environments in Florida;* 2 years; $19,200

GEORGE WASHINGTON UNIVERSITY, Wash., D.C., John M. Campbell; *Archaeological Investigation of the Arctic Slope of Northern Alaska;* 1 year; $19,300

HAMLINE UNIVERSITY, St. Paul, Minn.; Leland R. Cooper; *Aboriginal Cultural Horizons in Minnesota;* 1 year; $10,200

HARVARD UNIVERSITY, Cambridge, Mass., Cora DuBois; *Change and Stability in India;* 2 years; $14,800
Hugh O'Neill Hencken; *Study of Prehistoric Illyrians;* 1 year; $5,500
Margaret A. Towle; *Use of Plants by Man;* 4 years; $14,000
Gordon R. Willey; *Archeological Exploration of a Maya Site;* 2 years; $37,000

HUNTER COLLEGE, N.Y., N.Y.; Alphonse Riesenfeld; *The Effects of Upright Posture;* 1 year; $1,700

IDAHO STATE COLLEGE, Pocatello; Earl H. Swanson, Jr.; *Archaeological Explorations in Eastern Idaho;* 1 year; $14,200

ILLINOIS ARCHAEOLOGICAL SURVEY, Urbana; Melvin L. Fowler; *Investigation of the Mississippi River Valley;* 1 year; $40,000

INDIANA HISTORICAL SOCIETY, Indianapolis; Glenn A. Black; *Proton Magnetometer Project;* 2 years; $12,100

INSTITUTE OF ANDEAN RESEARCH, N.Y., N.Y.; Gordon F. Ekholm; *Interrelationships of New World Cultures;* 1 year; $32,300

INSTITUTE FOR ADVANCED STUDY, Princeton, N.J.; Stephen Foltiny; *Cultural Interrelations during the Bronze and Early Iron Ages;* 1 year; $3,100

KENTUCKY RESEARCH FOUNDATION, Lexington; Douglas W. Schwartz; *Analysis of Kentucky Palaeo-Indian;* 1 year; $11,200

UNIVERSITY OF MICHIGAN, Ann Arbor; James B. Griffin; *Prehistoric Occupations of the Great Lakes Area;* 2 years; $35,000

MILLS COLLEGE, Oakland, Calif.; Robert T. Anderson; *Urbanization of European Communities;* 1 year; $3,000

MILWAUKEE PUBLIC MUSEUM, Wis.; Stephan F. de Borhegyi; *Prehistoric Mexican Influences on the Maya;* 2 years; $12,900

MISSOURI BOTANICAL GARDEN, St. Louis; Hugh C. Cutler; *Studies of Archaeological Plant Material;* 3 years; $24,300

UNIVERSITY OF MISSOURI, Columbia; Carl H. Chapman; *Osage Prehistory;* 1 year; $14,600

UNIVERSITY OF NEW MEXICO, Albuquerque; Frank C. Hibben; *Recovery of Prehispanic Paintings;* 1 year; $16,700

NORTHWESTERN, UNIVERSITY, Evanston, Ill.; Gladwyn Murray Childs; *Ovimbundu Kingdoms;* 3 years; $1,400

UNIVERSITY OF OKLAHOMA, Norman; Robert E. Bell and William J. Mayer-Oakes; *Excavation of El Inga, Ecuador;* 1 year; $13,900

PENNSYLVANIA STATE UNIVERSITY, University Park; William T. Sanders; *Prehistoric Settlement Patterns of Teotihuacan;* 1 year; $6,900

UNIVERSITY OF PENNSYLVANIA, Philadelphia; Alfred Kidder, II; *Archaeology of Tikal, Guatemala;* 1 year; $24,000

Froelich Rainey; *Research on Archeological Techniques;* 1 year; $30,900

UNIVERSITY OF PITTSBURGH, Pa.; Edward A. Kennard, *Culture Change Among the Hopi;* 1 year; $15,600

R. S. PEABODY FOUNDATION FOR ARCHAEOLOGY, Andover, Mass.; Richard S. MacNeish; *Tehuacan Archaeological Investigations;* 2 years; $21,500

SMITH COLLEGE, Northampton, Mass.; Richard Slobodin; *Demographic Survey of the Western Kutchin;* 1 year; $4,100

SMITHSONIAN INSTITUTION, Washington, D.C.; Wallace L. Chafe; *Caddo Language Study;* 2 years; $1,700

Frank H. H. Roberts, Jr.; *Settlement Pattern in the Missouri Valley;* 1 year; $20,000

Gus W. Van Beek; *Culture History of South Arabia;* 1 year; $14,600

SOUTHERN ILLINOIS UNIVERSITY, Carbondale; J. Charles Kelley; *Northern Frontier of Mesoamerica;* 2 years; $51,600

STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion; Wesley R. Hurt; *Radiocarbon Analysis of Brazilian Specimens;* 1 year; $2,200

TEMPLE UNIVERSITY, Philadelphia, Pa.; William B. Schwab; *Gwelo Urban Study;* 1 year; $3,000

TULANE UNIVERSITY OF LOUISIANA, New Orleans; John L. Fischer; *The Effects of Household Composition on Personality;* 1 year; $20,000

Henry Orenstein; *Social Change in Bombay;* 1 year; $2,400

Robert Wauchope; *Archaeological Exploration in Honduras;* 2 years; $8,500

UNIVERSITY OF UTAH, Salt Lake City; Jesse D. Jennings; *Excavation of Kaiparowits Plateau, Utah;* 2 years $18,800

UNIVERSITY OF WASHINGTON, Seattle; Robert T. Anderson; *Urbanization of European Communities;* 1 year; $3,000

Verne F. Ray; *Bilateral Kinship Among Canadian Eskimos;* 1 year; $5,000

Melford E. Spiro; *Cultural-Functional Relationships in Burma;* 18 months; $31,500

Melford E. Spiro; *Ideology and Personality Development in Burma;* 1 year; $10,000

James B. Watson; *Dynamics and Microevolution of a Human Community;* 2 years; $40,000

WICHITA FOUNDATION, INC., Taos, N. Mex.; Fred Wendorf; *Late Pleistocene and Early Recent Deposits of New Mexico;* 1 year; $15,700

UNIVERSITY OF WISCONSIN, Madison; David A. Baerreis; *Archaeological Investigations at Oaxaca;* 1 year; $8,200

Chester S. Chard; *Archaeological Investigation of Howard Pass, Alaska;* 2 years; $15,400

William S. Laughlin and William G. Reeder; *Aleut-Konyag Prehistory;* 1 year; $30,000

YALE UNIVERSITY, New Haven, Conn.; Nicholas C. Bodman; *Tibeto-Burman Languages;* 1 year; $6,400

ASTRONOMY

AMHERST COLLEGE, Amherst, Mass.; Robert H. Koch and Albert P. Linnell; *Eclipsing Binaries;* 2 years; $31,000

AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS, Cambridge, Mass; Margaret W. Mayall; *Compilation and Publication of Visual Observations of Long Period Variable Stars;* 2 years; $20,000

UNIVERSITY OF ARIZONA, Tucson; Gerard P. Kuiper; *Stars and Stellar Systems;* 18 months; $21,600

Gerard P. Kuiper; *Statistical Studies of Faint Asteroids;* 1 year; $10,000

ASSOCIATION OF UNIVERSITIES FOR RESEARCH IN ASTRONOMY, INC., Tuscon, Ariz.; James M. Miller; *Site Survey in Chile;* 1 year; $74,800

CALIFORNIA INSTITUTE OF TECHNOLOGY; Pasadena; Guido Munch; *Motions in the Atmospheres of Red Giant Stars;* 1 year; $13,800

Fritz Zwicky; *Construction of Catalogue of Galaxies and of Clusters of Galaxies;* 2 years; $25,820

Fritz Zwicky; *Supernova Search;* 2 years; $29,800

Fritz Zwicky; *Faint Blue Stars of the Humason-Zwicky Types;* 2 years; $19,900

UNIVERSITY OF CALIFORNIA, Berkeley; George Wallerstein; *Abundances of the Elements in K Giant Stars,* 1 year; $13,000

A. E. Whitford; *Application of a Pressure-Scanning Fabry-Perot Interferometer to High Resolution Stellar Spectroscopy;* 1 year; $20,700

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; S. W. McCusky; *Low Dispersion Stellar Spectroscopy;* 1 year; $30,000

UNIVERSITY OF CHICAGO, Ill.; W. A. Hiltner; *Use of Image Tube for Astronomical Photography and Spectrocopy;* 1 year; $18,600

Peter Meyer; *Composition, Energy Spectrum, and Intensity of the Primary Cosmic Radiation as a Function of Time;* 1 year; $75,000

Kevin H. Prendergast and Richard H. Miller, Williams Bay, Wis.; *Physical Properties of Extragalactic Nebulae;* 1 year; $28,900

G. Van Biesbroeck; *Astrometric Investigations;* 1 year; $16,000

UNIVERSITY OF COLORADO; Boulder; George Gamow; *Properties of Spherical and Elliptical Galaxies;* 1 year; $7,300

Harold Zirin; *Research in Solor Magnetic Fields at the Crimean Astrophysical Observatory;* 1 year; $6,300

CORNELL UNIVERSITY, Ithaca, N.Y.; Thomas Gold; Theoretical Work in Cosmology; 6 months; $6,600

UNIVERSITY OF FLORIDA, Gainesville; Alex G. Smith and T. D. Carr; *Radio Observations of Jupiter and Saturn from Chile;* 2 years; $49,200

GEORGIA INSTITUTE OF TECHNOLOGY, Atlanta; Maurice W. Long; *Submillimeter Wave Astronomy;* 1 year; $38,900

HARVARD UNIVERSITY, Cambridge, Mass.; David Layzer; *The Spatial Distribution of Galaxies and Radio Sources;* 1 year; $14,400

David Layzer; *Atomic Energy Levels and Transition Probabilities;* 1 year; $65,100

Donald H. Menzel; *Procurement of Machine Shop Equipment;* 6 months; $32,400

Fred L. Whipple; *Harvard Radio Meteor Project;* 1 year; $175,000

UNIVERSITY OF ILLINOIS, Urbana; Pierre R. Demarque; *The Influence of Chemical Composition on Stellar Evolution;* 2 years; $14,450

Ivan R. King; *Structure of Globular Clusters;* 1 year; $3,100

INDIANA UNIVERSITY FOUNDATION, Bloomington; John B. Irwin; *Analysis of Photoelectric Observations of Cepheids;* 1 year; $4,700

Marshal H. Wrubel; *Solution of Astrophysical Problems with an Electronic Computer;* 3 years; $33,100

UNIVERSITY OF MICHIGAN, Ann Arbor; William E. Howard, III; *Radio Astronomy Source Spectral Catalogue;* 1 year; $7,700

George Makhov; *Development and Construction of a Radio Astronomy Maser Radiometer;* 8 months; $100,000

Orren C. Mohler; *Solar Flare Patrol—1961;* 1 year; $24,100

MOUNT HOLYOKE COLLEGE, South Hadley, Mass.; Kenneth M. Yoss; *Determination of Absolute Magnitudes for 'Weak CN' Stars;* 2 years; $24,700

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

John S. Coleman; *NAS–NRC Committee on Line Spectra of the Elements;* 2 years; $8,800

G. D. Meid and Hugh Odishaw; *ICSU Committee on Space Research (COSPAR)*; 1 year; $10,000

UNIVERSITY OF NEW MEXICO, Albuquerque; Victor H. Regener; *Zodiacal Light;* 1 year; $30,000

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus; John D. Kraus; *Completion of the 360-Foot Standing-Parabola, Tiltable-Flat-Sheet-Reflector, Radio Telescope;* 1 year; $34,500

Walter E. Mitchell, Jr.; *Photometric Atlas of the Solar Spectrum;* 1 year; $18,500

UNIVERSITY OF PENNSYLVANIA, Philadelphia; Frank B. Wood; *A Survey on Suggested Sites in New Zealand as to Their Suitability for Astronomical Research;* 18 months; $26,400

Frank B. Wood; *Multicolor Observations of Selected Eclipsing Variables;* 2 years; $21,700

POMFRET SCHOOL, Pomfret, Conn.; James R. McCullough; *Photoelectric Search for Ultra-Short-Period Variable Stars;* 2 years; $6,800

PRINCETON UNIVERSITY, Princeton, N.J.; Martin Schwarzschild; *High Altitude Astronomy;* 2 years; $602,000

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; J. Mayo Greenberg; *The Scattering of Light by Small Particles;* 1 year, $30,500

Alan S. Meltzer; *Astronomical Data Pertaining to Extinction and Polarization by Non-Spherical Particles;* 1 year; $13,800

SMITHSONIAN INSTITUTION, Washington, D.C.; Charles A. Whitney; *Stellar Atmospheres;* 2 years; $20,000

SWARTHMORE COLLEGE, Swarthmore, Pa.; Peter van de Kamp; *Astrometric Study of Nearby Stars;* 2 years; $28,800

UNIVERSITY OF TEXAS, Austin; Gerard H. de Vaucouleurs; *Photometric Studies of Bright Galaxies;* 1 year; $16,200

Harold L. Johnson; *Astrophysics Dealing with Infra-Red Photometry;* 2 years; $30,000

U.S. DEPARTMENT OF THE NAVY, OFFICE OF NAVAL RESEARCH, Washington, D.C.; Wayne C. Hall; *Laboratory High Temperature Spectroscopy;* 1 year; 75,000

VANDERBILT UNIVERSITY, Nashville, Tenn.; Robert H. Hardie; *Galactic Structure from Stellar Associations;* 1 year; $15,300

UNIVERSITY OF WISCONSIN, Madison; C. M. Huffer; *Computation of Elements of Eclipsing Binary Stars by High-Speed Computing Machines;* 1 year; $3,000

John S. Mathis; *Theoretical Models of Evolving Stars;* 1 year; $6,500

Donald E. Osterbrock; *Photoelectric Photometry of Comets and Nebulae;* 1 year; $10,000

YALE UNIVERSITY, New Haven, Conn.; Harlan J. Smith and James N. Douglas; *Planetary Non-thermal Radio Emission;* 1 year; $63,000

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UNIVERSITY OF ALASKA, College; T. Neil Davis and M. Sugiura; *Continuation of Studies of Auroral Morphology;* 2 years; $62,200

C. T. Elvey; *The Role of Height in Auroral Spectroscopy—Part II—Analysis;* 13 months; $108,000

Harold Leinbach, Jr.; *Inospheric Absorption, Cosmic Noise Method*; 2 years; $158,000

Masahisa Sugiura; *Morphology of Geomagnetic Pulsations in the Auroral Zone;* 2 years; $37,300

UNIVERSITY OF ARIZONA, Tucson; A. Richard Kassander, Jr. and Louis J. Battan; *Experimental Pulse Doppler Radar for Cloud Physics;* 3 years; $200,000

UNIVERSITY OF CALIFORNIA, Berkeley; Shih-Kung Kao; *Diffusion of Particles in the Upper Atmosphere;* 3 years; $67,500

Samuel Silver; *Radioastronomical and Upper Atmosphere Studies in the Microwave Region;* 2 years; $100,000

Jacob, Bjerknes, Los Angeles; *California Rainfall Processes;* 3 years; $151,000

W. Lawrence Gates, Los Angeles; *Analysis of Dynamic Models of the Atmosphere;* 2 years; $43,700

Yale Mintz, Los Angeles; *Numerical Studies of the Planetary Circulation;* 2 years; $82,800

Morris Neiburger, Los Angeles; *Growth of Ice Crystals and Cloud Drops;* 3 years; $99,100

UNIVERSITY OF CHICAGO, Illinois; Kaare Pedersen and Sverre Petterssen; *Numerical Prediction Model with Heat Sources and Sinks;* 18 months; $48,800

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins; Lewis O. Grant; *Snowfall and the Effects of Cloud Seeding on Snowfall in the Colorado Rockies;* 1 year; $5,000

Lewis O. Grant; *Artificial Ice Nuclei Over the Rocky Mountains;* 2 years; $65,000

Richard A. Schleusener; *Hail Clouds and Their Environment;* 1 year; $19,400

UNIVERSITY OF COLORADO, Boulder; William A. Rense; *Theoretical Physics of Upper Air and Solar Atmosphere;* 2 years; $51,000

DARTMOUTH COLLEGE, Hanover; Millett G. Morgan; *Synoptic Whistler Studies Along the E4° Geomagnetic Meridian;* 1 year; $46,000

FLORIDA STATE UNIVERSITY, Tallahassee; Thomas Gleeson; *Predictability in Meteorology;* 3 years; $32,100

FRANKLIN INSTITUTE, Philadelphia, Pa.; Martin A. Pomerantz; *Time Variations of the Primary Cosmic Radiation Near the North Geomagnetic Pole;* 1 year; $13,200

GEORGIA INSTITUTE OF TECHNOLOGY, Atlanta; Howard D. Edwards; *Shock Wave Phenomenon in the Upper Atmosphere;* 3 years; $69,000

UNIVERSITY OF HAWAII, Honolulu; Mariano A. Estoque; *Theoretical Studies of Tropical Cyclones and Related Disturbances;* 2 years; $79,100

UNIVERSITY OF IDAHO, Moscow; J. S. Kim; *Auroral Radar Echoes and Airglow;* 2 years; $45,700

UNIVERSITY OF ILLINOIS, Urbana; Glenn E. Stout, Richard G. Semonin, and Donald W. Staggs; *Cloud Electrification Studies in Illinois;* 2 years; $134,200

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; George S. Benton; *Streakiness in Rotating and Stratified Fluid Systems;* 3 years; $82,600

KANSAS UNIVERSITY ENDOWMENT ASSOCIATION, Lawrence; Ferdinand C. Bates; *Dynamics of Great Plains Thunderstorms;* 2 years; $59,000

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge; Hurd C. Willett; *Relation of Climatic Trends and Atmospheric Circulation to Solar Activity;* 2 years; $32,900

UNIVERSITY OF MICHIGAN, Ann Arbor; Donald J. Portman; *Atmospheric Turbulence with Optical Techniques;* 3 years; $150,400

UNIVERSITY OF MINNESOTA, Minneapolis; Alfred O. C. Nier; *Study of Composition of Upper Atmosphere with Rocket-Borne Magnetic Mass Spectrometers;* 1 year; $42,000

John R. Winckler and Edward P. Ney; *High Altitude Balloon Monitoring for Cosmic Rays and Solar Terrestrial Phenomena;* 7 months; $96,000

UNIVERSITY OF MISSOURI, Columbia; Wayne L. Decker; *Analysis of Rain Gage Records of The University of Chicago Cumulus Cloud Research Project;* 1 year; $3,200

James L. Kassner, Jr.; *A Systematic Study of Some Recent Developments in Cloud Chamber Techniques;* 2 years; $22,300

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL, Washington, D.C.; S. D. Cornell; *Support of the Geophysics Research Board;* 2 years; $98,400

John R. Sievers; *Activities of the Committee on Atmospheric Sciences;* 1 year; $36,800

John R. Sievers; *Support for the Committee on Atmospheric Sciences;* 1 year; $69,080

NEBRASKA STATE TEACHERS COLLEGE, Chadron; Lyle V. Andrews; *Physical Study of Hail Suppression;* 2 years; $14,200

UNIVERSITY OF NEBRASKA, Lincoln; Robert L. Chasson; *Cosmic Ray Intensity Variations Deep in the Atmosphere;* 3 years; $54,800

UNIVERSITY OF NEVADA, Reno; Wendell A. Mordy and Richard C. Sill; *Experiments in Solidification and Melting of Water;* 2 years; $52,100

UNIVERSITY OF NEW HAMPSHIRE, Durham; John A. Lockwood; *Neutron Intensity-Time Variations of Cosmic Radiation;* 1 year; $4,000

UNIVERSITY OF NEW MEXICO, Albuquerque; Victor H. Regener; *Time Variation of Cosmic Radiation;* 2 years; $31,300

NEW YORK UNIVERSITY, N.Y., N.Y.; Ben Davidson, Edwin Fisher and James E. Miller; *Interactions Between Microscale and Larger Scale Meteorological Processes;* 3 years; $198,200

Serge A. Korff; *Operation of Cosmic Ray Neutron Monitor in Alaska;* 2 years; $57,000

Jerome Spar; *Feasibility of Artificial Modification of Tropical Storms;* 3 years; $221,000

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman; Walter J. Saucier; *Stratospheric Patterns;* 2 years; $52,700

Eugene M. Wilkins; *Electro-Dynamic and Aerodynamic Processes in Tornadoes;* 2 years; $29,900

UNIVERSITY OF ST. THOMAS, Houston, Tex.; John C. Freeman, Jr.; *Theoretical Studies of Atmospheric Cross Sections;* 1 year; $4,400

STANFORD UNIVERSITY, Stanford, Calif.; R. A. Helliwell; *Synoptic Study of Whistlers and VLF Emissions;* 1 year; $33,600

STATE UNIVERSITY OF NEW YORK, Albany; Vincent J. Schaefer; *Field Research Seminar;* 1 year; $9,600

U.S. NAVAL RESEARCH LABORATORY, Washington, D.C.; H. Friedman; *Upper Atmosphere Studies with Rocket-Borne Magnetic Mass Spectrometers;* 1 year; $107,860

U.S. DEPARTMENT OF THE NAVY, OFFICE OF NAVAL RESEARCH, Washington, D.C.; Bernard Vonnegut and Charles B. Moore; *Cloud Electrification Studies;* 1 year; $66,500

U.S. WEATHER BUREAU, U.S. DEPARTMENT OF COMMERCE, Washington, D.C.; Helmut E. Landsberg; *Atmospheric Profiles;* 1 year; $5,000

F. W. Reichelderfer; *Specialized Upper-Air Observations at Santa Monica and Point Arguello;* 2 years; $14,500

R. H. Simpson; *Weather Modification in Severe Storms;* 3 years; $142,700

Sidney Teweles; *IGY and IGC Stratospheric Analysis and Research;* 18 months; $60,100

UNIVERSITY OF UTAH, Salt Lake City; Shih-Kung Kao; *Diffusion of Particles in the Upper Atmosphere;* 2 years; $31,000

WASHINGTON STATE UNIVERSITY, Pullman; Lloyd B. Craine and Glen L. Hower; *Coincidental Features of Natural Radio Emissions;* 3 years; $65,000

Ottis W. Riechard; *Statistical Methodology and Climatological Studies in Weather Modification Activities;* 2 years; $50,000

UNIVERSITY OF WASHINGTON, Seattle; Robert G. Fleagle, *Diabatic Effects on Atmospheric Motions;* 3 years; $27,000

WHITWORTH COLLEGE, Spokane, Wash.; William G. Wilson; *Electric Charge Separation During Freezing;* 3 years; $18,600

COLLEGE OF WILLIAM AND MARY, Williamsburg, Va.; James D. Lawrence, Jr.; *Correlation of Radio Star Scintillation with Scintillation of Satellite Signals;* 2 years; $40,000

YALE UNIVERSITY, New Haven, Conn.; William E. Reifsnyder; *The Energy Budget of a Forest;* 4 years; $94,200

Peter P. Wegener; *Rate of Condensation of Water Vapor in the Metastable State;* 1 year; $14,200

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AMHERST COLLEGE, Amherst, Mass.; Ralph A. Beebe; *Chemisorption and Physical Adsorption of Gases on Solid Surfaces;* 3 years; $39,700

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Carl S. Marvel; *Novel Polymerization Methods and Relation Between Structure and Properties of High Polymers;* 2 years; $28,400

AUGSBURG COLLEGE AND THEOLOGICAL SEMINARY, Minneapolis, Minn.; John R. Holum; *Participation of Neighboring Carbonyl in Nucleophilic Displacement of Halogen;* 2 years; $6,300

BOSTON UNIVERSITY, Mass.; Lowell V. Coulter; *Thermodynamic Properties of Beta-Quinol Clathrates;* 2 years; $27,400

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Robert Stevenson; *Constitution and Chemistry of Quassin and Related Products;* 3 years; $37,000

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UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Peter T. Lansbury; *New Reactions of Lithium Aluminum Hydride in Pyridine;* 2 years; $23,400

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UNIVERSITY OF CALIFORNIA, Berkeley; Richard George Brewer; *Optical Spectroscopy of High Temperature Molecules;* 2 years; $20,100

William G. Dauben, *Structural Studies in Alicyclic Systems;* 3 years; $65,900

W. F. Giauque; *Thermodynamic and Magnetic Properties at Low Temperatures;* 1 year; $120,000

Joel H. Hildebrand; *Properties and Solubility Relations of Nonelectrolytes;* 1 year; $12,700

Bruce H. Mahan; *Kinetics of Free Radicals and Atoms;* 2 years; $22,600

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Robert K. Brinton, Davis; *Investigation of Elementary Gas Phase Radical Reactions;* 3 years; $19,600

Herbert D. Kaesz, Los Angeles; *Transition Metal Carbonyls;* 2 years; $21,900

William G. Young, Los Angeles; *Displacement Reactions Involving Allylic Systems;* 2 years; $18,400

Glenn H. Miller and Glyn O. Pritchard, Santa Barbara; *Gas Phase Kinetic Studies of Some Fluorine Containing Free Radicals;* 1 year; $26,300

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; Malcolm E. Kenney; *Inorganic Studies Based on the Phthalocyanines;* 2 years; $25,000

UNIVERSITY OF CHICAGO, Chicago, Ill.; Michael J. S. Dewar; *New Heteroaromatic Boron Compounds;* 3 years; $76,200

Clyde A. Hutchison, Jr.; *Recording Double Beam Infrared Spectrophotometer;* 1 year; $16,000

Lothar Meyer; *Properties of Matter at Low Temperatures;* 2 years; $99,200

Stuart A. Rice; *Configurational and Thermodynamic Properties of Polar Polymers;* 42 months; $71,300

Leon M. Stock; *Influence of Polar Effects on Rate and Equilibria;* 2 years; $14,400

J. W. Stout; *Electronic Energy Levels in Paramagnetic Crystals;* 2 years; $58,900

Henry Taube; *Chemistry of Oxygen and Oxy-Compounds;* 2 years; $49,300

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Darl H. McDaniel; *Strong Hydrogen Bonds—Ion-Molecule Interactions;* 2 years; $13,900

Frank R. Meeks; *Nuclear Magnetic Resonance Spectrometer;* 1 year; $10,000

Milton Orchin; *Mechanism of Selenium Dehydrogenation;* 3 years; $14,600

COE COLLEGE, Cedar Rapids, Iowa; Frank C. Pennington; *Synthesis of 1,2,3,4-tetrahydroquinolin-3-ols;* 31 months; $9,700

UNIVERSITY OF COLORADO, Boulder; Stanley J. Cristol; *Mechanisms of Certain Organic Reactions;* 3 years; $62,300

John W. George; *Chemical Studies of the Decafluorides of Sulfur and Tellurium;* 3 years; $30,700

Walter M. Macintyre; *X-ray Laboratory Equipment;* 1 year; $18,200

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Victor K. La Mer; *Adsorption of Polymeric Flocculating Agents on Crystalline Solids;* 2 years; $15,600

Gilbert Stork; *Synthetic and Structural Problems in Organic Chemistry;* 3 years; $129,100

CORNELL COLLEGE, Mount Vernon, Iowa; Philip R. Marshall; *Kinetics of Gas-Solid Reactions;* $1,350

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W. Donald Cooke; *Gas Chromatography of High Molecular Weight Compounds;* 2 years; $32,300

Peter Debye; *Critical Opalescence Investigation of Molecular Interaction of Polymers;* 1 year; $14,500

Donald G. Farnum; *Intermediates in the Solvolytic Rearrangments of Cyclooctatriene Derivatives;* 3 years; $25,700

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge; Eugene Bell; *Limb Development and Cellular Differentiation*; 2 years; $103,000

MERCY INSTITUTE FOR BIOMEDICAL RESEARCH, Denver, Colo.; V. L. van Breemen; *Interfibrillar Membrane Systems in Striated Muscle,* 1 year; $44,600

MIAMI UNIVERSITY, Oxford, Ohio; Charles Heimsch; *Developmental Root Anatomy;* 1 year; $1,700

UNIVERSITY OF MICHIGAN, Ann Arbor; P. B. Kaufman; *Mechanism of Stem Elongation in Grasses;* 2 years; $18,400

UNIVERSITY OF MINNESOTA, Minneapolis; Norman S. Kerr; *Developmental Biology of the True Slime Mold, Didymium Nigripes;* 2 years; $37,400

MISSOURI BOTANICAL GARDEN, St. Louis; Norton H. Nickerson; *Growth Pattern Changes in Maize;* 1 year; $7,100

NEW YORK BOTANICAL GARDEN, New York, N.Y.; Richard M. Klein; *Interaction of Ultraviolet and Visible Radiation on Plant Growth,* 3 years; $20,600

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; Max H. Hommersand; *Cellular Differentiation in Chlamydomonas;* 2 years; $24,300

UNIVERSITY OF NORTH DAKOTA, Grand Forks, John J. Taylor; *Electron Microscopic Study of Developing Epithelium;* 3 years; $58,000

NORTHWESTERN UNIVERSITY, Evanston, Ill.; Shirley C. Tucker; *Ontogenetic Basis for Whorls;* 2 years; $20,800

Joan M. Whitten; *Insect Growth and Metamorphosis;* 2 years; $18,800

UNIVERSITY OF OREGON, Eugene; Sanford S. Tepfer; *Developmental Changes in Apices of Flowering Plants;* 3 years; $33,800

UNIVERSITY OF OREGON MEDICAL SCHOOL, Portland; R. L. Bacon; *Immunoelectrophoretic Analysis of Echinoderm Development;* 2 years; $23,500

UNIVERSITY OF PALERMO, Palermo, Italy; Alberto Monroy; *Ontogenesis of Hemoglobin in the Chick;* 3 years; $26,300

UNIVERSITY OF PENNSYLVANIA, Philadelphia; Ralph O. Erickson; *Cell Division and Cell Growth in Higher Plants;* 3 years; $31,700

Howard Holtzer; *Studies of Chondrogenesis and Myogenesis;* 5 years; $70,500

Lionel Jaffe; *Orientation of Cell Growth by Polarized Radiant Energy;* 2½ years; $26,800

UNIVERSITY OF PITTSBURGH, Pa.; Joan Elger Gottlieb; *Study of Factors in Normal Shoot Growth of Vascular Plants;* 1½ years; $9,500

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; J. S. Lovett; *Morphogenesis in the Aquatic Fungus Rhizophlyctis;* 2 years; $19,000

F. H. Wilt; *Molecular Biology of Differentiation;* 3 years; $75,400

S. N. Postlethwait and O. E. Nelson; *Characterization of Normal Development in Maize;* 3 years; $44,900

REED COLLEGE, Portland, Oreg.; Margaret J. Watkins; *Measurement of Chromosomal Mass During Cell Division;* 2 years; $11,000

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany; Wilfred A. Cote, Jr.; Syracuse; *Ultrastructure of Wood Cells;* 2 years; $7,800

Frederick H. Truscott; *Morphogenesis in the Genus Cuscuta;* 3 years; $9,200

UNIVERSITY OF ROCHESTER, N.Y.; William B. Muchmore; *Immunochemical Studies of Muscle Development;* 2 years; $23,700

ROCKEFELLER INSTITUTE, New York, N.Y.; Sam Granick; *Studies Toward the Growth and Differentiation of Chloroplasts in Vitro;* 2 years; $34,400

Keith R. Porter; *Wall Formation in Cells of Meristematic Plant Tissue;* 1 year; $17,300

Ulrich Naf; *Chemical Nature and Mode of Action of a Specific Inducer of the Antheridium in Ferns;* 3 years; $60,100

UNIVERSITY OF SASKATCHEWAN, CANADA; Taylor A. Steeves; *Leaf Development in Vascular Plants;* 1 year; $5,900

SMITH COLLEGE, Northampton, Mass.; David A. Haskell; *Origin and Development of Growth Centers in the Plant Embryo;* 2 years; $18,500

Elizabeth S. Hobbs; *Argentophilic Structures of Certain Ciliated Protozoa;* 1 year; $3,000

UNIVERSITY OF SOUTH FLORIDA, Tampa; Jerome S. Krivanek; *Chemical Analyses of the Developing Slime Mold, Dictyostelium discoideum;* 1 year; $13,500

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles; John W. Mehl; *Proteins in Cytoplasmic Cleavage;* 2 years; $16,900

SOUTHERN ILLINOIS UNIVERSITY, Carbondale; Margaret Kaeiser; *Proportions of Anatomical Components in Plant Structures;* 2 years; $3,000

STANFORD UNIVERSITY, Stanford Calif.; Donald L. Stilwell, Jr.; *Growth, Deformities and Vascularization of the Vertebral Column;* 2 years; $25,900

STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion; Donald G. Dunlap; *Comparative Morphology of Hind Limb Muscles in Salientia;* 2 years; $10,900

SYRACUSE UNIVERSITY, N.Y.; Thomas S. Argyris; *Mechanism of Hair Growth Stimulation During Hair Regeneration;* 3 years; $43,800

TEMPLE UNIVERSITY, Philadelphia, Pa.; Mann-Chiang Niu; *Induction of Specific Protein Synthesis;* 1 year; $25,600

Mann-Chiang Niu; *Induction of Specific Protein Synthesis by RNA;* 2 years; $36,700

TEXAS AGRICULTURAL EXPERIMENT STATION, College Station; J. Nevin Weaver; *Nutritional Factors in Dimorphic Differentiation of the Honeybee;* 2 years; $17,700

UNIVERSITY OF VIRGINIA, Charlottesville; James E. Kindred; *Histological Studies of Vertebrate Blood Cells;* 1 year; $3,200

WABASH COLLEGE, Crawfordville, Ind.; C. Francis Shutts; *In Vitro Embryogenesis in Angiosperms;* 3 years; $12,800

UNIVERSITY OF WASHINGTON, Seattle; Alex J. Haggis; *Study of DNA of Selected Cells of Rana pipiens Embryos;* 2 years; $20,700

Arthur H. Whiteley; *Developmental Physiology of Marine Invertebrates;* 4 years; $76,000

WASHINGTON UNIVERSITY, St. Louis, Mo.; R. Levi-Montalcini, V. Hamburger, and P. Angeletti; *Analysis of a Nerve Growth-Promoting Agent and its Antiserum on the Sympathetic System of Mammals;* 3 years; $132,400

WAYNE STATE UNIVERSITY, Detroit, Mich.; Werner G. Heim; *Ontogenesis of Mammalian Serum Proteins;* 2 years; $23,300

WELLESLEY COLLEGE, Wellesley, Mass.; Alice Louise Bull; *Effect of Genetic Disturbances on Drosophila Development;* 2 years; $8,200

WESLYAN UNIVERSITY, Middletown, Conn.; Earl D. Hanson; *Role of Ribonucleic Acid in Nucleocytoplasmic Interaction;* 2 years; $18,200

S. Meryl Rose; *Specific Inhibition during Development;* 1 year; $14,900

WILKES COLLEGE, Wilkes-Barre, Pa.; Francis J. Michelini; *Analysis of Leaf Constituents During Development;* 2 years; $11,800

WINTHROP COLLEGE, Rock Hill, S.C.; John A. Freeman; *Differential Functional Longevity of Gametes;* 2 years; $3,200

UNIVERSITY OF WISCONSIN, Madison; Ray F. Evert; *Phloem Structure in Woody Dicotyledons;* 2 years; $20,600

YALE UNIVERSITY, New Haven, Conn.; Donald F. Poulson; *Physiological and Developmental Studies on Drosophila;* 3 years; $60,600

Ian K. Ross; *Heterothallism and Homothallism in the Myxomycetes;* 1 year; $3,000

Ian M. SUSSEX; *Morphogenesis in the Shoot of Vascular Plants;* 3 years; $25,200

J. P. Trinkaus; *Histogenetic and Contact Specificity of Differentiating Cells;* 2 years; $28,000

YESHIVA UNIVERSITY, N.Y., N.Y.; Lois J. Smith; *Mechanisms of Normal and Abnormal Development;* 2 years; $10,800

EARTH SCIENCES

GERALD MARTIN, Richmond; *Glacial and Inter-Glacial Stratigraphy of the Alps for the Purpose of Comparison with that of the Rocky Mountains;* 11 months; $11,090

AMERICAN COMMITTEE FOR THE WEIZMANN INSTITUTE OF SCIENCE, N.Y., N.Y.; C. L. Pekeris, Rehovoth, Israel; *Determination of the Tides in the Real Oceans;* 2 years; $238,700

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Brian H. Mason; *The Mineralogy and Chemical Composition of Stony Meteorites;* 3 years; $30,130

UNIVERSITY OF ARIZONA, Tucson; Paul Damon; *Geochemical Dating;* 2 years; $34,800

UNIVERSITY OF ARKANSAS, Fayetteville; Paul K. Kuroda; *Trace Elements in Meteorites;* 2 years; $57,000

BRIGHAM YOUNG UNIVERSITY, Provo, Utah; Marion T. Millett; *Glacier Termini Study: Southern Alaska 1961;* 3 months; $9,500

BRYN MAWR COLLEGE, Pa.; Edward H. Watson; *X-ray Diffractometer Unit;* 1 year; $6,300

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena; Egon T. Degens; *Geochemical Investigations of Some Organic Constituents in Sediments;* 1 year; $9,100

Richard H. Jahns; *Pegmatite Genesis Through Controlled Laboratory Synthesis;* 1 year; $8,160

Claire C. Patterson; *Construction of a Mass Spectrometer;* 1 year; $33,600

Robert P. Sharp; *Glaciological Research on Valley Ice Streams;* 2 years; $18,400

UNIVERSITY OF CALIFORNIA, Berkeley; G. H. Curtis and J. F. Evernden; *Potassium-Argon Dating of Minerals and Rocks;* 2 years; $55,900

Albert E. J. Engel; *Variations in the Properties of Metamorphic Rocks and Constituent Minerals as a Function of the Kind and Degree of Metamorphism;* 3 years; $31,000

Herbert E. Hawkes, *Trace Element Dispersion in Igneous Rocks;* 2 years; $21,000

J. W. Johnson and Parker D. Trask, *Dynamics of Nearshore Sediment Movement;* 2 years; $75,000

Charles Meyer and William S. Fyfe; *Norelco Electron Probe;* 1 year; $52,300

Margaret K. Robinson; *Computation of Seasonal Variation in Sea Temperature from Incomplete Time Series;* 1 year; $14,000

Hans E. Suess; *Natural Radiocarbon Measurements;* 3 years; $74,200

Francis J. Turner; *Fabrics of Deformed Rocks and Minerals;* 2 years; $29,650

Stanley H. Ward; *Polarizations of Natural Magnetic Fields by Major Geologic Structures;* 1 year; $15,000

Emile A. Pessagno, Jr., Davis; *Study of the Upper Cretaceous Planktonic Foraminifera of the Gulf Coastal Plain;* 3 years; $16,500

Harmon Craig, La Jolla; *Isotopic Oceanography and Meteorology;* 2 years; $55,200

Robert L. Fisher, Richard P. Von Herzen, William R. Riedel and Gustaf Arrhenius, La Jolla; *Acquisition and Modification of Sonar Pingers;* 1 year; $13,885

John A. Knauss and John D. Isaacs, La Jolla; *Study of the Cromwell Current;* 1 year; $53,400

Francis P. Shepard, La Jolla; *Submarine Canyon Charting;* 3 years; $25,800

Tjeerd H. Van Andel and Joseph R. Curray, La Jolla; *Sediments and Post-Pleistocene History of Continental Shelves;* 2 years; $50,000

William G. Van Dorn, La Jolla; *Long Period Wave Stations on Pacific Islands;* 2 years; $59,700

W. S. Wooster, La Jolla; *Investigations of the Peru Current System;* 1 year; $56,000

UNIVERSITY OF CALIFORNIA, Los Angeles; David T. Griggs, Los Angeles; *Plasticity at High Temperatures and Pressures;* 2 years; $51,500

George W. Wetherill, Los Angeles; *Geochronology Using Radioisotopes;* 2 years; $66,150

W. F. Libby, Los Angeles; *Radiocarbon Dating Method and New Dating Methods of Longer Time Scale;* 3 years; $70,000

Richard V. Fisher, Santa Barbara; *Physical and Biostratigraphic Investigation of the*

John Day Formation, Oregon; 2 years; $14,150

CARNEGIE INSTITUTION OF WASHINTON; Washington, D.C.; Merle A. Tuve; *Seismic and Gravity Studies of the Andes;* 2 years; $40,000

UNIVERSITY OF CHICAGO, Chicago, Ill; Edward Anders; *Meteorite Studies;* 3 years; $39,800

Robert N. Clayton; *Oxygen Isotope Fractionation;* $4,800

Joseph V. Smith; *Amphibole, Pyroxene, and Sulfide Mineralogy;* 2 years; $40,000

UNIVERSITY OF CINCINNATI, Cincinnati, Ohio; William F. Jenks; *X-ray Diffractometer for the Solution of Certain Mineralogical, Petrological, and Sedimentological Problems;* 1 year; $16,000

UNIVERSITY OF COLORADO, Boulder; Don L. Eicher; *Cretaceous Foraminifera in the Rocky Mountain Area;* 2 years.; $8,100

COLUMBIA UNIVERSITY, New York, N.Y.; David B. Ericson; *Lithological and Micropaleontological Investigation of Ocean Sediment Cores;* 3 years; $40,700

Maurice Ewing; *Support of the Research Vessel VEMA;* 6 months; $240,000

James R. Heirtzler; *Geomagnetic Micropulsation Studies;* 18 months; $25,000

Jack E. Oliver; *Installation and Operation of Additional Earth Strain Meters in a Tectonically Inactive Area;* 2 years; $43,000

CORNELL UNIVERSITY, Ithaca, N.Y.; Philip M. Orville; *Investigation of Feldspars by Hydrothermal Alkali Ion Exchange Techniques;* 3 years; $32,000

DARTMOUTH COLLEGE; Hanover, N.H.; Robert C. Reynolds, Jr.; *Salinity of Pre-Cambrian Seas;* 2 years; $32,700

UNIVERSITY OF DELAWARE, Newark; John J. Groot; *A Palynological Investigation of the Nonmarine Cretaceous Sediments of the Atlantic Coastal Plain;* 3 years; $15,240

EARLHAM COLLEGE, Richmond, Ind.; David Telfair; *The Radioactivity of Soils and Soil Parent Materials;* 27 months; 33,750

FLORIDA STATE UNIVERSITY; Tallahassee; George W. Devore; *Optical Spectrographic Equipment for Geochemical Investigations of Minerals;* 1 year; $25,000

Takashi Ichiye; *Rotating Model Experiment on Circulation in the Gulf of Mexico;* 2 years; $20,000

FORDHAM UNIVERSITY, New York, N.Y.; Bartholomew Nagy; *Chromatographic Effects in Sedimentary Rocks;* 2 years; $23,140

Norman O. Smith and Bartholomew Nagy; *Solubility of Gases in Connate Water;* 2 years; $21,340

FRANKLIN AND MARSHALL COLLEGE, Lancaster, Pa.; Jacob Freedman; *Stratigraphy of the Wissahickon Schist;* 10 months; $16,000

UNIVERSITY OF GEORGIA, Athens; John H. Hoyt and Vernon J. Henry, Jr.; *Sedimentation, Structure, and Development of Barrier Islands;* 2 years; $11,300

UNIVERSITY OF HAWAII, Honolulu; G. Donald Sherman; *The Evaluation of Past Climates as Expressed in Fossil Soils;* 2 years; $31,700

UNIVERSITY OF HOUSTON, Tex.; Max F. Carmen, Jr.; *Petrographic Study of Alkaline Rocks in the Terlingua Area, Brewster County, Tex.;* 3 years; $29,500

Gene Ross Kellough; *Biostratigraphic and Paleoecologic Study of Foraminifera of the Upper Midway Group in East-Central Texas;* 2 years; $11,500

UNIVERSITY OF ILLINOIS; Urbana; A. H. Beavers; *Characterization of Opal Phytoliths in Soils and Selected Plants;* 2 years; $21,400

INTERNATIONAL SEISMOLOGICAL SUMMARY, Cambridge, England; R. Stonely; *Support of the International Seismological Summary,* 5 years; $50,000

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Ernst Cloos; *X-ray Analysis of Natural and Synthetic Minerals;* 1 year; $15,600

Donald W. Pritchard, *Design Study for a Catamaran Oceanographic Vessel;* 1 year; $10,000

UNIVERSITY OF KANSAS, Lawrence; Louis F. Dellwig; *Depositional Processes in the Salina Salt of Michigan and New York;* 2 years; $9,400

A. B. Leonard; *Fossil Mollusca and Seeds from Late Cenozoic Deposits of the Great Plains Region of the United States;* 3 years; $15,900

KENTUCKY RESEARCH FOUNDATION, Lexington; A. C. McFarlan and Edmund Nosow; *Ordovician - Mississippian Stratigraphic Problems in Kentucky and Vicinity;* 2 years; $17,000

LAMAR STATE COLLEGE OF TECHNOLOY, Beaumont, Tex.; Saul Aronow; *Pimple (Mima) Mounds in the Gulf Coast Region of Southeastern Texas and Southwestern Louisiana;* 2 years; $15,540

LAWRENCE COLLEGE, Appleton, Wis.; William F. Read; *Meteorite Investigations in the Wisconsin Area;* 3 years; $3,420

LEHIGH UNIVERSITY, Bethlehem, Pa.; H. R. Gault; *X-ray Equipment for Research in Geochemistry;* 1 year; $16,530

UNIVERSITY OF LOUISVILLE, Ky.; James E. Conkin; *Silurian and Devonian Smaller Foraminifera of Kentucky and Southern Indiana;* 2 years; $6,200

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge; John Hower; *Chemical Composition and Structure of Clay Minerals in Recent and Ancient Sediments;* 3 years; $27,800

Theodore R. Madden and Thomas Cantwell; *Application of Electromagnetic Measurements to Local and Regional Crustal Investigations;* 1 year; $20,000

UNIVERSITY OF MIAMI, Coral Gables, Fla.; J. Edward Hoffmeister; *Florida Coral Reef Studies;* 1 year; $17,200

Cesare Emiliani, Miami; *Paleotemperature Research;* 3 years; $75,000

Friedrich F. Koczy; *Oceanography and Deep-Sea Coring in the Caribbean;* 1 year; $40,000

Friedrich F. Koczy; *The Geochemistry of Radioactive Elements in the Marine Environment;* 1 year; $27,000

Friedrich F. Koczy: *Distribution and Vertical Transfer of Trace Elements in Tropical Waters;* 2 years; $50,000

Friedrich F. Koczy; *Support of the Research Vessel GERDA;* 1 year; $35,000

UNIVERSITY OF MICHIGAN, Ann Arbor; Paul L. Cloke; *A Geochemical Investigation of the Great Lakes;* 20 months; $70,000

John A. Dorr, Jr.; *Pre-Pleistocene Fossil Vertebrates in the Nonmarine Tertiary of Alaska;* 2 years; $16,000

James H. Zumberge; *Bottom Coring in Lake Superior;* 15 months; $98,350

UNIVERSITY OF MINNESOTA, Minneapolis; Paul W. Gast; *Isotopes of Lead and Strontium;* $3,900

William G. Phinney; *Chemical Equilibrium Between Coexisting Phases in Igneous and Metamorphic Rocks;* 2 years; $16,100

D. H. Yardley; *Trace Element Distribution in a Swamp Environment;* 2 years; $25,500

Tibor Zoltai; *Mineral Structure Determination;* 2 years; $24,700

UNIVERSITY OF MISSOURI, Columbia; John F. Hubert; *Petrology of Deep Sea Sands from the Hudson Submarine Canyon Area, Western North Atlantic;* 2 years; $8,300

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL, Washington, D.C.; John N. Adkins; *Experimental Drilling in Deep Water;* 1 year; $130,665

G. D. Meid; *Support of Coordinator, Indian Ocean Expedition;* 14 months; $56,900

UNIVERSITY OF NEW MEXICO, Albuquerque; Roger Y. Anderson; *Climatic Cycles and Patterns in Varved Sediments;* 2 years; $16,100

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; Ralph J. McCracken, Raleigh; *Mobile Soil Organic Matter and Its Interactions with Clay Minerals and Sesquioxides;* 3½ years; $14,700

OBERLIN COLLEGE, Oberlin, Ohio; Kathryn H. Clisby; *Pleistocene-Pliocene Stratigraphy, San Augustin Plains, New Mexico;* 3 years; $30,500

Fred Foreman; *Pleistocene-Pliocene Stratigraphy and Chronology;* 1 year; $1,800

OHIO STATE UNIVERSITY, Columbus; W. A. Heiskanen; *Publication of the Proceedings of the Symposium Geodesy in Space Age;* 6 months; $2,400

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus; Arthur J. Brandenberger; *Mapping Glaciers in Western United States;* 1 year; $2,230

Richard P. Goldthwait; *Structure in the Stagnant Ice of Burroughs Glacier, Glacier Bay, Alaska;* $6,000

Richard P. Goldthwait; *Origin of Glacial Deposits in Crillon Glacier Area, Alaska;* 1 year; $15,000

OREGON STATE COLLEGE, Corvallis; Wayne V. Burt; *Oregon Oceanographic Studies;* 1 year; $100,000

George S. Kock; *Distribution of Ore in Metalliferous Veins;* 3 years; $22,900

William H. Taubeneck; *Evolution of the Wallowa Mountains, Northeastern Oregon;* 2 years; $30,000

PENNSYLVANIA STATE UNIVERSITY, University Park; Thomas F. Bates; *X-ray Amorphous Mineral Materials and Their Role in the Weathering Process;* 2 years; $40,000

UNIVERSITY OF PENNSYLVANIA, Philadelphia; Elizabeth K. Ralph; *C–14 Measurements of Known Age Samples;* 2 years; $22,200

PRINCETON UNIVERSITY, Princeton, N.J.; William E. Bonini; *Seismic Crustal Measurements;* 2 years; $19,100

Harry H. Hess; *Geological and Geophysical Investigation of the Island of Hispaniola;* 2 years; $37,440

Heinrich D. Holland; *Solubility of Calcite and Dolomite in Aqueous Solutions at Temperatures up to 400° C;* 2 years; $29,800

Franklyn B. Van Houten; *Paleomagnetic Reversals in the Chugwater Red Beds and Iron Oxides in Red Beds as Paleomagnetic Data;* 2 years; $16,100

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles; K. O. Emery; *A Study of Monterey Bay and Submarine Canyon;* 2 years; $35,300

K. O. Emery and S. C. Rittenberg; *Investigations on the Mohole Test Core;* 1 year; $26,200

SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.; James E. Brooks; *The Devonian-Mississippian Boundary Problem in North Central Utah;* 1 year; $3,100

STANFORD UNIVERSITY, Stanford, Calif.; Colin O. Hutton; *Geology of Nevis and St. Christopher (St. Kitts);* 3 years; $10,900

TEXAS AGRICULTURAL AND MECHANICAL RESEARCH FOUNDATION, College Station; Richard G. Bader; *Investigation of Dissolved Organic Sorption by Minerals in Natural Waters;* 3 years; $50,000

Richard G. Bader; *Purchase of Surface Sonar Thumper;* 1 year; $6,000

Hugh J. McLellan; *Aid for Operating a Research Vessel for Basic Studies in Physical Oceanography and Marine Geophysics;* 1 year; $40,000

UNIVERSITY OF TEXAS, Austin; William R. Muehlberger; *Magnetic and Gravimetric Survey of Subsurface Ouachita Fold Belt in Central Texas;* 1 year; $2,800

UNIVERSITY OF TORONTO, Canada; G. B. Langford; *Study of the Limnology of the Great Lakes;* 3 years; $115,000

TULANE UNIVERSITY OF LOUISIANA, New Orleans; Roy A. Macdiarmid; *The Use of Thermoluminescence as a Prospecting Guide for Hydrothermal Ore Deposits;* 2 years; $12,240

U.S. GEOLOGICAL SURVEY, U.S. DEPARTMENT OF INTERIOR, Washington, D.C.; Thomas B. Nolan; *United States Geological Survey Cooperation in Experimental Drilling Program (Project Mohole);* 1 year; $8,700

U.S. DEPARTMENT OF THE NAVY, OFFICE OF NAVAL RESEARCH, Washington, D.C.; H. E. Ruble; *Committee on Oceanography of the National Academy of Science;* 1 year; $16,500

U.S. NAVY HYDROGRAPHIC OFFICE, Washington, D.C.; E. C. Stephan; *National Oceanographic Data Center;* 1 year; $48,000

SMITHSONIAN INSTITUTION, Washington D.C.; Edward L. Fireman; *Rare Gases in Meteorites;* 2 years; $25,000

VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg; Richard V. Dietrich; *Banded Gneisses;* 2 years; $4,275

Grant W. Thomas; *Electrolyte Imbibition by Soils;* 3 years; $19,000

UNIVERSITY OF WASHINGTON, Seattle; Kermit B. Bengtson; *Glaciological Studies in Glacier Bay National Monument, Alaska;* 1 year; $4,500

P. E. Church; *Aerial Reconnaissance and Photography of Glaciers in Alaska and Western United States;* 2 years; $31,000

Arthur W. Fairhall, *Radiocarbon Content of Sequoia Wood;* 30 months; $24,000

R. H. Fleming and R. G. Paquette; *Anchored Telemetering Buoy;* 3 years; $207,100

R. H. Fleming; *Leasing of Off-Campus Building for Expansion of Oceanographic Research Laboratories;* 3 years; $10,100

Maurice Rattray, Jr.; *Continuation of Oceanographic Model Studies of Puget Sound;* 1 year; $26,200

WASHINGTON STATE UNIVERSITY, Pullman; Ronald K. Sorem; *Mineralogical Study of Certain Manganese Oxide Ore Deposits in Washington;* 2 years; $10,850

WASHINGTON UNIVERSITY, St. Louis, Mo.; Henry N. Andrews, Jr.; *Studies of American Paleozoic Plants;* 3 years; $17,760

H. LeRoy Scharon; *Paleomagnetic Investigation of the St. Francois Mountains Igneous Rocks, Missouri;* 19 months; $11,300

UNIVERSITY OF WICHITA, Wichita, Kans.; Paul Tasch; *Leonardian Conchostracans;* 1 year; $15,000

WILLIAM MARSH RICE UNIVERSITY, Houston, Tex.; Jean-Claude de Bremaecker; *Speed of Shear Fractures;* 2 years; $20,600

Thomas W. Donnelly; *European Spilitic and Keratophyric Volcanic Rocks;* 1 year; $1,230

Thomas W. Donnelly; *Geological and Geophysical Investigations of the Older Rocks of the Puerto Rico Area;* 2 years; $10,260

John J. W. Rogers and Edward G. Purdy; *Facies Study of Selected Recent Sedimentary Environments of the Texas Gulf Coast;* 1 year; $7,800

UNIVERSITY OF WISCONSIN, Madison; Eugene N. Cameron; *Investigation of Chromite Deposits in the Critical Zone of the Bushvelt Complex, South Africa;* 3 years; $29,000

George P. Woollard; *Preparation of a Gravity Map of the United States;* 6 months; $7,800

George P. Woollard; *Magnetic Investigations of Crustal Structure and Basement Rock Configuration in Selected Areas in the United States;* 2 years; $66,400

George P. Woollard, Robert P. Meyer, and John S. Steinhart; *Continued Crustal Structure Studies from Seismic and Gravity Measurements;* 2 years; $46,000

George P. Woollard and Robert P. Meyer; *Seismic Study of Crustal Structure;* 1 year; $113,300

YALE UNIVERSITY, New Haven, Conn.; Mead Leroy Jensen; *Isotopic Study of Volcanic and Fumarolic Gases of Japan;* 2 years; $21,600

Elwyn L. Simons; *Paleontology and Stratigraphy of the Oligocene Deposits of the Fayum Region of Egypt;* 1 year; $13,400

Karl K. Turekian; *Potassium Argon Dating of Basin and Range Cenozoic Igneous Events by Neutron Activation Determination;* 2 years; $22,700

Karl M. Waage; *The Fox Hills Formation of the North Central Great Plains;* 4 years; $13,800

Matt Walton; *Preparation of Geologic Maps of the Eastern Adirondack Region, New York;* 1 year; $11,720

ECONOMICS

UNIVERSITY OF CHICAGO, Ill.; Zvi Griliches; *Econometric Investigations of Technological Change;* 3 years; $46,900

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Richard A. Musgrave; *Empirical Analysis of Tax Incidence;* 1 year; $21,900

MASSACHUSETTS INSTITUTE OF TECHNOLOGY. Cambridge; Albert K. Ando; *A Model of Growth for the U.S. Economy;* 15 months; $15,300

UNIVERSITY OF MINNESOTA, Minneapolis; Jacob Schmookler; *Preparation of Source Books on Economics of Invention;* 2 years; $9,600

NATIONAL BUREAU OF ECONOMIC RESEARCH, INC., N.Y., N.Y.; Geoffrey H. Moore; *Statistics Relating to Investment;* 1 year; $30,000

NATIONAL PLANNING ASSOCIATION, Washington, D.C.; Gerhard Colm; *Economic Implications of Research and Development;* 2 years; $42,700

NORTHWESTERN UNIVERSITY, Evanston, Ill.; Robert Eisner; *Empirical Study of the Investment Function;* 2 years; $43,000

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David H. Mertes; *Marine Bottom Communities and Sediments of Tomales Bay;* 1 year; $1,900

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UNIVERSITY OF PITTSBURGH, Pa.; Richard C Dugdale and John H. Ryther, Woods Hole Oceanographic Institution; *Nitrogen Cycle in the Sargasso Sea;* 3 years; $83,700

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Alton A. Lindsey; *Environmental Controls of Tree Species in the Presettlement Forests;* 2 years; $15,300

UNIVERSITY OF PUERTO RICO, Rio Piedras; Luis R. Almodovar; *Marine Algae of Mangroves;* 2 years; $12,000

R. E. Coker; *Physiological and Ecological Studies on Tropical Marine Algae;* 1 year; $4,600

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UNIVERSITY OF RHODE ISLAND, Kingston; Victor H. Hutchison; *Evolutionary and Ecological Significance of Pulmonary and Cutaneous Respiration in Certain Amphibia;* 3 yrs.; $21,300

Theodore J. Smayda; *Physiological Ecology of Marine Phytoplankton;* 3 years; $29,800

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ST. MARY'S COLLEGE OF CALIFORNIA, St. Mary's College; Lawrence Cory; *Biology of Rana Muscosa;* 1 year; $4,500

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UNIVERSITY OF SASKATCHEWAN, Saskatoon, Canada; *Richard S. Miller; Competition in Laboratory Populations of Drosophila;* 2 years; $6,300

SMITH COLLEGE, Northampton, Mass.; Amelia Polnik; *Competition in Field Populations of Isopods;* 2 years; $8,000

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UNIVERSITY OF BRITISH COLUMBIA, Vancouver, Canada; Henretta T. Band; *Lethals and Environment in Drosophila;* 2 years; $20,000

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Elof Axel Carlson, Los Angeles; *Analysis of Induced and Spontaneous Mutations;* 2 years; $35,000

Elof Axel Carlson, Los Angeles; *Intragenic Analyses of Chemically Induced Mutation;* 2 years; $11,100

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Eduardo Orias, Santa Barbara; *Physiological Genetics of Tetrahymena Mating Types;* 2 years; $16,600

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE, Gif-sur-Yvette, France; Georges N. Cohen; *Control of Enzyme Synthesis in Microorganisms;* 3 years; $40,900

UNIVERSITY OF CHICAGO, Ill.; John Lee Hubby; *Protein Differences in Drosophila;* 2 years; $27,800

Bernard S. Strauss; *Gene Action and Interaction;* 3 years; $38,300

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COLUMBIA UNIVERSITY, New York, N.Y.; Francis J. Ryan and James C. King; *Heterozygosity and Developmental Variation;* 1 year; $19,500

J. Herbert Taylor; *Genetic and Cytological Studies on the Genus Sciara;* 2 years; $34,200

UNIVERSITY OF CONNECTICUT, Storrs; William P. Brown; *Heterosis and Fitness in Drosophila Melanogaster;* 2 years; $15,500

GORGAS MEMORIAL INSTITUTE OF TROPICAL AND PREVENTIVE MEDICINE, Washington, D.C.; Sarah Bedichek Pipkin; *Taxonomic, Distributional and Ecological Studies of Drosophilidae of the Canal Zone and Vicinity;* 2 years; $7,100

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Locus in Neurospora crassa; 2 years; $28,200

HARVARD UNIVERSITY, Cambridge, Mass.; R. P. Levine; *Genetics of Chlamydomonas reinhardi;* 2 years; $22,100

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Dale M. Steffensen; *Chromosome Structure and Related Problems in Biochemical Cytology;* 2 years; $69,100

INSTITUT PASTEUR, Paris, France; Francois Jacob; *Episomic Elements and the Regulation of Protein Synthesis;* 3 years; $62,200

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JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Andrzej W. Kozinski and Philip Hartman; *Mechanism of transfer and replication of DNA in phage;* 1 year; $12,500

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LONG ISLAND BIOLOGICAL ASSOCIATION, Cold Spring Harbor, N.Y.; Arthur Chovnick; *Structural and Functional Organization of a Complex Locus in Drosophila Melanogaster;* 2 years; $20,500

MANHATTAN COLLEGE, New York, N.Y.; Robert E. Beardsley; *Genetics of Agrobacterium Tumefaciens;* 2 years; $7,000

MARQUETTE UNIVERSITY, Milwaukee, Wis.; Irwin M. Greenblatt; *Mutable Genetic Systems;* 2 years; $19,600

UNIVERSITY OF MASSACHUSETTS, Amherst; Manley Mandel; *Biology of Serratia Marcescens;* 2 years; $27,600

MEDICAL COLLEGE OF VIRGINIA, Richmond; J. Ives Townsend; *Population Genetics;* 1 year; $9,500

MIAMI UNIVERSITY, Oxford, Ohio; Thomas G. Gregg; *Genetics and Cytogenetics of Drosophila hydei;* 2 years; $9,400

MICHIGAN STATE UNIVERSITY, East Lansing; Albert H. Ellingboe; *Sexual Incompatibility in Higher Fungi;* 2 years; $4,800

UNIVERSITY OF MINNESOTA, Minneapolis; David J. Merrell; *The Dominant Burnsi Mutation in Natural Populations of the Leopard Frog;* 1 year; $6,200

UNIVERSITY OF MISSOURI, Columbia; Gyorgy Redei; *Physiological Genetics of Mutation in Arabidopsis;* 2 years; $10,500

UNIVERSITY OF NEBRASKA, Lincoln; Cecil T. Blunn; *Breeding Tests of Population Genetic Theory;* 2 years; $24,600

NEW ENGLAND INSTITUTE FOR MEDICAL RESEARCH, Ridgefield, Conn.; George H. Mickey; *Non-thermal Cytogenetic Effects of Radio Frequency on Tissues;* 2 years; $25,600

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; D. U. Gerstel, Raleigh; *Genetic Instability in Nicotiana;* 1 year; $22,700

Ken-ichi Kojima, Raleigh; *Genetics of Quantitative Traits under Selection;* 3 years; $68,600

H. F. Robinson, Raleigh; *Genetic Studies in the Genus Meloidogyne;* 2 years; $25,800

S. G. Stephens, Raleigh; *Species Differentiation in Gossypium;* 3 years; $113,200

NORTHERN ILLINOIS UNIVERSITY, De Kalb; C. J. Bennett; *Hereditary Effects of Early Transplantation in the Chicken;* 2 years; $8,600

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P. W. Whiting; *Cytological and Genetics Study of Polyploidy in the Wasp Mormoniella Vitripennis;* 1 year; $9,200

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Allan B. Burdick; *Structure and Function of the M–DY Complex in Drosophila Melanogaster;* 2 years; $38,800

Irwin Tessman; *Mutation and Replication of DNA;* 3 years; $73,400

Jules Janick; *Cytogenetic Aspects of Sex Determination;* 2 years; $13,700

UNIVERSITY OF ROCHESTER, N.Y.; Ernst Caspari; *Genetic Control in Ephestia;* 1 year; $6,200

ROSCOE B. JACKSON MEMORIAL LABORATORY, Bar Harbor, Maine; Margaret C. Green; *Physiological Genetics of the Short-Ear Gene in Mice;* 3 years; $26,000

SAN DIEGO STATE COLLEGE FOUNDATION, Calif.; Frank J. Ratty; *Effect of Proximal Heterochromatin on Mutation and Germinal Selection;* 1 year; $12,300

SOUTH DAKOTA STATE COLLEGE, Brookings; James G. Ross; *Homozygous Diploid Mutants in Sorghum;* 1 year; $10,800.

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles; T. T. Chen; *Collection of Paramecium bursaria in Australia and New Zealand;* 1 year; $1,500.

Margaret Lieb; *Mechanism of Mutation;* 2 years; $19,400

SOUTHERN ILLINOIS UNIVERSITY, Carbondale; Carl C. Lindegren; *Study of the Zymophage;* 2 years; $36,000

UNIVERSITY OF SOUTHWESTERN LOUISIANA, Lafayette; William L. Flannery; *Mutational Origin of Halophilic Bacteria;* 2 years; $16,300

STATE UNIVERSITY OF IOWA, Iowa City; Emil Witschi; *Genetics and Physiology of Sex Differentiation;* 2 years; $35,500

SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.; Roger D. Milkman; *Analysis of a Polygenic System in Drosophila melanogaster;* 1 year; $6,000

TEMPLE UNIVERSITY, Philadelphia, Pa.; Benedict Mark Hall; *Genetic Analysis of Somatic Cells of Higher Plants;* 2 years; $8,900

UNIVERSITY OF TEXAS, Austin; T. C. Hsu, Houston; *Mammalian Chromosomes in Vitro;* 2 years; $40,200

James Maniotis; *Biological Studies of Pyrenomycetous Fungi;* 2 years; $15,100

TULANE UNIVERSITY OF LOUISIANA, New Orleans; E. Peter Volpe; *Genetics of the Leopard Frog;* 3 years; $34,500

UNIVERSITY OF WASHINGTON, Seattle; Stanley M. Gartler; *Somatic Cell Genetics in Tissue Culture;* 3 years; $45,500

WASHINGTON STATE UNIVERSITY, Pullman; Adolph Hecht; *Sublethal Factors in Oenothera;* 2 years; $16,500

WAYNE STATE UNIVERSITY, Detroit, Mich.; Robert W. Tuveson; *Control of Nuclear Ratios in Heterocaryons and Somatic Diploids of a Plant-Pathogenic Fungus;* 2 years; $12,600

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; Jan H. Bruell; *Genetics of Behavior in Mice;* 2 years; $33,400

UNIVERSITY OF WISCONSIN, Madison; R. Alexander Brink; *Paramutation of R Locus in Maize;* 3 years; $36,200

Chin S. Chung; *Genetic Studies of Human Populations;* 2 years; $29,400

W. H. Gabelman; *Interactions of Genes and Cytoplasm in the Pollen Sterile Plants;* 2 years; $15,200

Waclaw Szybalski; *Genetics and Radiochemistry of Halogenated Deoxyuridine Analogs;* 1 year; $3,800

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BROWN UNIVERSITY, Providence, R.I.; David Joravsky; *A History of Michurinist Biology;* 1 year; $10,000

O. E. Neugebauer; *History of Mathematical Astronomy;* 3 years; $32,200

UNIVERSITY OF CALIFORNIA, Berkeley; C. D. O'Malley, Los Angeles; *Origins of Modern Anatomy;* 3 years; $15,500

UNIVERSITY OF CHICAGO, Ill.; Allen G. Debus; *Influence of Medicine on Modern Chemistry;* 2 years; $4,100

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins; Saul A. Basri; *A Deductive Physical Theory;* 2 years; $11,500

CORNELL UNIVERSITY, Ithaca, N.Y.; L. Pearce Williams; *The Collected Works of Michael Faraday;* 2 years; $6,100

GRINNELL COLLEGE, Grinnell, Iowa; Richard S. Westfall; *Study of Isaac Newton;* 2 years; $13,500

HARVARD UNIVERSITY, Cambridge, Mass.; I. Bernard Cohen; *History of Physical Sciences;* 3 years; $25,000

C. O'D. Iselin; *History of Oceanography;* 1 year; $7,500

UNIVERSITY OF ILLINOIS, Urbana; Robert Siegfried; *Weight-Related Concepts in Chemistry;* 2 years; $7,900

INDIANA UNIVERSITY FOUNDATION, Bloomington; Edward Grant; *Mathematical Proportionality;* 1 year; $700

Edward Grant; *A study of Mathematical Proportionality;* 2 years; $4,900

Alfred Rupert Hall and Marie Boas Hall; *The Correspondence of Henry Oldenburg;* 2 years; $12,000

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TULANE UNIVERSITY OF LOUISIANA, New Orleans; Joseph Ewan; *Studies on American Naturalists;* 1 year; $7,200

WAYNE STATE UNIVERSITY, Detroit, Mich.; Edward Lurie; *Scientific Organization in Nineteenth Century America;* 2 years; $12,400

YALE UNIVERSITY, New Haven, Conn.; Leonard G. Wilson; *Lyell and the Development of Geology;* 3 years; $9,800

Thomas R. Forbes; *William Yarrell, British Naturalist;* 1 year; $1,500

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AMERICAN MATHEMATICAL SOCIETY, Providence, R.I.; Gordon L. Walker; *Applications of Functional Analysis;* 1 year; $74,000

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H. Melvin Lieberstein; *Numerical Analysis;* 2 years; $18,500

Paul Slepian; *Network Theory;* 2 years; $19,000

BRANDEIS UNIVERSITY, Waltham, Mass.; Maurice Auslander, David A. Buchsbaum, and Dock S. Rim; *Homological Algebra;* 2 years; $51,700

Max Chretien; *Establishment of Computing Center;* 1 year; $30,000

Harold I. Levine and Richard S. Palais; *Differential Topology;* 2 years; $49,400

BROWN UNIVERSITY, Providence, R.I.; Iacopo Barsotti; *Algebraic Geometry;* 2 years; $37,000

Herbert Federer; *Geometric Measure Theory;* 2 years; $51,600

Katsumi Nomizu; *Automorphisms of Geometric Structures;* 27 months; $11,000

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena; R. P. Dilworth; *Group Theory and Matrix Theory;* 1 year; $22,500

A. Erdelyi; *Functional Analysis;* 1 year; $28,700

UNIVERSITY OF CALIFORNIA, Berkeley; Chen Chung Chang and Alfred Horn; *Foundations of Mathematics;* 2 years; $34,600

Jerzy Neyman; *Stochastic Treatment of Natural Phenomena;* 2 years; $78,000

M. H. Protter; *Partial Differential Equations;* 2 years; $49,000

Maxwell A. Rosenlicht; *Algebraic Geometry;* 2 years; $6,900

Alfred Tarski; *Metamathematics;* 2 years; $62,600

Charles A. Hayes, Jr., Davis; *Establishment of Computing Center;* 3 years; $40,000

Richard C. Gilbert and Vernon A. Kramer, Riverside; *Perturbation of Operators;* 2 years; $13,300

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; Walter Noll; *Mechanics and Thermodynamics;* 2 years; $18,700

Malempati M. Rao; *Inference in Stochastic Processes;* 2 years; $5,400

UNIVERSITY OF CHICAGO, Chicago, Ill.; A. A. Albert; *Algebra, Analysis, and Topology;* 2 years; $57,300

Walter L. Bailey; *Algebraic Function Theory;* 2 years; $16,600

Paul R. Halmos; *Entropy and Ergodic Theory;* 2 years; $46,300

Elias M. Stein; *Harmonic Functions and Fourier Analysis;* 2 years; $16,600

CLARK UNIVERSITY, Worcester, Mass.; Daniel Gorenstein; *Finite Groups;* 1 year; $9,300

COLUMBIA UNIVERSITY, New York, N.Y.; S. Eilenberg; *Algebra;* 2 years; $93,500

Edgar R. Lorch; *Abstract Integration Theory;* 1 year; $8,000

Herbert E. Robbins; *Probability Theory and Mathematical Statistics;* 2 years; $81,400

UNIVERSITY OF CONNECTICUT, Storrs; Geraldine A. Coon; *Boundary Value Problems;* 15 months; $5,600

Harold Torgersen; *Establishment of Computing Center;* 1 year; $30,000

E. S. Wolk; *Transitivity in Graphs;* 15 months; $5,600

CORNELL UNIVERSITY, Ithaca, N.Y.; Paul Olum; *Algebraic Topology;* 2 years; $136,000

DARTMOUTH COLLEGE, Hanover, N.H.; John G. Kemeny; *Potential Theory for Stochastic Processes;* 2 years; $54,700

Hazleton Mirkil; *Second Order Operators;* 2 years; $47,500

UNIVERSITY OF DETROIT, Michigan; Lyle E. Mehlenbacher; *Establishment of Computing Center (IBM 1620);* 3 years; $25,000

DUKE UNIVERSITY, Durham, N.C.; Leonard Carlitz; *Algebra and Number Theory;* 2 years; $37,000

John J. Gergen, Thomas M. Gallie, and Thomas D. Reynolds; *Establishment of Computing Center;* 3 years; $75,000

John H. Roberts; *Topology;* 2 years; $33,700

FLORIDA STATE UNIVERSITY, Tallahassee; Morton L. Curtis; *Generalized Manifolds;* 2 years; $59,000

GEORGETOWN UNIVERSITY, Washington, D.C.; Albert K. Aziz; *Partial Differential Equations;* 2 years; $13,000

UNIVERSITY OF GEORGIA, Athens; Lee W. Anderson; *Order and Topology;* 2 years; $15,400

J. G. Horne, Jr.; *Topological Semigroups on Euclidean Spaces;* 2 years; $14,500

HARVARD UNIVERSITY, Cambridge, Mass.; Garrett Birkhoff; *Lattice Theory and Its Applications;* 1 year; $12,866

R. Brauer, J. T. Tate, and O. Zariski; *Algebra, Number Theory, and Algebraic Geometry;* 2 years; $75,000

UNIVERSITY OF ILLINOIS, Urbana; S. S. Cairns; *Polyhedral and Differentiable Manifolds;* 2 years; $15,600

A. H. Taub; *Numerical Analysis and Applied Mathematics;* 2 years; $154,000

INDIANA UNIVERSITY FOUNDATION, Bloomington; T. Y. Thomas; *Mechanics of Continuous Media;* 1 year; $13,400

George W. Whaples; *Class Field Theory;* 2 years; $21,200

INSTITUTE FOR ADVANCED STUDY, Princeton, N.J.; Deane Montgomery; *Algebra and Topology;* 2 years; $93,600

Hassler Whitney; *Mathematics—Analysis;* 2 years; $93,600

IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames; Robert J. Buehler; *The Foundations of Statistical Inference;* 2 years; $7,600

H. O. Hartley; *Statistical Estimation and Mathematical Programming;* 2 years; $34,000

Oscar Kempthorne; *Residulas in Randomized Experiments;* 2 years; $17,600

George Seifert; *Systems of Ordinary Differential Equations;* 2 years; $20,500

UNIVERSITY OF KANSAS, Lawrence; Nachman Aronszajn; *Differential Problems;* 17 months; $37,000

LEHIGH UNIVERSITY, Bethlehem, Pa.; Samir Khabbaz; *Abelian Groups;* 2 years; $4,200

LOUISIANA STATE UNIVERSITY, Baton Rouge; R. D. Anderson; *Generalizations of the Cantor Set;* 2 years; $28,800

H. S. Collins; *Measure and Semigroups;* 2 years; $9,000

R. J. Koch; *Topological Semigroups;* 2 years; $21,400

UNIVERSITY OF MARYLAND, College Park; Avron Douglis; *Partial Differential Equations;* 2½ years; $41,000

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge; Kenkichi Iwasawa; *Galois Extensions of Algebraic Number Fields;* 2 years; $29,600

UNIVERSITY OF MASSACHUSETTS, Amherst; Alfonso G. Azpeitia, *Entire Functions Defined by Dirichlet Series;* 1 year; $3,200

MICHIGAN STATE UNIVERSITY, East Lansing; J. E. Adney and Wilbur E. Deskins; *Finite Groups;* 2 years; $29,000

UNIVERSITY OF MICHIGAN, Ann Arbor; Nicholas D. Kazarinoff; *Scalar Scattering by Convex Bodies;* 1 year; $3,500

UNIVERSITY OF MINNESOTA, Minneapolis; Erwin Engeler; *Theory of Models;* 1 year; $3,700

Marguerite J. Frank; *Lie Algebras;* 1 year; $8,000

Bjarni Jonsson; *Foundations of Algebra;* $1,050

Bjarni Jonsson and Peter Crawley; *Lattice Theory;* 2 years; $30,000

G. K. Kalish and B. R. Gelbaum; *Functional Analysis;* 2 years; $46,500

Hugh L. Turrittin; *Ordinary Differential Equations;* 1 year; $7,600

MISSISSIPPI SOUTHERN COLLEGE, Hattiesburg; Jack D. Munn; *Establishment of Computing Center;* 1 year; $10,000

NEW MEXICO STATE UNIVERSITY, University Park; Seymour Goldberg; *Unbounded Linear Operators;* 15 months; $8,400

Elbert A. Walker; *Infinite Abelian Groups;* 15 months; $31,800

NEW YORK UNIVERSITY, New York City; Sidney Borowitz; *Electromagnetic Theory;* 2 years; $77,900

Lipman Bers; *Summability;* 3 months; $5,700

Chia-Kun Chu; *Magneto-Hydrodynamic Nozzle Flows;* 1 year; $5,600

Richard Courant; *Methods of Mathematical Physics;* 2 years; $75,000

James J. Stoker; *Topics in Applied Mathematics;* 2 years; $200,000

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; John W. Carr, III; *Computer-Oriented Linguistics Studies;* 2 years; $40,000

NORTHWESTERN UNIVERSITY, Evanston, Ill.; R. P. Boas; *Trigonometric Series;* 1 year; $6,000

R. P. Boas; *Fourier Series;* 1 year; $4,500

R. P. Boas; *Extremal Problems;* 2 years; $84,000

Ivar Stakgold; *Boundary Value Problems;* 2 years; $40,200

Teruhisa Matsusaka, Alex Rosenberg, and Daniel Zelinsky; *Problems in Algebra and Algebraic Geometry;* 2 years; $125,000

H. C. Wang; *Minimal Immersion of Manifolds;* 1 year; $8,400

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; Hans J. Zassenhaus; *Geometry of Numbers;* 2 years; $31,400

OREGON STATE COLLEGE, Corvallis; Helmut Groemer; *General Packings and Coverings of Sets;* 2 years; $12,600

UNIVERSITY OF OREGON, Eugene; Fred C. Andrews; *Establishment of Computing Center (IBM 1620)*; 1 year; $30,000

Paul Civin and Bertram Yood; *Extensions of Banach Algebras;* 2 years; $39,000

PENNSYLVANIA STATE UNIVERSITY, University Park; Haskell B. Curry; *Combinatory Logic;* 2 years; $20,400

UNIVERSITY OF PENNSYLVANIA, Philadelphia; Saul Gorn; *Mechanical Languages;* 2 years; $27,000

Walter Koppelman; *The Hilbert and Riemann-Hilbert Problems;* 1 year; $3,900

Hans Rademacher; *Analytic Additive Number Theory;* 1 year $10,400

Smbat Abian; *Brouwer's Fixed Point Theorem;* 3 months; $3,700

PRINCETON UNIVERSITY, Princeton, N.J.; J. C. Elgin and A. W. Tucker; *Operation of Computing Center (IBM 650);* 1 year; $15,000

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Gregers L. Krabbe; *Generalized Spectral Decompositions;* 2 years; $9,800

Imanuel Marx; *Approximation Theory;* 2 years; $7,200

Georg J. Rieger; *Algebraic Numbers;* 2 years; $24,700

Henry Teicher; *Stochastic Processes;* 2 years; $14,000

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; Kurt Bing; *The Axiom of Choice;* 1 year; $4,200

UNIVERSITY OF ROCHESTER, N.Y.; William F. Eberlein; *Generalized Harmonic Analysis;* 2 years; $19,300

Leonard Gillman; *Semigroups and Rings;* 2 years; $48,200

Richard P. Goblirsch; *Topology of Euclidean Spaces;* 2 years; $12,900

Richard E. Johnson, *Atomic Modular Lattices;* 2 years; $31,000

Ralph A. Raimi; *Stone-Cech Compactifications;* 2 years; $19,600

Louis Sucheston; *Mixing and Entropy;* 2 years; $5,000

ROOSEVELT UNIVERSITY, Chicago, Ill.; Ruth B. Marcus; *Modal Logic;* 2 years; $9,400

UNIVERSITY OF SOUTHERN CALIFORNIA; Los Angeles; Herbert Busemann; *Non-Reimannian Spaces;* 2 years; $48,000

UNIVERSITY OF SOUTHWESTERN LOUISIANA, Lafayette; James R. Oliver; *Establishment of Computing Center;* 1 year; $15,000

STANFORD UNIVERSITY, Stanford, Calif.; Samuel Karlin; *Probability Theory and Functional Analysis;* 2 years; $80,000

Charles Loewner; *Continuous Semigroups;* 3 years; $50,000

Emanuel Parzen; *Time Series Analysis;* 2 years; $73,000

Ralph S. Phillips; *Functional Analysis;* 2 years; $90,000

Hans Samelson; *Topology and Lie Group Theory;* 1 year; $16,000

STATE UNIVERSITY OF IOWA, Iowa City; Harry T. Muhly; *Complete Ideals;* 14 months; $11,000

STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N.J.; Lawrence Goldman; *Homogeneous Linear Differential Equations;* 1 year; $3,100

SYRACUSE UNIVERSITY RESEARCH INSTITUTE, N.Y.; G. T. Cargo; *Holomorphic Functions;* 2 years; $8,800

Shu-Teh Chen Moy; *Markov-Chain and Information Theory;* 1 year; $8,500

P. T. Church; *Topology and Analysis;* 2 years; $13,700

Werner C. Rheinboldt; *Computing Research;* 2 years; $30,00

TEXAS CHRISTIAN UNIVERSITY, Fort Worth; M. E. Sadler; *Establishment of Computing Center;* 3 years; $15,000

TULANE UNIVERSITY, New Orleans, La.; A. D. Wallace; *Semigroups;* 2 years; $40,000

Gail S. Young; *Topological Methods in Analysis;* 2 years; $58,600

UTAH STATE UNIVERSITY; Logan; Wynne Thorne; *Establishment of Computing Center*; 3 years; $30,000

UNIVERSITY OF UTAH, Salt Lake City; S. S. Kistler; *Expansion of Computing Center;* 1 year; $30,000

UNIVERSITY OF VIRGINIA, Charlottesville; Alan P. Batson; *Establishment of Computing Center (Burroughs 205);* 1 year; $60,000

UNIVERSITY OF WASHINGTON, Seattle; J. M. G. Fell and H. S. Bear; *Functional and Group Algebras;* 2 years; $24,600

Edwin Hewitt; *Harmonic Analysis;* 1 year; $11,500

Robert F. Tate; *Estimation and Rank-Order Methods in Statistics;* 2 years; $15,600

WASHINGTON STATE UNIVERSITY, Pullman; T. G. Ostrom; *Finite Projective Planes;* 2 years; $15,800

WASHINGTON UNIVERSITY, St. Louis, Mo.; Franklin T. Haimo; *Univalent Functions, Functional and Harmonic Analysis, and Contact Transformations;* 2 years; $15,800
A. E. Nussbaum; *Laplace-Stieltjes Transforms in Groups;* 2 years; $8,800

WAYNE STATE UNIVERSITY, Detroit, Mich.; Seymour Sherman; *The Ising Model;* 2 years; $30,700

WEST VIRGINIA UNIVERSITY, Morgantown; Henry W. Gould; *Binomial Coefficient Summations;* 2 years; $9,700

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; George Leger; *Lie Algebras;* 2 years; $9,315

WILLIAM MARSH RICE UNIVERSITY, Houston, Tex.; John K. Iliffe; *Compiler Routines;* 2 years; $30,000

UNIVERSITY OF WISCONSIN, Madison; Morris Marden, Milwaukee; *Zeros of Polynomials;* 2 years; $37,700
Walter Rudin; *Studies in Analysis;* 2 years; $71,400

YALE UNIVERSITY, New Haven, Conn.; Oystein Ore; *Theory of Graphs and Networks;* 2 years; $13,700

METABOLIC BIOLOGY

ADELPHI COLLEGE, Garden City, N.Y.; Carl S. Hammen; *Carbon Dioxide Fixation in Invertebrates;* 2 years; $15,000

ALBERT EINSTEIN MEDICAL CENTER, Philadelphia, Pa.; David H. Ezekiel; *Structure and Function of the Bacterial Nuclear Apparatus;* 1 year; $36,400

BOYCE THOMPSON INSTITUTE FOR PLANT RESEARCH, INC., Yonkers, N.Y.; Karl Maramorosch; *Beneficial Effect of Aster Yellows Virus on Non-Vector Insects;* 2 years; $31,100

BRANDEIS UNIVERSITY, Waltham, Mass.; Nathan O. Kaplan; *Cellular Activity;* 3 years; $86,100
John M. Lowenstein; *Hydrogen in Biosynthesis;* 3 years; $50,000

UNIVERSITY OF CALIFORNIA, Los Angeles; David Appleman; *Function of Catalase;* 2 years; $15,000
Daniel I. Arnon; *Nitrogen Assimilation and Photosynthesis;* 3 years; $90,500
Michael Doudoroff; *Metabolism of Organic Substrates in Bacteria;* 3 years; $58,900
Samuel Lepkovsky; *Tryptophane Metabolism to Carbohydrate Metabolism;* 3 months; $3,000
P. K. Stumpf, Davis; *Enzymatic Mechanisms Participating in Fat Metabolism of Higher Plants;* 4 years; $61,100
John A. DeMoss, La Jolla; *Studies on the Genetic and Physiological Control of Cellular Structures;* 18 months; $19,800
Otto H. Scherbaum, Los Angeles; *Metabolic Studies Concerning the Mechanism of Synchronized Cell Division;* 2 years; $37,800
Victor W. Rodwell, San Francisco; *Bacterial Metabolism of Pipecolic Acid;* 2 years; $25,200

UNIVERSITY OF CHICAGO, Ill.; Warren A. Furumoto; *Infection by Tobacco Mosaic Virus;* 2 years; $20,000

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins; E. Merle Harrison and Merle G. Payne; *Chemical Identification and Mechanism of Action of a Phenolic Compound Responsible for Resistance to Cercospora Leaf-Spot;* 2 years; $9,000

UNIVERSITY OF CONNECTICUT, Storrs; Emil O. Bernstein; *Factors Responsible For and Associated With Obligate Photoautotrophy;* 2 years; $25,000

CORNELL UNIVERSITY, Ithaca, N.Y.; Martin Alexander and J. E. Dawson; *Metabolism of Chemoautotrophic and Heterotrophic Nitrifying Microorganisms;* 3 years; $28,800

UNIVERSITY OF DELAWARE, Newark; John H. McClendon; *Respiratory Mechanisms in Cultivated Mushroom;* 2 years; $8,000
John C. Wriston, Jr.; *Fractionation of Guinea Pig Serum, and Mechanism of its Action on a Mouse Tumor;* 2 years; $23,000

DUKE UNIVERSITY, Durham, N.C.; Aubrey W. Naylor; *Protein Formation and Amino Acid Metabolism in Plants;* 2 years; $20,000

UNIVERSITY OF FLORIDA, Gainesville; James A. Olson; *Intestinal Absorption and Blood Transport of Sterols and Fat-Soluble Vitamins;* 2 years; $39,500

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; Robert C. Wood; *Synthesis of Tetrahydropteroylpolyglutamic Acid from P-Aminobenzoic Acid and Pteridines by Bacteria;* 2 years; $29,400

UNIVERSITY OF GEORGIA, Athens; Robert A. McRorie and William J. Payne; *Enzymology of Bacterial Utilization of Uronic Acids;* 2 years; $17,900
William J. Payne; *Metabolism of Marine Bacteria;* 2 years; $19,500

GOUCHER COLLEGE, Baltimore, Md.; Helen M. Habermann; *Physiology of Pigment-deficient Mutants of Helianthus Annuus L;* 2 years; $37,000
Clifford R. Noll, Jr.; *Diphosphopyridine Nucleotide-Linked Dehydrogenases;* 6 months; $2,200

HAHNEMANN MEDICAL COLLEGE AND HOSPITAL, Philadelphia, Pa.; Herbert J. Eichel; *Studies on Respiratory Enzymes in Protozoa;* 2 years; $24,400
John J. Spitzer; *Metabolic Studies of Low Density Lipoproteins;* 2 years; $18,200
Morris A. Spirtes; *Tissue Slice Metabolism and Cell Membrane Permeability;* 2 years; $11,400

HARVARD UNIVERSITY, Cambridge, Mass.; Herbert L. Ennis and Martin Lubin; *Biosynthetic Control Mechanisms in Mammalian Cells;* 2 years; $29,100
R. P. Geyer; *Factors Affecting Lipide Metabolism;* 1 year; $11,800
Edmund C. C. Linn; *Control of Polyhydric Alcohol Metabolism in Bacterial Cells;* 2 years; $26,600

HARVARD UNIVERSITY, Cambridge, Mass.; A. M. Pappenheimer; *Biology of Diphtheria and of Diphtheria Bacillus;* 3 years; $56,800
William H. Pearlman; *Metabolism and Localization of High Radioactive Steroid Sex Hormones in Target Sexual Tissues;* 3 years; $33,000
William R. Sistrom; *Bacterial Chromatophores;* 3 years; $32,800

UNIVERSITY OF HAWAII, Honolulu; Robert W. Hiatt; *Equipment for Biochemical Research;* 1 year; $38,500

HENRY FORD HOSPITAL, Detroit, Mich.; O. H. Gaebler; *Metabolism of Nitrogen-15 From Individual Sources;* 3 years; $34,500

UNIVERSITY OF ILLINOIS, Urbana; I. C. Gunsalus; *Comparative Aspects of Metabolic Activity*; 1 year; $98,100

John B. Hanson; *Effect of Plant Growth Regulators on the Metabolic Activities of Subcellular Particles from Plant Tissue;* 3 years; $43,500

Lawrence I. Hochstein; *Bacterial Oxidation of N-acetylglucosamine;* 2 years; $18,000

B. Connor Johnson; *Vitamin A in Adrenocorticosteriod Biosynthesis;* 3 years; $17,600

INDIANA UNIVERSITY FOUNDATION, Bloomington; Felix Haurowitz; *Biosynthesis, Structure and Specificity of Proteins;* 3 years; $30,000

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Howard J. Saz; *Intermediary Metabolism of Ascaris Lumbricoides Adults and Larvae;* 2 years; $36,000

KAISER FOUNDATION RESEARCH INSTITUTE, Richmond, Calif.; Alex Shrift; *The Uncoupling of Cell Division From Growth;* 1 year; $2,000

UNIVERSITY OF KANSAS MEDICAL CENTER, Kansas City; Paul R. Schloerb; *Liquid Scintillation Counter;* 1 year; $12,500

LOS ANGELES STATE COLLEGE FOUNDATION, Calif.; Anthony J. Andreoli; *Metabolism of Glutaric and Higher Dicarboxylic Acids in Bacteria and Animal Tissues;* 2 years; $18,800

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge; Gene M. Brown; *Metabolism and Function of B Vitamins;* 3 years; $68,900

John M. Buchanan; *Biosynthesis of the Methyl Group of Methionine, Coenzymatic Role of Vitamin B12;* 3 years; $77,400

UNIVERSITY OF MASSACHUSETTS, Amherst; Trevor Robinson; *Enzymatic Pathways of Alkaloid Biosynthesis;* 1 year; $3,000

MIAMI UNIVERSITY, Oxford, Ohio; David W. Newman; *Physiology and Biochemistry of Lipids of Higher-Plant Chromoplasts;* 2 years; $15,000

UNIVERSITY OF MIAMI, Coral Gables, Fla.; W. J. van Wagtendonk; *Nucleic Acid Turnover in Paramecium Aurelia;* 2 years; $21,400

MICHAEL REESE HOSPITAL, Chicago, Ill.; Sidney Cohen and Felix Leitner; *Nature of Repressor of Penicillinase Synthesis in Staphylococcus Aureus;* 2 years; $22,000

MICHIGAN STATE UNIVERSITY, East Lansing; Harold M. Sell; *Biochemistry of Natural and Synthetic Growth Substances*; 2 years; $16,100

UNIVERSITY OF MICHIGAN, Ann Arbor; Harold J. Blumenthal; *Metabolism of Hexeric Acids;* 3 years; $32,900

Rowland H. Davis; *Biochemical Relationships Among Pyrimidine and Arginine Mutants of Neurospora;* 3 years; $37,300

OKLAHOMA STATE UNIVERSITY, Stillwater; L. M. Henderson; *Metabolism of 3-Hydroxyanthrenilate;* 2 years; $18,000

Roger K. Koeppe; *Metabolism of Glutaric Acid;* 2 years; $19,200

ORANGE COUNTY STATE COLLEGE FOUNDATION, Fullerton, Calif.; Donald D. Sutton; *Spore Formation in Fungi;* 3 years; $22,800

OREGON STATE COLLEGE, Corvallis; Te May Ching; *Fat Metabolism of Germinating Seed of Douglas Fir and Role of Plastid in Fat Metabolism;* 2 years; $16,800

Tsoo E. King; *Reconstitution of the Mitochondrial Respiratory Chain;* 3 years; $53,500

Leo W. Parks; *Ergosterol Metabolism in Saccharomyces Cerevisiae;* 2 years; $13,000

