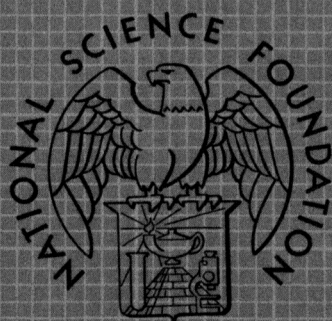


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National  
Science  
Foundation

10th *Annual Report, 1960*



# National Science Foundation

*Tenth Annual Report for the  
Fiscal Year Ended June 30, 1960*



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**LETTER OF TRANSMITTAL**

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

MY DEAR MR. PRESIDENT:

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

Respectfully,

ALAN T. WATERMAN,  
*Director, National Science Foundation.*

*The Honorable*

*The President of the United States.*

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## THE DIRECTOR'S STATEMENT

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

ALAN T. WATERMAN,  
*Director, National Science Foundation.*

Stimulating

The

National

Research

Effort

## STIMULATING THE NATIONAL RESEARCH EFFORT

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

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

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

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

The three factors which must be considered are:

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

### Progress of Research in Science

#### Conduct of Basic Research

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

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\*Published December 1958.

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

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

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

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

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

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

### **Support Methods**

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

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

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

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

### **Facilities for Research**

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

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

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

### **International Participation**

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



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

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

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

### **Communication of Scientific Information**

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

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

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

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

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

## **Development of the Individual Scientist**

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

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

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

. . . Americans should attach greater value to intellectual excellence.

. . . Every school and college should reexamine its curriculum to make sure that in every aspect it is giving adequate challenge to the intellectual capacities of its students.

. . . We should do far more than we are now doing to enhance the prestige of the teacher and to provide him with more effective support in his efforts to improve the effectiveness of his teaching.

. . . We should move much further in the direction of adapting our educational programs to the widely varying competence of students, and seek especially to meet the needs of the most gifted students.

. . . We should improve our scientific education at all levels, attempting to give better understanding of science to the nonscientist as well as to discover and stimulate more individuals who have the talents to become scientists and engineers.

. . . To attain these ends we conclude that four major areas need specific and urgent attention throughout our educational system:

- (1) the curriculum and the content of courses,
- (2) the quality and effectiveness of teachers,
- (3) the recognition and encouragement of students, and
- (4) the development of intellectual leadership.\*\*

### **Fellowships in Science**

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

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

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

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

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

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

### **Science Teacher Training**

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

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

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

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

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

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

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

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

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

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

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

### **Curriculum Improvement**

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

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

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

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

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

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

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

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

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

### **Support Should Emphasize Basic Research**

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

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

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

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

### **Rise of New Types of Research Organizations**

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

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



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

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

### **Group or Individual Support?**

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

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

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

### **Urgent Laboratory Needs**

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

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

### **In Summary**

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

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

### **U.S. Research Strong**

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

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

### **Government Organized for the Job**

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

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

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

### **Potential Not Realized**

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

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

A

Photographic

Sampling of

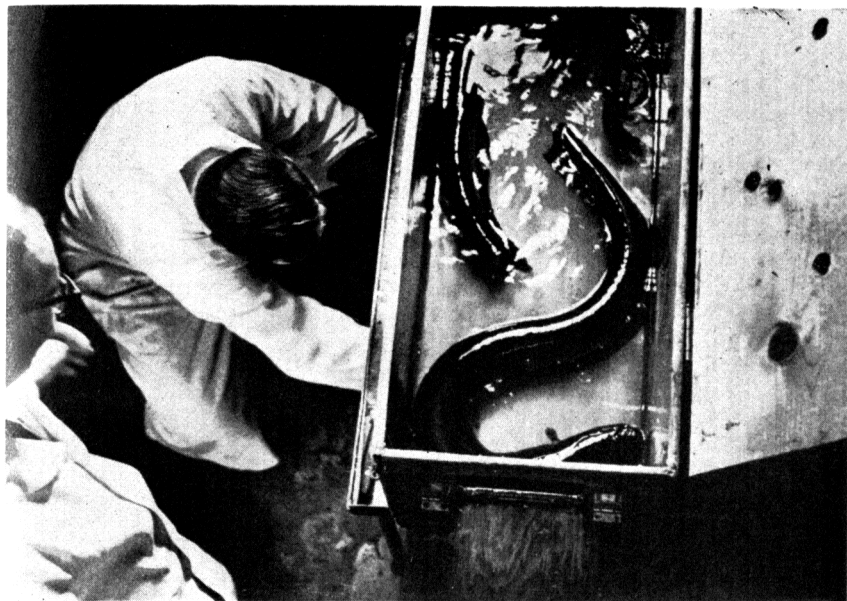
Foundation-Supported

Activities

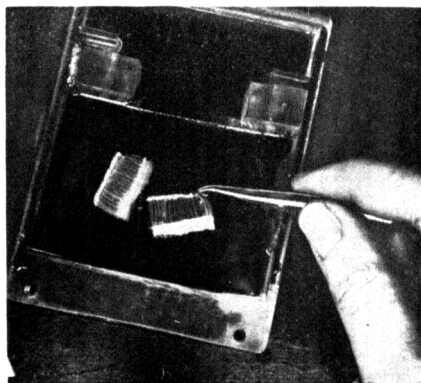
#### PHOTO CREDITS

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

## Electric Eel Illuminates Mechanism of Nerve Activity

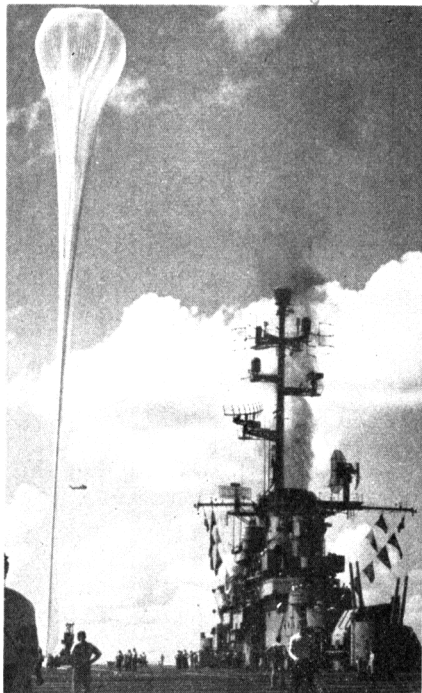


Of the 5- to 7-foot length of an electric eel, all but the first foot constitutes the electric organ composed of compartments arranged in columns. Each compartment is composed of a single cell, an electroplax, about one-half inch long, capable of producing 0.24 volt. The removal of one of these cells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



## Project ICEF for Studying Cosmic Rays at High Altitudes

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

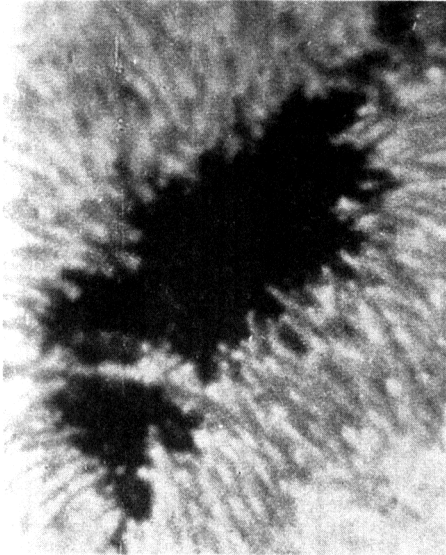


LEFT PHOTO shows 10 million cubic-foot balloon poised on bow of the aircraft carrier just prior to launching. Balloon and ship's stack gas stand straight up, showing care and precision with which carrier was kept on course to provide a "no wind" condition on deck.