PENNSYLVANIA STATE UNIVERSITY, University Park; Carl O. Clagett; *Peptides in Plant Metabolism;* 3 years; $11,900

E. S. Lindstrom; *Chromatophoral Sulfate Metabolism;* 3 years; $12,000

PHILADELPHIA GENERAL HOSPITAL RESEARCH FUND, Pa.; Gerald Litwack; *Action and Fractionation of Lysozyme Resistance Transferring DNA;* 3 years; $21,000

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Harry Beevers; *Biochemical Aspects of Germination;* 3 years; $67,300

Henry Koffler; *Biosynthesis of Carbohydrates;* 3 years; $50,000

F. C. Neidhardt; *Regulation of Ribonucleic Acid Synthesis in Bacteria;* 3 years; $60,000

William J. Ray, Jr.; *Group Transfer Process;* 3 years; $50,000

REED COLLEGE, Portland, Oreg.; Helen A. Stafford; *Physiology of Lignin Formation;* 3 years; $18,800

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany; Arthur M. Zimmerman, Brooklyn; *ATP on Living Cells;* 2 years; $15,000

ROCKEFELLER INSTITUTE, New York, N.Y.; Gertrude Gottschall; *White Cell Proteases in Hemostasis;* 2 years; $25,000

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Bernard W. Koft; *Biosynthesis of Pteridines by Bacteria;* 2 years; $15,000

Robert L. Starkey; *The Fate of Sulfur of Organic Compounds Decomposed by Microorganisms;* 2 years; $14,100

Henry J. Vogel; *Comparative Microbial Biosynthesis;* 3 years; $50,500

Selman A. Waksman; *Biosynthesis of Streptomycin Group of Antibiotics;* 3 years; $50,200

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles; Carmel M. Roberts; *Metabolism of Differentiating Cardiac Cells;* 2 years; $22,000

Eion G. Scott; *Metabolic Role of Boron;* 2 years; $18,200

STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion; A. D. Larson; *Bacterial Metabolism;* 2 years; $14,000

SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.; Donald G. Lundgren; *Biosynthesis in Obligate Chemosynthetic Autotroph;* 2 years; $6,400

UNIVERSITY OF TENNESSEE, Knoxville; Joseph A. Ontko; *Liquid Scintillation Counter for Research in Biochemistry;* 1 year; $12,500

UNIVERSITY OF TEXAS, Austin; David H. Ezekiel; *Structure and Function of Bacterial Nuclear Apparatus;* 3 years; $44,200

Jackson W. Foster; *Hydrocarbon Metabolism in Microorganisms;* 4 years; $132,600

Don W. Micks, Galveston; *Effects of Insecticides on Protein Synthesis;* 2 years; $16,000

Jack Myers; *Physiology and Biochemistry of Algae;* 3 years; $46,400

TUFTS UNIVERSITY, Medford, Mass.; Roy L. Kisliuk; *Role of Vitamin B_{12} in Methyl Group Synthesis;* 3 years; $56,400

UTAH STATE UNIVERSITY, Logan; Gene W. Miller; *Respiratory Chain Involved in Oxidative Phosphorylation in Relation to Carbon Dioxide-Bicarbonate Inhibition;* 2 years; $19,500

VANDERBILT UNIVERSITY, Nashville, Tenn.; C. R. Park; *Membrane Transport of Glucose;* 3 years; $39,000

J. van Eys; *New Sites of Action of Thiamine;* 3 years; $21,600

UNIVERSITY OF VERMONT, Burlington; Donald B. Melville; *A Study of Ergothioneine in Animals;* 1 year; $8,300

Donald B. Melville; *Biochemistry of Ergothioneine;* 2 years; $35,500

David Racusen; *Synthesis and Fate of Leaf Protein;* 2 years; $14,400

VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg; Kendall W. King; *Metabolic Transitions During Cellular Development in Algae;* 2 years; $25,600

M. Daniel Lane; *Alternate Pathways of Butyrate Metabolism;* 2 years; $24,600

WAKE FOREST COLLEGE, Winston-Salem, N.C.; Walter J. Bo; *Synthesis of Glycogen from Uridinediphosphoglucose in Uterus;* 1 year; $14,200

WASHINGTON STATE UNIVERSITY, Pullman; H. M. Nakata; *Physiology of Sporulation in Aerobic Bacilli;* 2 years; $13,000

WEST VIRGINIA UNIVERSITY, Morgantown; Wayne W. Luchsinger; *Studies on Mechanism of Action of Beta-Glucanases;* 2 years; $29,500

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; Henry Z. Sable; *Carbohydrate Metabolism*; 3 years; $44,800

UNIVERSITY OF WISCONSIN, Madison; W. H. McShan and Roland K. Meyer; *Purification and Characterization of Particulates from the Anterior Pituitary Gland;* 1 year; $16,700

WORCESTER FOUNDATION FOR EXPERIMENTAL BIOLOGY, Shrewsbury, Mass.; Erwin Schwenk; *Biosynthesis of Cholesterol;* 2 years; $10,000

YESHIVA UNIVERSITY, New York, N.Y.; Theodore Winnick; *Mechanisms of Biosynthesis of Polypetides;* 1 year; $20,900

MOLECULAR BIOLOGY

ALBERT EINSTEIN MEDICAL CENTER, Philadelphia, Pa.; Daniel A. Boroff; *Chemistry and Biological Activity of Botulinum Toxin;* 2 years; $60,000

AUBURN UNIVERSITY, Auburn, Ala.; Anton N. J. Heyn; *Fiber and Ultra Structure Research;* 2 years; $50,000

BOSTON UNIVERSITY, Mass.; William C. Boyd; *Antibody-Antigen Complex; Reactions and Chemistry;* 3 years; $60,000

BRANDEIS UNIVERSITY, Waltham, Mass.; Herman T. Epstein; *Properties of a New Megaterium Phage;* 2 years; $35,000

Lawrence Grossman; *Nucleic Acids;* 3 years; $58,900

William P. Jencks; *Energy Transferring in Biological Systems;* 3 years; $48,400

Mary Ellen Jones; *Biosynthetic and Transfer Reactions;* 3 years; $42,900

Julius Marmur; *The Biological Polymers;* 2 years; $71,300

BROWN UNIVERSITY, Providence, R.I.; Seymour Lederberg; *Origin and Function of Subcellular Particles of Microorganisms;* 2 years; $19,000

UNIVERSITY OF BRUSSELS, Belgium; P. R. Srinivasan; *The Mechanism of Transfer of Genetic Information Between Nucleus and Cytoplasm;* 2 years; $15,000

UNIVERSITY OF CALIFORNIA, Berkeley; Melvin Calvin; *Mass Spectrometer for Primitive Earth Gas Mixtures;* 1 year; $33,000

William A. Jensen; *Uptake of Macromolecules by Living Plant Cells;* 2 years; $20,000

Stanley L. Miller; *Mechanisms for the Synthesis of Organic Compounds on the Primitive Earth;* 18 months; $15,100

Manuel F. Morales; *Configuration of Dissolved Proteins and Protein Models;* 5 years; $31,000

Nello Pace; *Cation Exchange Binding Properties of Cellular Membrane Materials;* 2 years; $30,000

Benjamin E. Volcani; *Biochemical Studies on Siliceous Skeletal Formation in Marine Microorganisms;* 2 years; $70,000

Donald M. Reynolds, Davis; *Development of an Enzymatic Assay for Chitin;* 2 years; $30,000

Claude E. ZoBell, La Jolla; *Effects of Increased Hydrostatic Pressure on Bacterial Reaction Rates;* 2 years; $25,000

William J. Hartman and William G. Clark, Los Angeles; *Biosynthesis of Pharmacologically Active Amines in Cephalopods;* 2 years; $28,000

Fritiof S. Sjostrand, Los Angeles; *Analysis of Enzymatic Activities Connected with Certain Cytoplasmic Systems;* 2 years; $90,000

Joel W. Goodman, San Francisco; *Immunochemical Studies of the Glutamyl Polypeptide-Antipolypeptide System;* 2 years; $23,000

UNIVERSITY OF CHICAGO, Ill.; Irving H. Goldberg; *Enzymatic Synthesis of Ribonucleic Acid;* 3 years; $75,000

Kenneth D. Kopple; *Peptide Models of Enzymes;* 3 years; $52,400

John Westley; *Mechanism of Action of the Enzyme Rhodanese;* 2 years; $25,000

UNIVERSITY OF CINCINNATI, Ohio; Richard A. Day; *Determination of Secondary and Tertiary Structure of Proteins;* 5 years; $30,000

Robert C. Krueger; *Nature and the Mechanism of Tyrosinase Action;* 3 years; $12,900

CITY OF HOPE MEDICAL CENTER, Duarte, Calif.; Alois H. Nowotny and Janos Wein; *Bacterial O-antigens;* 2 years; $30,000

COLUMBIA UNIVERSITY, New York, N.Y.; David Shemin; *Biosynthesis and Function of Porphyrins;* 1 year; $5,000

Stuart W. Tanenbaum and Sam M. Beiser; *Biosynthesis of Antibody and Molecular Conformation of Combining Sites;* 3 years; $38,700

Stephen Zamenhof; *Studies on the Biochemistry of Polysugarphosphates;* 2 years; $20,000

CORNELL UNIVERSITY, Ithaca, N.Y.; Thomas C. Bruice; *Synthesis of a Series of Gem Mercaptoethylamines;* 4 years; $66,500

George P. Hess; *Structural and Functional Interrelationships in Enzymes;* 2 years; $42,000

Harold A. Scheraga; *Thermodynamic Properties of Proteins;* 3 years; $72,000

DARTMOUTH COLLEGE, Hanover, N.H.; R. Clinton Fuller; *Intracellular Structure and Function in Microbial Cells;* 2 years; $200,000

Joseph D. Harris; *Kinetics of Ionic Movement Across Membranes;* 3 years; $31,600

Arnold Wishnia; *Hydrophobic Interactions;* 3 years; $22,300

DUKE UNIVERSITY, Durham, N.C.; Paul Horowicz; *Ion Transport Across Membranes in Muscle;* 2 years; $28,000

Charles Tanford; *The Configuration of Proteins in Solution;* 1 year; $9,900

Charles Tanford; *Conformation of Proteins in Organic Aqueous Solvent Mixtures;* 3 years; $54,000

DUQUESNE UNIVERSITY, Pittsburgh, Pa.; Oscar Gawron; *Reaction of Cyanide with Cystine;* 2 years; $13,200

EDSEL B. FORD INSTITUTE FOR MEDICAL RESEARCH, Detroit, Mich.; Harvey F. Fisher; *Mechanisms of Reactions Catalyzed by Pyridine Nucleotide Dehydrogenases;* 2 years; $25,000

FLORIDA STATE UNIVERSITY, Tallahassee; Earl Frieden; *Copper Enzymes, Proteins, and Copper Ion Catalyses;* 3 years; $58,800

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; Stephen Yeandle; *Limulus Photoreceptor;* 3 years; $41,100

HARVARD UNIVERSITY, Cambridge, Mass.; Paul Doty; *Research on Polypeptides and Proteins;* 3 years; $225,000

John H. Law; *Bacterial Lipids;* 2 years; $22,000

Matthew S. Meselson; *Replication of DNA;* 3 years; $130,000

HEALTH RESEARCH INC., Buffalo, N.Y.; David Harker; *Crystal Structure of Ribonuclease;* 2 years; $70,000

HOWARD UNIVERSITY, Washington, D.C.; Felix Friedberg; *Estimation of Peptides;* 2 years; $14,500

UNIVERSITY OF ILLINOIS, Urbana; L. P. HAGER; *Biological Halogenation Mechanisms;* 1 year; $13,500

A. C. Ivy; *Determination of Histamine;* 1 year; $10,800

Eugene Rabinowitch; *Photochemical and Photogalvanic Storage of Light;* 3 years; $43,000

N. Sueoka; *DNA Base Composition and Structure of Enzymes;* 2 years; $50,000

Elizabeth Thorogood; *Legume Nodule Hemoproteins;* 1 year; $15,800

INDIANA UNIVERSITY FOUNDATION, Bloomington; Howard V. Rickenberg; *Control Mechanisms of Enzyme Biosynthesis;* 2 years; $31,000

JEFFERSON MEDICAL COLLEGE OF PHILADELPHIA, PA.; Alfred Marshak; *DNA in the Maturation of Echinoderm Eggs;* 2 years; $16,000

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Michael B. Yarmolinsky; *Mechanism of Protein Synthesis;* 3 years; $50,300

KANSAS STATE UNIVERSITY, Manhattan; Anthony M. Gawienowski and Richard N. McDonald; *Synthesis of 14_c Ring Labeled Diethylstilbesterol;* 2 years; $10,000

UNIVERSITY OF KANSAS MEDICAL CENTER, Kansas City; Jacob D. Duerksen; *Inducer Metabolism and its Relationship to the Function of Sub-cellular Particles;* 2 years; $27,000

KANSAS WESLEYAN UNIVERSITY, Salina; Orville L. Voth; *Interactions of Tocopherol with Proteins and Amino Acids;* $1,000

LAWRENCE COLLEGE, Appleton, Wis.; Robert M. Rosenberg; *Interaction of Proteins with Ethanol;* 2 years; $9,000

UNIVERSITY OF LOUISVILLE, Louisville, Ky.; Bruce M. Anderson; *Mechanism of Enzyme Action;* 3 years; $40,300

Paul G. LeFevre; *Mechanism of Transport Through Cell Membranes;* 1 year; $50,000

MASSACHUSETTS EYE AND EAR INFIRMARY, Boston, Mass.; S. Peter Marfey; *Structural and Synthetic Studies Related to Cytochrome C.;* 2 years; $30,000

MASSACHUSETTS GENERAL HOSPITAL, Boston; Murray Vernon King; *Crystallography of Proteins and Polypeptides;* 1 year; $15,000

Karl Schmid; *Chemical Structure of the Low Molecular Weight Human Plasma Glycoproteins;* 2 years; $27,000

Dorothy F. Travis; *The Molecular Biology of Crustacean Mineralized Tissues;* 2 years; $28,000

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge; Howard M. Dintzis; *Crystalline Proteins;* 1 year; $29,000

MAYO ASSOCIATION, Rochester, Minn.; Eugene Ackerman; *Physical Factors Controlling the Activity of Xanthine Oxidase and Other Enzymes;* 2 years; $27,000

MEDICAL COLLEGE OF VIRGINIA, Richmond; Alfred J. Richard; *Isolation of the Smallest Serologically Active Peptide from a Protein Hydrolyzate;* 2 years; $13,000

COLLEGE OF MEDICAL EVANGELISTS, Loma Linda, Calif.; Robert L. Nutter; *Relationship of DNA Synthesis to Protein Synthesis in Multiplicity Reactivation in the T. Even Bacteriophages;* 2 years; $11,000

MELLON INSTITUTE, Pittsburgh, Pa.; Edward F. Casassa; *Physical Chemistry of Seed Proteins;* 2 years; $29,000

UNIVERSITY OF MICHIGAN, Ann Arbor; Arthur Yuwiler; *Studies on 5-Hydroxytryptophan 3,4-Dihydroxyphenylalanine Decarboxylase;* 2 years; $24,000

UNIVERSITY OF MINNESOTA, Minneapolis; Allan H. Brown; *Photosynthetic Research;* 3 years; $36,000

Irvin E. Liener; *Structural Basis of Enzyme Action;* 3 years; $37,300

MONTANA STATE COLLEGE, Bozeman; Ralph A. Olsen; *Ion Accumulation by Plant Cells;* 1 year; $6,500

MOUNT SINAI HOSPITAL, New York, N.Y.; J. D. Chanley and Harry Sobotka; *Steroid Compounds from Invertebrates;* 3 years; $34,900

Harry Sobotka; *Factor Converting Mesophilic into Thermophilic Microorganisms;* 2 years; $28,000

NEW YORK UNIVERSITY, New York; Milton Levy; *Chemical Structure of Collagen and Other Fibrous Proteins;* 3 years; $52,000

OHIO STATE UNIVERSITY RESIDENT FOUNDATION, Columbus; George C. Webster; *Enzymatic Synthesis of Protein;* 3 years; $31,700

Melville L. Wolfrom; *Research on Polysaccharides;* 3 years; $39,000

UNIVERSITY OF OKLAHOMA, Norman; Everett C. Bracken; *Studies of Virus;* 2 years; $32,300

OREGON STATE COLLEGE, Corvallis; Harold J. Evans; *Nodule-nitrate Reductase in the Mechanism of Nitrogen Fixation by Leguminous Plants;* 6 months; $5,800

UNIVERSITY OF OREGON, Eugene; John A. Schellman; *The Binding of Nucleotides to Proteins;* 3 years; $40,000

PRINCETON UNIVERSITY, Princeton, N.J.; Aurin M. Chase; *Mechanism of Enzyme Action: Luciferase;* 3 years; $22,400

Jacques Fresco; *Physical-Chemical Investigations of Polynucleotides and Nucleic Acids;* 2 years; $30,000

PURDUE RESIDENT FOUNDATION, Lafayette, Ind.; A. I. Aronson; *Ribosomes: Their Structure, Synthesis, and Role in Intracellular Differentiation;* 3 years; $52,800

F. L. Crane; *Function of Quinones in Electron Transport and Phosphorylation Processes;* 2 years; $33,000

E. H. Simon; *Consequences of Incorporation of 5-Bromouracil into Deoxyribonucleic Acids of Hela Cells;* 3 years; $61,700

REED COLLEGE, Portland, Ore.; Michael Litt; *A Kinetic Study of Ribonuclease;* 1 year; $5,000

UNIVERSITY OF ROCHESTER, N.Y.; T. T. Bannister; *Primary Process in Photosynthesis;* 3 years; $60,000

Thomas R. Punnett; *Mechanisms of the Hill Reaction;* 2 years; $30,000

ROCKEFELLER INSTITUTE, New York, N.Y.; Daniel E. Koshland, Jr.; *Enzyme Structure and Function;* 1 year; $12,500

Beatrice S. Magdoff; *The Determination of the Structure of Southern Bean Mosaic Virus by X-ray Diffraction Technique;* 1 year; $10,000

RUTGERS, THE STATE UNIVERISTY, New Brunswick, N.J.; Michael Heidelberger; *Relations Between Chemical Constitution and Immunological Specificity;* 14 months; $14,600

SAINT LOUIS UNIVERSITY, Mo.; Audrey Stevens; *Metabolism of Ribonucleic Acid in Bacterial Extracts;* 3 years; $49,800

SMITH COLLEGE, Northampton, Mass.; Gladys A. Anslow; *Structure of Small Peptides;* 2 years; $34,700

UNIVERSITY OF SOUTH CAROLINA, Columbia; B. Theodore Cole; *A Comparative Study of Lipid Constituents and Changes Therein;* 2 years; $25,000

STANFORD UNIVERSITY, Stanford, Calif.; M. S. Blois; *g-Values of Biological Free Radicals;* 2 years; $45,000

STATE UNIVERSITY OF IOWA, Iowa City; Henry B. Bull; *Adsorbed Monolayers of Proteins;* 3 years; $72,000

TEXAS AGRICULTURAL AND MINING RESEARCH FOUNDATION, College Station; H. K. Zimmerman; *Fundamental Chemistry of Aminosugars;* 1 year; $15,000

UNIVERSITY OF TEXAS, Austin; Lester Packer, Dallas; *Function of Sub-Cellular Membranes;* 3 years; $65,000

Austen F. Riggs; *Biochemistry of Hemoglobin and of Nitrogen Fixation;* 2 years; $53,000

UNIVERSITY OF VERMONT AND STATE AGRICULTURE COLLEGE, Burlington; Thomas B. Tomasi; *Relation of Rheumatoid Factors to 19S Antibodies;* 1 year; $30,000

WASHINGTON UNIVERSITY, St. Louis, Mo.; Robert K. Crane; *Mechanism of Intestinal Absorption;* 3 years; $105,000

WEIZMANN INSTITUTE OF SCIENCE, Rehovoth, Israel; David Elson; *Ribonucleoproteins;* 3 years; $25,200

WELLS COLLEGE, Aurora, N.Y.; Diether G. Markees; *Synthesis of Substituted 2,6-Diaminopyridines;* 2 years; $7,100

UNIVERSITY OF WISCONSIN, Madison; Robert A. Alberty; *Physical Chemical Studies of Enzymes;* 4 years; $78,700

William Wallace, Cleveland; *Determination of Enzymic Mechanisms by Kinetic Studies;* 2 years; $10,000

H. Gobind Khorana; *Chemical and Enzymic Studies of Polynucleotides;* 3 years; $86,000

Oliver Smithies; *Genetic Determination of Protein Structure;* 3 years; $75,700

J. W. Williams; *Magnetically Supported Equilibrium Ultracentrifuge;* 2 years; $21,000

YALE UNIVERSITY, New Haven, Conn.; David I. Hitchcock; *Colloid Osmotic Pressures of Acid Protein Solutions;* 1 year; $1,200

Daniel L. Kline; *Activation and Purification of Fibrinolytic Enzymes;* 2 years; $22,000

Frank Ulrich; *Ion Transport by Mitochondria and Permeability of Mitochondrial Membranes;* 3 years; $26,400

YESHIVA UNIVERSITY, New York, N.Y.; Harry Eagle; *Studies in Cell Culture;* 1 year; $100,000

Sasha Englard; *Structural Nature of Malic Dehydrogenases;* 3 years; $35,000

Paul M. Gallop; *Study of High Weight Polypeptides;* 1 year; $1,400

Henry D. Hoberman; *Coupling of Coenzyme-linked Oxidation-reduction Reactions;* 2 years; $37,000

Nathar W. Penn; *RNA Synthesis in Liver Mitochondria;* 1 year; $10,000

PHYSICS

AGRICULTURAL AND TECHNICAL COLLEGE OF NORTH CAROLINA, Greensboro; Donald A. Edwards; *Phase Relationships of Cadmium-Magnesium Alloys;* 2 years; $13,300

AMHERST COLLEGE, Amherst, Mass.; Colby W. Dempesy, Joel E. Gordon, and Theodore Soller; *Specific Heat of Rare Earth Metals;* 2 years; $21,500

UNIVERSITY OF ARIZONA, Tucson; Robert M. Kalbach; *High Energy Elementary Particle Interactions in Nuclear Emulsion;* 1 year; $13,000

BRANDEIS UNIVERSITY, Waltham, Mass.; Saul Barshay, Kenneth W. Ford and Silvan S. Schweber; *Theoretical High Energy Physics;* 2 years; $90,700

Stanley Deser; *Elementary Particle Physics and General Relativity;* 2 years; $17,400

BRIGHAM YOUNG UNIVERSITY, Provo, Utah; Albert D. Swensen and E. John Eastmond; *Purchase of a Nitrogen Liquefier;* 2 years; $15,100

BROWN UNIVERSITY, Providence, R.I.; Rohn Truell; *Study of Defects in Solids by Means of Ultrasonic Methods;* 2 years; $39,000

BRYN MAWR COLLEGE, Bryn Mawr, Pa.; Walter C. Michels; *Investigations of the Structure of Matter;* 1 year; $16,700

BUCKNELL UNIVERSITY, Lewisburg, Pa.; Robert A. Artman; *Ultrasonic Waves in Anisotropic Media;* 14 months; $10,600

William S. Porter; *Theoretical Analysis of Deuteron Reactions and Scattering;* 15 months; $7,700

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Robert G. Arns; *Energy Levels in Odd Mass Number Nuclei;* 2 years; $30,800

Henry Goldberg; *Atom-Environment Interactions;* 2 years; $16,900

S. Mrozowski; *Spectroscopy of Forbidden Lines;* 2 years; $29,100

Edward H. Kerner; *Ensemble Treatment of Ecological Models;* 1 year; $4,300

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena; Jesse W. M. DuMond and Harry A. Kirkpatrick; *Precision Comparison of the X-ray Wavelength Scales;* 1 year: $18,000

UNIVERSITY OF CALIFORNIA, Berkeley; Sumner P. Davis; *Nuclear Properties and Atomic Spectra;* 2 years; $30,300

Erwin L. Hahn; *Double Spin Resonance Spectroscopy;* 3 years; $60,000

Bernd Matthias; *Equipment for Solid State Research;* 2 years; $48,200

William A. Nierenberg; *Hyperfine Structure Anomaly;* 2 years; $30,000

George Feher, La Jolla; *Electron Spin Resonance Studies;* 2 years; $283,800

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; George W. Hinman; *Solid State Gamma Ray Angular Correlation Studies;* 1 year; $17,800

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; Thomas G. Eck; *The Fine and Hyperfine Structure of Excited States of Atoms;* 2 years; $38,400

CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; Theodore A. Litovitz and George E. McDuffie; *Dielectric Relaxation Phenomena in Associated Liquids;* 2 years; $20,400

UNIVERSITY OF CHICAGO, Ill.; Masatoshi Koshiba; *Nuclear Interactions at Energies Greater Than 10^{12} Electron Volts;* 8½ months; $48,000

CITY COLLEGE OF NEW YORK, New York, N.Y.; Robert M. Lea; *Pion Scattering by Protons from Bubble Chamber Photographs;* 15 months; $19,800

COLBY COLLEGE, Waterville, Maine; James W. Beatty, Jr.; *Gaseous Diffusion of Multicomponent Systems;* 31 months; $16,800

UNIVERSITY OF COLORADO, Boulder; Masataka Mizushima; *Strong Field Stark Effect;* 18 months; $18,000

Frank Oppenheimer; *Elementary Particle Interactions from Bubble Chamber Photographs;* 2 years; $116,300

COLUMBIA UNIVERSITY, New York, N.Y.; Henry A. Boorse; *Superconductivity and Liquid Helium Studies;* 2 years; $83,600

Charles H. Townes; *Molecular Structure Studies with a Maser Beam Spectrometer;* 2 years; $49,800

CORNELL UNIVERSITY, Ithaca, N.Y.; Robert M. Cotts; *Nuclear Spin Resonance;* 3 years; $90,200

Benjamin M. Siegel; *Defect Structure in Solids;* 3 years; $42,200

DARTMOUTH COLLEGE, Hanover, N.H.; Robert W. Christy; *Optical and Electrical Properties of Ionic Crystals;* 2 years; $24,000

William P. Davis, Jr.; *Oscillations in Direct Current Glow Discharges;* 1 year; $7,400

UNIVERSITY OF DELAWARE, Newark; Charles B. Cooper; *An Experimental Investigation of Sputtering Using a Mass Spectrometer;* 2 years; $13,200

UNIVERSITY OF DENVER RESEARCH INSTITUTE, Colo.; Ed. N. Sickafus; *Microcalorimetry;* 1 year; $19,500

EMORY UNIVERSITY, Atlanta, Ga.; William C. Mallard; *Color Center Phenomena in X and Gamma Irradiated Alkali Halides;* 2 years; $27,500

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; Herbert Jehle; *Spinor Formulation of Kinematics, Mechanics, and Quantum Mechanics;* 2 years; $16,900

GRINNELL COLLEGE, Grinnell, Iowa; Roger J. Hanson; *Soft Gamma Background Radiation Near the Earth's Surface;* 2 years; $8,900

HARVARD UNIVERSITY, Cambridge, Mass.; Norman F. Ramsey; *Studies with the Atomic Hydrogen Maser;* 2 years; $88,600

HARVEY MUDD COLLEGE, Claremont, Calif.; Graydon D. Bell; *Spectroscopic Absorption Lines of Heavy Elements;* 2 years; $28,200

UNIVERSITY OF ILLINOIS, Urbana; Donald M. Ginsberg; *Properties of Superconductors;* 2 years; $47,700

John D. Jackson; *Theoretical Studies of Fields and Particles;* 3 years; $198,400

James S. Koehler; *Dislocations in Crystals;* 2 years; $48,200

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Thomas Fulton and Gordon Feldman; *Theoretical Physics;* 2 years; $61,200

UNIVERSITY OF KANSAS, Lawrence; J. W. Culvahouse; *Spin-Spin and Spin-Lattice Interactions in Paramagnetic Materials at Low Temperatures;* 2 years; $38,400

R. C. Sapp; *Nuclear Orientation at Low Temperatures;* 1 year; $11,600

L. Worth Seagondollar; *Nuclear Energy Levels in Low and Medium Mass Range;* 1 year; $19,700

KENT STATE UNIVERSITY, Kent, Ohio; J. W. McGrath and Anthony A. Silvidi; *Magnetic Resonance Studies in Hydrated Crystals;* 2 years; $37,700

KENTUCKY RESEARCH FOUNDATION, Lexington; Vincent P. Kenney and William D. Shephard; *Bubble Chamber Studies in Pion Physics;* 2 years; $119,800

LAWRENCE COLLEGE, Appleton, Wis.; J. Bruce Brackenridge; *Transverse Oscillations of a Hydro-Jet;* 2 years; $15,000

LEHIGH UNIVERSITY, Bethlehem, Pa.; Peter Havas; *Relativistic Theory of Interacting Particles;* 2 years; $36,600

James A. McLennan, Jr.; *Non-Equilibrium Statistical Mechanics and the Many-Body Problem;* 2 years; $41,000

Wesley R. Smith; *Chemical Kinetics in Gases and Acoustic Flame Studies;* 2 years; $55,000

LOUISIANA STATE UNIVERSITY, Baton Rouge; Richard W. Huggett; *Cosmic Ray Studies Using Nuclear Emulsions;* 2 years; $47,200

MANHATTAN COLLEGE, New York, N.Y.; Gabriel Kane; *High Energy Nuclear Emulsion Research;* 2 years; $12,000

UNIVERSITY OF MARYLAND, College Park; Thomas B. Day; *Elementary Particle Theory;* 2 years; $25,900

Hans R. Griem; *Damping Constants and Oscillator Strengths of Astrophysical Interest;* 1 year; $47,800

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge; Norman C. Rasmussen and Hans Mark; *Nuclear Gamma-Ray Energies;* 2 years; $119,700

UNIVERSITY OF MASSACHUSETTS, Amherst; Phillips R. Jones; *Inelastic Atomic Collisions Below 25 Kev;* 2 years; $33,600

MICHIGAN STATE UNIVERSITY, East Lansing; Julius S. Kovacs and Don B. Lichtenberg; *Theory of the Interactions of Mesons and Hyperons;* 2 years; $27,700

UNIVERSITY OF MICHIGAN, Ann Arbor; Wayne E. Hazen; *Nuclear Components of Air Showers;* 1 year; $25,600

Wayne E. Hazen; *Direct Pair Production by Mu Mesons;* 15 months; $7,700

Samuel Krimm; *Infrared Spectra of Macromolecules;* 3 years; $84,600

Noah Sherman; *Theoretical Corrections to Electron Scattering;* 1 year; $16,800

UNIVERSITY OF MISSOURI, Columbia; Richard A. Anderson; *Energy Exchange in Collisions of the Second Kind;* 2 years; $13,100

Nelson M. Duller and Densil M. Cooper; *High Energy Cosmic Ray Mu Mesons at Large Zenith Angles;* 15 months; $10,700

NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.; John S. Coleman; *NAS-NRC Committee on Nuclear Science;* 2 years; $32,600

UNIVERSITY OF NEBRASKA, Lincoln; Saul T. Epstein, Paul A. Goldhammer, and Henry S. Valk; *Nuclear Structure and Elementary Particle Physics;* 1 year; $23,000

Paul Goldhammer; *Properties of Nuclei and Nuclear Forces;* 8 months; $11,500

UNIVERSITY OF NEW MEXICO, Albuquerque, Walter M. Elsasser; *Mechanics and Statistics of Molecular Helices;* 2 years; $33,600

John R. Green; *Cores of Extensive Cosmic Ray Air Showers;* 10 months; $15,500

NEW YORK UNIVERSITY, N.Y.; Martin Pope; *Electrical Conductivity in Organic Solids;* 2 years; $44,000

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; Paul S. Hubbard; *Nuclear Magnetic Resonance;* 3 years; $62,000

Richard C. Jarnagin and Marvin Silver; *The Nature of Charge Transport in Organic Substances;* 2 years; $36,300

A. T. Stewart; *Positron Annihilation in Solids and Liquids;* 3 years; $78,800

UNIVERSITY OF NORTH DAKOTA, Grand Forks; Earl N. Mitchell; *Properties of Thin Ferromagnetic Films;* 2 years; $26,300

NORTHEASTERN UNIVERSITY, Boston, Mass.; Michael J. Glaubman; *Nuclear Spectroscopy;* 2 years; $23,500

Roy Weinstein; *Mu-Meson Studies Using Hodoscope Techniques;* 2 years; $69,400

NORTHWEST NAZARENE COLLEGE, Nampa, Idaho; Gilbert C. Ford; *Mass Spectrometer Studies;* 2 years; $37,700

NORTHWESTERN UNIVERSITY, Evanston, Ill.; Laurie M. Brown and Richard H. Capps; *Field Theory and High Energy Physics;* 2 years; $43,900

James H. Roberts; *Hyperfragments and Primary Cosmic Radiation;* 2 years; $66,100

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; Cecil B. Mast; *General Relativity and Physical Observation;* 2 years; $11,000

Robert S. Witte; *Interrelated Volume and Surface Electronic Properties of Insulating Crystals;* 2 years; $43,900

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus; J. G. Daunt; *Superfluidity and Zero Sound in Liquid Helium-Three;* 2 years; $103,200

Clifford V. Heer; *Properties of Metals and Alloys Below Three Degrees Absolute;* 2 years; $25,600

Clifford V. Heer; *Atomic Oscillators at Low Temperatures;* 3 years; $49,400

OHIO UNIVERSITY, Athens; Thomas S. Smith, Frederick A. Otter, Jr.; *Superconducting Alloys;* 2 years; $25,400

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman; Richard G. Fowler; *The Positive Column of Low Pressure Discharge;* 2 years; $24,000

Chun C. Lin and Edgar A. Rinehart; *Microwave Spectral Line Widths;* 2 years; $29,700

UNIVERSITY OF OREGON, Eugene; Bernd Crasemann; *Nuclear Energy Levels and Decay Schemes;* 2 years; $17,100

PENNSYLVANIA STATE UNIVERSITY, University Park; John A. Sauer and Arthur E. Woodward; *Dynamic Mechanical Behavior of High Polymers Over a Wide Temperature Range;* 2 years; $22,400

UNIVERSITY OF PENNSYLVANIA, Philadelphia; Kenneth R. Atkins; *Liquid Helium;* 2 years; $48,000

Sherman Frankel; *Nuclear Spectroscopy;* 2 years; $63,700

Henry Primakoff; *Theoretical Studies on Particle Interactions and Statistical Mechanics;* 3 years; $212,000

William E. Stephens; *Establishment of a 10-Mev Tandem Accelerator Facility;* 1 year; $45,100

William E. Stephens; *Tandem Accelerator Installation and Research-Instrumentation Development;* 6 months; $200,000

C. W. Ufford; *Theoretical Problems in Atomic and Nuclear Spectroscopy;* 1 year; $21,500

UNIVERSITY OF PITTSBURGH, Pa.; Norman Austern, Elizabeth Baranger and Sydney Meshkov; *Theory of Structure and Properties of Nuclei;* 18 months; $49,200

PRINCETON UNIVERSITY, Princeton, N.J.; Thomas R. Carver; *Magnetic Resonance in Solids and Gases;* 3 years; $108,300

A. S. Wightman; *Structure of Local Quantum Field Theory;* 15 months; $26,000

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Alexander N. Gerritsen; *Electron Transport Properties of Dilute Alloys;* 2 years; $49,600

Masao Sugawara; *Interactions of Elementary Particles;* 2 years; $24,000

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; Hillard B. Huntington and Roger W. Shaw; *Pulsed Ultrasonic Studies in Solids;* 3 years; $53,800

Heinrich A. Medicus and Paul F. Yergin; *Photonuclear Research;* 2 years; $65,200

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany; Arnold M. Feingold and B. James Raz, Oyster Bay; *Theoretical Studies in Nuclear Structure;* 2 years; $26,600

UNIVERSITY OF ROCHESTER, N.Y.; Morton F. Kaplon; *Primary Cosmic Ray Flux Studies;* 2 years; $153,300

ROLLINS COLLEGE, Winter Park, Fla.; John S. Ross; *Hyperfine Structure and Isotope Shift;* 2 years; $23,500

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Richard J. Plano; *High Energy Elementary Particle Physics;* 1 year; $77,200

ST. BONAVENTURE UNIVERSITY, New York, N.Y.; Zachery O'Friel; *High Energy Physics Using Emulsions;* 3 years; $7,400

UNIVERSITY OF SOUTH CAROLINA, Columbia; Ronald D. Edge and A. P. French; *Purchase of a Neutron Generator;* 1 year; $23,000

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles; John R. Holmes; *Electromagnetic Radiation from Plasmons in Thin Films;* 2 years; $16,600

SOUTHERN ILLINOIS UNIVERSITY, Carbondale; John A. Eisele; *Nuclear Spectroscopy of Rare Earth Radioactive Isotopes;* 2 years; $39,800

Otis B. Young; *Emulsion Studies of Cosmic Radiation;* 2 years; $9,800

SOUTHERN MISSIONARY COLLEGE, Collegedale, Tenn.; Ray Hefferlin; *Determination of Oscillator Strengths;* 2 years; $30,000

STANFORD UNIVERSITY, Stanford Calif.; Walter E. Meyerhof; *Equipment Installation for Use with a 3-Mev Van de Graaff Accelerator;* 2 years; $58,200

STANFORD RESEARCH INSTITUTE, Menlo Park, Calif.; Felix T. Smith; *Quantum Mechanics of Molecular Rearrangements;* 2 years; $34,800

STATE UNIVERSITY OF IOWA, Iowa City; Max Dresden and Fritz Rohrlich; *Field Theory and Its Applications;* 2 years; $43,600

STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N.J.; Snowden Taylor; *Emulsion Study of Elementary Particles;* 2 years; $46,400

SYRACUSE UNIVERSITY RESEARCH INSTITUTE, N.Y.; Arnold Honig; *Paramagnetic Resonance at Very Low Temperatures;* 2 years; $42,200

Nahmin Horwitz; *Properties of K-Minus Mesons;* 2 years; $60,600

UNIVERSITY OF TENNESSEE, Knoxville; D. T. King; *Multiple Production of Pions;* 2 years; $41,400

TEXAS AGRICULTURAL AND MECHANICAL RESEARCH FOUNDATION, College Station; Joe S. Ham; *Semiconduction of Organic Charge Transfer Complexes;* 2 years; $19,400

UNIVERSITY OF TEXAS, Austin; John D. Gavenda; *Ultrasonic Measurements of the Electronic Properties of Metals;* 2 years; $22,800

A. Wilson Nolle; *Magnetic Resonance Absorption and Relaxation;* 3 years; $48,000

TULANE UNIVERSITY OF LOUISIANA, New Orleans; Robert H. Morriss; *An Electron Microscopic and Electron Diffraction Investigation of Metals in the Colloidal State;* 2 years; $28,500

U.S. OFFICE OF NAVAL RESEARCH, Washington, D.C.; Masatoshi Koshiba; *International Cooperative Emulsion Flight Project;* 1 year; $81,000

UNIVERSITY OF UTAH, Salt Lake City; B. G. Dick; *Theory of Metals and Ionic Crystals;* 2 years; $34,600

VALPARAISO UNIVERSITY, Valparaiso, Ind.; V. Hugo Schmidt; *Protonic Semiconductors;* 2 years; $26,400

UNIVERSITY OF VERMONT, Burlington; Albert D., Crowell; *A Radioactive Tracer and Work Function Study of the Chemisorption of Gases on Metals;* 1 year; $13,200

UNIVERSITY OF WASHINGTON, Seattle; Jay Gregory Dash; *Mossbauer Effect at Low Temperatures;* 1 year; $16,500

Robert W. Williams, Young B. Kim and George E. Masek; *High Energy Physics;* 2 years; $195,600

WASHINGTON UNIVERSITY, St. Louis, Mo.; Michael W. Friedlander; *Primary Cosmic Radiation;* 3 years; $53,300

Suraj N. Gupta; *Quantum Theory of Fields;* 2 years; $32,000

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; Leonard S. Kisslinger; *Pairing and Long Range Force in Nuclear Structure;* 2 years; $19,200

WILLAMETTE UNIVERSITY, Salem, Oreg.; Robert L. Purbrick; *Vibrational Constants of Diatomic Molecules;* 3 years; $14,600

WILLIAM MARSH RICE UNIVERSITY, Houston, Tex.; Harold E. Rorschack, Jr.; *Low Temperature Physics;* 2 years; $36,700

UNIVERSITY OF WISCONSIN, Madison; Adam M. Bincer and Raymond F. Sawyer; *Dispersion Relations in Elementary Particle Theory;* 2 years; $34,500

Robert G. Sachs; *Summer Institute for Theoretical Physics;* 1 year; $33,000

YESHIVA UNIVERSITY, New York, N.Y.; David Finkelstein; *Fundamental Theory of Elementary Particles;* 1 year; $16,800

Leon Landovitz; *Theory of Elementary Particles;* 1 year; $11,800

PSYCHOBIOLOGY

ADELPHI COLLEGE, Garden City, N.Y.; Melvin Lyon; *Relation Between Thalamic Connections of Auditory System and Behavior;* 2 years; $14,600

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; T. C. Schneirla; *Comparisons of Behavior and Biology in Species of the Doryline Ant;* 2 years; $22,000

ANNA STATE HOSPITAL, Anna, Ill.; Nathan H. Azrin and William C. Holz; *Behavior Control Through Aversive Stimulation;* 3 years; $24,200

BOWLING GREEN STATE UNIVERSITY, Bowling Green, Ohio; Louis C. Graue; *Bird Orientation;* 2 years; $12,200

BROOKLYN COLLEGE, N.Y.; David H. Raab; *Forward and Backward Masking in Hearing and Vision;* 2 years; $30,000

BROWN UNIVERSITY, Providence, R.I.; Richard B. Millward; *Effects of Nonreinforced Trials in Verbal Conditioning;* 3 years; $30,200

Carl Pfaffmann; *Basic Psychophysiology of Taste and Smell;* 5 years; $155,500

Harold Schlosberg; *Consolidation Time for Visual Perception;* 3 years; $32,200

UNIVERSITY OF CALIFORNIA, Berkeley; Leo J. Postman; *Research in Human Learning;* 3 years; $173,500

F. Nowell Jones, Los Angeles; *Studies of Subjective Magnitude;* 2 years; $16,000

CLARK UNIVERSITY, Worcester, Mass.; Joachim F. Wohlwill; *Space Perception and its Development;* 2 years; $17,700

COLORADO COLLEGE, Colorado Springs; Carl L. Roberts; *The Reinforcing Efficacy of Sensory Changes;* 2 years; $20,000

COLUMBIA UNIVERSITY, New York, N.Y.; Earl C. Hagstrom; *A Behavioral Measure of Taste Thresholds for Animals;* 1 year; $9,500

William N. Schoenfeld and William M. Cumming; *Research on Schedules of Reinforcement;* 2 years; $40,000

CORNELL UNIVERSITY, Ithaca, N.Y.; William C. Dilger; *Genetics and Experience as Determiners of Behavior;* 2 years; $25,400

DARTMOUTH COLLEGE, Hanover, N.H.; Wolfgang Kohler; *Problems in Gestalt Psychology;* 3 years; $36,000

DUKE UNIVERSITY, Durham, N.C.; Robert P. Erickson; *Comparative Study of Afferent Neural Activity in Mammals;* 3 years; $49,600

EMORY UNIVERSITY, Atlanta, Ga.; L. Benjamin Wyckoff, Jr.; *Experimental Study of Stimulus Control over Drive States;* 2 years; $21,300

FELS RESEARCH INSTITUTE, Yellow Springs, Ohio; Elliot S. Valenstein; *Neural Interaction and Rewarding Brain Stimulation;* 1 year; $8,600

FLORIDA STATE UNIVERSITY, Tallahassee; Lloyd M. Beidler; *Physiological Properties of Taste Cells;* 5 years; $90,300

UNIVERSITY OF FLORIDA, Gainesville; Bradford N. Bunnell; *Physiological Correlates of Social Dominance Behaviors in Rodents;* 2 years; $28,800

FRANKLIN AND MARSHALL COLLEGE, Lancaster, Pa.; Kenneth H. Brookshire; *Factors in Preference for Water and Saline Solution;* 1 year; $6,000

FREDERIC BURK FOUNDATION FOR EDUCATION, San Francisco, Calif.; Robert I. Bowman; *Evolution of Vocal Communication in the Galapagos Finches;* 2 years; $42,400

FURMAN UNIVERSITY, Greenville, S.C.; Robert S. Beecroft; *Extinction of Differentially Reinforced Stimuli and Stimulus Compounds;* 3 years; $12,600

HARVARD UNIVERSITY, Cambridge, Mass.; Howard E. Evans; *Evolution of Structure and Behavior Patterns of Nyssonine Digger wasps;* 3 years; $29,000

Richard J. Herrnstein; *Studies on Location of Responding;* 2 years; $32,800

HOWARD UNIVERSITY, Washington, D.C.; Charles W. Hill and Max Meenes; *Perceptual-Motor Reversal Learning;* 1 year; $3,100

UNIVERSITY OF ILLINOIS, Urbana; Richard B. Selander; *Behavioral Study of the Blister Beetle;* 3 years; $26,500

B. F. Skinner; *Analysis of Complex Behavioral Processes;* 1 year; $50,900

Raymond W. Frankmann; *Statistical Learning Theory and T-maze Learning;* 19 months; $14,300

UNIVERSITY OF ILLINOIS, Urbana; G. Robert Grice; *Mediated Generalization in Human Conditioning and Performance;* 3 years; $25,700

Harold W. Hake; *Coherence Detection in Form Discrimination;* 3 years; $24,700

John Langdon Taylor, Jr., Chicago; *Environmental changes and Behavior;* 2 years; $16,000

Paul T. Young; *Incentive Motivations With Compound Taste Solutions;* 2 years; $21,900

INDIANA UNIVERSITY FOUNDATION, Bloomington; James P. Egan; *Detection and Recognition of Auditory Signals;* 1 year; $65,100

Isidore Gormezano; *Role of the Unconditioned Stimulus in Eyelid Conditioning;* 2 years; $14,600

Donald D. Jensen; *Behavioral Mechanisms in Invertebrates;* 2 years; $9,900

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Stewart H. Hulse; *A study of Reinforcement and Resistance to Extinction;* 3 years; $37,900

Leonard Matin; *Local Signs, Visual Direction and Involuntary Eye Movements;* 2 years; $35,000

Curt P. Richter; *Psychobiological Studies on Animal and Human Behavior and Metabolism;* 3 years; $61,200

UNIVERSITY OF KANSAS, Lawrence; Kenneth B. Armitage; *Social Behavior in Population Dynamics of the Marmot;* 3 years; $15,000

UNIVERSITY OF MASSACHUSETTS, Amherst; Warren H. Teichner; *Behavioral and Psychophysiological Effects of Thermal Environments;* 2 years; $32,700

MCGILL UNIVERSITY, Montreal, Canada; Herbert H. Jasper; *Neurophysiological Mechanisms of Attention and Learning;* 5 years; $90,500

MEDICAL RESEARCH FOUNDATION OF OREGON, INC., Portland; Robert W. Leary (Eugene) and Richard F. Thompson; *Comparative Analysis of Association Cortex and Behavior;* 3 years; $75,000

MICHIGAN STATE UNIVERSITY, East Lansing; Paul Bakan; *Kinesthetic After-Effects;* 2 years; $15,600

Donald M. Johnson; *Analysis of Thinking;* 2 years; $19,700

UNIVERSITY OF MICHIGAN, Ann Arbor; S. S. Fox; *Microelectrode Studies of Subcortical Pathways;* 1 year; $11,300

UNIVERSITY OF MINNESOTA, Minneapolis; David L. La Berge; *Choice Behavior;* 3 years; $24,700

Kenneth MacCorquodale and Paul E. Meehl; *Studies of Reinforcement;* 2 years; $18,800

NEW YORK UNIVERSITY, New York; Michael R. D'Amato; *Simple Discrimination Learning;* 3 years; $29,000

Leo M. Hurvich; *Brightness and Color Discrimination in Fish;* 1 year; $3,300

NEW YORK ZOOLOGICAL SOCIETY, New York; John T. Emlen, Jr.; *Ecology and Behavior of the Mountain Gorilla;* 1 year; $1,970

NORTHWESTERN UNIVERSITY, Evanston, Ill.; Stephen E. Glickman; *Studies in Animal Behavior;* 1 year; $870

Stephen E. Glickman, *Comparative Studies of Animal Behavior;* 2 years; $18,800

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus; Reed Lawson; *Generalized Reinforcement;* 1 year; $8,600

Donald R. Meyer; *Automatic Primate Test Apparatus;* 1 year; $5,600

OREGON RESEARCH INSTITUTE, Eugene; Paul J. Hoffman; *Test Reliability and Practice Effects;* 2 years; $25,500

PENNSYLVANIA STATE UNIVERSITY, University Park; Joseph H. Grosslight; *Reinforcement of Vocalization;* 2 years; $24,800

William F. Prokasy, Jr.; *Classical Conditioning;* 3 years; $36,800

UNIVERSITY OF PENNSYLVANIA, Philadelphia; Robert R. Bush; *Mathematical Learning Theory;* 3 years; $54,000

Kenneth P. Goodrich; *Compound Conditioned Stimuli in Classical Conditioning;* 2 years; $19,600

Jacob Beck and William A. Shaw; *Context Effects in Relation to Auditory and Visual Perception;* 2 years; $34,300

Richard L. Solomon; *Experiments on Aversive Autonomic Conditioning;* 4 years; $51,000

Saul Sternberg; *Human Attention and Immediate Memory;* 2 years; $17,200

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; George J. Wischner and Harry Fowler; *Factors in Punishment Affecting Discrimination Learning;* 2 years; $20,000

RESEARCH FOUNDATION FOR MENTAL HYGIENE, Middletown, N.Y.; Manfred Clynes; *Computer Evaluation of Evoked Brain Responses;* 1 year; $13,800

RESEARCH FOUNDATION OF THE STATE UNIVERSITY OF NEW YORK, Albany; Sol Kramer, Oyster Bay; *Factors Which Initiate the Parental-Squab Relationship;* 2 years; $13,700

Jack Richardson, Endicott; *Mediation in Verbal Concept Learning;* 3 years; $9,000

SAN DIEGO STATE COLLEGE FOUNDATION, Calif.; Duane M. Rumbaugh and J. A. Gengerelli; *Comparative Learning and Problem Solving Abilities;* 2 years; $17,900

Evalyn Segal; *Secondary Reinforcement, Chaining and Discrimination;* 2 years; $35,500

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles; Langdon E. Longstreth; *Determinants and Effects of Frustration in Children;* 2 years; $13,300

SWARTHMORE COLLEGE, Swarthmore, Pa.; Kenneth S. Rawson; *Experimental Analysis of Homing Behavior;* 3 years; $16,100

TEXAS CHRISTIAN UNIVERSITY, Fort Worth; Malcolm D. Arnoult and Winton H. Manning; *Auditory Pattern Perception;* 1 year; $5,200

UNIVERSITY OF TEXAS, Austin; Robert E. Morin; *Information Theory and Reaction Time;* 2 years; $19,500

TRAINING SCHOOL AT VINELAND, N.J.; Johs. Clausen; *Psychophysiological Mechanisms Involved in Electrical Phosphenes;* 4 months; $2,200

UNIVERSITY OF VERMONT AND STATE AGRICULTURE COLLEGE, Burlington; Norman J. Slamecka; *Retention of Connected Discourse;* 3 years; $16,400

WESLEYAN UNIVERSITY, Middletown, Conn.; William R. Thompson; *Effects of Pre-Natal Stress on Behavior;* 1 year; $8,000

UNIVERSITY OF WISCONSIN, Madison; W. J. Brogden; *Learning and Conditioning;* 2 years; $36,000

H. C. Coppel and J. E. Casida; *Reproduction in Insects;* 3 years; $32,600

Arthur D. Hasler; *Interactions Between Two Species of Fish;* 1 year; $3,500

REGULATORY BIOLOGY

Ellsworth C. Dougherty; *Cultivation of Micrometazoa;* 8 months; $10,760

AGRICULTURAL AND TECHNICAL COLLEGE OF NORTH CAROLINA, Greensboro; Burleigh C. Webb; *Interaction of Growth Regulators and Radiant Energy in Geotropic Response of Bermudagrass Rhizomes;* 2 years; $12,200

UNIVERSITY OF ARIZONA, Tucson; Joseph T. Bagnara; *Hormone Control of Amphibian Thymus;* 2 years; $10,500

George A. Gries; *Nature of Parasitism of and Disease Resistance to Phymatotrichum Omnivorum;* 3 years; $44,200

UNIVERSITY OF ARKANSAS, Fayetteville; Lowell F. Bailey; *Growth Inhibiting Substances in Dormant Flower and Leaf Buds of Woody Species;* 2 years; $15,900

John H. Cross, Little Rock; *The Nature and Mechanism of Acquired Immunity to Helminthic Infections;* 3 years; $28,100

Charles L. Wilson; *Microautoradiographic Studies of the Host-Parasite Relations of Three Plant Diseases;* 2 years; $22,600

ARTHUR P. NOYES RESEARCH FOUNDATION, INC., Norristown, Pa.; Walton B. Geiger; *Parasympathetic Transmitter Substances;* 2 years; $8,100

AUBURN UNIVERSITY, Auburn, Ala.; Joe B. Dixon; *Research Attachments for X-ray Diffraction Unit;* 1 year; $9,000

BOSTON UNIVERSITY, Boston, Mass.; Stewart Duncan; *Histopathology of Coccidial Parasite, Eimeria Labbeana;* 2 years; $17,300

John D. Ifft; *Relationship of the Hypothalamus to the Goandotrophic Activities of the Pituitary;* 1 year; $10,200

BOYCE THOMPSON INSTITUTE, Yonkers, N.Y.; Robert G. Owens; *Nematode-Induced Neoplasms in Plants;* 5 years; $106,700

BROWN UNIVERSITY, Providence, R.I.; Melvin S. Fuller; *Light and Development of the Cellular Slime Mold Acrasis Rosea;* 3 years; $34,500

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Dorothy Feir; *Chemical Attractants and Feeding Stimulants for Milkweed Bug;* 3 years; $31,300

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena; C. A. G. Wiersma; *Nervous System of Crustaceans and Other Arthropods;* 3 years; $109,500

UNIVERSITY OF CALIFORNIA, Berkeley; George M. Briggs and Ellsworth C. Dougherty; *Nutrition of Micrometazoa;* 2 years; $55,700

Robert E. Cleland; *Effect of Auxin on the Plant Cell Wall and Its Relation to Cellular Elongation;* 3 years; $30,100

Ralph H. Kellogg and Nello Pace; *Pulmonary Ventilation During Exercise at Altitude;* 1 year; $900

Elwin Marg; *Accessory Optic—Transpeduncular Tracts;* 2 years; $48,800

Ralph I. Smith; *Research on Baltic Sea Invertebrates;* 1 year; $3,700

F. E. Broadbent, Davis; *Interchange Between Organic and Inorganic Nitrogen in Soils;* 3 years; $44,600

Emanuel Epstein, Davis; *Physiology of Selective Ion Transport in Plants;* 4 years; $45,000

J. E. Moulton, Davis; *Pathology of Cold-Blooded Vertebrates;* 4 years; $6,900

David R. Viglierchio, Davis; *Chemical Factors in Plant Resistance to Parasitic Nematodes;* 3 years; $13,800

Ralph A. Lewin, La Jolla; *Viruses of Algae;* 3 years; $36,000

Sidney Roberts, Los Angeles; *Protein Mobilization;* 3 years; $97,700

Karl C. Hamner, Los Angeles; *Plant Photoperiodism as Influenced by Endogenous Rhythms;* 3 years; $61,100

Jack de Groot, San Francisco; *Neural Substrates and Mechanisms Subserving Feeding Behavior;* 3 years; $32,700

CHICAGO MEDICAL SCHOOL, Ill.; John J. Chiakulas; *Factors Affecting Magnitude and Rhythmicity of Mitotic Activity in Urodele Tissues;* 3 years; $29,400

UNIVERSITY OF COLORADO, Boulder; Charles W. Fishel; *Response of Mice to Isolated Components of Bordetella Pertussis;* 3 years; $29,200

Oscar K. Reiss; *Infrared Spectrophotometer for Research;* 1 year; $16,600

COLUMBIA UNIVERSITY, New York, N.Y.; Herbert Elftman; *Cytochemistry of the Female Reproductive System;* 2 years; $23,000

Wilbur H. Sawyer; *Comparative Physiology of the Neurohypophysis;* 5 years; $72,000

UNIVERSITY OF CONNECTICUT, Storrs; J. A. Cameron; *Bacteriophage Receptor Sites;* 3 years; $24,350

CORNELL UNIVERSITY, Ithaca, N.Y.; Damon Boynton; *Effects of Nutrient Deficiencies on Plants;* 2 years; $25,600

A. F. Sellers; *Blood Flow and Absorption;* 1 year $9,400

DARTMOUTH COLLEGE, Hanover, N.H.; Frank G. Carpenter; *Excitation of Smooth Muscle Cells;* 3 years; $19,200

Robert E. Gosselin; *Autorhythmicity of Cilia;* 3 years; $40,500

DUKE UNIVERSITY, Durham, N.C.; Knut Schmidt-Nielsen; *Heat and Water Balance in the Camel;* 2 years; $31,200

D. C. Tosteson; *Secretion of Solutes and Water Across Epithelial Membranes;* 4 years; $55,800

DUQUESNE UNIVERSITY, Pittsburgh, Pa.; Howard G. Ehrlich; *Stem Rust of Wheat;* 1 year; $10,300

UNIVERSITY OF FLORIDA, Gainesville; Ernest B. Wright; *Excitation and Conduction in Nerve;* 2 years; $45,800

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; Lawrence P. Sullivan; *Effect of pH Upon Renal Excretion of Weak Acids and Bases;* 3 years; $31,300

Charles S. Tidball; *Water Movement Across Intestinal Epithelium;* 3 years; $30,100

UNIVERSITY OF GEORGIA, Athens; Walter Kornfeld; *Gonadal Function of Female Domestic Fowl;* 3 years; $21,900

HARVARD UNIVERSITY, Cambridge, Mass.; Elwood Henneman; *Functional Significance of the Size of Neurons in the Central Nervous System;* 3 years; $47,100

I. Mackenzie Lamb; *Growth Regulation in Sporophores of Higher Fungi;* 2 years; $29,900

HASKINS LABORATORIES, INC., New York, N.Y.; Helene A. Nathan and Aimlee D. Laderman; *Axenization and Growth Studies with Selected Members of the Group Rotifera;* 2 years; $18,700

UNIVERSITY OF HAWAII, Honolulu; James A. Lockhart; *Action of Visible Radiation on Plant Growth;* 3 years; $55,800

UNIVERSITY OF ILLINOIS, Urbana; Clyde Manwell; *Studies on Hemoglobin Specificity;* 1 year; $6,300

Edward S. Mika; *Effect of Environment on Datura Stramonium;* 1 year; $7,100

ISTITUTO NEUROLOGICO, Milano, Italy; M. G. F. Fuortes; *Activity of Visual Receptors;* 3 years; $16,050

KENTUCKY RESEARCH FOUNDATION, Lexington; Gilbert Church, Bandung, Indonesia; *Continuous Auxetic Growth in Tropical Amphibia;* 1 year $1,300

S. E. Leland, Jr.; *Paper Electrophoresis System;* 1 year $4,500

UNIVERSITY OF KENTUCKY, Lexington, ; S. E. Leland, Jr.; *In Vitro Growth Requirements of Parasitic Nematodes;* 2 years; $23,300

LONG BEACH STATE COLLEGE FOUNDATION; Long Beach, Calif.; Richard G. Lincoln; *Biological Aspects of a Floral Initiating Extract;* 2 years; $16,600

Darwin L. Mayfield; *Concentration, Separation and Characterization of the Flowering Hormone, Florigen;* 2 years; $14,600

LOS ANGELES STATE COLLEGE OF APPLIED ARTS AND SCIENCE, Calif.; Samuel M. Caplin; *Effect of Environmental History on Growth;* 3 years; $25,200

UNIVERSITY OF LOUISVILLE, Ky.; Warren S. Rehm; *Mechanism of Insulin Action on in Vitro Frog's Gastric Mucosa;* 3 years $62,-400

LOYOLA UNIVERSITY, Chicago, Ill.; Edward E. Palincsar; *Growth and Physiology of Colonial Hydroids;* 3 years; $16,700

LYCOMING COLLEGE, Williamsport, Pa.; Bartley C. Block; *Gypsy Moths;* 1 year; $4,600

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge; Sanford A. Miller and Henry A. Dymsza; *Nutrition of the Infant Rat;* 2 years; $37,400

MICHIGAN STATE UNIVERSITY, East Lansing; Ralph W. Lewis; *Germination and Growth of Conidia;* 1 year; $3,400

George J. Wallace; *Residues of DDT in Food Chains of Wild Birds;* 2 years; $8,200

UNIVERSITY OF MICHIGAN, Ann Arbor; Richard L. Malvin; *Rates of Flow of Urine and Blood upon Renal Counter-Current Multiplier System;* 3 years; $25,500

Robert Zahner; *Growth and Morphogenesis of Pinus and Populus Species;* 5 years; $44,500

UNIVERSITY OF MINNESOTA, Minneapolis; Ray E. Burger and Ralph L. Kitchell; *Nervous Control of Avian Respiration;* 2 years; $26,300

A. J. Linck; *Mechanism of Accumulations of Compounds by Plant Reproductive Organs;* 4 years; $36,000

Dwain W. Warner; *Effects of Prolactin on the Reproductive Behavior;* 1 year; $4,900

UNIVERSITY OF MISSOURI, Columbia; Fred I. Kamemoto; *Ionic and Osmotic Relations in Earthworm and Other Annelids;* 2 years; $15,000

Jacob Levitt; *Resistance of Plants to Frost and Drought;* 1 year; $21,000

Jacob Levitt; *Physiological Basis of Resistance of Plants to Frost and Drought;* 1 year; $32,500

John E. Peterson; *Biology of the Myxobacteria;* 3 years; $50,600

MUHLENBERG COLLEGE, Allentown, Pa.; John E. Trainer; *Relation Between Respiratory Movements and Flight;* 1 year; $3,200

UNIVERSITY OF NEBRASKA, *Lincoln;* W. B. Allington, M. K. Brakke and E. L. Moorhead; *Plant Viruses and Interactions with Their Hosts;* 3 years; $67,200

NEW YORK UNIVERSITY, New York, N.Y.; Jonathan W. Uhr; *Immune Response of the Mammalian Embryo;* 3 years; $65,500

N.Y. ZOOLOGICAL SOCIETY, New York; Thomas Goreau; *Calcification and Nutrition in Reef Corals;* 2 years; $32,100

NORTHWESTERN UNIVERSITY, Evanston, Ill.; Albert Wolfson; *Oriented Migratory Behavior in Passerine Birds;* 3 years; $25,200

OHIO AGRICULTURAL EXPERIMENT STATION, Wooster, Ohio; Curt Leben; *Nature Reproduction and Interactions of Microorganisms on the Surface of the Aerial Parts of Plants;* 3 years; $25,300

OREGON STATE UNIVERSITY, Corvallis; Harold J. Evans; *Role of Cobalt in the Nutrition and Metabolism of Leguminous Plants;* 3 years; $84,900

UNIVERSITY OF OREGON, Eugene; Bradley T. Scheer; *Steady-State Current-Potential Relations Across Nerve Cell Membranes;* 2 years; $23,300

UNIVERSITY OF PENNSYLVANIA, Philadelphia; John D. Biggers; *Reproductive Processes in Wild Animals;* 3 years; $61,400

John R. Brobeck; *Regulation of Food Intake by Nervous System;* 5 years; $47,300

William S. Yamamoto; *Regulation of Arterial CO_2 Concentration in the Rat;* 5 years; $57,600

PRINCETON UNIVERSITY, Princeton, N.J.; Victor G. Bruce; *Investigation of the Biological Clock in Euglena;* 3 years; $14,600

Robert D. Lisk; *Actions of Gonadal Hormones on the Central Nervous System;* 3 years; $27,100

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Merwin Moskowitz; *Streptomycin on Mammalian Cells;* 3 years; $34,900

Arthur H. Westing; *Physiological Mechanisms of Geotropic Responses;* 3 years; $24,900

RUSSELL SAGE COLLEGE, Troy, N.Y.; Robert M. Coleman; *Serology of Dwarf Tapeworm;* 3 years; $11,100

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Hans Fisher and Paul Griminger; *Purchase of a Nitrogen Analyzer;* 1 year; $3,000

James H. Leathem; *Function of Gonadotrophin Stimulated Ovary;* 2 years; $8,000

David Pramer; *Trap Formation and Nematode Capture by Predaceous Fungi;* 2 years; $19,600

ST. OLAF COLLEGE, Northfield, Minn.; Paul R. Burton; *Cytological Studies of the Frog Lung-fluke, Haematoloechus Medioplexus: Mehlis' Gland and Vitelline Cells;* 2 years; $7,200

SMITH COLLEGE, Northampton, Mass., George W. de Villafranca; *Muscle Systems from Limulus Polyphemus;* 2 years; $7.000

STANFORD UNIVERSITY, Stanford, Calif.; Allen H. Gates and Robert W. Noyes; *Endocrine Factors Regulating Implantation in Three Species of Mammals;* 2 years; $47,800

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Lyman B. Smith; *Botanical Exploration in Southern Brazil;* 1 year; $7,400

Ellis Yochelson; *Ordovician Gastropods of Norway and a Comparison of American and European Ordovician Gastropods;* 1 year; $15,200

UNIVERSITY OF SOUTH CAROLINA, Columbia; James T. Penney; *Taxonomic Study of the Subfamily Meyeniinae;* 2 years; $7,000

UNIVERSITY OF SOUTHAMPTON, Southampton, England; M. J. Delany; *Life Histories, Ecology and Systematics of the Small Mammals;* 3 years; $5,900

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles; Robert J. Menzies; *A Study on Abyssal Isopod Crustacea;* 2 years; $25,300

Andrew Starrett; *Morphology of Bats;* 2 years; $10,200

SOUTHERN ILLINOIS UNIVERSITY, Carbondale; John W. Crenshaw, Jr.; *Species Variation in Blood Protein Patterns;* 1 year; $4,300

STATE UNIVERSITY OF IOWA, Iowa City; Grace S. Brush; *Classification of Fossil Coniferous Pollen and Its Significance;* 2 years; $7,800

UNIVERSITY OF TENNESSEE, Knoxville; Arthur C. Cole, Jr.; *Revisionary Studies of the Ant Genus Pogonomyrmex Mayr;* 2 years; $5,200

TEXAS RESEARCH FOUNDATION, Renner; Donovan S. Correll; *Flora of Texas;* 2 years; $21,500

TEXAS TECHNOLOGICAL COLLEGE, Lubbock; Dale J. Osborn; *Taxonomy and Distribution of Turkish Mammals;* 1 year; $700

UNIVERSITY OF TEXAS, Austin; Robert K. Selander; *Comparative Study of Behavior in the Quiscaline Icterids;* 1 year; $6,700

B. L. Turner; *Biochemical-Systematic Studies in the Leguminosae, Genus Baptisia;* 3 years; $58,700

TULANE UNIVERSITY, New Orleans, La.; T. T. Earle; *Purchase of Herbarium Cases;* 1 year; $5,000

Donald Eugene Stone; *A Biosystematic Study of the Genus Carya;* 3 years; $21,200

UNIVERSITY OF TULSA, Tulsa, Oklahoma; Harriet G. Barclay; *Systematics of the Paramos of South America;* 1 year; $4,000

UNIVERSITY OF UTAH, Salt Lake City; William H. Behle; *Birds of Utah;* 1 year; $7,500

John M. Legler; *Taxonomy and Distribution of Turtles in Central America;* 3 years; $23,400

VANDERBILT UNIVERSITY, Nashville, Tenn.; Howard F. L. Rock; *Revision of the Genus Helenium, Section Tetrodus Compositae;* 1 year; $3,000

VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg; William W. Scott; *Taxonomy and Biology of Fungi Associated with Fish and Fish Eggs;* 2 years; $15,600

WARNER PACIFIC COLLEGE, Portland, Oreg.; C. A. Hubbard; *Research in Siphonaptery (fleas)*; 5 years; $12,000

UNIVERSITY OF WASHINGTON, Seattle; Melville H. Hatch; *Beetles of the Pacific Northwest;* 1 year; $15,800

Grace E. Howard; *The Lichen Genus Ochrolechia in North America;* 3 years; $3,500

Alan J. Kohn; *Systematics of Indo-West Pacific Marine Mollusks of the Family Conidae;* 1 year; $5,000

James E. Lynch; *Phyllopod Crustacea of Western North America;* 2 years; $6,200

Daniel E. Stuntz; *North American Species of Inocybe (Mushrooms);* 2 years; $30,200

WASHINGTON UNIVERSITY; St. Louis, Mo.; Carroll W. Dodge; *Land Flora of the Antarctic Continent and Subantarctic Islands;* 2 years; $14,300

Robert E. Woodson, Jr., *Biometric Studies of the Butterfly Weed (Asclepias tuberosa)*; 1 year; $5,800

WAYNE STATE UNIVERSITY, Detroit, Mich.; Morris Goodman and John Buettner-Janusch; *Effects of Speciation on Soluble Proteins of the Primates;* 3 years; $34,600

WESTERN ILLINOIS UNIVERSITY, Macomb; Everett F. Morris; *Taxonomic Study of the Genus Harpographium and Related Forms of the Stilbellaceae;* 1 year; $2,000

Yale S. Sedman; *Revision of the Genus Chrysogaster in the New World;* 2 years; $4,800

YALE UNIVERSITY, New Haven, Conn.; Alfred W. Ebeling; *The Bathypelagic Fish Family Melamphaidae;* 2 years; $7,700

Peter Robinson; *A Study of the Eocene Mammal and Middle Eocene Insectivore Specimens at Yale;* 1 year; $11,100

GENERAL BIOLOGY

UNIVERSITY OF ALASKA, College; William Ransom Wood; *A Study of the Feasibility of Establishing an Arctic Biological Research*

Center at the University of Alaska; 1 year; $34,600

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Washington, D.C.; Hiden T. Cox; *A Study of the Feasibility of the Centralization of the Plant Sciences;* 1 year; $12,000

AMERICAN TYPE CULTURE COLLECTION, Washington, D.C.; William Arthur Clark; *Support of Curatorial and Administrative Operations;* 3 years; $99,750

Shuh-wei Hwang; *Techniques for Preservation of Pathogenic Fungi;* 3 years; $61,080

BAYLOR UNIVERSITY, Waco, Tex.; Stanley W. Olson, Houston; 3 years; $21,600

BERMUDA BIOLOGICAL STATION FOR RESEARCH, INC., St. George's West; W. H. Sutcliffe; *Summer Research Program in Experimental Marine Embryology;* 2 years; $24,800

BOSTON UNIVERSITY, Boston, Mass.; Arthur M. Lassek; *An Electron Microscope Unit for Basic Research;* 1 year; $51,500

UNIVERSITY OF BUFFALO, N.Y.; James A. English; *Short-Term Research by Medical (Dental) Students;* 3 years; $4,320

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena; Anton Lang; *Support of Plant Research Program and Facilities;* 5 years; $627,000

UNIVERSITY OF CALIFORNIA, Berkeley; Geoffrey B. Bodman; *Electron Microscope for Research on Problems of Soils and Plant Diseases;* 5 years; $42,000

J. B. deC. M. Saunders, San Francisco Medical Center; 1 year; $12,960

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins; John B. Rogan; *Infrared Spectrophotometer for Biochemical Research;* 1 year; $5,300

COLUMBIA UNIVERSITY, New York, N.Y.; Paul R. Burkholder, Palisades, N.Y.; *Equipment for a Marine Biology Research Laboratory;* 1 year; $68,000

Aura Edward Severinghaus; *Short-Term Research by Medical Students;* 3 years; $21,600

DARTMOUTH COLLEGE, Hanover, N.H.; Henry L. Heyl; *Short-Term Research by Medical Students;* 3 years; $8,640

UNIVERSITY OF DELAWARE, Newark; Franklin C. Daiber; *Feasibility Study for a Biological Oceanographic Vessel and Supporting Shore Facilities;* 1 year; $4,800

DUKE UNIVERSITY, Durham, N.C.; E. Croft Long; *Short-Term Research by Medical Students;* 3 years; $21,600

UNIVERSITY OF FLORIDA, Gainesville; George T. Harrell; *Short-Term Research by Medical Students;* 3 years; $6,480

HAHNEMANN MEDICAL COLLEGE AND HOSPITAL, Philadelphia, Pa.; Harold A. Taggart; *Short-Term Research by Medical Students;* 3 years; $12,960

HIGHLANDS BIOLOGICAL STATION, INC., Highlands, N.C.; Thelma Howell and H. J. Oosting, Duke U.; *Biological Research and a Research Training Program;* 3 years; $91,500

UNIVERSITY OF HOUSTON, Tex.; A. H. Bartel; *Preparatory Centrifuge for Subcellular Biological Studies;* 1 year; $7,800

Sara E. Huggins; *Refrigerated Centrifuge for Biological Research;* 1 year; $3,000

HOWARD UNIVERSITY, Washington, D.C.; K. Albert Harden; *Short-Term Research by Medical Students;* 3 years; $8,640

UNIVERSITY OF ILLINOIS, Urbana; Wilson N. Stewart; *Equipment for Botanical Research;* 1 year; $32,400

MARQUETTE UNIVERSITY, Milwaukee, Wis.; Joseph W. Rastetter; *Short-Term Research by Medical Students;* 1 year; $1,440

UNIVERSITY OF MINNESOTA, Minneapolis; Robert B. Howard; *Short-Term Research by Medical Students;* 3 years; $12,960

I. S. Isbin; *10,000 Curie Cesium–137 Source for Basic Research;* 1 year; $25,000

William H. Marshall; *Summer Research at Lake Itasca Station;* 2 years; $37,300

NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.; Frank L. Campbell; *Support for Organization of XVIth International Congress of Zoology;* 2 years; $35,650

Walter A. Rosenblith; *Committee on the Use of Electronic Computers in the Life Sciences;* 1 year; $9,800

UNIVERSITY OF NEBRASKA, Lincoln; J. P. Tollman, College of Medicine, Omaha: *Short-term Research for Medical Students;* 3 years; $8,640

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; John N. Couch and William J. Koch; *Electron Microscopy Laboratories for Studies in Micology;* 1 year; $24,200

NORTHWESTERN UNIVERSITY, Evanston, Ill.; Allen Lein, The Medical School, Chicago; *Short-term Research by Medical Students;* 3 years; $12,960

PASADENA FOUNDATION FOR MEDICAL RESEARCH, Pasadena, Calif.; C. M. Pomerat; *Experimental Cytology using Cell Cultures;* 2 years; $95,400

RESEARCH FOUNDATION, OKLAHOMA STATE UNIVERSITY, Stillwater; Norman N. Durham; *Equipment for Research in Bacteriology and Associated Areas;* 1 year; $14,800

UNIVERSITY OF ROCHESTER, Rochester, N.Y., Donald G. Anderson; *Short-term Research by Medical Students,* 3 years; $21,600

ROCKEFELLER INSTITUTE, New York, N.Y.; Fritz Lipmann; *Biosynthetic Mechanisms;* 5 years; $750,000

SOUTH DAKOTA STATE COLLEGE, Brookings; A. W. Halverson; *Amino Acid Analyzer for Biochemical Research;* 1 year; $13,500

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles; Frederick J. Moore; *Short-term Research by Medical Students;* 3 years; $17,280

STANFORD UNIVERSITY, Stanford, Calif.; Lawrence R. Blinks; *Feasibility Study for* the *Conversion of the Schooner PIONEER to a Marine Biology Research Ship;* 1 year; $5,000

UNIVERSITY OF TENNESSEE, Knoxville; Aaron J. Ladman; *Fine Structure of Tissue Engaged in Synthesis and Transport during Development;* 5 years; $230,600

UNIVERSITY OF TEXAS; Austin; Fred J. Wolma, Galveston; *Short-term Research by Medical Students;* 3 years; $17,280

TULANE UNIVERSITY OF LOUISIANA, New Orleans; Maxwell E. Lapham; *Short-term Research by Medical Students;* 3 years; $17,280

UNIVERSITY OF UTAH, Salt Lake City; Philip B. Price; *Short-term Research by Medical Students;* 3 years; $12,960

VANDERBILT UNIVERSITY, Nashville, Tenn.; James W. Ward; *Short-term Research by Medical Students;* 3 years; $21,600

UNIVERSITY OF VIRGINIA, Charlottesville; Oscar A. Thorup, Jr.; *Short-term Research by Medical Students;* 1 year; $2,880

UNIVERSITY OF WASHINGTON, Seattle; Richard J. Blandau; *Short-term Research by Medical Students;* 1 year; $3,600

WESTERN RESERVE UNIVERSITY, Cleveland Ohio: Harland G. Wood; *Mass Spectrometer for Biochemical Studies;* 1 year; $20,000

UNIVERSITY OF WISCONSIN; Madison; F. E. Shideman; *Short-term Research by Medical Students;* 3 years; $8,640

WOODS HOLE OCEANOGRAPHIC INSTITUTE, Woods Hole, Mass.; John H. Ryther; *Planning of a Program in Biology for the Indian Ocean Expedition;* 1 year; $24,000

YESHIVA UNIVERSITY, New York, N.Y.; Alfred Gilman; *Short-term Research by Medical Students;* 3 years; $17,280

SPECIALIZED FACILITIES

ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, Pa.; H. Radclyffe Roberts; *Maintenance of Systematic Collections;* 3 years; $75,000

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station; Fred J. Benson; *Expansion of a Computing Center;* 1 year; $50,000

UNIVERSITY OF ALASKA, College; C. T. Elvey; *Construction of Optical Laboratory Building;* 1 year; $20,000

AMERICAN TYPE CULTURE COLLECTION, Washington, D.C.; William Arthur Clark; *Permanent Facilities for the American Type Culture Collection;* 5 years; $650,000

UNIVERSITY OF ARIZONA, Tucson; Edwin F. Carpenter; *Relocation of the 36-inch Steward Reflecting Telescope;* 1 year; $120,000

UNIVERSITY OF CALIFORNIA, Berkeley; John E. Cushing, Santa Barbara; *Construction of the Research Portion of a Marine Laboratory Building;* 3 years; $171,000

CAPE HAZE MARINE LABORATORY, Placida, Fla.; Eugenie Clark; *Relocation and Expansion of Marine Biological Laboratories;* 1 year; $10,700

CHARLES DARWIN FOUNDATION FOR THE GALAPAGOS ISLES, Brussels, Belgium; Victor van Straelen; *Establishment of an International Biological Field Station in the Galapagos Isles;* 1 year; $6,500

UNIVERSITY OF CHICAGO, Chicago, Ill.; Charles E. Olmsted; *Special Equipment for Controlled Environment Facilities for Plant Research;* 2 years; $39,000

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins; David W. Robertson; *Expansion and Maintenance of a Barley Genetic Stock Center;* 5 years; $60,200

UNIVERSITY OF COLORADO, Boulder; John W. Marr; *Improvement of Road and Support of Other Facilities for Mountain Field Stations;* 1 year; $1,500

DUKE UNIVERSITY, Durham, N.C.; D. K. Adams and P. H. Klopfer, *Establishment of a Field Station for Animal Behavior Studies;* 1 year; $31,400

C. G. Bookhout; *Cooperative Research and Research Training Program in Biological Oceanography;* 5 years; $618,282

Thomas M. Gallie, Jr., John J. Gergen and Thomas D. Reynolds; *Expansion of Computing Center;* 3 years; $60,000

EMORY UNIVERSITY, Atlanta, Ga.; C. G. Goodchild; *Construction of a Biological Field Station;* 1 year; $18,200

FLORIDA STATE UNIVERSITY, Tallahassee; E. P. Miles, Jr.; *Expansion of Computing Center;* 1 year; $200,000

HARVARD UNIVERSITY, Cambridge, Mass.; A. S. Romer; *Building Improvements for the Museum of Comparative Zoology;* 1 year; $100,000

UNIVERSITY OF HAWAII, Honolulu; Robert W. Hiatt; *Construct and Equip an Institute of Geophysics;* 2 years; $300,000

INDIANA UNIVERSITY FOUNDATION, Bloomington; Harrison Shull; *Establishment of Computing Center;* 1 year; $285,000

INSTITUTE FOR CANCER RESEARCH, Philadelphia, Pa.; I. I. Oster; *Establishment and Maintenance of a Drosophila melanogaster Stock Center;* 5 years; $124,800

LOS ANGELES COUNTY MUSEUM, Calif.; Theodore Downs; *New Research Wing for Vertebrate Paleontology;* 3 years; $130,000

UNIVERSITY OF MIAMI, Coral Gables, Fla.; Friedrich F. Koczy, Miami; *Design of an Oceanographic Research Vessel;* 1 year; $150,000

UNIVERSITY OF MINNESOTA, Minneapolis; E. H. Rinke, J. J. Christenson and W. P. Martin; *Controlled Climate Facility;* 2 years; $80,000

NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY, Socorro; E. J. Workman; *Atmospheric Research and Weather Modification;* 2 years; $200,000

OHIO WESLEYAN UNIVERSITY, Delaware; John D. Kraus; *Observatory Facility for 360-foot Radio Telescope;* 1 year; $20,500

OREGON STATE COLLEGE, Corvallis; Arvid T. Lonseth, Louis N. Stone; *Construction of Computer (MANIAC III)*; 3 years; $200,000

PENNSYLVANIA STATE UNIVERSITY, University Park; Donald T. Laird; *Establishment of Computing Center (IBM 7070)*; 1 year; $200,000

UNIVERSITY OF PITTSBURGH, Pa.; Peter Gray; *Controlled Climate Facility;* 1 year; $54,000

ROCKY MOUNTAIN BIOLOGICAL LABORATORY, Crested Butte, Colo.; Robert K. Enders; *Construction and Improvement of Research and Living Quarters;* 1 year; $51,000

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; M. F. Buell; *Growth Chambers for Experimental Work in Botany;* 1 year; $15,000

SAN DIEGO SOCIETY OF NATURAL HISTORY, San Diego, Calif.; George E. Lindsay; *Establishment and Support of the Vermillion Sea Field Station;* 3 years; $19,200

STANFORD UNIVERSITY, Stanford, Calif.; L. R. Blinks; *Modernization and Expansion of Marine Biological Laboratories;* 3 years; $225,000

Rolf L. Bolin, Hopkins Marine Station, Pacific Grove; *Research and Graduate Training in Biological Oceanography;* 5 years; $462,950

Robert Hofstadter; *Studies and Experiments on the Design of an Iron-Free Solenoidal Spectrometer;* 13 months; $153,000

UNIVERSITY OF TEXAS, Austin; Howard T. Odum, Port Aransas; *Construction of a Boat Basin for Marine Research;* 1 year; $8,550

David M. Young, Jr.; *Establishment of a Computing Center (CDC 1604);* 1 year; $400,000

UTAH STATE UNIVERSITY, Logan; William F. Sigler; *Construction of a Field Biology Laboratory at Bear Lake;* 1 year; $25,000

UNIVERSITY OF WISCONSIN, Madison; W. R. Marshall, Jr.; *Establishment of Computing Center (CDC 1604);* 1 year; $400,000

WOODS HOLE OCEANOGRAPHIC INSTITUTION, Woods Hole, Mass.; Paul M. Fye; *Design and Construction of an Oceanographic Research Vessel;* 1 year; $1,750,000

WORCESTER FOUNDATION FOR EXPERIMENTAL BIOLOGY, Shrewsbury, Mass.; Hudson Hoagland; *Reventilation of Laboratories and Associated Animal Quarters;* 1 year; $114,000

CONTINUING ANTARCTIC RESEARCH

Aurora and Airglow

ARCTIC INSTITUTE OF NORTH AMERICA, Washington, D.C.; Norman J. Oliver; *Continuation of Aurora and Airglow Research in Antarctica;* 2 years; $128,726

Norman J. Oliver; *Auroral Heights Measurement Program;* 2 years; $57,480

Biology and Medicine

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Robert Cushman Murphy; *Completion of a Biogeographic Study of the Petrels and Their Allies (Birds, Order Procellariiformes);* 2 years; $12,000

BERNICE P. BISHOP MUSEUM, Honolulu, Hawaii; J. Linsley Gressitt; *Studies of Airborne Organisms in the Antarctic Area;* 1 year; $546

UNIVERSITY OF CALIFORNIA, Berkeley; Charles R. Goldman; *Studies on Basic Energy Sources and Pathways in Antarctic Ponds and Lakes;* 1 year; $27,208

UNIVERSITY OF CALIFORNIA, Berkeley; Frank A. Pitelka; *Ecological and Behavioral Comparison of the Antartic Skua with Closely Related Arctic Jaegers;* 1 year; $9,799

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; William J. L. Sladen and Carl R. Eklund; *USARP Bird-Banding Program;* 1 year; $14,039

UNIVERSITY OF KANSAS, Lawrence; Rufus H. Thompson and Kenneth B. Armitage; *Biological Investigation of Fresh Water Lakes in Antarctica;* 6 months; $1,192

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus; W. L. Boyd; *Ecological Survey of Antarctic Bacteria;* 1 year; $13,566

UNIVERSITY OF THE PACIFIC, Stockton, Calif.; Joel W. Hedgpeth; *Collecting and Studying Pycnogonida in Antarctica;* 1 year; $550

UNIVERSITY OF PUERTO RICO, Rio Piedras; J. M. Cruxent; *Archaeological Survey in the Antarctic Region;* 1 year; $1,601

STANFORD UNIVERSITY, Calif.; Donald E. Wohlaschlag; *Biological Laboratory at NAF McMurdo for the Continuing 1961 Biological and Medical Sciences Program;* 18 months; $2,000

Donald E. Wohlaschlag; *Continuing Ecological and Physiological Studies of McMurdo Sound Marine Animals;* 1 year; $48,499

UNIVERSITY OF TENNESSEE, Knoxville; Madison E. Pryor; *Analysis of Ecological Data Collected at Hallett Station;* 1 year; $9,960

VIRGINIA FISHERIES LABORATORIES, Gloucester Pt.; William J. Hargis, Jr.; *A Study of Certain Parasites of Antarctic Vertebrates and Invertebrates;* 2 years; $9,775

Consultation, Planning, and Modification

NATIONAL BUREAU OF STANDARDS, Washington, D.C.; F. W. Brown; *Design of Radio Antenna Complex for Floating Antarctic Research Station;* 1 year; $20,000

F. W. Brown; *Study of Radio Noise Aboard the Ship to be Used as a Floating Antarctic Research Station;* 1 year; $18,100

Cosmic Rays

BARTOL RESEARCH FOUNDATION OF THE FRANKLIN INSTITUTE, Swarthmore, Pa.; Martin A. Pomerantz; *Continuation of Investigations of Time Variations of the Primary Cosmic Radiation Near the South Geomagnetic Pole;* 1 year; $89,650

UNIVERSITY OF MARYLAND, College Park; S. F. Singer; *Cosmic Ray Monitoring Station in the Antarctic;* 2 years; $39,529

Geodesy and Cartography

U.S. DEPARTMENT OF THE INTERIOR, OFFICE OF GEOGRAPHY, Washington, D.C.; Meredith F. Burrill; *Standard Geographic Nomenclature in Antarctica for U.S. Use;* 1 year $12,448

U.S. DEPARTMENT OF THE INTERIOR, GEOLOGICAL SURVEY, Washington, D.C.; Thomas B. Nolan; *Antarctic Mapping Operation Fiscal Year 1960–61;* 1 year; $268,500

Thomas B. Nolan; *Plastic Relief Antarctic Map;* 1 year; $26,200

Thomas B. Nolan; *Program for Antarctic Mapping Operations;* 1 year; $304,000

Geology

UNIVERSITY OF KANSAS, Lawrence; Edward J. Zeller; *Determination of Age of Low Temperature Conditions in Antarctica by Thermoluminescence of Rocks;* 1 year; $11,239

UNIVERSITY OF MINNESOTA, Minneapolis; Campbell Craddock; *Bedrock Geology and Geomorphology of the Sentinel Mountain Area, West Antarctica;* 18 months; $85,080

Campbell Craddock; *Bedrock Geology of the Sentinel Mountain Chain and Northwest Marie Byrd Land, West Antartica;* 1 year; $59,220

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus; Parker Calkin; *Glacial and Bedrock Geology of the Mt. Gran Dry Valley Area, Antarctica;* 18 months; $23,760

S. B. Treves; *Geological Investigation of Antarctic Horst Area;* 18 months; $72,300

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; J. C. F. Tedrow; *A Study of Pedologic Processes in Antarctica;* 1 year; $16,387

U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF MINES, Washington, D.C.; Thomas H. Miller; *Investigation of Methods and Conditions of Mineral Exploration and Evaluation of Mineral Potential in Isolated Areas such as Antarctica;* 1 year; $11,210

U.S. DEPARTMENT OF THE INTERIOR, GEOLOGICAL SURVEY, Washington, D.C.; Thomas B. Nolan; *Systematic Areal Mapping, Geologic Reconnaissance, and Related Geologic Studies in Western Antarctica (Walgren-Eights Coast Project)*; 1 year; $10,900

Thomas B. Nolan; *Systematic Areal Mapping, Geologic Reconnaissance, and Related Geologic Studies in Western Antarctica (Horlick Mountains Project);* 1 year; $77,742

Thomas B. Nolan; *Systematic Areal Mapping, Geologic Reconnaissance, and Related Geologic Studies in Western Antarctica (Thurston Island Traverse Project);* 1 year; $15,926

Thomas B. Nolan; *Systematic Geologic Mapping and Related Studies in the Horlick Mountains, West Antarctica;* 1 year; $51,840

VICTORIA UNIVERSITY OF WELLINGTON, New Zealand; R. W. Balham; *Geologic Investigations in the Koettlitz Glacier Area;* 1 year; $6,089

UNIVERSITY OF WISCONSIN, Madison; Robert F. Black; *Continued Study of Patterned Ground in the Antarctic;* 1 year; $25,376

Robert H. Dott; *Stratigraphic and Tectonic Reliationships of Western Antarctica and Lower Palmer Peninsula to the Andean Mobile Belt;* 1 year; $5,108

Robert H. Dott; *Stratigraphic and Sedimentological Studies in the Antarctica Peninsula;* 1 year; $39,470

Geomagnetism

U.S. COAST AND GEODETIC SURVEY, Washington 25, D.C.; Rear Admiral H. Arnold Karo; *Establishment of Chilean Magnetic Station;* 1 year; $12,500

H. Arnold Karo, *U.S. Magnetic Observatories, 1961–62, Antarctic;* 2 years; $83,460

H. Arnold Karo; *USARP Magnetic Field Surveys in Antarctica, 1961–62;* 1 year; $27,820

Glaciology

ARCTIC INSTITUTE OF NORTH AMERICA, Washington, D.C.; Robert C. Faylor; *Hardening and Strength Studies of Disaggregated Snow at Very Low Temperatures;* 1 year; $4,920

UNIVERSITY OF MICHIGAN, Ann Arbor; James H. Zumberge; *Ross Ice Shelf Studies;* 1 year; $61,886

UNIVERSITY OF MINNESOTA, Minneapolis; Edward Thiel; *Airlifted Geophysical Program in Antarctica;* 1 year; $42,962

UNIVERSITY OF MISSOURI, Columbia; W. D. Keller; *A Study of Glacial Milk and Rock Flour from Antarctic Glaciers;* 1 year; $14,684

OHIO STATE UNIVERSITY, Columbus; Richard L. Cameron; *Exchange Scientist, Antarctic Program for Research in Glaciology and Glacial Geology with USSR;* 1 year $27,337

Richard L. Cameron; *Analysis of IGY–IGC Antarctic Glaciological Data;* 2 years; $24,378

R. P. Goldthwait; *Traverse Glaciology of Antarctic Firn;* 2 years; $30,042

U.S. ARMY COLD REGIONS RESEARCH AND ENGINEERING LABORATORY, Wilmette, Ill.; James A. Bender; *Work in Antarctica 1960–61 Season;* 1 year; $8,200

James A. Bender; *Work in Antarctica 1961–1962 Season;* 1 year; $13,310

Gravity

UNIVERSITY OF WISCONSIN, Madison; George P. Woollard; *Gravimetric Connections and Magnetic Observations Between Key Points in Antarctica;* 2 years; $42,367

Ionospheric Physics

UNIVERSITY OF CALIFORNIA, Berkeley; Robert R. Brown; *Conjugate Point Measurements of High Altitude Radiation Effects in the Geomagnetic Field;* 18 months; $68,357

NATIONAL BUREAU OF STANDARDS, Washington, D.C.; Fred Brown; *Study of Ionospheric Absorption at Mirny Base, Antarctica, Using the Cosmic Noise Method;* 2 years; $66,900

F. W. Brown; *Continuation of the Vertical-Incidence Antarctic Ionospheric Program;* 2 years; $161,200

STANFORD UNIVERSITY, Stanford, Calif.; R. A. Helliwell; *Continuation Studies of VLF Phenomena in the Antarctic;* 2 years; $136,248

Meteorology

UNIVERSITY OF CALIFORNIA, Berkeley; Charles D. Keeling; *A Study of the Abundance of Carbon Dioxide in the Atmosphere over Antarctica;* 2 years; $21,360

U.S. ARMY ORDNANCE, Aberdeen Proving Ground, Md.; John A. Brown; *Study of the Vertical Profile of Water Vapor in the Antarctic;* 1 year; $8,500