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

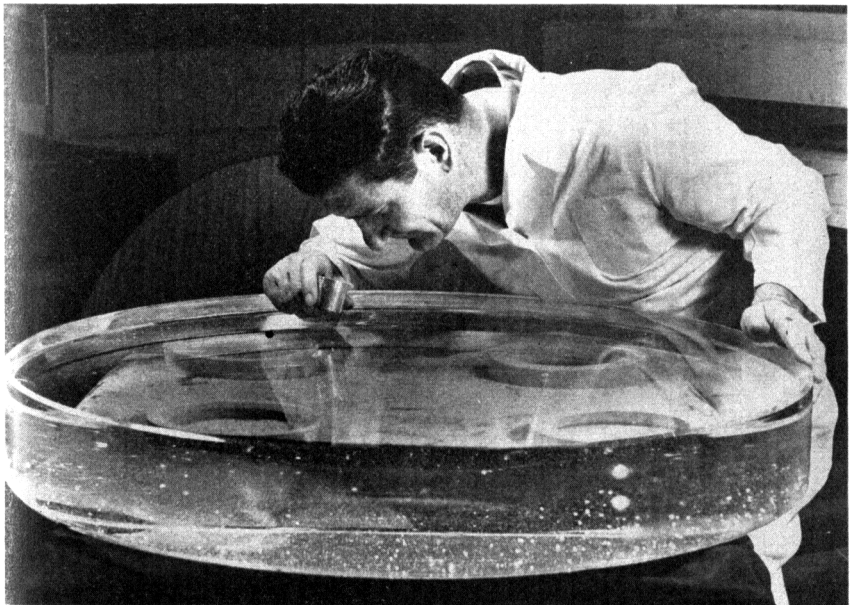


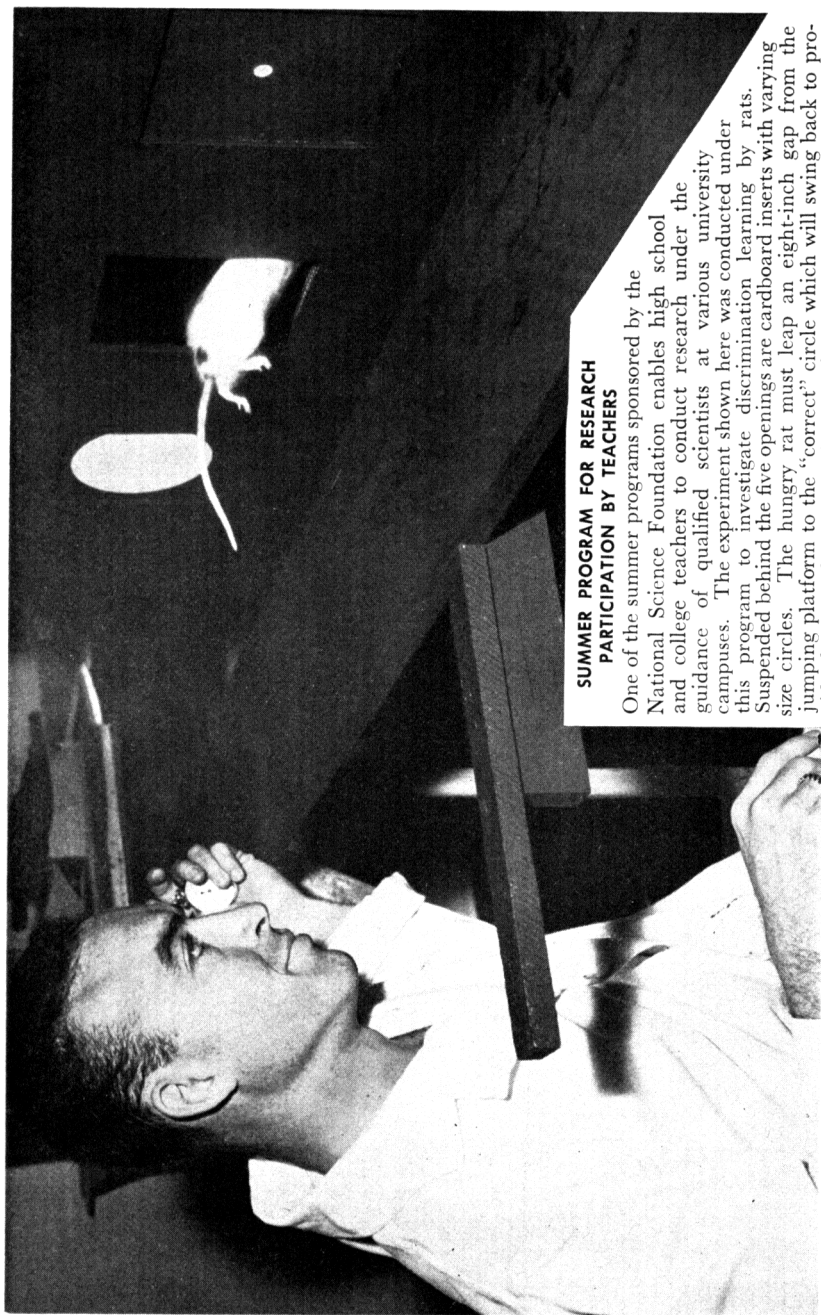
## Balloon-borne Telescope Photographs Interior of Sun Spot



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

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



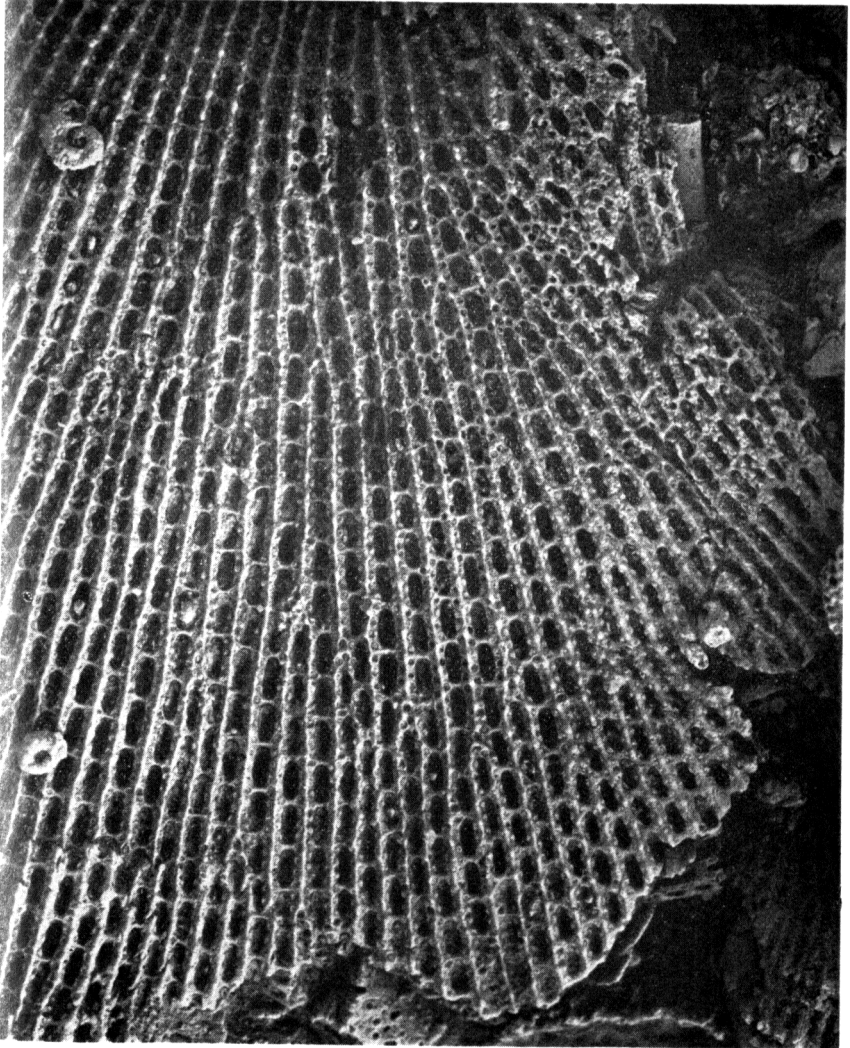


#### **SUMMER PROGRAM FOR RESEARCH PARTICIPATION BY TEACHERS**

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

## Small Aquatic Moss Animals Built Great Reefs

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



## Support for Research Facilities



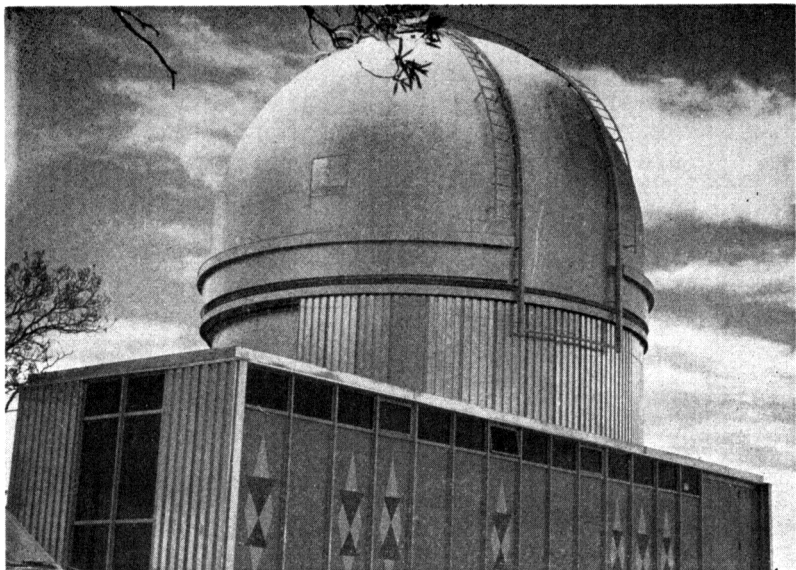
Recognizing the urgent need for new and more modern research facilities, the Foundation has provided assistance to universities and other nonprofit research institutions. The accompanying photograph is of a new 32,000-square foot, 4-story laboratory building at the Marine Biological Laboratory, Woods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