U.S. WEATHER BUREAU, Washington, D.C.; F. W. Reichelderfer; *Antarctic Meteorological Research Program—1961;* 30 months; $186,365

F. W. Reichelderfer; *Antarctic Meteorological Research Program;* 2 years; $546,108

F. W. Reichelderfer; *Atmospheric-Oceanic-Glaciologic Interaction in an Antarctic Interdisciplinary Research Program;* 1 year; $110,531

F. W. Reichelderfer; *International Antarctic Analysis Center, United States Participation;* 2 years; $43,390

Oceanography

COLUMBIA UNIVERSITY, New York, N.Y.; W. S. Broecker, Palisades; *Radioisotope Studies in the Oceans with Special Emphasis on the Antarctic;* 1 year; $35,580

FLORIDA STATE UNIVERSITY, Tallahassee; H. G. Goodell, D. S. Gorsline, and J. K. Osmond; *Analysis of Oceanic Bottom Sediments from Operation Deep Freeze;* 1 year; $40,704

TEXAS AGRICULTURAL AND MECHANICAL RESEARCH FOUNDATION, College Station; Donald W. Hood; *Calcium Carbonate Saturation Level of the Ocean from Latitudes of*

North America to Antarctica; 1 year; $17,970

Dale F. Leipper and Luis Capurro; *Surface and Deep Current Measurement in the Drake Passage;* 2 years; $50,785

U.S. ARMY COLD REGIONS RESEARCH AND ENGINEERING LABORATORY, Wilmette, Ill., William L. Nungesser; *Continuation of Calendar Year 1961 Phase of Deep Thermal Core Drilling in Ice Project;* 1 year; $17,350

U.S. NAVY HYDROGRAPHIC OFFICE, Washington D.C.; Admiral E. C. Stephan; *Ship-based Oceanographic Studies in Antarctica and Sub-Antarctic Regions;* 1 year; $94,616

YALE UNIVERSITY, New Haven, Conn.; Karl K. Turekian; *The Distribution of Rubidium, Strontium, Cesium and Barium in Oceanic Vertical Profiles with Special Emphasis on the Antarctic;* 1 year; $13,620

Polar Research Center

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus; Richard P. Goldthwait; *Institute of Polar Studies;* 1 year; $33,887

UNIVERSITY OF WISCONSIN, Madison; George P. Woollard; *Continuation of Geophysical and Polar Research Center at The University of Wisconsin;* 1 year; $65,950

Related Scientific Support

ARCTIC INSTITUTE OF NORTH AMERICA, INC., Washington, D.C.; *Transfer of Title of a Station Wagon from the Foundation to the Arctic Institute of North America, Inc.;* (C-157)

A. P. Crary; *Chief Scientist, U.S. Antarctic Research Program;* 1 year; $19,560

NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.; Harold J. Coolidge; *Tenth Pacific Science Congress;* 1 year; $5,900

Seismology

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena; Hugo Benioff; *Operation, Upkeep, Replacement of South American Earth Strain Stations at Nana, Peru, and Santiago, Chile;* 1 year; $12,636

COLUMBIA UNIVERSITY, New York, N.Y.; Maurice Ewing; *Seismic Reflection Measurements in High Southern Latitudes;* 1 year; $57,672

U.S. COAST AND GEODETIC SURVEY, Washington, D.C.; H. Arnold Karo; *Antarctic Seismological Observatories, 1961–62;* 1 year; $10,700

APPENDIX D

Other Than Basic Research Grants

ACADEMIC YEAR INSTITUTES FOR COLLEGE TEACHERS

CORNELL UNIVERSITY, Ithaca, N.Y.; C. L. Comar; 11 months; $50,600

UNIVERSITY OF KANSAS, Lawrence; William R. Scott; 9 months; $78,300

ACADEMIC YEAR INSTITUTES FOR JUNIOR COLLEGE TEACHERS

UNIVERSITY OF THE PACIFIC, Stockton, Calif.; Emerson G. Cobb; 11 months; $76,900

ACADEMIC YEAR INSTITUTES FOR HIGH SCHOOL AND COLLEGE TEACHERS

UNIVERSITY OF COLORADO, Boulder; John M. Cleveland; 11 months; $304,200

HARVARD UNIVERSITY, Cambridge, Mass.; Victor Guillemin, Jr.; 11 months; $318,100

UNIVERSITY OF ILLINOIS, Urbana; Joseph Landin; 12 months; $305,800

OHIO STATE UNIVERSITY, Columbus; John S. Richardson; 11 months; $295,600

WASHINGTON UNIVERSITY, St. Louis, Mo.; E. U. Condon; 11 months, $282,900

ACADEMIC YEAR INSTITUTES FOR HIGH SCHOOL TEACHERS

ARIZONA STATE UNIVERSITY, Tempe; Ernest E. Snyder, 11 months; $279,700

ATLANTA UNIVERSITY, Atlanta, Ga.; K. A. Huggins; 11 months; $265,500

BOSTON COLLEGE, Chestnut Hill, Mass.; Stanley J. Bezuszka, S. J.; 10 months; $237,200

BOWDOIN COLLEGE, Brunswick, Maine; Reinhard L. Korgen; 9 months; $60,700
Reinhard L. Korgen; 1962–63 Academic Year; 9 months; $60,700

BOWLING GREEN STATE UNIVERSITY, Bowling Green, Ohio; Bruce R. Bogeli; 11 months; $198,600

BROWN UNIVERSITY, Providence, R.I.; Elmer R. Smith; 11 months; $288,900

CORNELL UNIVERSITY, Ithaca, N.Y.; Damon Boynton; 12 months; $212,400

UNIVERSITY OF GEORGIA, Athens; Jonathan J. Westfall; 11 months; $280,800

UNIVERSITY OF HAWAII, Honolulu; Michael M. Frodyma; 9 months; $83,800

IOWA STATE TEACHERS COLLEGE, Cedar Falls; Robert A. Rogers; 11 months; $295,500

LOUISIANA STATE UNIVERSITY, Baton Rouge; Houston T. Karnes; 11 months; $288,000

MICHIGAN STATE UNIVERSITY, East Lansing; John M. Mason; 11 months; $268,800

UNIVERSITY OF MICHIGAN, Ann Arbor; Leigh C. Anderson; 11 months; $278,000

UNIVERSITY OF MISSISSIPPI, University; Noel A. Childress; 10 months; $186,300

NEW MEXICO HIGHLANDS UNIVERSITY, Las Vegas; E. Gerald Meyer; 11 months; $293,-100

UNIVERSITY OF NEW MEXICO, Albuquerque; Wilson H. Ivins; 10 months; $240,300

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; E. C. Markham; 11 months; $298,100

UNIVERSITY OF NORTH DAKOTA, Grand Forks; J. Donald Henderson; 11 months; $246,800

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; Arnold E. Ross; 11 months; $245,100

OKLAHOMA STATE UNIVERSITY, Stillwater; James H. Zant; 11 months; $191,700

OREGON STATE COLLEGE, Corvallis; Stanley E. Williamson; 11 months; $285,900

UNIVERSITY OF OREGON, Eugene; Sanford S. Tepfer; 10 months; $88,200
Sanford S. Tepfer; 1962–63 Academic Year; 11 months; $98,900

UNIVERSITY OF PENNSYLVANIA, Philadelphia; J. F. Hazel; 11 months; $252,800

UNIVERSITY OF PUERTO RICO, Rio Piedras; Mariano Garcia; 10 months; $124,100

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Robert L. Swain; 11 months; $185,900

UNIVERSITY OF SOUTH CAROLINA, Columbia; W. L. Williams; 11 months; $179,200

STANFORD UNIVERSITY, Stanford, Calif.; Harold M. Bacon; 9 months; $282,400

STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion; Charles M. Vaughn; 11 months; $302,100

SYRACUSE UNIVERSITY, Syracuse, N.Y.; Alfred T. Collette; 11 months; $242,700

TEMPLE UNIVERSITY, Philadelphia, Pa.; E. L. Offenbacher; 11 months; $137,000

UNIVERSITY OF TEXAS, Austin; Robert N. Little; 11 months; $273,300

UNIVERSITY OF UTAH, Salt Lake City; Thomas J. Parmley; 11 months; $300,100

UNIVERSITY OF VIRGINIA, Charlottesville; James W. Cole, Jr.; 11 months; $270,400

WEST VIRGINIA UNIVERSITY, Morgantown; James B. Hickman; 9 months; $167,100

UNIVERSITY OF WISCONSIN, Madison; Donald H. Bucklin; 11 months; $311,800

IN-SERVICE INSTITUTES FOR SECONDARY SCHOOL TEACHERS

ADELPHI COLLEGE, Garden City, N.Y.; Donald Solitar; 9 months; $39,140

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station; Edmund C. Klipple; 9 months; $5,880

AGRICULTURAL AND TECHNICAL COLLEGE OF NORTH CAROLINA, Greensboro; George C. Royal, Jr.; 9 months, $9,750

UNIVERSITY OF AKRON, Akron, Ohio; Mabel M. Riedinger; 9 months; $8,580

UNIVERSITY OF ALABAMA, University; C. L. Seebeck, Jr.; 9 months; $20,820

ALBANY STATE COLLEGE, Albany, Ga.; William E. Johnson, Jr.; 9 months; $19,180

ALBERTUS MAGNUS COLLEGE, New Haven, Conn.; Florence D. Jacobson; 8 months; $10,820

ALBION COLLEGE, Albion, Mich.; Paul H. Carnell; 9 months; $11,470

ALBRIGHT COLLEGE, Reading, Pa.; Richard J. Kohlmeyer; 9 months; $4,530

ALFRED UNIVERSITY, Alfred, N.Y.; E. Gordon Ogden; 9 months; $9,850

ALLEGHENY COLLEGE, Meadville, Pa.; Frederick H. Steen; 6 months; $3,090

AMERICAN UNIVERSITY, Washington, D.C.; Leo Schubert; 9 months; $22,290

ANDREWS UNIVERSITY, Berrien Springs, Mich.; Harold T. Jones; 8 months; $3,730

UNIVERSITY OF ARIZONA, Tucson; Millard G. Seeley; 9 months; $6,180

Arthur H. Steinbrenner; 9 months; $6,570

ARIZONA STATE UNIVERSITY, Tempe; Ernest E. Snyder; 9 months; $11,140

UNIVERSITY OF ARKANSAS, Fayetteville; William R. Orton; 9 months; $8,760

AUSTIN PEAY STATE COLLEGE, Clarksville, Tenn.; William G. Stokes; 9 months; $5,880

BALDWIN-WALLACE COLLEGE, Berea, Ohio; Dean L. Robb; 9 months; $4,590

BALL STATE TEACHERS COLLEGE, Muncie, Ind.; P. D. Edwards; 9 months; $15,020

BARAT COLLEGE OF THE SACRED HEART, Lake Forest, Ill.; Charlotte Dames; 9 months; $10,050

BEMIDJI STATE COLLEGE, Bemidji, Minn.; W. Richard Slinkman; 9 months; $5,970

BOSTON COLLEGE, Chestnut Hill, Mass.; Stanley J. Bezuszka; 8 months; $15,850

William G. Guindon; 9 months; $6,290

BOWLING GREEN STATE UNIVERSITY, Bowling Green, Ohio; W. H. Hall; 9 months; $5,670

BROOKLYN COLLEGE, Brooklyn, N.Y.; Meyer Jordon; 9 months; $6,060

BROWN UNIVERSITY, Providence, R.I.; Charles B. MacKay; 9 months; $6,220

BUCKNELL UNIVERSITY, Lewisburg, Pa.; William K. Smith; 9 months; $5,740

UNIVERSITY OF BUFFALO, N.Y.; Harriet F. Montague; 9 months; $6,520

Edith R. Schneckenburger; 9 months; $6,750

BUTLER UNIVERSITY, Indianapolis, Ind.; Harry E. Crull; 9 months; $9,750

UNIVERSITY OF CALIFORNIA, Berkeley; Clifford Bell, Los Angeles; 8 months; $5,940

Clifford Bell, Los Angeles; 8 months; $6,650

Clifford Bell, Los Angeles; 8 months; $6,540

Clifford Bell, Los Angeles; 8 months; $4,240

Clifford Bell, Los Angeles; 8 months; $4,730

Paul B. Johnson, Los Angeles; 8 months; $8,920

CAPITAL UNIVERSITY, Columbus, Ohio; Clarence H. Heinke; 9 months; $6,870

CENTENARY COLLEGE, Shreveport, La.; Virginia Carlton; 9 months; $6,700

CENTRAL MICHIGAN UNIVERSITY, Mount Pleasant; Malcolm H. Filson; 10 months; $10,290

Lauren G. Woodby; 9 months; $22,040

CENTRAL MISSOURI STATE COLLEGE, Warrensburg; Charles E. Kelley; 9 months; $8,110

CENTRAL STATE COLLEGE, Edmond, Okla.; Earl C. Rice; 9 months; $8,390

UNIVERSITY OF CHATTANOOGA, Chattanooga, Tenn.; Kenneth A. Fry; 9 months; $8,020

Kenneth A. Fry; 9 months; $9,840

UNIVERSITY OF CINCINNATI, Ohio; I. A. Barnett; 9 months; $17,900

THE CITY COLLEGE, N.Y., N.Y.; W. I. Pearman; 9 months; $10,570

W. I. Pearman; 9 months $7,880

UNIVERSITY OF COLORADO, Boulder; Burton W. Jones; 9 months; $9,100

Newell Younggren; 9 months; $11,170

COLORADO COLLEGE, Colorado Springs; Richard G. Beidleman; 9 months; $6,130

COLORADO SCHOOL OF MINES, Golden; James L. Hall; 9 months $3,340

COLORADO STATE COLLEGE, Greeley; Albert J. Hendricks, Jr.; 8 months; $8,140

O. W. Tollefson; 4 months; $4,300

CONNECTICUT COLLEGE, New London; Alice T. Schafer; 8 months; $7,320

UNIVERSITY OF CONNECTICUT, Storrs; David J. Blick; 9 months $12,670

CORNELL UNIVERSITY, Ithaca, N.Y.; R. William Shaw; 9 months; $12,950

DARTMOUTH COLLEGE, Hanover, N.H.; Charles J. Lyon; 5 months; $4,620

UNIVERSITY OF DAYTON, Dayton, Ohio; K. C. Schraut; 9 months; $8,660

UNIVERSITY OF DELAWARE, Newark; John A. Brown; 9 months; $4,950

DEPAUL UNIVERSITY, Chicago, Ill.; Willis B. Caton; 9 months; $12,370

UNIVERSITY OF DETROIT, Mich.; Lyle E. Mehlenbacher; 10 months; $13,580

DISTRICT OF COLUMBIA TEACHERS COLLEGE, Washington, D.C.; Daniel B. Lloyd; 9 months; $8,400

DOMINICAN COLLEGE OF SAN RAFAEL, San Rafael, Calif.; Mary Augusta; 8 months; $9,130

DRAKE UNIVERSITY, Des Moines, Iowa; Earle L. Canfield; 9 months; $15,570

DREW UNIVERSITY, Madison, N.J.; Bernard Greenspan; 8 months; $5,160

EARLHAM COLLEGE, Richmond, Ind.; Roland F. Smith; 9 months; $4,200

EASTERN MONTANA COLLEGE OF EDUCATION, Billings, George H. Gloege; 4 months; $4,120

Oliver W. Peterson; 4 months; $5,110

EASTERN NAZARENE COLLEGE, Wollaston, Mass.; P. Calvin Maybury; 9 months; $13,130

EAST TEXAS STATE COLLEGE, Commerce; Charles S. Rohrer; 9 months; $12,020

Robert K. Williams; 9 months; $7,310

EMORY AND HENRY COLLEGE, Emory, Va.; George M. Speed; 9 months; $4,220

EMORY UNIVERSITY, Atlanta, Ga.; Charles T. Lester; 7 months; $10,940

FAIRFIELD UNIVERSITY, Fairfield, Conn.; John A. Barone; 9 months; $10,230

FENN COLLEGE, Cleveland, Ohio; Walter R. Van Voorhis; 8 months; $12,930

FLORIDA STATE UNIVERSITY, Tallahassee; J. Stanley Marshall; 9 months; $11,750

J. Stanley Marshall; 10 months; $22,790

J. Stanley Marshall; 10 months; $9,060

UNIVERSITY OF FLORIDA, Gainesville; G. Ray Noggle; 10 months; $22,540

Caspar Rappenecker, Jacksonville; 9 months; $15,380

Kenneth P. Kidd, Orlando; 9 months; $15,320

N. Eldred Bingham, Tampa; 9 months; $28,710

FORDHAM UNIVERSITY, N.Y., N.Y.; Charles J. Lewis; 9 months; $11,740

FRANKLIN AND MARSHALL COLLEGE, Lancaster, Pa.; Bernard Jacobson; 9 months; $10,840

GEORGETOWN UNIVERSITY, Washington, D.C.; Matthew P. Thekaekara; 9 months; $10,310

UNIVERSITY OF GEORGIA, Athens; Charles L. Koelsche; 9 months; $13,000

GLASSBORO STATE COLLEGE, Glassboro, N.J.; Warren G. Roome; 9 months; $13,050

HAMPTON INSTITUTE, Hampton, Va.; Victor H. Fields; 8 months; $13,800

UNIVERSITY OF HAWAII, Honolulu; Jimmie B. Smith; 6 months; $10,430

HENDRIX COLLEGE, Conway, Ark.; John E. Stuckey; 9 months; $16,200

HOBART AND WILLIAM SMITH COLLEGES, Geneva, N.Y.; Robert L. Beinert; 8 months; $3,520

COLLEGE OF THE HOLY CROSS, Worcester, Mass.; John W. Flavin; 8 months; $6,240

William E. Hartnett; 8 months; $10,570

HOLY NAMES COLLEGE, Spokane, Wash.; Mary Eugene Gautereaux; 8 months; $9,340

HOWARD PAYNE COLLEGE, Brownwood, Tex.; Leonard R. Daniel; 9 months; $2,500

Leonard R. Daniel; 9 months; $8,050

HUMBOLDT STATE COLLEGE FOUNDATION, Arcata, Calif.; Orval M. Klose; 8 months; $8,040

HUNTER COLLEGE, N.Y., N.Y.; Jewell Hughes Bushey; 9 months; $14,090

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago; Haim Reingold; 9 months; $60,550

IMMACULATE HEART COLLEGE, Los Angeles, Calif.; Eugene T. Spain; 9 months; $5,110

INCARNATE WORD COLLEGE, San Antonio, Tex.; Joseph Marie; 9 months; $10,300

INDIANA CENTRAL COLLEGE, Indianapolis; Robert M. Brooker; 9 months; $7,680

INDIANA STATE TEACHERS COLLEGE, Terre Haute, Ind.; John C. Hook; 8 months; $7,350

JOHN CARROLL UNIVERSITY, Cleveland, Ohio; Henry F. Birkenhauer; 9 months; $3,960

KANSAS STATE COLLEGE OF PITTSBURG; R. G. Smith; 9 months; $13,800

KANSAS STATE TEACHERS COLLEGE, Emporia; Ted F. Andrews; 8 months; $24,330

KENT STATE UNIVERSITY, Kent, Ohio; Kenneth B. Cummins; 9 months; $8,630

Kenneth B. Cummins; 9 months; $5,990

KNOXVILLE COLLEGE, Knoxville, Tenn.; Robert H. Harvey; 8 months; $9,950

LAFAYETTE COLLEGE, Easton, Pa.; B. E. Rhoades; 9 months; $5,640

LAWRENCE COLLEGE, Appleton, Wis.; Robert M. Rosenberg; 9 months; $9,740

LE MOYNE COLLEGE, Memphis, Tenn.; W. W. Gibson; 9 months; $10,920

LEWIS AND CLARK COLLEGE, Portland, Oreg.; Elvy Fredrickson; 9 months; $6,590

LONG BEACH STATE COLLEGE FOUNDATION, Calif.; John J. Baird; 9 months; $11,600

LOUISIANA COLLEGE, Pineville; Henry Donohoe; 9 months; $6,990

LOUISIANA STATE UNIVERSITY, Baton Rouge; Henry G. Jacob, Jr.; 9 months; $7,700

Henry G. Jacob, Jr.; 9 months; $12,970

UNIVERSITY OF LOUISVILLE, Louisville, Ky.; Bruce B. Vance; 9 months; $5,100

LOYOLA UNIVERSITY, New Orleans, La.; F. A. Benedetto; 9 months; $1,290

F. A. Benedetto; 9 months; $8,290

H. R. Jolley; 9 months; $10,320

John F. Keller; 9 months; $8,920

MADISON COLLEGE, Harrisonburg, Va.; J. Emmert Ikenberry; 9 months; $5,320

MANCHESTER COLLEGE, North Manchester, Ind.; Carl W. Holl; 8 months; $9,860

MANHATTAN COLLEGE, New York, N.Y.; Arthur B. Kemper; 8 months; $6,100

Luke V. Titone; 9 months; $11,270

Bernard Alfred Welch; 9 months; $11,240

MARQUETTE UNIVERSITY, Milwaukee, Wis.; Arthur G. Barkow; 8 months; $6,790

Robert C. Craig; 9 months; $11,170

UNIVERSITY OF MARYLAND, College Park; Richard A. Good; 9 months; $16,690

Howard Laster; 9 months; $20,740

MARYLHURST COLLEGE, Marylhurst, Oreg.; Mary Loretta Ann; 8 months; $5,440

McNEESE STATE COLLEGE, Lake Charles, La.; S. M. Spencer; 9 months; $10,060

MEMPHIS STATE UNIVERSITY, Memphis, Tenn.; R. W. Johnson; 9 months; $8,400

UNIVERSITY OF MIAMI, Coral Gables, Fla.; J. H. Curtiss; 9 months; $19,850

UNIVERSITY OF MICHIGAN, Ann Arbor; Charles Brumfiel; 9 months; $11,450

MIDDLE TENNESSEE STATE COLLEGE, Murfreesboro; J. Eldred Wiser; 9 months; $7,240

MISSISSIPPI COLLEGE, Clinton; Archie H. Germany; 9 months; $16,790

MISSISSIPPI SOUTHERN COLLEGE, Hattiesburg; Virginia Felder; 9 months; $9,560

MISSISSIPPI STATE UNIVERSITY, State College; R. D. Boswell, Jr.; 9 months; $10,690

UNIVERSITY OF MISSOURI, Columbia; Harold Q. Fuller, Rolla; 8 months; $9,330

MONTANA STATE UNIVERSITY, Missoula; William R. Ballard; 5 months; $19,590

James W. Gebhart; 9 months; $8,530

MONTCLAIR STATE COLLEGE, Upper Montclair, N.J.; Max A. Sobel; 9 months; $12,150

MOREHEAD STATE COLLEGE, Morehead, Ky.; William B. Owsley; 9 months; $4,640

MOUNT MERCY COLLEGE, Pittsburgh, Pa.; Cornelius W. Kreke; 9 months, $8,625
William A. Uricchio; 8 months; $6,640

MURRAY STATE COLLEGE FOUNDATION, Murray, Ky.; Alfred Wolfson; 9 months; $9,780

NEBRASKA WESLEYAN UNIVERSITY, Lincoln; Walter R. French; 9 months; $1,630
Walter R. French, Jr.; 9 months; $13,600

UNIVERSITY OF NEVADA, Reno; E. M. Beesley; 10 months; $15,450

NEWARK COLLEGE OF ENGINEERING RESEARCH FOUNDATION, N.J.; Herbert Barkan; 9 months; $7,800
Paul O. Hoffmann; 9 months; $4,430
Charles Koren; 9 months; $3,670

UNIVERSITY OF NEW HAMPSHIRE, Durham; M. Evans Munroe; 9 months; $2,150
Shepley L. Ross; 9 months; $13,470

UNIVERSITY OF NEW MEXICO, Albuquerque; Merle Mitchell; 9 months; $5,230

NEW YORK UNIVERSITY, New York, N.Y.; Morris Kline; 9 months; $26,430

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; Sherwood Githens, Jr.; 9 months; $5,080
William A. White; 8 months; $8,300
Hollis J. Rogers, Greensboro; 9 months; $17,000
H. V. Park, Raleigh; 9 months; $6,770

NORTH DAKOTA STATE UNIVERSITY, Fargo; Joel W. Broberg; 9 months; $13,440

NORTHERN ILLINOIS UNIVERSITY, DeKalb; Loren T. Caldwell; 8 months; $8,600

NORTHERN MICHIGAN COLLEGE, Marquette; W. James Merry; 8 months; $10,700

NORTHLAND COLLEGE, Ashland, Wis.; Jesse M. Caskey; 8 months; $14,850

NORTH TEXAS STATE COLLEGE, Denton; Robert C. Sherman; 9 months; $15,400

NORTHWESTERN STATE COLLEGE, Alva, Okla.; J. Louis Bouchard; 9 months; $6,490

NORTHWESTERN UNIVERSITY, Evanston, Ill.; E. H. C. Hildebrandt; 9 months; $11,520

NORWICH UNIVERSITY, Northfield, Vt.; Edward A. Race; 8 months; $3,060

OHIO STATE UNIVERSITY, Columbus; William R. Riley; 9 months; $10,410

UNIVERSITY OF OKLAHOMA, Norman; Richard V. Andree; 9 months; $4,280
Richard V. Andree; 9 months; $27,650

UNIVERSITY OF OMAHA, Omaha, Nebr.; Merle E. Brooks; 9 months; $20,820

OREGON STATE COLLEGE, Corvallis; Albert R. Poole; 8 months; $3,370
W. D. Wilkinson; 9 months; $5,840

OREGON STATE SYSTEM OF HIGHER EDUCATION, Portland; J. Richard Byrne, Portland State College; 9 months; $4,190

UNIVERSITY OF OREGON, Eugene; A. F. Moursund; 8 months; $3,700

PACE COLLEGE, New York, N.Y.; Edward Ritter; 8 months; $13,920

PAN AMERICAN COLLEGE, Edinburg, Tex.; Sidney S. Draeger; 9 months; $10,340

UNIVERSITY OF PENNSYLVANIA, Philadelphia; J. F. Hazel; 9 months; $12,300

PENNSYLVANIA STATE UNIVERSITY, University Park; William H. Powers; 9 months; $8,600
William H. Powers; 10 months; $39,530

UNIVERSITY OF PITTSBURGH, Pa.; Peter Gray; 8 months; $7,780
John C. Knipp; 8 months; $9,060

PRAIRIE VIEW AGRICULTURAL AND MECHANICAL COLLEGE, Prairie View, Tex.; E. E. O'Banion; 9 months; $18,570

UNIVERSITY OF PUERTO RICO, Rio Piedras; Augusto Bobonis; 9 months; $14,480
Leticia del Rosario; 9 months; $9,810
Virgilio Biagii, Jr.; 9 months; $9,230

PURDUE UNIVERSITY, Lafayette, Ind.; M. Wiles Keller; 9 months; $43,480
Joseph D. Novak; 9 months; $39,450

QUEENS COLLEGE, Flushing, N.Y.; Nathan S. Washton; 9 months; $12,790

UNIVERSITY OF REDLANDS, Redlands, Calif.; Paul R. Gleason; 8 months; $10,810

REED COLLEGE, Portland, Oreg.; Arthur F. Scott; 9 months; $15,800

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany; Emery L. Will, Oneonta; 9 months; $5,490

RESEARCH FOUNDATION OF THE UNIVERSITY OF TOLEDO, Toledo, Ohio; Archie N. Solberg; 9 months; $15,280

RICKS COLLEGE, Rexburg, Idaho; Merle R. Fisher; 9 months; $7,620

UNIVERSITY OF ROCHESTER, N.Y.; John J. Montean; 9 months; $8,500

ROCKHURST COLLEGE, Kansas City, Mo.; William C. Doyle; 9 months; $8,050

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Joshua Barlaz; 9 months; $13,740
Joshua Barlaz; 9 months; $10,920

SACRAMENTO STATE COLLEGE FOUNDATION, Calif.; Stanley P. Hughart; 9 months; $18,970

ST. CLOUD STATE COLLEGE, St. Cloud, Minn.; Harold Hopkins; 5 months; $3,220

ST. JOSEPH COLLEGE, West Hartford, Conn.; Maria Clare Markham; 9 months; $6,220

ST. LOUIS UNIVERSITY, St. Louis, Mo.; John J. Andrews; 9 months; $3,990

ST. MARY'S UNIVERSITY OF SAN ANTONIO, San Antonio, Tex.; James F. Gray; 8 months; $9,110

ST. PETER'S COLLEGE, Jersey City, N.J.; Frank J. McMackin; 9 months; $9,450

UNIVERSITY OF SAN FRANCISCO, Calif.; Edward J. Farrell; 9 months; $7,210

SAN JOSE STATE COLLEGE CORP., Calif.; Rodney E. Anderson; 9 months; $18,270
Laurence E. Wilson; 9 months; $13,160

UNIVERSITY OF SANTA CLARA, Santa Clara, Calif.; Irving Sussman; 9 months; $28,500

SARAH LAWRENCE COLLEGE, Bronxville, N.Y.; Edward J. Cogan; 8 months; $14,620

UNIVERSITY OF SCRANTON, Scranton, Pa.; Joseph A. Rock; 9 months; $4,860
Joseph A. Rock; 9 months; $4,350

SHORTER COLLEGE, Rome, Ga.; Lewis Lipps; 9 months; $13,510

South Carolina State College, Orangeburg; George W. Hunter; 9 months; $30,470

Southeastern State College, Durant, Okla.; Leslie A. Dwight; 9 months; $5,630
Ernest Sturch, Jr., 9 *months*; $4,900

Southern University Agricultural and Mechanical College, Baton Rouge, La.; Russell M. Ampey; 9 months; 8,470

University of Southern California, Los Angeles; John W. Reith; 10 months, $13,820
Paul A. White; 9 months; $21,670

University of Southwestern Louisiana, Lafayette; James R. Oliver; 9 months; $26,100

Southwestern at Memphis, Tenn.; Jack U. Russell; 9 months; $4,430
Arlo I. Smith; 9 months; $9,180

State College at Salem, Mass.; Thomas I. Ryan; 8 months; $15,200

State University of Iowa, Iowa City; Robert E. Yager; 7 months; $15,860

State University of South Dakota, Vermillion; Theodore L. Reid; 9 months; $29,360

Stephen F. Austin State College, Nacogdoches, Tex.; W. I. Layton, 9 months; $7,280

Stetson University, De Land, Fla.; Gene W. Medlin; 9 months; $6,850

Talladega College, Talladega, Ala.; Cohen T. Simpson; 7 months; $5,000

Teachers College, Columbia University, N.Y., N.Y.; Howard F. Fehr; 8 months; $14,600

Temple University, Philadelphia, Pa.; Leonard Muldawer; 9 months; $17,330

Tennessee Agricultural and Industrial State University, Nashville; William N. Jackson; 9 months; $18,510

Tennessee Polytechnic Institute, Cookeville; G. B. Pennebaker; 9 months; $12,540

University of Tennessee, Knoxville; James M. Moore; 9 months; $11,200

Texas Woman's University, Denton; Harold T. Baker; 9 months; $4,700

University of Toledo, Ohio; Carroll E. Amos; 9 months; $9,410

Trenton State College, N.J.; Robert V. Price; 9 months; $10,850

Union College and University, Schenectady, N.Y.; C. W. Graves; 9 months; $17,720

University of Utah, Salt Lake City; E. Allan Davis; 9 months; $8,220

Villanova University, Villanova, Pa.; J. Bernard Hubbert; 9 months; $12,260

Virginia State College, Petersburg; Richard H. Dunn; 9 months; $7,970

University of Virginia, Charlottesville; William C. Lowry; 9 months; $16,010

Wake Forest College, Winston-Salem, N.C.; Ben M. Seelbinder; 9 months; $6,350

University of Washington, Seattle; Carl B. Allendoerfer; 3 months; $2,640
Carl B. Allendoerfer; 3 months; $2,790
Arthur D. Welander; 8 months; $440
Arthur D. Welander; 8 months; $1,700

Wayne State University, Detroit, Mich.; William V. Mayer; 10 months; $8,180
Harold T. Slaby; 10 months; $9,250

Western Kentucky State College, Bowling Green; Ward C. Sumpter; 9 months; $12,050

Western State College of Colorado, Gunnison; *Theodore D. Violett*; 8 *months*; $7,730

Western Michigan University, Kalamazoo; George G. Mallinson; 9 months; $12,800
George G. Mallinson; 9 months; $8,110

William Jewell College, Liberty, Mo.; Wallace A. Hilton; 9 months; $11,400

Wisconsin State College, Eau Claire; Marshall E. Wick; 9 months; $11,560

Worcester Polytechnic Institute, Mass.; Richard F. Morton; 9 months; $13,460

Xavier University, New Orleans, La.; Mary Veronica; 9 months; $7,460

Yeshiva University, New York, N.Y.; Abe Gelbart; 9 months; $72,500

Youngstown University, Youngstown, Ohio; Clair L. Worley; 9 months; $5,460

IN-SERVICE INSTITUTES FOR SECONDARY SCHOOL TEACHERS AND ELEMENTARY SCHOOL TEACHERS

University of Hawaii, Honolulu; Michael M. Frodyma; 8 months; $7,080

IN-SERVICE INSTITUTES FOR ELEMENTARY SCHOOL TEACHERS

University of Alabama, University; Esther J. Swenson; 9 months; $7,060

American Museum of Natural History, New York, N.Y.; Franklyn M. Branley; 4 months; $2,730

University of Arizona, Tucson; Arthur H. Steinbrenner; 9 months; $4,760

Arkansas State Teachers College, Conway; O. L. Hughes; 9 months; $5,630

Bridgewater College, Bridgewater, Va.; Harry G. M. Jopson; 8 months; $6,000

Bucknell University, Lewisburg, Pa.; Lester Kieft; 9 months; $5,690

University of California, Berkeley; Clifford Bell, Los Angeles; 8 months; $6,280

University of Colorado, Boulder; James R. Wailes; 8 months; $5,640

Delta State College, Cleveland, Miss.; Eleanor Walters, Meridian; 9 months; $3,130

Dominican College of San Rafael, San Rafael, Calif.; Mary Augusta; 8 months; $4,330

East Texas State College, Commerce; Charles S. Rohrer; 9 months; $6,350

Florida State University, Tallahassee; Eugene D. Nichols; 8 months; $6,460

University of Georgia, Athens; Charles L. Koelsche; 9 months; $4,620

Humboldt State College Foundation, Arcata, Calif.; Roy W. Tucker; 9 months; $6,820

Indiana Central College, Indianapolis; Robert M. Brooker; 9 months; $5,990

Kansas State College of Pittsburg; Elton W. Cline; 9 months; $6,230

Kansas State Teachers College, Emporia; Ted F. Andrews; 9 months; $6,840

Knoxville College, Knoxville, Tenn.; Robert H. Harvey; 8 months; $6,840

MILLERSVILLE STATE COLLEGE, Millersville, Pa.; William B. McIlwaine; 9 months; $5,870

NORTHERN ILLINOIS UNIVERSITY, DeKalb; Eugene W. Hellmich; 9 months; $6,770

OREGON STATE UNIVERSITY, Corvallis; Albert L. Leeland; 9 months; $6,430

UNIVERSITY OF PUGET SOUND, Tacoma, Wash.; Martin E. Nelson; 9 months; $3,820

RESEARCH FOUNDATION OF THE UNIVERSITY OF TOLEDO, Ohio; Robert R. Buell; 9 months; $6,000

RHODE ISLAND COLLEGE, Providence; Renato E. Leonelli; 9 months; $6,200

SACRAMENTO STATE COLLEGE FOUNDATION, Calif.; H. Stewart Moredock; 9 months; $6,080

ST. AUGUSTINE'S COLLEGE, Raleigh, N.C.; Prezell R. Robinson; 9 months; $6,160

SAN JOSE STATE COLLEGE CORP., Calif.; James R. Smart; 9 months; $5,870

SHORTER COLLEGE, Rome, Ga.; Lewis Lipps; 9 months; $6,540

SOUTHEASTERN STATE COLLEGE, Durant, Okla.; Leslie A. Dwight, 9 months; $5,230

STATE COLLEGE OF IOWA, Cedar Falls; E. Glenadine Gibb; 9 months; $5,360

SYRACUSE UNIVERSITY, N.Y.; Robert B. Davis; 9 months; $6,000

TEMPLE UNIVERSITY, Philadelphia, Pa.; Herman C. Kranzer; 9 months; $6,140

WESTERN KENTUCKY STATE COLLEGE, Bowling Green; Tate C. Page; 9 months; $6,550

WESTERN MICHIGAN UNIVERSITY, Kalamazoo; George G. Mallinson; 9 months; $6,890

SUMMER INSTITUTES FOR COLLEGE TEACHERS

AMERICAN UNIVERSITY, Washington, D.C.; Leo Schubert; 6 weeks; $48,900

ARIZONA STATE UNIVERSITY, Tempe; Gordon L. Bender; 6 weeks; $40,950

UNIVERSITY OF ARIZONA, Tucson; M. R. Bottaccini; 10 weeks; $55,200

BOWDOIN COLLEGE, Brunswick, Maine; Dan E. Christie; 6 weeks; $51,400

BUCKNELL UNIVERSITY, Lewisburg, Pa.; Charles H. Coder, Jr.; 6 weeks; $39,000

UNIVERSITY OF CALIFORNIA, Berkeley; George Jura; 8 weeks; $23,800

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins; James R. Barton; 8 weeks; $53,500

UNIVERSITY OF COLORADO, Boulder; Alec J. Kelso; 10 weeks; $58,900

DUKE UNIVERSITY, Durham, N.C.; Harold J. Humm; 5 weeks; $19,650

EMORY UNIVERSITY, Atlanta, Ga.; William H. Jones; 9 weeks; $42,900

GEORGIA INSTITUTE OF TECHNOLOGY, Atlanta; James A. Stanfield; 6 weeks; $52,100

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago; Peter Chiarulli; 8 weeks; $40,900

INDIANA UNIVERSITY, Bloomington; Wayne R. Lowell; 6 weeks; $89,000

IOWA STATE UNIVERSITY, Ames; T. A. Bancroft; 11 weeks; $84,900
Glenn Murphy; 6 weeks; $46,160

LOUISIANA POLYTECHNIC INSTITUTE, Ruston; M. A. Nobles; 9 weeks; $37,575

LOUISIANA STATE UNIVERSITY, Baton Rouge; Harry D. Richardson; 9 weeks; $26,600

UNIVERSITY OF MICHIGAN, Ann Arbor; Lloyd Brownell; 8 weeks; $22,800
Melvin Levine; 8 weeks; $19,200

UNIVERSITY OF MISSOURI, Columbia; Karl H. Evans; 8 weeks; $53,400

NEW MEXICO STATE UNIVERSITY, University Park; E. L. Cleveland; 8 weeks; $56,800

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; H. D. Crockford; 6 weeks; $56,500
H. F. Robinson, Raleigh; 6 weeks; $44,100

NORTHWESTERN UNIVERSITY, Evanston, Ill.; Edward J. Taaffe; 6 weeks; $30,500

OAK RIDGE INSTITUTE OF NUCLEAR STUDIES, Oak Ridge, Tenn.; Ralph T. Overman; 6 weeks; $17,600
Ralph T. Overman; 6 weeks; $17,600

OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Stillwater; James H. Boggs; 9 weeks; $52,700

UNIVERSITY OF OKLAHOMA, Norman; Horace H. Bliss; 8 weeks; $45,100
Horace E. Hoffman; 8 weeks; $23,400

OREGON STATE COLLEGE, Corvallis; A. V. Logan; 6 weeks; $49,950

UNIVERSITY OF OREGON, Eugene; Richard W. Castenholz; 8 weeks; $33,800

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; A. A. K. Booth; 4 weeks; $22,000

UNIVERSITY OF ROCHESTER, N.Y.; John B. Hursh; 6 weeks; $14,500

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles; Jay M. Savage; 6 weeks; $22,810

STANFORD UNIVERSITY, Stanford, Calif.; Howard S. Seifert; 6 weeks; $44,700

STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N.J.; Robert H. Seavy; 6 weeks; $44,500

SYRACUSE UNIVERSITY, N.Y.; M. W. Jennison; 6 weeks; $14,500

TULANE UNIVERSITY, New Orleans, La.; John K. Hampton, Jr.; 8 weeks; $19,200

WASHINGTON STATE UNIVERSITY, Pullman; Adolph Hecht; 6 weeks; $59,500

SUMMER INSTITUTES FOR JUNIOR COLLEGE AND COLLEGE TEACHERS

UNIVERSITY OF ARKANSAS, Fayetteville; R. C. Wray; 6 weeks; $39,150

UNIVERSITY OF CALIFORNIA, Berkeley; Peter K. E. Henrici, Los Angeles; 8 weeks; $68,400

SUMMER INSTITUTE FOR JUNIOR COLLEGE TEACHERS

WESTERN MICHIGAN UNIVERSITY, Kalamazoo; Haym Kruglak; 6 weeks; $33,650

SUMMER INSTITUTE FOR TECHNICAL INSTITUTE AND JUNIOR COLLEGE TEACHERS

UNIVERSITY OF HOUSTON, Texas; Herbert H. Curry; 8 weeks; $52,104

SUMMER INSTITUTE FOR TECHNICAL INSTITUTE TEACHERS

UNIVERSITY OF ILLINOIS, Urbana; Jerry S. Dobrovolny; 8 weeks; $38,100

SUMMER INSTITUTES FOR HIGH SCHOOL AND COLLEGE TEACHERS

UNIVERSITY OF ALABAMA, University; J. D. Mancill; 11 weeks; $63,300

GEORGE WASHINGTON CARVER FOUNDATION, Tuskegee Institute, Ala.; James H. M. Henderson; 8 weeks; $19,000

UNIVERSITY OF HAWAII, Honolulu; Sidney C. Hsiao; 6 weeks; $15,600

KENYON COLLEGE, Gambier, Ohio; Eric S. Graham; 7 weeks; $1,575

MICHIGAN STATE UNIVERSITY, East Lansing; Wayne Taylor; 11 weeks; $94,700

MONTANA STATE COLLEGE, Bozeman; L. O. Binder, Jr.; 5 weeks; $56,275

NEBRASKA WESLEYAN UNIVERSITY, Lincoln; Walter R. French, Jr.; 8 weeks; $64,400

NORTHWESTERN UNIVERSITY, Evanston, Ill.; E. H. C. Hildebrandt; 8 weeks; $72,100

PRINCETON UNIVERSITY, Princeton, N.J.; Joseph G. Bradshaw; 6 weeks; $46,700

TUFTS UNIVERSITY, Medford, Mass.; M. Kent Wilson; 6 weeks; $33,630

SUMMER INSTITUTES FOR HIGH SCHOOL AND JUNIOR COLLEGE TEACHERS

CLARK UNIVERSITY, Worcester, Mass.; John S. Stubbe; 6 weeks; $55,350

COLORADO COLLEGE, Colorado Springs; Richard G. Beidleman; 8 weeks; $87,300

EAST TENNESSEE STATE COLLEGE, Johnson City; Lester C. Hartsell; 8 weeks; $82,400

FLORIDA STATE UNIVERSITY, Tallahassee; Grace C. Madsen; 8 weeks; $40,500

HARVEY MUDD COLLEGE, Claremont, Calif.; Lloyd E. Malm; 6 weeks; $42,050

MISSISSIPPI STATE UNIVERSITY, State College; Clyde Q. Sheely; 11 weeks; $121,800

UNIVERSITY OF MISSISSIPPI, University; Noel A. Childress; 10.6 weeks; $140,400

UNIVERSITY OF OKLAHOMA, Norman; Horace E. Hoffman; 8 weeks; $45,900

OREGON STATE COLLEGE, Corvallis; Albert R. Poole; 8 weeks; $64,800

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Emory P. Starke; 6 weeks; $82,150

SUMMER INSTITUTES FOR HIGH SCHOOL TEACHERS

ADELPHI COLLEGE, Garden City, N.Y.; Howard A. Robinson; 6 weeks; $111,800

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station; James G. Potter; 6 weeks; $79,800

AGRICULTURAL AND TECHNICAL COLLEGE OF NORTH CAROLINA, Greensboro; Gerald A. Edwards; 6 weeks; $58,700

AGRICULTURAL AND TECHNICAL COLLEGE OF NORTH CAROLINA, Greensboro; Gerald A. Edwards; 9 weeks; $58,100

ALABAMA COLLEGE, Montevallo; Paul C. Bailey; 10 weeks; $90,000

UNIVERSITY OF ALABAMA, University; Julian D. Mancill; 11 weeks; $122,400

UNIVERSITY OF ALASKA COLLEGE; William R. Cashen; 8 weeks; $68,800

ALBANY STATE COLLEGE, Albany, Ga.; Alexander A. Hall; 6 weeks; $49,300

ALFRED UNIVERSITY, Alfred, N.Y.; E. Gordon Ogden; 6 weeks; $55,100

ALLEGHENY COLLEGE, Meadville, Pa.; Robert E. Bugbee; 7 weeks; $68,700

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Bruce C. Hunter; 6 weeks; $29,100

AMERICAN UNIVERSITY, Washington, D.C.; Leo Schubert; 7 weeks; $58,700

ANTIOCH COLLEGE, Yellow Springs, Ohio; James F. Corwin; 8 weeks; $84,300

ARIZONA STATE UNIVERSITY, Tempe; Valentine Galasyn; 8 weeks; $69,900

UNIVERSITY OF ARIZONA, Tucson; Millard G. Seeley; 8 weeks; $78,400
Arthur H. Steinbrenner; 8 weeks; $64,480

ARKANSAS STATE COLLEGE, State College; W. W. Nedrow; 5 weeks; $37,000

UNIVERSITY OF ARKANSAS, Fayetteville; Lowell F. Bailey; 6 weeks; $59,200

ATLANTA UNIVERSITY, Ga.; K. A. Huggins; 9 weeks; $63,400

AUBURN UNIVERSITY, Auburn, Ala.; Ernest Williams; 10½ weeks; $79,100
Ernest Williams; 10½ weeks; $61,600

BALDWIN-WALLACE COLLEGE, Berea, Ohio; Dean L. Robb; 6 weeks; $40,200

BAYLOR UNIVERSITY, Waco, Tex.; Bryce C. Brown; 8 weeks; $77,200

BIRMINGHAM-SOUTHERN COLLEGE, Birmingham, Ala.; Wiley S. Rogers; 8 weeks; $71,900

BOARD OF REGENTS OF WISCONSIN STATE COLLEGES, Madison; Eugene R. McPhee; 6 weeks; $46,800

BOSTON COLLEGE, Chestnut Hill, Mass.; Stanley J. Bezuszka; 6 weeks; $980
William G. Guindon, S.J.; 6 weeks; $20,750

BOWDOIN COLLEGE, Brunswick, Maine; Alton H. Gustafson; 6 weeks; $37,400
Samuel E. Kamerling; 6 weeks; $37,400
Reinhard L. Korgen; 6 weeks; $60,600
Noel C. Little; 6 weeks; $14,500

BRADLEY UNIVERSITY, Peoria, Ill.; A. Wayne McGaughey; 6 weeks; $41,500

BROOKLYN COLLEGE, Brooklyn, N.Y.; James Singer; 6 weeks; $34,300

BROWN UNIVERSITY, Providence, R.I.; Leallyn B. Clapp; 6 weeks; $43,800

BUCKNELL UNIVERSITY, Lewisburg, Pa.; Lester Kieft; 6 weeks; $66,300

UNIVERSITY OF BUFFALO, N.Y.; Harriet F. Montague; 6 weeks; $48,750

UNIVERSITY OF CALIFORNIA, Berkeley; Donald C. Bryant; 8 weeks; $19,000
Mario Menesini; 8 weeks; $63,800
Robert A. Rice; 8 weeks; $102,800
Frantisek Wolf; 7 weeks; $56,800
Clifford Bell, Los Angeles; 8 weeks; $44,000
William H. Meyer, Santa Barbara; 6 weeks; $51,700

CARLETON COLLEGE, Northfield, Minn.; Kenneth W. Wegner; 6 weeks; $55,950

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; Paul E. Guenther; 6 weeks; $53,100

CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; Raymond W. Moller; 6 weeks; $51,700

Henry P. Ward; 6 weeks; $41,200

CATHOLIC UNIVERSITY OF PUERTO RICO, Santa Maria; Joseph W. Stander, S.M.; 6 weeks; $41,500

CENTRAL COLLEGE, Fayette, Mo.; N. Christian Nielsen; 9 weeks; $38,500

CENTRAL MICHIGAN UNIVERSITY, Mount Pleasant; Carl A. Scheel; 6 weeks; $39,800

CENTRAL STATE COLLEGE, Wilberforce, Ohio; Bernard H. Johnson; 8 weeks; $32,500

UNIVERSITY OF CINCINNATI, Ohio; H. David Lipsich; 6 weeks; $51,900

CITY COLLEGE, New York, N.Y.; Chester B. Kremer; 6 weeks; $50,100

CLAFLIN COLLEGE, Orangeburg, S.C.; Hampton D. Smith, Sr.; 9 weeks; $74,700

CLARKSON COLLEGE OF TECHNOLOGY, Potsdam, N.Y.; F. Gordon Lindsey; 8 weeks; $86,100

CLEMSON COLLEGE, Clemson, S.C.; Floyd I. Brownley, Jr.; 6 weeks; $57,000

COLBY COLLEGE, Waterville, Maine; Wilfred J. Combellack; 6 weeks; $81,700

COLORADO SCHOOL OF MINES, Golden; James L. Hall; 6 weeks; $46,100

COLORADO STATE COLLEGE, Greeley; John A. Beel; 8 weeks; $63,400

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins; John R. Olive; 8 weeks; $53,800

George H. Splittgerber; 8 weeks; $55,100

UNIVERSITY OF COLORADO, Boulder; Charles R. Bitter; 7 weeks; $47,100

John M. Cleveland; 8 weeks; $600

John M. Cleveland; 8 weeks; $55,200

R. N. Keller; 8 weeks; $108,000

UNIVERSITY OF CONNECTICUT, Storrs; David J. Blick; 6 weeks; $91,500

CONVERSE COLLEGE, Spartanburg, S.C.; Walter James Wyatt; 8 weeks; $73,200

CORNELL UNIVERSITY, Ithaca, N.Y.; M. L. Nichols; 6 weeks; $44,050

R. William Shaw; 6 weeks; $54,900

DAVIS AND ELKINS COLLEGE, Elkins, W. Va.; Louis E. Mattison; 7 weeks; $57,000

UNIVERSITY OF DAYTON, Ohio; K. C. Schraut; 6 weeks; $33,900

UNIVERSITY OF DELAWARE, Newark; John A. Brown; 8 weeks; $70,300

UNIVERSITY OF DETROIT, Michigan; Everette L. Henderson; 6 weeks $54,500

DRAKE UNIVERSITY, Des Moines, Iowa; Rodney A. Rogers; 9 weeks; $69,655

EARLHAM COLLEGE, Richmond, Ind.; Murvel R. Garner; 6 weeks; $25,400

Laurence E. Strong; 6 weeks; $44,100

EAST TEXAS STATE COLLEGE, Commerce; C. B. Wright; 6 weeks; $36,500

EASTERN ILLINOIS UNIVERSITY, Charleston; Weldon N. Baker; 8 weeks; $76,500

EASTERN NEW MEXICO UNIVERSITY, Portales; Ruth B. Thomas; 8 weeks; $77,500

EMORY UNIVERSITY, Atlanta, Ga.; Henry Sharp, Jr.; 6 weeks; $34,530

FAIRLEIGH DICKINSON UNIVERSITY, Rutherford, N.J.; Dolores Elaine Keller, Teaneck; 6 weeks; $40,700

FISK UNIVERSITY, Nashville, Tenn.; Edward L. Maxwell; 8 weeks; $82,400

FLORIDA STATE UNIVERSITY, Tallahassee; C. W. Edington; 8 weeks; $19,000

James E. Snover; 8 weeks; $32,800

UNIVERSITY OF FLORIDA, Gainesville; W. T. Lippincott; 8 weeks; $114,400

FORDHAM UNIVERSITY, New York, N.Y.; Frederick L. Canavan, S.J.; 6 weeks; $47,500

FORT HAYS KANSAS STATE COLLEGE, Hays; Ward L. Sims; 8 weeks; $63,700

FRANKLIN AND MARSHALL COLLEGE, Lancaster, Pa.; Bernard Jacobson; 6 weeks; $39,500

John H. Moss; 8 weeks; $52,900

Richard I. Weller; 8 weeks; $54,712

FURMAN UNIVERSITY, Greenville, S.C.; J. A. Southern; 6 weeks; $44,700

GEORGE PEABODY COLLEGE FOR TEACHERS, Nashville, Tenn.; H. Craig Sipe; 9 weeks; $122,800

GEORGETOWN UNIVERSITY, Washington, D.C.; Malcolm W. Oliphant; 8 weeks; $50,800

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; David Nelson; 8 weeks; $62,200

GEORGIA SOUTHERN COLLEGE, Collegeboro; Burtem J. Bogitsh; 6 weeks; $48,200

GRAMBLING COLLEGE, Grambling, La.; Archie L. Lacey, Hunter College, N.Y.; 8 weeks; $54,200

HAMILTON COLLEGE, Clinton, N.Y.; Brewster H. Gere; 6 weeks; $53,700

UNIVERSITY OF HAWAII, Honolulu; Albert J. Bernatowicz; 6 weeks; $69,900

COLLEGE OF THE HOLY CROSS, Worcester, Mass.; John W. Flavin, S.J.; 6 weeks; $52,600

John J. MacDonnell; 6 weeks; $54,900

HOWARD PAYNE COLLEGE, Brownwood, Tex.; Leonard R. Daniel; 6 weeks; $48,200

HOWARD UNIVERSITY, Washington, D.C; Marie C. Taylor; 8 weeks; $49,900

HUMBOLDT STATE COLLEGE FOUNDATION, Arcata, Calif.; William M. Lanphere; 6 weeks; $61,100

HUNTER COLLEGE, N.Y., N.Y.; Jewell Hughes Bushey; 6 weeks; $47,100

HUSTON-TILLOTSON COLLEGE, Austin, Tex.; J. H. Morton; 6 weeks; $47,100

UNIVERSITY OF IDAHO, Moscow; K. A. Bush; 8 weeks; $41,900

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago; Haim Reingold; 8 weeks; $104,100

UNIVERSITY OF ILLINOIS, Urbana, Ill.; Max Beberman; 6 weeks; $115,650

Arnold M. Hartley; 8 weeks; $35,700

ILLINOIS WESLEYAN UNIVERSITY, Bloomington; Wayne W. Wantland; 8 weeks; $73,300

INDIANA UNIVERSITY, Bloomington, Ind.; Robert B. Fischer; 8 weeks; $51,700

L. S. McClung; 4 weeks; $27,400

T. G. Perry; 6 weeks; $32,200

Paul Weatherwax; 6 weeks; $39,100

Marie S. Wilcox, Thomas Carr Howe High School, Indianapolis; 6 weeks; $50,000

IOWA STATE UNIVERSITY, Ames; Orlando C. Kreider; 6 weeks; $92,900

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; William Kelso Morrill, Sr.; 6 weeks; $70,000

JUNIATA COLLEGE, Huntingdon, Pa.; David M. Hercules; 6 weeks; $40,200

KANSAS STATE COLLEGE OF PITTSBURG; R. G. Smith; 8 weeks; $76,700

KANSAS STATE TEACHERS COLLEGE, Emporia; Otto M. Smith; 12 weeks; $229,050

KANSAS STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Manhattan; J. R. Chelikowsky; 8 weeks; $55,500

Leonard E. Fuller; 8 weeks; $59,000

UNIVERSITY OF KANSAS, Lawrence; Russell N. Bradt; 8 weeks; $100,800

Edward I. Shaw; 8 weeks; $20,200

KENT STATE UNIVERSITY, Kent, Ohio; Kenneth B. Cummins; 8 weeks; $67,500

KENTUCKY RESEARCH FOUNDATION, Lexington; John M. Carpenter; 8 weeks; $100,600

KENYON COLLEGE, Gambier, Ohio; E. S. Graham; 6 weeks; $39,670

KNOX COLLEGE, Galesburg, Ill.; Herbert Priestley; 6 weeks; $52,000

Rothwell Stephens; 6 weeks; $50,150

LEHIGH UNIVERSITY, Bethlehem, Pa.; Clarence A. Shook; 6 weeks; $45,400

LOUISIANA STATE UNIVERSITY, Baton Rouge; Benjamin E. Mitchell; 9 weeks; $42,100

UNIVERSITY OF MAINE, Orono; S. H. Kimball; 6 weeks; $49,300

MARQUETTE UNIVERSITY, Milwaukee, Wis.; Raymond A. Bournique; 8 weeks; $54,000

L. J. Heider; 6 weeks; $35,000

MARSHALL FOUNDATION, INC., Huntington, W. Va.; Donald C. Martin; 11 weeks: $900

UNIVERSITY OF MARYLAND, College Park; Joshua R. C. Brown; 7 weeks; $84,200

MIAMI UNIVERSITY, Oxford, Ohio; Bruce V. Weidner; 8 weeks; $105,000

MICHIGAN COLLEGE OF MINING AND TECHNOLOGY, Houghton; Donald G. Yerg; 8 weeks; $62,200

MICHIGAN STATE UNIVERSITY, East Lansing; Sherwood Haynes; 11 weeks; $67,825

T. Wayne Porter, Hickory Corners; 8 weeks; $38,500

MIDDLE TENNESSEE STATE COLLEGE, Murfreesboro; J. Eldred Wiser; 11 weeks; $100,700

UNIVERSITY OF MINNESOTA, Minneapolis, Frank Verbrugge; 10 weeks; $113,250

David W. French, Lake Itasca; 5 weeks; $20,400

Francis A. Spurrell, St. Paul; 6 weeks; $14,500

MISSISSIPPI SOUTHERN COLLEGE, Hattiesburg; J. Fred Walker; 9 weeks; $103,400

UNIVERSITY OF MISSOURI, Columbia; Robert F. Brooks; 8 weeks; $61,000

Wesley J. Dale; 8 weeks; $64.300

Harold Q. Fuller, Rolla; 8 weeks; $95,200

MONTANA STATE UNIVERSITY, Missoula; Gorddon B. Castle; 8 weeks; $14,400

James W. Gebhart; 10 weeks; $78,600

William M. Myers; 10 weeks; $60,000

MONTCLAIR STATE COLLEGE, Upper Montclair, N.J.; Max A. Sobel; 6 weeks; $72,900

MORGAN STATE COLLEGE, Baltimore, Md., Thomas P. Fraser; 6 weeks; $60,700

MURRAY STATE COLLEGE FOUNDATION, Murray, Ky.; Alfred M. Wolfson; 8 weeks; $80,900

UNIVERSITY OF NEBRASKA, Lincoln; John R. Demuth; 8 weeks; $83,200

Walter E. Mientka; 8 weeks; $39,600

UNIVERSITY OF NEVADA, Reno; R. N. Tompson; 6 weeks; $48,350

UNIVERSITY OF NEW HAMPSHIRE, Durham; Harold A. Iddles; 8 weeks; $85,500

Shepley L. Ross; 8 weeks; $74,700

NEW MEXICO HIGHLANDS UNIVERSITY, Las Vegas; Vera Usdin; 5 weeks; $24,200

UNIVERSITY OF NEW MEXICO, Albuquerque; Frank C. Gentry; 8 weeks; $64,900

Loren D. Potter; 9 weeks; $21,300

NORTH CAROLINA COLLEGE AT DURHAM, Durham; William H. Robinson; 6 weeks; $78,300

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; Roy L. Ingram; 6 weeks; $38,400

NORTH DAKOTA AGRICULTURAL COLLEGE, Fargo; F. L. Minnear; 8 weeks; $97,900

UNIVERSITY OF NORTH DAKOTA, Grand Forks; J. Donald Henderson; 8 weeks; $79,700

NORTH TEXAS STATE COLLEGE, Denton; Robert C. Sherman; 9 weeks; $33,700

NORTHERN MICHIGAN COLLEGE, Marquette; Lucian F. Hunt; 6 weeks; $60,450

NORTHWESTERN STATE COLLEGE OF LOUISIANA, Natchitoches; George A. Stokes; 9 weeks; $65,600

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; Arnold E. Ross; 7 weeks; $107,000

OAK RIDGE INSTITUTE OF NUCLEAR STUDIES, Oak Ridge, Tenn.; Ralph T. Overman; 4 weeks; $31,300

OBERLIN COLLEGE, Oberlin, Ohio; Wade Ellis; 8 weeks; $104,400

OCCIDENTAL COLLEGE, Los Angeles, Calif.; Patrick H. Wells; 6 weeks; $40,100

OHIO STATE UNIVERSITY, Columbus; Robert C. Fisher; 8 weeks; $79,800

John S. Richardson; 8 weeks; $78,300

OHIO UNIVERSITY FUND INC., Athens; Lawrence P. Eblin; 6 weeks; $57,900

OHIO WESLYAN UNIVERSITY, Delaware; William D. Stull; 8 weeks; $82,500

OKLAHOMA BAPTIST UNIVERSITY, Shawnee; J. O. Purdue; 8 weeks; $42,400

OKLAHOMA STATE UNIVERSITY, Stillwater; James H. Zant; 8 weeks; $67,400

UNIVERSITY OF OKLAHOMA, Norman; Horace H. Bliss; 4 weeks; $40,300

Horace H. Bliss; 8 weeks; $38,700

Horace H. Bliss; 9 weeks; $82,700

OREGON STATE COLLEGE, Corvallis; Stanley E. Williamson; 8 weeks; $65,600

UNIVERSITY OF OREGON, Eugene; Robert W. Morris; 8 weeks; $94,580

A. F. Moursund; 8 weeks; $63,600

UNIVERSITY OF THE PACIFIC, Stockton, Calif.; Alexander Vavoulis; 10 weeks; $75,200

UNIVERSITY OF PENNSYLVANIA, Philadelphia; J. F. Hazel; 6 weeks; $80,500

PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE, Pa.; Arthur Osol; 6 weeks; $28,250

UNIVERSITY OF PITTSBURGH, Pa.; John C. Knipp; 6 weeks; $31,800

PRAIRIE VIEW AGRICULTURAL AND MECHANICAL COLLEGE, Prairie View, Tex.; E. E. O'Banion; 6 weeks; $50,900

PRINCETON UNIVERSITY, Princeton, N.J.; Joseph G. Bradshaw; 6 weeks; $40,650

UNIVERSITY OF PUERTO RICO, Rio Piedras; Augusto Bobonis; 8 weeks; $91,800
Jose A. Ferrer-Monge, Mayaguez; 6 weeks; $13,800
Mariano Garcia; 7 weeks; $57,800

PURDUE UNIVERSITY, Lafayette, Ind.; John E. Christian; 6 weeks; $14,500
D. A. Davenport; 8 weeks; $600
M. Wiles Keller; 8 weeks; $69,800
R. W. Lefler; 8 weeks; $600
R. W. Lefler; 8 weeks; $41,600
J. D. Novak; 8 weeks; $69,700

RANDOLPH-MACON WOMAN'S COLLEGE, Lynchburg, Va.; Helen L. Whidden; 6 weeks; $60,500

REED COLLEGE, Portland, Oreg.; Frederick A. Courts; 8 weeks; $39,600
Burrowes Hunt; 8 weeks; $71,000
Arthur H. Livermore; 6 weeks; $43,350

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany; M. Ira Dubins; 6 weeks; $39,000
Edgar W. Flinton; 6 weeks; $48,300

RESEARCH FOUNDATION OF THE UNIVERSITY OF TOLEDO, Ohio; Archie N. Solberg; 8 weeks; $62,000

UNIVERSITY OF RHODE ISLAND, Kingston; Elmer A. Palmatier; 6 weeks; $41,800

UNIVERSITY OF ROCHESTER, N.Y.; John J. Montean; 6 weeks; $51,700
John J. Montean; 6 weeks; $40,000
John J. Montean; 6 weeks; $49,100

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Raymond M. Manganelli; 6 weeks; $41,500
Richard K. Olsson; 6 weeks; $40,000
Paul G. Pearson; 6 weeks; $41,600
Robert L. Sells; 7 weeks; $46,900

ST. AUGUSTINE'S COLLEGE, Raleigh, N.C.; Jeffery Gipson; 6 weeks; $50,200

SAINT CLOUD STATE COLLEGE, St. Cloud, Minn.; Harold Hopkins; 5 weeks; $50,000

ST. LOUIS UNIVERSITY, Mo.; Francis Regan; 6 weeks; $49,550

COLLEGE OF SAINT THOMAS, St. Paul, Minn.; Martin Allen; 6 weeks; $24,500

SAN JOSE STATE COLLEGE, San Jose, Calif.; Max Kramer; 6 weeks; $49,000
Charles E. Smith, Jr.; 6 weeks; $500

UNIVERSITY OF SANTA CLARA, Santa Clara, Calif.; Alvin M. White; 6 weeks; $48,700

SETON HILL COLLEGE, Greensburg, Pa.; Sister Mary Thaddeus; 6 weeks; $43,000

SETON HALL UNIVERSITY, South Orange, N.J.; F. Leo Lynch, Jr.; 6 weeks; $34,100

SIMMONS COLLEGE, Boston, Mass.; Philip M. Richardson; 6 weeks; $24,700

SOUTH CAROLINA STATE COLLEGE, Orangeburg; Algernon S. Belcher; 8 weeks; $58,300

UNIVERSITY OF SOUTH CAROLINA, Columbia; W. L. Williams; 8 weeks; $82,600

SOUTH DAKOTA SCHOOL OF MINES AND TECHNOLOGY, Rapid City; Howard C. Peterson; 8 weeks; $128,900

SOUTH DAKOTA STATE COLLEGE, Brookings; Kenneth E. Howard; 8 weeks; $63,600

SOUTHEASTERN STATE COLLEGE, Durant, Okla.; Leslie A. Dwight; 8 weeks; $69,600

SOUTHERN ILLINOIS UNIVERSITY, Carbondale; Morton R. Kenner; 8 weeks; $51,900
I. L. Shechmeister; 8 weeks; $61,800

SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.; Joe P. Harris, Jr.; 6 weeks; $30,100

SOUTHERN UNIVERSITY, Baton Rouge, La.; Leon R. Roddy; 8 weeks; $56,900

UNIVERSITY OF SOUTHWESTERN LOUISIANA, Lafayette; James R. Oliver; 9 weeks; $55,200
James R. Oliver; 9 weeks; $47,700

SOUTHWESTERN STATE COLLEGE, Weatherford, Okla.; Earl A. Reynolds; 8 weeks; $50,600

UNIVERSITY OF THE SOUTH, Sewanee, Tenn.; H. Malcolm Owen; 8 weeks; $57,500

STANFORD UNIVERSITY, Stanford, Calif.; Harold M. Bacon; 6 weeks; $51,600

STATE COLLEGE OF IOWA, Cedar Falls; Irvin H. Brune; 8 weeks; $60,500
Dorothy C. Matala; 8 weeks; $37,500

STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion; C. R. Estee; 8 weeks; $77,600
M. M. Hasse; 8 weeks; $64,700

STEPHEN F. AUSTIN STATE COLLEGE, Nacogdoches, Tex.; E. L. Miller; 6 weeks; $31,000

STETSON UNIVERSITY, De Land, Fla.; Gene W. Medlin; 8 weeks; $62,400

STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N.J.; Robert H. Seavy; 6 weeks; $63,100

SYRACUSE UNIVERSITY, N.Y.; William R. Fredrickson; 6 weeks; $450

TENNESSEE AGRICULTURAL AND INDUSTRIAL STATE UNIVERSITY, Nashville; Rutherford H. Adkins; 8 weeks; $51,500

TENNESSEE POLYTECHNIC INSTITUTE, Cookeville; G. B. Pennebaker; 8 weeks; $92,200

UNIVERSITY OF TENNESSEE, Knoxville; Edgar D. Eaves; 8 weeks; $62,500

TEXAS CHRISTIAN UNIVERSITY, Fort Worth; E. R. Alexander; 6 weeks; $94,100

TEXAS SOUTHERN UNIVERSITY, Houston; Robert J. Terry; 12 weeks; $93,500

TEXAS TECHNICAL COLLEGE, Lubbock; Charles L. Riggs; 6 weeks; $46,300

UNIVERSITY OF TEXAS, Austin; Addison E. Lee; 9 weeks; $114,775

TEXAS WOMAN'S UNIVERSITY, Denton; Harold T. Baker; 9 weeks; $21,300
Harlan C. Miller; 6 weeks; $38,700

THIEL COLLEGE, Greenville, Pa.; Bela G. Kolossvary; 6 weeks; $51,300

TUFTS UNIVERSITY, Medford, Mass.; M. Kent Wilson; 6 weeks; $43,600

TULANE UNIVERSITY, New Orleans, La.; Joseph E. Gordon; 9 weeks; $59,400

UTAH STATE UNIVERSITY, Logan; Joe Elich; 10 weeks; $79,550

UNIVERSITY OF UTAH, Salt Lake City; E. Allan Davis; 7 weeks; $61,800
Thomas J. Parmley; 10 weeks; $83,600

VASSAR COLLEGE, Poughkeepsie, N.Y.; A. Scott Warthin, Jr.; 6 weeks; $37,700

UNIVERSITY OF VERMONT, Burlington; N. James Schoonmaker; 7 weeks; $67,000
Nelson L. Walbridge; 8 weeks; $67,800

VIRGINIA STATE COLLEGE, Petersburg; Richard H. Dunn; 8 weeks; $96,800

UNIVERSITY OF VIRGINIA, Charlottesville; James W. Cole, Jr.; 8 weeks; $79,300

WAKE FOREST COLLEGE, Winston-Salem, N.C.; Ivey C. Gentry; 6 weeks; $58,220

WASHINGTON STATE UNIVERSITY, Pullman; Alfred B. Butler; 8 weeks; $90,600

UNIVERSITY OF WASHINGTON, Seattle; Richard H. Fleming; 9 weeks; $42,700
E. C. Lingafelter; 5 weeks; $32,300
L. A. Sanderman; 8 weeks; $61,400

WAYNE STATE UNIVERSITY, Detroit, Mich., Walter Chavin; 8 weeks; $19,000
Karl W. Folley; 8 weeks; $66,700

WESLEYAN UNIVERSITY, Middletown, Conn.; Joseph S. Daltry; 6 weeks; $478

WESTERN KENTUCKY STATE COLLEGE, Bowling Green; Ward C. Sumpter; 8 weeks; $81,600

WESTERN MICHIGAN UNIVERSITY, Kalamazoo; James H. Powell; 6 weeks; $59,400

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; William M. Heston; 11 weeks; $119,000

WESTERN WASHINGTON COLLEGE OF EDUCATION, Bellingham; Sheldon T. Rio; 8 weeks; $49,200

COLLEGE OF WILLIAM AND MARY, Williamsburg, Va.; Melvin A. Pittman; 8 weeks; $118,616

WISCONSIN STATE COLLEGE, River Falls; Theodore Setterquist; 8 weeks; $51,800
Joseph W. Horton; 8 weeks; $36,700
Richard J. Delorit; 8 weeks; $39,900

UNIVERSITY OF WISCONSIN, Madison; Robert A. Jaggard, Milwaukee; 8 weeks; $61,700

WITTENBERG UNIVERSITY, Springfield, Ohio; Norman E. Dodson; 8 weeks; $44,500

WORCESTER POLYTECHNIC INSTITUTE, Worcester, Mass.; Richard F. Morton; 8 weeks; $81,600

UNIVERSITY OF WYOMING, Laramie; Carl A. Cinnamon; 8 weeks; $20,400
Samuel W. Harding; 10 weeks; $99,000
W. Norman Smith; 5 weeks; $41,600

YALE UNIVERSITY, New Haven, Conn.; Stuart R. Brinkley; 6 weeks; $88,150

YESHIVA UNIVERSITY, New York, N.Y.; Abe Gelbart; 8 weeks; $45,000

SUMMER INSTITUTE FOR JUNIOR AND SENIOR HIGH SCHOOL TEACHERS

UNIVERSITY OF CALIFORNIA, Berkeley; John H. Chilcott, Santa Barbara; 6 weeks; $37,800

SUMMER INSTITUTES FOR JUNIOR HIGH SCHOOL TEACHERS

BOWLING GREEN STATE UNIVERSITY, Bowling Green, Ohio; Bruce R. Vogeli; 5 weeks; $42,200

CARLETON COLLEGE, Northfield, Minn.; Robert T. Mathews; 6 weeks; $46,400

CENTRAL CONNECTICUT STATE COLLEGE, New Britain; Richard L. Mentzer; 6 weeks; $49,400

COLGATE UNIVERSITY, Hamilton, N.Y.; Oran B. Stanley; 6 weeks; $58,900

COLUMBIA UNIVERSITY, New York, N.Y.; Frederick L. Fitzpatrick; 6½ weeks; $30,300

DEPAUW UNIVERSITY, Greencastle, Ind.; Donald J. Cook; 6 weeks; $44,400

EASTERN MICHIGAN UNIVERSITY, Ypsilanti; James M. Barnes; 6 weeks; $60,800

HOPE COLLEGE, Holland, Mich.; Jay E. Folkert; 6 weeks; $42,100

INDIANA STATE TEACHERS COLLEGE, Terre Haute; John C. Hook; 10 weeks; $89,800

INTER AMERICAN UNIVERSITY OF PUERTO RICO, San German; Ismael Valez; 7 weeks; $45,900

IOWA STATE TEACHERS COLLEGE, Cedar Falls; Dorothy C. Matala; 8 weeks; $61,000

KANSAS STATE COLLEGE OF PITTSBURG; Margaret B. Parker; 8 weeks; $54,300

LOS ANGELES STATE COLLEGE FOUNDATION, Calif.; Wesley O. Griesel; 8 weeks; $62,700

MACALESTER COLLEGE, St. Paul, Minn.; Russell B. Hastings; 8 weeks; $72,900

UNIVERSITY OF MARYLAND, College Park; Stanley B. Jackson; 6 weeks; $34,300

UNIVERSITY OF MICHIGAN, Ann Arbor; Joseph N. Payne; 6 weeks; $50,000

SACRAMENTO STATE COLLEGE FOUNDATION, Calif.; Carl E. Ludwig; 6 weeks; $59,800

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany; Alexander G. Major, Potsdam; 6 weeks; $62,989

SAN JOSE STATE COLLEGE, San Jose, Calif.; Leonard I. Holder; 6 weeks; $47,800

SOUTHERN OREGON COLLEGE, Ashland; Irene Hollenbeck; 6 weeks; $49,826

SOUTHWEST MISSOURI STATE COLLEGE, Springfield; Carl V. Fronabarger; 6 weeks; $28,400

SYRACUSE UNIVERSITY, N.Y.; Robert B. Davis; 6 weeks; $49,150

UTAH STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Logan; Neville C. Hunsaker; 10 weeks; $80,800

VALPARAISO UNIVERSITY, Valparaiso, Ind.; Arthur E. Hallerberg; 7 weeks; $41,000

WASHBURN UNIVERSITY OF TOPEKA, Kans.; Laura Z. Greene; 8 weeks; $64,900

WEST VIRGINIA WESLEYAN COLLEGE, Buckhannon; William A. Hallam; 6 weeks; $55,000

WESTERN MICHIGAN UNIVERSITY, Kalamazoo; George G. Mallinson; 8 weeks; $48,800

WISCONSIN STATE COLLEGE, Eau Claire; Chester P. Olson; 8 weeks; $37,900

SUMMER INSTITUTES FOR ELEMENTARY SCHOOL TEACHERS

ARIZONA STATE UNIVERSITY, Tempe; Theodore W. Munch; 6 weeks; $31,300

BELOIT COLLEGE, Beloit, Wis.; John L. Biester; 8 weeks; $45,800

BIRMINGHAM-SOUTHERN COLLEGE, Birmingham, Ala.; Hoyt M. Kaylor; 8 weeks; $27,800

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Edith R. Schneckenburger; 6 weeks; $32,900

DEPAUW UNIVERSITY, Greencastle, Ind.; Donald J. Cook; 6 weeks; $25,800

EASTERN MICHIGAN UNIVERSITY, Ypsilanti; Albert W. Brown; 6 weeks; $35,000

UNIVERSITY OF FLORIDA, Gainesville; G. Marian Young; 8 weeks; $44,200

UNIVERSITY OF ILLINOIS, Urbana; David A. Page; 8 weeks; $46,600

NEW JERSEY STATE SCHOOL OF CONSERVATION, Branchville; James Cruise, Trenton; 6 weeks; $32,400

NORTHERN ILLINOIS UNIVERSITY, DeKalb; Frederick W. Rolf; 8 weeks; $44,800

NORTHERN MICHIGAN COLLEGE, Marquette; Henry S. Heimonen; 6 weeks; $35,000

UNIVERSITY OF OREGON, Eugene; Edwin G. Ebbighausen; 8 weeks; $42,200

PENNSYLVANIA STATE UNIVERSITY, University Park; H. Seymour Fowler; 6 weeks; $34,200

PRAIRIE VIEW AGRICULTURAL AND MECHANICAL COLLEGE, Prairie View, Tex.; Israel E. Glover; 6 weeks; $28,700

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Robert L. Swain; 6 weeks; $35,500

COLLEGE OF ST. CATHERINE, St. Paul, Minn.; Sister Seraphim, C.S.J.; 6 weeks; $30,600

SAN FERNANDO VALLEY STATE COLLEGE FOUNDATION, Northridge, Calif.; Ruth L. Roche; 6 weeks; $32,300

SOUTHEASTERN STATE COLLEGE, Durant, Okla.; Leslie A. Dwight; 4 weeks; $20,800

UNIVERSITY OF TEXAS, Austin; W. T. Guy, Jr.; 6 weeks; $31,100

SPECIAL GRANTS IN SUPPLEMENT TO 1960 SUMMER INSTITUTES

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station; James G. Potter; 12 weeks; $3,750

BOSTON UNIVERSITY, Mass.; George P. Fulton; 6 weeks; $1,800

CENTRAL MISSOURI STATE COLLEGE, Warrensburg; Sam B. Hewitt; 10 weeks; $10,900

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins; John J. Faris; 8 weeks; $13,250

UNIVERSITY OF DETROIT, Mich.; Lyle E. Mehlenbacher; 6 weeks; $6,250

MOREHEAD STATE COLLEGE, Morehead, Ky.; William B. Owsley; 8 weeks; $6,000

NEW MEXICO HIGHLANDS UNIVERSITY, Las Vegas; Galen W. Ewing; 8 weeks; $6,900

NORTHWESTERN STATE COLLEGE OF LOUISIANA, Natchitoches; W. G. Erwin; 9 weeks; $2,250

PENNSYLVANIA STATE UNIVERSITY, University Park; William H. Powers; 6 weeks; $20,350

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; A. A. K. Booth; 8 weeks; $11,900

ST. LOUIS UNIVERSITY, Mo.; Earl P. Murphy; 6 weeks; $800

SEATTLE UNIVERSITY, Wash.; Ernest P. Bertin; 8 weeks; $5,700

WEST VIRGINIA UNIVERSITY, Morgantown; James B. Hickman; 6 weeks; $9,050

SUMMER CONFERENCE FOR COLLEGE TEACHERS

AMERICAN UNIVERSITY, Washington, D.C.; Matthew F. Norton; 14 days; $19,200

UNIVERSITY OF ARKANSAS, Fayetteville; William R. Orton; 19 days; $13,000

BUTLER UNIVERSITY, Indianapolis, Ind.; Ralph K. Birdwhistell; 14 days; $16,100

UNIVERSITY OF CALIFORNIA, Berkeley; Richard M. Fulrath; 12 days; $11,800

Vernon A. Kramer; 20 days; $17,900

Paul B. Johnson, Los Angeles; 26 days; $18,000

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins; Franklin A. Graybill; 26 days; $21,100

Donald R. Wood; 19 days; $14,300

UNIVERSITY OF FLORIDA, Gainesville; Wallace S. Brey, Jr.; 11 days; $13,100

GEORGETOWN UNIVERSITY, Washington, D.C.; Matthew P. Thekaekara; 24 days; $21,300

INSTITUTE OF PAPER CHEMISTRY, Appleton, Wis.; Elwood O. Dillingham; 12 days; $12,400

KANSAS STATE UNIVERSITY, Manhattan; Warren W. Brandt; 13 days; $14,000

MICHIGAN COLLEGE OF MINING AND TECHNOLOGY, Houghton; Kenneth M. McMillin; 19 days; $7,500

MONTCLAIR STATE COLLEGE, Upper Montclair, N.J.; Max A. Sobel; 24 days; $17,800

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; Victor A. Greulach; 19 days; $14,100

OKLAHOMA STATE UNIVERSITY, Stillwater; James H. Zant; 21 days; $19,700

UNIVERSITY OF OKLAHOMA, Norman; Richard V. Andree; 23 days; $29,000

PURDUE UNIVERSITY, Lafayette, Ind.; John F. Schafer; 12 days; $13,900

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Richard F. Gabriel; 20 days; $16,600

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles; Robert D. Vold; 16 days; $13,600

TEMPLE UNIVERSITY, Philadelphia, Pa.; Elmer L. Offenbacher; 20 days; $18,000

TUFTS UNIVERSITY, Medford, Mass.; M. Kent Wilson; 11 days; $14,500

WASHINGTON AND JEFFERSON COLLEGE, Washington, Pa.; Wray G. Brady; 12 days; $9,100

SUMMER SCIENCE TRAINING PROGRAM FOR SECONDARY SCHOOL STUDENTS

AGRICULTURAL, MECHANICAL, AND NORMAL COLLEGE, Pine Bluff, Ark.; Rufus L. Caine; 5 weeks; $5,870

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station; Melvin Eisner; 5 weeks; $7,355

Jack T. Kent; 6 weeks; $8,775

William S. McCulley; 6 weeks; $7,520

Fred E. Smith; 6 weeks; $9,345

John J. Sperry; 6 weeks; $6,115

AGRICULTURAL AND TECHNICAL COLLEGE OF NORTH CAROLINA, Greensboro; Booker T. White; 6 weeks; $17,740

UNIVERSITY OF ALASKA COLLEGE, William S. Wilson; 3 weeks; $13,585

AMERICAN ACADEMY OF ARTS AND SCIENCES, Brookline, Mass.; William Stergios; 10 weeks; $23,585

AMERICAN METEOROLOGICAL SOCIETY, Boston, Mass.; Vincent J. Schaefer; 7 weeks; $17,720

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Franklyn M. Branley; 4 weeks; $8,260

APPALACHIAN STATE TEACHERS COLLEGE, Boone, N.C.; F. Ray Derrick; 5 weeks; $13,680

ARIZONA STATE COLLEGE, Flagstaff; J. Harvey Butchart; 5 weeks; $6,815

UNIVERSITY OF ARIZONA, Tucson; Henry Freiser; 10 weeks; $14,620

ASBURY COLLEGE, Wilmore, Ky.; J. Paul Ray; 8 weeks; $10,875

ASSUMPTION COLLEGE, Worcester, Mass.; Alfons J. van der Linden; 6 weeks; $14,765

AUBURN UNIVERSITY, Auburn, Ala.; Joseph T. Hood; 6 weeks; $5,370

AUGSBURG COLLEGE AND THEOLOGICAL SEMINARY, Minneapolis, Minn.; Courtland L. Agre; 6 weeks; $4,950

BENNETT COLLEGE, Greensboro, N.C.; J. Henry Sayles; 6 weeks; $23,835

BOWLING GREEN STATE UNIVERSITY, Bowling Green, Ohio; W. H. Hall; 5 weeks; $5,495

UNIVERSITY OF BRIDGEPORT, Bridgeport, Conn.; Earle M. Bigsbee; 7 weeks; $22,970

BROWN UNIVERSITY, Providence, R.I.; Charles B. MacKay; 6 weeks; $20,430

BUCKNELL UNIVERSITY, Lewisburg, Pa.; Lester Kieft; 13 weeks; $9,635

UNIVERSITY OF BUFFALO, N.Y.; Robert Guthrie; 8 weeks; $12,570

BUTLER UNIVERSITY, Indianapolis, Ind.; William H. Bessey; 7 weeks; $6,470

UNIVERSITY OF CALIFORNIA, Berkeley; Howard A. Shugart; 9 weeks; $19,920
 Frantisek Wolf; 6 weeks; $6,725
 Moshe Shifrine, Davis; 6 weeks; $15,420
 Norris W. Rakestraw, La Jolla; 10 weeks; $5,515
 Clifford Bell, Los Angeles; 6 weeks, $7,425

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; E. M. Williams; 9 weeks; $2,615

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; L. J. Green; 6 weeks; $4,885

CENTRAL MICHIGAN UNIVERSITY, Mount Pleasant; Malcolm H. Filson; 6 weeks; $12,010

CHAPMAN COLLEGE, Orange, Calif.; Peter Coad; 9 weeks; $5,650

CHICAGO ACADEMY OF SCIENCES, Ill.; William J. Beecher; 1 year; $12,075

CITY COLLEGE OF NEW YORK, New York. N.Y.; Chester B. Kremer; 6 weeks, $13,480

COLGATE UNIVERSITY, Hamilton, N.Y.; Robert E. Todd; 6 weeks; $14,960

COLORADO COLLEGE, Colorado Springs; Richard G. Beidleman; 8 weeks; $9,670

COLORADO SCHOOL OF MINES, Golden; James L. Hall; 6 weeks; $13,985

COLORADO-WYOMING ACADEMY OF SCIENCE, Boulder; Richard G. Beidleman, Colorado College; 1 year; $3,350

COMMITTEE FOR ADVANCE SCIENCE TRAINING, Los Angeles, Calif.; Harry Sobel; 10 weeks; $7,985

COOPER UNION FOR THE ADVANCEMENT OF SCIENCE AND ART, N.Y., N.Y.; Edward M. Griswold; 6 weeks; $22,585

DENISON UNIVERSITY, Granville, Ohio; Robert W. Alrutz; 8 weeks; $8,140

UNIVERSITY OF DENVER, Colo.; R. B. Feagin; 9 weeks; $6,125

EASTERN ILLINOIS UNIVERSITY, Charleston; Weldon N. Baker; 8 weeks; $13,480

EAST TEXAS STATE COLLEGE, Commerce; C. B. Wright; 6 weeks; $6,450

EMORY AND HENRY COLLEGE, Emory, Va.; Marius Blesi; 5 weeks; $6,795

EMORY UNIVERSITY, Atlanta, Ga.; James George Lester; 5 weeks; $20,750

UNIVERSITY OF FLORIDA, Gainesville; Luther A. Arnold; 8 weeks; $10,470

FLORIDA STATE UNIVERSITY, Tallahassee; Eugene D. Nichols; 6 weeks; $7,925

GENEVA COLLEGE, Beaver Falls, Pa.; Roy M. Adams; 9 weeks; $6,800

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; Martin Alexander Mason; 4 weeks; $5,050

UNIVERSITY OF GEORGIA, Athens; Thomas H. Whitehead; 6 weeks; $10,700

UNIVERSITY OF HAWAII, Honolulu, Donald C. McGuire; 7 weeks; $16,790

COLLEGE OF THE HOLY NAMES, Oakland, Calif.; Sister Mary Baptista; 6 weeks; $9,070

UNIVERSITY OF HOUSTON, Tex.; John C. Allred; 6 weeks; $12,375

HOWARD UNIVERSITY, Washington, D.C.; Herman Branson; 8 weeks; $12,540

HUMBOLDT STATE COLLEGE FOUNDATION, Arcata, Calif.; John E. Butler; 4 weeks; $12,970

HUNTER COLLEGE, N.Y., N.Y.; Melvin S. Schwartz; 6 weeks; $6,865
 Henry D. Thompson; 5 weeks; $4,505

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago; Haim Reingold; 36 weeks, $17,650

UNIVERSITY OF ILLINOIS, Urbana; Jerry S. Dobrovolny; 6 weeks; $11,335

INDIANA UNIVERSITY, Bloomington; Paul Klinge; 8 weeks; $20,070

INTER AMERICAN UNIVERSITY, San German, P.R.; Ismael Velez; 6 weeks; $13,675

JACKSON STATE COLLEGE, Jackson, Miss.; Benjamin H. McLemore; 6 weeks; $6,295

JOINT BOARD ON SCIENCE EDUCATION, Washington, D.C.; Leo Schubert, American University; 8 weeks; $2,500

KANSAS STATE TEACHERS COLLEGE, Emporia; Otto M. Smith; 6 weeks; $13,520

UNIVERSITY OF KANSAS, Lawrence; Robert W. Baxter; 8 weeks; $17,760

KENYON COLLEGE, Gambier, Ohio; Daniel T. Finkbeiner; 4 weeks; $12,010

LASALLE COLLEGE, Philadelphia, Pa.; John S. Penny; 8 weeks; $6,765

LEHIGH UNIVERSITY, Bethlehem, Pa.; Albert Wilansky; 6 weeks; $5,845

LE MOYNE COLLEGE, Memphis, Tenn.; W. W. Gibson; 6 weeks; $10,575

LIVINGSTONE COLLEGE, Salisbury, N.C.; Victor Julius Tulane; 6 weeks; $9,215

LONG BEACH STATE COLLEGE FOUNDATION, Long Beach, Calif.; Darwin Lyell Mayfield; 9 weeks; $885

LOUISIANA POLYTECHNIC INSTITUTE, Ruston; William R. Higgs; 9 weeks; $15,970

LOUISIANA STATE UNIVERSITY, Baton Rouge; Harry J. Bennett; 9 weeks; $4,675
John F. Christman; 9 weeks; $19,355

LOYOLA UNIVERSITY OF LOS ANGELES, Calif.; Clarence J. Wallen; 30 weeks; $2,865

MANCHESTER COLLEGE, North Manchester, Ind.; Harry R. Weimer; 8 weeks; $6,895

MANHATTAN COLLEGE, New York, N.Y.; C. Leonard O'Connor; 6 weeks; $10,210

UNIVERSITY OF MARYLAND, College Park; Howard Laster; 13 weeks; $6,020

UNIVERSITY OF MIAMI, Coral Gables, Fla.; J. H. Curtiss; 6 weeks; $9,670
Clarence Pervis Idyll; 9 weeks; $9,095

MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing; M. Isobel Blyth; 6 weeks; $22,120

MISSISSIPPI STATE UNIVERSITY, State College; Clyde Q. Sheely; 4 weeks; $12,620

UNIVERSITY OF MISSOURI, Columbia; Charles Roy Remington, Jr., Rolla; 7 weeks; $13,940

MONTANA STATE COLLEGE, Bozeman; Charles Crane Bradley; 10 weeks; $8,460

MORGAN STATE COLLEGE, Baltimore, Md.; John W. King; 6 weeks; $17,935

MURRAY STATE COLLEGE, Murray, Ky.; W. E. Blackburn; 8 weeks; $20,295

NASSON COLLEGE, Springvale, Maine; Lamar Washington; 6 months; $18,000

NATIONAL CHILDREN'S CARDIAC HOSPITAL, Miami, Fla.; Milton S. Saslaw; 16 months; $8,570

NEWARK COLLEGE OF ENGINEERING RESEARCH FOUNDATION, N.J.; Joseph M. Fitzgerald; 5 weeks; $3,220

NEW MEXICO STATE UNIVERSITY OF AGRICULTURE, ENGINEERING, AND SCIENCE, University Park; E. L. Cleveland; 6 weeks; $7,180

NEW YORK UNIVERSITY, N.Y., N.Y.; Harry A. Charipper; 6 weeks; $5,065

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; Samuel B. Knight; 6 weeks; $18,245
Hollis J. Rogers, Greensboro; 4 weeks; $6,840

NORTH CAROLINA COLLEGE; DURHAM; James Sumner Lee; 6 weeks; $14,680

UNIVERSITY OF NORTH DAKOTA, Grand Forks; Paul B. Kannowski; 6 weeks; $8,630

NORTH DAKOTA STATE UNIVERSITY, Fargo; H. G. Heggeness; 8 weeks; $12,785

NORTHEASTERN UNIVERSITY, Boston, Mass.; Charles M. Goolsby; 6 weeks; $10,300

NORTHERN MICHIGAN COLLEGE, Marquette; Henry S. Heimonen; 4 weeks; $10,900

NORTHWESTERN UNIVERSITY, Evanston, Ill.; F. G. Seulberger; 5 weeks; $21,955

NORTHWESTERN STATE COLLEGE OF LOUISIANA, Natchitoches; Richard E. Garth; 9 weeks; $5,195

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; Arnold E. Ross; 7 weeks; $20,740

OHIO STATE UNIVERSITY, Columbus; T. Scott Sutton; 4 weeks; $5,110
Paul T. Yarrington; 10 weeks; $7,935

OHIO UNIVERSITY, Athens; James T. Shipman; 5 weeks; $14,305

OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Stillwater; L. F. Sheerar; 6 weeks; $10,580

UNIVERSITY OF OKLAHOMA, Norman; Horace E. Hoffman; 8 weeks; $20,500

OREGON STATE COLLEGE, Corvallis; Robert Eugene Gaskell; 7 weeks; $16,560

UNIVERSITY OF THE PACIFIC, Stockton, Calif.; Jesse S. Binford, Jr.; 6 weeks; $9,905

PAN AMERICAN COLLEGE, Edinburg, Tex.; Paul R. Engle; 6 weeks; $9,840

PEPPERDINE COLLEGE, Los Angeles, Calif.; Ladis Daniel Kovach; 4 weeks; $2,370

UNIVERSITY OF PITTSBURGH, Pa.; John R. Jablonski; 12 weeks; $6,810

POLYTECHNIC INSTITUTE OF BROOKLYN, N.Y.; Reed F. Riley; 9 weeks; $7,720

PORTLAND STATE COLLEGE, Oreg.; Robert Weir Rempfer; 10 weeks; $10,035

PRAIRIE VIEW AGRICULTURAL AND MECHANICAL COLLEGE, Prairie View, Tex.; Israel E. Glover; 6 weeks; $6,325
Charles H. Nicholas; 6 weeks; $6,795
E. E. O'Banion; 6 weeks; $7,500