## Unique Sacred Image of Tribal God Found in Arizona Excavations

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

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



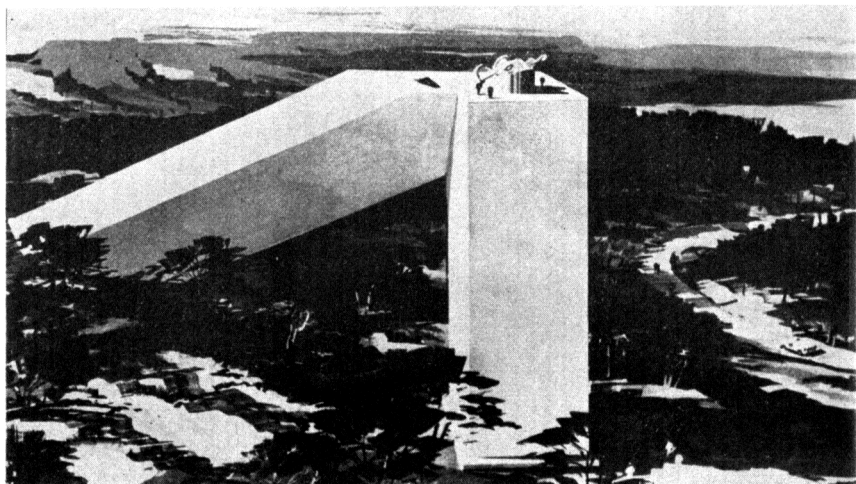


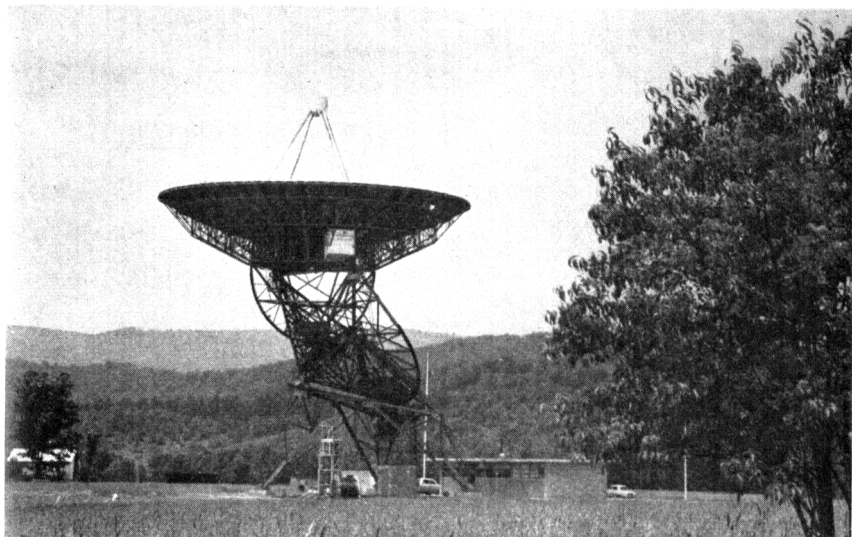
### **New Optical Facilities at Kitt Peak National Observatory**

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

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

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

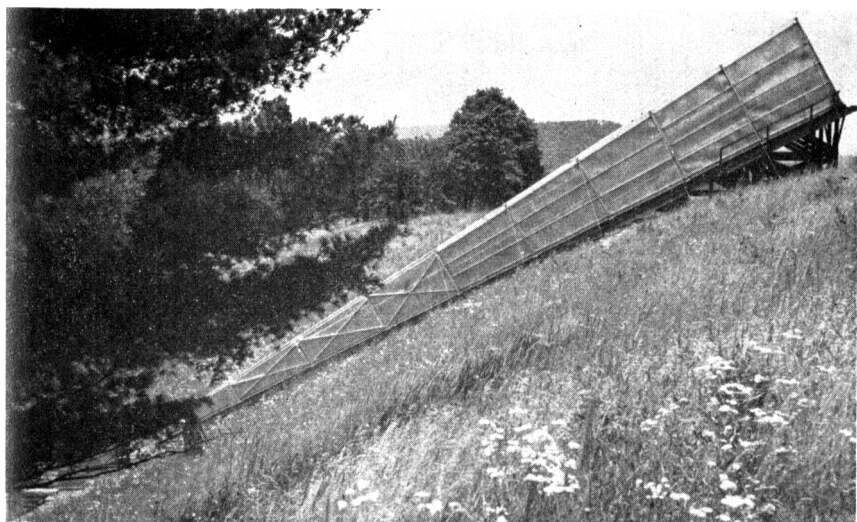




### **Radio Telescopes in Use at National Radio Astronomy Observatory**

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

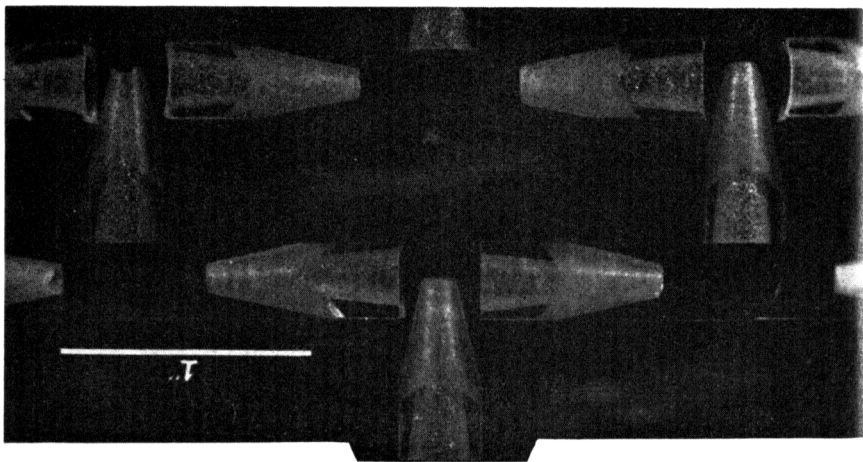
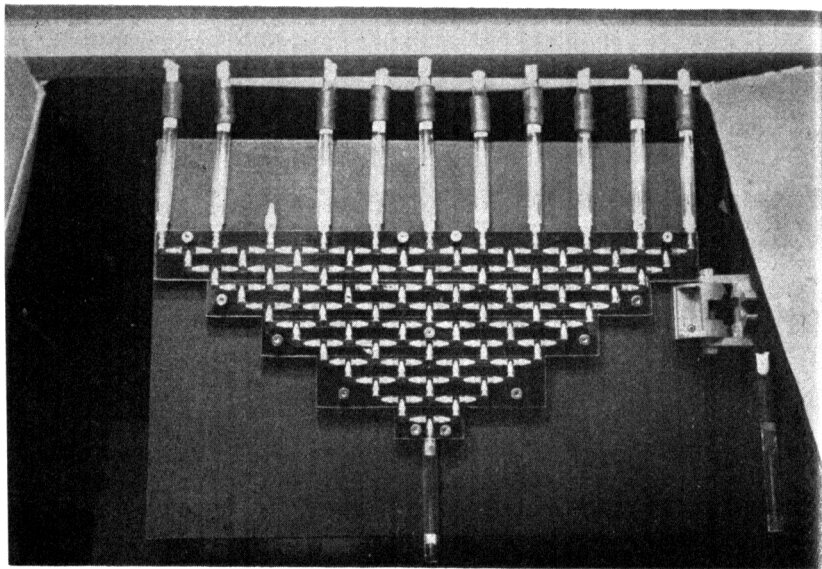
The "Little Big Horn" is a radio telescope of unusual design, known technically as a horn antenna. It is fixed so that once each day it observes the strong radio source in Cassiopeia. This is used to measure accurately the energy of the incoming radio waves—which the 120-foot-long horn is particularly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



### Maze for Studying Variation in Gravity Response of Fruit Flies

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

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





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

### **Participation by U.S. Scientific Personnel**

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

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

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

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

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

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

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

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

#### **Exchange Scientists**

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

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

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

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

### **Current Research Support**

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

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

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

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

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

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### **Significant Research Developments**

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

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

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

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

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

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

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

\* \* \*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Vitamin B<sub>12</sub>, essential to animal life, was first isolated from liver in 1958. Its administration is the effective therapy for pernicious anemia.

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

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

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



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

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

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

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

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

For another discovery of this expedition, see page 27.

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

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

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

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

The San Clemente gage consisted of three recorders located in a

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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## Research-Related Activities

### Scientific Conferences and Symposia

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



## Patents Resulting From NSF-Supported Research

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

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

## Fiscal Analysis of Research Programs

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

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

**Table 1.—Distribution of research grant funds by type of expenditure <sup>1</sup>  
fiscal year 1960**

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

<sup>1</sup> Based on budget estimates at time of activation.

<sup>2</sup> Based on 1,943 grants awarded totaling \$58,303,861 for an average duration of 2.20 years.

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

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

Field	Number	Amount
<b>Biological and medical sciences:</b>		
Developmental biology . . . . .	65	\$1, 706, 495
Environmental biology . . . . .	129	2, 650, 000
Genetic biology . . . . .	74	2, 100, 300
Metabolic biology . . . . .	116	3, 103, 100
Molecular biology . . . . .	116	5, 542, 700
Psychobiology . . . . .	83	2, 192, 730
Regulatory biology . . . . .	121	3, 527, 275
Systematic biology . . . . .	149	2, 767, 150
General biology . . . . .	38	1, 144, 660
<b>Total . . . . .</b>	<b>991</b>	<b>24, 734, 410</b>
<b>Mathematical, physical, and engineering sciences:</b>		
Astronomy . . . . .	62	2, 169, 500
Atmospheric . . . . .	44	3, 912, 525
Chemistry . . . . .	222	5, 462, 500
Earth sciences . . . . .	127	4, 128, 735
Engineering sciences . . . . .	184	5, 702, 405
Mathematical sciences . . . . .	132	3, 648, 600
Physics . . . . .	145	6, 444, 100
<b>Total . . . . .</b>	<b>916</b>	<b>31, 468, 365</b>
<b>Social sciences:</b>		
Anthropology . . . . .	49	717, 850
Economics . . . . .	16	526, 986
History and philosophy of science . . . . .	12	85, 750
Sociology . . . . .	32	758, 600
<b>Total . . . . .</b>	<b>109</b>	<b>2, 089, 186</b>
Antarctic research (life and physical sciences) . . . . .	79	3, 625, 851
<b>Grand total . . . . .</b>	<b>1, 995</b>	<b>61, 917, 812</b>