PRATT INSTITUTE, Brooklyn, N.Y.; David Vitrogan; 6 weeks; $9,070

UNIVERSITY OF PUERTO RICO, Rio Piedras; Francisco Garriga; 6 weeks; $9,340
Eddie Ortiz; 6 weeks; $10,690

PURDUE UNIVERSITY, Lafayette, Ind.; Richard C. Dobson; 8 weeks; $19,460

UNIVERSITY OF RHODE ISLAND, Kingston; William H. Wiley; 4 weeks; $4,300

ROLLINS COLLEGE, Winter Park, Fla.; Bruce B. Wavell; 6 weeks; $7,885

ROSCOE B. JACKSON MEMORIAL LABORATORY, Bar Harbor, Maine; John Longworthy Fuller; 10 weeks; $15,720

ROSWELL PARK MEMORIAL INSTITUTE, Buffalo, N.Y.; Edwin A. Mirand; 8 weeks; $11,230

ST. CLOUD STATE COLLEGE, St. Cloud, Minn.; Philip Youngner; 4 weeks; $9,800

ST. JOHN'S UNIVERSITY, Jamaica, N.Y.; William H. Pasfield; 6 weeks; $10,935

COLLEGE OF ST. JOSEPH ON THE RIO GRANDE, Albuquerque, N. Mex.; Mary Lauriana Saam; 6 weeks; $9,070

ST. LOUIS UNIVERSITY, St. Louis, Mo.; John J. Andrews; 4 weeks; $5,320

SAN JOSE STATE COLLEGE CORP., Calif.; Wilbur Sprain; 6 weeks; $12,495

UNIVERSITY OF SANTA CLARA, Santa Clara, Calif.; Arthur T. Phelps; 6 weeks; $7,800

SIMPSON COLLEGE, Indianola, Iowa; Jack L. Carter; 6 weeks; $6,175

South Carolina State College, Orangeburg; George W. Hunter; 6 weeks; $12,640

South Dakota State College, Brookings; Stanley Sundet; 6 weeks; $6,235

Southeastern State College, Durant, Okla.; Leslie A. Dwight; 5 weeks; $4,950

Southern Illinois University, Carbondale; Howard G. Applegate; 6 weeks; $14,705

Southern Methodist University, Dallas, Tex., Frank J. Palas; 5 weeks; $6,975

Southern State College, Magnolia, Ark.; John J. Chapman; 6 weeks; $3,050

Southwestern at Memphis, Tenn.; Raymond T. Vaughn; 6 weeks; $4,970

State University of Iowa, Iowa City; Robert E. Yager; 8 weeks; $23,960

State University of New York, Geneseo; Edward F. Pierce; 13 weeks; $2,250

State University of South Dakota, Vermillion; Wayne W. Gutzman; 6 weeks; $7,940

Stephen F. Austin State College, Nacogdoches, Tex., Edwin L. Miller; 6 weeks; $7,925

Temple University, Philadelphia, Pa.; Walter S. Lawton; 6 weeks; $9,020

University of Tennessee, Knoxville; J. H. Wood; 6 weeks; $10,315

Texas Technological College, Lubbock; J. W. Day; 5 weeks; $6,565

University of Texas, Austin; Robert L. Augustine; 6 weeks; $9,750

Murray M. Copeland, Houston; 8 weeks; $4,570

H. J. Ettlinger; 6 weeks; $5,970

Irwin Spear; 6 weeks; $9,130

Texas Woman's University, Denton; Robert W. Higgins; 8 weeks; $13,725

University of Tulsa, Okla.; C. D. Thomas; 6 weeks; $10,065

Tuskegee Institute, Tuskegee Institute, Ala.; Bennie D. Mayberry; 10 weeks; $14,185

University of Utah, Salt Lake City; Edward Allan Davis; 4 weeks; $5,690

William Lee Stokes; 6 weeks; $8,230

Virginia Union University, Richmond; Walter Oswald Bradley; 6 weeks; $9,375

Virginia State College, Petersburg; Paul L. Brown, Norfolk; 6 weeks; $12,490

Washington University, St. Louis, Mo.; Richard Sutherland; 6 weeks; $4,310

John Crenshaw, Southern Illinois U.; 5 weeks; $3,940

Western Illinois University, Macomb; Eugene Pergament; 8 weeks; $3,860

Western Kentucky State College, Bowling Green; Tate C. Page; 8 weeks; $23,420

Western Michigan University, Kalamazoo; George Greisen Mallinson; 6 weeks; $12,580

West Virginia University, Morgantown; O. J. Burger; 4 weeks; $4,470

West Virginia Wesleyan College, Buckhannon; John C. Wright; 4 weeks; $10,280

Whitworth College, Spokane, Wash.; William G. Wilson; 6 weeks; $8,075

Wofford College, Spartanburg, S.C.; James C. Loftin; 7 weeks; $12,000

Worcester Foundation for Experimental Biology, Shrewsbury, Mass.; Frederick R. Avis, St. Mark's School; 9 weeks; $18,185

Yeshiva University, N.Y., N.Y.; Moses D. Tendler; 8 weeks; $9,430

COOPERATIVE COLLEGE-SCHOOL SCIENCE PROGRAM

Columbia University, New York, N.Y.; Donald Barr; 18 months; $76,460

Cornell University, Ithaca, N.Y.; Philip G. Johnson; 11 weeks; $4,960

Philip G. Johnson; 18 months; $20,400

Thomas R. Nielsen; 6½ weeks; $36,000

Dartmouth College, Hanover, N.H.; William P. Davis, Jr.; 11 months; $985

George Peabody College for Teachers, Nashville, Tenn.; David Turney; 1 year; $52,885

Hiram College, Hiram, Ohio; Edward B. Rosser; 5 weeks; $8,080

Edward B. Rosser; 5 weeks; $6,815

Keene Teachers College, Keene, N.H.; R. Philip Hugny, Concord; 6 weeks; $27,000

University of Michigan, Ann Arbor; Leigh C. Anderson; 6 weeks; $19,265

Northeast Missouri State Teachers College, Kirksville; Dean A. Rosebery; 6 months; $19,660

University of North Carolina, Chapel Hill; Willis A. Reid, Raleigh; 6 weeks; $17,285

Northern Illinois University, De Kalb; Virginia M. Schelar; 8 weeks; $12,475

University of Pittsburgh, Pa.; John R. Jablonski; 18 months; $16,185

University of Puerto Rico, Rio Piedras; Mariano Garcia; 1 year; $2,040

University of Rhode Island, Kingston; James E. Casey; 18 months; $10,660

Rutgers, The State University, New Brunswick, N.J.; Kenneth W. Iversen, Cranford; 1 year; $2,070

St. Olaf College, Northfield, Minn.; Thomas Rossing; 8 weeks; $24,105

Southern Connecticut State College, New Haven; Edward M. North, Wallingford; 6 weeks; $26,600

Stetson University, De Land, Fla.; Harland C. Merriam, 8 weeks; $16,170

Syracuse University, N.Y.; Alfred T. Collette; 6 weeks; $13,875

University of Virginia, Charlottesville; Bart van't Riet; 8 weeks; $6,635

Waldemar Medical Research Foundation, Inc., Port Washington, N.Y.; Norman Molomut; 8 weeks; $13,805

STATE ACADEMIES OF SCIENCE PROGRAM

Academy of Science of St. Louis, Mo.; Murl Deusing, Museum of Science and Natural History; 1 year; $17,505

Arizona Academy of Science, Tucson; Paul M. Wallack; 1 year; $21,115

Arkansas Academy of Science, Jonesboro; John W. Keesee; 1 year; $10,065

Cooper Union for the Advancement of Science and Art, N.Y., N.Y.; James N. Eastham; 1 year; $4,960

FLORIDA ACADEMY OF SCIENCE, Gainesville; Luther A. Arnold, University of Florida; 1 year; $19,150

HAWAII ACADEMY OF SCIENCE, Honolulu; Albert B. Carr, Jr., University of Hawaii; 1 year; $4,220

Donald C. McGuire, University of Hawaii; 1 year; $18,460

James Moomaw, University of Hawaii; 1 year; $2,900

IDAHO ACADEMY OF SCIENCES, Pocatello; Elmer K. Raunio, University of Idaho; 1 year; $15,060

ILLINOIS STATE ACADEMY OF SCIENCE, Urbana; Donald G. Hopkins, Carl Sandburg High School, Orland Park; 1 year; $15,150

Norman D. Levine, University of Illinois; 1 year; $14,090

INDIANA ACADEMY OF SCIENCE, Lafayette; Howard H. Michaud; 1 year; $17,150

KANSAS ACADEMY OF SCIENCE, Hays; Standlee V. Dalton; 1 year; $22,440

Standlee V. Dalton; 1 year; $9,220

LOUISIANA STATE UNIVERSITY, Baton Rouge; Harry J. Bennett; 1 year; $8,960

Harry J. Bennett; 1 year; $19,840

MARYLAND ACADEMY OF SCIENCES, Baltimore; Thomson King; 1 year; $1,680

Thomson King; 20 months; $14,755

MICHIGAN ACADEMY OF SCIENCE, ARTS, AND LETTERS, East Lansing; Wayne Taylor, Michigan State University; 1 year; $20,895

MINNESOTA ACADEMY OF SCIENCE, St. Paul; John L. Rendall; 1 year; $23,300

MISSISSIPPI ACADEMY OF SCIENCES, INC., Clinton; Clyde Q. Sheely, Mississippi State University; 1 year; $35,600

MONTANA ACADEMY OF SCIENCES, Bozeman; John H. Rumely; 1 year; $12,800

MUSEUM OF ART, SCIENCE AND INDUSTRY, Bridgeport, Conn.; Earle W. Newton; 1 year; $10,925

NEBRASKA ACADEMY OF SCIENCES, INC., Lincoln; James A. Rutledge; 1 year; $17,465

NEW HAMPSHIRE ACADEMY OF SCIENCE, New London; Allen L. King; 1 year; $9,490

Allen L. King; 1 year; $9,370

Howard I. Wagner; 1 year; $3,000

NEW MEXICO ACADEMY OF SCIENCE, Socorro; Joseph A. Schufle; 1 year; $9,785

Joseph A. Schufle; 1 year; $1,600

Joseph A. Schufle; 1 year; $1,600

NORTH CAROLINA ACADEMY OF SCIENCE, Swannanoa; Herbert E. Speece, North Carolina State College; 1 year; $20,600

OHIO ACADEMY OF SCIENCE, Cincinnati; G. Gerald Acker, Bowling Green State University; 1 year; $7,735

Kenneth B. Hobbs; 1 year; $23,000

OKLAHOMA ACADEMY OF SCIENCE, Oklahoma City; Robert C. Fite, Oklahoma State University; 1 year; $6,520

J. Teague Self; 1 year; $27,635

PENNSYLVANIA ACADEMY OF SCIENCE, Reading; Charles L. Bikle; 1 year; $9,760

UNIVERSITY OF PUERTO RICO, Rio Piedras; Herminio Lugo Lugo; 1 year; $29,400

SOUTH DAKOTA ACADEMY OF SCIENCE, Brookings; John M. Winter, State University of South Dakota; 1 year; $8,820

John M. Winter; 1 year; $9,225

John M. Winter; 1 year; $3,635

STATE UNIVERSITY OF IOWA, Iowa City; T. R. Porter; 1 year; $22,840

TENNESSEE ACADEMY OF SCIENCE, Oak Ridge; Myron S. McCay, University of Chattanooga; 1 year; $12,500

Arlo I. Smith, Southwestern at Memphis; 1 year; $18,785

TEXAS ACADEMY OF SCIENCE, Austin; Charles La Motte, Agricultural and Mechanical College of Texas; 1 year; $9,725

TEXAS ACADEMY OF SCIENCE, Dallas; Addison E. Lee, University of Texas; 1 year; $23,920

UTAH ACADEMY OF SCIENCES, ARTS, AND LETTERS, Provo; Orson Whitney Young, Weber College; 1 year; $14,720

WASHINGTON ACADEMY OF SCIENCE, Washington, D.C.; John K. Taylor, National Bureau of Standards; 1 year; $26,775

WEST VIRGINIA ACADEMY OF SCIENCE, Morgantown; John C. Wright, West Virginia Wesleyan College; 1 year; $5,880

John C. Wright; 1 year; $1,600

RESEARCH PARTICIPATION FOR COLLEGE TEACHERS PROGRAM

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station; J. B. Coon; 18 months; $10,260

A. F. Isbell; 3 months; $5,120

BOSTON UNIVERSITY, Mass.; Lowell V. Coulter; 2 years; $30,825

BRANDEIS UNIVERSITY, Waltham, Mass.; B. Dorain; 3 months; $10,660

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Howard Tieckelmann; 2 years; $12,460

UNIVERSITY OF CALIFORNIA, Berkeley; Curt Stern; 2 years; $12,380

CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; Leopold May; 2 years; $10,940

CLARK UNIVERSITY, Worcester, Mass.; Gerson Kegeles, 3 months; $14,510

UNIVERSITY OF COLORADO, Boulder; Albert A. Bartlett; 3 months; $12,430

Bert M. Tolbert; 6 months; $24,360

FLORIDA STATE UNIVERSITY, Tallahassee; Leland Shanor; 3 months; $9,290

Barron B. Scarborough; 3 months; $11,220

UNIVERSITY OF GEORGIA, Athens; Robert A. McRorie; 3 months; $4,320

HOWARD UNIVERSITY, Washington, D.C.; Lloyd N. Ferguson; 3 months; $13,470

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago; Sidney I. Miller; 2 years; $28,750

INDIANA UNIVERSITY, Bloomington; L. S. McClung; 2 years; $18,920

Roger W. Russell; 2 years; $22,820

IOWA STATE UNIVERSITY, Ames; Paul F. Romberg; 3 months; $7,465

KANSAS STATE UNIVERSITY, Manhattan; Jack L. Lambert; 1 year; $30,845

UNIVERSITY OF KANSAS, Lawrence; C. A. Vanderwerf; 6 months; $24,270

LEHIGH UNIVERSITY, Bethlehem, Pa.; Thomas E. Young; 3 months; $2,640

LOUISIANA STATE UNIVERSITY, Baton Rouge; R. V. Nauman; 3 months; $13,480
Vincent E. Parker; 3 months; $14,870

UNIVERSITY OF MASSACHUSETTS, Amherst; D. S. Van Fleet; 3 months; $4,830

UNIVERSITY OF MICHIGAN, Ann Arbor; Robert L. Isaacson; 1 year; $61,240

UNIVERSITY OF MISSISSIPPI, University; Paul A. D. de Maine; 3 months; $12,110

UNIVERSITY OF NEBRASKA, Lincoln; John Weymouth; 3 months; $9,500

NEW YORK UNIVERSITY, New York, N.Y.; Alvin I. Kosak; 3 months; $14,795
Leonard Yarmus; 3 months; $6,620

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; Homer C. Folks, Raleigh; 3 months; $21,700
T. E. Maki, Raleigh; 3 months; $3,910
William T. Snyder, Raleigh; 1 year; $14,630

UNIVERSITY OF NORTH DAKOTA, Grand Forks; H. E. Ederstrom; 3 months; $2,880

OHIO STATE UNIVERSITY, Columbus; F. E. Deatherage; 3 months; $14,190

OKLAHOMA STATE UNIVERSITY, Stillwater; Glenn W. Todd; 1 year; $11,360

UNIVERSITY OF OKLAHOMA, Norman; Alfred J. Weinheimer; 1 year; $12,235

OREGON STATE COLLEGE, Corvallis; W. H. Slabaugh; 6 months; $23,980

PENNSYLVANIA STATE UNIVERSITY, University Park; William M. Lepley; 3 months; $16,960
Monty J. Montjar, 3 months; $9,835
John A. Sauer; 3 months; $9,835

PURDUE UNIVERSITY, Lafayette, Ind.; Kirk L. Athow; 3 months; $2,360

RESEARCH FOUNDATION, OKLAHOMA STATE UNIVERSITY, Stillwater; Troy C. Dorris; 3 months; $5,550
Marvin T. Edmison; 3 months; $7,680

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany; Edwin C. Jahn, Syracuse; 3 months; $9,300

UNIVERSITY OF SOUTH CAROLINA, Columbia; Peyton C. Teague; 3 months; $4,730

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles; Charles S. Copeland; 3 months; $15,180

STANFORD UNIVERSITY, Stanford, Calif.; Willis W. Harman; 3 months; $21,680

STATE UNIVERSITY OF IOWA, Iowa City; Don Lewis; 3 months; $8,180
Ralph L. Shriner; 6 months; $13,420

UNIVERSITY OF TENNESSEE, Knoxville; William E. Bull; 3 months; $19,300

UNIVERSITY OF TEXAS, Austin; Harold C. Bold; 2 years; $30,650

UNIVERSITY OF UTAH, Salt Lake City; W. J. Burke; 2 years; $38,390

VIRGINIA FISHERIES LABORATORY, Gloucester Point; Robert S. Bailey; 3 months; $18,810

UNIVERSITY OF VIRGINIA, Charlottesville; Bart van't Riet; 1 year; $10,810

RESEARCH PARTICIPATION FOR HIGH SCHOOL TEACHERS PROGRAM

UNIVERSITY OF ARIZONA, Tucson; A. B. Weaver; 18 months; $26,500

BOYCE THOMPSON INSTITUTE FOR PLANT RESEARCH, INC., Yonkers, N.Y.; Lawrence P. Miller; 3 months; $6,235

BRIGHAM YOUNG UNIVERSITY, Provo, Utah; Lane A. Compton; 3 months; $11,795

UNIVERSITY OF BUFFALO, N.Y.; Howard Tieckelmann; 1 year; $14,875

UNIVERSITY OF CALIFORNIA, Berkeley; Fred E. Dickinson; 1 year; $32,430
Robert L. Thornton; 3 months; $39,935

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; Everard M. Williams; 3 months; $6,570

CITY COLLEGE OF NEW YORK, New York, N.Y.; Chester B. Kremer; 18 months; $17,655

CLARKSON COLLEGE OF TECHNOLOGY, Potsdam, N.Y.; Theodore Renzema; 7 months; $14,935

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins; Merle G. Payne; 18 months; $21,840

CORNELL UNIVERSITY, Ithaca, N.Y.; Philip G. Johnson; 7 months; $31,110

DARTMOUTH COLLEGE, Hanover, N.H.; Thomas E. Kurtz; 7 months; $10,960

UNIVERSITY OF DELAWARE, Newark; J. C. Kakavas; 3 months; $9,730

UNIVERSITY OF GEORGIA, ATHENS; Robert A. McRorie; 3 months; $21,035

GOSHEN COLLEGE, Goshen, Ind.; Arthur A. Smucker; 3 months; $3,620

UNIVERSITY OF HAWAII, Honolulu; Albert J. Bernatowicz; 1 year; $13,995

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago; Sidney I. Miller; 10 weeks; $14,445

INDIANA UNIVERSITY, Bloomington; L. S. McClung; 1 year; $9,190

IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames; Paul F. Romberg; 3 months; $24,425

KANSAS STATE TEACHERS COLLEGE, Emporia; Ted F. Andrews; 1 year; $11,315

LONG BEACH STATE COLLEGE, Long Beach, Calif.; Darwin L. Mayfield; 3 months; $8,765

UNIVERSITY OF MASSACHUSETTS, Amherst; D. S. Van Fleet; 1 year; $3,465

MIAMI UNIVERSITY, Oxford, Ohio; Harry Weller; 3 months; $11,965

UNIVERSITY OF MISSISSIPPI, University; Barton Milligan; 1 year; $7,095

NEWARK COLLEGE OF ENGINEERING, N.J.; James A. Bradley; 3 months; $15,385

UNIVERSITY OF NEW MEXICO, Albuquerque; Philip E. Bocquet; 1 year; $16,790

NEW MEXICO HIGHLANDS UNIVERSITY, Las Vegas; E. Gerald Meyer; 18 months; $24,550

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; William T. Snyder, Raleigh; 1 year; $7,560

NORTH DAKOTA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCES, Fargo; J. A. Callenbach; 3 months; $16,895

UNIVERSITY OF NORTH DAKOTA, Grand Forks; Francis A. Jacobs; 3 months; $5,380
Theodore Snook; 3 months; $2,985

NORTH TEXAS STATE COLLEGE, Denton; Robert C. Sherman; 3 months; $12,450

UNIVERSITY OF OKLAHOMA, Norman; Orrin K. Crosser; 1 year; $11,195
Carl D. Riggs; 3 months; $8,430

UNIVERSITY OF THE PACIFIC, Stockton, Calif.; Joel W. Hedgpeth; 1 year; $13,305

PRAIRIE VIEW AGRICULTURAL AND MECHANICAL COLLEGE, Prairie View, Tex.; E. E. O'Banion; 4 months; $8,430

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; A. A. K. Booth; 19 months; $28,815

UNIVERSITY OF RHODE ISLAND, Kingston; Eugene C. Winslow; 1 year; $7,810

ST. JOHN'S UNIVERSITY, Jamaica, N.Y.; Paul T. Medici; 3 months; $12,655

UNIVERSITY OF SOUTH CAROLINA, Columbia; Peyton C. Teague; 3 months; $3,060

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles; Charles S. Copeland; 3 months; $8,050

STANFORD UNIVERSITY, Stanford, Calif.; O. Cutler Shepard; 3 months; $10,060

STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion; George P. Scott; 1 year; $13,500

TEXAS SOUTHERN UNIVERSITY, Houston; Lloyd L. Woods; 4 months; $8,940

U.S. NAVY ELECTRONICS LABORATORY, San Diego, Calif; Robert W. Young; 3 months; $3,875

UNIVERSITY OF VERMONT, Burlington; Howard M. Smith, Jr.; 1 year; $10,925

UNIVERSITY OF VIRGINIA, Charlottesville; Jacques J. Rappaport; 1 year; $6,445
Bart van't Riet; 1 year; $7,480

WAYNE STATE UNIVERSITY, Detroit, Mich.; Joseph J. Jasper; 3 months; $9,935

UNIVERSITY OF WISCONSIN, Madison; Donald H. Bucklin; 1 year; $32,015

COLLEGE OF WOOSTER, Wooster, Ohio; John D. Reinheimer; 1 year; $7,820

RESEARCH PARTICIPATION FOR TEACHER TRAINING PROGRAM

BROOKLYN COLLEGE, Brooklyn, N.Y.; Louis G. Moriber; 3 months; $90

UNDERGRADUATE RESEARCH PARTICIPATION PROGRAM

ADELPHI COLLEGE, Garden City, N.Y.; Joan Brooks; 10 weeks; $2,015
Richard J. Lacey; 14 months; $16,690

AGRICULTURAL AND TECHNICAL COLLEGE OF NORTH CAROLINA, Greensboro; Cecile H. Edwards; 14 months $12,140
George C. Royal, Jr.; 1 year; $4,555

UNIVERSITY OF ALABAMA, University; Willard F. Gray; 1 year; $1,535
Margaret Green; 10 weeks; $7,935
Donald F. Smith; 10 weeks; $10,065

UNIVERSITY OF ALASKA, College; Allan H. Mick; 12 weeks; $5,235

ALFRED UNIVERSITY, Alfred, N.Y.; Robert M. Campbell; 10 weeks; $3,005

ALLEGHENY COLLEGE, Meadville, Pa.; Herbert S. Rhinesmith; 2 years; $17,165
Georgiana W. Scovil; 1 year; $3,660.

AMERICAN MUSEUM OF NATURAL HISTORY, N.Y., N.Y.; Evelyn Shaw; 2 years; $76,705

AMERICAN UNIVERSITY, Washington, D.C.; Alfred B. Chaet; 1 year; $11,005

AMHERST COLLEGE, Amherst, Mass.; Lincoln Pierson Brower; 10 weeks; $2,960

UNIVERSITY OF ARKANSAS, Fayetteville; Glen T. Clayton; 1 year; $5,710
W. L. Evans; 1 year; $9,570
Arthur Fry; 1 year; $12,960

ASBURY COLLEGE, Wilmore, Ky.; Julian M. Pike; 1 year; $7,820

ASSOCIATED UNIVERSITIES INC., New York, N.Y.; Frank D. Drake; 3 months; $7,200
C. M. Wade; 17 weeks; $7,200

AUBURN UNIVERSITY, Auburn, Ala.; Moore J. Burns; 1 year; $10,600

BELOIT COLLEGE, Beloit, Wis.; Donald Lee McMasters; 1 year; $170
Donald Lee McMasters; 2 years; $18,495

BETHANY COLLEGE, Bethany, W. Va.; W. D. Richey; 1 year; $8,560

BOSTON COLLEGE, Chestnut Hill, Mass.; William G., Guindon, S. J.; 1 year; $2,810

BOSTON UNIVERSITY, Mass.; Norman N. Lichtin; 2 years; $18,675
Robert F. Slechta; 2 years; $19,420

BRADFORD DURFEE COLLEGE OF TECHNOLOGY, Fall River, Mass.; Walter E. Conrad; 2 years; $9,875

BRANDEIS UNIVERSITY, Waltham, Mass.; Paul B. Dorain; 1 year; $4,830

BROOKLYN COLLEGE, N.Y.; Irving Allan Kaye; 1 year; $3,325

BRYN MAWR COLLEGE, Bryn Mawr, Pa.; Robert L. Conner; 15 months; $10,005

BUCKNELL UNIVERSITY, Lewisburg, Pa.; Harold W. Heine; 1 year; $7,960

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Theodor Ranov; 1 year; $3,350
Harriet F. Montague; 1 year; $3,240

BUTLER UNIVERSITY, Indianapolis, Ind.; John W. Martin; 8 weeks; $1,490

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena; James Bonner; 2 years; $28,520
Norman Davidson; 27 months; $3,450
Richard A. Dean; 1 year; $2,155

UNIVERSITY OF CALIFORNIA, Berkeley; Donald Carlisle, Los Angeles; 15 months; $10,095
Daniel Kivelson, Los Angeles; 1 year; $12,710
Ronald D. Archer, Riverside; 2 years; $46,430
Robert M. Gottsdanker, Santa Barbara; 1 year; $5,470
Roger C. Owen, Santa Barbara; 14 months; $5,640

CANISIUS COLLEGE, Buffalo, N.Y.; Herman A. Szymanski; 1 year; $5,980

CARLETON COLLEGE, Northfield, Minn.; James E. Finholt; 15 months; $13,570
Thurlo B. Thomas; 1 year; $8,280

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; J. Paul Fugassi; 15 months; $15,800
Richard H. Lambert; 10 weeks; $6,440
Thomas E. Stelson; 14 months; $15,870
Everard M. Williams; 2 years; $13,400

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; R. H. Thomas; 1 year; $11,335

CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; Leopold May; 1 year; $7,500
Joseph C. Michalowicz; 10 weeks; $4,500

CHAPMAN COLLEGE, Orange, Calif.; Peter Coad; 1 year; $2,480

COLLEGE OF CHARLESTON, Charleston, S.C.; Joseph R. Merkel, Fort Johnson Marine Biological Laboratory; 2 years; $6,950

UNIVERSITY OF CHICAGO, Ill.; Arnold C. Harberger; 7 months; $15,920
Daniel L. Harris; 10 weeks; $14,590

UNIVERSITY OF CINCINNATI, Ohio; Ronald G. Schmidt; 1 year; $1,840

CITY COLLEGE, N.Y., N.Y.; Frank Brescia; 2 years; $50,500

CLARK UNIVERSITY, Worcester, Mass.; Vernon Ahmadjian; 1 year; $3,280
Gerson Kegeles; 2 years; $15,640

CLARKSON COLLEGE OF TECHNOLOGY, Potsdam, N.Y.; T. J. Ward; 1 year; $6,785

COE COLLEGE, Cedar Rapids, Iowa; Frank C. Pennington; 2 years; $9,660

COLBY COLLEGE, Waterville, Maine; Charles F. Hickox, Jr.; 10 weeks; $1,200

COLGATE UNIVERSITY, Hamilton, N.Y.; Raymond J. Myers; 1 year; $8,640

COLORADO COLLEGE, Colorado Springs; Milton K. Snyder; 1 year; $1,940

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Pittsburgh, Pa.; Ralph Baker; 10 weeks; $3,485
Franklin A. Graybill; 10 weeks; $2,280
M. Leslie Madison; 1 year; $11,675

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins; S. M. Morrison; 2 years; $1,245
R. V. Smith; 1 year; $9,060
Harry E. Troxell; 1 year; $5,525

UNIVERSITY OF COLORADO, Boulder; Donald G. Burkhard; 1 year; $15,180
Frank Kreith; 1 year; $12,650
John W. Marr; 10 weeks; $8,055

COLUMBIA UNIVERSITY, N.Y., N.Y.; Edward F. Leonard; 3 years; $980

COMMITTEE FOR ADVANCE SCIENCE TRAINING, Los Angeles, Calif.; Harry Sobel; 2 years; $16,195

UNIVERSITY OF CONNECTICUT, Storrs; Hugh Clark; 2 years; $11,960
John T. Stock; 2 years; $11,180

CORNELL UNIVERSITY, Ithaca, N.Y.; R. F. Holland; 1 year; $6,935
G. C. Kent; 10 weeks; $5,305
Simpson Linke; 1 year; $9,200
M. L. Nichols; 10 weeks; $10,695

DARTMOUTH COLLEGE, Hanover, N.H.; William W. Ballard; 1 year; $7,130
William P. Davis, Jr.; 1 year; $7,190

DEPAUL UNIVERSITY, Chicago, Ill.; Robert C. Miller; 1 year; $3,300

DEPAUW UNIVERSITY, Greencastle, Ind.; John L. Warren; 1 year; $3,925

DREW UNIVERSITY, Madison, N.J.; Louise F. Bush; 2 years; $13,710

DREXEL INSTITUTE OF TECHNOLOGY, Philadelphia, Pa.; Frank A. Fletcher; 1 year; $6,120
Frank A. Fletcher; 1 year; $1,245
Robert S. Hanson; 1 year; $5,700

EARLHAM COLLEGE, Richmond, Ind.; Ansel M. Gooding; 1 year; $7,480
William Stephenson; 2 years; $22,400

ELMIRA COLLEGE, Elmira, N.Y.; Gertrude Spremulli; 1 year; $1,420

EMORY UNIVERSITY, Atlanta, Ga.; R. A. Day, Jr.; 2 years; $19,895

FISK UNIVERSITY, Nashville, Tenn.; Irvin W. Elliott; 1 year; $5,255
James R. Lawson; 1 year; $5,140

FLORIDA STATE UNIVERSITY, Tallahassee; Leland Shanor; 1 year; $11,615
Howard E. Taylor; 1 year; $4,890

FORDHAM UNIVERSITY, N.Y., N.Y.; Clarence C. Schubert; 1 year; $12,825

FRANKLIN INSTITUTE, BARTOL RESEARCH FOUNDATION, Philadelphia, Pa.; W. E. Danforth; 15 months; $7,590

FRANKLIN AND MARSHALL COLLEGE, Lancaster, Pa.; John H. Moss; 10 weeks; $8,465
Fred H. Suydam; 10 weeks; $3,550

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; Russell B. Stevens; 1 year; $1,935

UNIVERSITY OF GEORGIA, Athens; R. Barclay McGhee; 10 weeks; $5,790
Robert A. McRorie; 1 year; $10,865
Robert A. McRorie; 1 year; $1,840
Louis A. Rayburn; 10 weeks; $11,385

GONZAGA UNIVERSITY, Spokane, Wash.; Timothy J. O'Leary; 14 months; $5,290

GRINNELL COLLEGE, Grinnell, Iowa; Grant O. Gale; 10 weeks; $4,315
William A. Nevill; 15 months; $10,695

GUSTAVUS ADOLPHUS COLLEGE, St. Peter, Minn.; H. Bradford Thompson; 2 years; $3,785

HAMILTON COLLEGE, Clinton, N.Y.; L. E. Cratty, Jr.; 2 years; $9,200

HARVARD UNIVERSITY, Cambridge, Mass.; A. M. Pappenheimer, Jr.; 10 weeks; $21,275

HARVEY MUDD COLLEGE, Claremont, Calif.; Roy A. Whiteker; 2 years; $20,850

HAVERFORD COLLEGE, Haverford, Pa., Harmon C. Dunathan; 27 months; $1,045

UNIVERSITY OF HAWAII, Honolulu; D. Elmo Hardy; 1 year; $7,305
John L. T. Waugh; 2 years; $15,520

HOFSTRA COLLEGE, Hempstead, L.I. N.Y.; Edward E. Schweizer; 13 weeks; $6,100

COLLEGE OF THE HOLY CROSS, Worcester, Mass.; Vincent O. McBrien; 1 year; $1,830

UNIVERSITY OF IDAHO, Moscow; Malcolm M. Renfrew; 1 year; $3,050
Malcolm M. Renfrew; 1 year $2,740

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago; Peter Chiarulli; 14 months; $4,830
Peter Chiarulli; 1 year; $4,260
Peter Chiarulli; 1 year; $15,870
Peter Chiarulli; 2 years; $8,420
Peter Chiarulli; 2 years; $21,275
Peter Chiarulli; 10 weeks; $750
Peter Chiarulli; 1 year; $1,440

UNIVERSITY OF ILLINOIS, Urbana; M. T. Davisson; 2 years; $12,060
James C. Martin; 2 years; $17,940

IMMACULATE HEART COLLEGE, Los Angeles, Calif.; Lois Wong Chi; 1 year; $4,485
Sister Agnes Ann Green; 10 weeks; $6,210

INCARNATE WORD COLLEGE, San Antonio, Tex.; Sister Joseph Marie; 1 year; $8,105

INDIANA UNIVERSITY, Bloomington; H. W. Hofstetter; 9 weeks; $2,350
Paul Klinge; 8 weeks; $3,015

L. S. McClung; 2 years; $11,975
Raymond G. Murray; 1 year; $5,175
Roger W. Russell; 2 years; $13,410
V. J. Shiner, Jr.; 1 year; $9,260

IOWA STATE UNIVERSITY, Ames; D. R. Boylan; 1 year; $24,980
Donald E. Hudson; 1 year; $20,855
Donald E. Hudson; 1 year; $9,535
Donald E. Hudson; 1 year; $3,195

JOHN CARROLL UNIVERSITY, Cleveland, Ohio; Richard J. Gaul; 8 weeks; $4,025

JUNIATA COLLEGE, Huntingdon, Pa.; B. E. Blaisdell; 2 years; $16,790
David M. Hercules; 1 year; $2,335

KANSAS STATE COLLEGE OF PITTSBURG; Joe M. Walker; 16 months; $5,205

KANSAS STATE UNIVERSITY, Manhattan; A. B. Cardwell; 2 years; $11,595
H. C. Fryer; 1 year; $12,590
M. F. Hansen; 10 weeks; $4,345
Jack L. Lambert; 2 years; $19,505

UNIVERSITY OF KANSAS, Lawrence; Harold F. Rosson; 8 weeks; $2,210
Frederick E. Samson, Jr.; 1 year; $27,610
Edward E. Smissman; 1 year; $6,155

KANSAS WESLEYAN UNIVERSITY, Salina; Charles B. Creager; 1 year; $2,990

KENTUCKY RESEARCH FOUNDATION, Lexington; O. Merl Baker; 1 year; $4,085
David K. Blythe; 1 year; $1,150
Jacob R. Meadow; 1 year; $24,770
H. A. Romanowitz; 1 year; $9,775
G. W. Schneider; 14 months; $8,280

KENYON COLLEGE, Gambier, Ohio; Daniel T. Finkbeiner, II; 1 year; $3,105
Edwin J. Robinson, Jr.; 2 years; $6,440

KNOX COLLEGE, Galesburg, Ill.; Paul H. Shepard; 1 year; $2,690

LAFAYETTE COLLEGE, Easton, Pa.; Winfield Keck; 8 weeks; $4,450
E. Lee McMillen; 1 year; $2,590
Thomas G. Miller; 2 years; $3,335

LEBANON VALLEY COLLEGE, Annville, Pa.; Karl L. Lockwood; 10 weeks; $6,975

LEHIGH UNIVERSITY, Bethlehem, Pa.; George R. Jenkins; 1 year; $7,370

LINFELD COLLEGE, McMinnville, Oreg.; John A. Day; 1 year; $1,520
Robert E. Jones; 1 year; $1,220

LINFIELD RESEARCH FOUNDATION, McMinnville, Oreg.; Robert E. Jones; 2 years; $4,130

LONG ISLAND BIOLOGICAL ASSOCIATION, Cold Spring Harbor, N.Y.; Arthur Chovnik; 2 years; $24,535

LORAS COLLEGE, Dubuque, Iowa; George N. Schulte; 1 year; $5,980

LOUISIANA STATE UNIVERSITY, Baton Rouge; C. O. Durham, Jr.; 9 weeks; $5,680
George C. Kent, Jr.; 1 year; $4,890
Irwin S. Krule; 14 months; $24,400
Vincent E. Parker; 9 weeks; $2,495
H. B. Williams; 7 months; $13,435

LOYOLA UNIVERSITY, New Orleans, La.; F. A. Benedetto; 1 year; $7,385

MANHATTAN COLLEGE, N.Y., N.Y.; Arthur B. Kemper; 1 year; $3,450
Donald J. O'Connor; 1 year; $2,930

MARINE BIOLOGICAL LABORATORY, Woods Hole, Mass.; William Stone, Jr., Boston; 15 months; $18,200

MARYGROVE COLLEGE, Detroit, Mich.; Sister M. Stanislaus Huddleston; 1 year; $6,155

UNIVERSITY OF MARYLAND, College Park; Joshua R. C. Brown; 10 weeks; $4,670
Howard Laster; 14 months; $26,910

UNIVERSITY OF MASSACHUSETTS, Amherst; Phillips R. Jones; 1 year; $1,955

MERCYHURST COLLEGE, Erie, Pa.; Sister M. Fidelis O'Connor; 8 weeks; $7,140

UNIVERSITY OF MIAMI, Coral Gables, Fla.; Samuel P. Meyers, Miami; 3 months; $3,745

MICHIGAN COLLEGE OF MINING AND TECHNOLOGY, Houghton; Frank Kerekes; 14 months; $2,150

MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing; Erwin J. Benne; 2 years; $41,045
Sherwood K. Haynes; 2 years; $33,225
Herman L. King; 1 year; $17,195
Elmer Leininger; 2 years; $25,580
Harold B. Stonehouse; 2 years; $29,165

UNIVERSITY OF MICHIGAN, Ann Arbor; J. B. Griffin; 2 years; $13,110
Kenneth L. Jones; 8 weeks; $3,645
Robert C. Taylor; 1 year; $7,590

MILLSAPS COLLEGE, Jackson, Miss.; Richard R. Priddy; 2 years; $1,230

UNIVERSITY OF MINNESOTA, Minneapolis; E. R. G. Eckert; 1 year; $7,535
Lawrence E. Goodman; 1 year; $4,315
James C. Nichol; 1 year; $10,275
Wayland E. Noland; 15 months; $20,395
Theron O. Odlaug; 1 year; $1,780
I. Richard Savage; 7 months; $12,650

MOUNT HOLYOKE COLLEGE, South Hadley, Mass.; Edwin S. Weaver; 8 weeks; $5,635

MOUNT ST. MARY'S COLLEGE, Los Angeles, Calif.; Hallie F. Bundy; 1 year; $2,600

MISSISSIPPI STATE UNIVERSITY, State College; Charles B. Cliett; 2 years; $20,335

UNIVERSITY OF MISSISSIPPI; University; Virgil M. Benson; 1 year; $3,360

UNIVERSITY OF MISSOURI, Columbia; Ernest W. Carlton, Rolla; 1 year; $2,090
Harold Q. Fuller, Rolla; 1 year; $2,915
Howard L. Furr, Rolla; 1 year; $2,320

NATIONAL CHILDREN'S CARDIAC HOSPITAL, Miami, Fla.; Milton S. Saslaw; 9 weeks; $2,990

UNIVERSITY OF NEBRASKA, Lincoln; Donald G. Hanway; 2 years; $8,405

NEWARK COLLEGE OF ENGINEERING, N.J.; Harold Moroson; 1 year; $1,095

NEW JERSEY NEURO-PSYCHIATRIC INSTITUTE, BUREAU OF RESEARCH IN NEUROLOGY AND PSYCHIATRY, Princeton; Dewitt Hendee Smith; 1 year; $4,830

NEW MEXICO HIGHLANDS UNIVERSITY, Las Vegas; Robert G. Lindeborg; 2 years; $10,580

NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY, Socorro; William Hume; 1 year; $10,280

NEW MEXICO STATE UNIVERSITY, University Park; James E. Weiss; 1 year; $15,870

UNIVERSITY OF NEW MEXICO, Albuquerque; Richard K. Traeger; 1 year; $2,925

NEW YORK UNIVERSITY, N.Y., N.Y.; Joseph D. Gettler; 1 year; $12,190
Leonard Yarmus; 10 weeks; $5,475

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; Charles E. Bowerman; 10 weeks; $12,290
Francis Nash Collier, Jr.; 7 months; $6,630
Francis Nash Collier, Jr.; 7 months; $6,630
C. H. Bostian, Raleigh; 2 years; $15,065
P. H. Harvey, Raleigh; 10 weeks; $9,895
T. E. Maki, Raleigh; 1 year; $5,005

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; H. T. Scofield, Raleigh; 1 year; $2,590
William T. Snyder, Raleigh; 2 years; $25,645
Alfred J. Stamm, Raleigh; 1 year; $3,450

NORTH DAKOTA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Fargo; J. A. Callenbach; 1 year; $16,570
Franz H. Rathmann; 1 year; $9,920
Donald Schwartz; 1 year; $4,210

UNIVERSITY OF NORTH DAKOTA, Grand Forks; D. E. Severson; 1 year; $240

NORTHEASTERN UNIVERSITY, Boston, Mass.; Robert A. Shepard; 1 year; $4,060
Ralph A. Troupe; 1 year; $4,405

NORTHERN ILLINOIS UNIVERSITY, DeKalb; C. J. Rohde, Jr.; 10 weeks; $2,990

NORTH TEXAS STATE COLLEGE, Denton; Robert C. Sherman; 1 year; $7,400
Robert C. Sherman; 1 year; $3,850
Robert C. Sherman; 1 year; $9,500

NORTHWESTERN STATE COLLEGE OF LOUISIANA; Natchitoches; Richard E. Garth; 1 year; $3,175
Floyd L. Judd; 1 year; $1,840
James L. Rhoades; 1 year; $920

NORTHWESTERN UNIVERSITY, Evanston, Ill.; Richard C. Bowers; 1 year; $15,020
Ray L. Watterson; 1 year; $11,560

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; Julius T. Banchero; 14 months; $4,830
Raymond C. Gutschick; 14 months; $8,305

OBERLIN COLLEGE, Oberlin, Ohio; Norman C. Craig; 15 months; $9,780

OHIO STATE UNIVERSITY, Columbus; Lloyd M. Parks; 1 year $8,455

OHIO WESLEYAN UNIVERSITY, Delaware; Thomas S. Oey; 2 years; $10,050
J. Gordon Ogden, III; 1 year; $1,945

OKLAHOMA STATE UNIVERSITY, Stillwater; Robert B. Kamm; 1 year; $2,500

UNIVERSITY OF OKLAHOMA, Norman; Richard A. Goff; 2 years; $3,400
Alfred J. Weinheimer; 1 year; $11,485

OREGON STATE COLLEGE, Corvallis; E. C. Gilbert; 3 months; $7,525
A. T. Lonseth; 10 weeks; $7,420
Leo A. Sciuchetti; 1 year; $6,880
Roy A. Young; 15 months; $1,400

UNIVERSITY OF OREGON, Eugene; L. S. Cressman; 1 year; $9,330
Robert A. Ellis; 1 year; $6,810
Leroy H. Klemm; 2 years; $12,540
Andrew F. Moursund; 1 year; $6,040
E. Novitski; 2 years; $38,815
J. L. Powell; 2 years; $15,270
Harry A. Shoemaker; 1 year; $19,255
J. A. Shotwell; 10 weeks; $3,855

PENNSYLVANIA STATE UNIVERSITY, University Park; William F. Prokasy, Jr.; 2 years; $9,660

POLYTECHNIC INSTITUTE OF BROOKLYN, N.Y.; Ernest I. Becker; 10 weeks; $11,345
John J. Dropkin; 1 year; $15,065

POMONA COLLEGE, Claremont, Calif.; Alvin L. Beilby; 1 year; $17,410

UNIVERSITY OF PORTLAND, Oreg.; Ambrose J. Wheeler; 1 year; $5,985

PRINCETON UNIVERSITY, Princeton, N.J.; John G. Danielson; 18 months; $14,625

PURDUE UNIVERSITY, Lafayette, Ind.; C. J. Goodnight; 1 year; $22,355
Dale W. Margerum; 2 years; $10,925

UNIVERSITY OF REDLANDS, Redlands, Calif.; Robert H. Maybury; 1 year; $7,855

REED COLLEGE, Portland, Oreg.; J. E. H. Hancock; 1 year; $10,080

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; Stephen E. Wiberley; 2 years; $5,750
Stephen E. Wiberley; 10 weeks; $3,365
Stephen E. Wiberley; 15 months; $11,385
Stephen E. Wiberley; 15 months; $13,570

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany; C. Eugene Farnsworth; 1 year; $3,695
Edwin C. Jahn, Syracuse; 10 weeks; $8,855
Ralph T. King, Syracuse; 10 weeks; $3,315

RESEARCH FOUNDATION, OKLAHOMA STATE UNIVERSITY, Stillwater; Marvin T. Edmison; 1 year; $13,970

UNIVERSITY OF RHODE ISLAND, Kingston; J. W. Cobble; 10 weeks; $900
C. Polk; 1 year; $3,450

UNIVERSITY OF ROCHESTER, N.Y.; S. D. S. Spragg; 1 year; $4,830
Edwin O. Wiig; 10 weeks; $5,730

ROCKY MOUNTAIN BIOLOGICAL LABORATORY, Crested Butte, Colo.; R. K. Enders, Swarthmore, Pa.; 2 years; $22,225

ROSCOE B. JACKSON MEMORIAL LABORATORY, Bar Harbor, Maine; John L. Fuller; 2 years; $45,270

ROSEMONT COLLEGE, Rosemont, Pa.; Mother Mary Colman Wall; 10 weeks; $3,250

ROSWELL PARK MEMORIAL INSTITUTE, HEALTH AND RESEARCH, INC., Buffalo, N.Y.; Edwin A. Mirand; 12 weeks; $23,405

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Donald G. Forgays; 1 year; $2,465
James B. Durand, Camden; 15 months; $2,185

ST. FRANCIS COLLEGE, Brooklyn, N.Y.; John M. Burke; 1 year; $2,510

ST. JOSEPH COLLEGE, Emmitsburg, Md.; Sister Denise Eby; 1 year; $3,030

ST. JOSEPH'S COLLEGE FOR WOMEN, Brooklyn, N.Y.; Sister Saint Francis; 14 months; $8,670

ST. LOUIS UNIVERSITY, Mo.; Paul E. Peterson; 8 weeks; $3,335
Arthur G. Rouse; 1 year; $1,875

ST. OLAF COLLEGE, Northfield, Minn.; Fritjof E. Christensen; 1 year; $17,220

ST. PROCOPIUS COLLEGE, Lisle, Ill.; Norman A. Frigerio; 1 year; $5,775

San Diego State College Foundation, Calif.; R. Gordon Gastil; 1 year; $14,345
Burt Nelson; 1 year; $4,645
Power B. Sogo; 1 year; $2,760
Harold Walba; 1 year; $16,220

University of San Francisco, Calif.; William Maroney; 1 year; $4,250

San Jose State College Corp., Calif.; Lloyd Van Alten; 1 year; $10,430

University of Santa Clara, Calif.; John B. Drahmann; 12 weeks; $2,620
Abraham P. Hillman; 1 year; $8,100
Stanislaw Kownacki; 10 weeks; $2,760

University of Scranton, Scranton, Pa.; Martin D. Appleton; 10 weeks; $5,865

Seattle University, Wash.; Harry Majors, Jr.; 1 year; $2,300
Francis P. Wood; 1 year; $2,845

Smith College, Northampton, Mass.; Milton D. Soffer; 2 years; $4,890

University of South Carolina, Columbia; E. Fontelle Thompson, Jr.; 9 weeks; $4,925
E. C. Woodward, Jr.; 1 year; $2,665

South Dakota State College, Brookings; Dennis L. Moe; 1 year; $3,070

South Dakota School of Mines and Technology, Rapid City; Edward L. Tullis; 1 year; $585

Southeast Missouri State College, Cape Girardeau; G. E. Brown; 14 months; $19,700

Southern Illinois University, Carbondale; I. L. Shechmeister; 2 years; $18,540
Walter B. Welch; 1 year; $2,830

Spring Hill College, Spring Hill, Ala.; Walter J. Rhein; 8 weeks; $3,695

Stanford University, Stanford, Calif.; Eric Hutchinson; 10 weeks; $6,185
David M. Mason; 2 years; $23,798
O. Cutler Shepard; 7 months; $27,210
O. Cutler Shepard; 1 year; $4,715

State University of Iowa, Iowa City; Don Lewis; 1 year; $3,625
Ralph L. Shriner; 2 years; $9,545

Stevens Institute of Technology, Hoboken, N.J.; S. S. Stivala; 14 months; $27,780

Swarthmore College, Swarthmore, Pa.; Norman A. Meinkoth; 8 weeks; $8,165
Peter T. Thompson; 10 weeks; $7,190

Syracuse University, N.Y.; Hiram J. Evans; 2 years; $14,885
James A. Luker; 10 weeks; $6,875
Wallace R. McAllister; 1 year; $7,810
Henry E. Wirth; 1 year; $13,310

Tennessee Agricultural and Industrial State University, Nashville; Carl M. Hill; 1 year; $1,000

University of Tennessee, Knoxville; Arthur W. Jones; 1 year; $4,395

Agricultural and Mechanical College of Texas, College Station; Richard M. Adams; 7 months; $13,170
Richard J. Baldauf; 7 months; $5,550
A. I. Flowers; 15 months; $6,900
A. F. Isbell; 12 weeks; $2,270

Texas Christian University, Fort Worth; William H. Watson; 1 year; $5,300

University of Texas, Austin; R. N. Little; 9 weeks; $7,570

Texas Woman's University, Denton; William L. Mecay; 21 months; $6,790

Tulane University, New Orleans, La.; Hans B. Jonassen; 17 months; $7,935

Ursuline College, Louisville, Ky.; Sister M. Angelice Seibert; 1 year; $2,410

University of Utah, Salt Lake City; M. Duane Bown; 1 year; $6,470
Ivan B. Cutler; 10 weeks; $8,970
Robert E. Stephenson; 1 year; $1,230
J. M. Sugihara; 2 years; $17,355
Angus M. Woodbury; 1 year; $4,865

Utah State University, Logan; R. L. Berger; 10 weeks; $5,380

Valparaiso University, Valparaiso, Ind.; Robert J. Hanson; 14 months; $5,130

Vanderbilt University, Nashville, Tenn.; Stanford C. Ericksen; 2 years; $10,580

Villanova University, Villanova, Pa.; Robert E. White; 1 year; $4,140

Virginia Fisheries Laboratory, Gloucester Point; Robert S. Bailey; 15 months; $16,175

Virginia Polytechnic Institute, Blacksburg; Robert C. Krug; 10 weeks; $3,220

Virginia State College, Petersburg; Lewis A. Gist, Jr.; 14 months; $18,840

Washington State University, Pullman; Seth Barton Locke; 1 year; $575
Richard A. Parker; 1 year; $5,120

Wayne State University, Detroit, Mich.; Henry V. Bohm; 1 year; $12,175

Wesleyan University, Middletown, Conn.; G. Philip Johnson; 7 months; $9,600

Western Michigan University, Kalamazoo; Lillian H. Meyer; 10 weeks; $6,460
Paul Rood; 1 year; $2,910

Western Reserve University, Cleveland, Ohio; Jan H. Bruell; 2 years; $17,085
Richard F. Firestone; 2 years; $14,320
Gerald Tauber; 2 years; $11,700

Wheaton College, Norton, Mass.; Bojan Hamlin Jennings; 10 weeks; $1,840

Wilkes College, Wilkes-Barre, Pa.; Sheldon G. Cohen; 14 months; $3,000
Francis J. Michelini; 1 year; $2,795

William Marsh Rice University, Houston, Tex.; Allen C. Enders; 2 years; $11,960

University of Wisconsin, Madison; R. H. Dott, Jr.; 10 weeks; $2,265
Calvin O. Huber; 1 year; $470

Wittenberg University, Springfield, Ohio; Paul K. Glasoe; 1 year; $3,790

Worcester Polytechnic Institute, Worcester, Mass.; Wilmer L. Kranich; 10 weeks; $3,970
Allan E. Parker; 10 weeks; $8,395

Xavier University, Cincinnati, Ohio; Harvey A. Dube; 1 year; $5,110
Joseph J. Peters; 1 year; $460

Yale University, New Haven, Conn.; E. J. Boell; 1 year; $11,215
John P. Chesick; 1 year; $12,535
Ralph Norman Haber; 2 years; $15,295
Ralph Norman Haber; 2 years; $11,730
Harlan J. Smith; 27 months; $5,765

Yeshiva University, New York, N.Y.; Phyllis H. Cahn; 10 weeks; $1,205
Harry E. Rauch; 1 year; $4,035

ADVANCED SUBJECT-MATTER INSTITUTES

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station; B. C. Moore; 6 months; $29,210

UNIVERSITY OF ARIZONA, Tucson; Gerard P. Kuiper; 6 months; $41,300

BRANDEIS UNIVERSITY, Waltham, Mass.; Kenneth W. Ford; 7 months; $33,980
Kenneth W. Ford; 4 months; $2,500

UNIVERSITY OF CALIFORNIA, Berkeley; Charles H. Sawyer, Los Angeles; 6 months; $9,890

CANISIUS COLLEGE, Buffalo, N.Y.; Herman A. Szymanski; 6 months; $5,400

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; Alan J. Perlis; 6 months; $46,180

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins; Glenwood P. Epling; 3 days; $7,335

UNIVERSITY OF COLORADO, Boulder; W. E. Brittin; 10 weeks; $53,710

FISK UNIVERSITY, Nashville, Tenn.; Nelson Fuson; 6 months; $7,480

FLORIDA STATE UNIVERSITY, Tallahassee; Donn S. Gorsline; 10 months; $34,930

UNIVERSITY OF FLORIDA, Gainesville; Per-Olov Lowdin; 9 months; $53,150

HARVARD UNIVERSITY, Cambridge, Mass.; William Liller; 8 months; $16,925

UNIVERSITY OF GEORGIA, Athens; M. K. Fort, Jr.; 6 months; $35,225

UNIVERSITY OF HAWAII, Honolulu; Maxwell S. Doty; 8 months; $11,560

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge; Robert W. Mann; 6 months; $33,270

UNIVERSITY OF MICHIGAN, Ann Arbor; Alan A. Marra; 6 months; $12,330

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; John W. Carr, III; 6 months; $57,930

OKLAHOMA STATE UNIVERSITY, Stillwater; L. Wayne Johnson; 6 months; $35,400

UNIVERSITY OF OKLAHOMA, Norman; William Viavant; 6 months; $32,700

UNIVERSITY OF PENNSYLVANIA, Philadelphia; Hsuan Yeh; 6 days; $7,200

UNIVERSITY OF PITTSBURGH, Pa.; Adolph Grunbaum; 1 year; $3,530

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles; Jay M. Savage; 6 weeks; $1,800

UNIVERSITY OF TEXAS, Austin; Howard T. Odum, Port Aransas; 6 months; $7,300

UNIVERSITY OF UTAH, Salt Lake City; C. E. Burgess; 6 months; $35,500

VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg; D. H. Pletta; 8 months; $49,250

UNIVERSITY OF WISCONSIN, Madison; R. Byron Bird; 3 weeks; $43,250

WOODS HOLE OCEANOGRAPHIC INSTITUTION, Woods Hole, Mass.; George Veronis; 7 months; $21,200

PUBLIC UNDERSTANDING OF SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Washington, D.C.; Dael Wolfle; *Program of Science Lectures;* 1 day; $8,900

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; C. Bruce Hunter; *Lecture Series in the Sciences;* 1 year; $9,630

ASPEN INSTITUTE FOR HUMANISTIC STUDIES, Aspen, Colo.; Robert W. Craig; *Public Understanding the Role of Science in Society;* 1 year; $44,460

BOARD OF REGENTS OF STATE COLLEGES, Madison, Wis.; Harry F. Bangsberg; *Science Seminar for Newspaper Editors;* 6 months; $3,560

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins; Herman M. Weisman; *Science News Writing Seminar for Rocky Mountain-Plains States;* 6 months; $12,980

COLUMBIA UNIVERSITY, New York, N.Y.; John Foster; *Conference of Scientists and Mass Media Executives;* 1 year; $6,960

CONFERENCE BOARD OF THE MATHEMATICAL SCIENCES, Washington, D.C.; G. Baley Price; *Project for Planning Public Information Services in Mathematics;* 6 months; $10,000

MICHIGAN STATE UNIVERSITY, East Lansing; James Stokely; *Seminar for Science Writers;* 1 week; $10,700

NATIONAL EDUCATIONAL TELEVISION AND RADIO CENTER, New York, N.Y.; Robert B. Hudson; *The Citizen and the New Age of Science;* 1 year; $179,620

NORTHWESTERN UNIVERSITY, Evanston, Ill.; Shirley M. Linde; *Midwestern Science Public Information Seminar;* 6 months; $19,000

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; Norval Neil Luxon; *Science Writers Institute;* 1 year; $24,650

SUPPLEMENTARY TRAINING FOR TEACHERS

AMERICAN SOCIETY OF ZOOLOGISTS, Urbana, Ill.; C. Ladd Prosser; *Recent Advances in Comparative Neurophysiology;* 7 months; $4,600

BOSTON COLLEGE, Chestnut Hill, Mass.; S. J. Bezuszka; *Summer Institute in Mathematics;* 6 months; $2,900
S. J. Bezuszka; *Cooperative Unit Study Program in Mathematics;* 16 months; $20,500

UNIVERSITY OF COLORADO, Boulder; James R. Wailes; *Summer Institute for Science Supervisors;* 6 months; $18,380

COLUMBIA UNIVERSITY, New York, N.Y.; Polykarp Kusch; *Summer Conference on Scientific Frontiers and Their Interaction With Society;* 6 weeks; $56,275

DUKE UNIVERSITY, Durham, N.C.; J. J. Gergen; *Experimental Program in the Retraining of Armed Service Officers for Teaching Mathematics;* 30 months; $22,400

EDUCATIONAL SERVICES, INC., Watertown, Mass.; Jerrold R. Zacharias; *One-week Training Conference for the Instructional Staffs of Institutes Dealing With the Physics Course Prepared by the Physical Science Study Committee;* 6 months; $27,515

EMORY UNIVERSITY, Atlanta, Ga.; Charles T. Lester; *Program Involving a Television Course on Science for Elementary School Teachers;* 1 year; $36,380

KANSAS STATE TEACHERS COLLEGE, Emporia; Otto M. Smith; *One-Day Conference of*

Principal, Supervisors, and School Board Members; 5 months; $500

MIAMI UNIVERSITY, Oxford, Ohio; L. Warren Nelson; *Workshops for Improving the Elementary Teacher's Abilities in Selection and Use of Science Equipment;* 15 months; $12,595

MICHIGAN COLLEGE OF MINING AND TECHNOLOGY, Houghton; Eric A. Bourdo, Jr., L'Anse; *Chemical and Biological Laboratory Training for High School and College Techers;* 8 weeks; $2,820

M. E. Volin; *Laboratory Training Program for Teachers;* 7 months; $6,860

UNIVERSITY OF NORTH DAKOTA, Grand Forks; J. Donald Henderson; *Supplementary Training for Teachers;* 2 days; $500

UNIVERSITY OF OKLAHOMA, Norman; Richard V. Andree; *In-Service Institute for College Teachers of Mathematics, Science, and Engineering;* 17 months; $29,900

Horace Hoffman; *Conference for Advanced Course Planning for Twelfth Grade Science;* 8 weeks; $25,900

UNIVERSITY OF SOUTH FLORIDA, Tampa; T. C. Helvey; *Conference for High School Physics Teachers in Aero-Space Sciences;* 2 weeks; $6,910

STANFORD UNIVERSITY, Stanford, Calif.; Lawrence R. Blinks; *Institute in Marine Biology;* 10 weeks; $20,725

UNIVERSITY OF TEXAS, Austin; Harold J. Plass, Jr.; *Development of Teachers of Engineering Mechanics;* 18 months; $31,670

WHEELING COLLEGE, Wheeling, W.Va.; Joseph A. Duke; *Science Teacher Workshop Series;* 30 months; $5,750

UNIVERSITY OF WISCONSIN, Madison; 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; $9,410

VISITING FOREIGN SCIENTISTS PROGRAM

AMERICAN INSTITUTE OF PHYSICS, New York, N.Y.; Elmer Hutchisson; 30 months; $50,550

AMERICAN CHEMICAL SOCIETY, Washington, D.C.; Donald J. Cook, DePauw University; 30 months; $56,800

AMERICAN MATHEMATICAL SOCIETY, Providence, R.I.; Gordon L. Walker; 30 months; $50,000

AMERICAN PSYCHOLOGICAL ASSOCIATION, Washington, D.C.; Sherman Ross; 30 months; $36,360

Sherman Ross; 1 year; $19,800

ENGINEERS JOINT COUNCIL, New York, N.Y.; L. K. Wheelock; 30 months; $60,000

VISITING SCIENTISTS TO COLLEGES PROGRAM

AMERICAN ANTHROPOLOGICAL ASSOCIATION, Washington, D.C.; Leslie A. White; 16 months; $20,855

AMERICAN ASTRONOMICAL SOCIETY, Princeton, N.J.; Franklyn M. Branley; 18 months; $23,675

AMERICAN CHEMICAL SOCIETY, Washington, D.C.; Donald J. Cook, DePauw University; 31 months; $82,000

AMERICAN GEOPHYSICAL UNION, Washington, D.C.; Norris Rakestraw, University of California, La Jolla; 18 months; $11,700

AMERICAN INSTITUTE OF PHYSICS, New York, N.Y.; Elmer Hutchisson; 17 months; $25,715

AMERICAN METEOROLOGICAL SOCIETY, Boston, Mass.; Kenneth C. Spengler; 18 months; $33,350

AMERICAN PSYCHOLOGICAL ASSOCIATION, Washington, D.C.; Sherman Ross; 34 months; $46,260

AMERICAN SOCIETY FOR ENGINEERING EDUCATION, Urbana, Ill.; W. Leighton Collins; 17 months; $24,700

W. Leighton Collins; 6 months; $8,875

MATHEMATICAL ASSOCIATION OF AMERICA, INC., Buffalo, N.Y.; Robert A. Rosenbaum; 19 months; $25,000

Robert A. Rosenbaum; 1 year; $25,000

NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.; Robert C. Stephenson; 18 months; $28,990

SOCIETY OF AMERICAN FORESTERS, Washington, D.C.; Henry Clepper; 31 months; $30,150

SOCIETY FOR INDUSTRIAL AND APPLIED MATHEMATICS, Philadelphia, Pa.; John K. Sterrett; 33 months; $32,280

VISITING SCIENTISTS TO HIGH SCHOOLS PROGRAM

AMERICAN CHEMICAL SOCIETY, Washington, D.C.; Donald J. Cook, DePauw University; 18 months; $24,300

AMERICAN INSTITUTE OF PHYSICS, New York, N.Y.; Elmer Hutchisson; 32 months; $56,780

SCIENTIFIC MANPOWER STUDIES

AMERICAN INSTITUTE OF PHYSICS, New York, N.Y.; Elmer Hutchisson; *Analysis of Educational and Manpower Data in Physics;* 2 years; $51,740

AMERICAN UNIVERSITY, Washington, D.C.; Ernest S. Griffith; *Current Role of the Sino-Soviet Bloc Countries in the Development of the Scientific and Engineering Manpower Resources of Other Countries;* 1 year; $14,000

HARVARD UNIVERSITY, Cambridge, Mass.; Charles G. McArthur; *An Industrial Cross-Validation of Early Childhood Characteristics That Distinguish Scientists from Nonscientists;* 1 year; $17,250

UNIVERSITY OF MARYLAND, College Park; Norton T. Dodge; *Evaluation of Utilization of Women as a Manpower Resource in the Soviet Union;* 15 months; $19,320

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL, Washington, D.C.; M. H. Trytten; *Continuation of Revision on Soviet Professional Manpower;* 6 months; $19,345

NATIONAL MERIT SCHOLARSHIP CORP., Evanston, Ill.; Clifford G. McCollum; *Research Program in High Level Talent at the Secondary School Level;* 5 years; $125,000

NATIONAL OPINION RESEARCH CENTER, Chicago, Ill.; Peter H. Rossi; *Development of a Study Plan for Post-Enumeration Census Studies;* 2 years; $16,634

SETON HALL UNIVERSITY, South Orange, N.J.; John B. Tsu; *Employment and Utilization of Communist China's Scientists and Engineers, 1950–60;* 18 months; $31,600

U.S. DEPARTMENT OF COMMERCE, BUREAU OF THE CENSUS, Washington, D.C.; Richard M. Scammon; *Planning and Testing for Proposed Post Enumeration Census Studies;* 6 months; $12,000

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, OFFICE OF EDUCATION, Washington, D.C.; Lawrence G. Derthick; *Study of Graduating Classes of American Undergraduate Colleges;* 14 months; $31,250

Clayton D. Hutchins; *1960–61 Survey of Federal Funds for Science Education;* 1 year; $35,875

John G. Lorenz; *Characteristics of Non-Public Secondary Schools;* 1 year; $7,500

Virgil Walker; *Sources of Financial Support of Graduate Students;* 6 months; $1,500

U.S. DEPARTMENT OF LABOR, Washington, D.C.; Ewan Clague; *Planning Phase of the 1961 Survey of Scientific and Technical Personnel in Industry;* 6 months; $29,500

Ewan Clague; *1961 Survey of Scientific and Technical Employment in Industry;* 1 year; $107,000

Ewan Clague; *Development of Long-Range Estimates of Demand for Scientific and Technical Personnel;* 1 year; $49,700

UNIVERSITY OF UTAH, Salt Lake City; Calvin W. Taylor; *To Organize and Extend the Work of the Utah Conferences on the Identification of Creative Scientific Talent;* 2 years; $11,990

Calvin W. Taylor; *Identifying High School Students with Characteristics Needed in Research Work;* 20 months; $17,825

COURSE CONTENT STUDIES AND DEVELOPMENT

AMERICAN INSTITUTE OF PHYSICS; New York, N.Y.; Elmer Hutchisson; *Source Material on the Recent History of Physics in the United States;* 2 years; $69,600

AMERICAN PHYSIOLOGICAL SOCIETY; Washington, D.C.; Arthur W. Martin; *Preparation of Laboratory Experiments in Elementary Human Physiology;* 1 year; $4,070

AMERICAN SOCIETY FOR ENGINEERING EDUCATION; Urbana, Ill.; Bonham Campbell, University of California; *Evaluation Study of Technical Institute Education;* 1 year; $47,250

UNIVERSITY OF ARIZONA, Tucson; Granino A. Korn; *Development of a Laboratory Course Employing Simple Computer Techniques to Teach Statistical Methods and Random Process Theory;* 18 months; $18,660

BRYN MAWR COLLEGE, Bryn Mawr, Pa.; Walter C. Michels; *Commission on College Physics;* 2 years; $180,400

UNIVERSITY OF CALIFORNIA, Berkeley; J. Arthur Campbell; *Chemical Education Materials Study;* 25 months; $715,800

CENTER FOR RESEARCH IN ENGINEERING SCIENCE OF THE UNIVERSITY OF KANSAS, Lawrence; John S. McNown; *Conference for a Comprehensive Study of Engineering Education;* 1 year; $25,000

UNIVERSITY OF COLORADO, Boulder; Harold Liebowitz; *Structural Mechanics Summer Study Group;* 1 year; $54,850

UNIVERSITY OF DENVER, Colo.; Byron Cohen; *Three Conferences on the Undergraduate Curriculum in Physics;* 6 months; $54,065

UNIVERSITY OF DETROIT, Mich.; Paul M. Reinhard; *Content Development in Graphics for Scientific Engineering Curricula;* 2 years; $68,080

EARLHAM COLLEGE, Richmond, Ind.; Laurence E. Strong; *The Chemical Bond Approach Project;* 1 year; $399,050

EDUCATIONAL SERVICES INC., Watertown, Mass.; Jerrold R. Zacharias; *Adaptation of the Physical Science Study Committee Physics Course for Use in Colleges and Junior Colleges;* 1 year; $214,700

Jerrold R., Zacharias; *Adaptation of a Number of Existing Physical Science Study Committee Films for Experimental Use in Colleges;* 9 months; $19,200

HARVARD UNIVERSITY, Cambridge, Mass.; George Wald; *A New Introductory College Course in Biology;* 3 years; $104,020

HOLLINS COLLEGE, Hollins College, Va.; Beatrice E. Gushee; *Development of a New Approach to the Teaching of Analytical Chemistry;* 13 months; $2,410

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge; Francis L. Friedman; *Science Teaching Center: College Physics;* 1 year; $198,000

MONTANA STATE COLLEGE, Bozeman; William B. Cook; *Publication of a Report of a Conference on a College Chemistry Course for Non-Science Majors;* 1 year; $1,050

NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.; Robert C. Stephenson; *Teaching Resources Development Program in Geology;* 1 year; $5,000

Robert C. Stephenson; *Course Content and Curriculum Study in the Geological Sciences;* 2 years; $126,950

NEW YORK UNIVERSITY, New York, N.Y.; Fred Landis; *Development of Laboratory Experiments in Heat Transfer and Fluid Mechanics;* 1 year; $12,250

UNIVERSITY OF PENNSYLVANIA, Philadelphia; John G. Brainerd; *Workshop on Systems Engineering in Electrical Engineering Education;* 1 week; $30,400

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; Harry F. Meiners and Robert Resnick; *A Reference Source for Demonstration Experiments in Physics;* 2 years; $102,800

STANFORD UNIVERSITY, Stanford, Calif.; E. G. Begle; *The School Mathematics Study Group;* 1 year; $80,500

Newton Hawley; *Experimental Teaching of Mathematics in the Elementary School;* 1 year; $29,900

Patrick Suppes; *Experimental Teaching of Mathematics in the Elementary School;* 2 years; $126,500

UNIVERSITY OF TEXAS, Austin; E. Mott Davis; *Course Content Improvement Project in the Field of Archeology;* 2 years; $90,700

U.S. DEPARTMENT OF AGRICULTURE, GRADUATE SCHOOL, Washington, D.C.; John B, Holden; *Recording on Film and Video Tape a Series of Five Lectures Entitled, Promise of the Life Sciences;* 6 months; $15,500

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WASHINGTON UNIVERSITY, St. Louis, Mo.; John M. Fowler and Edward D. Lambe; *Development of Lecture Demonstration Material and Laboratory Exercises for Introductory College Physics;* 1 year; $20,050

UNIVERSITY OF WICHITA, Wichita, Kans.; Robert T. Howard; *Development of a Course in the Science of Engineering Materials;* 18 months; $16,950

UNIVERSITY OF WISCONSIN, Madison; Edward F. Obert; *Development of Generalized Engineering Laboratory Equipment and Instruction Procedures;* 14 months; $37,030

YALE UNIVERSITY, New Haven, Conn.; E. G. Begle; *Preparation of an Experimental Curriculum in Elementary Mathematics;* 1 year; $42,820

C. E. Rickart; *School Mathematics Study Group;* 3 years; $150,000

SUPPLEMENTARY TEACHING AIDS

AMERICAN PSYCHOLOGICAL ASSOCIATION, Washington, D.C.; John G. Darley; *Film Series in Psychology;* 9 months; $148,240

UNIVERSITY OF ARIZONA, Tucson; Neil R. Bartlett; *Design and Development of an Inexpensive Device for Classroom Demonstrations and for Student Laboratory Measurements of Audition;* 6 months; $2,590

John W. Harshbarger; *Development of Hydraulic Models, Analogous to Subsurface Geologic Conditions;* 2 years; $21,190

E. K. Parks and R. E. Petersen; *Development of a Versatile Apparatus for the Demonstration and Investigation of Non-Stationary Compressible Flows;* 2 years; $19,050

BIO-RESEARCH INSTITUTE, INC., Cambridge, Mass.; Freddy Homburger; *Development of Teaching Aids in Biology;* 1 year; $22,890

BOSTON COLLEGE, Chestnut Hill, Mass.; Stanley J. Bezuszka; *Development of Formal Deductive and Symbolic Logic Training and Teaching Equipment;* 16 months; $17,700

BOSTON UNIVERSITY, Massachusetts; George P. Fulton; *Development of Inexpensive Modern Laboratory Equipment for the Biological Sciences;* 1 year; $8,500

BROWN UNIVERSITY, Providence, R.I.; Lorrin A. Riggs; *Development of a Projection Color Mixer;* 1 year; $890

BUCKNELL UNIVERSITY, Lewisburg, Pa.; Douglas K. Candland; *Development of Equipment for Classroom Demonstration and Student Research in Experimental Psychology;* 1 year; $4,400

UNIVERSITY OF CALIFORNIA, Berkeley; Samuel A. Barrett; *Documentary Sound Color Films and Sound Recordings of Indian Culture in Western North America;* 1 year; $122,380

Donald M. Reynolds, Davis; *Production of Short Motion Picture Films for University Level Instruction in Microbiology;* 4 months; $4,150

Norman N. Goldstein, Jr., San Anselmo; *Instruments for Study of Physiological Phenomena in Secondary School Biology;* 1 year; $25,550

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; Milton C. Shaw; *Development of Analog Apparatus and Experiments for Studying the Plastic Flow Characteristics of Materials;* 1 year; $14,950

CARSON-NEWMAN COLLEGE, Jefferson City, Tenn.; Will J. Cloyd and Joe A. Chapman; *Development of Transistorized Circuits for the Integration of Solar Radiation, Temperature, and Humidity;* 1 year; $3,650

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins; R. D. Frandson; *Cinephotographic Techniques for Visualizing Anatomical Structures in Depth Using the Central Nervous System;* 1 year; $12,190

COLUMBIA UNIVERSITY, New York, N.Y.; Robert A. Gross; *Development of Energy Conversion Devices for Instruction in Mechanical Engineering;* 1 year; $29,100

DARTMOUTH COLLEGE, Hanover, N.H.; John W. Dewdney; *Development of an Apparatus for Measuring the Relativistic Mass of Electrons;* 2 years; $17,450

UNIVERSITY OF DAYTON, Ohio; Raymond J. Stith; *Development of Inexpensive, Transparent, Flexible Models Having Internal Lines, Grids, or Planes for the Observation and Demonstration of Internal Deformation Patterns;* 20 months; $7,040

UNIVERSITY OF DENVER, Colorado; Fred E. D'Amour; *Development of Graphic Demonstrations in the Teaching of Physiology;* 1 year; $4,680

GETTYSBURG COLLEGE, Gettysburg, Pa.; J. Richard Haskins; *Development of a Mossbauer Effect Apparatus for an Advanced Undergraduate Physics Laboratory;* 1 year; $4,750

HARVARD UNIVERSITY, Cambridge, Mass.; David D. Donaldson, Boston; *Development of Equipment for Producing Stereograms;* 2 years; $20,990

UNIVERSITY OF ILLINOIS, Urbana; E. H. Gaylord; *Development of Demonstration Equipment for Structural Engineering;* 1 year; $27,140

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago; Bernet S. Swanson; *Development of Equipment and Manual for Laboratory Instruction in Automatic Process Control;* 15 months; $12,420

IOWA STATE UNIVERSITY, Ames; Wallace L. Cassell; *Development of a Small Magnetic Disc Memory Oscilloscope;* 1 year; $5,630

KANSAS STATE UNIVERSITY, Manhattan; Alphia E. Knapp; *Development of Laboratory Equipment for Obtaining the Contours of a Fluid Membrane;* 1 year; $13,010

LEARNING RESOURCES INSTITUTE, New York, N.Y.; Thomas P. Robinson; *Preparation of a College-Level Television-Film Course in Modern Biology;* 1 year; $216,800

MARQUETTE UNIVERSITY, Milwaukee, Wis.; Ali Seireg; *Development of a Universal Tester for Demonstrations and Measurements of Shock and Vibration Phenomena;* 1 year; $12,480

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge; Nathan H. Cook; *Development of Multi-Functional Machines for the Teaching of Materials Processing;* 18 months; $23,000

Robert J. Hansen; *Development of Modeling Techniques for Teaching of Structural Design;* 21 months; $27,020.

Erik Mollo-Christensen; *Development of Lecture Demonstration Equipment in Which a View of the Apparatus and Measuring Equipment is Projected on a Screen for Use in Courses of Aero-Dynamics, Thermodynamics, Elasticity, and Mechanics;* 2 years; $13,920

J. Lowen Shearer; *Design and Development of Apparatus for Experiments and Demonstrations in Dynamic Systems, Automatic Control, and Materials Courses in Mechanical Engineering;* 1 year; $29,160

MATHEMATICAL ASSOCIATION OF AMERICA, Buffalo, N.Y.; Harry M. Gehman; *Production of Films for Improving Collegiate Mathematics;* 1 year; $15,000

UNIVERSITY OF MICHIGAN, Ann Arbor; David L. Jones; *Development of Laboratory and Demonstration Equipment in Meteorological Instruction;* 1 year; $14,700

Joseph N. Payne; *Development and Testing of Individual Manipulative Materials for Use in Teaching Arithmetic;* 1 year; $22,710

MICHIGAN STATE UNIVERSITY, East Lansing; H. E. Koenig; *Development of Prototype Systems Laboratory Apparatus;* 1 year; $23,670

MIDWEST RESEARCH INSTITUTE, Kansas City, Mo.; Thomas I. Marx; *Development of a Student's Warburg Apparatus;* 8 months; $1,750

UNIVERSITY OF MINNESOTA, Minneapolis; John M. Lagerwerff; *Development of a Direct-Reading Portable Cardiotachometer for Educational and Clinical Use;* 4 months; $6,370

UNIVERSITY OF MISSOURI, Columbia; Robert F. G. Spier; *Preparation and Presentation of Graphic Aids in Teaching Basic Anthropometry;* 9 months; $8,430

UNIVERSITY OF NEW MEXICO, Albuquerque; Richard K. Moore; *Development of Kit-Style Digital Computers for Construction and Use by High School Students;* 1 year; $20,650

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; Charles N. Reilley; *Development of Apparatus for Teaching Advanced Electronic Instrumentation in Quantitative Chemistry;* 1 year; $13,800

George B. Hoadley, Raleigh; *Development of Phasor Display Device;* 8 months; $3,450

NORTHWESTERN UNIVERSITY, Evanston, Ill.; Ali Bulent Cambel; *Development of Apparatus and Experiments in Magneto-Gasdynamics;* 2 years; $42,360

OHIO STATE UNIVERSITY, Columbus; Neal A. Smith; *Development of a Magnetic Network Demonstrator;* 1 year; $4,780

OHIO UNIVERSITY, Athens; H. Benne Kendall; *Development of a Versatile Apparatus for Instructing Undergraduates in Flow System Chemical Reaction Rate Phenomena;* 1 year; $3,440

OKLAHOMA STATE UNIVERSITY, Stillwater; H. G. Thuesen; *Development of a Memo-Activity Camera;* 13 months; $6,940

PENNSYLVANIA STATE UNIVERSITY, University Park; Hans Neuberger; *Development of Lecture Demonstrations, Laboratory Experiments, and Observational Equipment for Teaching Elementary Meteorology in Schools and Colleges;* 1 year; $9,330

UNIVERSITY OF PITTSBURGH, Pa.; Edward A. Kennard; *Design and Development of Three-Dimensional Representations of Kinship Structures;* 1 year; $8,260

PRINCETON UNIVERSITY, Princeton, N.J.; Hubert N. Alyea; *Development of Overhead Projection Techniques;* 1 year; $27,520

PURDUE UNIVERSITY, Lafayette, Ind.; James W. Barany; *Development of a Force-Platform for Measuring Bodily Movements;* 1 year; $4,490

George W. Hughes; *Development of an Inexpensive Digital-to-Analog Converter for Curve Plotting with Small Digital Computers;* 6 months; $6,110

REED COLLEGE, Portland, Oreg.; Frederick D. Tabbutt; *Development of Equipment and Experiments for Teaching Instrumental Analysis;* 1 year; $8,020

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; Henry E. Breed; *Development of an Electron-Optical Bench for Student Experiment;* 1 year; $11,040

Paul M. DeRusso; *Development of a Digital-Analog Controller for Sampled Data Systems;* 1 year; $12,590

ST. LOUIS UNIVERSITY, St. Louis, Mo.; Lyman J. Wood; *Construction and Description of Symmetry Models of the Principal Space Groups;* 1 year; $8,800

STANFORD UNIVERSITY, Stanford, Calif.; George A. Parks; *Development of Apparatus for the Study of Automatic Control Systems;* 2 years; $7,620

John C. Shyne; *Preparation of Projection Slides for Use in Teaching Materials Science;* 1 year; $5,450

TEMPLE UNIVERSITY, Philadelphia, Pa.; John Franklin Huber; *Development of Models of Structural Relationships in Difficult to Understand Areas of Human Anatomy;* 1 year; $8,450

TUFTS UNIVERSITY, Medford, Mass.; Karl H. Illinger; *Development of Quantitative Molecular Models Representing the Molecular Charge Distribution;* 2 years; $17,240

VALPARAISO UNIVERSITY, Valparaiso, Ind.; Leslie M. Zoss; *Development of a Control System Analog for Demonstration and Laboratory Use in the Teaching of Closed Loop Control Theory;* 1 year; $5,390

UNIVERSITY OF WASHINGTON, Seattle; Albert L. Babb and William E. Wilson, Jr.; *Development of a Boron Trifluoride Pile Oscillator for University Nuclear Training Reactors;* 2 years; $22,630

WASHINGTON STATE UNIVERSITY, Pullman; Charles F. Morrison, Jr.; *Development of a General Utility Analytical (Chemical) Instrument Employing Operational Amplifiers;* 16 months; $4,670

WAYNE STATE UNIVERSITY, Detroit, Mich.; Yehuda Klausner; *Designing and Building of a Pneumatic Loading Device for Pure Deviatoric Loading of Soils;* 15 months; $5,170

WESTERN MICHIGAN UNIVERSITY, Kalamazoo; George E. Bradley and Jacob P. Dewitt; *Development of Atomic and Nuclear Experiments for Use in Undergraduate Laboratories;* 2 years; $2,070

UNIVERSITY OF WISCONSIN, Madison; Henry Van Engen; *Development of Television Courses in Mathematics for Elementary Schools;* 2 years; $130,200

OTHER EDUCATION IN THE SCIENCES GRANTS

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Washington, D.C.; Hilary J. Deason; *Traveling High School and Elementary School Science Library Program;* 18 months; $248,000

John R. Mayor; *1961 Visiting Foreign Staff Project;* 1 year; $83,600

Dael Wolfle; *A Study of the Organization, Operation, Objectives, and Potentials of Junior and Collegiate Academies of Science;* 18 months; $10,470

AMERICAN PSYCHOLOGICAL ASSOCIATION, Washington, D.C.; Sherman Ross; *Preparation of a brochure on "A Career in Psychology";* 1 year; $4,600

BOSTON UNIVERSITY, Mass.; Robert S. Cohen; *Inter-institutional Cooperative Association in the Philosophy of Science;* 14 months; $6,930

CARLETON COLLEGE, Northfield, Minn.; Seymour Schuster; *Conference on Undergraduate Research in Mathematics;* 1 week; $19,770

UNIVERSITY OF CHICAGO, Ill.; Sverre Petterssen; *Inter-institutional Cooperative Association in Oceanography;* 30 months; $31,390

INTERNATIONAL COOPERATION ADMINISTRATION, Washington, D.C.; James W. Riddleberger; *World Wide Scientists Research Project;* 1 year; $30,000

MUSEUM OF ART, SCIENCE, AND INDUSTRY, Bridgeport, Conn.; Earle W. Newton; *Mobile Exhibit Trailer in Astronomy and Interplanetary Exploration;* 18 months; $13,225

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL, Washington, D.C.; Paul R. Schaffer; *Special Field Institute for American College Teachers of Geology in Great Britain;* 1 year; $47,720

NATIONAL 4–H CLUB FOUNDATION OF AMERICA, INC., Washington, D.C.; Grant A. Shrum; *A Study of the Possibilities of Expanding the Understanding and Use of Science Through 4–H Work;* 18 months; $47,200

NATIONAL HEALTH COUNCIL, N.Y., N.Y.; Zilpha C. Franklin; *Printing and Distribution of Booklet—New Careers in the Health Sciences;* 1 year; $17,250

NATIONAL SCIENCE TEACHERS ASSOCIATION, Washington, D.C.; Robert H. Carleton; *Supplementary Student Science Project;* 5 months; $970

UNIVERSITY OF NEBRASKA, Lincoln; Norman H. Cromwell; *Cooperative College Teacher Development Program;* 30 months; $159,800

OKLAHOMA ACADEMY OF SCIENCE, Norman; J. Teague Self; *Consultative Service for Community Sponsored Improvement Programs in Science Education;* 1 year; $2,800

POLYTECHNIC INSTITUTE OF BROOKLYN, N.Y.; Albert D. Capuro; *The Preparation of Foreign Trained Engineers to Teach Engineering, Mathematics, Physics, and Chemistry;* 20 months; $30,060

SCIENCE SERVICE, Washington, D.C.; Watson Davis; *National Science Youth Program;* 16 months; $25,000

TEMPLE UNIVERSITY, Philadelphia, Pa.; Elmer L. Offenbacher; *Visiting Foreign Staff Project for 1960 Summer Institutes in Physical Sciences;* 10 months; $4,425

WALDEMAR MEDICAL RESEARCH FOUNDATION, INC., Port Washington, N.Y.; Norman Molomut; *Research Science Projects: Guidance to High School Teachers and Students in the Biological Sciences;* 18 months; $12,925

UNIVERSITY OF WASHINGTON, Seattle; Joseph L. McCarthy; *Inter-Institutional Cooperative Association in the Teaching of Science;* 26 months; $120,040

GRADUATE LABORATORY DEVELOPMENT

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, *College Station;* Wayne C. Hall; *Construction of Botanical Sciences Research Laboratories;* 2 years; $100,000

UNIVERSITY OF ARIZONA, Tucson; Emil W. Haury; *Addition of a Floor to a New Anthropology Building;* 2 years; $183,800

BOSTON UNIVERSITY, Mass.; Lowell V. Coulter; *Improvement and Expansion of Facilities for Chemical Research;* 1 year; $161,000

George P. Fulton; *Remodeling of a Building to Permit Expansion of Biological Research Laboratory Facilities;* 2 years; $295,260

BRANDEIS UNIVERSITY, Waltham, Mass.; Saul G. Cohen; *Construction of a New Chemistry Research Building;* 2 years; $150,420

Nathan O. Kaplan; *Expansion, Remodelling, and Furnishing of Laboratories for Biochemical Research;* 1 year; $22,600

BROWN UNIVERSITY, Providence, R.I.; Alonzo W. Quinn; *Modernization of Laboratories for Graduate Research in Geology;* 1 year; $5,800

UNIVERSITY OF BUFFALO, N.Y.; Clinton M. Osborn; *Construction of a Research Greenhouse;* 1 year; $16,200

UNIVERSITY OF CALIFORNIA, Berkeley, Melvin Calvin; *Construction of a Laboratory for Photosynthesis and Chemical Biodynamics;* 3 years; $627,500

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; Truman P. Kohman; *Nuclear Chemistry Laboratory Extension;* 1 year; $20,500

A. G. Milnes; *Renovation of Space to Expand Basic Research for Materials Science;* 1 year; $15,000

CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; Henry P. Ward; *Renovation and Refurnishing of Chemistry Research Laboratories;* 2 years; $75,000

UNIVERSITY OF CHICAGO, Ill.; Clyde A. Hutchison, Jr.; *Partial Renovation of Kent Chemical Laboratory;* 2 years; $148,800

R. S. Mulliken and C. C. S. Roothaan; *Modernization of the Molecular Structure and Spectra Laboratory;* 1 year; $5,000

UNIVERSITY OF CINCINNATI, Ohio; Milton Orchin; *Renovation and Modernization of Graduate Research Laboratories in the Chemistry Building;* 1 year; $47,000

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins; Harold K. Hagen and Lee E. Yeager; *Renovation of Laboratories for Fisheries and Wildlife Research;* 1 year; $1,500

T. E. Haus; *Construction of Controlled Environment Chambers for Plant and Soil Research;* 1 year; $19,000

COLUMBIA UNIVERSITY, New York, N.Y.; Charles O. Beckmann; *Renovation of the Chandler Chemical Laboratories;* 2 years; $145,600

J. R. Dunning; *Construction of Terrace Building Portion of the New Engineering Center;* 2 years; $350,000

CORNELL UNIVERSITY, Ithaca, N.Y.; C. E. Palm and W. K. Kennedy; *Construction of Laboratory Facilities for Research on Plant Nutrition and Metabolism;* 2 years; $118,300

A. F. Ross and W. F. Mai; *Construction of Laboratories for Research in Plant Virology and Plant Nematology;* 1 year; $72,100

Robert L. Sproull; *Renovation of Graduate Research Laboratories in Department of Physics, Rockefeller Hall;* 1 year; $16,400

DUKE UNIVERSITY, Durham, N.C.; H. J. Oesting and K. M. Wilbur; *Furnishings for Botany and Zoology Research Laboratories;* 2 years; $155,500

UNIVERSITY OF FLORIDA, Gainesville; John T. Creighton; *Remodeling of Entomological Research Laboratory;* 1 year; $5,200

GEORGETOWN UNIVERSITY, Washington, D.C.; F. O. Rice; *Construction of New Research Facilities for Chemistry in New Science Building;* 15 months; $250,000

GEORGIA INSTITUTE OF TECHNOLOGY, Atlanta; William M. Spicer; *Addition of Third Floor to Present Chemistry Annex Building;* 2 years; $94,400

HARVARD UNIVERSITY, Cambridge, Mass.; Eugene P. Kennedy; *Remodeling and Expansion of Research Facilities in the Department of Biological Chemistry of the Medical School;* 2 years; $111,000

Carroll M. Williams; *Renovation and Refurnishing of Biological Research Laboratories;* 2 years; $400,000

UNIVERSITY OF ILLINOIS, Urbana; William H. Johnson; *Construction of Laboratories for Electron Microscopy;* 1 year; $86,600

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; G. H. Dieke; *Enlargement of the Physics Laboratory;* 2 years; $400,000

KANSAS STATE UNIVERSITY, Manhattan; A. Eisenstark; *Conversion of Attic Space to Laboratories for Bacteriological Research;* 1 year; $22,000

UNIVERSITY OF KANSAS, Lawrence; Ronald L. McGregor; *Furnishings for Biological Research Laboratories;* 1 year; $66,800

UNIVERSITY OF KENTUCKY, Lexington; R. H. Weaver; *Furnishing of Electron Microscope and Isotope Laboratories for Bacteriological Research;* 1 year; $3,800

UNIVERSITY OF LOUISVILLE, Ky.; Paul G. LeFevre; *Renovation of Pharmacology Basic Research Laboratory;* 1 year; $4,800

LOYOLA UNIVERSITY, Chicago, Ill.; Raymond P. Mariella; *Modernization and Renovation of Space for Chemistry Laboratories;* 1 year; $12,500

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge; Edwin R. Gilliland; *Renovation of Chemical Engineering Research Laboratories;* 1 year; $13,800

UNIVERSITY OF MIAMI, Coral Gables, Fla.; W. Henry Leigh; *Renovation of Laboratories for Research in Zoology;* 1 year; $6,800

MICHIGAN STATE UNIVERSITY, East Lansing; H. B. Stonehouse; *Remodeling and Refurbishing a Geochemistry Research Laboratory;* 1 year; $3,000

UNIVERSITY OF MICHIGAN, Ann Arbor, A. Geoffrey Norman; *Construction of Laboratories for Botanical Gardens;* 2 years; $120,000

Karl F. Lagler; *Graduate Research Facilities for Fisheries Biology;* 1 year; $34,000

NEW MEXICO HIGHLANDS UNIVERSITY, Las Vegas; Earl Usdin; *Construction of a Cold Room in the Science Annex for Biochemical Research;* 1 year; $3,100

NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY, Socorro; Marx Brook; *Enlargement of Observation Tower and Atmospheric Physics Laboratory;* 1 year; $30,600

UNIVERSITY OF NEW MEXICO, Albuquerque, F. D. Ju; *Controlled Environment Facility for Mechanical Engineering Research;* 1 year; $3,400

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; John N. Couch; *Construction and Furnishing of a New Building for the Department of Botany;* 2 years; $80,250

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; Adolf G. Strandhagen; *Modernization of Engineering Science Research Laboratories;* 1 year; $10,900

OHIO WESLEYAN UNIVERSITY, Delaware; Arne Slettebak, *Renovations to Provide Increased Library and Office Space at the Perkins Observatory;* 1 year; $2,500