## EDUCATION IN THE SCIENCES

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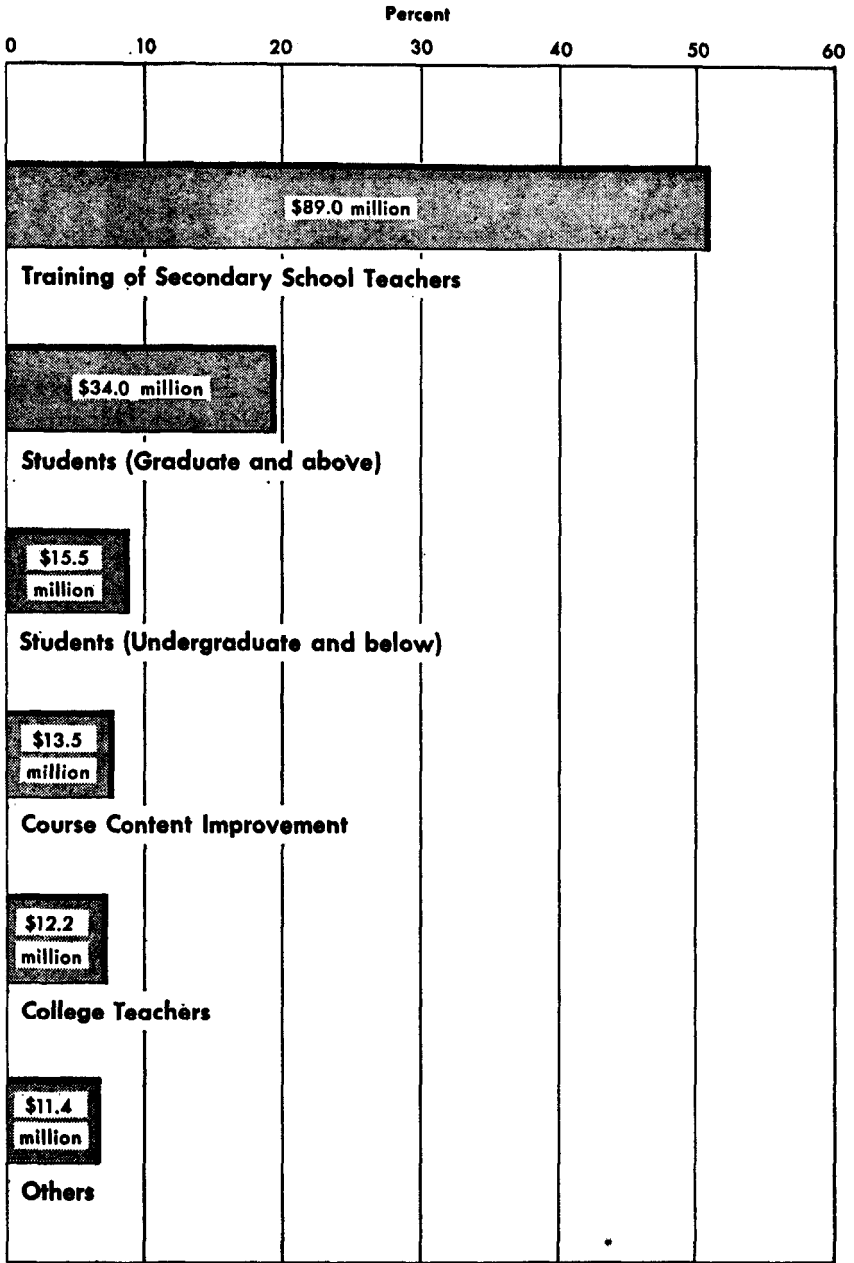
Nine years have elapsed and much money and effort have been expended for the promotion of education in the sciences by the Foundation since the initial grant for fellowships was made in 1952.

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

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

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

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



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

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

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

### **Principles Guiding Operation of Education Programs**

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

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

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

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

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

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

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

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

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

### **Fellowship Programs**

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

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

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

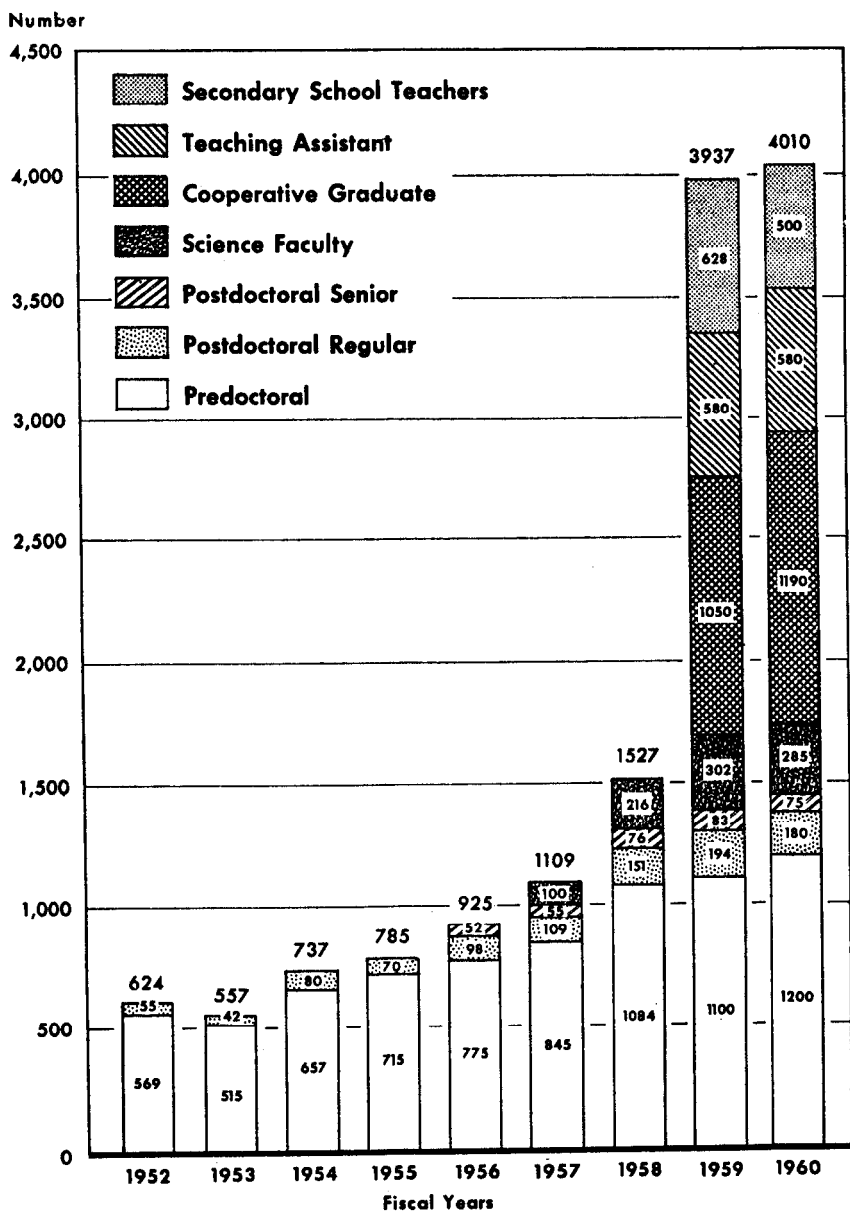
2. *Cooperative Graduate Fellowships* similar to graduate fellowships except that certain aspects of the program are administered jointly by the cooperating institutions and the National Science Foundation. (Initiated in 1959.)