OREGON STATE UNIVERSITY, Corvallis; F. W. Decker; *Construction of Meteorological Research Facilities;* 1 year; $2,050

PENNSYLVANIA STATE UNIVERSITY, University Park; Richard G. Stoner; *Renovation of Graduate Research Facilities in Physics;* 1 year; $5,000

O. F. Tuttle; *Addition to the Geochemistry Research Laboratories;* 2 years; $67,750

Robert W. Taft, Jr.; *Conversion of Storage Space for Expansion of Chemistry Research Facilities;* 1 year; $7,000

UNIVERSITY OF PENNSYLVANIA, Philadelphia; V. G. Dethier; *Completion and Furnishing of Biology Animal Service;* 2 years; $41,900

H. E. Morton; *Equipment for a New Central Microbiological Media Room;* 1 year; $25,200

UNIVERSITY OF PITTSBURGH, Pa.; James Coull; *Modernization of Research Laboratories in Chemical Engineering;* 1 year; $27,000

T. H. Dunkelberger; *Renovation of Chemistry Research Laboratories;* 1 year; $12,500

C. L. Ralph; *Renovation and Furnishing of Biological Research Laboratory;* 1 year; $3,600

POLYTECHNIC INSTITUTE OF BROOKLYN, N.Y.; Nathan Marcuvitz; *Construction of Grad-*

uate Level Research Laboratories; 2 years; $375,000

PRINCETON UNIVERSITY, N.J.; J. C. Elgin; *Construction and Furnishing of Graduate Research Laboratory;* 2 years; $275,000

H. H. Hess; *Equipping of Existing Geology Research Facility;* 1 year; $20,500

William P. Jacobs; *Controlled Environment Rooms and Chambers for Biological Research;* 1 year; $30,000

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; E. Blueler; *Addition to Physics Building;* 2 years; $91,900

R. E. Davis and J. Wolinsky; *Conversion of Fifth Floor of Chemistry Building into Research Space;* 1 year; $30,000

PURDUE UNIVERSITY, Lafayette, Ind.; A. C. Leopold and A. T. Leiser; *Construction of High Light Intensity Environmental Control Chambers for Research in Plant Physiology;* 1 year; $37,200

J. V. Osmun; *Controlled Environment Facility for Research in Entomology;* 1 year; $23,200

B. J. Rogers; *Expansion of and Increase in Light Intensity in the Controlled Climate Facility;* 1 year; $13,000

RESEARCH FOUNDATION OF STATE OF NEW YORK, Albany; R. A. Zabel, Syracuse; *Renovation of Forest Botany Research Laboratories;* 1 year; $5,300

UNIVERSITY OF RHODE ISLAND, Kingston; Richard F. Stouffer; *Construction of Greenhouses and Furnishing of a Plant Virology Laboratory;* 1 year; $6,900

UNIVERSITY OF ROCHESTER, N.Y.; R. E. Marshak, P. Ramil, and R. E. Hopkins; *Addition of Wing to Bausch and Lomb Building;* 2 years; $375,000

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; W. R. Robbins; *Renovation of Chemical Facility of Plant Physiology Research Laboratory;* 1 year; $1,500

Henry C. Torrey; *Construction of a Physics Research Building;* 2 years; $400,000

STANFORD UNIVERSITY, Calif.; L. I. Schiff; *Construction of a New Physics Research Laboratory;* 2 years; $400,000

STATE UNIVERSITY OF IOWA, Iowa City; Jerry J. Kollros; *Renovation of Research Space in the Zoology Building;* 1 year; $11,000

Ralph L. Shriner; *Construction of Annex to the Chemistry Building;* 1 year; $200,000

STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N.J.; S. S. Stivala; *Renovation and Expansion of Chemistry and Chemical Engineering Research Laboratories;* 18 months; $45,600

UNIVERSITY OF TENNESSEE, Knoxville; Alvin H. Nielsen; *Additional Research Space in New Physics Building;* 2 years; $108,000

TEXAS AGRICULTURAL AND MECHANICAL RESEARCH FOUNDATION, College Station; Ethan C. Holt; *Renovation and Furnishing of Plant Cytogenetics Research Laboratories;* 1 year; $2,250

Dale F. Leipper; *Expansion, Renovation, and Modernization of Research Laboratories of Oceanography;* 1 year; $50,000

TULANE UNIVERSITY, New Orleans, La.; Paul C. Beaver; *Modernization and Expansion of Insectary and other Facilities for Parasitological Research,* 1 year; $1,700

H. S. Mayerson and W. B. Wendel; *Furnishing of Biochemistry and Physiology Laboratories for Graduate Student Research;* 1 year; $27,700

UTAH STATE UNIVERSITY, Logan; W. Whitney Smith; *Construction of a Cold Room for Bacteriological Research;* 1 year; $800

WASHINGTON STATE UNIVERSITY, Pullman; Carl M. Stevens; *Completion of Certain Research Facilities of the Department of Chemistry;* 1 year; $8,300

UNIVERSITY OF WASHINGTON, Seattle; P. C. Cross; *New Research Facilities in the Chemistry Laboratory;* 2½ years; $300,000

Arthur W. Martin, *Construction of Biological Research Facilities in the New University Museum;* 2 years; $100,000

UNIVERSITY OF WISCONSIN, Madison; M. R. Irwin and J. F. Crow; *Construction of a New Building for Research in Genetics;* 2 years; $122,000

W. S. Laughlin; *Furnishings for a Research Laboratory of Physical Anthropology;* 1 year; $7,100

R. Rollefson; *Construction of a Physics Research Facility Addition to Sterling Hall;* 1 year; $200,000

William D. Walker; *A Laboratory Building for High Energy Physics;* 1 year; $72,500

YALE UNIVERSITY, New Haven, Conn.; R. F. Flint; *Geologic Research Laboratory;* 2 years; $400,000

INSTITUTIONAL GRANTS FOR SCIENTIFIC ACTIVITIES

ADELPHI COLLEGE, Garden City, N.Y.; $985

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station; $8,438

UNIVERSITY OF AKRON, Ohio; $465

UNIVERSITY OF ALABAMA, University; $1,210

UNIVERSITY OF ALASKA, College; $9,700

ALBION COLLEGE, Albion, Mich.; $170

ALFRED UNIVERSITY, Alfred, New York; $200

AMERICAN UNIVERSITY, Washington, D.C.; $135

AMHERST COLLEGE, Amherst, Mass.; $3,210

UNIVERSITY OF ARIZONA, Tucson; $17,510

ARIZONA STATE UNIVERSITY, Tempe; $560

UNIVERSITY OF ARKANSAS, Fayetteville; $4,350

AUGSBURG COLLEGE AND THEOLOGICAL SEMINARY, Minneapolis, Minn.; $90

AUGUSTANA COLLEGE, Rock Island, Ill.; $250

BEREA COLLEGE, Berea, Ky.; $55

BOSTON COLLEGE, Chestnut Hill, Mass.; $265

BOSTON UNIVERSITY, Mass.; $8,150

BOWDOIN COLLEGE, Brunswick, Maine; $475

BRANDEIS UNIVERSITY, Waltham, Mass.; $19,358

BRIGHAM YOUNG UNIVERSITY, Provo, Utah; $3,395

BROWN UNIVERSITY, Providence, R.I.; $11,-579

BRYN MAWR COLLEGE, Bryn Mawr, Pa.; $315

UNIVERSITY OF BUFFALO, New York; $4,068

UNIVERSITY OF CALIFORNIA, Berkeley; $37,500

University of California, Davis; $8,833
University of California, La Jolla; $37,500
University of California, Los Angeles; $32,395
University of California, Riverside; $1,070
University of California, Santa Barbara; $405
California Institute of Technology, Pasadena; $23,764
Canisius College, Buffalo, N.Y.; $175
Carleton College, Northfield, Minn.; $830
Carnegie Institute of Technology, Pittsburgh, Pa.; $8,350
Case Institute of Technology, Cleveland, Ohio; $6,565
Catholic University, Washington, D.C.; $3,310
Central State College, Wilberforce, Ohio; $170
College of Charleston, Charleston, S.C.; $175
University of Chicago, Ill.; $37,500
University of Cincinnati, Cincinnati, Ohio; $3,988
City College, New York, N.Y.; $675
Clarkson College of Technology, Potsdam, N.Y.; $105
Clark University, Worcester, Mass.; $1,650
Clemson College, Clemson, S.C.; $685
Coe College, Cedar Rapids, Iowa; $200
Colby College, Waterville, Maine; $395
University of Colorado, Boulder; $13,791
Colorado School of Mines, Golden; $730
Colorado State University, Fort Collins; $4,625
Columbia University, New York, N.Y.; $36,807
University of Connecticut, Storrs; $3,218
Connecticut College, New London; $340
Cornell College, Mount Vernon, Iowa; $640
Cornell University, Ithaca, N.Y.; $21,748
Dartmouth College, Hanover, N.H.; $17,025
University of Dayton, Ohio; $300
University of Delaware, Newark; $2,970
Denison University, Granville, Ohio; $198
DePaul University, Chicago, Ill.; $525
DePauw University, Greencastle, Ind.; $505
Duke University, Durham, N.C.; $13,185
Duquesne University, Pittsburgh, Pa.; $1,275
Earlham College, Richmond, Ind.; $210
Elmira College, Elmira, N.Y.; $305
Emory University, Atlanta, Ga.; $3,053
University of Florida, Gainesville; $11,525
Florida State University, Tallahassee; $13,043
Fordham University, New York, N.Y.; $8,500
Franklin and Marshall College, Lancaster, Pa.; $947
George Washington University, Washington, D.C.; $4,759
Georgetown University, Washington, D.C.; $935
George Washington Carver Foundation, Tuskegee Institute, Ala.; $390
University of Georgia, Athens; $5,705
Georgia Institute of Technology, Atlanta; $7,790
Goshen College, Goshen, Ind.; $180
Goucher College, Baltimore, Md.; $1,299
Grinnell College, Grinnell, Iowa; $1,635
Hamilton College, Clinton, N.Y.; $185
Hanover College, Hanover, Ind.; $10
Harvard University, Cambridge, Mass.; $37,500
Harvey Mudd College, Claremont, Calif.; $940
Haverford College, Haverford, Pa.; $1,500
University of Hawaii, Honolulu; $7,450
University of Houston, Houston, Tex.; $3,298
Howard University, Washington, D.C.; $250
University of Idaho, Moscow; $1,483
Idaho State College, Pocatello; $230
University of Illinois, Urbana; $37,500
Illinois Institute of Technology, Chicago; $4,497
Indiana University, Bloomington; $18,375
Iowa State University of Science and Technology, Ames; $8,880
Jefferson Medical College of Philadelphia, Pa.; $600
Johns Hopkins University, Baltimore, Md.; $23,753
Kalamazoo College, Kalamazoo, Mich.; $165
University of Kansas, Lawrence; $18,002
University of Kansas City, Kansas City, Mo.; $705
Kansas State Teachers College, Emporia; $825
Kansas State University, Manhattan, $2,200
Kansas Wesleyan University, Salina; $150
Kent State University, Kent, Ohio; $960
Kentucky Research Foundation, Lexington; $2,760
Lafayette College, Easton, Pa.; $150
Lamar State College of Technology, Beaumont, Tex.; $505
Lawrence College, Appleton, Wis.; $375
Lehigh University, Bethlehem, Pa.; $4,367
LeMoyne College, Syracuse, N.Y.; $360
Lincoln University, Jefferson City, Mo.; $120
Linfield Research Institute, McMinnville, Oreg.; $585
Long Beach State College Foundation, Calif.; $705
Longwood College, Farmville, Va.; $540
Louisiana Polytechnic Institute, Ruston; $180

Louisiana State University, Baton Rouge; $6,451

University of Louisville, Louisville, Ky.; $5,140

Loyola University; Chicago, Ill.; $470

Loyola University, New Orleans, La.; $115

Lubbock Christian College, Lubbock, Tex.; $60

Macalester College, St. Paul, Minn.; $197

University of Maine, Orono; $525

Manchester College, North Manchester, Ind.; $545

Manhattan College, N.Y., N.Y.; $575

Marquette University, Milwaukee, Wis.; $3,552

University of Maryland, College Park; $8,829

University of Massachusetts, Amherst; $2,590

Massachusetts Institute of Technology, Cambridge; $37,500

Medical College of South Carolina, Charleston; $529

Medical College of Virginia, Richmond; $925

University of Miami, Coral Gables, Fla.; $12,925

Miami University, Oxford, Ohio; $935

University of Michigan, Ann Arbor; $37,500

Michigan State University, East Lansing; $13,705

Middlebury College, Middlebury, Vt.; $375

University of Minnesota, Minneapolis; $33,936

University of Mississippi, University; $895

Mississippi State University, State College; $200

University of Missouri, Columbia; $11,035

Montana State College, Bozeman; $2,235

Montana State University, Missoula; $1,410

Mount Holyoke College, South Hadley, Mass.; $700

University of Nebraska, Lincoln; $7,005

University of Nevada, Reno; $235

University of New Hampshire, Durham; $2,935

University of New Mexico, Albuquerque; $4,995

New Mexico Institute of Mining and Technology, Socorro; $870

New Mexico Highlands University, Las Vegas; $75

New Mexico State University, University Park; $290

New York University, N.Y.; $24,749

University of North Carolina, Chapel Hill, N.C.; $20,025

University of North Dakota, Grand Forks; $2,680

North Dakota State University, Fargo; $960

Northeastern University, Boston, Mass.; $740

Northern Illinois University, DeKalb; $780

Northwestern University, Evanston, Ill.; $17,024

Northwest Nazarene College, Nampa, Idaho; $510

University of Notre Dame, Notre Dame, Ind.; $6,870

Oberlin College, Oberlin, Ohio; $1,140

Ohio State University, Columbus; $22,271

Ohio University, Athens; $1,135

Ohio Wesleyan University, Delaware; $730

University of Oklahoma Research Institute, Norman; $8,120

Oklahoma State University, Stillwater; $6,874

University of Oregon, Eugene; $12,343

Oregon State University, Corvallis; $11,883

Pan American College, Edinburg, Tex.; $160

University of Pennsylvania, Philadelphia; $37,500

Pennsylvania State University, University Park; $17,988

University of Pittsburgh, Pa.; $13,105

Polytechnic Institute of Brooklyn, N.Y.; $3,585

Pomona College, Claremont, Calif.; $245

University of Portland, Oreg.; $230

Portland State College, Oreg.; $1,175

Pratt Institute, Brooklyn, N.Y.; $210

Princeton University, Princeton, N.J.; $27,946

Principia College, Elsah, Ill.; $225

University of Puget Sound, Tacoma, Wash.; $530

Purdue Research Foundation, Lafayette, Ind.; $28,375

Reed College, Portland, Oreg.; $1,286

Rensselaer Polytechnic Institute, Troy, N.Y.; $4,235

Research Foundation of State University of New York, Albany; $9,724

University of Rhode Island, Kingston; $1,360

University of Rochester, N.Y.; $8,355

Rockefeller Institute, New York, N.Y.; $4,393

Roosevelt University, Chicago, Ill.; $270

Rose Polytechnic Institute, Terre Haute, Ind.; $750

Rutgers, The State University, New Brunswick, N.J.; $14,385

Sacramento State College Foundation, Calif.; $1,140

St. Bonaventure University, St. Bonaventure, N.Y.; $145

St. Lawrence University, Canton, N.Y.; $105

St. Louis University, Mo.; $1,555

St. Olaf College, Northfield, Minn.; $200

San Diego State College Foundation, Calif.; $865

University of San Francisco, Calif.; $510

San Jose State College Corporation, Calif.; $420

Seattle Pacific College, Wash.; $275

Smith College, Northampton, Mass.; $2,680

University of South Carolina, Columbia; $565

South Dakota State College, Brookings; $540

University of Southern California, Los Angeles; $13,725

Southern Illinois University, Carbondale; $1,455

Southern Methodist University, Dallas, Tex.; $1,915

University of Southwestern Louisiana, Lafayette; $440

Stanford University, Stanford, Calif.; $37,500

State University of Iowa, Iowa City; $8,419

State University of South Dakota, Vermillion; $1,050

Stephen F. Austin State College, Nacogdoches, Tex.; $110

Stevens Institute of Technology, Hoboken, N.J.; $1,275

Swarthmore College, Swarthmore, Pa.; $1,985

Syracuse University, N.Y.; $10,730

Temple University, Philadelphia, Pa.; $3,990

University of Tennessee, Knoxville; $9,185

University of Texas, Austin; $26,924

Texas Christian University, Fort Worth; $750

Texas College of Arts and Industries, Kingsville; $130

Texas Technological College, Lubbock; $886

University of Toledo, Ohio; $290

Trinity College, Hartford, Conn.; $223

Tufts University, Medford, Mass.; $6,335

Tulane University, New Orleans, La.; $9,803

University of Tulsa, Okla.; $200

Union College and University, Schenectady, N.Y.; $385

University of Utah, Salt Lake City; $8,522

Utah State University, Logan; $1,230

Vanderbilt University, Nashville, Tenn.; $8,075

Vassar College, Poughkeepsie, N.Y.; $110

University of Vermont, Burlington; $5,741

Villanova University, Villanova, Pa.; $760

University of Virginia, Charlottesville; $2,865

Virginia Polytechnic Institute, Blacksburg; $2,294

Wabash College, Crawfordsville, Ind.; $670

University of Washington, Seattle, Wash.; $31,935

Washington and Lee University, Lexington, Va.; $90

Washington State University, Pullman, Wash.; $6,841

Washington University, St. Louis, Mo.; $14,205

Wayne State University, Detroit, Mich.; $7,635

Wellesley College, Wellesley, Mass.; $450

Wesleyan University, Middletown, Conn.; $2,367

Western Reserve University, Cleveland, Ohio; $9,391

West Virginia University, Morgantown, W. Va.; $1,792

Whitman College, Walla Walla, Wash.; $380

Whitworth College, Spokane, Wash.; $510

University of Wichita, Wichita, Kans.; $833

College of William and Mary, Williamsburg, Va.; $750

William Marsh Rice University, Houston, Tex.; $3,417

Williams College, Williamstown, Mass.; $185

Wilson College, Chambersburg, Pa.; $335

University of Wisconsin, Madison; $37,500

Worcester Polytechnic Institute, Worcester, Mass.; $105

University of Wyoming, Laramie; $580

Yale University, New Haven, Conn.; $26,432

Yeshiva University, N.Y., N.Y.; $4,350

INTERNATIONAL SCIENCE AND INTERNATIONAL SCIENCE EDUCATION

African-American Institute, N.Y., N.Y.; Loyd V. Steere; *Travel of Foreign Participants in Summer Institutes, 1961;* 5 months; $14,000

Ahrenkiel Richard K.; *NATO Advanced Study Institute;* $640

American Institute of Biological Sciences, Washington, D.C.; Arnold B. Grobman; *Support of Foreign Scientists to Participate in BSCS Writing Conference;* 1 year; $16,475

Asia Foundation, San Francisco, Calif.; Glen Bowersox; *Travel of Foreign Participants in Summer Institutes, 1961;* 5 months; $10,000

Barry, Jeremiah H.; *NATO Advanced Study Institute;* $575

Beecher, Henry K.; *NATO Advanced Study Institute;* $580

Brown, Fielding; *NATO Advanced Study Institute;* $625

University of Buenos Aires, Argentina; Juan Jose Giambiagi; *U.S. Participants at the Latin American School of Physics, 1961;* 6 months; $6,200

Chew, Geoffrey F.; *NATO Advanced Study Institute;* $175

Cicchetti, John B.; *NATO Advanced Study Institute;* $280

Dietz, Frank T., *NATO Advanced Study Institute;* $490

EDUCATIONAL SERVICES, INC., Watertown, Mass.; 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; $8,880

ELLIS, WADE; *Study of Teacher-Training in Mathematics in Peru;* 3 months; $1,150

ENGINEERS JOINT COUNCIL, New York, N.Y.; H. K. Justice; *U.S. Mission to the UPADI Pan American Congress on Engineering Education;* 1 year; $900

ESHLEMAN, VON R.; *NATO Advanced Study Institute;* 10 days; $825

FERNELIUS, NILS C.; *NATO Advanced Study Institute;* $640

GALLOP, PAUL M.; *NATO Advanced Study Institute;* $465

GARTH, JOHN CAMPBELL; *NATO Advanced Study Institute;* $640

GERARD, RALPH W.; *A Survey of Some Aspects of Bio-medical Research in India;* 2 months; $1,200

GOVE, NORWOOD B., *NATO Advanced Study Institute;* $335

GREENBERG, J. MAYO; *NATO Advanced Study Institute;* $100

HANNAY, NORMAN BRUCE; *NATO Advanced Study Institute;* $485

HARRIS, ROBERT A.; *NATO Advanced Study Institute;* $520

HARVARD UNIVERSITY, Cambridge, Mass.; Victor Guillemin; *Academic Year Institute for High School and College Teachers of Science and Mathematics;* 9 months; $6,260

HETZER, HERBERT O.; *NATO Advanced Study Institute;* $500

HILL, ROBERT NYDEN; *NATO Advanced Study Institute;* $600

HOHENBERG, PIERRE C.; *NATO Advanced Study Institute;* $590

INSTITUTE OF INTERNATIONAL EDUCATION, N.Y., N.Y.; Cassie Anderson; *Travel of Foreign Participants in Summer Institutes, 1961;* 5 months; $3,800

INTER-AMERICAN CONFERENCE ON MATHEMATICAL EDUCATION, Chicago, Ill.; Marshall H. Stone; *Inter-American Conference on Mathematical Education;* 18 months; $8,000

INTERNATIONAL UNION OF PHYSIOLOGICAL SCIENCES, Rochester, N.Y.; Wallace O. Fenn; *International Traveling Lecture Team in Physiology;* 2 years; $4,300

JOHNSON, FRANCIS S.; *NATO Advanced Study Institute;* 8 weeks; $825

LASTER, HOWARD; *NATO Advanced Study Institute;* $625

MENGERT, PETER; *NATO Advanced Study Institute;* $100

MORAN, PAUL R., *NATO Advanced Study Institute;* $575

MUSHER, JEREMY I.; *NATO Advanced Study Institute;* $525

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL, Washington, D.C.; Wallace W. Atwood, Jr.; *Academician A. P. Topchiev, Vice President of the Academy of Sciences of the U.S.S.R. and Party on A Visit to the United States;* 6 months; $4,350

W. W. Atwood, Jr.; *Emergency Financial Support to the Bureau of ICSU;* 1 year; $40,000

W. W. Atwood, Jr.; *Emergency Support to the International Union of Pure and Applied Chemistry (IUPAC);* 1 year; $20,000

M. H. Trytten; *Travel Support of IAEA Fellows, 1960;* 1 year; $1,400

M. H. Trytten; *11th Meeting of Nobel Laureates at Lindau;* 1 month; $1,750

NATIONAL SCIENCE TEACHERS ASSOCIATION, Washington, D.C.; Robert H. Carleton; *Cooperative Program Between the National Science Teachers Association and the British Science Masters' Association;* 3 months; $2,500

NEUMANN, GERHARD; *NATO Advanced Study Institute on Oceanography;* $450

PAN AMERICAN UNION, Washington, D.C.; Theodore R. Crevenna; *A Teaching Seminar in the Method of Establishing Chronological Sequences of Pre-Columbian Cultures in the Americas;* 1 year; $3,850

Jesse D. Perkinson, Jr.; *Program of Inter-American Cooperation in Science Education;* 6 months; $11,400

Pines, David; *NATO Advanced Study Institute;* $550

Pipberger, Hubert, *NATO Advanced Study Institute;* $630

Rabun, Edwin D.; *NATO Advanced Study Institute;* $520

Reis, Charles S.; *NATO Advanced Study Institute on Underwater Acoustics;* $775

Roberg, Jane; *NATO Advanced Study Institute;* $635

Salzman, George; *NATO Advanced Study Institute;* $625

Scalapino, Douglas James; *NATO Advanced Study Institute;* $650

SCANDINAVIAN COUNCIL FOR APPLIED RESEARCH, Blindern, Norway; Elin Tornudd; *United States Participation in the Second Year of the Growing Points Program in the Scandinavian Countries;* 1 year; $4,600

Shapley, Harlow; *Survey of Work in Progress in the Fields of Astronomy in India;* 3 months; $6,075

Smith, David Y.; *NATO Advanced Study Institute;* $585

Smith, Sister Marian Jose; *NATO Advanced Study Institute;* $585

Springer, George; *Trial in Brazil of Modern Methods in the Teaching of Mathematics;* 6 months; $5,475

Squire, David Roland; *NATO Advanced Study Institute;* $600

Stahmann, Mark A.; *NATO Advanced Study Institute;* $550

Stroke, H. Henry; *NATO Advanced Study Institute in Nuclear Physics;* $600

Suhl, Harry; *NATO Advanced Study Institute;* $665

U.S.-SOUTH AFRICA LEADER EXCHANGE PROGRAM, INC., Philadelphia, Pa.; Frank S. Loescher; *Travel of Foreign Participants in Summer Institutes, 1961;* 5 months; $4,855

VERONIS GEORGE; *NATO Advanced Study Institute on Oceanography;* $450

WALLACE, A. D.; *Preparing a Report on Mathematical Activity in Czechoslovakia, Hungary, Poland, and Yugoslavia;* 5 months; $200

WARNER, HOMER R.; *NATO Advanced Study Institute;* $820

WEBER, JOSEPH; *NATO Advanced Study Institute;* $500

WORTIS, MICHAEL; *NATO Advanced Study Institute;* $455

ZIPOY, DAVID M.; *NATO Avanced Study Institute;* $290

SPECIAL RESEARCH AND DEVELOPMENT STUDIES

U.S. DEPARTMENT OF COMMERCE, BUREAU OF THE CENSUS, Washington, D.C.; Robert W. Burgess; *Census-Internal Revenue Service Link Project;* $15,000

Max R. Conklin; *Survey of Research and Development Costs of Industry-Oriented Organizations During 1959;* $7,797

Max R. Conklin; *Survey of Research and Development Costs of Industry-Oriented Organizations During 1960;* $95,000

U.S. DEPARTMENT OF LABOR, COMMISSIONER OF LABOR STATISTICS, Washington, D.C.; Ewan Clague; *Cost Index Applicable to Research and Development Budgets;* 1 year; $16,200

INTERNATIONAL GEOPHYSICAL YEAR

GLENN L. MARTIN CO., RIAS DIV., Baltimore, Md.; Phillip Schwed; *Determination of the Flux of Heavy Primary Cosmic Ray Nuclei;* $17,195

DOCUMENTATION RESEARCH

AMERICAN PSYCHOLOGICAL ASSOCIATION, Washington, D.C.; John G. Darley; *Coordinated Study of Information Exchange in Psychology;* 2 years; $167,760

UNIVERSITY OF CALIFORNIA, Berkeley; Sydney M. Lamb and Mary R. Haas; *Support of Research on the Machine Translation of Technical Literature with Special Reference to Russian and Chinese*; 18 months; $208,000

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; Russell L. Ackoff; *Research on Measurement of Value of Recorded Scientific Information;* 1 month; $1,920

HARVARD UNIVERSITY, Cambridge, Mass.; Anthony G. Oettinger; *Automatic Translation and Mathematical Linguistics;* 1 year; $150,000

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Victor H. Yngve; *Basic Research on Methods of Translating Languages by Machine;* 1 year; $150,000

NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.; Clem O. Miller; *Chemical Notation Systems Project;* 1 year; $56,000

NATIONAL BUREAU OF STANDARDS, U.S. DEPARTMENT OF COMMERCE, Washington, D.C.; Samuel N. Alexander; *Research Information Center and Advisory Service on Information Processing;* 1 year; $50,000

Robert D. Elbourn; *Research in Picture Processing Operations;* 2 months; $15,000

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus; William S-Y Wang; *Research on Syntactic Analysis;* 1 year; $14,700

UNIVERSITY OF PENNSYLVANIA, Philadelphia; Zellig S. Harris; *Linguistic Transformations for Information Retrieval;* 1 year; $180,400

READING CHEMISTS' CLUB, West Reading, Pa.; William J. Wiswesser; *A Study of the Line-Formula Notation;* 2 years; $11,000

WAYNE STATE UNIVERSITY, Detroit, Mich.; Harry H. Josselson; *Standardization of Format for Russian-to-English Automatic Dictionaries;* $4,500

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; Allen Kent; *Test Program for Evaluating Procedures for the Exploitation of Literature of Interest to Metallurgists;* 6 months; $100,800

Allen Kent; *Test Program for Evaluating Procedures for the Exploitation of Literature of Interest to Metallurgists;* 1 year; $200,148

FOREIGN SCIENCE INFORMATION

ACTA METALLURGICA, Schenectady, N.Y.; John H. Hollomon; *Translation and Publication of the 1960 Issues of the Russian Journals, The Physics of Metals and Metallography, and Abstracts-Metallurgy, Part A;* 1 year; $58,287

John H. Hollomon; *Translation and Publication of the 1960 Issues of Two Russian Journals: Metallurg and MiTom;* 1 year; $34,507

AMERICAN CERAMIC SOCIETY, INC., Columbus, Ohio; Charles S. Pearce; *Translation and Publication of the 1961 and 1962 Issues of the Russian Journal, Steklo I Keramika (Glass and Ceramics)*; 2 years; $8,500

AMERICAN CHEMICAL SOCIETY, Washington, D.C.; Richard H. Belknap; *A Survey to Determine Need for English Translations of Russian Scientific Journals;* 1 year; $4,955

AMERICAN GEOGRAPHICAL SOCIETY, New York, N.Y.; Charles B. Hitchcock; *Translation and Publication of Soviet Geography;* 1 year; $23,480

AMERICAN GEOPHYSICAL UNION, Washington, D.C.; Waldo E. Smith; *1960 Issues, Bulletin of the Academy of Sciences, USSR; Geophysics Series;* 1 year; $57,730

Waldo E. Smith; *Translation and Publication of the 1961 Issues of Izvestiya, Geophysics Series;* 1 year; $55,790

Waldo E. Smith; *Translation and Publication of the 1960 Volume of the Russian Journal, Geodesy and Cartography;* 1 year; $24,335

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Washington, D.C.; Francis C. Harwood; *Translation and Publication of the 1960 Issues of the Russian Journal, Soviet Soil Science;* 1 year; $56,566

Francis C. Harwood; *Translation and Publication of the 1960 Issues of the Russian Journal, Doklady—Biochemistry Section;* 1 year; $18,888

Francis C. Harwood; *Translation and Publication of the 1960 Issues of the Russian Journal, Entomological Review;* 1 year; $34,961

Francis C. Harwood; *Translation and publication of the 1960 Issues of Four Russian Journals: Doklady-Biological Sciences, Doklady-Botanical Sciences, Microbiology; and Plant Physiology;* 1 year; $112,447

Francis C. Harwood; *Wintering of Plants;* 1 year; $10,350

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, New York, N.Y.; F. J. Van Antwerpen; *Translation and Publication of an International Chemical Engineering Quarterly Journal;* 1 year; $83,670

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, New York, N.Y.; N. S. Hibshman; *Translation and Publication of the First Three 1961 Issues of Three Russian Journals: Radio Engineering, Radio Engineering and Electronics, and Telecommunications;* 3 months; $28,750

AMERICAN INSTITUTE OF PHYSICS, New York, N.Y.; Wallace Waterfall; *Translation and publication of the Russian Journal, Crystallography (1960)*; 1 year; $12,950

Wallace Waterfall; *Translation and Publication of the Russian Journal, Progress of Physical Sciences, 1960 Issues,* 1 year; $31,500

Wallace Waterfall; *1960 Issues of the Russian Journal, Solid State Physics;* 1 year; $44,600

Wallace Waterfall; *1960 Issues of the Russian Journal, Astronomy;* 1 year; $26,800

AMERICAN MATHEMATICAL SOCIETY, Providence, R.I.; Gordon L. Walker; *Survey of Contemporary Chinese Mathematical Research to Study Translation Needs and the Preparation of Reviews of Chinese Mathematical Articles;* 1 year; $10,150

Gordon L. Walker; *Translation of Mathematical Research Articles from the Russian, and Other Languages;* 1 year; $42,953

Gordon L. Walker; *Translation of a Russian Mathematics Book, Generalized Analytic Functions;* 1 year; $8,305

Gordon L. Walker; *Translation of a Russian Mathematics Book, Linear Representations of the Lorentz Group,* 18 months; $4,973

Gordon L. Walker; *Translation of the Russian Book—Mathematics: Its Content, Methods and Meaning;* 18 months; $16,687

Gordon L. Walker; *Translation and Publication of the Russian Journal, Soviet Mathematics-Doklady;* 1 year; $22,635

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, New York, N.Y.; Jos. Sansone; *1959 Volume of The Russian Journal, Friction and Wear in Machinery (Serial);* 1 year, $6,600

Jos. Sansone; *Translation and Publication of the Latest Edition of the Russian Book, Theory of Special Kinds of Castings;* 1 year; $6,325

Jos. Sansone; *Translation and Publication of Volumes 11 and 14 of the Russian Serial, Friction and Wear in Machinery;* 1 year; $12,500

S. A. Tucker; *Translation and Publication of the 1961 Issues, Volume 25, of the Russian Journal of Applied Mathematics and Mechanics;* 1 year; $37,400

BIOLOGICAL ABSTRACTS, UNIVERSITY OF PENNSYLVANIA, Philadelphia; Allen J. Sprow; *Translation of Soviet Biological Literature;* 3 years; $55,705

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; Herbert A. Simon; *Translation of Dr. De Groot's Book, Research on Cognitive Processes;* 1 year; $3,910

COLUMBIA UNIVERSITY, New York, N.Y.; Charles H. Behre; *Review and Translation of Articles Published in Russian, Geology of Ore Deposits, beginning with the 1959 Issues;* 3 years; $2,530

Vladimer Slamecka; *Study of the Resources of Scientific Information in Czechoslovakia and the German Democratic Republic;* 1 year; $17,411

EARTHQUAKE ENGINEERING RESEARCH INSTITUTE, Pasadena, Calif.; George W. Housner; *Translation of the Russian Book, Construction in Seismic Regions, and Partial Translation of the Russian Book, Norms and Regulation in Seismic Regions;* 6 months; $1,080

GEOCHEMICAL SOCIETY, Washington, D.C.; Earl Ingerson; *An English Edition of the 1957 Issues of the Russian Journal, Geochemistry;* 1 year; $3,400.

Earl Ingerson; *Translation and Publication of the 1960 Issues of Russian Journal, Geochemistry;* 1 year; $15,000

INSTRUMENT SOCIETY OF AMERICA, Pittsburgh, Pa.; William H. Kushnick; *The 1960 Issues of Four Russian Journals—Automation and Remote Control, Measurement Techniques, Instruments and Experimental Techniques, and Industrial Laboratory;* 1 year; $120,220

JAPAN DOCUMENTATION SOCIETY, Tokyo; Haruo Ootuka; *Revision and Updating of the Kerr Report "Science Information Services in Japan";* 7 weeks; $500

LIBRARY OF CONGRESS, Washington, D.C.; Henry J. Dubester; *Publication of Part I of a monthly World List of Future International Meetings;* 1 year; $18,500

Henry Dubester; *Preparation and Publication of a Guide to International Information Facilities in Science, Technology, Medicine, and Agriculture;* 1 year; $2,033

Charles M. Gottschalk; *Preparation and Publication of World-Wide Scientific Serials;* 1 year; $19,891

Rudolph Smits and Robert R. Holmes; *Publication of the Monthly Index of Russian Accessions and the East European Accessions Index;* 1 year; $66,000

John Sherrod; *Source File of Soviet Science;* 3 months; $4,815

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge; William N. Locke; *Translation and Publication of the 1960 Issues of Three Russian Journals—Radio Engineering, Radio Engineering and Electronics, and Telecommunications;* 1 year; $71,875

William N. Locke, *2nd Conference of Translation Editors;* 2 days; $2,250

MIDWEST INTER-LIBRARY CENTER, Chicago, Ill.; Gordon R. Williams, *Support of Travel to Russia to Arrange for the Acquisition of Russian Doctoral Dissertations;* 3 weeks; $285

Gordon R. Williams; *Operation of the Scientific Journals Center;* 1 year; $18,147

NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.; B. L. Kropp; *A Descriptive Area Scientific Research and Information Study in Indonesia and A Survey of the Accumulation and Dissemination of Scientific Information in Vietnam;* 1 year; $2,330

Robert C. Stephenson; *Publication of an International Geology Review;* 1 year; $22,438

Robert C. Stephenson; *Translation and Publication of the Doklady Geology Series—1959 Volume Year;* 1 year; $6,555

Robert C. Stephenson; *Translation and Publication of Doklady Geology Series—1960 Volume Year;* 1 year; $37,285

Robert C. Stephenson; *Translation and Publication of the International Geology Review, Vol. 3, 1961, and Soviet Geology;* 1 year; $71,690

Robert C. Stephenson; *Translation and Publication of the 1960 Issues of the Russian Bulletin, Izvestiya—Geology Series, U.S.S.R. Academy of Sciences;* 1 year; $40,776

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; John W. Cell, Raleigh; *Translation of L. A. Galin's Book—Contact Problems of the Theory of Elasticity (Moscow 1953);* 1 year; $1,840

OPTICAL SOCIETY OF AMERICA, Washington, D.C.; Mary E. Warga; *Translation and Publication of the 1961 Issues of the Russian Journal—Optika I Spektroskopiva (Optics and Spectroscopy);* 1 year; $50,000

PAN AMERICAN UNION, Washington, D.C.; Jesse D. Perkinson, Jr.; *Publication of a Report Covering a Study of the Activities and Programs of Latin American Bibliographic and Documentation Centers;* 6 months; $1,000

Jesse D. Perkinson, Jr.; *Comprehensive Study of the Status of the Publication of Scientific and Technical Journals in Latin America;* 1 year; $22,500

PRINCETON UNIVERSITY, Princeton, N.J.; John Turkevich; *Preparation of a Guide to Soviet Sciences;* 1 year; $24,587

SOCIAL SCIENCE RESEARCH COUNCIL, N.Y., N.Y.; Bryce Wood; *SSRC–OTS Translation Distribution Project;* 1 year; $7,910

SOCIETY FOR INDUSTRIAL AND APPLIED MATHEMATICS, Philadelphia, Pa.; I. E. Block; *1960 Issues of the Russian Journal, Theory of Probability and Its Applications;* 1 year; $10,712

I. E. Block; *Translation and Publication of the Muskhelishvili Anniversary Volume;* 1 year; $23,874

SPECIAL LIBRARIES ASSOCIATION, N.Y., N.Y.; Ildiko D. Nowak; *Collateral Support for the Operation of the Translations Center;* 1 year; $30,500

STANFORD UNIVERSITY PRESS, Stanford, Calif.; Leon E. Seltzer; *Translation of Dr. Krasovskii's Book, Certain Problems in the Theory of Stability of Motion, Moscow 1959;* 1 year; $3,450

Leon E. Seltzer; *Translation of the Book, Asymptotic Methods in the Theory of Nonlinear Oscillations (2d Ed., Moscow 1958);* 1 year; $4,543

STIFTERVERBAND FUR DIE DEUTSCHE WISSENSCHAFT, Essen-Bredeney, West Germany; F. E. Nord; *Translation and Revision of the Publication, World-Wide Science;* 1 year; $10,700

U.S. DEPARTMENT OF COMMERCE, OFFICE OF TECHNICAL SERVICES, Washington, D.C.; John C. Green; *Operational Functions of the P.L. 480 Translation Program;* 7 months; $12,859

John C. Green; *Support of the Translation Center in Delft;* 1 year; $7,000

U.S. DEPARTMENT OF STATE, OFFICE OF BUDGET, Washington, D.C.; *Employment of a Polish National at the Embassy, Warsaw, Poland in support of P.L. 480 Program;* $519

GENERAL SCIENCE INFORMATION GRANTS

ASSOCIATION OF RESEARCH LIBRARIES, Ithaca, N.Y.; Stephen A. McCarthy; *Meeting Expenses of ARL Liaison Committee;* 6 months; $1,500

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Robert H. Roy; *An Operations Research and Systems Engineering Study of a University Library;* 1 year; $22,311

NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.; Karl F. Heumann; *Office of Documentation;* 1 year; $97,359

NEW YORK PUBLIC LIBRARY, N.Y.; Robert E. Kingery; *Development of United States Standards in Library Work and Documentation;* 1 year; $8,470

RESEARCH DATA AND INFORMATION SERVICES

CHEMICAL ABSTRACTS SERVICE, Columbus, Ohio; G. Malcolm Dyson; *Systems Development for Improved Information Services in Chemistry;* 1 year; $117,600

MUSEUM OF THE AMERICAN INDIAN, New York, N.Y.; Frederick J. Dockstader; *Emergency Preservation of Documentary Research Films on American Indians;* 1 year; $20,000

OFFICE OF TECHNICAL SERVICES, U.S. DEPARTMENT OF COMMERCE, Washington, D.C., John C. Green; *Establishment and Initial Operation of a System of Twelve Regional Reference Centers;* 1 year; $22,000

SMITHSONIAN INSTITUTION, Washington, D.C.; Stella L. Deignan; *Proposed Enlargement of Facilities and Increase in Services of the Bio-Sciences Information Exchange;* 1 year; $105,200

Stella L. Deignan; *Operating Expenses of the Science Information Exchange;* 1 year; $45,000

Stella L. Deignan; *Enlargement of the Senior Staff of the Science Information Exchange for Planning and Executing the Expanded Activities of the Exchange;* 1 year; $67,139

SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.; William J. Graff; *A Feasibility Study for a Regional Information Center;* 9 months; $28,200

SCIENTIFIC PUBLICATIONS

AMERICAN ASTRONOMICAL SOCIETY, Princeton, N.J.; Frank K. Edmondson; *Publication of the Astronomical Journal;* 6 months; $3,300

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Washington, D.C.; Hiden T. Cox; *Publication of the Proceedings of the First Conference on Brain and Behavior;* 1 year; $17,350

Hiden T. Cox; *Biological Sciences Communication Project;* 1 year; $151,200

Francis C. Harwood; *Publication of the Translated Russian Monograph, Monogenetic Trematodes, Their Systematics and Phylogeny;* 1 year; $5,000

AMERICAN MATHEMATICAL SOCIETY, Providence, R.I.; Gordon L. Walker; *Publication of Mathematical Reviews;* 1 year; $40,000

Gordon L. Walker; *Preparation of a Cumulative Index to Mathematical Reviews;* 1 year; $9,000

Gordon L. Walker; *Preparation and Publication of Survey Reviews in Mathematics;* 1 year; $12,900

Gordon L. Walker; *Reprinting the American Mathematical Society Translations of Russian Mathematical Articles. Series I;* 18 months; $10,800

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Brooks F. Ellis; *Support of Compilation of a Catalogue of Index Foraminifera;* 2 years; $30,000

AMERICAN ROCKET SOCIETY, INC., New York, N.Y.; James J. Harford; *Partial Support for Enlarging the ARS Journal;* 18 months; $90,000

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, New York, N.Y.; Stephen Juhasz; *Publication of Applied Mechanics Review;* 3 years; $50,000

AMERICAN SOCIETY OF ZOOLOGISTS, Urbana, Ill., Emil Witschi; *Establishing the New Journal, American* ZOOLOGIST*;* 2 years; $5,300

AMERICAN SOCIOLOGICAL ASSOCIATION, New York, N.Y.; Leo P. Chall; *Enlarging the Editorial Office of Sociological Abstracts;* 1 year; $27,600

ARCTIC INSTITUTE OF NORTH AMERICA, Washington, D.C.; Robert C. Faylor; *Compilation of the Arctic Bibliography;* 1 year; $25,000

BIOLOGICAL ABSTRACTS, INC., Philadelphia, Pa.; G. Miles Conrad; *Continued Expansion of Coverage of Biological Abstracts and Development of BASIC Index;* 1 year; $197,000

UNIVERSITY OF CALIFORNIA, Berkeley; Joseph L. Reid, Jr., La Jolla; *Preparation of Data for Oceanic Observations of the Pacific;* 3 years; $67,800

CAMBRIDGE ENTOMOLOGICAL CLUB, Cambridge, Mass.; Frank M. Carpenter; *Temporary Support of the Journal Psyche;* 2 years; $2,000

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; Russell Ackoff; *Operations Research Study of Publication Costs of Scientific Journals;* 6 months; $11,960

UNIVERSITY OF CHICAGO, Chicago, Ill.; Gerard P. Kuiper; *Publications of the Yerkes Observatory;* 1 year; $2,000

COUNCIL OF OLD WORLD ARCHAEOLOGY, Boston, Mass.; Donald F. Brown; *COWA Surveys and Bibliographies;* 2 years; $17,000

FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY, Washington, D.C.; Sara F. Leslie; *Partial Support of Publication of the Proceedings of the International Symposium on Cold Acclimation;* 6 months; $6,500

FEDERATION INTERNATIONALE DE DOCUMENTATION, Paris, France; N. A. J. Voorhoeve; *Partial Support of the Federation Internationale de Documentation;* 2 years; $14,000

HARVARD UNIVERSITY PRESS, Cambridge, Mass.; Thomas J. Wilson; *Partial Support of Final Preparation and Republication of Collected Experimental Papers by Percy W. Bridgman;* 1 year; $17,490

INSTITUTE OF AEROSPACE SCIENCES, INC., New York, N.Y.; S. Paul Johnston; *Establishment of International Aero/Space Abstracts;* 1 year; $63,000

S. Paul Johnston; *Preparation and Publication of an Annual Index to International Aerospace Abstracts;* 1 year; $39,000

INTERNATIONAL ASSOCIATION OF SCIENTIFIC HYDROLOGY, Gentbrugge, Belgium; L. J. Tison; *Publication of the Hydrology Proceedings of the IUGG, 1960;* 1 year; $4,250

INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS, Paris, France; G. A. Boutry; *Continued Partial Support of the International Abstracting Board;* 1 year; $7,500

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; G. Herberton Evans, Jr.; *Publishing Economics Library Selections;* 2 years; $34,000

JOSIAH MACY, JR. FOUNDATION, New York, N.Y.; Frank Fremont-Smith, *Publication of the Transactions of the Third Conference on the Central Nervous System and Behavior;* 1 year; $20,500

LIBRARY OF CONGRESS, Washington, D.C.; Clement R. Brown; *Preparation of the International Geophysical Year Bibliography;* 1 year; $37,700

L. Quincy Mumford; *Compilation of a Bibliography of Foreign Abstracting and Indexing Services;* 1 year; $10,725

UNIVERSITY OF LOUISVILLE, Ky.; Stephen G. Vandenberg; *Publication of Computers in Behavioral Science;* 3 years; $18,400

METALLURGICAL SOCIETY OF AIME, New York, N.Y.; John Chipman; *Transactions of the Metallurgical Society of AIME;* 1 year; $20,000

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; George E. Hay; *Michigan Mathematical Journal;* 3 years; $3,000

Lewis E. Wehmeyer; *Publication of a World Monograph of the Genus Pleospora and Its Segregates;* 2 years; $12,900

MODERN LANGUAGE ASSOCIATION OF AMERICA, New York, N.Y.; Leonard Cohan and Kenneth Craven; *Publication of a Report on Science Information Personnel;* 1 year; $3,725

NATIONAL ACADEMY OF SCIENCES, NATIONAL RESEARCH COUNCIL, Washington, D.C.; Karl F. Heumann; *Office of Documentation;* 3 months; $2,300

NATIONAL ACADEMY OF SCIENCES/AMERICAN GEOLOGICAL INSTITUTE, Washington, D.C.; Robert C. Stephenson; *Publication of GeoScience Abstracts;* 1 year; $35,750

NATIONAL FEDERATION OF SCIENCE ABSTRACTING AND INDEXING SERVICES, Washington, D.C.; Raymond A. Jensen; *Publication of a Bibliography of U.S. Abstracting and Indexing Services;* 6 months; $2,200

Raymond A. Jensen; *Partial Support of the Federation Secretariat;* 1 year; $25,000

NEW YORK BOTANICAL GARDEN, New York City; William C. Steere; *Systematic and Economic Botany;* 16 weeks; $2,760

H. W. Rickett; *Publication of Part I of a Manual of the Leafy Hepaticae of the West Indies, Mexico, Central and South America by Margaret Fulford;* 1 year; $4,000

William C. Steere and Sydney Gould, *Preparation of an International Plant In-*

dex by Use of Punched Cards and Data Processing Machines; 2 years; $178,600

UNIVERSITY OF NORTH CAROLINA, Chapel Hill; David A. Young, Raleigh; *Catalogue of the Homoptera Auchenorhyncha of the World;* 1 year; $34,400

PENNSYLVANIA STATE UNIVERSITY, University Park; William Spackman; *Compilation and Publication of Catalog of Fossil Spores and Pollen;* 1 year; $24,800

SEISMOLOGICAL SOCIETY OF AMERICA, San Francisco, Calif.; Don Tocher; *Alaska Earthquake of 1958;* 1 year; $3,800

SMITHSONIAN INSTITUTION, Washington, D.C.; Paul H. Oehser; *Preparation and Publication of Supplement to Annotated Bibliography of Termites, 1955–1960;* 1 year; $4,800

SOCIETY FOR EXPERIMENTAL STRESS ANALYSIS, Minneapolis, Minn.; B. J. Lazan; *Establish a New Journal, Experimental Mechanics;* 3 years; $45,000

SOCIETY OF AMERICAN BACTERIOLOGISTS, Madison, Wis.; E. M. Foster; *Publication of Backlog Manuscripts in the Journal of Bacteriology;* 1 year; $34,300

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles; Richard D. Terry; *Preparation of Bibliography of the Geology and Mineral Resources of California, 1937 to 1959;* 6 months; $2,400

STANFORD UNIVERSITY, Stanford, Calif.; Bernard J. Siegel; *Partial Support of Publication on Biennial Review of Anthropology, 1961;* 1 year; $3,500

UNIVERSITY OF TEXAS, Austin; G. de Vaucouleurs; *Preparation of a Reference Catalogue of Bright Galaxies;* 1 year; $2,957

VIRGINIA DEPARTMENT OF HIGHWAYS, Richmond; W. T. Parrott; *Reprinting Proceedings of the Highway Geology Symposium;* 1 year; $6,100

WASHINGTON STATE UNIVERSITY, Pullman; Robert A. Nilan; *The Cytology and Genetics of Barley;* 1 year; $5,000

UNIVERSITY OF WASHINGTON PRESS, Seattle; W. M. Read; *Partial Support for Publication of the Biosystematics of American Crows;* 1 year; $500

UNIVERSITY OF WYOMING, Laramie; O. A. Beath; *Revision of a Book on Selenium;* 2 years; $8,750

CONFERENCES IN SUPPORT OF SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Washington, D.C.; W. George Parks; *Gordon Research Conference on Inorganic Chemistry;* 1 year; $2,500

Dael Wolfle; *Symposium on the Sciences in Communist China;* 3 months, $28,803

AMERICAN CERAMIC SOCIETY, INC., Columbus, Ohio; Charles S. Pearce; *VI International Congress on Glass;* 2 years; $7,500

AMERICAN CHEMICAL SOCIETY, DIVISION OF BIOLOGICAL CHEMISTRY, Philadelphia, Pa.; Leroy Augenstine; *Electronic Rearrangements and Energy Transfer in Biological Systems;* 1 year; $700

AMERICAN DOCUMENTATION INSTITUTE, Washington, D.C.; Claire K. Schultz; *Support of Symposium on the State of the Art of Documentation and Information Retrieval,* 8 months; $10,964

AMERICAN INSTITUTE OF MINING, METALLURGICAL, AND PETROLEUM ENGINEERS, Paoli, Pa.; William B. Stephenson; *International Symposium on Agglomeration;* 1 year; $3,100

AMERICAN MATHEMATICAL SOCIETY, Providence R.I.; Gordon L. Walker; *Symposium on Mathematical Problems in the Biological Sciences;* 18 months; $5,800

AMERICAN METEOROLOGICAL SOCIETY, Boston, Mass.; Thomas F. Malone; *Conferences on Scientific Aspects of Weather Prediction and Control;* 1 year; $5,000

AMERICAN ORNITHOLOGIST'S UNION, Ithaca, N.Y.; Charles G. Sibley; *XIII International Ornithological Congress;* 2 years; $36,100

AMERICAN SOCIETY OF LIMNOLOGY AND OCEANOGRAPHY, INC., Ann Arbor, Mich.; George H. Lauff; *Support of a Conference entitled "XV International Congress of Limnology";* 2 years; $30,000

AMERICAN SOCIETY OF ZOOLOGISTS, Iowa City, Iowa; Emil Witschi; *Regional Conferences in Developmental Biology;* 3 years; $17,300

Emil Witschi; *Five Regional Conferences in Comparative Endocrinology;* 1 year; $5,750

AMERICAN SOCIOLOGICAL ASSOCIATION, New York, N.Y.; Robert C. Angell; *Fifth World Congress of Sociology;* 2 years; $25,000

ASSOCIATION OF AMERICAN COLLEGES, Washington, D.C.; F. L. Wormald; *Advisory Conference Relative to Science Potential of Small Colleges;* 2 days; $5,462

UNIVERSITY OF CALIFORNIA, Berkeley; Robert M. Oliver and Raymond C. Grassi; *Conference on Mathematical Optimization Techniques;* 1 year.; $3,290

C. D. Shane; *General Assembly of the International Astronomical Union;* 1 year; $15,000

Keith A. Brueckner, La Jolla; *Conference in Elementary Particle Theory,* 1 year.; $9,200

H. W. Magoun, Los Angeles; *Conference on Brain and Behavior;* 4 days; $26,400

Robert L. Pecsok, Los Angeles; *Conference on Gas Chromatography;* 1 year; $700

H. S. Thomson, Santa Barbara; *A Symposium on Problems of Extragalactic Research;* 1 year; $28,700

CANADIAN MATHEMATICAL CONGRESS, Wolfville, Nova Scotia, Canada; L. F. S. Ritcey, Montreal; *Seminar in Mathematics;* 4 weeks; $2,000

CARNEGIE INSTITUTION OF WASHINGTON, D.C.; Edward A. Ackerman; *Biologic Innovations and the Geologic Record;* 1 year; $7,500

CENTER FOR ADVANCED STUDY IN THE BEHAVIORAL SCIENCES, Stanford, Calif.; Jerry Hirsch; *Research Conference on Behavior Genetics;* 1 year; $11,700

UNIVERSITY OF COLORADO, Boulder; Donald E. Billings; *IAU Symposium on the Solar Corona;* 1 year; $22,300

DARTMOUTH COLLEGE, Hanover, N.H.; Hazelton Mirkil; *Conference on Function Algebras;* 1 year; $4,600

ECONOMETRIC SOCIETY, New Haven, Conn.; Lionel W. McKenzie; *Travel to Meetings of the Econometric Society;* 5 years; $17,500

ELECTROCHEMICAL SOCIETY, INC., New York, N.Y.; Robert K. Shannon; *Symposium on Modern Electrochemical Instrumentation,* 1 year; $6,000

ELECTRON MICROSCOPE SOCIETY OF AMERICA, Philadelphia, Pa.; Thomas F. Anderson; *Fifth International Congress for Electron Microscopy;* 2 years; $40,000

FOUNDATION FOR INSTRUMENTATION EDUCATION AND RESEARCH, INC., N.Y.; Lloyd E. Slater; *Meeting on Impact of Feedback Control Concepts in the Study of Economic and Business Systems;* 1 year; $4,000

UNIVERSITY OF GEORGIA, Athens; M. K. Fort, Jr.; *Topology of 3-Manifolds;* 1 year; $27,500

GORDON RESEARCH CONFERENCES, INC., Kingston, R.I.; W. George Parks; *Gordon Research Conference on Cell Structure and Metabolism;* 1 year; $7,000

W. George Parks; *Gordon Conference on Photonuclear Reactions;* 1 year; $6,000

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago; Max M. Frocht; *International Symposium on Photoelasticity;* 1 year; $4,000

UNIVERSITY OF ILLINOIS, Urbana; Clyde E. Kesler; *Second Conference on Fundamental Research on Plain Concrete;* 1 year; $10,200

Samuel Schrage; *Chemistry High School—College Teachers Conference;* 1 day; $200

INDIANA UNIVERSITY, Bloomington; Paul Klinge; *Conference for Summer Biology Institute Directors;* 3 days; $30,300

INSTITUTE OF RADIO ENGINEERS, INC., New York, N.Y.; Lee B. Lusted; *4th International Conference on Medical Electronics;* 1 week; $5,000

KAISER FOUNDATION RESEARCH INSTITUTE, Richmond, Calif.; Clifford H. Keene; *Symposium on Lower Metazoa, Oakland, California;* 4 days; $18,600

LONG ISLAND BIOLOGICAL ASSOCIATION, Cold Spring Harbor, N.Y.; Arthur Chovnick; *Cold Spring Harbor Symposium on Quantitative Biology;* 1 year; $7,000

MARIA MITCHELL OBSERVATORY, Nantucket, Mass.; Dorrit Hoffleit; *Symposium on Comets;* 3 months; $4,600

UNIVERSITY OF MARYLAND, College Park; J. M. Burgers; *Conference on Fluid Dynamics and Applied Mathematics;* 1 year; $4,000

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge; John E. Burchard; *International Conference on Scientific and Engineering Education;* 1 year; $50,000

Thomas T. Sandel; *Research Training Conference in Computer Techniques for Biological Scientists;* 1 year; $17,900

John M. Wynne; *Science and the Scientist in International Educational and Cultural Affairs;* 3 days; $1,800

MATHEMATICAL ASSOCIATION OF AMERICA, Buffalo, N.Y.; W. H. Meyer, University of Chicago; *Conference of Mathematical Lecturers at 1961 Summer Institutes for High School Teachers;* 3 days; $22,000

METALLURGICAL SOCIETY OF AIME, New York, N.Y.; John Chipman; *Symposium on Decomposition of Austenite;* 1 year; $2,270

Carleton C. Long; *Direct Observation of Defects in Crystals;* 1 year; $3,000

UNIVERSITY OF MINNESOTA, Minneapolis; Warren B. Cheston; *Midwest Conference on Theoretical Physics;* 1 year; $2,000

MISSOURI BOTANICAL GARDEN, St. Louis; Robert L. Dressler; *Symposium on the Population Concept in Systematics;* 1 year; $1,800

NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.; Frank A. Beach; *Conference on Sex and Behavior;* 2 years; $26,800

Frank L. Campbell; *Symposia (1) on Mutations (Fall 1960) and (2) on Statistics (Spring 1961) in Genetics;* 2 years; $14,200

Frank L. Campbell; *Current Research on Neurospora;* 3 days; $18,700

John S. Coleman; *XI General Assembly of the International Astronomical Union;* 1 year; $24,400

Harold J. Coolidge; *Symposium on Biological and Physical Aspects of Light in the Sea;* 1 year; $9,510

Glen Finch; *Committee on Non-Human Primate Behavioral Research;* 1 year; $3,600

Linn Hoover; *Ninth Annual Conference on Clays and Clay Minerals;* 1 year; $2,100

NEW YORK STATE VETERINARY COLLEGE, CORNELL UNIVERSITY, Ithaca, N.Y.; Morley R. Kare; *Physiological and Behavioral Aspects of Taste;* 1 year; $800

NORTHWESTERN UNIVERSITY, Evanston, Ill.; M. E. Fine, *International Conference on Chemical Physics of Non-Metallic Crystals;* 1 year; $7,000

OHIO STATE UNIVERSITY, Columbus; W. A. Heiskanen; *Geodesy in Space Age;* 1 year; $1,950

PENNSYLVANIA STATE UNIVERSITY, University Park; Howard L. Hartman, *Fourth Symposium on Rock Mechanics;* 1 year; $3,200

POPULATION ASSOCIATION OF AMERICA, INC., Raleigh, N.C.; C. Horace Hamilton; *International Population Congress;* 7 days; $20,000

SCIENCE SERVICE, Washington, D.C.; Watson Davis; *Conference to Consider the Role of Schools of Journalism in the Training of Science Writers;* 2 days; $11,865

SOCIETY FOR INDUSTRIAL AND APPLIED MATHEMATICS, Philadelphia, Pa.; F. Joachim Weyl and A. S. Householder; *Symposium on Matrix Computation;* 2 months; $15,750

SOCIETY FOR THE STUDY OF DEVELOPMENT AND GROWTH, Waltham, Mass.; Edgar Zwilling; *Support of the Growth Symposia for 1961, 1962, and 1963;* 3 years; $15,000

SOCIETY OF AMERICAN FORESTERS, Washington, D.C.; Tom Gill; *Partial Support of the Fifth World Forestry Congress, Seattle, Washington;* 12 days; $10,000

SOCIETY OF ECONOMIC PALEONTOLOGISTS AND MINERALOGISTS, Iowa City, Iowa; William M. Furnish; *Record of Patterns of Water Movement in Recent and Ancient Sediments;* 1 year; $850

SOCIETY OF GENERAL PHYSIOLOGISTS, Bethesda, Md.; Douglas G. Humm; University of North Carolina; *Regional Symposium in Invertebrate Physiology;* 1 year $1,000

South Dakota School of Mines and Technology, Rapid City; F. L. Partlo; *Conference on a Program for Atmospheric Research in the Black Hills Region;* 1 year; $3,000

University of Southampton, Southampton, England; Byron Thwaites; *The Southampton Mathematical Conference;* 10 days; $500

University of Southern California, Los Angeles; Gerhard L. Weissler; *International Conference on Vacuum Ultraviolet Radiation Physics;* 18 months; $30,700

Stanford Research Institute, Menlo Park, Calif.; Richard D. Cradle; *Symposium on Chemical Reactions in the Lower and Upper Atmosphere;* 2 days; $3,000

Swarthmore College, Swarthmore, Pa.; Peter van de Kamp; *Symposium on Visual Double Stars;* 1 year; $15,400

Syracuse University Research Institute, N.Y.; Wilber R. LePage; *International Conference on Electrical Engineering Education;* 1 year; $32,900

University of Tennessee, Knoxville; R. L. Murphree; *Fifth Biennial Symposium on Animal Reproduction;* 1 week; $2,400

Teratology Society, Cincinnati, Ohio; Josef Warkany; *Symposium on Chromosomes and Congenital Malformations;* 1 year; $3,500

University of Texas, Austin; Saul Kit, Houston; *Symposium: Structure, Conformation, and Function of Nucleic Acids and Proteins;* 1 year; $8,000

DeWitt C. Reddick; *A Conference on Mass Communications and Understanding of Science;* 1 year; $12,990

Tulane University, New Orleans, La.; F. B. Wright; *Symposium on Ergodic Theory;* 1 year; $28,750

U.S. Department of the Interior, Washington, D.C.; A. L. Miller; *Desalination Research Study;* 1 year; $29,600

Washington University, St. Louis, Mo.; Herman N. Eisen; *Continuing Workshop on Antibody Synthesis and Characterization;* 2 years; $19,000

University of Wisconsin, Madison; Robert A. Alberty; *Experimental Techniques for Studying Very Fast Reactions in Solution;* 1 year; $7,000

Lewis M. Cline; *Symposium on Oceanography in the Midwest;* 6 months; $1,100

Worcester Polytechnic Institute, Worcester, Mass.; Arthur B. Bronwell, *Conference on Research Goals;* $350

Yale University, New Haven, Conn.; F. R. E. Crossley; *Institute on Mechanism Theory;* 4 days; $13,545

ATTENDANCE AT INTERNATIONAL MEETINGS

African Ecology and Human Evolution, Burg Wartenstein, Austria; September 2 to September 12, 1961:

Wenner-Gren Foundation for Anthropological Research; $3,500

1961 Anniversary Meeting of the Chemical Society of London, Liverpool, England; April 11 to April 14, 1961:

Anton B. Burg; University of Southern California; $700

John R. Johnson; Cornell University; $500

Berufsverband Deutscher Psychologen Congress, Hamburg, Germany; August 10 to August 21, 1961:

Gordon W. Allport; Harvard University; $550

Ceramics and Man, Burg Wartenstein, Austria; September 2 to September 12, 1961:

Wenner-Gren Foundation for Anthropological Research; $2,300

Conference on Functional Analysis, Warsaw, Poland, September 4 to September 10, 1960:

Alberto P. Calderon; University of Chicago; $750

Conference on Heat and Mass Transfer with Phase and Chemical Conversions, Minsk, U.S.S.R.; January 23 to January 28, 1961:

Ernst R. Eckert; University of Minnesota; $851

Conference on Physics of Polymers, Bristol, England; January 10 to January 12, 1961:

Richard S. Stein; University of Massachusetts; $375

Robert Ullman; Polytechnic Institute of Brooklyn; $350

Conferences Regarding the Business Arrangements for the Mineralogical Abstracts Journal:

Marjorie Hooker; U.S. Department of the Interior; $390

Conferences with Publishers of Zentralblatt Für Mathematik and the Library of the Academy of Sciences of the U.S.S.R., held in Berlin, Germany and Leningrad, U.S.S.R., from October 5 to October 25, 1960:

Gordon L. Walker; American Mathematical Society; $1,400

COSPAR Meeting, Florence, Italy; April 7 to April 18, 1961:

Kinsey A. Anderson; $950

Sidney A. Bowhill; Pennsylvania State University; $1,000

John C. Brandt; California Institute of Technology; $1,000

Hilde Kallmann-Bijl; University of California; $1,275

Ernest Harry Vestine; RAND Corporation; $1,275

Delegation to Automatic Control Research Centers, Tokyo, Japan; May 9 to May 30, 1961:

Gilbert H. Fett; University of Illinois; $1,030

Otto J. M. Smith; University of California; $780

Travel to Meetings of the Econometric Society:

Econometric Society; New Haven, Conn.; $15,000

To Deliver a Series of Lectures in Poland, Switzerland and France; Summer 1961:

Stefan Bergman; Stanford University; $950

Earth Tides Symposium, Brussels, Belgium; June 5 to June 10, 1961:

Walter D. Lambert; Ohio State University; $275

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Editorial Committee of the Tenth International Botanical Congress, Brussels, Belgium, November 3 to November 9, 1960:

Reed C. Rollins; Harvard University; $1,600

Enzyme Commission of the International Union of Biochemistry, Marseilles, France; March 22 to March 29, 1961:

Albert L. Lehninger; Johns Hopkins University; $500

Enzyme Commission of the International Union of Biochemistry, Marseilles, France; March 22 to March 29, 1961, and Drafting Sub-Commission, Torremolinos, Spain; January, 1962:

Sidney P. Colowick; Vanderbilt University; $1,000

European Committee for Concrete, Monaco; January 12 to January 19, 1961:

Chester P. Siess; University of Illinois; $792

European Conference of Chemical Engineers, Toulouse, France; September 28 to September 29, 1961:

Barnett F. Dodge; Yale University; $590

European Congress of Chemical Engineering, Frankfurt am Main, Germany; June 9 to June 17, 1961:

Karl Kammermeyer; State University of Iowa; $760

The Faraday Society Discussions on "The Physical Chemistry of Aerosols", Bristol, England, September 13 to September 16, 1960:

Stuart W. Churchill; University of Michigan; $500

Faraday Society Discussion on the Structure of Ionic Melts, Liverpool, England; September 5 to September 7, 1961:

Benson Ross Sundheim; New York University; $525

Fifth European Congress on Molecular Spectroscopy, Amsterdam, The Netherlands; May 29 to June 3, 1961:

David A. Dows; University of Southern California; $750

Velmer A. Fassel; Iowa State University; $600

George K. Fraenkel; Columbia University; $525

Donald F. Hornig; Princeton University; $525

James R. Lawson; Fisk University; $440

Fifth International Conference on Ionization Phenomena in Gases, Munich, Germany; August 28 to September 1, 1961:

Benjamin Bederson; New York University; $600

Fifth International Conference on Semiconductors; Prague, Czechoslovakia, August 29 to September 2, 1960:

John Bardeen; University of Illinois; $650

Fifth International Symposium on Free Radicals, Uppsala, Sweden; July 6 to July 7, 1961:

B. deB. Darwent; Catholic University of America; $650

Eugene R. Hardwick; University of California; $750

Henry A. McGee, Jr.; Georgia Institute of Technology; $800

Dolphus E. Milligan; Mellon Institute; $650

Fausto Ramirez; State University of New York; $625

F. O. Rice; Georgetown University; $650

Robert L. Strong; Rensselaer Polytechnic Institute; $650

Fifth Scientific Pharmaceutical Congress, Poznan, Poland, September 22 to September 24, 1960:

Charles H. Becker; University of Florida; $1,085

First International Conference of Protozoologists, Prague, Czechoslovakia; August 22 to August 30, 1961:

Society of Protozoologists; $21,350

First International Conference on the Mechanics of the Soil-Vehicle Systems, Torino, Italy; June 5 to June 9, 1961:

Edward T. Vincent; University of Michigan; $750

First International Congress on Metallic Corrosion, London, England; April 10 to April 15, 1961:

Mars G. Fontana; Ohio State University; $540

Norbert D. Greene; Rensselaer Polytechnic Institute; $500

Norman Hackerman; University of Texas; $750

Harold W. Paxton; Carnegie Institute of Technology; $560

Fifth International Conference on Soil Mechanics and Foundation Engineering, Paris, France; July 17 to July 22, 1961:

Boris S. Browzin; Ohio State University; $570

Ronald C. Hirschfeld; Harvard University; $550

Herbert Orin Ireland; University of Illinois; $600

Charles C. Ladd; Massachusetts Institute of Technology; $550

14th Congress of the International Scientific Film Association, Prague, Czechoslovakia; September 14 to October 2, 1960:

Robert Eugene Green; National Academy of Sciences—National Research Council; $976

R. M. Whaley; Wayne State University; $1,019

XIVth General Assembly of the International Union of Biological Sciences, Amsterdam; July 12 to July 15, 1961:

National Academy of Sciences—National Research Council; $4,600

Fourth Annual Soviet Union Mathematical Congress, Leningrad, U.S.S.R.; July 3 to July 13, 1961:

Lars V. Ahlfors; Harvard University; $1,100

Lipman Bers; New York University; $1,100

Jerzy Neyman; Stanford University; $1,300

IVth International Congress of the International Union for the Study of Social Insects, Pavia, Italy; September 9 to September 14, 1961, and Symposium of the Entomological Society of London, London, England; September 21 to September 22, 1961:

Charles D. Michener; University of Kansas; $1,200

IVth International Congress of the International Union for the Study of Social Insects, Pavia, Italy; September 9 to September 14, 1961:
- Arthur C. Cole, Jr.; University of Tennessee; $1,030
- Paul B. Kannowski; University of North Dakota; $770
- Kumar Krishna; University of Chicago; $1,040

IVth International Congress of the International Union for the Study of Social Insects, Pavia, Italy; September 9 to September 14, 1961; and XVIII International Beekeeping Congress, Madrid, Spain; September 23 to September 24, 1961:
- Roger A. Morse; Cornell University; $1,110

Fourth International Congress on Animal Reproduction, The Hague, Netherlands; June 5 to June 9, 1961:
- John O. Almquist; Pennsylvania State University; $960
- Philip J. Dziuk; University of Illinois; $700
- Robert M. Melampy; Iowa State University; $645
- G. W. Salisbury; University of Illinois; $700
- Alvin C. Warnick; University of Florida; $640

Fourth International Seaweed Symposium, Biarritz, France; September 18 to September 25, 1961:
- Harold J. Humm; Duke University; $650
- Robert T. Wilce; University of Massachusetts; $650

Fourth Plansee Seminar, Reutte, Tyrol, Austria; June 20 to June 24, 1961:
- George C. Kuczynski; $680
- Fritz V. Lenel; Rensselaer Polytechnic Institute; $560

Golden Jubilee Congress, Hong Kong; September 8 to September 16, 1961:
- Morton H. Fried; University of Michigan; $850
- Wilhelm G. Solheim II; Florida State University; $850

Haldane Symposium (One Year; effective date 11/60):
- Wallace O. Fenn; University of Rochester; $10,000

Indian Science Congress, 48th Session, Roorkee, India; January 3 to January 9, 1961:
- Harold F. Osborne; American Institute of Biological Sciences; $1,750

Individual-Meeting of the Officers and Technical Committee Chairmen of the International Federation of Automatic Control, Oslo, Norway; March 20 to March 22, 1961:
- Donald P. Eckman, Case Institute of Technology; $545

International Biophysical Congress and International Pharmacological Meetings, Stockholm, Sweden; July and August 1961, and International Neurological Meetings, Rome, Italy; September 1961:
- Eduardo Eidelberg; University of California; $1,400

International Brain Research Organization, Paris, France; October 4 to October 7, 1960:
- Mary A. B. Brazier; Massachusetts General Hospital; $600
- Donald B. Lindsley; University of California; $650
- Walter A. Rosenblith; Massachusetts Institute of Technology; $600
- Heinrich Waelsch; Columbia University; $500

International Cloud Physics Conference, Canberra and Sydney, Australia; September 11 to September 20, 1961:
- Roscoe R. Braham, Jr.; University of Chicago; $1,425
- Charles L. Hosler; Pennsylvania State University; $1,500
- James E. McDonald; University of Arizona; $1,300
- Morris Neiburger; University of California; $1,230
- J. Doyne Sartor; RAND Corp.; $1,000
- Vincent J. Schaefer; State University of New York; $1,525
- Bernard Vonnegut; Arthur D. Little, Inc., $1,500

International Colloquium on the Mechanics of Turbulence, Marseilles, France; August 28 to September 2, 1961:
- Donald Coles; California Institute of Technology; $800
- J. Kestin; Brown University; $600
- Robert H. Kraichnan; New York University; $650
- Peter Damian Richardson; Brown University; $260
- Mahinder S. Uberoi; University of Michigan; $610

International Colloquium on Shock Waves, Paris, France; August 28 to September 2, 1961:
- John S. Rinehart; Colorado School of Mines; $705

International Colloquium on Simplified Calculation Methods, Brussels, Belgium; September 4 to September 6, 1961:
- Stefan J. Medwadowski; University of California; $795

1961 International Colloquy for Methodology of Sciences, Warsaw, Poland; September 18 to September 23, 1961:
- Max Black; Cornell University; $705
- Robert S. Mulliken; University of Chicago; $475
- Walter R. Thorson; Massachusetts Institute of Technology; $475

International Committee for Biosystematic Terminology, Copenhagen, Denmark; September 7 to September 14, 1960:
- Harlan Lewis; University of California, Berkeley; $1,270

International Commission for Optics, Colloquium on Optical Materials, Paris, France; July 5 to July 14, 1961:
- David Z. Robinson; $750

International Committee for Paleozoic Microflora, Krefeld, Germany; May 11 to May 17, 1961:
- G. K. Guennel; Indiana University; $750
- Robert M. Kosanke; University of Illinois; $750

International Committee of the Histochemical Society, Paris, France; May 29 to May 31, 1961:
- American Histochemical Society; University of Chicago; $1,000

International Committee on Coal Petrology, Krefeld and Essen, Germany; May 15 to May 19, 1961:

William Spackman; Pennsylvania State University; $750

International Conference on Cosmic Rays, Kyoto, Japan; September 7 to September 15, 1961:

Robert R. Brown; University of California; $1,300

International Conference on Earth-Filled Dams and Fifth International Conference on Soil Mechanics and Foundation Engineering, Rome, Italy and Paris, France; July 10 to July 22, 1961:

Thomas E. Phalen, Jr.; Northeastern University; $790

International Conference on Magnetism and Crystallography, Kyoto, Japan; September 25 to September 30, 1961:

Lawrence S. Bartell; Iowa State University; $1,050
Russell A. Bonham; Indiana University; $1,025
Lawrence O. Brockway; University of Michigan; $600
Robert Brout; Cornell University; $1,100
William Fuller Brown, Jr.; University of Minnesota; $1,050
Kenneth Hedberg; Oregon State University; $775
Clyde A. Hutchinson, Jr.; University of Chicago; $1,050
Charles Kittel; University of California; $850
George Fred Koster; Massachusetts Institute of Technology; $1,150
Selmer Wilfred Peterson; Oak Ridge National Laboratory; $850
George W. Pratt, Jr.; Massachusetts Institute of Technology; $1,150
Clifford G. Shull; Massachusetts Institute of Technology; $1,150
J. W. Stout; University of Chicago; $1,050
Harry Suhl; University of California; $850
Michael Tinkham; University of California; $850
Michael Kennerly Wilkinson; Oak Ridge National Laboratory; $940

International Conference on Microwave Measurement Techniques, London, England; September 6 to September 8, 1961:

Arthur A. Oliner; Polytechnic Institute of Brooklyn; $485

International Conference on Science in the Advancement of New States; Rehovoth, Israel, August 15 to August 30, 1960:

Marshall H. Brucer; $1,000

International Conference on Spectral Line Shape and Molecular Interactions, Rehovoth, Israel; August 28 to August 31, 1961:

Marvin B. Lewis; Northwestern University; $1,100
Masataka Mizushima; University of Colorado; $1,100
Albert Moscowitz; University of Minnesota; $950

International Conference on the Teaching of Anthropology; Burg Wartenstein, Austria; August 9 to August 16, 1960:

Gabriel Ward Lasker; Wayne State University; $725

International Congress of Biophysics, Stockholm, Sweden; July 31 to August 4, 1961:

Frank L. Campbell; National Academy of Sciences-National Research Council; $35,000

International Congress on Analytical Chemistry, Budapest, Hungary; April 24 to April 29, 1961:

Louis Gordon; Case Institute of Technology; $700
Philip W. West; Louisiana State University; $700

1961 International Ethological Conference, Seewiesen, Germany; September 12 to September 22, 1961:

Richard J. Andrew; Yale University; $390
George W. Barlow; University of Illinois; $940
Frank A. Beach; University of California; $1,200
Jocelyn Crane; New York Zoological Society; $600
Vincent G. Dethier; University of Pennsylvania; $550
William C. Dilger; Cornell University; $760
Bernard S. Greenberg; Roosevelt University; $770
Eckhard H. Hess; University of Chicago; $800
Peter H. Klopfer; Duke University; $840
Daniel S. Lehrman; Rutgers, The State University; $700
Peter R. Marler; University of California; $620
Robert A. McCleary; University of Michigan; $930
Kenneth D. Roeder; Tufts University; $600
Martin W. Schein; Pennsylvania State University; $710
John P. Scott; Roscoe B. Jackson Memorial Laboratory; $560

International Federation of Library Associations Committee on Union Catalogues and Interlibrary Loan; Malmo and Lund, Sweden; August 8 to August 11, 1960:

George A. Schwegmann, Jr.; Library of Congress; $794

International Forum, Alpbach, Austria; August 18 to September 6, 1961:

Herbert Feigl; University of Minnesota; $870

International Institute of Refrigeration, Cambridge, England; September 18 to September 19, 1961:

Carl F. Kayan; Columbia University; $485

International Institute of Refrigeration, Cambridge, England; September 18 to September 19, 1961, and International Conference on Heating, Ventilating and Air Conditioning, London, England; September 27 to October 4, 1961:

Burgess H. Jennings; Northwestern University; $555

International Institute of Refrigeration, Paris, France; November 28 to November 30, 1960:

Richard C. Jordan; University of Minnesota; $550

International Ophthalmic Optical Congress, London, England; July 5 to July 12, 1961:

Merrill J. Allen; Indiana University; $920
V. J. Ellerbrock; Ohio State University; $550

International Standards Organization, Helsinki, Finland; June 5 to June 17, 1961:
John R. Townsend; National Bureau of Standards; $906

International Symposium on Fundamental Problems in Turbulence and Their Relation to Geophysics, Marseilles, France, September 4 to September 9, 1961:
Alfred K. Blackadar; Pennsylvania State University; $750
Ralph Bolgiano, Jr.; Cornell University; $900
Hans A. Panofsky; University of Minnesota; $750
Willard J. Pierson, Jr.; New York University; $568
Donald J. Portman; University of Michigan; $800
H. Kenneth Wiskind; Johns Hopkins University; $700

International Symposium on Numerical Weather Prediction; Tokyo, Japan, November 7, 1960 to November 13, 1960:
Mariano A. Estoque; University of Hawaii; $700
George K. Morikawa; New York University; $1,125
Jerome Spar; New York University; $1,125

International Symposium on Substance P, Sarajevo, Yugoslavia; June 9 to June 10, 1961:
William A. Krivoy; Baylor Medical College; $1,100

International Union of Crystallography Commission on Crystallographic Computing, Frankfurt, Germany; June 12 to June 16, 1961:
G. A. Jeffrey; University of Pittsburgh; $600
David P. Shoemaker; Massachusetts Institute of Technology; $575

Inter-Union Committee on Radio Meteorology, Paris, France; April 5 to April 7, 1961:
Alan T. Waterman, Jr.; Stanford University; $1,002

IUCN-CCTA Conference on Conservation of Nature and Natural Resources in Modern African States, Arusha, Tanganyika; September 5 to September 12, 1961:
Helmut K. Buechner; Washington State University; Lecture and Visit Five Laboratories in the Moscow and Rostov Regions, U.S.S.R.; April 17 to April 28, 1961; $1.370
Bruce W. Gonser, Battelle Memorial Institute; $1,230

Mass Spectrometry Conference, Oxford, England; September 12 to September 15, 1961:
Frank A. Long; Cornell University; $525

Mathematical Knowledge Required by the Physicist and Engineer, Lyons, France; February 14 to February 17, 1961:
George F. Carrier; Harvard University; $500

Mathematical Meetings in Conjunction with 150th Anniversary of the Argentine Independence; Buenos Aires, Argentina, September 22 to September 27, 1960:
Emil Grosswald; University of Pennsylvania; $1,050

Mathematical Workshop, Bonn, Germany; June 16 to June 23, 1961:
Joseph J. Kohn; Brandeis University; $575
Harold I. Levine; Brandeis University; $1,050
Richard S. Palais; Brandeis University; $575

Maxwell Colour Centenary, London, England; May 17 to May 19, 1961:
Harry Helson, University of Texas; $950

Meeting of the Association of Physiologists and Pharmacologists of India, Hyderbad, India; December 1960:
Russell A. Huggins; Baylor University; $2,000

Meeting of the Bureau of the International Union for History and Philosophy of Science; Paris, France, December 1 to December 10, 1960:
Stephen Cole Kleene; University of Wisconsin; $630
Patrick Suppes; Stanford University; $760

Meeting of Executive Board and General Assembly, ICSU, Bureau IUHPS, London, England; September 19 to September 29, 1961:
Stephen C. Kleene; University of Wisconsin; $585

Meeting of the Executive Committee of the International Brain Research Organization, Paris, France; September 3 to September 5, 1961:
Heinrich Waelsch; Columbia University; $830

Meeting of the Executive Committee of the International Union on Theoretical and Applied Mechanics, Marseilles, France; September 1 to September 7, 1961:
Nicholas J. Hoff; Stanford University; $580

Meeting of Soviet Mathematicians, Leningrad, U.S.S.R.; July 13 to July 16, 1961:
Herbert Busemann; University of Southern California; $1,300

Meetings of the Agrupacion Rioplatense de Logica y Filosofia Cientifica; Buenos Aires, Argentina, October 3 to October 14, 1960:
Hector Neri Castaneda; Wayne State University; $670

Meetings of Regional and National Units of the International Biometric Society; July 1961–July 1962:
Chester I. Bliss; Connecticut Agricultural Experiment Station; $1,500

Microbial Reaction to Environment, London, England; April 11 to April 12, 1961:
Harry W. Seeley, Jr.; Cornell University; $600

Modern Methods of Analysis and Synthesis of Electrical Networks, Prague, Czechoslovakia; September 4 to September 9, 1961:
Norman Balabanian; Syracuse University; $635

NATO Advanced Study Institute, Riso, Denmark; August 1 to August 13, 1960:
Lawrence W. Fagg; Atlantic Research Corporation; $600
Edward G. Harris; University of Tennessee; $80

NATO Advanced Study Institute, Varenna, Italy; August 1 to August 17, 1960:

John B. Cicchetti; Waterbury, Connecticut; $565

NATO Advanced Study Institute; Edinburgh, Scotland; August 1 to August 21, 1960:

William R. Frazer; University of California; $700

NATO Advanced Study Institute; Kjeller, Norway; August 22 to September 3, 1960:

James A. Merrill; Phillips Petroleum Company; $870

NATO Advanced Study Institute, Manchester, England; August 29 to September 9, 1960:

Anton N. J. Heyn; Virginia Institute for Scientific Research; $335

NATO Advanced Study Institute; Glasgow, Scotland; September 5 to September 19, 1960;

G. Robert DiMarco; Rutgers, The State University; $525

Irwin E. Liener; University of Minnesota; $565

NATO Advanced Study Institute; Ispra (Varese), Italy; September 5 to September 24, 1960:

John M. Worlock; Cornell University; $620

Ralph O. Simmons; University of Illinois; $690

NATO Advanced Study Institute; Gottingen, Germany; September 12 to September 24, 1960:

George Gorin; Oklahoma State University; $770

Earl Usdin; New Mexico Highlands University; $540

NATO Advanced Study Institute; Mariensee, Germany; September 14 to September 28, 1960:

Robert Woodbury Bray; University of Wisconsin; $610

Jay L. Lush; Iowa State University; $720

Neurological Congresses, Rome, Italy; Munich, Germany; and Paris, France; July and September, 1961:

James L. O'Leary; Washington University; $7,700

9th Congress, International Association for Hydraulic Research, Belgrade, Yugoslavia; September 3 to September 7, 1961:

George Bugliarello; Carnegie Institute of Technology; $720

John S. McNown; University of Kansas; $670

Ninth International Congress of Photogrammetry; London, England; September 5 to September 17, 1960:

Albert A. Blank; Institute of Mathematical Sciences; $675

Frederick J. Doyle; Broadview Research Corporation; $270

Arthur J. McNair; Cornell University; $550

Ninth International Towing Tank Conference; Paris, France; September 8 to September 16, 1960:

John P. Breslin; Stevens Institute of Technology; $490

Obtaining and Exchanging Information on Chinese Science; London, England; March 4 to March 27, 1961:

G. Raymond Nunn; University of Michigan; $870

OEEC Conference on Technical Education and Industry, Baden-Baden, Germany; April 11 to April 13, 1961:

Henry H. Armsby; U.S. Department of Health, Education, and Welfare; $940

Organizing Committee for Tenth Congress of F.I.G., Bern, Switzerland; June 8 to June 14, 1961:

B. Austin Barry; Manhattan College; $590

George C. Bestor; $895

Plenary Meeting of the International Committee for Social Sciences Documentation, London, England; March 23 to March 25, 1961:

Henry J. Dubester; Library of Congress; $831

Polish Academy of Sciences, Krakow, Poland; June 25 to July 10, 1961:

Arthur B. Sweney; University of Illinois; $775

Preparatory Meeting for "Systematic Investigation of Europe's Needs for Education in Relation to Economic Growth," Copenhagen, Denmark; September 19 to September 21, 1960:

Seymour E. Harris; Harvard University; $900

Presentation of Lectures in X-ray Microanalytical Techniques, Cambridge, England; July 24 to August 4, 1961:

Robert E. Ogilvie; Massachusetts Institute of Technology; $425

Primary and Elementary Processes in Living Cells Initiated by Ionizing Radiations, Moscow; October 18 to October 22, 1960:

Ernest Charles Pollard; Yale University; $1,000

Cornelius A. Tobias; University of California; $1,200

1961 Quantum Chemistry Conference, Oxford, England; April 10 to April 15, 1961:

Michael J. S. Dewar; University of Chicago; $475

Radiation Effects in Inorganic Solids, Saclay, France; April 11 to April 12, 1961:

John E. Wertz; University of Minnesota; $650

Reviewing Progress in Meteorology; Moscow, Russia; August 6 to August 18, 1960:

Sverre Petterssen; University of Chicago; $370

The Rutherford Jubilee, International Conference, Manchester, England; September 4 to September 8, 1961;

Tom W. Bonner; William Marsh Rice University; $650

Bernard L. Cohen; University of Pittsburgh; $650

Second British Congress on the History of Medicine, London, England; September 28 to September 29, 1961:

Allen G. Debus; Harvard University; $660

Second Conference on Clay Mineralogy and Petrography, Prague, Czechoslovakia; May 10 to May 17, 1961:

Joe Lloyd White; Purdue University; $750

Second International Conference of Human Genetics. Rome, Italy; September, 1961:

American Society of Human Genetics; C. C. Li (Director); $15,300

Second International Conference on Operational Research; Aix-en-Provence, France; September 5 to September 10, 1960:

Russell L. Ackoff; Case Institute of Technology; $625

C. West Churchman; University of California; $700

Maurice D. Kilbridge; University of Chicago; $350

John B. Lathrop; Lockheed Aircraft Corp.; $300

Taylor D. Lewis; Cornell University; $115

Seminar on East Asian Area Seismology and Earthquake Engineering, Tokyo, Japan; July 18 to July 25, 1961:

Perry Byerly; University of California; $1,450

George W. Housner; California Institute of Technology; $1,450

Seminar on Fast and Intermediate Reactors, Vienna, Austria; August 3 to August 11, 1961:

Paul F. Zweifel; University of Michigan; $640

7th Inter-American Congress of Sanitary Engineering, Montevideo, Uruguay; October 2 to October 9, 1960:

John Alexander Logan; Northwestern University; $950

P. H. McGauhey; University of California; $791

Seventh International Conference on Cosmic Rays and International Symposium on the Earth Storm, Kyoto, Japan; September 4 to September 15, 1961:

R. Grant Athay; High Altitude Observatory; $1,000

Robert B. Brode; University of California; $1,100

Joseph W. Chamberlain; University of Chicago; $1,025

Robert L. Chasson; University of Nebraska; $1,000

Giuseppe Cocconi; Cornell University; $1,100

John R. Green; University of New Mexico; $1,000

Kennth Greisen; Cornell University; $1,100

John Linsley; Massachusetts Institute of Technology; $1,020

John A. Lockwood; University of New Hampshire; $1,150

Sadami Matsushita; High Altitude Observatory; $1,000

Peter Meyer; University of Chicago; $1,050

Victor H. Regener; University of New Mexico; $1,000

John A. Simpson; University of Chicago; $1,050

William F. G. Swann; Bartol Research Foundation of The Franklin Institute; $1,150

Anthony R. Thompson; Harvard University; $1,000

Robert W. Thompson; University of Chicago; $1,050

7th International Congress on Large Dams, Rome, Italy; June 26 to July 1, 1961:

T. W. Mermel, U.S. Department of the Interior; $650

Olgierd C. Zienkiewicz; Northwestern University; $690

17th Assembly, International Commission for the Scientific Exploration of the Mediterranean Sea, Monaco; December 12 to December 17, 1960:

William Herbert Littlewood; U.S. Department of State; $325

Sixth Congress, International Association on Quaternary Research, Warsaw, Poland; September 2 to September 7, 1961:

Robert F. Black; University of Wisconsin; $700

Wallace S. Broecker; Columbia University; $650

Edward S. Deevey; Yale University; $650

David B. Ericson; Columbia University; $650

Richard Foster Flint; Yale University; $650

David G. Frey; Indiana University; $750

Sheldon Judson; Princeton University; $175

John F. Lance; University of Arizona; $900

Morris M. Leighton; Illinois Geological Survey; $650

Paul S. Martin; University of Arizona; $900

John P. Miller, Harvard University; $650

Ernest H. Muller; Syracuse University; $650

Gerald M. Richmond; U.S. Department of the Interior; $300

Gene A. Rusnak; University of Miami; $800

Richard J. Russell; Louisiana State University; $600

C. Bertrand Schultz; University of Nebraska; $800

Terah L. Smiley; University of Arizona; $900

H. T. U. Smith; University of Massachusetts; $650

Herbert E. Wright, Jr.; University of Minnesota; $750

The VI International INQUA Congress, Warsaw, Poland; August 28 to September 7, 1961:

Ralph S. Solecki; Columbia University; $770

Rose L. Solecki; Columbia University; $770

H. M. Wormington; Denver Museum of Natural History; $950

Sixth International Nematology Symposium, Ghent, Belgium; July 24 to July 28, 1961:

Richard A. Rohde; University of Massachusetts; $525

M. L. Schuster; University of Nebraska; $700

Solvay Congress, Brussels, Belgium; October 8 to October 13, 1961:

Tsung-Dao Lee; Institute for Advanced Study; $830

Chen Ning Yang; Institute for Advanced Study; $830

Southampton Mathematical Conference, Southampton, England; April 12 to April 21, 1961:

Henry Swain; New Trier Township High School; $800

To Study Japanese Progress and Development in all Phases of Science Abstracting and Indexing, Japan; June 13 to June 30, 1961:

National Federation of Science—Abstracting and Indexing Services; $8,326

Subcommission 6C (Biology and Medicine) of the International Institute of Refrigeration, Belgrade, Yugoslavia; May 1961:

Isidore Gersh; University of Chicago; $750

Summer Courses on New Programs in Chemistry for Secondary Schools, Dublin, Ireland; July 3 to July 29, 1961:

Wendell H. Taylor; Lawrenceville School; $690

Robert Tellefsen; Napa High School; $920

Symposium of the Research Film Section of the International Scientific Film Association, Gottingen, Germany; June 7 to June 9, 1961:

Leslie P. Greenhill; Pennsylvania State University; $938

Randall M. Whaley; Wayne State University; $955

Symposium on Antigen-Antibody Reactions, Monte Carlo, Monaco; April 30 to May 5, 1961:

Joseph W. Noah; Washington University School of Medicine; $700

Abram B. Stavitsky; Western Reserve University; $700

Zoltan Ovary; New York University School of Medicine; $700

Symposium on Atmospheric Ozone, Arosa, Switzerland; August 6 to August 19, 1961:

Julius London; New York University; $750

Symposium on Boolean Algebras and Measure Theory, Oberwolfach, Germany; July 30 to August 4, 1961, and International Colloquium on the Concept of Foundations, Warsaw, Poland; September 18 to September 23, 1961:

Alfred Tarski; University of California; $900

Symposium on Changes of Climate with Special Reference to the Arid Zones, Rome, Italy; October 2 to October 7, 1961:

Fred Wendorf; Museum of New Mexico; $1,020

Symposium on Crack Propagation, Cranfield, England; September 25 to September 29, 1961:

John J. Gilman; Brown University; $500

Symposium on the Detection and Use of Tritium in the Physical and Biological Sciences, Vienna, Austria; May 3 to May 10, 1961:

Lloyd A. Currie; Pennsylvania State University; $625

Paul Y. Feng; Armour Research Foundation, Illinois Institute of Technology; $675

Symposium on Electrical Machine Design, Coimbatore, India; October 25 to October 28, 1960:

Paul D. Agarwal; University of Massachusetts; $1,180

Symposium on Electroretinography, Stockholm, Sweden; May 31 to June 3, 1961:

Hermann M. Burian; State University of Iowa; $1,100

Symposium, European Committee on Liaison for Cellulose and Paper, Oxford, England; September 25 to September 29, 1961:

Alfred H. Nissan; Rensselaer Polytechnic Institute; $545

Symposium on Flow Measurement in Closed Conduits; Glasgow, Scotland, September 27 to September 30, 1960:

Kenneth John Bell; Case Institute of Technology; $510

A. R. Chamberlain; Colorado State University; $660

Steponas Kolupaila; University of Notre Dame; $540

Symposium on Function Theory, Tokyo, Japan; June 5 to July 21, 1961:

Maurice Heins; University of Illinois; $1,200

Symposium on General Topology and Its Relations to Modern Analysis and Algebra, Prague, Czechoslovakia; September 1 to September 8, 1961:

Richard Arens; University of California; $875

R. H. Bing; University of Wisconsin; $725

Leonard Gillman; University of Rochester; $650

Edwin Hewitt; University of Washington; $875

John R. Isbell; University of Washington; $875

Victor L. Klee, Jr.; University of Washington; $875

Ernest A. Michael; Institute for Advanced Study; $700

Edwin E. Moise; Harvard University; $600

A. H. Stone; University of Rochester; $650

Symposium on Injection Grout for Prestressed Concrete, Trondheim, Norway; January 5 to January 7, 1961:

Milos Polivka; University of California; $770

Symposium on the Mechanical Resistance of Glass and Methods of Amelioration, Florence, Italy; September 26 to September 29, 1961:

Eugene F. Poncelet; Stanford Research Institute; $890

Symposium on Phase Transformations in Metals and Alloys, Melbourne, Australia; November 10 and November 11, 1960:

David S. Lieberman; University of Illinois; $1,250

Symposium on Radiation Effects and Milieu, Montreux, Switzerland; May 29 to June 3, 1961:

Theodor M. Fliedner; Washington University School of Medicine; $700

Anna R. Whiting; University of Pennsylvania; $600

Symposium on Radioisotopes and Radiation in Entomology, Bombay, India; December 5 to December 9, 1960:

Wayne Arthur; Auburn University; $2,200

John Edward Casida; University of Wisconsin; $2,200

Theodore L. Hopkins; Kansas State University; $2,300

Symposium on Shell Research, Delft, Holland; August 30 to September 2, 1961:
- David P. Billington; Princeton University; $525
- Howard P. Harrenstien; University of Arizona; $775
- Dicran Goulian, Jr.; $900
- Theodore S. Hauschka; Roswell Park Memorial Institute; $1,000
- Nathan Kaliss; Roscoe B. Jackson Memorial Laboratory; $1,200
- Felix Milgrom; University of Buffalo School of Medicine; $1,100
- Jack H. Stimpfling; Roscoe B. Jackson Memorial Laboratory; $1,200
- Leandro M. Tocantins; Jefferson Medical College; $1,050

Tenth Pacific Science Congress, Honolulu, Hawaii; August 21 to September 6, 1961:
- National Academy of Sciences—National Research Council; $65,000

Third International Association for Analog Computation, Belgrade, Yugoslavia; September 4 to September 9, 1961:
- Granino Arthur Korn; University of Arizona; $930

Third International Congress of Automobile Traffic, Paris, France; September 11 to September 16, 1961:
- Daniel L. Gerlough; National Academy of Sciences—National Research Council; $555

Third International Congress of Dietetics, London, England; July 10 to July 14, 1961:
- Sidney S. Negus; Medical College of Virginia; $845

Third International Congress of Surface Activity; Cologne, Germany; September 12 to September 17, 1960:
- A. C. Zettlemoyer; Lehigh University; $500

Third International Symposium on Comparative Endocrinology, Tokyo, Japan; June 6 to June 10, 1961:
- American Institute of Biological Sciences; Hiden T. Cox (Director); $15,900

Third Symposium of the Society for the Study of Human Biology; London, England; November 14 to November 21, 1960:
- Stanley M. Gartler; University of Washington; $900

XIII International Phytogeographical Excursion, Finland & Northern Norway; July 13 to August 5, 1961:
- Stanley A. Cain; $1,035
- William A. Weber; University of Colorado; $1,200

33rd Session, International Statistical Institute, Paris, France; August 28 to September 7, 1961:
- Herbert Solomon; Stanford University; $700
- Leo Breiman; University of California; $800
- Benjamin Epstein; $800
- Emil J. Gumbel; Columbia University; $550
- Richard E. Quandt; Princeton University; $525

To give lectures at Hebrew University, in Jerusalem, Israel, during the fall of 1960:
- Roger C. Lyndon; University of London, England; $500

Travel to The International Union of Forestry Research Organizations, Vienna, Austria; September 1961:
- Henry Clepper; Society of American Foresters; $10,000

25th Anniversary Congress, Japanese Chemical Engineers Society, Tokyo, Japan; November 6 to November 15, 1961:
- R. B. Bird; University of Wisconsin; $985
- H. C. Hottel; Massachusetts Institute of Technology; $1,070
- W. R. Marshall, Jr.; University of Wisconsin; $985
- Theodore Vermeulen; University of California; $785
- R. H. Wilhelm; Princeton University; $1,070
- C. R. Wilke; University of California; $785
- William E. Ranz; University of Minnesota; $985
- J. Henry Rushton, Purdue University; $985
- Frank M. Tiller; University of Houston; $950

U.S.S.R. Commission for the Determination of the Age of Rocks, Kiev, U.S.S.R.; May, 1961:
- Henry Faul; Mineralogisch-petrographisches Institut der Universität Bern; $400

United Nations Conference on New Sources of Energy, Rome, Italy; August 21 to August 31, 1961:
- Raymond W. Bliss, Jr.; University of Arizona; $1,050
- D. K. Edwards; University of California; $1,050
- Werner Norbert Grune; Georgia Institute of Technology; $850
- Rudolph J. Marcus; Stanford Research Institute; $1,050
- James Raymond McNitt; California Division of Mines; $1,050
- Sverre Petterssen; University of Chicago; $900
- Sidney W. Wilcox; Arizona State University; $1,050

Visiting the Czechoslovak Academy of Science, Prague, Czechoslovakia; Spring of 1961:
- Hubert A. Lechevalier; $925

World Association of Veterinary Anatomists, Vienna, Austria; September, 1961:
- American Association of Veterinary Anatomists; $4,600

APPENDIX E

Fellowship Awards Offered

National Science Foundation Fellowship Awards, by Type and Field, Fiscal Year 1961

Field	Graduate	Cooperative graduate	Graduate teaching assistants	Postdoctoral (regular)	Postdoctoral (senior)	Science faculty	Secondary school teachers	Total
Life Sciences:								
Agriculture	8	8	5	2	1	3	1	28
Anthropology	31	12	6	3	0	1	0	53
Biochemistry	53	24	7	19	6	5	3	117
Biophysics	32	2	1	3	3	1	1	43
Botany	25	19	27	8	5	4	9	97
General Biology	26	18	18	2	1	4	67	136
Genetics	18	9	6	5	4	1	2	45
Medical Sciences	4	5	4	15	3	4	0	35
Microbiology	15	4	12	3	4	3	1	42
Physiology	20	7	7	5	2	3	0	44
Psychology	49	42	28	6	3	2	0	130
Zoology	66	36	54	4	3	11	21	195
Subtotal	347	186	175	75	35	42	105	965
Physical Sciences:								
Astronomy	13	7	1	5	0	1	0	27
Chemistry	239	185	141	48	16	27	25	681
Earth Sciences	85	29	55	8	4	11	1	193
Engineering	262	256	61	11	7	111	0	708
Mathematics	235	201	103	31	8	56	157	791
Meteorology	4	2	1	2	0	1	0	10
Oceanography	3	0	0	1	0	3	0	7
Physics	314	202	61	51	17	27	21	693
General Science	0	0	0	0	0	6	15	21
Subtotal	1,155	882	423	157	52	243	219	3,132
Social Sciences	34	32	27	3	4	0	0	100
Total	1,536	1,100	625	235	91	285	324	4,196

Names, Residences, and Fields of Study of Individuals Offered National Science Foundation Fellowships

ALABAMA

Graduate

BURGESS, EDWARD M., Birmingham, Chemistry
BURKE, JAMES D., Mobile, Chemistry
COULTER, CLAUDE A., Phenix City, Physics
GUNTER, THOMAS E., Tuscumbia, Physics
MCCLANAHAN, WARREN B., Mobile, Mathematics
MORAN, MARTIN T., Mobile, Physics
NELSON, PAUL, JR., Meridianville, Physics
ROBERTS, DENNIS L., Jr., Montgomery, Physics
SMITH, DONALD R., Sylacauga, Mathematics
STERNGLANZ, ROLF, Birmingham, Chemistry
STURGES, WILTON, III, Dothan, Oceanography
WRIGHT, GORDON T., Tuscaloosa, Biophysics

Cooperative Graduate

BAGWELL, JOHN T., Jr., Montgomery, Mathematics
COGGINS, JAMES L., Brundidge, Engineering
COULTER, PHILIP W., Phenix City, Physics
GARRETT, ARTHUR R., Jr., Montevallo, Biology
GARRETT, WILLIAM R., Warrior, Physics
GRABEN, HENRY W., Delta, Physics
HOSEA, JOEL C., Birmingham, Engineering
ISSOS, JAMES N., Birmingham, Mathematics
MULLINS, PEGGY J., Huntsville, Mathematics
PRICE, DAVID K., Auburn, Chemistry
ROBERTS, EUGENE C., Birmingham, Chemistry
SMITH, CLOYD V., Jr., Sylacauga, Engineering
SWEET, RICHARD F., Mobile, Physics

Summer Fellowships for Graduate Teaching Assistants

ASQUITH, CLAIRE F., University, Engineering
BAGWELL, JOHN T., Jr., Montgomery, Mathematics
GRABEN, HENRY W., Delta, Physics
ISSOS, JAMES N., Birmingham, Mathematics
O'NEIL, JAMES M., Auburn, Mathematics
YARBROUGH, RUPERT H., Tuscaloosa, Mathematics

Postdoctoral

HOOD, WILLIAM B., Jr., Birmingham, Medical Sciences

Science Faculty

HENDERSON, JAMES H. M., Tuskegee, Botany
OLIVER, CALVIN C., Chicksaw, 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 Science
NANCARROW, DOROTHY V., Birmingham, Biology
NORRIS, CHARLES W., Andalusia, Mathematics
SABOL, SR. M. TERESITA, Montgomery, Chemistry

ALASKA

Graduate

MILAN, FREDERICK A., Fairbanks, Anthropology

Science Faculty

BRYCE, DONALD H., College, Earth Sciences

ARIZONA

Graduate

BISSETT, DAVID H., Prescott, Earth Sciences
BRETERNITZ, DAVID A., Tucson, Anthropology
DOLE, JIM W., Phoenix, Biology
FINNEY, JOSEPH J., Tucson, Earth Sciences
GREGORY, BOB L., Phoenix, Engineering
HALPERN, MARTIN B., Tucson, Physics
LANGE, ROBERT V., Phoenix, Physics
LEWIS, RICHARD B., Douglas, Physics
YEAZELL, MARTHA E., Tucson, Biochemistry

Cooperative Graduate

BROWN, KEITH S., Jr., Amado, Chemistry
COOPER, RICHARD K., Tucson, Physics
ERICKSON, ROLFE C., Tucson, Earth Sciences
LINDHOLM, FRED A., Tucson, Engineering
PEAKE, EDMUND J., Jr., Phoenix, Mathematics
TAYLOR, JAMES G., Phoenix, Engineering
WEINBERG, DAVID S., Tucson, Chemistry
YOUNG, JON N., Florence, Social Sciences

Summer Fellowships for Graduate Teaching Assistants

HATFIELD, WILLIAM E., Tucson, Chemistry
KERR, DONALD R., Jr., Tucson, Mathematics
YEAZELL, MARTHA E., Tucson, Biochemistry

Postdoctoral

SAVAGE, JAMES C., Tucson, Earth Sciences

Science Faculty

FORSTER, LESLIE S., Tucson, Chemistry
SMITH, JACK, Tucson, Engineering
STAATS, ARTHUR W., Tempe, Psychology

Summer Fellowships for Secondary School Teachers

DAVY, ROGER H., Phoenix, Zoology
SHOWLEY, DEVON LEE, Scottsdale, Physics
TOOHEY, JACK V., Phoenix, Biology

ARKANSAS

Graduate

BROWN, ROBERT M., Little Rock, Physics
CHRISTIE, JOE H., Magnolia, Chemistry
GRAMLICH, JIM V., Charleston, Agriculture
NEIHOUSE, LEON J., Fort Smith, Physics
PARCHMAN, LONNIE G., Brinkley, Genetics
WEATHERFORD, WENDELL, Newport, Physics

Cooperative Graduate

BIGGS, FRANK, Pea Ridge, Physics
CHILDS, WILLIAM V., Magnolia, Chemistry
MCMILLAN, WILLIAM L., Little Rock, Physics
PETZ, JOHN I., Fayetteville, Physics
SPARKS, BRYAN, Fayetteville, Chemistry
STRICKLAND, WILLIAM T., Little Rock, Engineering
VAULX, RANN L., Pine Bluff, Chemistry

Summer Fellowships for Graduate Teaching Assistants

HULTSMAN, ST. CLAIR L., Little Rock, Physics

Science Faculty

DEAVER, FRANKLIN K., Fayetteville, Engineering
HEIPLE, LOREN R., Fayetteville, Engineering
PRYOR, CARLON W., Little Rock, Microbiology

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
ANDERSON, BARRY F., Redwood City, Psychology
ANDERSON, LORAN C., Claremont, Botany
ANSPAUGH, LYNN R., Berkeley, Biophysics
AWBREY, FRANK T., Ventura, Biology
BACHER, ANDREW D., Pasadena, Astronomy

BANKS, PHILIP O., Sacramento, Earth Sciences
BARNES, LYNNE R., Los Angeles, Mathematics
BATES, DAVID M., Los Angeles, Botany
BAUER, ANDREW B., Long Beach, Engineering
BEAL, ALAN J., Santa Clara, Mathematics
BELMONT, PETER A., San Francisco, Mathematics
BERNICK, ROBERT L., N. Hollywood, Physics
BIONDI, ENRICO F., Palo Alto, Engineering
BLACK, NEVILLE A., Los Angeles, Engineering
BLANDFORD, ROBERT, Pasadena, Earth Sciences
BLETHEN, SANDRA L., Oakland, Biochemistry
BLOOMFIELD, VICTOR, Cotati, Chemistry
BLUE, JAMES L., Los Angeles, Physics
BORGMAN, LEON E., Los Angeles, Mathematics
BOULWARE, DAVID G., Lafayette, Physics
BOYD, ROBERT G., Riverside, Physics
BRONZAN, JOHN B., Los Angeles, Physics
BROWN, IRENE L., Portola Valley, Biology
BROWN, JEROME R., Hillsborough, Physics
BROWN, LAWRENCE D., Beverly Hills, Mathematics
BURNETT, DONALD S., Berkeley, Chemistry
BURR, STEFAN A., El Cerrito, Mathematics
CAMBERN, MICHAEL J., Oakland, Mathematics
CAMPBELL, JOHN H., Monrovia, Microbiology
CARTER, CHARLES C., Covina, Chemistry
CASTOR, JOHN I., Fresno, Astronomy
CLARK, ALAN R., San Jose, Physics
CLARK, BRIAN R., La Puente, Biochemistry
COOPER, JAMES A., Chatsworth, Engineering
CRAPO, LAWRENCE M., Porterville, Chemistry
CRICHTON, JAMES H., Berkeley, Physics
CROSS, RALPH H., III, Berkeley, Engineering
DALRYMPLE, GARY B., Lafayette, Earth Sciences
DAVIS, STEPHEN L., Oakland, Biophysics
DENMAN, SUE C., Berkeley, Anthropology
DICK, GEORGE J., Winton, Physics
DOUGLAS, ROY R., Vallejo, Mathematics
DOUGLASS, ROGER L., Albany, Physics
DUKE, MICHAEL B., Pasadena, Earth Sciences
ELLIS, DAVID J., Whittier, Chemistry
ELLSWORTH, BARBARA H., Van Nuys, Microbiology
FELDMAN, MARTIN R., Los Angeles, Chemistry
FOLKMAN, JON H., Berkeley, Mathematics
FRANZ, GILBERT W., Reedley, Earth Sciences
GETZINGER, RICHARD W., La Puente, Engineering
GIANCOLI, DOUGLAS C., Berkeley, Physics
GIBSON, EDWARD G., Pasadena, Engineering
GRAHAM, RONALD L., Berkeley, Mathematics
GRIFFITH, HAYES O., La Verne, Chemistry
GRIFFITHS, ROBERT B., Stanford, Physics
GRIMES, CHARLES C., Berkeley, Physics
GRZESIK, JAN A., Inglewood, Physics
HAGADORN, IRVINE R., Albany, Zoology
HALEY, KENNETH W., Oakland, Engineering
HARTWELL, LELAND H., Pasadena, Biochemistry
HASSLER, FRANCES J., Los Angeles, Anthropology
HAYLER, DONALD A., Belmont, Physics
HECHLER, STEPHEN H., San Leandro, Mathematics
HEILBRON, JOHN L., Berkeley, Social Sciences
HELLER, MARILYN B., Los Angeles, Chemistry
HENDRICKS, TARRAH J., La Jolla, Physics
HOLDAWAY, MICHAEL J., Berkeley, Earth Sciences
HONE, DANIEL W., San Francisco, Physics
HOUGH, WILLIAM W., Pasadena, Engineering
HUDSON, DOHERTY B., San Francisco, Medical Sciences
HUFBAUER, KARL G., La Jolla, Social Sciences
HULD, BENT, Pasadena, Physics
JAECKEL, LOUIS A., Pacoima, Mathematics
KARIG, DANIEL E., Pasadena, Earth Sciences
KASPER, JEROME V., Pasadena, Chemistry
KEEFFE, JAMES R., Dinuba, Chemistry
KEESING, ROGER M., Stanford, Anthropology
KEIGHTLEY, WILLARD O., Pasadena, Engineering
KENNEDY, KENNETH A., San Francisco, Anthropology
KIRK, WILLIAM L., Jr., Los Angeles, Psychology
KLEIGER, LINDA J., Sherman Oaks, Social Sciences
KLEIN, STANLEY A., Ontario, Physics
KLOTZ, EUGENE A., Costa Mesa, Mathematics
KONRAD, MICHAEL W., Pt. Richmond, Biophysics
KRASNE, FRANKLIN B., Sausalito, Psychology
KRIEGER, STEPHAN J., Berkeley, Physics
KULA, RICHARD J., San Gabriel, Chemistry
LANDGREBE, JOHN A., San Francisco, Chemistry
LANG, SIDNEY B., San Francisco, Engineering
LEVINE, MICHAEL J., Pasadena, Physics
LEWIS, FRANCIS H., Menlo Park, Physics
LEWIS, RICHARD A., Tarzana, Engineering
LINDQUIST, EVERT E., Berkeley, Zoology
LINDSEY, JAMES S., Santa Monica, Physics
LINSON, LEWIS M., Oakland, Physics
MACINTYRE, FERREN, Carpinteria, Chemistry
MACOMBER, JAMES D., Marysville, Chemistry
MANDELL, RICHARD L., Rosemead, Engineering
MARSHALL, J. HOWARD, Pasadena, Physics
MARTIN, LAURENCE R., La Jolla, Chemistry
MASTERS, MILLICENT R., Berkeley, Microbiology
MATTHEWS, JUNE L., Altadena, Physics
MAURER, CHARLES J., Lawndale, Engineering
MAXWELL, DOUGLAS L., Claremont, Social Sciences
MCDOWELL, EDWARD R., Pasadena, Engineering
MCREYNOLDS, STEPHEN R., Santa Monica, Mathematics
MERZ, MARTIN D., Wasco, Engineering
MIHALAS, DIMITRI M., Los Angeles, Astronomy
MILDER, DAVID M., N. Hollywood, Physics
MILLSTEIN, JERRY, Los Angeles, Physics
MONTI, STEPHEN A., San Rafael, Chemistry
MOOERS, CHRISTOPHER N., San Diego, Oceanography
MOORE, CHARLES B., Albany, Chemistry
MORRIS, WILLIAM G., Oakland, Engineering
MOYNIHAN, CORNELIUS T., San Jose, Chemistry
MUNSON, JOHN H., Burbank, Physics
NEIGHBOR, JAMES E., Walnut Creek, Physics
NELSON, ANDREW P., Berkeley, Botany
NELSON, KEITH B., Berkeley, Zoology
NEVILLE, DONALD E., Los Angeles, Physics
NIETO, MICHAEL M., Los Angeles, Physics
NOBLE, DONALD C., Stanford, Earth Sciences
O'CONNELL, JOHN P., Santa Ana, Engineering
PARKER, PETER D., Monterey Park, Physics
PEAK, LLOYD S., Pico Rivera, Chemistry
PEARSON, GERALD A., Manhattan Beach, Chemistry
PHILLIPS, LORNA M., Berkeley, Zoology

PIERSON, Sr., MARY B., Belmont, Microbiology
PITZER, RUSSELL M., Berkeley, Chemistry
RAPIER, JERRY L., Palo Alto, Physics
RENKEN, JAMES H., Altadena, Physics
REYNOLDS, MITCHELL W., Berkeley, Earth Sciences
RICHIE, KENNETH E., Hollywood, Physics
RIMERMAN, ERNEST A., Los Angeles, Biochemistry
ROEDER, DAVID W., El Cerrito, Mathematics
RONY, PETER R., Los Angeles, Engineering
RUSHFORTH, CRAIG K., Stanford, Engineering
SAEGEBARTH, ELLEN I., Berkeley, Chemistry
SAHYUN, MELVILLE R., Santa Barbara, Chemistry
SHANKS, WESLEY L., Pasadena, Physics
SILVERSTONE, HARRIS J., Pasadena, Chemistry
SKIDMORE, LIONEL J., Inglewood, Engineering
SMITH, DAVID H., Alhambra, Social Sciences
SNIVELY, FRANK T., Pasadena, Physics
SPECHT, WALTER A., Jr., Pasadena, Engineering
STEA, DAVID, Stanford, Psychology
STEINGOLD, HAROLD, Santa Monica, Engineering
STREET, ROBERT L., Menlo Park, Engineering
SUELZLE, LARRY R., San Bruno, Physics
SUMNER, PETER R., Granada Hills, Chemistry
SUO, MIKIO, Fresno, Engineering
TAYLOR, CHARLES R., South Gate, Physiology
TAYLOR, ROBERT W., Torrance, Mathematics
TELLER, DAVID C., Berkeley, Biochemistry
TELLER, DAVIDA Y., Berkeley, Psychology
THIELE, ALAN G., Vacaville, Engineering
THOE, DALE W., Sunny Vale, Mathematics
THOMAS, DONALD, Morgan Hill, Chemistry
THOMASSEN, KEITH I., Stanford, Engineering
THOREN, VICTOR E., Los Angeles, Social Sciences
THORNTON, ROBERT M., Colfax, Botany
TURNER, GEORGE D., Alhambra, Earth Sciences
VER PLANCK, PETER, La Jolla, Engineering
VICTOR, JUDITH C., Los Angeles, Social Sciences
VIDAVER, WILLIAM E., Pacific Grove, Botany
VILLANUEVA, RICHARD C., San Fernando, Mathematics
VLASES, GEORGE C., Pasadena, Engineering
WAGNER, TERRY J., Albany, Engineering
WATTERS, GARY Z., Chico, Engineering
WEIL, JON D., Davis, Genetics
WEILER, JOHN H., Jr., Berkeley, Botany
WEILL, DANIEL F., Berkeley, Earth Sciences
WEINSTEIN, SANDRA, Los Angeles, Mathematics
WERSEL, ORTWIN A., Los Angeles, Chemistry
WIGLEY, NEIL M., Berkeley, Mathematics
WILLEMSEN, ELEANOR W., Palo Alto, Psychology
WILLIAMSON, ROBERT E., Albany, Mathematics
WILLIS, EDWIN O., Berkeley, Zoology
WILSON, WALTER D., Berkeley, Engineering
WIRTH, JAMES F., San Francisco, Mathematics
WITTE, ALFRED H., Jr., Redwood City, Engineering
WULFF, DANIEL L., Arcadia, Chemistry
YOUNG, RAYMOND G., San Francisco, Engineering
YURA, HAROLD T., Pasadena, Physics
ZISK, STANLEY H., Stanford, Engineering

Cooperative Graduate

ACKERMAN, CHARLES D., Los Angeles, Social Sciences
ANDERSON, DONALD W., Van Nuys, Mathematics
ATKINSON, REILLY, III, Palo Alto, Physics
BALL, RALPH W., Glendale, Mathematics
BOHN, ROBERT K., Sebastopol, Chemistry
BOTTGER, GARY L., Los Angeles, Chemistry
BROWN, MELANCTHON S., Stanford, Chemistry
BUCHHOLZ, JERRY R., Albany, Chemistry
BUTERA, RICHARD A., Albany, Chemistry
CALFEE, ROBERT C., Los Angeles, Psychology
CARTER, BENJAMIN P., Berkeley, Mathematics
CAULEY, JOSEPH M., Pasadena, Physics
CERESETO, SHIRLEY, Anaheim, Social Sciences
CHONG, DELANO P., San Francisco, Chemistry
COCCHIARELLA, NINO B., Los Angeles, Social Sciences
COCIVERA, MICHAEL, Los Angeles, Chemistry
COHEN, DAVID H., Berkeley, Psychology
COOPER, HARRISON R., La Mirada, Engineering
DAVIES, IRVEN W., Jr., Reedley, Chemistry
DELEY, GARY W., Menlo Park, Engineering
EAKIN, DAVID M., Berkeley, Physics
GERONIMO, JOSEPH, Dixon, Botany
GRAGG, WILLIAM B., Jr., Los Angeles, Mathematics
GRONER, GABRIEL F., Los Angeles, Engineering
GROSS, FLETCHER I., La Canada, Mathematics
HALES, ALFRED W., Pasadena, Mathematics
HALSETH, MARTIN W., Walnut Creek, Engineering
HALSTEAD, SALLY, San Diego, Mathematics
HANSEN, HENRY K., Berkeley, Astronomy
HARTMANN, RICHARD W., Santa Monica, Genetics
HEATH, JAMES M., San Francisco, Mathematics
HINICH, MELVIN J., Menlo Park, Mathematics
HOWARD, CHARLES M., Los Angeles, Mathematics
JANTSCHER, GERALD R., Fontana, Social Sciences
JEWETT, ROBERT I., Venice, Mathematics
KENNEDY, ROBERT P., La Canada, Engineering
KITTLE, PAUL A., Berkeley, Chemistry
KLEIN, HARVEY S., Berkeley, Chemistry
KRUSE, ROBERT L., Upland, Mathematics
LACY, CURTIS E., Angwin, Physics
LEIBOVITZ, SARANE G., Pacific Palisades, Anthropology
LOCKARD, ROBERT B., Bakersfield, Psychology
LUMPKIN, OSCAR J., Los Angeles, Physics
MAGEE, PATRICK M., Palo Alto, Engineering
MAH, RAYMOND W., San Francisco, Chemistry
MANGO, FRANK D., Stanford, Chemistry
MASTERS, GILBERT M., Los Angeles, Engineering
MOCHIZUKI, HORACE Y., Madera, Mathematics
NAZAROFF, GEORGE V., San Francisco, Chemistry
NEARING, JAMES C., Hawthorne, Physics

NILSON, MATS C., San Diego, Engineering
NORDTVEDT, KENNETH L., Jr., Redwood City, Physics
NORRIS, JAMES A., Berkeley, Chemistry
OLMSTED, JOHN D., Riverside, Biology
O'MALLEY, MICHAEL H., Agoura, Social Sciences
OSGOOD, CHARLES F., Berkeley, Mathematics
OUELLETTE, ROBERT J., Albany, Chemistry
PARKER, ROBERT A., Monterey Park, Astronomy
PATTERSON, JOHN D., Berkeley, Engineering
PETERSEN, CARL F., Geyserville, Earth Sciences
RICHARDS, WILLIAM R., Atascadero, Chemistry
RIDER, DANIEL G., Santa Ana, Mathematics
RIGGS, ARTHUR D., San Bernardino, Biochemistry
ROBERTSON, JAMES C., Santa Barbara, Engineering
ROELOF, EDMOND C., Granada Hills, Physics
RUECKER, MICHAEL R., Pasadena, Engineering
SKARDA, RALPH V., Jr., Covina, Mathematics
SOULE, MICHAEL E., Palo Alto, Biology
SPAID, FRANK W., Altadena, Engineering
STARK, HAROLD M., Glendale, Mathematics
STAUFFER, PETER H., Palo Alto, Earth Sciences
STELMAN, DAVID, Berkeley, Chemistry
THACHER, PHILIP D., Orinda, Physics
THEOBALD, WILLIAM L., Los Angeles, Botany
THIESS, FRANK B., Palo Alto, Mathematics
TUCKER, VANCE A., Los Angeles, Biology
WEISS, ROBERT J., Empire, Mathematics
WEISSENBERGER, STEIN, Mountain View, Engineering
WILKINSON, JOHN F., Sausalito, Mathematics
WINN, WILLIAM P., Arcadia, Physics
YALE, IRL K., Berkeley, Mathematics

Summer Fellowships for Graduate Teaching Assistants

CHIAPPINO, LEFRAN M., San Jose, Zoology
COCCHIARELLA, NINO B., Los Angeles, Social Sciences
COSTANZA, JAMES L., Martinez, Engineering
BEUS, STANLEY S., Los Angeles, Earth Sciences
BLACK, STUART E., Los Angeles, Mathematics
BLATT, HARVEY, Culver City, Earth Sciences
CRAPO, LAWRENCE M., Porterville, Chemistry
DAVIS, BRIANT L., Culver City, Earth Sciences
DAVIS, HENRY W., Beverly Hills, Mathematics
DEWOLF, MARY Y., San Marino, Chemistry
FICKES, GARRY N., Oakland, Chemistry
FOSTER, EDWARD M., Campbell, Social Sciences
FRANKLIN, STANLEY P., Los Angeles, Mathematics
GAUDET, JOHN J., Berkeley, Botany
GILMOUR, ERNEST H., Norwalk, Earth Sciences
GLUSKOTER, HAROLD J., Berkeley, Earth Sciences
GRIFFIN, JAMES R., Watsonville, Botany
HADLEY, ELMER B., Santa Barbara, Biology
HALPERN, JAMES D., Berkeley, Mathematics
HALSTEAD, SALLY, San Diego, Mathematics
HARVILL, LEE L., Los Angeles, Earth Sciences
HEATH, ALAN G., Palo Alto, Physiology
JUNKER, LEROY V., Pasadena, Mathematics
KLIKOFF, LIONEL G., Santa Monica, Biology
KRUSE, ROBERT L., Upland, Mathematics
LAWRENCE, JOHN F., Oakland, Zoology
MCKEE, EDWIN H., Berkeley, Earth Sciences
MEEKER, LOREN D., Redwood City, Mathematics
METZGER DARRYL E., Salinas, Engineering
MOCHIZUKI, HORACE Y., Madera, Mathematics
NOWER, LEON, Mountain View, Mathematics
O'CONNOR, PATRICK D., Oakland, Zoology
PARKINSON, MICHAEL T., San Francisco, Physics
PENE, JACQUES J., Los Angeles, Microbiology
PITMAN, PAUL M., Jr., Castro Valley, Botany
SWANSON, JOHN R., Albany, Botany
SWANSON, TERRY B., Palo Alto, Chemistry
TYLER, JAMES C., Stanford, Zoology
VASILEVSKIS, JANIS, Mt. Hamilton, Chemistry
ROISEN, BENJAMIN A., Berkeley, Mathematics
ROWE, MARY E., Sacramento, Zoology
RYFF, JOHN V., Palo Alto, Mathematics
WEBER, GERALD I., Los Angeles, Social Sciences
WEISSBERG, BYRON G., Los Angeles, Earth Sciences
WERTHEIM, JANE A., Stanford, Psychology

Postdoctoral

AUGUST, GERALD, Berkeley, Physics
BACHYRITA, PAUL, San Francisco, Physiology
BLATTNER, ROBERT J., Los Angeles, Mathematics
BRANTON, DANIEL, Berkeley, Botany
BRESLER, BORIS, Berkeley, Engineering
BROSEMER, RONALD W., Oakland, Biochemistry
BROWN, LOWELL S., Visalia, Physics
DEAVER, BASCOM S., Jr., Palo Alto, Physics
DUFFY, WILLIAM T., Jr., Santa Clara, Physics
EASTMAN, JOHN W., Berkeley, Chemistry
EHLERS, VERNON J., Berkeley, Physics
EMBREE, ROBERT W., Berkeley, Botany
EMERY, THOMAS F., San Anselmo, Biochemistry
ENRIGHT, JAMES T., San Diego, Zoology
FISH, ROBERT A., Los Altos, Astronomy
FOX, RAYMOND, Oakland, Physics
GLASEL, JAY A., San Diego, Chemistry
GODDARD, JOE D., Albany, Engineering
GORDON, MALCOLM S., Pacific Palisades, Physiology
GREENBERG, MARVIN J., Berkeley, Mathematics
HANLON, MARY S., Berkeley, Biochemistry
HAYES, ROBERT G., Berkeley, Physics
HEARST, JOHN E., Pasadena, Chemistry
HEIN, GEORGE E., Pasadena, Chemistry
HODGE, PAUL W., Pasadena, Astronomy
HREN, JOHN A., Stanford, Engineering
IRVINE, WILLIAM M., Beverly Hills, Astronomy
JAY, EDWARD J., Berkeley, Anthropology
JORDAN, PETER C., Los Angeles, Chemistry
KARAKASHIAN, MARLENE W., Los Angeles, Biochemistry
KRAUSE, DALE C., Lakewood, Oceanography
LINGREL, JERRY B., Pasadena, Biochemistry
ORBACH, RAYMOND L., Los Angeles, Physics
ORDRONNEAU, CHARLES E., Monterey Park, Chemistry
PINCUS, PHILIP A., Albany, Physics
REPLOGLE, LANNY L., Ventura, Chemistry
RHODES, ROBERT S., Stanford, Physics
RICHARDS, ELMER G., Berkeley, Biochemistry
SCHMITZ, FRANCIS J., Berkeley, Chemistry

SCOTT, PETER L., La Jolla, Physics
SPARKS, MARSHALL S., Jr., Berkeley, Physics
SUNDSTEN, JOHN W., Escondido, Medical Sciences
WILSON, BRAYTON F., Berkeley, Botany
WURTELE, MORTON G., Santa Monica, Meteorology
ZALKIN, HOWARD, Davis, Biochemistry
ZIMMERMAN, JACK M., Woodland Hills, Mathematics

Senior Postdoctoral

ADAMSON, ARTHUR W., Los Angeles, Chemistry
BALLOU, CLINTON E., Berkeley, Biochemistry
CHERNOFF, HERMAN, Stanford, Mathematics
COHN, MELVIN, Stanford, Biochemistry
COMREY, ANDREW L., Los Angeles, Psychology
CUPPS, PERRY T., Davis, Physiology
GLASER, DONALD A., Berkeley, Biophysics
GROSSMAN, LAWRENCE M., Berkeley, Engineering
HAHN, ERWIN L., Berkeley, Physics
JENDEN, DONALD J., Los Angeles, Biophysics
KENDRICK, JAMES B., Jr., Riverside, Botany
KLINE, STEPHEN J., Stanford, Engineering
KRIEGER, ALEX D., Riverside, Social Sciences
NELSON, CLEMENS A., Los Angeles, Earth Sciences
NOYES, ROBERT W., Stanford, Medical Sciences
PRAUSNITZ, JOHN M., Berkeley, Engineering
RASMUSSEN, JOHN O., Jr., Berkeley, Physics
SCOTT, ROBERT L., Los Angeles, Physics
STUMPF, PAUL K., Davis, Biochemistry
WHITE, R. STEPHEN, Berkeley, Physics

Science Faculty

ACOSTA, ALLAN J., Pasadena, Oceanography
BENSON, RUSSELL V., Long Beach, Mathematics
BOOS, FRED LEWIS, Jr., Chico, Physics
BOYER, WILLIAM E., Upland, Physics
CLIFGARD, ROY G., Lancaster, Biology
COLE, FRANKLYN W., San Jose, Meteorology
GABRIEL, LESTER H., Sacramento, Engineering
GLEN, WILLIAM, San Mateo, Earth Sciences
HALBERG, C. J. A., Jr., Riverside, Mathematics
HANES, TED L., Azusa, Botany
HOLTZ, WALTER E., San Dimas, Engineering
INGLIS, STUART J., Berkeley, General Science
JONES, DONLAN F., Santa Clara, Engineering
LOCKLEY, JEANETTE E., Oakland, Mathematics
LONG, ROBERT W., El Camino, Biochemistry
MAYBURY, ROBERT H., Redlands, Chemistry
MILLER, JACK C., Claremont, Physics
MONTGOMERY, DAVID H., San Dimas, Zoology
O'BRIEN, SR. MARIE T., Belmont, Biochemistry
PHILLIPS, EDWIN A., Claremont, Botany
PRATHER, RONALD E., San Jose, Mathematics
RICHARDSON, NEAL A., Los Angeles, Engineering
SCHULTZ, CRAMER W., Long Beach, Physics
SHACKLETT, ROBERT L., Fresno, Physics
SICULAR, GEORGE M., San Jose, Engineering
VENUTI, WILLIAM J., San Jose, Engineering
WILLIS, DAVID L., Fullerton, General Science

Summer Fellowships for Secondary School Teachers

ANSON, HERBERT F., Ventura, Mathematics
BEEMAN, ROBERT DAVID, Walnut, Zoology
BLOSSER, JOHN E., San Diego, General Science
BREHMER, ROGER B., Oakland, General Science
BRENNAN, SR. M. ELAINE, San Rafael, General Science
BRYANT, HARRY DELWYN, Davis, Zoology
CLARK, BURNICE V., Bakersfield, Mathematics
COMMINS, SR. M. VICTORIA, San Francisco, Biochemistry
DAVID, IRA A., Brea, General Science
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 Science
WARD, HARRY JOHNSON, Bakersfield, Mathematics
WILSON, CHARLES ORIN, Manhattan Beach, Zoology
WOODHEAD, ROBERT JAMES, Sutter, General Science

COLORADO

Graduate

BAKER, M. MICHELLE, Boulder, Zoology
BARTH, THEODORE J., Colorado Springs, Mathematics
CLARK, LOWELL E., Fort Collins, Engineering
CORNWALL, JOHN M., Denver, Physics
DAILEY, DIXIE L., Lakewood, Genetics
DEWEY, CLARENCE F., Jr., Pueblo, Engineering
GRAUE, DENNIS J., Wheat Ridge, Engineering
HAWLEY, CHARLES C., Lakewood, Earth Sciences
HEATHCOCK, CLAYTON H., Boulder, Chemistry
IRWIN, HENRY J., Denver, Anthropology
KJELDGAARD, EDWIN A., Brush, Chemistry
KRIEGER, HENRY A., Denver, Mathematics
MCKINNIS, RALPH W., Boulder, Mathematics
PICKEN, JAMES S., Loveland, Engineering
SHIER, GEORGE D., Golden, Chemistry
STONE, GEORGE T., Cowdrey, Earth Sciences

TETTEMER, ELOUISE S., Denver, Genetics
WEBB, GEORGE D., Denver, Physiology
WISEMAN, JOHN R., Boulder, Chemistry

Cooperative Graduate

BIRKY, CARL W., Jr., Fort Collins, Zoology
EHN, DENNIS C., Ault, Physics
FRANK, ERNEST C., Fort Collins, Agricultural Sciences
GOLD, ANN, Greeley, Zoology
HOCHMUTH, ROBERT M., Denver, Engineering
SEELY, ALAN L., Boulder, Engineering
WAGMAN, JAMES, Denver, Chemistry

Summer Fellowships for Graduate Teaching Assistants

CONNOR, JON J., Boulder, Earth Sciences
GOLD, ANN, Greeley, Zoology
McCOY, CLARENCE J., Jr., Boulder, Zoology
OVECHKA, CHARLOTTE A., Pueblo, Chemistry
RAMALEY, LOUIS, Boulder, Chemistry
SCHMIDT, GERALD D., Greeley, Zoology
SCHMITZ, EUGENE H., Boulder, Zoology
YOUNG, TIMOTHY M., Denver, Physics

Postdoctoral

AXE, JOHN D., Jr., Littleton, Chemistry
SNYDER, GILBERT B., Denver, Medical Sciences
SALZMAN, FREDA, Boulder, Physics

Science Faculty

BRIGGS, WILLIAM E., Boulder, Mathematics
BUDAK, ARAM, Fort Collins, Engineering
GLESS, GEORGE E., Jr., Boulder, Engineering
GROSE, LUCIUS T., Colorado Springs, Earth Sciences
MOODY, MARTIN L., Jr., Boulder, Engineering
WOLFF, ERNEST N., Fort Collins, Earth Sciences

Summer Fellowships for Secondary School Teachers

BAKER, CLAUDE KENNETH, Englewood, General Science
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
CARLETON, EDWARD J., Jr., West Hartford, Psychology
CARROLL, VERN, Cambridge, Anthropology
DOLLARD, JOHN D., New Haven, Physics
DUNNING, JOHN R., Jr., Sherman, Physics
FLYNN, GEORGE W., Jr., Hartford, Chemistry
FULTON, WILLIAM E., Darien, Mathematics
GARVEY, GERALD T., New Haven, Physics
GAUTHIER, HOWARD L., Jr., Meriden, Social Sciences
JOHNSTON, JOAN E., Ansonia, Zoology
KENNEDY, STARRETT C., Guilford, Engineering
KLEY, RONALD J., New Britain, Earth Sciences
LABINE, PATRICIA A., Somers, Zoology
LASKER, BARRY M., West Hartford, Astronomy
LERMAN, STEVEN H., Hartford, Physics
MAGID, RONALD M., New Haven, Chemistry
MASSO, JOSEPH F., Darien, Physics
McCORD, MICHAEL C., New Haven, Mathematics
MERMIN, JOEL L., New Haven, Mathematics
MURCH, ROBERT E., New London, Engineering
NEWSOM, GERALD H., New Fairfield, Astronomy
PALMER, PAUL, New Haven, Chemistry
PEASE, ROGER W., New Britain, Zoology
RUNNELS, LYNN K., Seymour, Chemistry
SHAMROTH, STEPHEN J., West Hartford, Engineering
SHIELDS, ROBERT M., Jr., Darien, Earth Sciences
SUPLINSKAS, RAYMOND J., Hartford, Chemistry
TOTH, LOUIS E., Easton, Engineering
TURRO, NICHOLAS J., Jr., Middletown, Chemistry
VIMMERSTEDT, JOHN P., New Haven, Agricultural Sciences
WALLACE, JOHN R., New Haven, Mathematics

Cooperative Graduate

BRANDT, RICHARD G., Bristol, Physics
DIMMOCK, DAVID K., Waterford, Engineering
DIMMOCK, JOHN O., Branford, Physics
FREEDMAN, DANIEL Z., West Hartford, Physics
KERMES, JANE A., Darien, Earth Sciences
McDONALD, JAMES R., Wilton, Social Sciences
MODELL, MICHAEL, New Haven, Engineering
PERKINS, FRANCIS W., Jr., West Hartford, Physics
SWEET, MERRILL H., Storrs, Zoology
URIANO, GEORGE A., Waterbury, Physics

Summer Fellowships for Graduate Teaching Assistants

BOCCALATTE, ROSEMARY L., Hartford, Biochemistry
CATHEY, WADE T., Jr., Branford, Engineering
LIPMAN, PETER W., Cannondale, Earth Sciences
JONES, MAITLAND, Jr., New Haven, Chemistry
KERMES, JANE A., Darien, Earth Sciences
McCALLUM, MALCOLM E., Burlington, Earth Sciences
OREHOTSKY, RICHARD S., Coventry, Chemistry
ORMSBY, ELIZABETH L., Niantic, Psychology
STANLEY, ROLFE S., Cheshire, Earth Sciences

Postdoctoral

GRAHAM, JOHN D., New Haven, Chemistry
QUINTON, ARTHUR R., Hamden, Physics
MERMIN, N. DAVID, New Haven, Physics
WATTS, HAROLD W., Cheshire, Social Sciences

Science Faculty

EDELMAN, RAYMOND B., New Haven, Engineering
KATZ, LEWIS, Storrs, Chemistry
RESCHOVSKY, HELENE, Storrs, Mathematics

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. Anthony, Stamford, Biology
Guilbault, Sr. St. Lucille, Stamford, Mathematics
Powell, John J., Clinton, General Science
Stone, George Norton, Lakeville, Mathematics

DELAWARE

Graduate

Day, Benjamin D., Newark, Physics
Jordan, David M., Wilmington, Chemistry
King, Merrill K., Claymont, Engineering
Loomis, Herschel H., Jr., Wilmington, Engineering
Turner, Laura H., Wilmington, Chemistry

Cooperative Graduate

Bollinger, Robert E., Newark, Engineering
Chichester, Richard, Wilmington, Mathematics
Heindel, Ned D., Newark, Chemistry
Hynes, Thomas V., Wilmington, Physics
Schultz, Abraham, Felton, Physics
Weber, Carolyn J., New Castle, Zoology

Summer Fellowships For Graduate Teaching Assistants

Bretzger, Donald, Newark, Chemistry
Read, Harold E., Newark, Engineering

Summer Fellowships for Secondary School Teachers

Mahan, Ralph Eugene, Seaford, Mathematics
Mitchell, Mo. Frances de Sales, Wilmington, Biology

DISTRICT OF COLUMBIA

Graduate

Belsley, David A., Social Sciences
Darley, John M., Psychology
Easton, William B., Mathematics
Fisher, George W., Earth Sciences
Haymaker, Richard W., Physics
MacNamara, John P., Zoology
Muckenthaler, Florian, Zoology
Munroe, Marian H., Botany
Myers, Gardiner H., Chemistry
Rinehart, George S., Mathematics
Senturia, Stephen D., Physics
Shepley, Lawrence C., Physics
Wilson, Kent R., Chemistry

Cooperative Graduate

Bellmer, Elizabeth H., Zoology
Gilliland, Kitt E., Engineering
Golab, Thomas J., Engineering
Gray, Charles A., Engineering
Marlow, Addicks R., Physics
Young, Frank C., Physics

Summer Fellowships for Graduate Teaching Assistants

Barnhart, James W., Biochemistry
Felton, Ronald H., Chemistry
Munroe, Marian H., Botany
Pribor, Donald B., Zoology

Postdoctoral

Roller, Ann, Biophysics

Senior Postdoctoral

Snow, George A., Physics

Science Faculty

Ferguson, Lloyd N., Chemistry

Summer Fellowships for Secondary School Teachers

Fritsch, Sr. Mary Clare, Biology
Maury, Margaret H., General Science
McKeon, Bro. Eugene Peter, Chemistry
McNabb, Sr. M. de Sales, Mathematics

FLORIDA

Graduate

Ash, Michael E., Punta Gorda, Mathematics
Brandon, Nancy E., Tampa, Biochemistry
Cobb, John I., III, Tallahassee, Mathematics
Dutko, Michael P., Miami Beach, Mathematics
Echols, Ronald J., Naples, Earth Sciences
Fogel, Joseph S., Pompano Beach, Chemistry
Gresens, Randall L., Tallahassee, Earth Sciences
Harvey, Charles M., Atlantic Beach, Mathematics
Howard, James H., III, Daytona Beach, Earth Sciences
Jones, Janet G., Vero Beach, Chemistry
Klages, Karlene C., Ft. Lauderdale, Physics
Kuhn, Harland L., Hawthorne, Engineering
Kuntz, Irwin D., Jr., Miami Shores, Chemistry
Lambert, Jerry R., Live Oak, Engineering
Minnick, John H., Gainesville, Mathematics
Nealy, David L., Sarasota, Chemistry
Roberts, Charles S., Miami, Physics
Schaaf, Homer D., Lake Wales, Physics
Sholtes, Robert S., Gainesville, Engineering
Starck, Walter A., II, Miami, Biology
Triplett, Melvin E., Tallahassee, Engineering
Walker, Loren H., Jacksonville, Engineering
Wells, John C., Jr., Winter Haven, Physics

Cooperative Graduate

Brown, Thomas V., Ocala, Psychology
Goodman, Rob W., Lakeland, Mathematics
Holmes, Douglas, Venice, Psychology
Lado, Fred, Tampa, Physics
Lucas, Thomas R., Tampa, Mathematics
Lundberg, Gail K., Orlando, Social Sciences
Lysek, Amelia J., Tampa, Social Sciences
Mailen, James C., Gainesville, Engineering
McKinley, Marvin D., Gainesville, Engineering
Schapiro, Harriette C., Miami, Biochemistry
Shampine, Lawrence F., Ocala, Mathematics
Smith, Douglas B., Gainesville, Engineering
White, Helen L., Pensacola, Psychology
Whitten, Jerry L., Bartow, Chemistry

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Summer Fellowships for Graduate Teaching Assistants

ALLEN, TED T., Miami, Zoology
BELSHE, JOHN F., Miami, Biology
BENNETT, CARL M., Panama City, Mathematics
BRILL, EARL, Miami, Chemistry
FACKLAM, RICHARD R., Tallahassee, Microbiology
GOLDSTEIN, JUDITH F., Miami, Psychology
GOODMAN, ALAN L., Miami Beach, Chemistry
HIGBEE, PAUL N., St. Petersburg, Astronomy
INSEL, ARNOLD J., Hollywood, Mathematics
MARCUS, ALVIN B., Miami Beach, Chemistry
SELDEN, JOHN, Coral Gables, Mathematics
STRICKLAND, MILDRED, Bristol, Microbiology

Postdoctoral

BOND, FREDERICK T., Tavernier, Chemistry
CARROLL, JOHN D., Jacksonville, Psychology
MARVIN DONALD A., Dunedin, Biology
SCHUSTERMAN, RONALD J., Orange Park, Psychology
WOOD, RICHARD F., Gainesville, Physics

Science Faculty

BROOKS, HAROLD K., Gainesville, Earth Sciences
LORENZEN, FRED J., Jr., Gainesville, Mathematics
MAYER, THOMAS C., Ft. Lauderdale, Biology
RICE, CHARLES R., Tampa, Chemistry
SHAFFER, CHARLES V., Gainesville, Engineering

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
O'BRIEN, LELAND M., Summerfield, Biology
WHITTON, ETTA MAE, Tallahassee, Mathematics
WOOLEVER, JOHN D., Sarasota, Biology
WORTHINGTON, CAROLYN B., Miami, Mathematics

GEORGIA

Graduate

BRAMBLETT, JERRY E., Smyrna, Mathematics
DELANY, VINCENT M., Atlanta, Physics
FERRIS, VIRGINIA W., Augusta, Medical Sciences
FLOYD, MIDDLETON B., Decatur, Chemistry
HALL, ZACH W., Atlanta, Physiology
HARRIS, GRADY W., Atlanta, Engineering
HOLLEY, EDWARD R., Jr., Atlanta, Engineering
MORGAN, WILLIAM J., Savannah, Physics
SHEATS, JOHN E., East Point, Chemistry
SULLINS, WALTER R., Jr., Atlanta, Psychology
TAYLOR, SANDRA D., Arlington, Botany
WOODS, ROBERT C., Atlanta, Chemistry

Cooperative Graduate

ANDERSON, WYATT W., Brunswick, Genetics
BURDICK, ROBERT O., Decatur, Mathematics
FRAHM, CHARLES P., Atlanta, Physics
JOHNSON, ELLIS L., Athens, Mathematics
LINEBERGER, WILLIAM C., Atlanta, Engineering
MELLICHAMP, DUNCAN A., Jr., Toccoa, Engineering
SACKER, ROBERT J., Doraville, Mathematics
TERRY, CLAUDE E., Jr., Cumming, Genetics

Summer Fellowships for Graduate Teaching Assistants

HILLIARD, SAM B., Bowersville, Earth Sciences
SULLINS, WALTER R., Jr., Atlanta, Psychology
WALTER, WILLIAM M., Jr., Athens, Chemistry

Postdoctoral

JOHNSON, CHARLES S., Jr., Albany, Chemistry
PROSSER, FRANKLIN P., Atlanta, Chemistry

Senior Postdoctoral

MAY, GEORGE D., Atlanta, Engineering
VINCENT, JOSEPH F., Milledgeville, Chemistry

Summer Fellowships for Secondary School Teachers

DELOACH, JESSIE C., Folkston, Mathematics
FLEMING, MYRTLE M., Franklin Springs, Zoology
POLLER, FRANCINE I., Waycross, Mathematics
SHARROCK, RUTH Y., Smyrna, Mathematics
WILSON, MONTINE C., Cartersville, General Science

HAWAII

Graduate

GARCIA, RAYMOND A., Aiea, Mathematics
STORY, ALFRED E., Maui, Engineering
TAKASHIMA, HERBERT T., Lahaina Maui, Chemistry

Cooperative Graduate

JAY, BARBARA K., Honolulu, Physics
SATO, RALPH I., Honolulu, Physics
TSUNODA, JOYCE S., Honolulu, Biochemistry

Summer Fellowships for Graduate Teaching Assistants

MORRISON, CARL R., Honolulu, Anthropology

Science Faculty

CHIU, ARTHUR N., Honolulu, Engineering

IDAHO

Graduate

AMUNDSEN, CLIFFORD C., Pocatello, Botany
BURDICK, GLENN A., Pocatello, Physics
CHOULES, GEORGE L., Twin Falls, Biochemistry
EVANS, DENNIS R., Alameda, Engineering
MACKI, JACK W., Mullan, Mathematics
METTER, DEAN E., Moscow, Zoology
MURPHY, CAROL J., Twin Falls, Anthropology

Cooperative Graduate

BOBISUD, LARRY E., Midvale, Physics
CONANT, DONALD R., Jr., Caldwell, Chemistry
IRVING, GEORGE B., Moscow, Engineering
WRIGHT, JAMES R., Gooding, Chemistry

Summer Fellowships for Graduate Teaching Assistants

BRANDSBERG, JOHN W., Moscow, Botany
METTER, DEAN E., Moscow, Zoology
STECKER, RONALD E., Moscow, Zoology
STEWART, DONALD G., Pocatello, Mathematics

Science Faculty

BARNES, WILLIAM P., Moscow, Engineering
MAXWELL, LEE M., Moscow, Engineering

ILLINOIS

Graduate

ADAMS, ARTHUR C., Robinson, Chemistry
ALBERTS, BRUCE M., Highland Park, Biophysics
ANDRES, RONALD P., Elmhurst, Engineering
ANGER, FRANK D., Glen Ellyn, Mathematics
ARNOLD, RICHARD C., Chicago, Physics
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
BRANDT, KARL G., Park Forest, Chemistry
BROOKS, PHILIP R., Hazel Crest, Chemistry
BRUCH, LUDWIG W., Winnebago, Physics
CALNEK, EDWARD E., Chicago, Anthropology
CARHART, RICHARD A., Evanston, Physics
CARTER, JEAN E., Urbana, Anthropology
CHANIOT, GEORGE E., Jr., Decatur, Zoology
COLEMAN, SIDNEY R., Chicago, Physics
COLLINS, FRANK G., Evanston, Engineering
CONDON, JOSEPH H., Evanston, Physics
CONNOLLY, YVONNE I., Evanston, Biochemistry
COPPOLA, PATRICIA T., Greenville, Zoology
CRAIN, ROBERT L., Chicago, Social Sciences
CUMMINS, JAMES N., Dix, Botany
CUSHING, JAMES T., Chicago, Physics
DAVIS, MICHAEL M., Peoria, Astronomy
DAY, MAHLON M., Urbana, Mathematics
DONAHUE, JACK D., West Chicago, Earth Sciences
DONOVAN, THOMAS A., Champaign, Chemistry
DOUGHERTY, RALPH C., Scott Air Force Base, Chemistry
EDIDIN, MICHAEL A., Chicago, Zoology
FAHEY, ROBERT C., Chicago, Chemistry
FAIRBANKS, GRANT, Jr., Urbana, Biophysics
FAY, ROBERT C., Urbana, Chemistry
FRANZETTI, JUDITH C., Chicago, Biochemistry
FREEMAN, SMITH Jr., Northfield, Physics
GARLAND, JAMES W., Jr., Chicago, Physics
GARRETT, VIRGINIA W., Champaign, Mathematics
GOLIN, STUART J., Chicago, Physics
GUSTAFSON, ROBERT D., Elmhurst, Engineering
HALPERN, HERBERT P., Chicago, Mathematics
HANOR, JEFFREY S., Arlington Heights, Earth Sciences
HAPP, GEORGE M., Elsah, Zoology
HETTINGER, THOMAS P., Aurora, Biochemistry
HILL, ROBERT N., Evanston, Physics
HOWE, ROBERT K., Kewanee, Chemistry
HUDSON, JOHN L., Chicago, Engineering
HUMPHREYS, TOM D., II, Chicago, Zoology
HUNT, RICHARD L., Chicago, Chemistry
JOHNSON, ROBERT P., Urbana, Chemistry
JONES, ROBERT B., Raleigh, Physics
JULIAN, WILLIAM H., Winnetka, Engineering
KERMICLE, JERRY L., Dundas, Genetics
KEYSER, LEON F., Waukegan, Chemistry
KLANDERMAN, BRUCE H., Urbana, Chemistry
KLEMENT, WILLIAM, Jr., Bensenville, Physics
KRAMER, SHELDON J., Chicago, Engineering
LA ROI, GEORGE H., Winnetka, Biology
LEDERER, CHARLES M., Chicago, Chemistry
LELAND, KENNETH O., Chicago, Mathematics
LEUER, CONSTANCE J., Highland Park, Mathematics
LOGAN, ROBERT K., Chicago, Physics
LOHMAR, PHOEBE H., Galesburg, Biochemistry
LOWRY, STEPHEN R., Chicago, Biochemistry
LUBAN, MARSHALL, Chicago, Physics
MADSEN, WAYNE A., Chicago, Engineering
MAIER, WILLIAM B., II, Chicago, Physics
MALVEN, PAUL V., Kingston, Physiology
MASSEY, JAMES L., Ottawa, Engineering
MCCORMICK, NORMAN J., Normal, Engineering
MCCRIMMON, KEVIN M., Urbana, Mathematics
MICHAEL, JOEL A., Skokie, Physiology
MILGRAM, RICHARD J., Chicago, Mathematics
MULLIN, MICHAEL M., Mt. Carroll, Biology
MURPHY, Sr. M. NADINE, Chicago, Botany
MURRAY, WILLIAM, Olympia Fields, Engineering
NIEMEYER, GEORGE L., Jr., Lake Forest, Engineering
OLCOTT, RICHARD J., Chicago, Chemistry
PARKMAN, MARGARET A., Chicago, Social Sciences
PATERSON, WILLIAM J., Kincaid, Engineering
PERONE, SAM P., Rockford, Chemistry
POWERS, RICHARD J., Oak Park, Physics
PROST, MARILYN T., Chicago, Physics
READEY, DENNIS W., Aurora, Engineering
REESE, WILLIAM, Champaign, Physics
REHM, RONALD G., Glenellyn, Mathematics
ROWND, ROBERT H., Chicago, Biophysics
ROZYCKI, ALAN A., Chicago, Microbiology
RUCH, LAUREL A., Belleville, Mathematics
RUST, MILBERN J., Chicago, Mathematics
SACKETT, JAMES R., Northbrook, Anthropology
SCHAEFER, ELMER J., Winnetka, Mathematics
SCHMIDT, LANNY D., Zion, Chemistry
SHEPARD, HARVEY K., Chicago, Physics
SHULT, ERNEST E., Carbondale, Mathematics
SIMON, NANCY J., Lagrange, Physics
SMITHSON, SCOTT B., Glenview, Earth Sciences
SODERBERG, ROGER H., Elgin, Chemistry
STEBBINGS, JAMES H., Jr., East St. Louis, Biology
STEPHEN, KEITH H., Evanston, Chemistry
STEVENS, WILLIAM G., Urbana, Chemistry
STRUNK, JACQUELINE D., Evanston, Psychology
SWANK, ROBERT K., Urbana, Physics
SWITZER, ROBERT L., Orangeville, Biochemistry
TOBEY, ROBERT A., Urbana, Microbiology
TOTTEN, STANLEY M., Champaign, Earth Sciences
UEBBING, JOHN J., Chicago, Engineering
VALBERT, JON R., Harvey, Engineering
VANDEVELDE, JOSEPH R., Chicago, Mathematics
VANSTEE, SUZANNE C., Urbana, Zoology
VOLZ, RICHARD A., Woodstock, Engineering
WAHL, ARNOLD C., Chicago, Chemistry
WALTER, THEODORE A., Elmwood Park, Chemistry

WILDE, GEORGE R., West Chicago, Engineering
WINDMILLER, LEE R., Skokie, Physics
WOOD, ALLEN D., Palos Heights, Engineering
YOUNG, PHILIP D., Downers Grove, Anthropology
ZIMMERMAN, JOHN L., Champaign, Biology

Cooperative Graduate

AHRENKIEL, RICHARD K., Athens, Physics
ANDERSON, JOHN, Chicago, Mathematics
ARNOLD, ROBERT L., Chicago, Chemistry
BAER, WALTER S., Glencoe, Physics
BERLINER, JORDAN P., Chicago, Biochemistry
BRYA, WILLIAM J., Chicago, Engineering
CLEMENS, LAWRENCE M., Chicago, Chemistry
COATES, ROBERT M., Palatine, Chemistry
CRAIG, RICHARD A., Urbana, Physics
CROOK, JOSEPH R., Chicago, Chemistry
DOOLEN, GARY D., Riverside, Physics
DRUMKE, JOHN S., Chicago, Botany
DUDLEY, RICHARD M., Flossmoor, Mathematics
FEIGL, FRANK J., Chicago, Physics
GASSNER, RONALD L., Des Plaines, Engineering
GRIFFIN, JOHN R., Du Quoin, Engineering
HAGEN, CARL R., Chicago, Physics
HENRY, CHARLES H., Urbana, Physics
HOUSTON, ALEXANDRA L., Galesburg, Mathematics
HUSTON, ROBERT B., Plainfield, Biochemistry
INTERRANTE, LEONARD V., Urbana, Chemistry
JONES, ROBERT M., Urbana, Engineering
JORDAN, ROBERT E., Chicago, Anthropology
KAISER, JACK A. C., Chicago, Meteorology
KASER, JOHN D., Lemont, Engineering
KEENAN, WILLIAM M., Des Plaines, Social Sciences
KIMBALL, ORVILLE F., Chicago, Engineering
KIRK, FRANK A., Carbondale, Psychology
LASAINE, ALFRED D., Chicago, Mathematics
LEAF, RUSSELL C., Chicago, Psychology
LEE, KATHARINE W., Chicago, Biochemistry
LELLINGER, DAVID B., Naperville, Botany
LIETZ, GERARD P., Chicago, Physics
LINNERUD, HAROLD J., Crystal Lake, Engineering
LOCHRIE, WILLIAM D., Springfield, Engineering
MARCUS, SHELDON H., Chicago, Chemistry
MATHEWS, WESLEY N., Jr., Champaign, Physics
McMAHON, JOHN P., Chicago, Psychology
MERSON, RICHARD L., Urbana, Engineering
MIECH, RONALD J., Urbana, Mathematics
MORTON, RICHARD A., Elmhurst, Physics
MUIRHEAD, JAMES S., Elgin, Chemistry
MURLEY, THOMAS E., Minooka, Engineering
NEWMARK, RICHARD A., Urbana, Chemistry
NUTTALL, RONALD L., Downers Grove, Psychology
O'CONNELL, REV. DANIEL C., Decatur, Psychology
O'CONNELL, EDWARD J., Jr., Evanston, Psychology
OLSON, CLARK S., Elmhurst, Biology
OPFER, JAMES E., Shobonier, Physics
REEDER, THOMAS M., Champaign, Engineering
ROSENKRANTZ, WALTER A., Chicago, Mathematics
RUST, JAMES H., Pekin, Engineering
RUTLEDGE, ROBERT B., III, East St. Louis, Mathematics
SADAGURSKY, PAUL L., Urbana, Mathematics
SATHER, NORMAN F., Elmhurst, Engineering
SCHROEDER, ROLF R., Chicago, Engineering
SCHUYLER, WILLIAM M., Jr., Chicago, Social Sciences
SCUDDER, CHARLES L., Chicago, Medical Sciences
SHERMAN, MALCOLM J., Chicago, Mathematics
SHOEMAKER, VAUGHAN H., Urbana, Zoology
SIMS, LESLIE B., Urbana, Chemistry
SINE, ROBERT C., Waukegan, Mathematics
SPICER, LARRY D., Urbana, Chemistry
SWENDSEN, JOANNE R., Pekin, Mathematics
SWENSON, GEORGE W., Chicago, Chemistry
SWIONTEK, MICHAEL C., Chicago, Engineering
TRAPP, CHARLES A., Chicago, Chemistry
VEATCH, ROBERT M., Evanston, Medical Sciences
VILLAREJO, MERNA R., Chicago, Biochemistry
VISCO, ROBERT E., Champaign, Chemistry
WAGNER, PETER J., Wilmette, Chemistry
WEINER, HOWARD J., Chicago, Mathematics
WILSON, PAUL D., Chicago, Psychology
WITT, GERALD L., Alton, Physics
WOLF, LUDWIG, Jr., Chicago, Engineering

Summer Fellowships for Graduate Teaching Assistants

COHEN, MARSHALL M., Chicago, Mathematics
COLLINS, THOMAS W., Murphysboro, Biology
AIROFARULLA, JOELYN M., Chicago, Psychology
ALLGOWER, EUGENE L., Chicago, Mathematics
BAER, WALTER S., Glencoe, Physics
BARKER, JOHN L., Jr., Chicago, Chemistry
BAUMAN, STEVEN F., Urbana, Mathematics
BENING, RICHARD A., Elgin, Mathematics
BINFORD, LAURENCE C., Glencoe, Zoology
BREEN, WILLIAM J., DeKalb, Social Sciences
BRUNZIE, GERALD F., Downers Grove, Chemistry
CARLSON, DONALD E., Tampico, Engineering
CRILEY, BRUCE B., Urbana, Zoology
CULBERTSON, JON R., Wilmette, Zoology
DAYTON, JAMES A., Jr., Chicago, Engineering
FEIGL, FRANK J., Chicago, Physics
FITZGERALD, ROBERT S., Chicago, Physiology
GALE, DAVID M., Chicago, Chemistry
HAMELINK, RONALD C., Chicago, Mathematics
LELLINGER, DAVID B., Naperville, Botany
LENN, PETER D., Evanston, Engineering
LEVENBERG, MILTON I., Chicago, Chemistry
MACLACHLAN, BRUCE B., Chicago, Anthropology
MACRAE, ROBERT E., Chicago, Mathematics
HULSEY, JESSIE D., Champaign, Earth Sciences
KARNER, FRANK R., Champaign, Earth Sciences
KAUFMAN, ERNEST D., Skokie, Chemistry
LANGBERG, GEORGE, Urbana, Mathematics
LARSON, PAUL Z., Rockford, Engineering
LEAF, GARY K., Champaign, Mathematics
MAGIN, RALPH W., Belleville, Chemistry
MALAKER, DONALD L., Aurora, Physics
MARCUS, SHELDON H., Chicago, Chemistry
MIECH, RONALD J., Urbana, Mathematics
MILLER, JAMES L., Urbana, Zoology
NEMETH, EDWARD M., Chicago, Chemistry
O'BRIEN, RONALD J., Chicago, Physics
OLSON, JOHN E., Chicago, Mathematics
OPFER, JAMES E., Shobonier, Physics
PARISI, JOSEPH T., Chicago, Microbiology

PARKER, NANCY R., Antioch, Genetics
PYE, GORDON B., Wheaton, Social Sciences
TAX, SUSAN M., Chicago, Anthropology
TOBEY, ROBERT A., Urbana, Microbiology
REAM, CATHERINE H., Chicago, Biology
RIGGS, ELLIOTT A., Urbana, Earth Sciences
SINGER, RALPH M., Chicago, Engineering
SODERBERG, ROGER H., Elgin, Chemistry
STROHL, JOHN H., Chicago, Chemistry
WALBRIDGE, EDWARD W., Libertyville, Physics
WELLEK, ROBERT M., Chicago, Engineering
WERNSMAN, EARL A., Vernon, Genetics

Postdoctoral

BAKER, ROBERT H., Jr., Evanston, Biochemistry
BIRCHFIELD, GENE E., Chicago, Meteorology
DARON, HARLOW H., Urbana, Biochemistry
DE MARR, RALPH A., Jacksonville, Mathematics
GARBISCH, EDGAR W., Jr., Glenview, Chemistry
GORDON, SIDNEY L., Chicago, Chemistry
HOFFMANN, PHILIP C., La Grange, Medical Sciences
HOGAN, JERRY A., Chicago, Psychology
HOLE, FRANK A., Oak Park, Social Sciences
IBEN, ICKO, Jr., Champaign, Astronomy
LIBBY, WILLIAM J., Jr., Wheaton, Genetics
LIULEVICIUS, ARUNAS L., Chicago, Mathematics
MACRAE, ROBERT E., Chicago, Mathematics
MARGULIES, SEYMOUR, Champaign, Physics
RIDDIFORD, LYNN M., Poplar Grove, Biochemistry
SONLEITNER, FRANK J., Chicago, Zoology
SPECTOR, HAROLD N., Chicago, Physics
TROY, ALAN, Urbana, Mathematics
WALSH, THOMAS D., Chicago, Chemistry
WOLF, JOSEPH A., Chicago, Mathematics

Senior Postdoctoral

BASOLO, FRED, Evanston, Chemistry
BLACK, LINDSAY M., Urbana, Botany
CAMBEL, ALI B., Evanston, Engineering
JOHNSON, B. CONNOR, Urbana, Biochemistry
MEYER, LOTHAR, Chicago, Chemistry
TURKEVICH, ANTHONY L., Chicago, Earth Sciences
WOLFSON, ALBERT, Evanston, Zoology

Science Faculty

ANDRIS, PETER, Chicago, General Science
CARLBORG, FRANK W., Rockford, Mathematics
CHEO, PETER K., Aurora, Physics
CLAYTON, KENNETH D., De Kalb, Zoology
EDWARDS, DELWIN C., Belleville, Chemistry
KAPLAN, LEO, Carbondale, General Science
KRAEMER, LOUISE M., Chicago, Chemistry
KURS, LOUIS NATHAN, Urbana, Earth Sciences
MANHEIM, JEROME H., Chicago, Mathematics
MOSBORG, ROBERT J., Urbana, Engineering
PABARCIUS, ALGIS, Urbana, Engineering

Summer Fellowships For Secondary School Teachers

BAUER, SR. M. DARIA, Chicago, Biology
BUCKLER, WILLIAM F., Aurora, Mathematics
BURNS, ROBERT BYRON, Peoria, General Science
BURROW, GEORGE IRVING, Port Byron, General Science
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, La Grange 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, MO. MATTHIAS, Decatur, Biology
MUCKERMANN, SR. M. ALPHON, Breese, Biology
MUELLER, PAUL NEAL, Arlington Heights, General Science
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., La Grange, 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

BEINEKE, LOWELL W., Decatur, Mathematics
BRUNNER, PHILIP W., Ossian, Engineering
CARLSON, LEE A., Valparaiso, Mathematics
COCANOWER, ALFRED B., Osceola, Engineering
CORY, ROBERT P., Fortville, Biochemistry
CURTIS, MYRON D., Mount Vernon, Chemistry
CUSHMAN, DAVID W., Indianapolis, Biochemistry
FAN, DAVID P., West Lafayette, Biophysics
FISCH, MICHAEL H., Indianapolis, Chemistry
FISHER, THORNTON R., Indianapolis, Physics
HADFIELD, JACK A., Indianapolis, Engineering
JACKSON, MARION T., West Lafayette, Biology
LUTHER, LARS C., Bloomington, Chemistry
MEDVED, JOAN K., Gary, Microbiology
MILES, GLEN A., Cloverdale, Engineering
MOBLEY, DONALD I., Indianapolis, Zoology
NEUMANN, HOLM W., Bloomington, Anthropology
PARR, JAMES T., Indianapolis, Mathematics
PETERS, PHILIP C., Chesterton, Physics
PURSLEY, STEPHEN A., Indianapolis, Engineering
RAGLAND, THOMAS E., North Salem, Biochemistry
RAIN, DON W., Laporte, Engineering
RIGG, ROBERT G., Hammond, Engineering
ROGERS, MARION A., Lewisville, Earth Sciences
ROOT, FORREST K., Bedford, Earth Sciences

RUPPERT, RICHARD W., West Lafayette, Social Sciences
SANDERS, WILLIAM A., Oxford, Chemistry
SCHERER, KIRBY V., JR., Newburgh, Chemistry
SCHMALBERGER, DONALD, Bloomington, Astronomy
WHITCOMB, ALBERT R., South Bend, Mathematics
WILLIAMS, RICHARD R., Anderson, Engineering

Cooperative Graduate

BERTULSONS, TATIANA, Manchester, Chemistry
COHEN, LAWRENCE B., Indianapolis, Physiology
CONNOLLY, JOHN W., West Lafayette, Chemistry
CUFFEY, ROGER J., Bloomington, Earth Sciences
DERUDDER, RONALD D., Bloomington, Earth Sciences
DILLING, ROGER L., North Manchester, Physics
DILLING, WENDELL L., West Lafayette, Chemistry
DUNDES, ALAN, Bloomington, Anthropology
GABBARD, LARRY J., Lawrenceburg, Engineering
GROSSMAN, RICHARD F., Lafayette, Chemistry
GROT, RICHARD A., Griffith, Engineering
HANSON, GEORGE P., Bloomington, Botany
HEIEN, GENE W., Bloomington, Earth Sciences
HOWELL, ROBERT C., Indianapolis, Social Sciences
JONES, LARRY K., Lafayette, Engineering
KIRK, WILLIAM A., Reelsville, Mathematics
KIRKHAM, MARY A., Corydon, Biochemistry
LADUKE, ALICE J., Mt. Vernon, Mathematics
LEBO, JERRY A., Winamac, Engineering
LEDDEN, PATRICK J., Fort Wayne, Mathematics
MADEY, THEODORE E., South Bend, Physics
MARQUIS, EDWARD T., South Bend, Chemistry
MEDCALF, DARRELL G., West Lafayette, Biochemistry
MEYER, HAROLD D., Indianapolis, Engineering
MOSBY, JAMES F., Indianapolis, Engineering
RAAB, JACOB L., Elkhart, Zoology
ROBERTS, PETER J., West Lafayette, Physics
RORABACHER, DAVID B., West Lafayette, Chemistry
ROSS, ROBERT W., Frankfort, Engineering
SABBAGH, HAROLD A., Lafayette, Engineering
STAMBAUGH, ROBERT L., Marion, Chemistry
STEVENS, DONALD C., Indianapolis, Mathematics
STILLER, THOMAS M., Connersville, Engineering
THOMPSON, MAYNARD D., Michigan City, Mathematics
WATERS, ANNETTE J., Bloomington, Botany
WHITE, HENRY E., JR., Lafayette, Mathematics
WOOLDRIDGE, DAVID P., Bloomington, Zoology

Summer Fellowships for Graduate Teaching Assistants

COHEN, LOIS R., West Lafayette, Social Sciences
BAKER, FRANK W., Hanover, Chemistry
BLEYMAN, LEA K., Bloomington, Physiology
BROWN, DONALD R., West Lafayette, Psychology
CALVIN, CLYDE L., West Lafayette, Agriculture
CARLSON, NORMAN R., Michigan City, Engineering
DAY, GEORGE W., West Lafayette, Mathematics
DEAN, EDWIN R., South Bend, Social Sciences
DORN, GORDON L., West Lafayette, Genetics
LEININGER, WILLIAM J., West Lafayette, Social Sciences
HEIEN, GENE W., Bloomington, Earth Sciences
JOHNSON, LOWELL B., West Lafayette, Botany
JOHNSON, WILLIAM H., Fairmount, Earth Sciences
KIRK, WILLIAM A., Reelsville, Mathematics
LEDDEN, PATRICK J., Fort Wayne, Mathematics
MAXON, MARSHALL S., Bloomington, Physics
MEADE, THOMAS G., West Lafayette, Zoology
NICKANDER, RODNEY C., West Lafayette, Medical Sciences
UECKER, FRANCIS A., Fort Wayne, Botany
SCHRENK, GEORGE L., Seymour, Physics
SCHROCK, STEVEN L., Lafayette, Engineering
WILDIN, MAURICE W., West Lafayette, Engineering
WINTER, EDWARD M., West Lafayette, Engineering
YAQUB, FAWZI M., Lafayette, Mathematics

Postdoctoral

ALLING, NORMAN L., West Lafayette, Mathematics
BAYER, HORST O., West Lafayette, Chemistry
BELINFANTE, JOHAN G., West Lafayette, Physics
DAVIDSON, ERNEST R., Bloomington, Chemistry
DORN, GORDON L., West Lafayette, Genetics
HARWIT, MARTIN O., Bloomington, Astronomy
POHL, WILLIAM F., Michigan City, Mathematics

Senior Postdoctoral

FRASER, W. DEAN, Bloomington, Microbiology
HEISER, CHARLES B., Jr., Bloomington, Botany
NELSON, OLIVER E., Lafayette, Genetics
ROGERS, BRUCE J., Lafayette, Botany
SCHAEFFER, RILEY O., Bloomington, Chemistry

Science Faculty

BARTON, JAY, II, Collegeville, Biology
BROWN, CHARLES L., Lafayette, Engineering
DAVIS, CHESTER L., Angola, Engineering
FLETCHER, ROBERT I., Greencastle, Microbiology
HARTSAW, WILLIAM O., Evansville, Engineering
HAWTHORNE, QUINTIN J., Angola, Engineering
HITCHCOCK, JAMES E., Lafayette, Engineering
HOELZER, JOHN H., Muncie, Mathematics
JACKSON, LOWELL B., Lafayette, Engineering
JONES, JAMES B., Lafayette, Engineering
KOZIN, FRANK, Lafayette, Engineering
MILLER, MELTON M., Jr., Lafayette, Engineering

SKIBINSKY, MORRIS, Lafayette, Mathematics
STRONG, LAURENCE E., Richmond, Chemistry

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., West Lafayette, Mathematics
FLANSBURG, GLENN E., Hammond, Mathematics
FREDERICK, TERRY JOE, Vincennes, Mathematics
GOODNIGHT, FREDRICK H., North Judson, Biology
KINCAID, WAYNE H., Indianapolis, General Science
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

BERGE, GLENN L., Decorah, Astronomy
BRUMBAUGH, JOHN A., Ames, Genetics
CHRISTNER, JAMES E., Wellman, Biochemistry
DAUGHERTY, JACK D., Ottumwa, Engineering
EGGER, CARL T., Monticello, Engineering
FELLOWS, LARRY D., Shenandoah, Earth Sciences
HANSON, FRIDOLF A., Des Moines, Anthropology
HEMESATH, NORBERT B., Cedar Rapids, Engineering
HICKMAN, JOHN M., Cedar Rapids, Anthropology
HORNE, WILLIAM C., Burlington, Psychology
JOSEPHSON, KEITH B., Boone, Mathematics
KUST, ROGER N., Ames, Chemistry
LANDWEBER, PETER S., Iowa City, Mathematics
LEVY, HIRAM, II, Bettendorf, Chemistry
LILLEHOJ, EIVIND B., Kimballton, Botany
McCALL, GEORGE J., Iowa City, Psychology
McCLELLAN, RONALD E., Marshalltown, Engineering
MILLER, DON H., Cedar Rapids, Mathematics
MILLER, RICHARD K., Clarinda, Mathematics
NICOLSON, DAN H., Shenandoah, Botany
NORDSTROM, JOHN D., Williamsburg, Chemistry
PHILLIPS, DAVID T., Algona, Physics
POLKING, JOHN C., Breda, Mathematics
PULLEY, ARDEN O., Ames, Biochemistry
SARGEANT, PETER B., Cedar Rapids, Chemistry
SPECKER, WAYNE H., Des Moines, Engineering
SUNDBERG, RICHARD J., Linn Grove, Chemistry
THOMAS, BRUCE R., Guthrie Center, Physics
THORNTON, MELVIN C., Storm Lake, Mathematics
WEIDLER, DONALD J., New Hampton, Zoology

Cooperative Graduate

CLAMPITT, PHILIP T., Des Moines, Biology
CURRY, SHARON G., Ames, Earth Sciences
DAHM, ARNOLD J., Pella, Physics
DIXON, CHRIST D., Waltham, Mathematics
EDEN, RICHARD C., Springville, Engineering
FRIEDELL, REV. JOHN C., Dubuque, Mathematics
GABRIELSON, JAMES E., Cedar Rapids, Engineering
GOBEN, CHARLES A., Chariton, Engineering
GOODMAN, MAJOR M., Des Moines, Genetics
GREENWOOD, WILLIAM R., Pleasant Valley, Earth Sciences
GURALNIK, GERALD S., Cedar Falls, Physics
HANSON, FRANK E., Jr., Hawarden, Physiology
HENDRICKSON, HOWARD T., Cedar Rapids, Engineering
HOVERSTEN, ESTIL V., Ames, Engineering
JOHNSON, KENT E., Davenport, Earth Sciences
JOHNSON, ROBERT W., Marathon, Engineering
KRISTIANSON, BRYANT N., Ogden, Engineering
KRUEMPEL, KENNETH C., Independence, Engineering
MARK, JOAN T., Orange City, Social Sciences
MARSHALL, MARILYN E., Iowa City, Psychology
MARTIN, JOSEPH M., Keokuk, Mathematics
MATHRE, DONALD E., Ames, Botany
OTTO, ALBERT D., Gladbrook, Mathematics
ROMIG, BERNARD E., Villisca, Engineering
SACKETT, ROBERT N., Des Moines, Engineering
SMALLEY, KATHERINE N., Iowa City, Zoology
STARK, PHILIP H., Iowa City, Earth Sciences
TENNANT, JERRY R., Burnside, Engineering
THYSELL, RICHARD V., Iowa City, Psychology
TROTT, CAROLYN M., Iowa City, Mathematics
VARNUM, CLARK M., Tama, Physics
VITOLS, VISVALDIS A., Des Moines, Engineering
WAUER, JOHN C., Sioux City, Engineering

Summer Fellowships for Graduate Teaching Assistants

BATHIE, WILLIAM W., Ames, Engineering
COONCE, HARRY B., Ames, Mathematics
CUNNING, JOE D., Mount Ayr, Engineering
LOMEN, DAVID O., Decorah, Mathematics
LUTHER, NORMAN Y., Iowa City, Mathematics
HOLLENHORST, JEROME J., Ames, Social Sciences
KLAPPER, GILBERT J., Iowa City, Earth Sciences
MULFORD, CHARLES L., Ames, Social Sciences
MUTH, WAYNE A., Ames, Engineering
PIRON, ROBERT, Ames, Social Sciences
THOMAS, ROBERT W., JR., Ames, Social Sciences
ROGERS, WALLACE A., Fort Dodge, Zoology
SECREST, BRUCE G., West Branch, Mathematics
SMITH, PAUL E., Spirit Lake, Biology

Postdoctoral

HOFFMAN, LARRY R., Sigourney, Botany
KASPERBAUER, MICHAEL J., Manning, Botany
PIXLEY, RALPH E., Des Moines, Physics

Senior Postdoctoral

HALMI, NICHOLAS S., Iowa City, Medical Sciences

Science Faculty

DOCKEN, ADRIAN M., Decorah, Chemistry
GRAHAM, FREDERICK M., Ames, Engineering
HANSON, ROGER J., Grinnell, Physics
LORENZ, PHILIP J., Jr., Fayette, Physics
MUTH, WAYNE A., Ames, Engineering
PILGRIM, DONALD H., Decorah, Mathematics
RYDER, SR. M. BRIANT, Dubuque, Physics

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, Ft. Madison, Biology
OSHER, ROBERT ELMER, Marshalltown, Mathematics
SCHAUB, RUSSELL E., Titonka, Mathematics
SNYDER, JOHN D., Carroll, Mathematics
TRUMP, RICHARD F., Ames, Zoology

KANSAS

Graduate

ANDERSON, DAVID K., Riverton, Chemistry
BARNHILL, ROBERT E., Lawrence, Mathematics
BARRETT, BRUCE R., Kansas City, Physics
BATH, THOMAS D., Kansas City, Engineering
BERRY, WILLIAM H., Shawnee Mission, Mathematics
CORNELIUS, ARCHIE J., Manhattan, Engineering
DEONIER, DICK L., Eudora, Zoology
ENOS, PAUL P., Perry, Earth Sciences
HALL, ROBERT E., Pittsburg, Physics
HAYES, DENNIS E., Mission, Earth Sciences
HAYS, BYRON G., Wichita, Chemistry
HEAD, THOMAS J., Topeka, Mathematics
HEIDER, KARL G., Lawrence, Anthropology
KEVAN, LARRY J., Shawnee Mission, Chemistry
KOCH, RICHARD M., Haven, Mathematics
KOHLMAN, DAVID L., Lawrence, Engineering
MANTEY, JOHN P., Sharon Springs, Engineering
MANTEY, PATRICK E., Sharon Springs, Engineering
MILLS, ROBERT B., Topeka, Zoology
NAUMAN, EDWARD B., Shawnee Mission, Engineering
REYNOLDS, WYNETKA A, Emporia, Zoology
RICHERT, ANTON S., Wichita, Physics
ROOT, JOHN W., Lawrence, Chemistry
SPENCER, JOHN B., Topeka, Chemistry
WALTERS, WILLIAM B., Highland, Chemistry
WARNE, THOMAS M., Jr., Leawood, Chemistry
WHITEHEAD, C. THOMAS, Columbus, Engineering
ZIMMERMAN, JOHN F., Lawrence, Chemistry

Cooperative Graduate

BUTLER, RONALD D., Manhattan, Chemistry
CARPENTER, KENNETH H., Matfield Green, Engineering
DAVIS, ELMER E., Haviland, Mathematics
GRIFFITH, SUSAN J., Mission, Zoology
HARRI, JOHN G., Brookville, Engineering
HOBSON, ARTHUR S., Manhattan, Physics
HYSLOP, ROBERT S., Jr., Kansas City, Engineering
KEZLAN, THOMAS P., Lawrence, Mathematics
NOBLE, LARRY D., Iola, Engineering
PLATT, DWIGHT R., Newton, Zoology
RAMSAY, ARLAN B., Dodge City, Mathematics
ROGERS, JOYCE M., Mission, Mathematics
RUPF, JOHN A., Wichita, Engineering
SALSER, WINSTON A., Wichita, Biophysics
SKINNER, JAMES L., Lincoln, Engineering
SMITH, DEAN L., Jr., Topeka, Engineering
WEIDMAN, DONALD R., Kansas City, Mathematics
ZAHNLEY, JAMES C., Manhattan, Biochemistry

Summer Fellowships for Graduate Teaching Assistants

BAFUS, DONALD A., Newton, Chemistry
FAGAN, JOHN R., Manhattan, Engineering
FLANAGIN, VERNON L., Gem, Botany
HAINES, HOWARD B., Kansas City, Biology
LONG, JOHN B., Topeka, Psychology
HOPPING, JOE M., Manhattan, Biochemistry
MCDANIEL, JAMES S., Pittsburg, Zoology
VAN SANT, JAN F., Lawrence, Earth Sciences
RINEHART, MARILYN E., Hutchinson, Microbiology
SMITH, DEAN L., Jr., Topeka, Engineering
WALTERS, WILLIAM B., Highland, Chemistry
WARNER, CLARENCE E., Burr Oak, Chemistry
WEATHERLY, NORMAN F., Manhattan, Zoology

Postdoctoral

HORNE, FREDERICK H., Mission, Chemistry
SETSER, DONALD W., Hudson, Chemistry

Senior Postdoctoral

ZELLER, EDWARD J., Lawrence, Earth Sciences

Science Faculty

HAMILTON, HOWARD B., Wichita, Engineering
JOHNSON, WILLIAM J., Hillsboro, Biochemistry
KUBITZA, WILHELM K., Manhattan, Engineering
LAWS, LEONARD S., Winfield, Mathematics
LYNCH, ROGER V., Baldwin City, Mathematics
TOMBAUGH, ROBERT M., Salina, Chemistry

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

BROWN, GREGORY N., Lexington, Agricultural Sciences
BURCKEL, ROBERT B., Louisville, Mathematics
DIERCKES, ALBERT C., Covington, Engineering
FANGMAN, WALTON L., Louisville, Physiology
HANLON, JAMES T., Ft. Thomas, Engineering
HERM, RONALD R., Louisville, Chemistry
KEISTER, WILLIAM P., Louisville, Engineering
LONG, WILLIAM S., Lexington, Biochemistry
MARRS, JO R., Nicholasville, Chemistry
SCHNEITER, GEORGE R., Louisville, Engineering
SUICH, JOHN E., Louisville, Engineering
WHITESIDES, GEORGE M., Anchorage, Chemistry

Cooperative Graduate

BEINEKE, THOMAS A., Ft. Thomas, Chemistry
CANON, ARDATH B., Murray, Chemistry
CARNIGHAN, ROBERT H., Louisville, Chemistry
CLARKE, FRANCIS R., Frankfort, Chemistry
CRAIG, DONALD F., Glasgow, Engineering
GRIGGS, EDWIN I., Lowes, Engineering
HAGYARD, MONA J., Lexington, Physics
HARP, ROLLIE J., Corbin, Mathematics
HOHMAN SR., BENEDICT, Louisville, Chemistry
KINCH, LAEL F., Lexington, Mathematics
LUCHETA, ROGER A., Louisville, Engineering
MONROE, BURT L., Jr., Anchorage, Zoology
MOORE, GEORGE C., Bowling Green, Physics
PERCY, PAUL S., Monticello, Physics
PORTER, MARCELLUS C., Louisville, Engineering
STAPLES, CODY E., Louisville, Chemistry
WATSON, MARTHA F., Murray, Mathematics

Summer Fellowships for Graduate Teaching Assistants

COOK, MAURICE G., Hatton, Agriculture
AMBROSE, HARRISON W., III, Lexington, Zoology
BOYD, CLAIRE L., Lexington, Biochemistry
JOHNSON, ROBERT S., Frankfort, Mathematics
KING, JERRY P., Murray, Mathematics
REKER, JOSEPH S., Louisville, Engineering
WILSON, FRED L., Murray, Physics

Postdoctoral

LAYSON, WILLIAM M., Millersburg, Physics
O'SULLIVAN, JOHN B., Lebanon, Earth Sciences

Science Faculty

BRADLEY, EUGENE B., Lexington, Physics
CRAIG, CECIL, Jr., South Fort Mitchell, Mathematics
HEER, JOHN E., Jr., Louisville, Engineering
LAFFERTY, JAMES F., Lexington, Engineering

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

CARROLL, KEITH J., New Iberia, Physics
CONWAY, EDWARD D., III, New Orleans, Mathematics
CONWAY, JOHN B., New Orleans, Mathematics
CRUMP, KENNY S., Haynesville, Engineering
DUCHAMP, DAVID J., St. Martinville, Chemistry
FERTEL, NORMAN S., New Orleans, Mathematics
FRICKEN, RAYMOND L., New Orleans, Physics
GRAHAM, EDWARD W., Natchitoches, Chemistry
HODGESON, JIMMIE A., Baker, Chemistry
MERRILL, SAMUEL, III, Bogalusa, Mathematics
PENNEY, DAVID E., New Orleans, Mathematics
PITTMAN, MICHAEL E., New Orleans, Physics
REVELLE, CAROLE L., Lake Charles, Psychology
WHARTON, JAMES H., Baton Rouge, Chemistry

Cooperative Graduate

ANDERSON, ALFRED P., Gonzales, Engineering
CALAMARI, TIMOTHY A., Jr., Baton Rouge, Chemistry
DENEY, CLIFFORD L., Jr., Natchitoches, Physics
FAGOT, HACKER J., Ponchatoula, Psychology
HEBERT, JOEL J., Jennings, Engineering
HUSSEY, ROBERT G., Shreveport, Physics
MASON, PERRY S., Baton Rouge, Chemistry
MATHEWS, HARRY T., New Orleans, Mathematics
SETTLES, RONALD D., Baton Rouge, Physics
TIMON, WILLIAM E., Jr., Natchitoches, Mathematics
YOUNG, WARREN L., Eunice, Chemistry

Summer Fellowships for Graduate Teaching Assistants

CHIPMAN, ROBERT K., New Orleans, Zoology
ALLEN, JOHN E., Jonesboro, Mathematics
AMBROSE, JAMES E., Baton Rouge, Zoology
EBERT, PAUL J., New Orleans, Physics
EIDSON, WILLIAM W., New Orleans, Physics
HAMILTON, JANET V., New Orleans, Chemistry
MACKEY, HENRY J., Baton Rouge, Physics
HOLDEMAN, JONAS T., Jr., Baton Rouge, Physics
PINTER, AELITA J., New Orleans, Biology
VEITH, DANIEL A., New Orleans, Physics

Postdoctoral

CHEETHAM, ALAN H., Baton Rouge, Earth Sciences
HOLLAND, WILBUR C., New Orleans, Mathematics

Science Faculty

COLE, GEORGE D., Thibodaux, Physics

CULP, WILLIAM C., Natchitoches, Earth Sciences
DOHSE, FRITZ E., Baton Rouge, Engineering
HANSON, MARVIN W., Shreveport, Chemistry
JOHNSON, DAVID E., Ruston, Mathematics
TURNER, HUMPHREYS T., Shreveport, Engineering
WALKER, HUGH S., Shreveport, Engineering

Summer Fellowships for Secondary School Teachers

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, Engineering
CLARK, ALTON H., Portland, Psychology
MOORE, JOHN S., Skowhegan, Physics
O'CONNOR, BRIAN R., Lewiston, Chemistry
SCOTT, SARAH V., Bar Harbor, Anthropology
TRAFTON, PAUL J., Southwest Harbor, Engineering

Cooperative Graduate

FURROW, STANLEY D., Bangor, Chemistry
HODSON, DAVID M., Old Town, Engineering
THORPE, JOHN A., Auburn, Mathematics
TOWNES, HARRY W., Auburn, Engineering

Summer Fellowships for Graduate Teaching Assistant

JOHNSON, BRUCE P., Lewiston, Physics

Science Faculty

BODINE, MARC W., Jr., Brunswick, Earth Sciences
CHITTIM, RICHARD L., Brunswick, Mathematics
HART, MRS. JEAN G., Orono, Mathematics

MARYLAND

Graduate

BLUM, EDWARD H., Silver Spring, Engineering
BRENNER, DOUGLAS, Chevy Chase, Physics
BROWN, ROBERT L., Kensington, Chemistry
BROWN, STANLEY G., Kensington, Physics
CLEMENT, DAVID E., Baltimore, Psychology
CLIFTON, H. EDWARD, Baltimore, Earth Sciences
DOBSON, PETER N., Jr., Baltimore, Physics
DOWLING, ELIZABETH E., Silver Spring, Physics
DWYER, THOMAS F., Baltimore, Engineering
FENTRESS, JOHN C., Chevy Chase, Biology
FERGUSON, JOHN D., Bishop Head, Mathematics
FRIEDMAN, WILLIAM A., Silver Spring, Physics
GAMMON, ROBERT W., Baltimore, Physics
HALL, BARBARA C., Baldwin, Social Sciences
HAZLETT, BRIAN A., District Heights, Zoology
HEBB, MATHIEDE J., Butler, Physics
HOLLAND, NICHOLAS D., Chevy Chase, Physiology
HUGHES, ANTHONY C., Catonsville, Mathematics
KAISER, MARTHA L., Ellicott City, Microbiology
KANTOR, PAUL B., Silver Spring, Physics
LAMPE, DONALD R., Baltimore, Engineering
LICHT, ARTHUR L., College Park, Physics
MELSON, WILLIAM G., East Riverdale, Earth Sciences
MILLERD, WILLIAM H., Jr., Baltimore, Physics
NOLEN, JERRY A., Jr., Aberdeen, Physics
NOLL, DAGMAR J., Baltimore, Mathematics
PARKER, REBECCA A., Washington, Physics
QUARLES, RICHARD H., Baltimore, Biochemistry
RECTOR, CHARLES W., Baltimore, Physics
RUSSEY, WILLIAM E., Baltimore, Chemistry
SINGLETERRY, ANN M., Bethesda, Mathematics
SMITH, DAVID A., Pocomoke City, Mathematics
STEINHARDT, RICHARD A., Chevy Chase, Physiology
STRATHDEE, JOHN A., Army Chemical Center, Physics
TAYLOR, HOWARD M., III, Baltimore, Mathematics
TEFFT, WAYNE E., Bethesda, Physics
TEPLITZ, VIGDOR L., College Park, Physics
WELLS, ROBERT, Bethesda, Mathematics
WING, CHARLES G., Baltimore, Oceanography

Cooperative Graduate

AKS, STANLEY, College Park, Physics
BEAN, RALPH J., Mt. Rainier, Mathematics
BRIODY, ROBERT G., Hagerstown, Chemistry
BURSEY, MAURICE M., Baltimore, Chemistry
CLAVELLI, LOUIS J., Hillcrest Heights, Physics
HARTLE, JAMES B., Baltimore, Physics
JULIAN, GLENN M., Hagerstown, Physics
KELLAM, JOHN M., Jr., Baltimore, Engineering
MADSEN, ERNEST L., District Heights, Physics
MCGRODDY, JAMES C., West Hyattsville, Physics
PRESNALL, DEAN C., Westgate, Earth Sciences
RITTER, MELVIN L., Lavale, Chemistry
SLIFKER, JAMES F., Baltimore, Mathematics
SPECTOR, MARSHALL, Baltimore, Social Sciences
WILKINSON, HERBERT S., Silver Spring, Engineering

Summer Fellowships for Graduate Teaching Assistants

COLE, FRANCIS E., Jr., Mt. Rainier, Microbiology
CARTER, WINFRED O., Lanham, Engineering

DuPont, Jacqueline L., Silver Spring, Biology
Gilbert, Walter J., Takoma Park, Physics
Gilmore, Maurice E., Bethesda, Mathematics
McGoldrick, Lawrence F., Baltimore, Engineering
Pittman, Kenneth A., College Park, Zoology
Spector, Marshall, Baltimore, Social Sciences

Postdoctoral

Adams, William H., Glen Burnie, Chemistry
Glick, Arnold J., West Hyattsville, Physics
Kanfer, Julian N., Silver Spring, Biochemistry
Lazarus, Maxine B., Baltimore, Biochemistry
Schneiderman, Lawrence, Bethesda, Genetics

Senior Postdoctoral

Carlson, Francis D., Baltimore, Biophysics
Sampson, Joseph H., Baltimore, Mathematics

Science Faculty

Callahan, Sr. M. Vincent, Baltimore, Chemistry
Ojalvo, Morris S., Silver Spring, Engineering
Reifman, Lucille K., Bethesda, Mathematics
Sexton, Phillip G., Baltimore, Engineering

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 Science

MASSACHUSETTS

Graduate

Albert, Richard H., Dorchester, Chemistry
Alperin, Jonathan L., Newton Centre, Mathematics
Austin, Michael E., Weymouth, Engineering
Baker, Kirby A., Winchester, Mathematics
Berger, Edmond L., Salem, Physics
Birmingham, Thomas J., Milford, Physics
Blumenthal, Ralph B., Cambridge, Physics
Bohmer, Harold, Jr., Amherst, Earth Sciences
Budnitz, Robert J., Pittsfield, Physics
Buffington, Andrew, East Walpole, Physics
Carroll, Alan S., Cambridge, Physics
Chase, Theodore, Jr., Dover, Biochemistry
Chesebrough, Carolyn, Needham, Genetics
Clauser, Milton J., Rolling Hills, Physics
Cleary, Richard T., Boston, Biochemistry
Coe, Robert S., Chatham, Earth Sciences
Coffey, John J., Watertown, Zoology
Comly, James B., Cambridge, Engineering
Cone, Albert A., Boston, Physics
Conlon, Lawrence W., Boston, Mathematics
Covitz, Frank H., Burlington, Chemistry
Cronin, David V., West Lynn, Engineering
Davison, Gerald C., Dorchester, Psychology
Doreman, Merlin, Newton Highlands, Engineering
Drinks, Janis, Newton Highlands, Mathematics
Earle, Elisabeth J., Cambridge, Botany
Evensen, David A., Gardner, Engineering
Federer, Charles A., Belmont, Agricultural Sciences
Feldman, Paul A., Chelsea, Physics
Ford, Dwain L., Lancaster, Biochemistry
Fuchs, Norman H., Boston, Physics
Fuglister, Frederick, Woods Hole, Mathematics
Gerstein, Ira S., Cambridge, Physics
Godchaux, Walter III, Cambridge, Biology
Goldstein, Steven N., Brookline, Physics
Grant, Walter J., Lawrence, Physics
Guertin, Ralph F., Indian Orchard, Physics
Guidotti, Charles V., Hudson, Earth Sciences
Guillemin, Victor W., Belmont, Mathematics
Hartshorne, Robert C., Cambridge, Mathematics
Impink, Albert J., Jr., Watertown, Engineering
Kalnajs, Agris J., Newton Centre, Astronomy
Kay, Paul D., Somerville, Anthropology
Kleiman, Steven L. Marblehead, Mathematics
Korenman, Victor, Cambridge, Physics
LaMarche, Valmore C., Brighton, Earth Sciences
Larsen, David M., Cambridge, Physics
Lockshin, Richard A., Northhampton, Physiology
Lynch, William T., Boston, Engineering
Masters, Stanley H., Winchester, Mathematics
McGoff, David J., Somerville, Engineering
Moore, Peter B., Brookline, Biophysics
Mutchler, Gordon S., Boston, Physics
Nelson, Ralph D., Jr., Westboro, Chemistry
Oatman, Barbara B., Cambridge, Psychology
Oberlander, Herbert, Revere, Physiology
Pankiwskyj, Kost A., Cambridge, Earth Sciences
Postma, Thomas E., Whitinsville, Engineering
Ralls, Kenneth M., Cambridge, Engineering
Rock, Peter A., Lowell, Chemistry
Rothkopf, Michael H., Boston, Social Sciences
Savin, Harris B., Newton Highlands, Psychology
Savin, Samuel M., Newton Highlands, Earth Sciences
Schultz, Martin H., Chestnut Hill, Mathematics
Segre, Gino C., Cambridge, Physics
Singer, Harvey A., Boston, Engineering
Southard, John B., Boston, Earth Sciences
Sullivan, Jeremiah D., Foxboro, Physics
Ward, Harold N., Cambridge, Mathematics
Warner, Frank W., III, Watertown, Mathematics

Warner, Jonathan R., Boston, Biophysics
Weiner, Stephen, D., West Newton, Physics
Weinstein, Herbert G., Swampscott, Engineering
Yegian, Charles D., Amherst, Biophysics

Cooperative Graduate

Alwitt, Robert S., Adams, Engineering
Augstkalns, Valdis A., North Adams, Engineering
Avery, Donald H., Winchester, Engineering
Black, Fischer S., Jr., Cambridge, Mathematics
Bonvini, Gladys H., Newtonville, Biology
Bowmar, Robert H., Canton, Mathematics
Burgiel, Joseph C., Ware, Physics
Chin, Gilbert Y., Brighton, Engineering
Chmura, Carol A., Chicopee, Earth Sciences
Cooke, Cynthia W., Needham Heights, Biochemistry
Daley, Henry O., Jr., Braintree, Chemistry
Deacon, Howard J., Jr., Quincy, Engineering
Dunleavy, James E., Jr., Amherst, Engineering
Fendell, Francis E., Brookline, Engineering
Foote, Stefanie V., Framingham, Social Sciences
Forslund, Robert P., Norwell, Engineering
Groblicki, Peter J., New Bedford, Chemistry
Henry, George R., Pittsfield, Physics
Herzberg, Norman P., Clinton, Mathematics
Hohenberg, Pierre C., Cambridge, Physics
Howe, Norman M., Jr., Princeton, Engineering
Keaveney, Paul F., Brookline, Chemistry
Kelley, Kevin J., Northampton, Engineering
Krueger, William H., Allston, Zoology
Lidsky, Lawrence M., Cambridge, Engineering
Lieberman, Burton B., Brookline, Mathematics
McClung, John B., Jr., Brockton, Engineering
Mills, Wayne A., Natick, Physics
Myrvaagnes, Rodney N., Winchester, Physics
Nelson, Charles H., Worcester, Chemistry
Nickerson, Earl R., Somerville, Mathematics
Noshkin, Victor E., Worcester, Chemistry
Nussmann, David G., Needham, Earth Sciences
O'Brien, Edward J., Lenox, Physics
Pasterczyk, Francis W., Chicopee Falls, Engineering
Peck, Newton T., Waban, Mathematics
Peirce, William B., Hanson, Engineering
Picard, Richard H., Hudson, Physics
Rhoades, Richard, G., Northampton, Engineering
Rousseau, William F., West Newton, Engineering
Savage, John E., Lynn, Engineering
Schmidt, John P., Holyoke, Engineering
Stolzenberg, Louis G., Cambridge, Mathematics
Sweetser, Judith, Norwell, Social Sciences
Tritter, Stephen D., Brookline, Engineering

Summer Fellowships for Graduate Teaching Assistant

Anderson, Samuel W., Cambridge, Psychology
Bertrand, Rene R., Leominster, Chemistry
Boutilier, Robert F., North Andover, Earth Sciences
Burke, James J., Jr., Northampton, Chemistry
Carlson, Arabelle P., Brookline, Chemistry
Cronin, Timothy H., West Roxbury, Chemistry
Donoghue, John T., Holyoke, Chemistry
Gauvin, Paul N., New Bedford, Chemistry
Liss, Robert H., Boston, Zoology
Hart, Nathan H., Cambridge, Zoology
Hedlund, Richard W., Worcester, Earth Sciences
Jetter, Katharine B., Wellesley Hills, Chemistry
Knee, David I., Cambridge, Mathematics
Michelson, Richard A., Amherst, Mathematics
Pearle, Philip M., Cambridge, Physics
Peck, Newton T., Waban, Mathematics
Reardon, John F., Boston, Chemistry
Wagner, Andrew J., Cambridge, Meteorology
Wallace, Robert B., Lynnfield Center, Psychology

Postdoctoral

Adam, Waldemar, Cambridge, Chemistry
Anderson, Charles H., Cambridge, Physics
Bienkowski, George K., Brighton, Engineering
Corn, Morton, Belmont, Engineering
Diamond, Jared M., Brookline, Biophysics
Dixon, William B., Fall River, Chemistry
Eigner, Joseph, Swampscott, Biochemistry
Hobey, William D., Peabody, Chemistry
Mathews, Micheline M., Cambridge, Microbiology
Rockett, Thomas J., Medford, Earth Sciences
Silver, Marc S., Amherst, Biochemistry
Strang, William G., Arlington Heights, Mathematics
Watson, Richard E., Brighton, Physics
Williams, Forman A., Bedford, Engineering

Senior Post Doctoral

Auslander, Maurice, Waltham, Mathematics
Buchi, George H., Cambridge, Chemistry
Ford, Kenneth W., Waltham, Physics

Science Faculty

Berman, Mildred, Malden, Earth Sciences
Bond, Robert S., Amherst, Agriculture
Durfee, William H., South Hadley, Mathematics
Dzialo, Frederick J., Amherst, Engineering
Hall, George E., South Hadley, Chemistry
Hayden, Seymour, Worcester, Mathematics
Knipp, Julian K., Medford, Physics
Moner, John G., Amherst, Biology
Murnane, John P., Springfield, Oceanography
O'Neill, Anne F., Norton, Mathematics
Sobala, Daniel, Amherst, Engineering

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
Bajema, Carl J., Grand Rapids, Genetics
Ball, Richard J., Owosso, Psychology
Beck, William F., Lansing, Engineering
Bickel, Thomas F., Detroit, Mathematics
Bufe, Charles G., Sault Ste. Marie, Earth Sciences
Buzzelli, Donald E., Detroit, Engineering
Carroll, Robert L., Mason, Biology
Coburn, Lewis A., Ann Arbor, Mathematics
Cornwell, George W., Sawyer, Zoology
Deibert, Max C., St. Johns, Engineering
DeWitt, Calvin B., Grand Rapids, Zoology
Ferrar, Joseph C., Okemos, Mathematics
Fettig, Lyle P., Petoskey, Social Sciences
Fischer, Patrick C., Ann Arbor, Mathematics
Foulser, David A., Ann Arbor, Mathematics
Genshaw, Marvin A., Petoskey, Chemistry
George, James P., Southfield, Physics
Gignac, Donald A., Detroit, Mathematics
Greenman, David L., Lansing, Physiology
Gussin, Gary N., Detroit, Biophysics
Guyer, Melvin J., Detroit, Psychology
Haas, Terry E., St. Johns, Chemistry
Hogh, Gottfried, Detroit, Zoology
Jokipii, Jack R., Ironwood, Physics
Keana, John F. W., Benton Harbor, Biochemistry
Kelly, Robert C., Kalamazoo, Chemistry
Kessler, David P., Ann Arbor, Engineering
Lazarov, Connor, Detroit, Mathematics
Lillya, Clifford P., Ann Arbor, Chemistry
Matwiyoff, Nicholas A., Rogers City, Chemistry
McIlrath, Thomas J., East Lansing, Physics
McVaugh, Michael R., Ann Arbor, Social Sciences
Mintz, Leigh W., Royal Oak, Earth Sciences
Mitchell, Lawrence C., Ann Arbor, Chemistry
Mummert, Vernon S., Brutus, Engineering
Opoka, Carolyn M., Wyandotte, Chemistry
Owens, James C., Grosse Pointe, Physics
Parizek, Robert J., Bay City, Engineering
Payne, Robert B., Niles, Zoology
Petrie, Ted E., Lansing, Mathematics
Robertson, Wayne M., Fremont, Engineering
Ross, David W., Detroit, Physics
Shultz, Wendell A., Hastings, Mathematics
Slobin, Dan I., Detroit, Psychology
Smith, Gene E., Ann Arbor, Engineering
Street, James R., Detroit, Engineering
Terhune, Kenneth W., East Lansing, Psychology
Trabasso, Thomas R., East Lansing, Psychology
Trebado, Paul A., Ann Arbor, Physics
Veech, William A., Pleasant Ridge, Mathematics
Webster, Dale A., Wyandotte, Biochemistry
Westerdale, Thomas H., Pontiac, Botany
Weston, Elizabeth A., Detroit, Biochemistry
Winkler, Herbert H., Farmington, Medical Sciences
Wiser, Nathan, Detroit, Physics
Wolf, Larry L., Midland, Zoology
Wolverton, Franklin B., Ann Arbor, Physics
Wood, Rodney D., Charlotte, Engineering
Zier, Robert E., Detroit, Psychology

Cooperative Graduate

Allard, Marvel J., East Lansing, Physics
Armstrong, Robert L., Kalamazoo, Engineering
Aubel, Joseph L., Lansing, Physics
Axelrod, Euegne H., Detroit, Chemistry
Babcock, Muriel L., Detroit, Zoology
Baldwin, Ransom L., East Lansing, Biology
Black, William L., Detroit, Engineering
Blass, William E., East Lansing, Physics
Bredeweg, Corwin J., Dorr, Chemistry
Briggs, James E., Ann Arbor, Engineering
Cantwell, John C., Detroit, Mathematics
Colpetzer, Thomas R., East Lansing, Engineering
Dunlap, Robert W., Ann Arbor, Engineering
Garland, Howard, Oak Park, Mathematics
Gillingham, Kent K., Ann Arbor, Medical Sciences
Grantner, Leonard J., Grand Blanc, Engineering
Hanna, Martin S., Birmingham, Mathematics
Harrison, Randall P., East Lansing, Social Sciences
Hrinevich, John, Jr., Flint, Engineering
Hunt, Robert H., Ann Arbor, Physics
Judson, Harlow M., Rockford, Engineering
Kaler, James B., Ann Arbor, Astronomy
Kania, Henry J., Detroit, Biology
Kazdan, Jerry L., Oak Park, Mathematics
Knutson, Roger M., East Lansing, Botany
Lemay, Joseph L., Ann Arbor, Engineering
Lindman, Harold R., Ann Arbor, Psychology
Little, Robert E., Inkster, Engineering
Luehrs, Dean C., Lansing, Chemistry
Marckwardt, Judith M., Ann Arbor, Earth Sciences
McKinney, Norris P., Ann Arbor, Social Sciences
Posner, Michael I., Ann Arbor, Psychology
Randall, Charles M., East Lansing, Physics
Reverski, Carol J., Ann Arbor, Psychology
Richardson, Robert W., Ann Arbor, Physics
Rosenfeld, Robert L., Jackson, Engineering
Ryan, Mark E., Bad Axe, Chemistry
Sarason, Donald E., Detroit, Mathematics
Schwartz, Alan S., Detroit, Engineering
Schwartz, Harlow W., Hopkins, Engineering
Siebert, Sheila G., Ann Arbor, Psychology
Silbar, Richard R., Fenton, Physics
Slovic, Stewart P., Ann Arbor, Psychology
Summerfield, George C., East Lansing, Physics
Walsh, Bertram J., Ann Arbor, Mathematics
Wilson, Carol M., Detroit, Biochemistry
Wolfson, Seymour J., Detroit, Physics
Wolsey, Wayne C., Battle Creek, Chemistry
Zinn, Karl L., Marshall, Psychology

Summer Fellowships for Graduate Teaching Assistants

Corbett, Gail A., Ann Arbor, Botany
Andrews, George H., Ann Arbor, Mathematics

AUBEL, JOSEPH D., Lansing, Physics
BELL, FREDERICK W., Detroit, Social Sciences
BERNSTEIN, STANLEY C., Ann Arbor, Chemistry
CVANCARA, ALAN M., Ann Arbor, Earth Sciences
DEHARDT, DORIS C., East Lansing, Psychology
DILLMAN, CHARLES D., Detroit, Social Sciences
DUBES, RICHARD C., East Lansing, Engineering
DUGGER, HARRY A., Ann Arbor, Chemistry
GRAHAM, SHIRLEY A., Grand Blanc, Botany
GULLAHORN, JEANNE E., East Lansing, Psychology
HATFIELD, ELAINE C., Detroit, Psychology
HEINSOHN, ROBERT J., East Lansing, Engineering
HERTEL, GEORGE R., Harper Woods, Chemistry
HILL, RONALD A., East Lansing, Physics
HOOVER, WILLIAM G., Ann Arbor, Chemistry
HOPPE, RONALD A., East Lansing, Psychology
HOUSTON, ANN H., Ann Arbor, Zoology
ISTOCK, CONRAD A., Grosse Pointe Woods, Zoology
MARTENS, HINRICH R., East Lansing, Engineering
MERCER, MARVIN R., Ann Arbor, Psychology
NIEDZIELSKI, ROBERT J., Bay City, Chemistry
PONCHIE, JEANPIERRE M., Dearborn, Social Sciences
TER HAAR, GARY L., Ann Arbor, Chemistry
TERHUNE, KENNETH W., East Lansing, Psychology
THOMPSON, RICHARD W., East Lansing, Psychology
RAMSEY, JAMES H., Detroit, Mathematics
SEBASTIAN, LOIS P., Ann Arbor, Psychology
SHRIVER, DUWARD F., Ann Arbor, Chemistry
SMITH, PAUL E., Ann Arbor, Social Sciences
STIMMEL, DAVID T., Ann Arbor, Psychology
WIER, KAREN E., Iron Mountain, Earth Sciences
WIRTH, JOHN L., East Lansing, Engineering

Postdoctoral

BROWN, MORTON, Ann Arbor, Mathematics
HODGES, RONALD W., Lansing, Zoology
KIRSCH, JACK F., Detroit, Biochemistry
MCKNIGHT, LEE G., Ann Arbor, Chemistry
SCHUMACHER, CLIFFORD R., Detroit, Physics
SMART, JOHN R., East Lansing, Mathematics
STEWARD, OMAR W., Midland, Chemistry
VAN PUTTEN, JAMES D., Jr., Ann Arbor Physics

Senior Postdoctoral

COON, MINOR J., Ann Arbor, Chemistry
HAYS, WILLIAM L., Ann Arbor, Mathematics
WRIGLEY, CHARLES F., East Lansing, Psychology

Science Faculty

BLUMAN, DEAN E., East Lansing, General Science
BOLT, JAY A., Ann Arbor, Engineering
CHAFFEE, WILLIAM B., East Lansing, Physics
CLOCK, DANIEL A., Marquette, Mathematics
DURBETAKI, PANDELI, East Lansing, Engineering
DYE, JAMES L., East Lansing, Chemistry
JOHNSON, KENSIE R., Houghton, Engineering
KAUFMAN, KURT D., Kalamazoo, Biochemistry
KEARNS, ROBERT W., Detroit, Engineering
MAHAN, HAROLD D., Mt. Pleasant, Zoology
MCCULLY, JOSEPH C., Kalamazoo, Mathematics
NORRIS, DOUGLAS M., Jr., Jackson, Engineering
NORTHEY, JAMES H., Ypsilanti, Mathematics
TURNER, WALTER W., Detroit, Mathematics
VANWESTENBURG, JOHN A., Houghton, 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. Z., Mason, Biology
HAM, JOHN B., Grand Rapids, Biology
HARMON, MO. 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. ANDRETTA, 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
ANSHUS, BYRON E., Minneapolis, Engineering
ARNESON, RICHARD M., Minneapolis, Zoology
BERG, JOHN C., Hopkins, Engineering
BLACK, MARY B., Minneapolis, Anthropology
COHEN, ROBERT R., Duluth, Zoology
CONE, RICHARD A., St. Paul, Physics
DEUTSCHE, CRAIG W., Minneapolis, Chemistry
DRATZ, EDWARD A., Minneapolis, Chemistry
ECKLUND, STANLEY D., Minneapolis, Physics
FRIEDMAN, LAWRENCE B., Duluth, Chemistry
FRISTEDT, BERT E., Hopkins, Mathematics
GAMELIN, THEODORE W., Robbinsdale, Mathematics
GORDON, STANLEY L., Walnut Grove, Engineering
GRANZBERG, GARY R., St. Paul, Anthropology
HAJICEK, JAMES D., Minneapolis, Physics
JANZEN, DANIEL H., Minneapolis, Zoology
JENSEN, TIMOTHY B., Minneapolis, Engineering
LOKEN, JAMES G., Minneapolis, Physics
LOWRY, THOMAS H., Minneapolis, Chemistry
MCKENZIE, DOUGLAS H., Minneapolis, Anthropology
NEWMAN, RILEY D., St. Paul, Physics

PTASHNE, MARK S., Minneapolis, Biophysics
PULKRABEK, WILLARD W., St. Paul, Engineering
RUSH, KENT R., Minneapolis, Chemistry
SCHLEINITZ, HENRY M., DULUTH, Engineering
SCHULTZ, GERALD E., Minneapolis, Earth Sciences
SOMMER, DAVID C., St. Paul, Mathematics
SOUTHWICK, DAVID L., Rochester, Earth Sciences
STRYK, ROBERT A., St. Paul, Physics
SWANSON, STANLEY M., St. Paul, Physics
TAUER, SR. RITA J., St. Paul, Mathematics
THOMAS, PAUL J., St. Paul, Biochemistry
THURNAUER, PETER G., St. Paul, Physics
UBITAM, REIN A., Moorhead, Physics
WHITE, ROSCOE B., Minneapolis, Physics
WILLETT, ROGER D., Northfield, Chemistry

Cooperative Graduate

AMBS, LAWRENCE L., Minneapolis, Engineering
ANGELICI, ROBERT J., Rochester, Chemistry
BECKER, PHILIP M., Minneapolis, Engineering
BEEKMAN, JOHN A., St. Paul, Mathematics
BRAUN, CHARLES L., Minneapolis, Chemistry
BRODSKY, STANLEY J., St. Paul, Physics
DUSSERE, PAUL L., Moorhead, Mathematics
EFRON, BRADLEY, St. Paul, Mathematics
EKROOT, CHARLES G., Duluth, Engineering
FLEMING, DAVID P., Minneapolis, Engineering
GAUSTAD, JOHN E., Minneapolis, Astronomy
GROVE, LARRY C., Minneapolis, Mathematics
HAIGHT, CHARLES H., Minneapolis, Engineering
HELLING, ROBERT B., Madelia, Genetics
HEUER, CHARLES V., Bertha, Mathematics
JOHNSON, LELAND G., Hadley, Zoology
KIRCHNER, ROGER B., Minneapolis, Mathematics
KLAY, ROBERT F., St. Paul, Agricultural Sciences
KLINE, KENNETH A., Minneapolis, Engineering
LANGE, ROBERT G., Pipestone, Mathematics
LEVINE, JAMES L., Minneapolis, Physics
MIDDAUGH, MICAL E., Minneapolis, Zoology
OAKES, THOMAS R., Minneapolis, Chemistry
ORIEL, PATRICK J., Stillwater, Chemistry
PFITZER, KARL A., Duluth, Physics
RECK, GENE P., Minneapolis, Chemistry
SAPPENFIELD, DALE S., Minneapolis, Chemistry
TORVIK, PETER J., Minneapolis, Engineering
VANDERZIEL, JAN P., Minneapolis, Engineering
VENNIX, ALAN J., South St. Paul, Engineering
VISTE, ARLEN E., Austin, Chemistry
WALKER, JAMES F., Jr., Minneapolis, Physics

Summer Fellowships for Graduate Teaching Assistants

COFFMAN, ROBERT E., Minneapolis, Chemistry
BEAUDOIN, JEAN M., Duluth, Engineering
BLOCK, DOUGLAS A., East Grand Forks, Earth Sciences
GREEN, SANDRA J., Coleraine, Zoology
GROVE, LARRY C., Minneapolis, Mathematics
HEUER, CHARLES V., Bertha, Mathematics
MCANDREWS, JOHN H., St. Paul, Biology
PARKER, HELEN M., St. Paul, Chemistry
VENNIX, ALAN J., South St. Paul, Engineering
RECK, GENE P., Minneapolis, Chemistry
SATHER, DUANE P., Minneapolis, Mathematics

STORMS, HOWARD A., Ada, Chemistry
WEINMANN, JOAN M., Granada, Chemistry
WOOD, JOHN B., Minneapolis, Mathematics
WOODBURY, GEORGE W., Jr., Minneapolis, Chemistry

Postdoctoral

ARONSON, DONALD G., Minneapolis, Mathematics
CAMPBELL, DAVID P., St. Paul, Psychology
DAWES, CLINTON J., Robbinsdale, Botany
GARLAND, WILLIAM, Minneapolis, Anthropology
RICHTER, MARCEL K., St. Paul, Mathematics
THOMPSON, TRAVIS I., St. Paul, Psychology

Senior Postdoctoral

BRASTED, ROBERT C., Minneapolis, Chemistry
JOHNSTON, LAWRENCE H., Minneapolis, Physics
OREY, STEVEN, Minneapolis, Mathematics

Science Faculty

ANDERSON, LEROY T., Minneapolis, Engineering
ROSSING, THOMAS D., Northfield, Physics
STANAITIS, OTONAS E., Northfield, Mathematics
STENSTROM, ROBERT C., Minneapolis, Mathematics

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
BROAD, ANNE L., Jackson, Biology
MURPHY, JAMES L., Pontotoc, Mathematics
MURRILL, PAUL W., Jackson, Engineering
NAMKOONG, GENE, Gulfport, Genetics
ROGERS, CECIL A., Jr., Jackson, Psychology

Cooperative Graduate

CAVIN, RALPH K., Natchez, Engineering
DAVIS, WILLIAM M., Columbus, Genetics
HOLLAND, HUGH O., Jr., Louisville, Chemistry
LOWTHER, JAMES D., Jackson, Engineering
MCCAIN, MICHAEL L., Merigold, Engineering
POUNDS, DONNIE J., Booneville, Engineering
RICKS, JAMES V., Jr., Greenwood, Engineering
SIMPSON, WILBURN D., Jackson, Physics
SUBER, LEWIS A., Jr., Jackson, Engineering
TROTTER, JAMES D., Bolton, Engineering

Summer Fellowships for Graduate Teaching Assistants

HARRIS, RICHARD B., Jackson, Social Sciences
ROBINSON, JAMES V., Jr., Laurel, Psychology
ROSSO, SAMUEL W., Centreville, Botany
WILKINSON, KENNETH P., Starkville, Social Sciences

Postdoctoral

HUDSON, ANNE L., Inverness, Mathematics

Science Faculty

CARNES, WALTER R., State College, Engineering
GRACE, EDWARD E., Corinth, Mathematics
LEWIS, JESSE C., Jackson, Mathematics

Summer Fellowships for Secondary School Teachers

AUSTIN, GLADYS, Meridian, Biology
BEGLEY, GRACE B., Jackson, General Science
DANIEL, ARMY, Jr., Jackson, General Science
GOODGAME, LUCILE H., Laurel, Mathematics
JONES, DOROTHY LOUISE, Canton, Biology
LEWIS, ROBERT L., Hattiesburg, Microbiology
LEWIS, RUTH TODD, Okolona, General Science
TILLMAN, MARGARET H., Bruce, General Science
WILSON, WILLIAM RAY, Port Gibson, Mathematics

MISSOURI

Graduate

BAILEY, RICHARD C., St. Louis, Engineering
BERGMAN, ROBERT K., Columbia, Physiology
BRIDGER, ROBERT F., Joplin, Chemistry
DOIG, MARILYN L., Independence, Mathematics
ECKERT, CHARLES A., St. Louis, Engineering
ELSON, ELLIOT L., Ladue, Biochemistry
FORNEY, G. DAVID, Jr., St. Louis, Engineering
FRANKEL, RICHARD B., Columbia, Chemistry
HERKSTROETER, WILLIAM, St. Louis, Chemistry
HIATT, VIVIAN S., Florissant, Zoology
JONES, LEE B., Caruthersville, Chemistry
KREBS, CHARLES J., St. Louis, Biology
KWENTUS, GERALD K., Kirkwood, Engineering
LAUGHLIN, PATRICK R., St. Louis, Psychology
MCMAHON, LEE E., St. Louis, Psychology
MUNCH, JOHN H., Webster Groves, Chemistry
MYERS, WAYNE W., St. Louis, Biochemistry
NANCE, JON R., Springfield, Physics
PARKHURST, LAWRENCE J., Kansas City, Chemistry
STONE, HAROLD S., Clayton, Engineering

Cooperative Graduate

BALL, WILLIAM F., Slater, Physics
BARNETT, DONALD L., Hannibal, Mathematics
BROWN, LARRY N., Springfield, Zoology
BUMCROT, ROBERT J., Columbia, Mathematics
CONRAD, JOSEPH R., Bowling Green, Chemistry
COOK, ROBERT A., University City, Mathematics
FLACHSBART, BARRY B., St. Louis, Engineering
HAGEN, DAVID C., St. Louis, Engineering
KRONE, WILLIAM J., St. Louis, Engineering
LICKEY, MARVIN E., Marshall, Psychology
LUCKETT, WINTER P., Kansas City, Zoology
MCCOOL, DONALD K., Cameron, Engineering
MCNEES, ROBERT S., Kansas City, Chemistry
MYERS, THOMAS W., Liberal, Engineering
ROSENBERGER, FREDERICK, Kirkwood, Engineering
SCHRAUTEMEIER, BERNARD, St. Louis, Physics
STEINER, EUGENE F., Columbia, Mathematics
THORP, JAMES S., Kansas City, Engineering
WOLF, LAWRENCE J., St. Louis, Engineering
WOLFF, CAROLE E., Columbia, Social Sciences

Summer Fellowships for Graduate Teaching Assistants

BUMCROT, ROBERT J., Columbia, Mathematics
CRAIG, WILLIAM W., Excelsior Springs, Earth Sciences
LONG, LELAND L., Rolla, Engineering
HANSEN, SPENST M., Rolla, Earth Sciences
HAZEL, JOSEPH E., Caruthersville, Earth Sciences
JONES, LEE B., Caruthersville, Chemistry
JONES, PETER F., Kansas City, Chemistry
MERSMANN, HARRY J., St. Louis, Zoology
VANSANT, CARL A., Clinton, Engineering
ROSSNER, LAWRENCE F., University City, Physics
SCHRAUTEMEIER, BERNARD, St. Louis, Physics
STARR, NORTON L., Kansas City, Mathematics
STEINER, EUGENE F., Columbia, Mathematics
WELLING, DAN J., St. Louis, Physics

Postdoctoral

ASKEY, RICHARD A., St. Louis, Mathematics
HARMONY, MARLIN D., Kansas City, Chemistry
NUSSBAUM, ADOLF E., University City, Mathematics

Senior Postdoctoral

BOOTHBY, WILLIAM M., St. Louis, Mathematics.
LARK, KARL G., St. Louis, Zoology
LEVITT, JACOB, Columbia, Botany
SEGAL, HAROLD L., St. Louis, Biochemistry

Science Faculty

BENNINGFIELD, LLOYD M., Columbia, Engineering
CAUDLE, RODNEY D., Rolla, Engineering
GERBER, CHARLES E., St. Louis, Engineering
GOLDHABER, JACOB K., St. Louis, Mathematics
HANSEN, PETER G., Rolla, Engineering
LAGO, GLADWYN V., Columbia, Engineering
NOWACKI, C. R., Rolla, Engineering
SHELTON, GEORGE C., Columbia, Medical Sciences
THOMAS, JAMES F., Jr., Marshall, Physics

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
HIX, SR. PATRICIA M., St. Louis, Mathematics

HOGER, CHARLES E., St. Louis, Zoology
MAGRUDER, WILLIS J., Kirksville, General Science
MCCORMICK, SR. M. AUSTIN, 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 Science

MONTANA

Graduate

IHLER, GARRET M., Great Falls, Biochemistry
RENNE, ROGER L., Bozeman, Mathematics
VINCELETTE, RICHARD R., Billings, Earth Sciences

Cooperative Graduate

HUFF, NORMAN T., Sunburst, Chemistry
KRUEGER, DAVID A., Sidney, Physics
MOUNTAIN, RAYMOND D., Billings, Physics
NELSON, RICHARD L., Shelby, Engineering
SACKETT, GARY G., Bozeman, Mathematics
SILVER, JACK H., Missoula, Mathematics

Summer Fellowships for Graduate Teaching Assistants

CLAUSEN, CARLA R., Missoula, Microbiology
BINGHAM, RALPH L., Missoula, Mathematics
CAMERON, DAVID G., Great Falls, Biology

Science Faculty

CAUGHLAN, GEORGEANNE R., Bozeman, Physics
DURNFORD, ROBERT F., Bozeman, Engineering
GERRY, HENRY E., Bozeman, Chemistry

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

ANDERSEN, JOHN P., Omaha, Mathematics
BAUER, WILLIAM R., McCook, Chemistry
BOLAR, MARLIN L., Lincoln, Botany
CASSEL, DAVID G., Ainsworth, Physics
FRAHM, RICHARD R., Lyman, Agricultural Sciences
GRADWOHL, DAVID M., Lincoln, Anthropology
MCARTHUR, DONALD E., Lincoln, Physics
WRIGHT, BRADFORD L., Lincoln, Physics

Cooperative Graduate

ANDERSON, JOHN S., Kearney, Biochemistry
ANDERSON, SONIA R., Omaha, Biochemistry
BARNES, AARON, Omaha, Physics
DANKLEFF, MARY A., Avoca, Chemistry
HERZOG, JOHN O., Lincoln, Mathematics
LAETSCH, THEODORE W., Seward, Physics
LANG, WAYNE W., Lincoln, Physics
PARK, JOHN T., Lincoln, Physics
SCHUTZ, WILFRED M., Eustis, Genetics
SKOV, CHARLES E., Riverdale, Physics

Summer Fellowships for Graduate Teaching Assistants

BECKERBAUER, RICHARD, Lincoln, Chemistry
HERZOG, JOHN O., Lincoln, Mathematics
SWANSON, JAMES A., Aurora, Chemistry
SULLIVAN, GEORGE A., Lincoln, Physics

Postdoctoral

BLEICHER, MICHAEL N., Omaha, Mathematics
HOLCOMB, DAVID N., Hartington, Chemistry
WORLOCK, JOHN M., Kearney, Physics

Science Faculty

HANSEN, PAUL V., Jr., Blair, Chemistry
MOORE, CARROLL L., Lincoln, Astronomy
WILSON, LELAND Y., Lincoln, Chemistry

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

SIBBALD, GARTH H., Reno, Social Sciences

Summer Fellowships for Secondary School Teachers

ANDERSON, HOWARD V., Hawthorne, Mathematics
STEERE, BOB FARREL, Las Vegas, Biology

NEW HAMPSHIRE

Graduate

BROWN, VERNE R., Dover, Engineering
ROBINSON, PETER, Hanover, Earth Sciences
WING, HAROLD C., Concord, Engineering

Cooperative Graduate

RUTLEDGE, EDWARD F., Dublin, Psychology
TUTTLE, ELIZABETH R., Conway, Physics

Summer Fellowships for Graduate Teaching Assistant

BEAUDOIN, RICHARD L., Manchester, Zoology
LAVINE, WILLIAM S., Dover, Zoology
MORRIS, JOHN R. II, Durham, Chemistry
VALLIERE, ELAINE S., Berlin, Zoology
STIMSON, RONALD M., Dover, Chemistry

Science Faculty

CLARK, RONALD R., Durham, Engineering
LONG, CARL F., Hanover, Engineering
LYONS, JOHN B., Hanover, General Science

Summer Fellowships for Secondary School Teachers

COSTELLO, SR. M. BEATRICE, Manchester, Biology
PELLETIER, SR. MARIE C., Hudson, Biology

NEW JERSEY

Graduate

ANAGNOSTAKIS, CHRISTO, Princeton, Mathematics
BENNETT, JAMES H., Princeton, Mathematics
BERNER, ROBERT A., Leonia, Earth Sciences
BURK, CREIGHTON A., Princeton, Earth Sciences
CALDWELL, DENNIS J., Penns Grove, Chemistry
CALLAN, CURTIS G., Jr., Little Silver, Physics
CARLSMITH, JAMES M., Summit, Psychology
CASSIDY, PATRICK J., Atlantic Highlands, Chemistry
CHAIKEN, JAN M., Rahway, Physics
COBURN, STEPHEN P., Summit, Biochemistry
CONRAD, PETER W., East Rutherford, Engineering
DAVIS, BRIAN T., Princeton, Earth Sciences
FAHRNEY, DAVID E., Fort Lee, Biochemistry
FLEISCHMAN, WILLIAM M., East Orange, Mathematics
FORREST, HELEN E., Upper Montclair, Zoology
FRIEDMAN, KENNETH A., Highland Park, Physics
GEORGE, ALBERT R., Jr., Princeton, Engineering
GILL, HELEN K., West Englewood, Biochemistry
GLASHAUSSER, CHARLES, Glen Ridge, Physics
GRAF, RONALD E., Passaic, Physics
HAND, BRYCE M., Jersey City, Earth Sciences
HARTUNG, ROLF, Fairlawn, Zoology
HAYS, JAMES F., Short Hills, Earth Sciences
HECHTEL, MAUREEN A., Irvington, Microbiology
HINNERS, NOEL W., Chatham, Earth Sciences
HOLZWARTH, GEORGE M., Westfield, Biophysics
HUBER, DAVID L., Toms River, Physics
HUTCHINSON, JOHN W., Bridgeton, Engineering
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
KREPS, RODNEY E., Princeton, Physics
LAMOLA, ANGELO A., Newark, Chemistry
LAWRENCE, DAVID R., Pitman, Earth Sciences
LOMET, DAVID B., Oakhurst, Biophysics
MERRILL, DEANE W., JR., South Orange, Physics
MILLMAN, MICHAEL G., Summit, Physics
MOLLOW, BENJAMIN R., Union, Physics
NOBLE, JAMES J., Mount Holly, Chemistry
PICARD, MEREDITH D., Princeton, Earth Sciences
PILLA, MICHAEL A., Trenton, Engineering
POAGE, JAMES F., Morristown, Engineering
PRICE, BARBARA J., Fort Monmouth, Anthropology
ROGERS, JOSEPH E., JR., Moorestown, Chemistry
SEYBOLD, PAUL G., Collingswood, Biophysics
SINNIS, JAMES, Hoboken, Physics
STEVENS, RICHARD M., Audubon, Chemistry
THIESSEN, HENRY A., Dumont, Physics
ULLRICH, FELIX T., Cranford, Physics
VEZZETTI, DAVID J., Hoboken, Physics
VILMS, JURI, Seabrook, Engineering
VINCZ, GLORIA A., Fords, Physiology
WAGONER, ROBERT V., JR., West Englewood, Engineering
YONKERS, KATHERINE E., Mountain Lakes, Biology

Cooperative Graduate

ANDREWS, PETER B., Tenafly, Mathematics
BRADY, PETER M., Jr., West Orange, Mathematics
BURKE, JAMES A., Andover, Astronomy
CHARLAP, LEONARD S., Penns Grove, Mathematics
COHEN, JACK K., Newark, Mathematics
COZZARELLI, NICHOLAS R., Jersey City, Medical Sciences
DEDOMINICIS, ALEX J., Union City, Chemistry
FESQ, ROBERT M., Teaneck, Mathematics
FISHER, CYNTHIA J., New Brunswick, Zoology
FLANIGAN, FRANCIS J., Jersey City, Mathematics
FRIEDMAN, MARCELLE, Newark, Mathematics
GOLD, HARRY S., Pennsauken, Engineering
HALPERN, GERALD M., Jersey City, Physics
HILL, DAVID B., Hoboken, Mathematics
HOLSTEN, RICHARD D., Pennington, Biology
JEFFERSON, JAMES W., Westwood, Medical Sciences
JOHNSTON, DAVID L., Livingston, Engineering
KOWAL, ROBERT R., Rochelle Park, Botany
LASIEWSKI, ROBERT C., Maywood, Zoology
MCLEO, THOMAS J., Teaneck, Mathematics
PELIOS, ANGELO, North Plainfield, Mathematics
PERRY, CLARK W., Ridgefield, Chemistry
POLAND, DOUGLAS C., Westfield, Chemistry
PROGELHOF, RICHARD C., West Orange, Engineering
QUILLEN, DANIEL G., East Orange, Mathematics
RABINOWITZ, PAUL H., Hillside, Mathematics
SEITCHIK, JEROLD A., Merchantville, Physics
STALLARD, CAROLYN, Towaco, Botany
STERN, STEPHEN M., North Bergen, Engineering
WEISS, STEPHEN M., Newark, Mathematics
WESSELY, ROBERT M., New Brunswick, Physics
ZENACK, NATHAN B., Bloomfield, Engineering
ZIRKEL, EUGENE J., Bayonne, Mathematics

Summer Fellowships for Graduate Teaching Assistant

CHARLAP, LEONARD S., Penns Grove, Mathematics
BODKIN, RONALD G., Wenonah, Social Sciences
FORREST, HELEN F., Upper Montclair, Zoology
FRANKE, CHARLES H., Bloomfield, Mathematics
GORRES, BYRON T., Princeton, Chemistry
GURST, JEROME E., Margate City, Chemistry
LIBERA, RICHARD J., New Brunswick, Mathematics
HEWITSON, WALTER M., Neptune, Botany

KARLSSON, MARGARET A., River Edge, Chemistry
KIEFER, RALPH W., Clinton, Engineering
LANDI, VINCENT R., Skillman, Chemistry
MANNING, ROBERT E., Paramus, Chemistry
MEINZER, RICHARD A., Hanover, Chemistry
MICALE, MARIE T., Belmar, Chemistry
PURYEAR, STANLEY R., Asbury Park, Mathematics
ROBINSON, LEWIS, Beach Haven, Chemistry
ROTH, LORRAINE L., New Brunswick, Psychology
STRUZYNSKI, RAYMOND E., Jersey City, Physics
WESSELY, ROBERT M., New Brunswick, Physics

Postdoctoral

ADLER, ALFRED W., Franklin Park, Mathematics
BARTH, ROBERT H., Jr., Ridgewood, Physiology
BURNS, GEORGE, Princeton, Chemistry
DOLOTTA, THEODORE A., Millburn, Engineering
EISENBERG, ADI, Princeton, Chemistry
ERNEST, JOHN A., Princeton, Mathematics
GLUCK, HERMAN R., Princeton, Mathematics
GREENLEAF, NEWCOMB, Princeton, Mathematics
KALLENBACH, NEVILLE R., West New York, Chemistry
KESSEL, ROSSLYN W., New Brunswick, Microbiology
KOLTUN, DANIEL S., Princeton, Physics
MANNING, ROBERT E., Paramus, Chemistry
POSNER, MARTIN, Princeton, Physics
SOVERS, OJARS J., Princeton, Chemistry
VAUGHAN, WORTH E., Tenafly, Chemistry
WOLFF, STEPHEN S., Princeton, Engineering

Senior Postdoctoral

BOSTICK, WINSTON H., Hoboken, Physics
GROSS, PAUL R., Leonia, Microbiology
LIEHR, ANDREW D., Morristown, Chemistry
MAXWELL, JOHN C., Princeton, Earth Sciences
STRAUSS, ULRICH P., New Brunswick, Chemistry

Science Faculty

DELLATORRE, EDWARD, New Brunswick, Physics
JOHNSON, EBEN L., East Orange, Earth Sciences
MCGAR FRANK H., Jr., New Brunswick, Physics
MOLONY, DONALD A., New Brunswick, Engineering

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. PHILOTHEA, 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

ATKINSON, WILLIAM W., Albuquerque, Earth Sciences
BERGSTRESSER, THOMAS, Los Alamos, Physics
DIEBOLD, ROBERT E., Los Lunas, Physics
DOWDLE, JOHN R., Deming, Mathematics
EGBERT, LARRE N., Los Alamos, Genetics
EMRICH, ROBERT L., Gallup, Anthropology
HARRIS, ARTHUR H., Albuquerque, Zoology
SHLAER, WILLIAM J., Los Alamos, Physics
THOMPSON, RICHARD S., Hobbs, Physics
WALSH, JOSEPH M., Santa Fe, Biochemistry

Cooperative Graduate

CONVERSE, GLENN L., Albuquerque, Engineering
GARCIA, MARGOT W., Albuquerque, Physiology
MOTT, DAVID L., Las Cruces, Physics

Summer Fellowships for Graduate Teaching Assistants

DIXON, HOBART N., Santa Fe, Biology
GENNARO, ANTONIO L., Albuquerque, Zoology
MITCHELL, ALFRED R., Las Cruces, Mathematics
WILLIAMS, FRANK M., Las Cruces, Mathematics

Postdoctoral

KINGSBURY, CHARLES A., Albuquerque, Chemistry

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., New York, Physics
AUER, HENRY E., New Rochelle, Biochemistry
BARASH, NAOMI E., Brooklyn, Mathematics
BARSHAY, JACOB, Brooklyn, Mathematics
BATT, RUSSELL H., Jamestown, Chemistry
BAUM, PAUL F., New York, Mathematics
BECK, BERNARD, Bronx, Social Sciences
BECKER, MARTIN, New York, Engineering
BERGER, ROBERT, Freeport, Engineering
BERNOLD, STANLEY, Flushing, Earth Sciences
BISHOP, ALISON, Ithaca, Zoology

BODE, RAYMOND R., Valley Stream, Engineering
BOYLAN, EDWARD S., New York, Mathematics
BRAGG, LINCOLN E., Orchard Park, Mathematics
BRAU, CHARLES A., Malverne, Engineering
BREGSTONE, EDWARD, Brooklyn, Engineering
BREINDEL, BARRY, New York, Engineering
BRENDEL, PHILIP J., Woodside, Engineering
BRESLAU, MICHAEL, Troy, Engineering
BRODO, IRWIN M., New York, Botany
CANN, ROSS S., Brooklyn, Earth Sciences
CASEY, KENNETH P., Jackson Heights, Mathematics
COHEN, NATALIE S., Floral Park, Long Island, Biology
COOK, DAVID M., Troy, Physics
COOK, STEPHEN A., Clarence, Mathematics
CORNWELL, ROBERT G., Rochester, Physics
CRIM, DONALD E., Ithaca, Anthropology
DALY, DANIEL F., Brooklyn, Physics
DANCIS, JEROME, Brooklyn, Physics
DEWSBURY, DONALD A., Wantagh, Psychology
DONNELLY, JOSEPH P., Brooklyn, Engineering
DORFMAN, BEN ZION, Brooklyn, Botany
DUSHMAN, MIRIAM B., New York, Biophysics
ECKHART, WALTER, Yonkers, Biophysics
EINBINDER, HERBERT M., Far Rockaway, Physics
EISENBERG, JUDAH M., Forest Hills, Physics
EISENSTEIN, BOB I., New York, Physics
ENGELS, JOAN C., Malverne, Earth Sciences
FALTZ, LEONARD M., Bronx, Mathematics
FEIN, BURTON I., Brooklyn, Mathematics
FELDMAN, MARTIN, Brooklyn, Physics
FENNESSEY, JAMES P., North Syracuse, Chemistry
FETZ, EBERHARD E., Troy, Physics
FINE, TERRENCE L., Bronx, Engineering
FRANCO, VICTOR, New York, Physics
FREED, JACK H., Brooklyn, Chemistry
FREY, JEFFREY I., Brooklyn, Engineering
FRIEDBERG, RICHARD M., New York, Physics
FRIEDMAN, DAVID, Brooklyn, Mathematics
FRUCHTBAUM, HAROLD, Brooklyn, Social Sciences
GASTWIRTH, JOSEPH L., Rego Park, Mathematics
GEIST, GRACE E., Forest Hills, Mathematics
GENTNER, DONALD R., Springville, Chemistry
GEOGHAN, ROBERT E., Brooklyn, Mathematics
GERSTEN, STEPHEN M., Utica, Mathematics
GEWIRTZ, STEPHEN J., Brooklyn, Mathematics
GEZELTER, JOSEPH, New York, Physics
GINSBERG, EDWARD S., New York, Physics
GINSBERG, JONATHAN I., Forest Hills, Mathematics
GLAUBERMAN, GEORGE, Richmond Hill, Mathematics
GLAUBIGER, DANIEL L., Brooklyn, Mathematics
GOLDIN, KENNETH D., Staten Island, Social Sciences
GOLDHABER, ALFRED S., Bayport, Physics
GOLDMAN, JAY R., Brooklyn, Mathematics
GOLDSTEIN, ROBERT, South Ozone Park, Engineering
GOLUB, ROBERT, New York, Physics
GOODMAN, JOHN M., Ithaca, Physics
GOTTLIEB, JOAN A., Brooklyn, Mathematics
GRAPPEL, SARAH F., Brooklyn, Microbiology
GREEN, MICHAEL E., Brooklyn, Biochemistry
GREENEBAUM, MICHAEL, Brooklyn, Physics
GREIBACH, SHEILA A., New Rochelle, Mathematics
GROSSBERG, STEPHEN, Jackson Heights, Mathematics
GROSSMAN, DAVID D., New York, Physics
GUNTHER, LEON, Brooklyn, Physics
HALPERIN, BERTRAND I., Cambridge, Physics
HANDEL, DAVID, Flushing, Long Island, Mathematics
HARRIS, CHARLES S., Great Neck, Psychology
HAVENDER, WILLIAM R., New York, Genetics
HECKEL, PHILIP H., Rochester, Earth Sciences
HEIKO, LANCE, K., New York, Physics
HEILWEIL, BERNARD H., New York, Engineering
HEIMBURG, RICHARD W., Tonawanda, Engineering
HERZOG, STANLEY, New York, Engineering
HICKS, NANCY E., Staten Island, Physics
HILL, CHARLES G., Jr., Elmira, Engineering
HIRSCH, ELI, Brooklyn, Social Sciences
HOLTZMAN, ERIC, Bronx, Zoology
HOLZSAGER, RICHARD A., New York, Mathematics
HYLAND, MICHAEL J., New York, Engineering
HYMAN, EMILE, Flushing, Physics
INKELES, DAVID M., Lawrence, Social Sciences
IRVING, DAVID C., Plymouth, Physics
ISAACS, IRVING M., Bronx, Mathematics
JAFFE, ARTHUR M., Pelham, Physics
KAHN, PETER J., Forest Hills, Mathematics
KAHN, ROBERT E., Flushing, Engineering
KAMMER, ANN E., Auburn, Zoology
KAPLAN, LEONARD, Bronx, Chemistry
KASDAN, JOHN M., New York, Mathematics
KASTL, ALBERT J., New York, Psychology
KATCHER, ALAN M., Brooklyn, Engineering
KELLY, DAVID C., New Rochelle, Mathematics
KENDALL, ROBERT L., Rochester, Zoology
KENNISON. JOHN F., St. Albans, Mathematics
KOHLER, WERNER E., Yonkers, Engineering
KRIEGER, JOSEPH B., Brooklyn, Physics
KRIPKE, BERNARD R., Scarsdale, Mathematics
KRUBINER, ALAN M., Bronx, Chemistry
LANDMAN, MAURICE A., Jamaica, Mathematics
LANFORD, OSCAR E., III, Castleton-on-Hudson, Physics
LASHER, RICHARD J., Germantown, Engineering
LESK, ARTHUR M., Brooklyn, Biophysics
LEVINE, IRA N., Brooklyn, Chemistry
LEVINE, RHEA C., Brooklyn, Physiology
LEVITCH, ROY U., Buffalo, Engineering
LEVY, PETER M., New York, Engineering
LEWIN, RUTH L., New York, Chemistry
LITT, FREDRIC A., New York, Chemistry
LOGCHER, ROBERT D., Scarsdale, Engineering
LOGEMANN, GEORGE W., New York, Mathematics
LUBKIN, SAUL, Brooklyn, Mathematics
LUKS, EUGENE M., Brooklyn, Mathematics
LUTTMANN, FREDERICK W., Chappaqua, Mathematics
LYNCH, BEN E., Horseheads, Physics
MALTZ, HENRY, Brooklyn, Chemistry
MANSON, STEVEN T., Brooklyn, Physics
MARGOLISH, MERRY A., New Rochelle, Biophysics
MARTINELLI, MICHAEL A., Brooklyn, Physics
MATLIN, ARNOLD H., Brooklyn, Psychology
McAVOY, THOMAS J., Neponsit, Engineering
McCARTHY, DONALD J., Brooklyn, Mathematics
McGUIRE, ODELL S., Syracuse, Earth Sciences

MEININGHAUS, ARLYN R., Lancaster, Chemistry
MEYERS, CHARLES J., New York, Psychology
MICHAEL, JOE V., Rochester, Chemistry
MIKE, JOHN C., Flushing, Physics
MILLER, EDWARD J., Rochester, Biophysics
MILLER, JOHN C., Lockport, Mathematics
MILLER, RICHARD C., Bellmore, Engineering
MOLDOVER, MICHAEL R., New York, Physics
MOPSIK, FREDERICK I., Forest Hills, Chemistry
MOSHER, CHARLES H., Scotia, Engineering
MULLER, RICHARD L., Brooklyn, Mathematics
NEWMAN, FRED M., Flushing, Physics
NEWMAN, GABRIELLE C., New York, Social Sciences
O'BRIEN, JOHN A., Staten Island, Engineering
O'CONNELL, WILLIAM J., Brooklyn, Physics
ORMAN, JUDITH A., Flushing, Mathematics
OSTON, STEVEN G., Bayside, Engineering
PALKA, YVONNE S., Jackson Heights, Zoology
PARKER, WILLIAM L., Clinton, Chemistry
PARSEGIAN, VOZKEN A., Troy, Biophysics
PASSMAN, DONALD S., Bronx, Mathematics
PERRIN, ROBERT P., New York, Physics
PIRKLE, WILLIAM H., Rochester, Chemistry
PLATEK, RICHARD A., Brooklyn, Mathematics
PLOWS, WILLIAM H., Flushing, Mathematics
POLLACK, HELEN S., New York, Psychology
POLLACK, JAMES B., Woodmere, Physics
POLLATSEK, ALEXANDER, New York, Chemistry
PRESS, MARK, Brooklyn, Chemistry
PRILL, DAVID D., Buffalo, Mathematics
RADOWSKI, ALFRED F., New York, Physics
RALEIGH, EDWARD W., Ithaca, Chemistry
RAPP, WILLIAM V., New York, Social Sciences
REYNOLDS, BRO. JOSEPH, Troy, Engineering
RICHER, IRA, New York, Engineering
RIES, LILLIAN L., Beechhurst, Engineering
ROSE, RICHARD M., Port Washington, Psychology
ROSEN, ALLAN J., New York, Chemistry
ROTHMAN, JUNE L., Forest Hills, Microbiology
RUBENFELD, FRANK A., New York, Psychology
RUNG, ROBERT, College Point, Engineering
SALTHE, STANLEY N., Brooklyn, Zoology
SCHABTACH, GRETCHEN, Schenectady, Zoology
SCHMEIDLER, ROBERT J., Hastings-on-Hudson, Mathematics
SCHULMAN, JEROME M., New Rochelle, Chemistry
SCHULZ, M. RICHARDS, New York, Botany
SCHWEITZER, PAUL J., Elmont, Physics
SEGEL, IRWIN H., Staten Island, Biochemistry
SHANNON, RICHARD T., New York, Mathematics
SHARP, DAVID H., Buffalo, Physics
SHELUPSKY, DAVID I., Brooklyn, Physics
SHERMAN, JOHN D., Horseheads, Engineering
SHORE, HERBERT B., Brooklyn, Physics
SIGMAN, DAVID S., Rego Park, Chemistry
SILVERMAN, MICHAEL, Brooklyn, Mathematics
SOCOLOW, ROBERT H., New York, Physics
SOLAND, RICHARD M., Bronx, Mathematics
SOLOVAY, ROBERT M., Brooklyn, Mathematics
SPIEGEL, EUGENE, Brooklyn, Mathematics
SPIVAK, Michael D., Jamaica, Mathematics
ST. GEORGE, JOHN P., New York, Chemistry
STEEN, LYNN A., Staten Island, Mathematics
STENARD, CHARLES E., Watertown, Mathematics
STOLLER, GERALD S., Brooklyn, Mathematics
STRAUSS, WALTER A., Kew Gardens, Mathematics
STREETER, SERENO S., New York, Earth Sciences
SUSSMAN, RUTH P., New York, Biochemistry
SUTHERLAND, IVAN E., Scarsdale, Engineering
TANNENBAUM, MICHAEL J., Bronx, Physics
TITTERTON, PAUL J., Farmingdale, Long Island, Physics
TOWELL, DAVID G., Fillmore, Earth Sciences
VALLEE, JAMES A., Oriskany, Biology
VOGEL, STEVEN, Beacon, Zoology
WEBB, JULIAN P., Rochester, Physics
WEINER, ROBERT A., Brooklyn, Physics
WEINMAN, ROBERT W., Brooklyn, Physics
WEISBERGER, WILLIAM I., Scarsdale, Physics
WEISSTEIN, NAOMI, New York, Psychology
WOJCIK, JOHN F., Ithaca, Chemistry
WOJTASZEK, JOSEPH H., Rochester, Physics
WORTIS, MICHAEL, New York, Physics
WRATTEN, CRAIG C., Snyder, Biochemistry
WRIGHT, JACKSON S., Bronx, Mathematics
ZVENGROWSKI, PETER D., New York, Mathematics
ZWILLENBERG, MELVIN L., Brooklyn, Engineering

Cooperative Graduate

ABRAMSON, LYNN S., New York, Chemistry
ALLIS, JOHN W., Buffalo, Chemistry
ANASTASIO, SALVATORE, Brooklyn, Mathematics
BAILYN, PAUL M., New York, Mathematics
BEARDSLEY, CLYDE L., Elmira, Mathematics
BEINE, GEORGE E., Rochester, Engineering
BELL, HOWARD E., Medusa, Mathematics
BENTSEN, IRVING O., Amenia, Mathematics
BERKLEY, DAVID A., New York, Physics
BLOOM, CLIFFORD O., New York, Mathematics
BOLKER, ETHAN D., Brooklyn, Mathematics
BRANCAZIO, PETER J., Flushing, Physics
BREGMAN, JACK M., Kew Gardens, Chemistry
BRIENZA, MICHAEL J., Mount Vernon, Physics
BROOKS, DAVID W., Brooklyn, Chemistry
BUEHL, WALTER M., Niagara Falls, Engineering
BUEHLER, HERBERT H., Glendale, Engineering
CAPRIO, JAMES R., Niagara Falls, Engineering
CASLER, LAWRENCE R., New York, Psychology
COWLEY, ARTHUR M., Manhasset, Engineering
CURRIE, DOUGLAS G., Rochester, Physics
DAUBER, PHILIP S., Brooklyn, Engineering
DAUM, WALTER, Yonkers, Mathematics
DENHARDT, DAVID T., Scarsdale, Biophysics
DIAMENT, PAUL, Brooklyn Engineering
DIAMOND, PETER A., Woodmere, Social Sciences
DICARLO, JAMES A., Buffalo, Physics
DIETZ, RUSSELL N., Wantagh, Engineering
DOWD, PAUL, New York, Chemistry
EASTON, PAUL D., New York, Physics
FADEN, ARNOLD M., New York, Social Sciences
FARARO, THOMAS J., Syracuse, Social Sciences
FAWCETT, JAMES T., Yonkers, Psychology
FELDMAN, PAUL D., Floral Park, Physics

FINKEL, ROBERT W., Bronx, Physics
FINNERTY, ANTHONY E., Brooklyn, Chemistry
FOX, JOEL S., Brooklyn, Engineering
FREEMAN, LESLIE G., JR., New City, Anthropology
FREUND, ISAAC, New York, Chemistry
FRIEDMAN, DAVID H., Long Beach, Engineering
FULMER, RICHARD H., Manlius, Physics
GAHAN, ANTHONY B., New York, Anthropology
GALANIDES, OTTO, Elmhurst, Psychology
GARDNER, LAURENCE T. Jr., New York, Mathematics
GARROD, CLAUDE, Bronx, Physics
GELMAN, HARRY, Bronx, Physics
GILLARY, HOWARD L., Flushing, Zoology
GLICKFELD, BARNETT W., New York, Mathematics
GLOVER, DIANA R., Rochester, Chemistry
GOLDFELD, STEPHEN M., Brooklyn, Social Sciences
GOLDREICH, PETER M., Ithaca, Physics
GOLDSTEIN, ROBERT P., Binghampton, Engineering
GORDON, MYRA, Mount Vernon, Chemistry
GRAHAM, PAUL W., Corning, Engineering
GREEN, PAUL S., New York, Mathematics
GREENBLATT, ROBERT, Brooklyn, Mathematics
HALEY, PAUL H., Buffalo, Engineering
HAMMER, ROBERTA E., Brooklyn, Biochemistry
HANSER, FREDERICK A., Whitestone, Physics
HASKINS, DAVID E., Great Neck, Engineering
HEINEMANN, HERMAN M., Franklin Square, Long Island, Engineering
HERMAN, HARVEY B., Syracuse, Chemistry
HIRSCH, PETER, Brooklyn, Engineering
HOLMAN, ERIC W., New York, Psychology
HUBER, LAWRENCE J., Buffalo, Mathematics
JOHNSON, STANLEY L., Ithaca, Biochemistry
JORDAN, THOMAS F., Rochester, Physics
KASSIN, KENNETH M., Bronx, Mathematics
KEEN, LINDA J., Brooklyn, Mathematics
KNOBE, PEARL A., Bronx, Psychology
KNOWLTON, FREDERICK F., Springville, Biology
KRESGE, DAVID T., Ithaca, Social Sciences
KUBIS, JOSEPH J., Queens, Physics
KUBY, GEORGE H., New York, Mathematics
LAMPORT, LESLIE B., New York, Mathematics
LANGE, RAYMOND J., Buffalo, Chemistry
LEVENTHAL, JOAN B., Brooklyn, Physics
LICHTENBAUM, STEPHEN, Brooklyn, Mathematics
LINTON, FRED E. J., New York, Mathematics
LIPPERT, ALAN, New York, Engineering
LOPER, DAVID E., Oswego, Engineering
LOVELAND, DONALD W., Rochester, Mathematics
LOWENTHAL, FRANKLIN, New York, Mathematics
LUTZ, CHARLES A., West Hempstead, Chemistry
LYON, DORENE D., Cazenovia, Biology
MALAMY, MICHAEL H., Bronx, Microbiology
MARCUS, BRUCE D., Ithaca, Engineering
MARGOLIS, FRANK L., Brooklyn, Biochemistry
MAZO, JAMES E., Syracuse, Physics
MCGIBNEY, DONALD J., Bronx, Physics
MCGOWAN, JON G., Silver Creek, Engineering
MCINERNEY, THOMAS J., Bronx, Mathematics
MELNICK, JACK D., New York, Physics
MERZ, ANTONY W., New York, Mathematics
MILSTEIN, SANDRA, Bronx, Psychology
MORMINO, THOMAS A., Staten Island, Mathematics
MOSES, FRED, Brooklyn, Engineering
MOSHER, ROBERT E., Larchmont, Mathematics
MOSS, ROBERT A., Flushing, Chemistry
MULLER, ROBERT A., Syracuse, Earth Sciences
NAGER, JOEL A., Jamaica, Mathematics
NEWMAN, STEVEN S., Baldwin, Physics
NOE, RALPH W., New York, Chemistry
NOVICK, AARON J., Brooklyn, Physics
OLSEN, PHILIP F., Binghamton, Engineering
OLSHAKER, ARNOLD E., Brooklyn, Engineering
PAINE, DWIGHT M., Albion, Mathematics
PARKER, ALFRED B., Jamestown, Earth Sciences
PECORA, ROBERT, Brooklyn, Chemistry
PENCHINA, CLAUDE M., New York, Physics
PERLMUTTER, HOWARD D., Brooklyn, Chemistry
PERUN, THOMAS J., Binghamton, Chemistry
PORTER, GERALD J., Ithaca, Mathematics
POSIN, ROBYN L., Brooklyn, Psychology
PRATT, SUSAN A., Rochester, Biology
RADINSKY, LEONARD B., Staten Island, Earth Sciences
RAFFEL, HELEN, New York, Social Sciences
RAYMONDA, JOHN W., Utica, Chemistry
READIO, PHILIP D., Ithaca, Chemistry
REILLY, SR. MARGUERITE, Albany, Zoology
REYNOLDS, DONALD P., Ithaca, Engineering
RIGGS, JOHN P., Ithaca, Engineering
ROSENBAUM, HANNAH L., Brooklyn, Mathematics
ROSENSTARK, JEANNETTE, Bronx, Mathematics
RUBIN, STANLEY G., Brooklyn, Engineering
SALINGER, RUDOLF M., Lynbrook, Chemistry
SALOMONE, RAMON A., New York, Chemistry
SANDBERG, ROLLIN T., Lakewood, Mathematics
SAVINI, CHARLES G., Port Washington, Engineering
SAXE, BERNHARD D., Flushing, Chemistry
SCHER, HARVEY, Syracuse, Physics
SHAPIRO, CHARLES S., Syracuse, Physics
SHERRY, EDWIN J., New York, Mathematics
SHPIZ, JOSEPH M., New York, Physics
SIBNER, LESLEY M., Brooklyn, Mathematics
SIBNER, ROBERT J., Brooklyn, Mathematics
SILVERT, WILLIAM L., New York, Physics
SIMMS, JULIET R., Brooklyn, Zoology
SIROVICH, CAROLE H., New York, Mathematics
SKLAR, LAWRENCE, Laurelton, Social Sciences
SLAVIN, LAWRENCE M., Yonkers, Engineering
SMALL, AUDREY M., New York, Chemistry
SNOW, WOLFE, Brooklyn, Mathematics
SNYGG, JOHN, Oswego, Mathematics
SONSHINE, RICHARD M., Yonkers, Engineering
STAHL, HAROLD M., New York, Physics
STEFFENS, CAROL A., Spring Valley, Anthropology
STEIN, SAMUEL H., Brooklyn, Chemistry
SWARTZ, JEROME, Brooklyn, Engineering
TEIGER, MARTIN L., Brooklyn, Physics
TILSON, SEYMOUR, New York, Earth Sciences
TRAGER, GEORGE W., Buffalo, Biochemistry
TROEH, FREDERICK R., Ithaca, Agriculture
TURNER, ROBERT E., New York, Mathematics
VANDER, STOUW GERALD G., Rochester, Chemistry
WALTON, DANIEL C., Syracuse, Physiology
WEINBAUM, SHELDON, Brooklyn, Engineering

WEINGOLD, HARRIS D., New York, Engineering
WELDON, EDWARD J., Tuckahoe, Engineering
WHALLON, ROBERT E., Jr., Averill Park, Anthropology
WORTIS, ROCHELLE P., New York, Psychology
WROBEL, JOSEPH S., Solvay, Physics
ZAUDERER, ERICH, New York, Mathematics
ZEH, DALE W., Buffalo, Engineering
ZIMMERMAN, MICHAEL, Great Neck, Mathematics

Summer Fellowships for Graduate Teaching Assistants

COSCIA, CARMINE J., Mount Vernon, Chemistry
COUFAL, JAMES E., Syracuse, Agriculture
ARONOWITZ, FREDERICK, Brooklyn, Physics
BANK, STEVEN B., Middle Village, Mathematics
BASILE, DOMINICK V., Yonkers, Botany
BELT, EDWARD S., Glen Cove, L.I., Earth Sciences
BERNECKER, RICHARD R., Ithaca, Chemistry
BEUERMAN, DAVID R., Kenmore, Mathematics
BIESTERFELDT, HERMAN J., Woodhaven, Mathematics
BLAKELY, RUTH M., Ithaca, Genetics
BLEIHOLDER, ROLAND F., Floral Park, Chemistry
DUSHMAN, MIRIAM B., New York, Biophysics
FINK, RICHARD D., New Rochelle, Chemistry
FOLCHETTI, JOHN R., Brewster, Earth Sciences
FOWLER, GARY L., Syracuse, Social Sciences
GARDNER, ALBERT H., Syracuse, Psychology
GATCHELL, CHARLES J., Syracuse, Engineering
GENTNER, ROBERT F., College Point, Chemistry
GOLDSTEIN, JULIUS L., Rochester, Engineering
GORDON, MYRA, Mount Vernon, Chemistry
GRAFF, ROBERT A., New York, Engineering
HAMEL, BERNARD B., Brooklyn, Engineering
LEIBOWITZ, GERALD M., New York, Mathematics
LESSIE, THOMAS G., College Point, Microbiology
LIND, MAURICE D., Jamestown, Chemistry
HOPENS, THEODORE, New York, Mathematics
HUNDERFUND, RICHARD C., Pearl River, Microbiology
JOHNSON, DONALD E., Ithaca, Engineering
JURINSKI, NEIL B., Buchanan, Chemistry
KINLOCH, JOHN, New York, Mathematics
KUNSTMANN, MARTIN P., Rochester, Chemistry
LANDO, JUDAH L., New York, Chemistry
LANG, FRANK T., Long Island, Chemistry
MARSHALL, RALPH J., North Tonawanda, Mathematics
MAZO, JAMES E., Syracuse, Physics
MILLER, DAVID C., New York, Physics
MONTZKA, THOMAS A., Penfield, Chemistry
NAUS, JOSEPH I., New York, Mathematics
PARISH, ROGER C., Utica, Chemistry
PAULSEN, PAUL J., Ithaca, Chemistry
PORTER, GERALD J., Ithaca, Mathematics
PRIEN, ROBERT F., Syracuse, Psychology
RAFANELLI, KENNETH R., Astoria, L.I.C., Physics
TAVEL, MORTON A., Brooklyn, Physics
RECHER, HARRY F., Roslyn Heights, Biology
REYNOLDS, DONALD P., Ithaca, Engineering
RIEFFEL, MARC A., New York, Mathematics
RITVO, CYNTHIA S., Buffalo, Mathematics
SCHEE, HARVEY, Syracuse, Physics
SILK, SUSAN T., New York, Chemistry
STAHL, HAROLD M., New York, Physics
STEIN, SAMUEL H., Brooklyn, Chemistry
STERN, SAMUEL T., Kenmore, Mathematics
STUBER, JOAN E., Yonkers, Chemistry
VOSBURG, ALBERT C., Rochester, Mathematics
WARREN, WILLIAM E., Cortland, Engineering
WEISS, JONAS, New York, Chemistry
WRIGHT, CHARLES J., Hector, Chemistry
WYZALEK, MONICA J., Binghamton, Mathematics
YASSO, WARREN E., Brooklyn, Earth Sciences

Postdoctoral

ALPERT, SEYMOUR, New York, Medical Sciences
ARNUSH, DONALD, New York, Physics
BANDER, MYRON, St. Albans, Physics
BARDASIS, ANGELO, New York, Physics
CIRIACKS, KENNETH W., Mamaroneck, Earth Sciences
COOPERSMITH, MICHAEL H., Ithaca, Physics
DENNIS, FRANK G., Jr., Ithaca, Agriculture
DHRYMES, PHOEBUS J., Valley Stream, Social Sciences
FIDDLEMAN, PAUL B., Brooklyn, Psychology
GREENE, SAMUEL L., Syracuse, Physics
GRUHN, RUTH E., Cornwall on Hudson, Anthropology
HARRINGTON, DAVID R., North Tonawanda, Physics
KLEIMAN, HERBERT, Brooklyn, Physics
KRETCHMAR, LARRY H., Rochester, Medical Sciences
MARSHALEK, EUGENE R., Hollis, Physics
NAUENBERG, MICHAEL, New York, Physics
POSKANZER, AUTHUR M., Bellport, L.I., Chemistry
PUGH, EVAN R., New Rochelle, Physics
REICHLIN, MORRIS, Bronx, Medical Sciences
ROSEN, SAMUEL M., Bronx, Medical Sciences
ROTH, JESSE, Lake Mohegan, Medical Sciences
SACHS, EUGENE, Rochester, Physiology
SACKS, GERALD E., Woodridge, Mathematics
SCHALIT, LEWIS M., New York, Chemistry
SCHILDKRAUT, CARL L., Woodmere, Biochemistry
TETELMAN, ALAN S., New York, Engineering
WITONSKY, PHILIP, Bellerose, Biochemistry
YESAIR, DAVID W., Suffern, Biochemistry

Senior Postdoctoral

ARGYRIS, THOMAS S., Syracuse, Zoology
BIGELEISEN, JACOB, Bayport, Chemistry
CONWAY, HARRY D., Ithaca, Engineering
ELLIOTT, JOANNE, New York, Mathematics
LENNOX, EDWIN S., New York, Biochemistry
LEWONTIN, RICHARD C., Rochester, Genetics
WIDOM, BENJAMIN, Ithaca, Chemistry
WILLIAMS, ROBIN M., Jr., Ithaca, Social Sciences

Science Faculty

BARBERA, MARGARET J., Brooklyn, Zoology
BATTIN, WILLIAM J., Jr., Potsdam, Engineering
BERNABEI, BR. A., Riverdale, Physics
CLARKE, REV. ARTHUR A., New York, Mathematics
CULLEN, CHARLES G., Watkins Glen, Mathematics
CURRAN, PETER M., New York, Mathematics
DAVIS, ALPHEUS G., Potsdam, Mathematics

HEIM, LOUISE M., Garden City, Biology
KEAR, EDWARD B., Jr., Potsdam, Engineering
LOWEN, WALTER, Albany, Engineering
MCLEAN, LESLIE D., Hempstead, Mathematics
MEYER, PAUL R., New York, Mathematics
MULLIGAN, REV. JOSEPH F., New York, Physics
PENNOCK, ROGER Jr., Albany, Agriculture
RUOFF, ARTHUR L., Ithaca, Engineering
SHARFSTEIN, HARVEY B., Brooklyn, Engineering
SHEFFER, HOWARD E., Albany, Chemistry
SMITH, SIGMUND A., Brockport, Mathematics
WHITE, MARY V., Ithaca, Chemistry
WYLIE, RUTH C., Bronxville, 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 Science
GAFFNEY, SR. KATHERINE B., Bardonia, Chemistry
GERLOCK, FRANK GEORGE, Nyack, Biology
GESLAK, FRANK W., Chateaugay, General Science
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 Science
JAFFE, BENJAMIN, New York, Mathematics
KELLNER, SR. MARIA, Rochester, Chemistry
KLEI*, 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
RITE, 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 Science
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

BARKER, ROBERT H., Chapel Hill, Chemistry
BRITTAIN, JERE A., Horse Shoe, Agricultural Sciences
CARLTON, TERRY S., Reidsville, Chemistry
CROWDER, BILLY L., Greensboro, Chemistry
DAVIS, HOWARD T., Hendersonville, Chemistry
GARRISON, DAVID Q., Charlotte, Mathematics
GIBBS, HYATT M., North Wilkesboro, Physics
GRIFFITHS, PHILLIP A., Raleigh, Mathematics
HAPPER, WILLIAM Jr., Lenoir, Physics
JONES, THOMAS L., Brevard, Engineering
KOLODNY, WILLIAM P., Charlotte, Mathematics
KOWAL, NORMAN E., Durham, Botany
MARK, FRANCES G., Durham, Chemistry
MINK, LAWRENCE A., Winston-Salem, Physics
ROBERTS, BRYAN W., Hillsboro, Chemistry
RUSH, LEWIS O., Jr., Asheboro, Mathematics

Cooperative Graduate

COCKE, WILLIAM J., III, Asheville, Physics
COUCHELL, GUS P., Charlotte, Physics
FALLAW, WALLACE C., Hillsboro, Earth Sciences
GUMPERT, PETER, Asheville, Psychology
HAMPTON, KENNETH G., Winston-Salem, Chemistry
HILL, JAMES C., Hendersonville, Engineering
JACKSON, PHILIP S., Pittsboro, Physics
KIMEL, JACOB D., Jr., Winston-Salem, Physics
MICHAEL, WILLIAM B., Bostic, Physics
ROSENSTEIN, GEORGE M., Jr., Durham, Mathematics
SCHELL, KERRY F., Durham, Agricultural Sciences
THOMAS, VIRGINIA C., Asheville, Chemistry
WORK, STEWART D., Durham, Chemistry

Summer Fellowships for Graduate Teaching Assistants

BOWERS, DONALD E., Charlotte, Physiology
CHAMPION, ROY L., Jr., Wilson, Physics
CROWDER, BILLY L., Greensboro, Chemistry
DIAL, STEVE C., Landis, Biology
DOTSON, ALLEN C., Badin, Physics
DOVE, LEWIS D., Durham, Botany
DOWDLE, JOSEPH C., Raleigh, Engineering
LEWIS, ROBERT G., Morehead City, Chemistry
NIXON, DAVID E., Raleigh, Mathematics

PEARCE, ROBERT G., Henderson, Engineering
PEARSON, JOSEPH T., Jr., Raleigh, Engineering
PLYLER, DANIEL B., Gastonia, Botany
TAYLOR, ALEX O., Durham, Physics

Science Faculty

BRINSON, HALBERT F., Raleigh, Engineering
GARCIA, BERTRAM H., Jr., Raleigh, Engineering
GARDNER, WILLIAM H., Jr., Durham, Engineering
MOBLEY, JEAN B., Red Springs, Mathematics
SMALLWOOD, CHARLES, 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

SCHEIBE, PAUL O., Marion, Engineering
SPANDE, THOMAS F., Mayville, Chemistry
THOMPSON, BETTY C., Voltaire, Chemistry
UTGAARD, JOHN E., Minot, Earth Sciences

Cooperative Graduate

ANDERSON, LYNN B., Fargo, Mathematics
DICKIE, RAY A., Grand Forks, Chemistry
ELLIS, BRUCE W., Jamestown, Physics
FELDMANN, RODNEY M., Grand Forks, Earth Sciences
JOHNSTON, MARGERY A., Fargo, Botany
MASON, EARL S., Grand Forks, Engineering
MCCULLOUGH, JOHN W., Fargo, Engineering

Summer Fellowships for Graduate Teaching Assistants

BLAKE, SHIRLEY, Fargo, Chemistry
ISAACSON, WILLIAM B., Minot, Engineering
JOHNSTON, MARGERY A., Fargo, Botany
PETTERSEN, JAMES C., Grand Forks, Zoology
SCHAUBERT, JACKIE A., Bowdon, Engineering
WINGER, DONLEY J., Mayville, Engineering

Science Faculty

MCLEOD, GORDON K., Jamestown, Physics

Summer Fellowships for Secondary School Teachers

JACOBSON, ROBERT L., Grand Forks, Mathematics
OLLENBURGER, ALVIN W., Wimbledon, Mathematics

OHIO

Graduate

ADMAN, RAYMOND L., Dayton, Biochemistry
ANKENBRANDT, CHARLES, Cleveland, Physics
ARGUS, CAROL J., Columbus, Physics
BARGER, JAMES E., Toledo, Engineering
BEAN, ANITA M., Yellow Springs, Genetics
BLOOM, SANFORD G., Columbus, Engineering
BRABSON, BENNET B., Findlay, Physics
BRIGHT, MARY A., Lima, Mathematics
CARPENTER, RICHARD N., Cleveland, Chemistry
CHANEY, ROBIN W., Columbus, Mathematics
CONNOR, DANIEL S., Cleveland, Chemistry
COOPER, PAUL D., Worthington, Earth Sciences
DIXON, ROBERT D., Columbus, Mathematics
ELLIS, DAVID G., Marietta, Physics
FARISON, JAMES B., McClure, Engineering
FLETCHER, JOSEPH A., Jr., Canton, Engineering
FLOMENHOFT, HUBERT I., Columbus, Engineering
FRANKS, DORIS J., Dover, Zoology
GINAVEN, ROBERT O., Akron, Physics
GLESER, LEON J., Cincinnati, Mathematics
GORDON, ROY G., Akron, Physics
GREENBERG, WILLIAM M., Toledo, Physics
HAMILTON, JOHN T., Dayton, Physics
HAMMER, LOIS R., Yellow Springs, Psychology
HEINZ, RICHARD M., Toledo, Physics
HEMPFLING, WALTER P., Cincinnati, Microbiology
HOLMES, FREDERIC L., Cincinnati, Social Sciences
HORN, WILLIAM A., Cincinnati, Mathematics
HRIBAR, JOHN R., Madison, Engineering
JACKSON, MICHAEL G., Chagrin Falls, Agricultural Sciences
JONES, ALLAN E., Columbus, Engineering
KOVAR, FREDERICK R., Cleveland, Physics
KREIMER, HERBERT F., JR., Cincinnati, Mathematics
KRIZEK, DONALD T., Garfield Heights, Botany
KUEMPEL, PETER L., Cincinnati, Biochemistry
KUTCHER, JAMES W., East Cleveland, Physics
LAZDINS, DAGNIJA, Delaware, Chemistry
LEVY, RICHARD M., Cincinnati Chemistry
LOBLIGER, DAVID A., Wooster, Chemistry
MACMAHON, JAMES A., Dayton, Biology
MARELUF, GEORGE A., Columbus, Genetics
MAWBY, JOHN E., Dayton, Earth Sciences
MENGERT, PETER H., Painesville, Physics
MILLER, DAVID L., Cincinnati, Chemistry
MILLER, STEVEN R., Westlake, Chemistry
MYERS, ALAN L., Cincinnati, Engineering
NIEMAN, GEORGE C., Tipp City, Chemistry
NOBEL, PARK S., Solon, Physics
OPASKAR, CARL G., Cleveland Heights, Physics
ORANGE, ELIZABETH C., Rocky River, Psychology
PATCH, RICHARD W., Westerville, Engineering
PATTERSON, RICHARD R., Dayton, Mathematics
POLITZER, PETER A., Cleveland, Chemistry
REEDER, RONALD H., Mt. Vernon, Biophysics
REILLY, BERNARD E., Cleveland Microbiology
RIX, JOHN R., Bay Village, Physics
SCHLAUG, ROBERT N., Cleveland, Engineering
SCHROEER, DIETRICH, Enon, Physics
SHAFER, DAVID M., Cincinnati, Mathematics
SMITH, ALLAN L., Granville, Chemistry
SOPKOVICH, NICHOLAS J., Canfield, Physics
STIFFLER, PRICE E., Columbus, Mathematics
SUGAR, ROBERT L., Beachwood, Physics
SWAIN, RICHARD R., Toledo, Biochemistry
SWIGERT, ROGER D., Akron, Chemistry
TAYLOR, LYNN J., Cuyahoga Falls, Chemistry

TSCHANZ, JOHN F., Lima, Physics
VAN FLANDERN, MARGUER, Norwood, Physics
VANDENBYNDEN, CHARLES, St. Bernard, Mathematics
WILCOX, JOHN P., Columbus, Engineering
WILLIAMS, FRANCIS D., Columbus, Mathematics
WILSON, JOHN E., Celina, Biochemistry
ZARE, RICHARD N., University Heights, Chemistry
ZAVORTINK, THOMAS J., Ravenna, Botany

Cooperative Graduate

ANNAVEDDER, EDWIN K., Cincinnati, Mathematics
ARMSTRONG, ROBERT LEE, Fairborn, Biochemistry
BARRETT, RICHARD E., Columbus, Engineering
BODMAN, SAMUEL W., III, Akron, Engineering
BRUNGS, WILLIAM A., Jr., Columbus, Zoology
BRUNNER, CARL A., Cincinnati, Engineering
COLEMAN, JOHN F., Akron, Chemistry
COPPAGE, WILLIAM E., Columbus, Mathematics
CRUDEN, ROBERT W., Berea, Botany
CURNOW, WILLIAM J., Jr., Columbus, Chemistry
DAVIDSON, JOSEPH K., Columbus, Engineering
DAWSON, WALLACE D., Jr., Columbus, Genetics
DEEVER, DAVID L., Westerville, Mathematics
DORIA, MICHAEL L., Cleveland, Engineering
DREYFUSS, PATRICIA M., Cuyahoga Falls, Chemistry
ELLISON, JAMES T., Cleveland, Mathematics
FAGAN, TERRENCE J., Cleveland, Engineering
FENTIMAN, ALLISON F., Jr., New Concord, Chemistry
FISHER, FARLEY, Painesville, Chemistry
FORDHAM, WILLIAM D., Marietta, Chemistry
FOX, CHARLES F., Springfield, Biochemistry
GIESY, DANIEL P., Columbus, Mathematics
GLAZMAN, JERRY S., Akron, Chemistry
GOETZ, RICHARD W., Cincinnati, Chemistry
GUTKNECHT, JOHN W., Poland, Biology
HENDRIX, JOHN E., Columbus, Botany
HOOT, CHARLES G., Canton, Physics
HUBSCHMAN, JERRY H., Columbus, Zoology
HUTCHISON, BOYD A., Bellevue, Agricultural Sciences
JANNEY, GARETH M., Berkey, Physics
KELSO, ANNE G., Euclid, Zoology
KEPLAR, RICHARD K., Springfield, Engineering
KOLOPUS, JAMES L., Elyria, Physics
KOMITSKY, FRANK, Jr., Columbus, Chemistry
KRAUSE, DANIEL J., Columbus, Engineering
KVARDA, BETTY L., Lakeside, Mathematics
LAFFER, WALTER B., II, Columbus, Mathematics
LANDMAN, BETTE E., Columbus, Anthropology
LEETMAA, MAIA, Fremont, Mathematics
LEWIS, RAYMOND A., Alpha, Physics
MARTIN, JANICE C., East Liverpool, Mathematics
MAY, WARREN L., Dayton, Mathematics
MENTZER, ROBERT G., Columbus, Chemistry
METZGER, DANIEL S., Columbus, Physics
MILLER, HARRY G., Columbus, Physics
MOSER, ROBERT E., Defiance, Chemistry
NICOL, CHARLES H., New Washington, Chemistry
OGG, OSCAR R., Bowling Green, Mathematics
PARSONS, RONALD G., Lebanon, Physics
PERKINS, RONALD D., Cincinnati, Earth Sciences
PINKAVA, DONALD J., Chagrin Falls, Botany
POHNER, JUDY M., Louisville, Microbiology
POOS, WILMA J., Eaton, Biochemistry
PORTER, JAMES C., Cleveland Heights, Physics
REPAS, PAUL E., Cleveland, Engineering
ROBINSON, DAVID P., Cincinnati, Chemistry
SCHAEFFER, ANTHONY J., Wyoming, Physics
SCHOEN, THOMAS A., Dayton, Mathematics
SECOY, DIANE M., Troy, Zoology
SHERIDAN, CHARLES L., Columbus, Psychology
SHIMP, CHARLES P., Columbus, Psychology
SMITH, JAMES A., Columbus, Chemistry
STARK, ROYAL W., Sullivan, Physics
STEIN, CAROL B., Worthington, Biology
STURCH, CONRAD R., Dayton, Astronomy
THOMAS, DAVID T., Columbus, Engineering
VANHORN, EARL C., Jr., Cincinnati, Engineering
VICKERS, VIRGIL E., Berlin Center, Engineering
WARNER, HUBER R., Kent, Biochemistry
WHITLOCK, RICHARD T., Cleveland, Physics
WIEGAND, KARL L., Worthington, Physics
WILEY, DAVID S., Troy, Physics
WILLIAMS, LAWRENCE E., Youngstown, Physics
WING, LARRY E., Circleville, Engineering
WRATHALL, JAY W., Columbus, Chemistry
ZAIDINS, CLYDE S., Cincinnati, Physics
ZERLA, FREDRIC J., Dillonvale, Mathematics

Summer Fellowships for Graduate Teaching Assistants

COPPAGE, WILLIAM E., Columbus, Mathematics
ATTALLA, ALBERT, Cincinnati, Chemistry
BEASLEY, JAMES D, Eaton, Physics
BIAGLOW, JOHN E., Cleveland, Biochemistry
BRABENEC, ROBERT L., Columbus, Mathematics
BRANAND, DAVID C., Cleveland, Earth Sciences
BRUNGS, WILLIAM A., Jr., Columbus, Zoology
CRAIG, ROBERT T., Columbus, Mathematics
CRANO, JOHN C., Euclid, Chemistry
DELVIGS, PETER, East Cleveland, Chemistry
DORENBUSCH, WILLIAM E., Middletown, Physics
FISHER, FARLEY, Painesville, Chemistry
GLIOZZI, JAMES, Kent, Earth Sciences
GUSTAFSON, LEWIS B., Lakewood, Earth Sciences
HALPERN, EVELYN, Cleveland Heights, Chemistry
LONGFELLOW, LAYNE A., Jackson, Psychology
HANSON, HAROLD N., Cincinnati, Chemistry
HUBSCHMAN, JERRY H., Columbus, Zoology
INGLIS, JEAN E., Worthington, Zoology
MAY, WARREN L., Dayton, Mathematics
MCEWEN, MICHAEL C., Toledo, Earth Sciences
MILLER, DAVID L., Cincinnati, Chemistry
OETGEN, RONALD R., Cleveland Heights, Chemistry
OSBORN, NEAL L., Chardon, Botany
PERKINS, RONALD D., Cincinnati, Earth Sciences
SHIELDS, ROBERT J., Columbus, Zoology
SKAVARIL, RUSSELL V., Columbus, Genetics
VITZ, PAUL C., Cincinnati, Psychology
WALKER, CHARLES C., Westlake, Chemistry
ZEPF, THOMAS H., Cincinnati, Physics

Postdoctoral

BERNDT, DONALD C., Toledo, Chemistry
GREENBERGER, DANIEL M., Columbus, Physics
MURRAY, WALTER A., Jr., Columbus, Medical Sciences
OGG, ANDREW P., Bowling Green, Mathematics
SOLOMON, IRENE L., Columbus, Medical Sciences
SOULE, DAVID E., Berea, Physics
WEST, JAN C., Alliance, Biophysics
WILLIAMS, FLOYD J., Columbus, Botany
ZWOLENIK, JAMES J., Cleveland, Chemistry

Senior Postdoctoral

BLACK, JOHN W., Columbus, Psychology
WILLIAMS, DUDLEY, Columbus, Physics

Science Faculty

BALL, WILFRED R., Columbus, Zoology
BARNES, ROBERT A., Columbus, Engineering
BRANDELL, BRUCE R., Akron, Zoology
ELLIS, WADE, Oberlin, Mathematics
GRUDIN, ARNOLD, Granville, Mathematics
JOHNSON, WENDELL G., Hiram, Mathematics
KROLL, ROBERT J., Cincinnati, Engineering
NETTER, MILTON A., Jr., Toledo, Engineering
NOWAK, RICHARD T., Toledo, Engineering
OSTERBROCK, CARL H., Cincinnati, Engineering
PINZKA, CHARLES F., Cincinnati, Mathematics
SCHUELE, DONALD E., Cleveland, Physics
SPITAL, SIDNEY, Toledo, Mathematics
WRIGHT, HAROLD E., Dayton, Engineering

Summer Fellowships for Secondary School Teachers

BAIRD, SR. THOMAS MORE, Columbus, Biology
BARGER, JACK HAROLD, Deleware, General Science
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 Falls, 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

BUTLER, LARRY G., Ochelata, Biochemistry
CLARKE, ROBERT F., Norman, Zoology
COOPER, JANE E., Tulsa, Zoology
FAUDREE, RALPH J., Atoka, Mathematics
GERLACH, CHARLES R., Guthrie, Engineering
GILBERT, M. CHARLES, Lawton, Earth Sciences
GOLDWYN, ROGER M., Tulsa, Engineering
GRUVER, GEORGE W., Stillwater, Engineering
HURST, GERALD L., Jones, Chemistry
KELLY, SR. SUZANNE, Tulsa, Social Sciences
KIRMSE, DALE W., Alva, Engineering
LIPE, WILLIAM D., Bristow, Anthropology
MURRAY, FREDERICK, N., Tulsa, Earth Sciences
OLDHAM, IRA B., III, Muskogee, Engineering
PAGE, LEROY E., Oklahoma City, Social Sciences
PAUL, JOHNNY C., Fairview, Engineering
PONSOR, KENNETH C., Oklahoma City, Engineering
PROPHET, CARL W., Norman, Zoology
REINHARDT, WILLIAM N., Bartlesville, Mathematics
ROBINSON, ROBERT L., Jr., Muskogee, Engineering
SANMANN, EVERETT E., Geronimo, Physics
SMITH, WARREN L., Norman, Zoology
TECH, JACK L., Oklahoma City, Astronomy
THACH, ROBERT E., Oklahoma City, Biophysics
WOLFE, JAMES F., Oklahoma City, Engineering
WOOD, DAVID E., Seminole, Chemistry

Cooperative Graduate

CLARK, ALFRED Jr., Bartlesville, Mathematics
COMBRINK, CHARLES R., Caddo, Mathematics
CRAWFORD, JOHN C., Ponca City, Physics
FRIDAY, JOHN R., Cleveland, Engineering
FRIEDRICH, HENRY, B., Clinton, Chemistry
GRAHAM, ROBERT E., Tulsa, Physics
HANN, ROY, W., Jr., Oklahoma City, Engineering
HARDAGE, BOB A., Checotah, Physics
McCORMICK, BAILIE J., Stillwater, Chemistry
McCREARY, JAMES G., Norman, Engineering
MORRIS, ROBERT J., Jr., Oklahoma City, Social Sciences
PIERCE, DONALD A., Enid, Engineering
RICE, JAMES H., Norman, Mathematics
SHERLE, JERRY P., Hobart, Chemistry
SLAUGHTER, EUGENE E., Jr., Durant, Mathematics
STONG, ROBERT E., Oklahoma City, Mathematics

Summer Fellowships for Graduate Teaching Assistants

BAILEY, HORACE H., Norman, Physiology
BANKS, DONALD J., Stillwater, Botany
BENNETT, ALLISON C., Indiahoma, Agriculture
CARTER, WILLIAM A., Stillwater, Zoology

CECIL, DAVID R., Tulsa, Mathematics
CRONOBLE, WILLIAM R., Bartlesville, Earth Sciences
DAVIS, KENNETH J., Lawton, Engineering
GASS, JERALD D., Oklahoma City, Chemistry
JONES, ROBERT E., Kingfisher, Mathematics
LEE, ROY C., Delaware, Engineering
LEGRAND, FRANK E., Mayfield, Agriculture
ROPER, LEON D., Arnett, Physics
ROWETT, CHARLES L., Norman, Earth Sciences
SILVER, BURR A., Tulsa, Earth Sciences
SMITH, DEAN C., Oklahoma City, Social Sciences

Postdoctoral

FRETWELL, LYMAN J., Jr., Tulsa, Physics

Senior Postdoctoral

HYDE, BEAL B., Norman, Microbiology
ROLLER, DUANE H. D., Norman, Social Sciences

Science Faculty

GLENN, BERTIS L., Stillwater, Medical Sciences
HALLETT, PAUL C., Stillwater, Engineering
JONES, WOODROW H., Oklahoma City Oceanography
SCHOEPPEL, ROGER J., Norman, Engineering
VENABLE, JOHN H., Stillwater, Medical Sciences

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 Science
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

ANDREWS, GEORGE E., Salem, Mathematics
BIRD, KENNETH J., Grants Pass, Earth Sciences
BROWN, ROBERT B., Portland, Mathematics
CHAMPION, JOHN C., Pendleton, Physiology
DIXON, RICHARD W., Woodburn, Engineering
HARRIS, DAVID O., Corvallis, Chemistry
HITCHCOCK, DICKEY, Corvallis Engineering
LYNN, ELIZABETH, Eugene, Psychology
MACINTYRE, ROSS J., Yachats, Genetics
MCNEAL, BRIAN L., Corvallis, Agriculture
MORSE, HOWARD C., Culver, Biology
MOURSUND, ANNE L., Eugene, Chemistry
MOURSUND, DAVID G., Eugene, Mathematics
POOLE, MICHAEL G., Ontario, Mathematics
RINARD, GILBERT A., Newberg, Physiology
SATHER, CLIFFORD A., Portland, Anthropology
STOUT, EDGAR L., Grants Pass, Mathematics

Cooperative Graduate

ALEXANDER, GERALD C., Corvallis, Engineering
BENSON, CLARK T., Portland, Mathematics
CALLIS, PATRIK R., Springfield, Chemistry
CATLIN, SETH, Portland, Mathematics
DONALDSON, ROBERT R., Oregon City, Engineering
DUMOND, DON E., Portland, Anthropology
FORBESS, DENNIS L., Nyssa, Chemistry
LORENZEN, LEOLA C., Roseburg, Physiology
PARKER, JERALD V., Portland, Physics
PEARSON, GARY A., Portland, Physics
PETERSEN, ROBERT J., Hillsboro, Chemistry
ROCKHOLT, CELIA R., Corvallis, Chemistry
SORENSEN, FRANK C., Corvallis, Agricultural Sciences
THILENIUS, JOHN F., Corvallis, Biology
WEST, NEIL E., Klamath Falls, Biology

Summer Fellowships for Graduate Teaching Assistants

DONOHUE, DONALD J., Eugene, Mathematics
LUTZ, PAULA L., Eugene, Anthropology
HANSEN, JOHN D., Corvallis, Chemistry
HINRICHS, LOWELL A., Portland, Mathematics
OTOOLE, RICHARD E., Eugene, Social Sciences
RANDALL, WILLIAM J., Cottage Grove, Chemistry
RESCH, WILLIAM M., Eugene, Psychology
ROHNER, RONALD P., Salem, Anthropology
WILSON, ROBERT E., Corvallis, Engineering
WOODMAN, DARRELL, J., Portland, Chemistry

Senior Postdoctoral

KNUDSEN, JAMES G., Corvallis, Engineering
NOVITSKI, EDWARD, Eugene, Genetics

Science Faculty

BURGESS, FREDRICK J., Corvallis, Engineering
CHRESTENSON, HUBERT, Portland, Mathematics
DAVIS, KENNETH E., Portland, Physics
JENSEN, LELAND C., Corvallis, Engineering
STONE, SOLON A., Corvallis, Engineering

Summer Fellowships for Secondary School Teachers

BIEDERMAN, ARTHUR A., Tigard, General Science
MCCORD, WILLIAM M., Portland, General Science
OVERTON, VEARL H., Lakeview, Mathematics
ROGERS, JAMES V., Portland, Mathematics
STAPLETON, CHRISTOPHER, Portland, General Science

PENNSYLVANIA

Graduate

ADAIR, WILLIAM R., Conshohocken, Engineering
ADLER, RONALD J., Pittsburgh, Physics
ANDERSON, JAMES B., State College, Engineering
BARR, MICHAEL, Drexel Hill, Mathematics
BEATTIE, JAMES K., York, Chemistry
BERMON, STUART, Philadelphia, Physics
BEUSCH, JOHN U., Erie, Engineering
BICKING, LEWIS A., Phoenixville, Biophysics
BRAUMAN, JOHN I., Pittsburgh, Chemistry

BRODSKY, ALAN R., Philadelphia, Mathematics
BURNHAM, DAVID C., Pittsburgh, Physics
CAPECCHI, MARIO R., Southampton, Biophysics
CARROLL, ALICE H., Swarthmore, Chemistry
CHILTON, WILLIAM S., Lansdowne, Chemistry
CLARK, JOSEPH C., Glen Campbell, Earth Sciences
DEMKO, GEORGE J., State College, Social Sciences
EDWARDS, DALLAS C., Meadville, Zoology
EPLER, JAMES L., York, Genetics
FARKAS, EDWARD J., Media, Engineering
FETTER, ALEXANDER L., Philadelphia, Physics
FOW, BENJAMIN R., Philadelphia, Meteorology
FRASER, MALCOLM D., Pittsburgh, Engineering
GARVINE, RICHARD W., Pottstown, Engineering
GASTON, CHARLES A., Lancaster, Engineering
GEISSINGER, LADNOR D., Zionsville, Mathematics
GIMPEL, JAMES F., Philadelphia, Engineering
GINTIS, HERBERT M., Bala Cynwyd, Mathematics
GRAY, DONALD M., Milton, Biophysics
GREAVES, JAMES R., Pittsburgh, Physics
HALLIDAY, ROBERT P., Pittsburgh, Medical Sciences
HAMBURGER, MICHAEL J., Pittsburgh, Social Sciences
HARTENBAUM, BRUCE, Philadelphia, Engineering
HAUK, PETER, Pittsburgh, Chemistry
HILL, VICTOR E., Pittsburgh, Mathematics
HOFFMAN, DONALD B., Jr., Allentown, Biophysics
HOROWITZ, DANIEL H., University Park, Earth Sciences
HORSTMAN, CLIFFORD C., Sharpsville, Engineering
HOUGHTON, DAVID D., Media, Meteorology
HUDOCK, GEORGE A., Norristown, Genetics
HUMPHREYS, RICHARD F., Lewisburg, Engineering
INFANGER, SR. ANN M., Greensburg, Genetics
JAMES, ELSIE L., Philadelphia, Chemistry
JEROME, JOSEPH W., Philadelphia, Mathematics
KALME, CHARLES I., Philadelphia, Mathematics
KAUFFMAN, JOEL M., Huntingdon Valley, Chemistry
KAUFMANN, HARRY, Clifton Heights, Psychology
KONRAD, KARL W., East Lansdowne, Psychology
KRALL, ALLAN M., State College, Mathematics
KRANTZ, DAVID H., Philadelphia, Psychology
KREISS, PAUL H., Swarthmore, Zoology
KUNTZ, ROBERT R., Pittsburgh, Chemistry
LARKIN, FRANCIS P., Middletown, Mathematics
LARSON, RICHARD G., Philadelphia, Mathematics
LAVINE, RICHARD B., Huntingdon Valley, Mathematics
LEWIS, RONALD M., State College, Earth Sciences
MAYER, RAYMOND A., Jr., Philadelphia, Mathematics
MCGRADY, SR. M. MERCY, Pittsburgh, Chemistry
MCNUTT, DOUGLAS P., Philadelphia, Physics
MENKUS, RICHARD H., Philadelphia, Microbiology
MOORE, JOHN W., Paoli, Chemistry
MORAN, PAUL R., Coudersport, Physics
MORRIS, ROBERT A., Philadelphia, Physics
MOYER, ROBERT D., Allentown, Mathematics
NAUMANN, DOROTHY C., Philadelphia, Biochemistry
NOBLE, ROBERT W., JR., Ardmore, Biophysics
O'DONNELL, PATRICIA A., Conshohocken, Chemistry
ORNSTON, LEO N., Horsham, Biochemistry
PHILIPS, THOMAS O., Lansdowne, Physics
RABIGER, DOROTHY J., Cheltenham, Chemistry
RAUB, WILLIAM F., Alden Station, Physiology
RAUCH, FRANCIS C., Philadelphia, Chemistry
RICE, ALAN W., Bridgeville, Engineering
ROSENBERG, RONALD C., Philadelphia, Engineering
RYSZ, WALTER R., Old Forge, Chemistry
SCHICK, MICHAEL, Philadelphia, Physics
SHABAKER, ROBERT H., Media, Engineering
SHAFFER, OLIVIA C., Swarthmore, Psychology
SHANAHAN, PATRICIA A., Bethel Park, Psychology
SILVERSTEIN, MARTIN L., Philadelphia, Mathematics
SOMERSET, JAMES H., Glenside, Engineering
STIENING, RAE F., Pittsburgh, Physics
STONER, JOHN O., Berlin, Physics
STOWELL, JOHN C., Erie, Chemistry
SUNA, ANDRIS, Broomall, Physics
THORINGTON, RICHARD W., Wynnewood, Biology
TRAHANOVSKY, WALTER S., Conemaugh, Chemistry
TRUEMAN, THOMAS L., Media, Physics
VOGT, WILLIAM G., McKeesport, Engineering
WEISS, CHARLES, JR., Philadelphia, Biochemistry
WILLIAMS, JOHN E., Clarion, Biology
WILLIAMSON, SAMUEL J., Sayre, Physics
WILSON, GUSTAVUS E., JR., Philadelphia, Chemistry
WOLL, EDWIN J., JR., Pittsburgh, Physics
WRIGHT, ARTHUR W., Broomall, Social Sciences
YOST, PATRICIA A., Sugarloaf, Psychology
ZARTMAN, ROBERT E., Lititz, Earth Sciences

Cooperative Graduate

BAKER, DOROTHY, Pottsville, Chemistry
BENNETT, LEE C., Jr., Media, Earth Sciences
BETZ, JOHN V., Bala Cynwyd, Microbiology
BRADY, JAMES E., State College, Chemistry
CAMPBELL, MARY K., Havertown, Chemistry
CANTOR, ROBERT H., Philadelphia, Mathematics
CAREY, FRANCIS A., Philadelphia, Chemistry
CHESLER, RONALD, Philadelphia, Physics
ENGLEHART, RICHARD W., Pittsburgh, Engineering
ESKIN, ROCHELLE M., Philadelphia, Psychology
FERNELIUS, NILS C., Pittsburgh, Physics
FLEMING, GORDON N., Philadelphia, Physics
FORTNER, EDWARD, Pittsburgh, Engineering
GREENLEAF, FREDERICK P., Allentown, Mathematics
HAY, JAMES E., Pittsburgh, Physics
HILL, DAVID G., Tarentum, Physics
HOLLOWAY, LELAND E., Jr., Philadelphia, Physics
HOPKINS, PAUL D., Pittsburgh, Chemistry
HUMPHREYS, JAMES E., Erie, Social Sciences

IFFT, EDWARD M., Butler, Physics
JEFFERS, PETER M., Myerstown, Chemistry
KLINGENER, DAVID J., Meadville, Zoology
KREMER, ROSS A., Schuylkill Haven, Engineering
KURLAND, JONATHAN J., Philadelphia, Chemistry
LUYBEN, WILLIAM L., Zieglerville, Engineering
MAGAN, JOHN R., Bethelhem, Physics
MARCUS, SANFORD M., Philadelphia, Physics
MARIK, ROBERT H., Pittsburgh, Engineering
MASTASCUSA, EDWARD J., Pittsburgh, Engineering
MELIUS, MELVIN E., Jr., Drexel Hill, Zoology
MICHAEL, KEITH W., University Park, Chemistry
MILGRAM, JEROME H., Philadelphia, Engineering
MILLER, JEROME P., State College, Chemistry
MISNER, JOHN, Pittsburgh, Mathematics
NAGLE, JOHN F., Girard, Physics
NONEMAKER, LARRY F., New Freedom, Chemistry
NYSTROM, WILLIAM A., Emporium, Engineering
PAGELS, HEINZ R., Wynnewood, Physics
PEET, ROBERT G., Bristol, Engineering
PERRIN, CHARLES L., Pittsburgh, Chemistry
PHILLIPS, ROGER C., Philadelphia, Chemistry
PIERCE, RUSSELL D., Homer City, Physics
POELLOT, JAMES H., Bridgeville, Engineering
REINER, THOMAS A., Philadelphia, Social Sciences
RICHMAN, FRED, Philadelphia, Mathematics
SAVARY, LOUIS M., Scranton, Mathematics
SHULTZ, CHARLES H., Lancaster, Earth Sciences
SMITH, RICHARD L., Berwick, Engineering
SNYDER, MITCHELL, Philadelphia, Mathematics
STILES, PHILLIP J., Philadelphia, Physics
TAYLOR, BARRY N., Philadelphia, Physics
TIETJEN, JAMES J., State College, Chemistry
TORRENCE, ROBERT J., Pittsburgh, Physics
VERBIT, LAWRENCE P., Philadelphia, Chemistry
WARDEN, ROBERT B., Swarthmore, Engineering
WHITMAN, MARINA V., Pittsburgh, Social Sciences
ZAHRADNIK, RAYMOND L., Ford City, Engineering

Summer Fellowships for Graduate Teaching Assistants

BALOGA, MICHAEL R., Wilkes Barre, Chemistry
BENNETT, RICHARD B., Grove City, Chemistry
BIEHL, EDWARD R., Pittsburgh, Chemistry
BRADY, JAMES E., State College, Chemistry
BRENNER, GILBERT J., State College, Earth Sciences
BRIMHALL, JAMES E., Pittsburgh, Physics
CHORTYK, ORESTES T., Philadelphia, Chemistry
CLARK, GEORGE M., Boalsburg, Earth Sciences
CLOVIS, JAMES S., Waynesburg, Chemistry
COLEBOB, CAROLE J., Pittsburgh, Mathematics
COUCH, WALTER E., Pittsburgh, Physics
DERSARKISSIAN, MICHAEL, State College, Physics
DICARLO, ERNEST N., Parkland, Chemistry
FEAIRHELLER, STEPHEN H., Philadelphia, Chemistry
FREEMAN, ALAN R., Upper Darby, Medical Sciences
GALLOWAY, GORDON L., Pottstown, Chemistry
GIBISH, PATRICIA A., Pittsburgh, Chemistry
GUBER, ALBERT L., Bridgeville, Earth Sciences
HARNISH, DANIEL F., Harrisburg, Chemistry
HOUCK, GEORGE B., Mechanicsburg, Engineering
KLEIN, RICHARD M., Elkins Park, Chemistry
KUCHEMBA, NANCY K., Philadelphia, Medical Sciences
LYKE, EDWARD B., Gibsonia, Zoology
MAGAN, JOHN R., Bethlehem, Physics
MAGILL, KENNETH D., State College, Mathematics
MALINAUSKAS, ANTHONY P., Ashley, Chemistry
MARSH, ELBERT L., Philadelphia, Engineering
MARTIN, JOHN P., Jr., Connellsville, Chemistry
MELIUS, MELVIN E., Jr., Drexel Hill, Zoology
MIDDAUGH, RICHARD L., Meadville, Chemistry
MORRIS, CLIFTON, Fredericktown, Microbiology
PRESCOTT, HENRY E., Jr., Prospect Park, Botany
PRUETT, PATRICIA A., Bryn Mawr, Biochemistry
TAYLOR, ROBERT C., Sheffield, Chemistry
RHEIN, RONALD R., Reading, Zoology
SCHLEH, EDWARD E., Williamsport, Earth Sciences
SCHLEICHER, DAVID L., Bloomsburg, Earth Sciences
SCHULTZ, ALBERT B., Philadelphia, Engineering
SEGAL, BARBARA E., Philadelphia, Medical Sciences
SCHULTZ, CHARLES H., Lancaster, Earth Sciences
SIEBER, JAMES L., Blairs Mills, Mathematics
STRINE, WILLIAM B., Media, Engineering
VERBIT, LAWRENCE P., Philadelphia, Chemistry
WADDILL, MARCELLUS E., Pittsburgh, Mathematics
YURA, JOSEPH A., Allentown, Engineering

Postdoctoral

BARANGER, ELIZABETH U., Pittsburgh, Physics
DEYRUP, JAMES A., West Chester, Chemistry
FIVEL, DANIEL I., Philadelphia, Physics
GUBER, ALBERT L., Bridgeville, Earth Sciences
HOYLAND, JAMES R., Pittsburgh, Chemistry
LANGER, JAMES S., Pittsburgh, Physics
LEITNER, ALFRED, Allentown, Medical Sciences
LUDWIG, OLIVER G., Philadelphia, Chemistry
PEARSON, JAMES J., Pittsburgh, Physics
SIMKOVICH, GEORGE, Jacobs Creek, Engineering
WHINSTON, ANDREW, Pittsburgh, Mathematics

Senior Postdoctoral

AUSTERN, NORMAN, Pittsburgh, Physics
BARANGER, MICHEL, Pittsburgh, Physics
CUTKOSKY, RICHARD E., Pittsburgh, Physics

GOODMAN, LIONEL, University Park, Chemistry
KLEIN, ABRAHAM, Philadelphia, Physics
LINDSTROM, EUGENE S., University Park, Physiology
SKELL, PHILIP S., University Park, Chemistry

Science Faculty

ANTOUN, SR. M. LAWREACE, Erie, Chemistry
BOTDORF, RUTH G., Harrisburg, Chemistry
BRICKMAN, ARTHUR D., University Park, Engineering
COMSTOCK, CRAIG, Norristown, Mathematics
FRITZ, RODGER L., University Park, Engineering
GENZLINGER, BRYCE S., Philadelphia, Engineering
HAAG, VINCENT H., Lancaster, Mathematics
HEINE, HAROLD W., Lewisburg, Chemistry
HEISEY, H. ORVILLE, Grantham, Chemistry
LEIDY, BLAINE I., Pittsburgh, Engineering
MCNABB, JOHN W., Easton, Engineering
MOSS, JOHN H., Lancaster, Earth Sciences
REMICK, FORREST J., Jr., University Park, Engineering
ROSEN, DAVID, Swarthmore, Mathematics
SHONTZ, CHARLES J., Clarion, Biology
VAN METER, ROBERT G., Beaver Falls, Mathematics
WOOD, THOMAS H., Philadelphia, Biophysics

Summer Fellowships for Secondary School Teachers

ACKERMAN, SR. M. ALICE I., Philadelphia, Biology
AMMERMAN, EDWARD G., Philipsburg, General Science
ANSELMO, SHIRLEY M., New Castle, Biology
ARTHUR, ROBERT S., Pittsburgh, Mathematics
ATTY, ALEX G., Windber, General Science
BEAM, SR. M. ALEXINE, Pittsburgh, Biology
BENDER, EARL ARTHUR, Slatington, Biology
BONNER, SR. M. CATHERINE, Philadelphia, General Science
CALLANAN, MO. DOLORES M., Philadelphia, Mathematics
DEMITRAS, BRO. GREGORY C., Philadelphia, Chemistry
DOTTERER, STANLEY S., Elizabethtown, Mathematics
DOUBET, SR. M. MARK, Erie, Mathematics
EVANS, EDWARD WILLIAM, West Lawn, Mathematics
HERMAN, RICHARD P., Hatboro, Mathematics
HOUGH, RAYMOND EARLE, Monongahela, Mathematics
JONES, DOROTHY LOIS, State 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 Science
MCLAUGHLIN, JANE ANN, Harrisburg, Mathematics
MOYER, STUART F., York, Mathematics
PATTERSON, BRO. D. STEPHEN, Pittsburgh, Mathematics
PETRARCA, SR. M. JEAN, Greensburg, Mathematics
SAUKAITIS, SR. M. P., Coraopolis, Zoology
SCHILLINGER, SR. M. J., Pittsburgh, Biology
SCHROEDER, KENNETH E., George 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 Science
ZICCARDI, VINCENT, New Hope, Biology
ZIMMERMAN, PATRICIA V., Elkins Park, Mathematics

PUERTO RICO

Graduate

COLONROLDAN, IVAN E., Rio Piedras, Mathematics

Science Faculty

ESCABI, LUIS A., Santa Maria, Genetics

RHODE ISLAND

Graduate

DURST, RICHARD A., Newport, Chemistry
FINE, ARTHUR D., Providence, Engineering
GOULD, MEREDITH C., West Barrington, Zoology
GOULD, ROBERT O., Providence, Chemistry
LUND, JUDITH N., East Providence, Botany
MARTINS, JOSEPH F., East Providence, Chemistry
SIMMONS, WILLIAM S., Providence, Anthropology

Cooperative Graduate

BEAUDET, PAUL R., Pawtucket, Physics
CAPOTOSTO, AUGUSTINE, Jr., Cranston, Chemistry
CUTTS, WILLIAM B., Providence, Zoology
FORTIER, GERALD J., Pawtucket, Engineering
HARTMANN, GEORGE C., Providence, Botany
HOWARD, ALAN, Providence, Mathematics
JACKMAN, REGINALD C., Wakefield, Physics
LIPSON, MELVIN A., Cranston, Chemistry
TUCKER, DONALD P., Barrington, Social Sciences

Summer Fellowships for Graduate Teaching Assistants

DILEONE, GILBERT R., Providence, Microbiology
DURST, RICHARD A., Newport, Chemistry
GORMALLY, JOHN M., North Providence, Engineering
HOWARD, ALAN, Providence, Mathematics
VERY, PHILIP S., Warwick, Psychology
VOICHICK, MICHAEL, Providence, Mathematics

Senior Postdoctoral

BRAY, PHILIP J., Providence, Physics
COLE, ROBERT H., Providence, Chemistry

Science Faculty

DUTCHER, BARRY C., Providence, Mathematics
GURLAND, JOSEPH, Providence, Engineering

Summer Fellowships for Secondary School Teachers

SCHUMANN, MO. VIRGINIA M., Providence, Mathematics
WALSH, SR. M. TERENCE, Riverside, Mathematics

SOUTH CAROLINA

Graduate

CONNOR, LAURENCE N., JR., Barnwell, Engineering
GETTYS, WILLIAM E., Union, Physics
JOHNSON, BEN L., Clemson, Engineering
LUNNEY, DAVID C., Camden, Chemistry
MONTGOMERY, LUCIUS K., Kingstree, Mathematics
ROGERSON, NANCY C., Columbia, Physics

Cooperative Graduate

ALLEN, LEONARD R., Kings Creek, Botany
BOWERS, KERRY W., Columbia, Chemistry
HASKELL, PETER L., West Columbia, Engineering
JONES, EDWIN R., JR., Dillon, Physics
KNIGHT, FURMAN D., Sumter, Mathematics
RUGHEIMER, JOHN H., Charleston, Physics
WHITE, HAROLD M., Clemson, Chemistry

Summer Fellowships for Graduate Teaching Assistants

BICKLEY, JOE D., Elloree, Engineering
GIBSON, GERALD W., Pauline, Chemistry
HENRY, OSCAR, Columbia, Botany
MORRISON, ROBERT W., JR., Columbia, Chemistry
PARNELL, JAMES F., Timmonsville, Biology
TILLER, WILLIAM E., Anderson, Physics
WYNN, WILLARD K., JR., Newberry, Botany
YARBROUGH, DAVID W., Charleston, Engineering

Postdoctoral

SHEALY, CLYDE N., Kershaw, Medical Sciences

Science Faculty

LITMAN, SAMUEL, Columbia, Engineering
ULDRICK, JOHN P., Clemson, Engineering

Summer Fellowships for Secondary School Teachers

JENKINS, FAYE E., Anderson, Mathematics
KURTZ, MARGARET G., Columbia, Mathematics

SOUTH DAKOTA

Graduate

BUSWELL, LINDA M., Aberdeen, Psychology
DRIML, MARILYN J., Hot Springs, Zoology
RASMUSSON, GARY H., Clark, Chemistry
SCHUMAKER, LARRY L., Britton, Mathematics

Cooperative Graduate

MACEK, JOSEPH H., Faulkton, Physics
PIERCE, ROBERT L., Huron, Mathematics
TIESZEN, LARRY L., Sioux Falls, Zoology

Summer Fellowships for Graduate Teaching Assistants

ROBINSON, THOMAS A., Hot Springs, Chemistry

Postdoctoral

SCHIRBER, JAMES E., Mobridge, Physics

Science Faculty

MCNEIL, RICHARD D., Rapid City, Engineering
MOORE, RAYMOND A., Brookings, Agriculture

Summer Fellowships for Secondary School Teachers

CONKLIN, AUGUST, Aberdeen, Biology
CONWAY, JOHN V., Yankton, Mathematics
HILLS, CARROLL L., Mitchell, Biochemistry

TENNESSEE

Graduate

BLOOMER, JAMES L., Knoxville, Chemistry
BURNS, RALPH M., Alcoa, Engineering
DIETRICH, FRANK S., Memphis, Physics
ENGELBERG, DON P., Memphis, Physics
GARDNER, JANET K., Memphis, Biochemistry
HALL, DONALD E., Cleveland, Physics
HAMM, ROBERT N., Ramer, Physics
LANIER, RANDOLPH D., Nashville, Chemistry
PORTER, JOHN C., Columbia, Engineering
RANDOL, BURTON S., Memphis, Mathematics
RITTENBERG, ALAN, Nashville, Physics
RITTER, ENLOE T., Memphis, Physics
THOMPSON, JAMES R., Memphis, Mathematics
VARNELL, LARRY S., Sewanee, Physics
WALPOLE, JAMES N., Brownsville, Engineering

Cooperative Graduate

ASHLEY, JAMES C., Bristol, Physics
BOYD, DAVID A., Chattanooga, Engineering
CHRISTY, JOHN H., Jr., Nashville, Mathematics
HEIMBERG, LAURA K., Nashville, Psychology
JONES, WILLIAM D., Nashville, Physics
KROHN, KENNETH B., Nashville, Physics
MCNIELL, GLENDA F., Memphis, Microbiology
QUARLES, WILLIAM G., Nashville, Chemistry
RUTLEDGE, RONALD M., Knoxville, Chemistry
SCHEINBERG, STEPHEN, Memphis, Mathematics
SHOUP, CHARLES S., Jr., Oak Ridge, Chemistry
SMITH, ALPHONSO L., Memphis, Mathematics
THOMPSON, CLIFTON C., Jr., Columbia, Chemistry
THOMPSON, WILLIAM T., Chattanooga, Chemistry
WOODY, CHARLES O., Jr., Somerville, Physiology

Summer Fellowships for Graduate Teaching Assistants

CAMPBELL, GEORGE M., Nashville, Chemistry
DAVIS, KENNETH J., Knoxville, Mathematics
JONES, WILLIAM D., South Nashville, Physics
KERCE, ROBERT H., Nashville, Mathematics
MCCARTY, STUART W., Knoxville, Chemistry
MILLER, ROBERT V., Knoxville, Physics
SNOWDEN, BRINKLEY S., Jr., Collierville, Chemistry
STEWART, MARY C., Pleasant Hill, Zoology
STONE, ELMORE T., Nashville, Chemistry
WEBB, NED C., Linden, Chemistry

Postdoctoral

BROCKMAN, HERMAN E., Clinton, Genetics
FAIN, JOHN N., Jefferson City, Physiology

Senior Postdoctoral

MAKINODAN, TAKASHI, Oak Ridge, Biology

Science Faculty

BEIL, ROBERT J., Nashville, Mathematics
KEEDY, HUGH F., Nashville, Engineering
MIN, TONY C., Rockwood, Engineering
REDWINE, FREDERICK R., Chattanooga, Physics

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
BOTT, JERRY F., Tyler, Engineering
BRICE, DAVID K., Sulphur Spring, Physics
BUFFLER, RICHARD T., Austin, Earth Sciences
CHANDLER, COLSTON, Sherman, Physics
CHESTER, ARTHUR N., Austin, Physics
CLARK, BARRY G., Canyon, Astronomy
COGDELL, THOMAS J., Electra, Chemistry
COLLIER, ROBERT J., Fort Worth, Physiology
DORROH, JAMES R., Austin, Mathematics
DOUGHARTY, NEIL A., Jasper, Engineering
DOYLE, JOSEPH C., Houston, Physics
DREWRY, GEORGE E., Austin, Zoology
FINNEY, PAULINE M., McAllen, Biochemistry
GIBSON, BENJAMIN F., Lufkin, Physics
GILMARTIN, MICHAEL C., Fort Worth, Mathematics
GRABINER, SANDY, Pharr, Mathematics
GREENHALL, CHARLES A., Dallas, Physics
GUNN, JAMES E., Beeville, Astronomy
HALE, LEONARD A., Snyder, Engineering
HAMRICK, GARY C., Dallas, Mathematics
JACKSON, HENRY W., Houston, Physics
JOHNSON, CLAIBORNE H., Dallas, Mathematics
JOHNSON, ERNEST W., Jr., Dallas, Biophysics
JORDAN, EMILY C., Houston, Zoology
KAMINSKY, MARJORIE E., Sealy, Biochemistry
KNEZEK, BERNARD D., Seymour, Biology
LEVY, CHARLES M., Houston, Psychology
LOMONACO, SAM J., Dallas, Mathematics
MCCLAIN, WILLIAM M., Georgetown, Chemistry
MCGUIRE, MICHAEL L., College Station, Engineering
MECKEL, LAWRENCE D., Baytown, Earth Sciences
MEYERS, CLYDE C., Jr., Beaumont, Engineering
MOORE, ROBERT E., Arlington, Zoology
MYERS, RALPH L., Wichita Falls, Earth Sciences
ODELL, RALPH D., Austin, Engineering
PRESCOTT, CHARLES Y., Houston, Physics
PUSEY, WALTER C., III, Houston, Earth Sciences
REICHERT, JOHN D., Austin, Physics
SANDERS, BOBBY L., Canton, Mathematics
THOMAS, LEE C., Austin, Engineering
WILLEY, FREDERICK G., Garland, Chemistry

Cooperative Graduate

ABLES, PAULA R., Austin, Biochemistry
BEYMON, EUGENE T., Jr., Corpus Christi, Engineering
BYERLY, HAMILTON R., Jr., Houston, Physics
COLLINS, CARL B., Jr., San Antonio, Physics
COON, JULIAN B., Pasadena, Physics
CROSBY, GARY W., Spurger, Earth Sciences
DUCE, ROBERT A., San Antonio, Chemistry
FINCH, RAY N., Bay City, Engineering
GALE, WILLIAM A., Fort Worth, Mathematics
GEORGE, CHARLES F., Jr., Brownwood, Engineering
GORSUCH, RICHARD L., Fort Worth, Psychology
GRAY, ALFRED, Dallas, Mathematics
HAIN, PAUL L., Dallas, Engineering
HODGES, LAURENT, Houston, Physics
LADNER, SIDNEY J., Houston, Chemistry
LEE, WILLIAM J., Sweetwater, Engineering
LIPE, WILLIAM N., San Benito, Agricultural Sciences
LOEFFLER, CHARLES E., Junction, Engineering
MCENTEE, WINNIE R., Dallas, Chemistry
MCGEHEE, RICHARD V., Abilene, Earth Sciences
OTTMERS, DELBERT M., Jr., San Marcos, Engineering
POHLER, ROBERT F., Fredericksburg, Engineering
QUADE, CHARLES R., Dallas, Physics
RICHARDSON, RICHARD H., Mexia, Genetics
SCOUTEN, DONALD C., Dallas, Engineering
SHELTON, ROBERT D., Fort Worth, Engineering
STANFORD, JOHN L., La Porte, Physics
STROUP, DOROTHY A., Dallas, Botany
WHITE, ELNA H., Houston, Psychology
WILLIAMS, JOHN M., Houston, Engineering
YOUNG, PHILLIP G., Jr., Refugio, Physics

Summer Fellowships for Graduate Teaching Assistants

ANDERSON, JAY E., Jr., Austin, Earth Sciences
BEACH, STELLAR B., Waco, Physiology
BRIDGES, JAMES W., Jr., Houston, Engineering
BUNTING, WILLIAM D., Jr., College Station, Physics
CLINGER, BARBARA A., Austin, Mathematics
COLEMAN, EUGENE A., Amherst, Genetics
ELSIK, WILLIAM C., Caldwell, Earth Sciences
FRY, JOHN L., Waco, Physics
HEATHERLY, HENRY E., College Station, Mathematics
KAINER, GEORGIA A., Weimar, Social Sciences
KERR, JAMES D., Lubbock, Engineering
MCALISTER, WAYNE H., Cuero, Zoology
MCENTEE, WINNIE R., Dallas, Chemistry
NEWTON, SANDRA A., Beaumont, Physiology
NILES, FRANKLIN E., Austin, Physics
OWEN, DON E., Fort Worth, Earth Sciences
PARK, LESLIE J., Midland, Chemistry
RIKE, ZEB W., III, Farmersville, Chemistry
RYAN, DONALD E., Austin, Mathematics
SAUNDERS, CHARLES R., Roscoe, Zoology
SMITH, LEE A., Fort Worth, Earth Sciences

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STOUSE, PIERRE A., Jr., Austin, Social Sciences
WATTS, HARRY L., Portland, Mathematics
WOFFORD, JERRY C., Waco, Psychology

Postdoctoral

BEYERS, ROBERT J., Austin, Biology
CONNELL, EDWIN H., Anson, Mathematics
GROSS, MEREDITH G., Jr., Amarillo, Earth Sciences
HALPRIN, KENNETH M., Lackland Air Force Base, Biochemistry
HENDERSON, GEORGE W., Dallas, Mathematics
SIMMONS, MARVIN G., Carrollton, Earth Sciences
STUBBLEFIELD, TRAVIS E., Denton, Microbiology
TOMBRELLO, THOMAS A., Houston, Physics
VAN AUKEN, THOMAS V., Alpine, Chemistry
WORRELL, JOHN M., Jr., Colorado City, Mathematics

Senior Postdoctoral

KASTEN, FREDERICK H., College Station, Microbiology
MATSEN, FREDERICK A., Austin, Chemistry
PASLAY, PAUL R., Houston, Engineering

Science Faculty

ALBERT, MARILYN L., Waco, Microbiology
BAKER, H. W. CHARLES, Dallas, Engineering
BALLARD, HAROLD N., El Paso, Physics
BRANNEN, JOSEPH P., Austin, Mathematics
BREHM, BERTRAM G., Jr., Baytown, Botany
CALCOTE, LEE R., Arlington, Engineering
GRUBBS, EDWARD C., College Station, Engineering
GUERRANT, WILLIAM B., Jr., Sherman, Chemistry
KRAHL, NAT W., Houston, Engineering
KUNZE, OTTO R., College Station, Engineering
MARTIN, EDWARD W., Prairie View, Zoology
MITCHELL, ROBERT W., Beaumont, Zoology
PINNELL, CHARLES, College Station, Engineering
REKOFF, MICHAEL G., Jr., College Station, Engineering
SCHOELLER, WILBUR C., Dallas, Engineering
WISSLER, EUGENE H., Austin, Engineering

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 Science
TITUS, BRO. GILBERT R., San Antonio, General Science
WALKER, SHERRELL G., Gladewater, Mathematics

UTAH

Graduate

BREWER, JOHN M., Baltimore, Biochemistry
DEWEY, JOHN R., Salt Lake City, Anthropology
DORNY, CARL N., Provo, Engineering
GERRIETS, CARL E. J., Logan, Mathematics
GRANT, SHELDON K., New Harmony, Earth Sciences
IVIE, EVAN L., Ogden, Engineering
JENSON, EVAN D., Brigham City, Chemistry
MOLER, CLEVE B., Salt Lake City, Mathematics
MORTIMER, ROBERT G., Logan, Chemistry
MUIRBROOK, NEWELL K., Ogden, Engineering
PRICE, JOHN A., Salt Lake City, Anthropology
RUNNELS, DONALD D., Salt Lake City, Earth Sciences
TAYLOR, VASCO R., Salt Lake City, Meteorology
TOLMAN, CHADWICK A., Bountiful, Chemistry

Cooperative Graduate

BATTY, JOSEPH C., Vernal, Engineering
BILLS, JAMES L., Salt Lake City, Chemistry
BROTHERS, JOHN E., Salt Lake City, Mathematics
GILES, EUGENE, Salt Lake City, Anthropology
HALAMANDARIS, HARRY, Price, Engineering
JACOB, RICHARD J., Salt Lake City, Physics
PALMER, BRENT C., Cedar City, Botany
WAGNER, RICHARD L., Jr., Salt Lake City, Physics

Summer Fellowships for Graduate Teaching Assistants

CHRISTIAN, RAYMOND W., Salt Lake City, Earth Sciences
DASTRUP, BERNARD C., Provo, Biology
FRANK, JEAN A., Logan, Chemistry
JONES, MERRELL R., Salt Lake City, Physics
MURRI, WILLIAM J., Provo, Physics
ROBISON, RICHARD A., Fillmore, Earth Sciences
SHAW, WEILDING T., Clearfield, Physics

Postdoctoral

MILLER, GENE W., Logan, Botany

Senior Postdoctoral

TAYLOR, STERLING A., Logan, Agricultural Sciences

Science Faculty

DALLEY, JAMES E., Salt Lake City, Engineering
ELICH, JOSEPH, Logan, Mathematics
JONES, WILLIAM L., Logan, Engineering

Summer Fellowships for Secondary School Teachers

KING, A. LAVELL, Orem, Zoology

VERMONT

Graduate

ADLER, STEPHEN L., Bennington, Physics
COLE, STEPHEN A., Jamaica, Social Sciences
SARGENT, GEORGE D., Barre, Chemistry

Cooperative Graduate

COOK, PHILIP W., Underhill, Botany

Science Faculty

CASAVANT, DOMINIQUE P., Winooski, Physics
FOLINAS, SR. MARY D., Burlington, Biology

VIRGINIA

Graduate

ADAMS, JOHN B., Charlottesville, Physics
ADELBERGER, ERIC G., Arlington, Physics
ANDERSON, JAMES T., Alexandria, Mathematics
BAKER, THOMAS N., III, Petersburg, Chemistry
BARKER, ROBERT G., Charlottesville, Mathematics
BOWEN, ELEANOR W., Petersburg, Zoology
BOYKIN, JOHN C., Richmond, Zoology
COOK, GERALD, Galax, Engineering
GARMON, LUCILLE B., Richmond, Chemistry
HENDERSON, NANINE S., Norfolk, Zoology
HUFFMAN, ARTHUR H., Blacksburg, Physics
KENK, VIDA C., Alexandria, Biology
LOUTZENHEISER, CARL B., Arlington, Engineering
LUNDQUIST, DAVID E., Hampton, Physics
MANGUM, CHARLOTTE P., Norfolk, Zoology
MCCLANAHAN, CHARLENE, Grundy, Genetics
MINTZ, MICHAEL J., Arlington, Chemistry
MONTGOMERY, CHARLES G., Hollins College, Physics
MOSS, CALVIN E., Richmond, Physics
MURRAY, JOSEPH J., Jr., Lexington, Zoology
RENNINGER, GEORGE H., Fredericksburg, Physics
RICHARDSON, SARA L., Blacksburg, Physiology
SMITH, ROBERT S., Arlington, Engineering
SPITZER, DANIEL M., Jr., Charlottesville, Physics
STANDRIDGE, ROBERT T., Charlottesville, Chemistry
STEARNS, EVELYN N., Arlington, Chemistry
STEPHENS, FRANKLIN M., Arlington, Earth Sciences
YOUNG, JOHN A., Arlington, Meteorology

Cooperative Graduate

BARNARD, MARLENE B., Richmond, Chemistry
CAMP, FREDERICK W., Arlington, Engineering
DAVIS, HAWTHORNE A., Quinton, Physics
DAVIS, RANDALL T., Winchester, Engineering
DESJARDINS, RICHARD, Falls Church, Physics
DOUGHTY, WILLIAM C., Willis Wharf, Physics
DRUM, CHARLES M., Richmond, Physics
HUGHES, JAMES L., Richmond, Mathematics
MCCONNELL, ALAN, Alexandria, Mathematics
MCNETT, CHARLES W., Jr., Alexandria, Anthropology
NORDQUIST, PAUL E., Jr., Arlington, Chemistry
NORTON, JOHN R., Falls Church, Mathematics
SHENK, WILLIAM E., Arlington, Meteorology
SNOW, SAMUEL G., Hickory, Physics
SUTER, DANIEL B., Harrisonburg, Zoology
SYDNOR, GILES G., III, Winchester, Engineering
THOMAS, KEITH S., Weyers Cave, Physics
VAUGHAN, LAWRENCE G., Arlington, Chemistry
WYNN, RONALD L., Newport News, Physics

Summer Fellowships for Graduate Teaching Assistants

MANGUM, CHARLOTTE P., Norfolk, Zoology
MORRIS, MICHAEL S., Roanoke, Physics
SHOEMAKER, NANCY E., Fredericksburg, Chemistry

Science Faculty

BLANK, GRACE J., Williamsburg, Medical Sciences
BLISS, LAURA, Lynchburg, Biochemistry
LEE, JOSEPH R., Williamsburg, Mathematics

Summer Fellowships for Secondary School Teachers

BAKER, LOUIS CALVIN, Arlington, Biology
HAACK, LOUISE B., Annandale, Mathematics
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
BEATTY, DAVID D., Blaine, Physiology
CRASWELL, KEITH J., Port Orchard, Mathematics
ESPER, HILDEGARD, Index, Zoology
FARIS, WILLIAM G., Seattle, Mathematics
GERBRACHT, ROBERT J., Seattle, Physics
HARTILL, DONALD L., Chewelah, Physics
HEIPLE, CLINTON R., Seattle, Engineering
HODGE, ROBERT W., Port Angeles, Social Sciences
HOPCROFT, JOHN E., Seattle, Engineering
INGRAHAM, JOHN C., Cambridge, Physics
JENKINS, DAVID A., Seattle, Engineering
JONAS, ROBERT J., Pullman, Biology
KARLINSEY, KURTLEE J., Tacoma, Engineering
KLEIN, GERALD W., Seattle, Chemistry
KROON, JOHN D., Seattle, Mathematics
KRUEGER, ROGER C., Seattle, Engineering
LAWLER, RONALD G., Seattle, Chemistry
MCNEILL, DALE A., Tacoma, Physics
RITER, JOHN R., Jr., Seattle, Chemistry
RUSTAD, NORMAN E., Poulsbo, Chemistry
SANDBERG, HOWARD E., Spokane, Biophysics
STAVE, LLOYD P., Seattle, Engineering
SWANSON, DONALD A., Centralia, Earth Sciences
VERNER, JARED, Bothell, Zoology
WIBERG, CURT A., Ellensburg, Biology

Cooperative Graduate

ARGABRIGHT, LOREN N., Seattle, Mathematics
BENSTON, MARGARET A., Kelso, Chemistry
BRANSCOMB, ELBERT W., Tacoma, Physics
CAMPBELL, WARREN A., Seattle, Astronomy
FIRTH, WILLIAM G., Seattle, Physics
FUKUSHIMA, EIICHI, Seattle, Physics
GERHOLD, GEORGE A., Seattle, Chemistry
HOFFMAN, ETHELWYN G., Seattle, Zoology
KIBBY, CHARLES L., Chelan, Chemistry
LONG, JOHN A., Seattle, Zoology
LOREE, THOMAS R., Vancouver, Physics
PARISEAU, MARIAN A., Kelso, Chemistry
PETERSEN, JON E., Olympia, Mathematics
PETERSON, ROY J., Everett, Physics
PILKEY, ORRIN H., Richland, Earth Sciences
RAMUS, JOSEPH E., Seattle, Physics
ROBBINS, STERLING G., Seattle, Anthropology
ROSENGREN, PATRICIA A., Centralia, Mathematics
SHACKLEFORD, WILLIAM L., Seattle, Engineering
STIEFBOLD, DAVID R., Pullman, Engineering
TOUTONGHI, JOHN P., Seattle, Physics
VERNON, CARL W., Seattle, Physics
WAKE, DAVID B., Parkland, Biology
WEISS, MAX L., Seattle, Mathematics

Summer Fellowships for Graduate Teaching Assistants

CONE, WYATT W., Pullman, Zoology
BAKUS, GERALD J., Seattle, Zoology
DUBE, MAURICE A., Rosalia, Botany
LARSEN, JOHN H., Jr., Tacoma, Zoology
PARISEAU, MARIAN A., Kelso, Chemistry
ROBBINS, STERLING G., Seattle, Anthropology
SCOTT, NORMAN R., Mead, Engineering

Postdoctoral

ALEXANDER, ALEX G., Lowell, Agriculture
BLUMENTHAL, ROBERT M., Seattle, Mathematics
CURRENT, JERRY H., Seattle, Chemistry
FAHRENBACH, WOLF H., Seattle, Zoology
KARGES, DAVID E., Seattle, Medical Sciences
LEPSE, PAUL A., Seattle, Chemistry
MCDANIELS, DAVID K., Seattle, Physics
MEERON, EMMANUEL, Seattle, Physics
TASHJIAN, ARMEN H., Jr., Seattle, Medical Sciences

Senior Postdoctoral

BLAIR, JOHN S., Seattle, Physics
JAYNE, BENJAMIN A., Pullman, Chemistry
PIERCE, RICHARD S., Seattle, Mathematics
WILETS, LAWRENCE, Seattle, Physics
WOOLF, HARRY, Seattle, Social Sciences

Science Faculty

BENDER, DONALD L., Pullman, Engineering
HALLEEN, ROBERT M., Pullman, Engineering
KRIENKE, O. KARL, Jr., Seattle, Physics
SANKS, ROBERT L., Spokane, Engineering
SMITH, LYNWOOD S., Bremerton, Zoology

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 Science
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

BILLHEIMER, JOHN W., Huntington, Engineering
CALDWELL, RICHARD A., Huntington, Chemistry
CLEVELAND, JAMES D., Charleston, Chemistry
DAVIDSON, CHARLES N., Paden City, Chemistry
FRIEDLY, JOHN C., Jr., Moundsville, Engineering
HARRIS, CONSTANCE M., South Charleston, Biochemistry
HIRST, LESTER L., Jr., Morgantown, Physics
HOLT, ROBERT B., Charleston, Chemistry
MANN, JAMES E., Jr., Bluefield, Engineering
WEIMER, ROBERT F., Wheeling, Engineering

Cooperative Graduate

BALL, EDWIN D., Philippi, Physics
BONAR, DANIEL D., Murraysville, Mathematics
CORMAN, CHARLES D., South Charleston, Psychology
FISHER, SAM S., Huntington, Engineering
JEFFERSON, GEORGE R., Fairmont, Engineering
RAY, JAMES P., Princeton, Mathematics
WOLFE, CHARLES M., Fairmont, Engineering

Summer Fellowships for Graduate Teaching Assistants

BIRD, SAMUEL O., South Charleston, Earth Sciences
GREENWALD, EDWARD K., Parkersburg, Physics
GUNTER, JOHN L., St. Albans, Physics

Postdoctoral

WHEELER, JAMES W., Jr., Fairmont, Chemistry

Science Faculty

WALKER, LEWIS A., Huntington, Chemistry

Summer Fellowships for Secondary School Teachers

ADALIS, DOROTHY, Weirton, Biology
NUNLEY, ROBERT GRAY, Williamsburg, Biology
BIRD, RALPH SIDNEY, Matoaka, Chemistry
SCHELL, DELMER L., Petersburg, Biology

WISCONSIN

Graduate

ASPNES, DAVID E., Deforest, Physics
BEALL, HERBERT A., Appleton, Chemistry
BEITZEL, JOHN E., Wauwatosa, Earth Sciences
BERMAN, NEIL S., Milwaukee, Engineering
BIRDSALL, WILLIAM C., Milwaukee, Social Sciences
BRANT, DAVID A., Madison, Chemistry
BUTTON, ALLAN C., Lake Geneva, Chemistry
CROWLEY, JOHN M., Readstown, Social Sciences

Doedens, Robert J., Milwaukee, Chemistry
Ebert, Paul M., Watertown, Engineering
Eikenberry, Eric F., Madison, Biophysics
Frea, James I., Sturgeon Bay, Microbiology
Freriks, Judith M., Waupun, Botany
Harriman, John E., Appleton, Chemistry
Heider, O. Frederick, Sheboygan, Engineering
Henke, William L., Janesville, Engineering
Hintzman, William R., Milwaukee, Mathematics
Ingraham, Edward C., Madison, Mathematics
Jacobs, Stanley J., Hartland, Mathematics
Kaufman, Ronald, Milwaukee, Psychology
Kestner, Neil R., Muskego, Chemistry
Kress, Lawrence F., Milwaukee, Botany
Krubsack, Arnold J., Clintonville, Chemistry
Leith, John D., Jr., Madison, Zoology
Levy, Jerome F., Madison, Chemistry
Link, John K., Madison, Physics
Macurda, Donald B., Jr., Madison, Earth Sciences
Mahowald, Anthony P., Milwaukee, Biology
Makous, Walter L., Wauwatosa, Physics
Meyer, Ralph R., Milwaukee, Zoology
Oetzel, George N., Beloit, Engineering
Ostriker, Jeremiah P., Madison, Astronomy
Ramsden, Charles J., Beloit, Engineering
Rutherford, Reginald, Madison, Physics
Smith, Douglas L., Madison, Chemistry
Sutton, Paul W., Sparta, Chemistry
Treichel, Paul M., Jr., Madison, Chemistry
Wagner, Eugene R., Madison, Chemistry
Wyngaard, John C., Madison, Engineering

Cooperative Graduate

Appleman, Joan D., Mukwonago, Chemistry
Ayen, Richard J., Marshall, Engineering
Beshinske, Raymond J., Madison, Chemistry
Bjorkholm, John E., Milwaukee, Engineering
Brill, Wesley A., Beloit, Engineering
Bronikowski, Thomas A., Milwaukee, Mathematics
Bruening, George E., Madison, Biochemistry
Chase, Lloyd L., Milwaukee, Physics
Eberhardt, John F., Milwaukee, Engineering
Elwood, James K., Ladysmith, Chemistry
Gillman, David S., Madison, Mathematics
Grimm, Robert A., Two Rivers, Chemistry
Halverson, Peder E., Neenah, Engineering
Hanss, Robert E., Milwaukee, Earth Sciences
Huppler, John D., Neenah, Engineering
Imhof, Violet I., South Milwaukee, Chemistry
Johnson, Paul A., Appleton, Chemistry
Klanderman, Kent A., Spring Valley, Chemistry
Krause, Eugene F., Madison, Mathematics
Levine, Seymour D., Madison, Chemistry
Mandelker, Mark W., Milwaukee, Mathematics
McClure, Charles W., Madison, Engineering
McCormack, Charles E., Salem, Physiology
Meisters, George J., Milwaukee, Chemistry
Pitterle, Thomas A., Milwaukee, Engineering
Pombraning, Gerald C., Oshkosh, Engineering
Riedl, John O., Jr., Milwaukee, Mathematics
Rublein, George T., West Allis, Mathematics
Sether, Lowell A., Iola, Zoology
Shands, Henry L., Madison, Agricultural Sciences
Wagner, Curtis A., Monroe, Physics
Wendland, Daniel W., Sheboygan, Engineering
Widmier, John M., Madison, Earth Sciences
Williams, Michael C., Waukesha, Engineering
Willson, Mary F., Baraboo, Zoology
Wolfe, Robert R., Chippewa Falls, Engineering
Wolpert, Julian, Madison, Social Sciences
Zawadzki, Joseph F., Withee, Chemistry

Summer Fellowships for Graduate Teaching Assistants

Bixler, John W., Sauk City, Chemistry
Bohrnstedt, George W., Arcadia, Social Sciences
Brown, Robert F., Madison, Mathematics
Dubrin, James W., Milwaukee, Chemistry
Greenwood, Priscilla E., Milwaukee, Mathematics
Leysieffer, Frederick W., Wauwatosa, Mathematics
Lonngren, Karl E., South Milwaukee, Engineering
Lundin, Herbert J., Oshkosh, Social Sciences
Macurda, Donald B., Jr., Madison, Earth Sciences
Hartley, Thomas G., La Crosse, Botany
Howard, Eugene F., Milwaukee, Botany
Klanderman, Kent A., Spring Valley, Chemistry
Kress, Lawrence F., Milwaukee, Botany
Krueger, Robert J., Madison, Engineering
Kulas, Gregory S., Waterford, Physics
Meisters, George J., Milwaukee, Chemistry
Nicholson, Richard S., Madison, Chemistry
Nybakken, Bette H., Madison, Biology
Poland, Duncan E., Madison, Chemistry
Pontrelli, Gene J., Madison, Chemistry
Price, Thomas M., Madison, Mathematics
Rasmussen, Gerald E., Janesville, Earth Sciences
Reid, Archie, Madison, Biology
Rust, Charles C., Madison, Zoology
Sell, George R., Hales Corners, Mathematics
Skindrud, Karlton D., Sparta, Psychology
Witt, Jerry R., Marshfield, Chemistry

Postdoctoral

Gaggioli, Richard A., Madison, Engineering
Miller, Gerald R., Milwaukee, Chemistry
Schneider, Imogene P., Pewaukee, Genetics
Whatley, Malcolm C., Madison, Physics
Woolsey, Neil F., Madison, Chemistry

Science Faculty

Aumann, Glenn D., Stanley, Zoology
Bennett, Miriam F., Milwaukee, Zoology
Feidreisen, William J., Madison, Engineering
Gotter, Elroy E., Eau Claire, Mathematics
Jansen, Richard J., Madison, Engineering
Law, John, Jr., Madison, Engineering
Lawrence, Willard E., Milwaukee, Mathematics

LIVERMORE, DONALD F., Madison, Engineering
WHITEFORD, ANDREW H., Beloit, Anthropology

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, Milwaukee, Biology
REINHOLZ, HARVEY H., Appleton, Biology
TREBATOSKI, SR. M. GABRIEL, Stevens Point, Biology
WEINBERGER, F. RICHARD, Muskego, Mathematics
WOLFF, HARRY LUDWIG, Janesville, Mathematics
ZWENG, MARILYN J., Madison, Mathematics

WYOMING

Graduate

CALVERT, JAMES B., Casper, Physics
FRONAPFEL, RICHARD W., Torrington, Mathematics

Cooperative Graduate

GILBERT, JOHN C., Laramie, Chemistry

Summer Fellowships for Graduate Teaching Assistants

MILLER, DON E., Cheyenne, Zoology
SCULLY, MARLAN O., Casper, Physics

Science Faculty

SINGLETON, PAUL C., Laramie, Chemistry

Summer Fellowships for Secondary School Teachers

NIELSEN, LENUS A., Sheridan, General Science

Institutions 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 Fellowship Program for Secondary School Teachers. G. Summer Fellowship Program for Graduate Teaching Assistants.]

	A	B	C	D	E	F	G
Alabama, University of, University, Ala					1	1	3
Alaska, University of, College, Alaska	1						
American University, Washington, D.C							1
Arizona State College, Flagstaff, Ariz						1	
Arizona State University, Tempe, Ariz						2	
Arizona, University of, Tucson, Ariz	5					3	3
Arkansas, University of, Fayetteville, Ark	5					4	
Atlanta University, Atlanta, Ga						5	
Auburn University, Auburn, Ala	2						3
Baylor University, Waco, Tex							4
Boston College, Chestnut Hill, Mass	2					1	
Boston University, Boston, Mass	7						5
Bowling Green State University, Bowling Green, Ohio						1	
Brandeis University, Waltham, Mass	5		2				
Brigham Young University, Provo, Utah							3
Brooklyn, Polytechnic Institute of, Brooklyn, N.Y	8					1	2
Brown University, Providence, R. I	5	9			2		3
Bryn Mawr College, Bryn Mawr, Pa	4				1		3
Buffalo, University of, Buffalo, N.Y	3					1	4
California Institute of Technology, Pasadena, Calif	22	96	8		2		3
California, University of, Berkeley, Calif	40	161	11	2	16	2	9
California, University of, Davis, Calif		1			1		
California, University of, La Jolla, Calif		5	1	1	1		
California, University of, Los Angeles, Calif	13	17	3		4	2	10
California, University of, Riverside, Calif						1	
California, University of, San Francisco, Calif		1					
California, University of, Santa Barbara, Calif					1		
Carnegie Institute of Technology, Pittsburgh, Pa	17	11	1	3			2
Carnegie Institute of Washington, Washington, D.C				1			
Case Institute of Technology, Cleveland, Ohio	5				2		3
Catholic University of America, Washington, D.C	5				1	8	3
Central Missouri State College, Warrensburg, Mo						1	
Chicago, University of, Chicago, Ill	21	50	2		2	2	11
Children's Hospital, Columbus, Ohio			1				
Cincinnati, University of, Cincinnati, Ohio	7	1			2		2
Clark University, Worcester, Mass	2				1		
Clemson Agricultural College, Clemson, S.C	3						
Colorado State College, Greeley, Colo						3	
Colorado State University, Fort Collins, Colo	3					2	1
Colorado, University of, Boulder, Colo	4	10			3	10	5
Columbia University, New York, N.Y	32	30	1		5	7	10

	A	B	C	D	E	F	G
Connecticut, University of, Storrs, Conn	6						1
Cornell University, Ithaca, N.Y	28	29	3		5		14
Creighton University, Omaha, Nebr						3	
Dartmouth University, Hanover, N.H			1				
Delaware, University of, Newark, Del	4	1			1		3
Detroit, University of, Detroit, Mich						2	
Dominican College of San Rafael, San Rafael, Calif						2	
Duke University, Durham, N.C		7			1	2	4
Duquesne University, Pittsburgh, Pa							1
Emory University, Atlanta, Ga	2		1				1
Florida State University, Tallahassee, Fla	4	6			1	2	3
Florida, University of, Gainesville, Fla	1				5	3	5
Fordham University, New York, N.Y	1				1	10	3
George Peabody College for Teachers, Nashville, Tenn						1	2
George Washington University, Washington, D.C	3						
Georgetown University, Washington, D.C	3						1
Georgia Institute of Technology, Atlanta, Ga	4				1		1
Georgia, University of, Athens, Ga	3	1				2	4
Hahnemann Medical College, Philadelphia, Pa							1
Harvard University, Cambridge, Mass	25	206	16	1	9		12
Hawaii, University of, Honolulu, Hawaii	1	1				1	1
Houston, University of, Houston, Tex	3				1		
Humboldt State College, Arcata, Calif						1	
Hunter College, New York, N.Y						1	
Idaho, University of, Moscow, Idaho	3						3
Illinois Institute of Technology, Chicago, Ill	5				1	3	3
Illinois State Normal University, Normal, Ill						1	
Illinois, University of, Urbana, Ill	32	42	2		12	3	27
Immaculate Heart College, Los Angeles, Calif						1	
Indiana University, Bloomington, Ind	13	13	1		1	8	6
Institute for Advanced Study, Princeton, N.J			12	8			
Institute of Paper Chemistry, Appelton, Wis	1						
Iowa State University of Science and Technology, Ames, Iowa	14	11			4		11
Iowa, State University of, Iowa City, Iowa	9	7	1		2	2	7
John Carroll University, Cleveland, Ohio						1	
Johns Hopkins University, Baltimore, Md	6	26	1		3	1	4
Kansas State Teachers College, Emporia, Kans						3	
Kansas State University of Agriculture and Applied Sciences, Manhattan, Kans	7				3		4
Kansas, University of, Lawrence, Kans	7	6			1		4
Kentucky, University of, Lexington, Ky	4						3
Lehigh University, Bethlehem, Pa	4				1		1
Long Beach State College, Long Beach, Calif						1	
Los Angeles State College, Los Angeles, Calif						1	
Louisiana Polytechnic Institute, Ruston, La						1	
Louisiana State University and Agricultural and Mechanical College, Baton Rouge, La	8	5			2	2	6
Louisville, University of, Louisville, Ky	2					1	1
Loyola University, Chicago, Ill	4					2	4
Maine, University of, Orono, Maine	2						
Mankato State College, Mankato, Minn						1	
Marine Biological Laboratory, Woods Hole, Mass					1		
Marquette University, Milwaukee, Wis						4	2
Maryland, University of, College Park, Md	8	5	3				4
Massachusetts Institute of Technology, Cambridge, Mass	43	168	2	1	4		27
Massachusetts, University of, Amherst, Mass	1						2
Medical College of Virginia, Richmond, Va	2				1		
Miami, University of, Coral Gables, Fla	3					1	3
Michigan State University, East Lansing, Mich	17	7			12	2	12
Michigan, University of, Ann Arbor, Mich	34	34		1	12	5	24
Minnesota, University of, Minneapolis, Minn	29	14	2	1	6	3	19
Mississippi Southern College, Hattiesburg, Miss						1	
Mississippi State University, State College, Miss	7						1
Mississippi, University of, University, Miss	2					1	2
Missouri, University of, Columbia, Mo	7	1			2		6
Montana State College, Bozeman, Mont	3						1
Montana State University, Missoula, Mont						3	2
Nebraska, University of, Lincoln, Nebr	6				2		6
New Hampshire, University of, Durham, N.H	2					2	4
New Mexico Highlands University, Las Vegas, N. Mex						1	
New Mexico State University, State College, N. Mex	3				1	2	3
New Mexico, University of, Albuquerque, N. Mex	3						4

	A	B	C	D	E	F	G
New York, State University of, College of Education, Albany, N.Y.						1	
New York, State University of, College of Forestry, Syracuse, N.Y.	3				1		2
New York University, New York, N.Y.	43	9	3		2	7	3
North Carolina State College of Agriculture and Engineering, Raleigh, N.C.	8		2		1		6
North Carolina, University of, Chapel Hill, N.C.	5	4	1		1	1	4
North Dakota State University, N. Dak.	2						2
North Dakota, University of, Grand Forks, N. Dak.	5					2	4
North Texas State College, Denton, Tex.						3	
Northern Michigan College, Marquette, Mich.						1	
Northwestern University, Evanston, Ill.	8	14	2		4	5	3
Notre Dame, University of, Notre Dame, Ind.	7				2	16	3
Oak Ridge National Laboratory, Oak Ridge, Tenn.			1				
Ohio State University, Columbus, Ohio	47	12	2		6	6	15
Ohio University, Athens, Ohio	1						1
Oklahoma State University of Agriculture and Applied Sciences, Stillwater, Okla.	6	4			3	9	6
Oklahoma, University of, Norman, Okla.	5	7			2		5
Oregon State College, Corvalis, Oreg.	7				2	2	4
Oregon, University of, Eugene, Oreg.	5	6			1	1	5
Pacific, University of the, Stockton, Calif.	1				1		
Pennsylvania State University, University Park, Pa.	13	7			3	7	8
Pennsylvania, University of, Philadelphia, Pa.	15	15				3	4
Peter Bent Brigham Hospital, Boston, Mass.			1				
Pittsburgh, University of, Pittsburgh, Pa.	8				2	5	7
Prairie View Agricultural and Mechanical College, Prairie View, Tex.						1	
Princeton University, Princeton, N.J.	10	112	2		2		7
Puerto Rico, University of, Rio Piedras, P.R.						1	
Purdue University, Lafayette, Ind.	36	22			10	12	20
Radcliffe College, Cambridge, Mass.	2	18					2
Rensselaer Polytechnic Institute, Troy, N.Y.	5	4			1	13	1
Rhode Island, University of, Kingston, R.I.	3						2
Rochester, University of, Rochester, N.Y.	6		1			1	5
Rutgers, The State University, New Brunswick, N.J.	7				2		
St. Bonaventure University, St. Bonaventure, N.Y.	1					2	
St. Johns University, Jamaica, N.Y.	1					2	
St. Louis University, St. Louis, Mo.	3				1	3	
San Diego State College, San Diego, Calif.						1	
San Jose State College, San Jose, Calif.						2	
Seattle University, Seattle, Wash.						3	
Smithsonian Institution, Washington, D.C.						1	
South Carolina, University of, Columbia, S.C.	3	1					4
South Dakota, State University of, Vermillion, S. Dak.						7	1
Southern California, University of, Los Angeles, Calif.	5				2	3	4
Southern Illinois University, Carbondale, Ill.	1						
Southwestern Louisiana Institute, Lafayette, La.						2	
Stanford University, Stanford, Calif.	39	70	5	2	20	5	19
Stevens Institute of Technology, Hoboken, N.J.	6						3
Syracuse University, Syracuse, N.Y.	11				3	4	9
Temple University, Philadelphia, Pa.	1	1					2
Tennessee, University of, Knoxville, Tenn.	7						5
Texas, Agricultural and Mechanical College of, College Station, Tex.	2				1		4
Texas Technological College, Lubbock, Tex.							2
Texas, University of, Austin, Tex.	12	10	2		9	5	10
Trinity University, San Antonio, Tex.						1	
Tufts University, Medford, Mass.	1						
Tulane University, New Orleans, La.	3	1	1				5
United States Department of Health, Education, and Welfare, Washington, D.C.			1				
Utah State University, Logan, Utah	3	1					1
Utah, University of, Salt Lake City, Utah	2				2		4
Vanderbilt University, Nashville, Tenn.	3	1			1		3
Villanova University, Villanova, Pa.						1	
Virginia Polytechnic Institute, Blacksburg, Va.	3				1		1
Virginia, University of, Charlottesville, Va.	4		1		1	1	
Wake Forest College, Winston-Salem, N.C.		1					
Washington State University, Pullman, Wash.	3	1					1
Washington University, St. Louis, Mo.	8				3		4
Washington, University of, Seattle, Wash.	27	14	1	1	3	6	8
Wayne State University, Detroit, Mich.	5					4	3
Wesleyan University, Middletown, Conn.						2	
West Virginia University, Morgantown, W. Va.	3						1

Institutions Chosen by Fellowship Awardees—Continued

	A	B	C	D	E	F	G
Western Illinois University, Macomb, Ill						2	
Western Michigan University, Kalamazoo, Mich						1	
Western Reserve University, Cleveland, Ohio	3					7	2
William Marsh Rice University, Houston, Tex	3	4					2
Wisconsin, University of, Madison, Wis	46	52	7		13	13	24
Worcester Polytechnic Institute, Worcester, Mass	3	1					
Wyoming, University of, Laramie, Wyo						4	3
Xavier University, Cincinnati, Ohio						3	
Yale University, New Haven, Conn	11	48	1		4		9
Yeshiva University, New York, N.Y	3	1	3		1	1	

Foreign Institutions Chosen by Fellowship Awardees

	Graduate	Post-Doctoral	Senior Post-Doctoral	Science Faculty
Agricultural Research Council, England			1	
Amsterdam, University of, Netherlands			1	
Atomic Energy Research Establishment, England		1		
Australian National University, Australia		2		
Baden Institute of Technology, Germany		2		
Basel, University of, Switzerland		1		
Bern, University of, Switzerland			1	
Birmingham, University of, England				1
Bonn, University of, Germany		1		
Bristol, University of, England		1		1
British Columbia, University of, Canada	1			
British Museum of Natural History, England		1		
Brussels, University of, Belgium		1	3	
Cambridge University, England	5	10	2	3
Carlsberg Foundation, Biological Institute, Denmark				2
Catholic University of Sacred Heart, Italy			1	
CERN, Switzerland		7	4	
College of France, France		1		
Cologne, University of, Germany			1	
Commonwealth Scientific and Industrial Research Organization, Australia		1		
Copenhagen, University of, Denmark		6	6	2
Council for Scientific Research, Spain				1
Ecuador, Central University of, Ecuador			1	
Edinburgh, University of, Scotland	1		2	
Florence, University of, Italy			1	
Frankfurt, University of, Germany			1	
French Atomic Energy Commission, France			1	
Glasgow, University of, Scotland		1		1
Gottingen, University of, Germany			1	
Grenoble, Polytechnical Institute of, France		1		
Hamburg, University of, Germany	1			
Hebrew University, Israel		1		
Heidelberg, University of, Germany		1	1	
Hokkaido University, Japan		1		
Hospital of Saint-Antoine, France		1		
Institute of Physio-Chemical Biology, France			2	
Iron and Steel Institute for Research, France				1
Karolinska Institute, Sweden			1	
Leeds, University of England	1	1		
Leicester, University of, England		1		
Leiden, University of, Netherlands		1		
Liege, University of, Belgium			1	
London, University of, England		11	9	11
Marburg, University of, Germany		3		
Max Plank Institute, Germany		8	1	1
Milan, University of, Italy		1		
Munich, University of, Germany		2	1	1
Munster, University of, Germany			1	

	Graduate	Post-Doctoral	Senior Post-Doctoral	Science Faculty
National Center of Scientific Research, France		5	4	
National Institute of Psychology, Italy			1	
National Institute of Radiological Sciences, Japan			1	
National Research Council, Canada		1		
Netherlands School of Economics, Netherlands		2		
New Zealand Oceanographic Institute, New Zealand		1		
Oslo, University of, Norway	1	2	1	
Oxford University, England	8	7	3	1
Paris, University of, France		8	3	2
Pasteur Institute, France			3	
Reading, University of, England		1		
Rome, University of, Italy		2	1	1
Royal Institute of Technology, Sweden		1		
Royal Veterinary College, Sweden		1		
Saclay Nuclear Research Center, France		3	2	
St. Andrews, University of, Scotland	1			
St. Thomas' Hospital, England		2		
Sheffield, University of, England		1	1	
Stockholm University of, Sweden		2		
Swiss Federal Institute of Technology, Switzerland		3	2	4
Sydney, University of, Australia		1	1	
Technical Institute, Germany		1	1	1
Teheran, University of, Iran		1		
Tokyo, University of, Japan		1	1	
Tubingen, University of, Germany		1		
University of Technology, Austria				1
Uppsala, Royal University of, Sweden		3		1
Veterinary School of Norway, Norway			1	
Vienna, University of, Austria			1	
Weizmann Institute of Science, Israel		4	2	
Zoological Station, Italy	1			
Zurich, University of, Switzerland		2	2	

Present or Most Recent Institutional Affiliation of Individuals Offered Science Faculty, Senior Postdoctoral, and Postdoctoral Fellowships

	Science faculty	Senior post-doctoral	Post-doctoral
Adelphi College, Garden City, N.Y	1		
Akron, University of, Akron, Ohio	1		
Alaska, University of, College, Alaska	1		
Alcorn Agricultural and Mechanical College, Alcorn, Miss	1		
American International College, Springfield, Mass	1		
American University, Washington, D.C	1		
Antelope Valley Junior College, Lancaster, Calif	1		
Arizona State University, Tempe, Ariz	1		
Arizona, University of, Tucson, Ariz	2		
Arkansas, University of, Fayetteville, Ark	2		
Arlington State College, Arlington, Tex	1		
Auburn University, Auburn, Ala	1		
Augsburg College and Theological Seminary, Minneapolis, Minn	1		
Aurora College, Aurora, Ill	1		
Austin College, Sherman, Tex	1		
Baker University, Baldwin City, Kans	1		
Ball State Teachers College, Muncie, Ind	1		
Barnard College, New York, N.Y		1	
Baylor University, Waco, Tex	1		
Belleville Township Junior College, Belleville, Ill	1		
Beloit College, Beloit, Wis	1		
Birmingham, University of, England			1
Bowdoin College, Brunswick, Maine	2		
Brandeis University, Waltham, Mass		3	
Brookhaven National Laboratory, New York, N.Y		1	
Brown University, Providence, R.I	1	2	
Bucknell University, Lewisburg, Pa	1		

Present or Most Recent Institutional Affiliation of Individuals Offered Science Faculty, Senior Postdoctoral, and Postdoctoral Fellowships—Con.

	Science faculty	Senior post-doctoral	Post-doctoral
California Institute of Technology, Pasadena, Calif.	1		10
California State Polytechnic College, San Luis Obispo, Calif.	2		
California, University of, Berkeley, Calif.		7	21
California, University of, Davis, Calif.		2	1
California, University of, La Jolla, Calif.			1
California, University of, Los Angeles, Calif.	1	4	10
California, University of, Riverside, Calif.	1	1	
Cambridge University, England			4
Carnegie Institute of Technology, Pittsburgh, Pa.		2	3
Case Institute of Technology, Cleveland, Ohio	2		
Catholic University of Puerto Rico, Ponce, P.R.	1		
Centenary College, Shreveport, La.	1		
Central Michigan University, Mt. Pleasant, Mich.	1		
CERN, Switzerland			1
Chattanooga, University of, Chattanooga, Tenn.	1		
Chicago City Junior College, Woodrow Wilson Branch, Chicago, Ill.	1		
Chicago, University of, Chicago, Ill.	1	2	15
Chico State College, Chico, Calif.	1		
Cincinnati, University of, Cincinnati, Ohio	4		
Citrus Junior College, Azusa, Calif.	1		
Clarion State College, Clarion, Pa.	1		
Clark University, Worcester, Mass.	1		
Clarke University, Dubuque, Iowa	1		
Clarkson College of Technology, Potsdam, N.Y.	3		
Colorado College, Colorado Springs, Colo.	1		
Colorado State University, Fort Collins, Colo.	2		
Colorado, University of, Boulder, Colo.	3		
Columbia University, New York City, N.Y.	2		7
Connecticut, University of, Storrs, Conn.	2		
Contra Costa College, San Pablo, Calif.	1		
Cornell University, Ithaca, N.Y.	2	3	12
Dana College, Blair, Nebr.	1		
Dartmouth College, Hanover, N.H.	2		
Dayton, University of, Dayton, Ohio	1		
Denison College, Granville, Ohio	1		
DePauw University, Greencastle, Ind.	1		
Drexel Institute, Philadelphia, Pa.	1		
Duke University, Durham, N.C.	1		1
Earlham College, Richmond, Ind.	1		
Eastern Michigan University, Ypsilanti, Mich.	1		
El Camino College, El Camino College, Calif.	1		
Emory University, Atlanta, Ga.	1		1
Evansville College, Evansville, Ind.	1		
Flora Macdonald College, Red Springs, N.C.	1		
Florida Christian College, Tampa, Fla.	1		
Florida State University, Tallahassee, Fla.	1		2
Florida, University of, Gainesville, Fla.	4		
Fordham University, New York, N.Y.	3		
Francis T. Nicholls State College, Thibodaux, La.	1		
Franklin and Marshall College, Lancaster, Pa.	2		
Fresno State College, Fresno, Calif.	1		
Fullerton Junior College, Fullerton, Calif.	1		
General Motors Institute, Flint, Mich.	1		
Geneva College, Beaver Falls, Pa.	1		
George Washington University, Washington, D.C.	1		1
Georgia Institute of Technology, Atlanta, Ga.	2		
Georgia State College for Women, Milledgeville, Ga.	1		
Gogebic Community College, Ironwood, Mich.	1		
Gonzaga University, Spokane, Wash.	1		
Grinnell College, Grinnell, Iowa	1		
Harvard University, Cambridge, Mass.			16
Hawaii, University of, Honolulu, Hawaii	1		
Hiram College, Hiram, Ohio	1		
Hofstra College, Hempstead, L.I., N.Y.	1		
Howard University, Washington, D.C.	1		
Idaho, University of, Moscow, Idaho	2		
Illinois, University of, Urbana, Ill.	1	2	14
Illinois, University of, Chicago, Ill.	2		
Indiana University, Bloomington, Ind.		3	1
Iowa State University of Science and Technology, Ames, Iowa	1	1	3
Jackson Junior College, Jackson, Mich.	1		
Jackson State College, Jackson, Miss.	1		
Jamestown College, Jamestown, N. Dak.	1		
Johns Hopkins University, Baltimore, Md.		2	1

Present or Most Recent Institutional Affiliation of Individuals Offered Science Faculty, Senior Postdoctoral, and Postdoctoral Fellowships—Con.

	Science faculty	Senior post-doctoral	Post-doctoral
Kalamazoo College, Kalamazoo, Mich	1		
Kansas State University of Agriculture and Applied Science, Manhattan, Kans.	1		
Kansas, University of, Lawrence, Kans		1	1
Kansas Wesleyan University, Salina, Kans	1		
Kentucky, University of, Lexington, Ky	2		
Lafayette College, Easton, Pa	1		
Lamar State College of Technology, Beaumont, Tex	1		
Lee College, Baytown, Tex	1		
London, University of, England			2
Long Beach City College, Long Beach, Calif	1		
Long Beach State College, Long Beach, Calif	1		
Long Island University, Brooklyn, N.Y	1		
Louisiana, Northwestern State College of, Natchitoches, La	1		
Louisiana Polytechnic Institute, Ruston, La	1		
Louisiana State University, Baton Rouge, La	2		
Louisiana State University, New Orleans, La	1		
Luther College, Decorah, Iowa	2		
Maine, University of, Orono, Maine	1		
Manhattan College, New York, N.Y	1		
Marburg, University of, Germany			1
Marquette University, Milwaukee, Wis	1		
Marshall College, Huntington, W. Va	1		
Maryland, College of Notre Dame of, Baltimore, Md	1		
Maryland, University of, College Park, Md		1	2
Massachusetts General Hospital, Boston, Mass		1	
Massachusetts Institute of Technology, Cambridge, Mass		2	11
Massachusetts, University of, Amherst, Mass	4		
Messiah College, Grantham, Pa	1		
Mexico City College, Mexico			1
Michigan College of Mining and Technology, Houghton, Mich	2		
Michigan State University of Agriculture and Applied Science, East Lansing, Mich	3	1	2
Michigan, University of, Ann Arbor, Mich	3	2	3
Minnesota, University of, Minneapolis, Minn	1	3	4
Mississippi State College for Women, Columbus, Miss	1		
Missouri, University of, Columbia, Mo	3	1	
Missouri, University of, School of Mines, Rolla, Mo	5		
Missouri Valley College, Marshall, Mo	1		
Montana State College, Bozeman, Mont	2		
Montclair State College, Upper Montclair, N.J	1		
Mount Holyoke College, South Hadely, Mass	2		
Municipal Museum, Riverside, Bell Telephone Laboratories, N.J		2	
National Institutes of Health, Bethesda, Md			1
Nebraska Wesleyan University, Lincoln, Nebr	1		
New Hampshire, University of, Durham, N.H	1		
New York, State University of, Agriculture and Technical Institute at Farmingdale, N.Y	1		
New York State University of, College of Education at Brockport, N.Y	1		
New York University, New York, N.Y		2	2
North Carolina State College of Agriculture and Engineering, Raleigh, N.C	3		
North Carolina, University of, Chapel Hill, N.C			1
Northern Illinois University, DeKalb, Ill	1		
Northern Michigan College, Marquette, Mich	1		
Northwestern University, Evanston, Ill		3	2
Notre Dame, College of, Belmont, Calif	1		
Oak Ridge National Laboratories, Oak Ridge, Tenn		1	
Oakland City College, Merritt Campus, Oakland, Calif	1		
Oberlin College, Oberlin, Ohio	1		
Ohio State University, Columbus, Ohio	2	2	7
Oklahoma State University of Agriculture and Applied Sciences, Stillwater, Okla	3		
Oklahoma, University of Norman, Okla		2	
Olympic College, Bremerton, Wash	1		
Oregon State, Corvallis, Oreg	3	1	
Oregon, University of, Eugene, Oreg		1	
Oxford University, England			1
Pennsylvania State University, Ogontz Campus, Philadelphia, Pa	1		
Pennsylvania State University, University Park, Pa	3	3	3
Pennsylvania, University of, Philadelphia, Pa	1	1	2
Pittsburgh, University of, Pittsburgh, Pa	1	1	1
Polytechnic Institute of Brooklyn, Brooklyn, N.Y	1		
Pomona College, Claremont, Calif	2		
Prairie View Agricultural and Mechanical College, Prairie View, Tex	2		

Present or Most Recent Institutional Affiliation of Individuals Offered Science Faculty, Senior Postdoctoral, and Postdoctoral Fellowships—Con.

	Science faculty	Senior post-doctoral	Post-doctoral
Princeton University, Princeton, N.J		1	14
Purdue University, Lafayette, Ind	7	2	3
Radcliffe College, Cambridge, Mass			1
Randolph-Macon Women's College, Lynchburg, Va	1		
Redlands, University of, Redlands, Calif	1		
Reed College, Portland, Oreg	2		
Rice Institute, Houston, Tex	1	1	1
Rider College, Trenton, N.J	1		
Rochester, University of, Rochester, N.Y	1	1	2
Rockefeller Institute, New York, N.Y			1
Rockford College, Rockford, Ill	1		
Rutgers, The State University, New Brunswick, N.J	3	1	1
St. Joseph's College, Collegeville, Ind	1		
St. Louis University, St. Louis, Mo		2	
St. Michael's College, Winouski, Vt	1		
St. Olaf's College, Northfield, Minn	2		
Sacramento State College, Sacramento, Calif	1		
San Jose State College, San Jose, Calif	4		
San Mateo, College of, San Mateo, Calif	1		
Santa Clara, University of, Santa Clara, Calif	1		
Sarah Lawrence College, Bronxville, N.Y	1		
Seattle Pacific College, Seattle, Wash	1		
South Carolina, University of, Columbia, S.C	1		
South Dakota School of Mines and Technology, Rapid City, S. Dak	1		
South Dakota State College of Agriculture and Mechanic Arts, Brookings, S. Dak	1		
Southern California, University of, Los Angeles, Calif		1	1
Southern Illinois University, Carbondale, Ill	1		
Southern Methodist University, Dallas, Tex	2		
Southern University and Agricultural and Mechanical College, Baton Rouge, La	1		
Southwestern College, Winfield, Kans	1		
Stanford University, Stanford, Calif	1	4	7
State College at Salem, Salem, Mass	1		
Stevens Institute of Technology, Hoboken, N.J		1	
Swarthmore College, Swarthmore, Pa	1		
Sweetbriar College, Sweet Briar, Va	1		
Sydney, University of, Australia			1
Syracuse University, Syracuse, N.Y		1	1
Tabor College, Hillsboro, Kans	1		
Texas Agricultural and Mechanical College, College Station, Tex	3	1	
Texas Western College, El Paso, Tex	1		
Texas, University of, Austin, Tex	2	1	4
Toledo, University of, Toledo, Ohio	1		
Trinity College, Burlington, Vt	1		
Tri-State College, Angola, Ind	2		
Tufts University, Medford, Mass	1		
Tulane University, New Orleans, La			2
Tuskegee Institute, Tuskegee Institute, Ala	1		
Union College, Lincoln, Neb	1		
Union College and University, Schenectady, N.Y	2		
United States Naval Postgraduate School, Monterey, Calif	1		
Upland College, Upland, Calif	1		
Upper Iowa University, Fayette, Iowa	1		
Upsala College, East Orange, N.J	1		
Utah State University of Agriculture and Applied Science, Logan, Utah	2	1	1
Utah, University of, Salt Lake City, Utah	1		
Vanderbilt University, Nashville, Tenn	2		
Vermont, University of, Burlington, Vt			1
Villa Marie College, Erie, Pa	1		
Warsaw, University of, Poland			1
Washington State University, Pullman, Wash	2	1	
Washington University, St. Louis, Mo	2	1	1
Washington, University of, Seattle, Wash		4	6
Wayne State University, Detroit, Mich	1		
Western Michigan University, Kalamazoo, Mich	1		
Wheaton College, Norton, Mass	1		
Wichita, University of, Wichita, Kans	1		
William and Mary, College of, Williamsburg, Va	2		
Wisconsin State College, Whitewater, Wis	1		
Wisconsin, University of, Madison, Wis	4		6
Wyoming, University of, Laramie, Wyo	1		
Yale University, New Haven, Conn	1		6
Yeshiva University, New York City, N.Y			1

APPENDIX F

Publications of the National Science Foundation

This listing includes publications issued by the National Science Foundation during fiscal year 1961. 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

Tenth Annual Report, for fiscal year ending June 30, 1960: NSF 61–1, $1.

Second Annual Weather Modification Report, for fiscal year ending June 30, 1960: NSF 61–30, $0.15.

MANPOWER AND EDUCATION REPORTS

1. Scientific Manpower—1960 (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 61–34, $0.40.
2. Scientific Manpower Bulletin
   No. 12. Salaries and Characteristics of Scientists in the National Register of Scientific and Technical Personnel, 1960: NSF 60–78.
3. The Science Doctorates of 1958 and 1959, Their Numbers, Characteristics, and Employment: NSF 60–60, $0.25.
4. Scientific and Technical Personnel in American Industry, Report on a 1959 Survey: NSF 60–62, $0.45.
5. National Science Foundation Programs for Education in the Sciences: NSF 61–5.
6. Professional Manpower and Education in Communist China: NSF 61–3, $2.
7. Fellowship, Institute, and Other Education Program Announcements (with instructions for applying).

RESEARCH AND DEVELOPMENT ECONOMIC REPORTS

1. Federal Funds for Science IX. The Federal Research and Development Budget, Fiscal Years 1959, 1960, and 1961: NSF 60–80, $0.50.
2. Reviews of Data on Research and Development (A series of leaflets devoted to specific aspects of research and development economics):
   No. 28. Capital Expenditures for Research and Development in Colleges and Universities, Fiscal Year 1958: NSF 61–31, $0.05.
   No. 27. Scientists and Engineers Engaged in Research and Development in Colleges and Universities, 1958: NSF 61–21, $0.10.
   No. 26. Research and Development and the Gross National Product: NSF 61–9, $0.10.
   No. 25. Funds for Research and Development in Agriculture Experiment Stations and Agricultural Colleges in the U.S., Fiscal Year 1958: NSF 60–70, $0.10.
   No. 24. Funds for Performance of Research and Development in American Industry, 1959: NSF 60–81, $0.10.
   No. 23. Federal Contract Research Centers in Colleges and Universities, Fiscal Year 1958: NSF 60–61, $0.05.
   No. 22. Funds for the Performance of Basic Research in the United States, 1953–58: NSF 60–43, $0.15.
   No. 21. Funds for Research and Development in Engineering Schools, Fiscal Year 1958: NSF 60–42, $0.10.
3. Current Projects on Economic and Social Implications of Scientific Research and Development, 1960: NSF 60–79, $0.60.
4. Funds for Research and Development in Industry, 1957: NSF 60–49, $0.65.

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. 2, No. 4, August–September 1960; NSF 60–47.
   Vol. 2, No. 5, October–November 1960; NSF 60–64.
   Vol. 2, No. 6, December 1960–January 1961; NSF 60–77.
   Vol. 3, No. 1, February–March, 1961; NSF 61–11.
   Vol. 3, No. 2, April–May, 1961; NSF 61–23.
   Vol. 3, No. 3, June–July, 1961; NSF 61–35.
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. 10. Veterans Administration: NSF 61–22, $0.10.
   No. 9. Federal Communications Commission: NSF 61–12, $0.05.
   No. 8. Department of Commerce, Part III: NSF 60–59, $0.10.

No. 7. Department of Commerce, Part II: NSF 60–58, $0.20.
No. 6. National Science Foundation: NSF 60–56, $0.10.
No. 5. Tennessee Valley Authority: NSF 60–44, $0.05.

3. Current Research and Development in Scientific Documentation (Semiannual reports containing descriptive statements from individuals and organizations involved in this field):
   No. 7, NSF 60–65, $0.65.
   No. 8, NSF 61–29, $0.65.
4. List of Russian Scientific Journals Available in English: NSF 60–46.
5. Dues and Memberships in Scientific Societies: NSF 60–55.

SCIENCE ADMINISTRATION REPORTS

1. The Role of Nuclear Reactors in University Research Programs: NSF 60–39.
2. Science, the Endless Frontier (Reissued as part of the Tenth Anniversary Observance, National Science Foundation, 1950–1960): NSF 60–40.
3. Investing in Scientific Progress: NSF 61–27.

U.S. GOVERNMENT PRINTING OFFICE: 1961