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

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

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

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





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

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

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

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

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

#### **Graduate Fellowships (Predoctoral)**

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

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

#### **Cooperative Graduate Fellowships**

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

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

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

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

### **Summer Fellowships for Graduate Teaching Assistants**

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

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

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

### **Postdoctoral Fellowships (Regular)**

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

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

## **Senior Postdoctoral Fellowships**

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

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

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

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

## **Science Faculty Fellowships**

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

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

## **Summer Fellowships for Secondary School Teachers of Science and Mathematics**

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

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

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

### **Extramural Fellowships**

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

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

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

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

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

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

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

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

## **Institute Programs**

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

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

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

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

### **Summer Institutes**

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

**Table 3.—Study Opportunities<sup>1</sup> in NSF Institute Programs**

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

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

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

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

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

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

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

#### ***Summer Institutes for Elementary School Supervisors and Teachers***

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

#### ***Summer Institutes for Technical Institute Personnel***

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

#### ***Summer Conferences for College Teachers***

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

### **Academic Year Institutes**

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

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

### **In-Service Institutes**

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

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

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

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

### **Special Projects in Science Education**

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



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

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

### **Secondary School Programs**

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

#### **Visiting Scientists (Secondary Schools)**

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

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

#### **Traveling Science Libraries**

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

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

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

### ***Traveling Science Demonstration Lectures***

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

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

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

### ***Science Clubs***

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

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

### **Summer Training for Secondary School Students**

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

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

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

### **State Academies of Science**

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

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

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

### **Science Career Information**

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

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

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

### **College Programs and Teacher Improvement Programs**

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

#### **Visiting Scientists (Colleges)**

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

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

#### **Visiting Scientists (Foreign)**

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

#### **Undergraduate Science Education**

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

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

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

### ***Research Participation for Teacher Training***

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

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

### ***Supplementary Training for Science Teachers***

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

### ***Special Field Institutes***

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

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

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

### **Public Understanding of Science**

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

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

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

### **Course Content Improvement Programs**

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

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

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

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

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

### **Course Content Studies and Development**

#### ***Elementary-Junior High School***

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

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

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

### **High School**

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

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

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

### **College and University**

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



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

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

### **Supplementary Teaching Aids**

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

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

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

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

### **Scientific Manpower Program**

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

#### **The National Register of Scientific and Technical Personnel**

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

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

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

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

### ***A Study of Scientific and Technical Manpower***

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

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

1. Approximately 90 percent of scientists in fields now considered of mobilization importance should be registered.

2. Certain applied and other science fields should be covered as they, in turn, are deemed important for this purpose.

3. Substantive information on employment and professional characteristics will be brought up to date at no longer than two-year intervals. Methods will be sought to maintain current addresses within one year.

4. Registration should be on a voluntary basis during peacetime. In a mobilizing situation, however, registration of scientists should be geared into other more comprehensive registration programs, some or all of which may be mandatory.

5. In view of the complexities of registering engineers, based on diverse training, types of jobs held, and the large number of engineers in the country, the Foundation has turned to the engineering profession to study this problem. The need for better information on numbers and professional characteristics of engineers is not questioned.

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

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

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

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

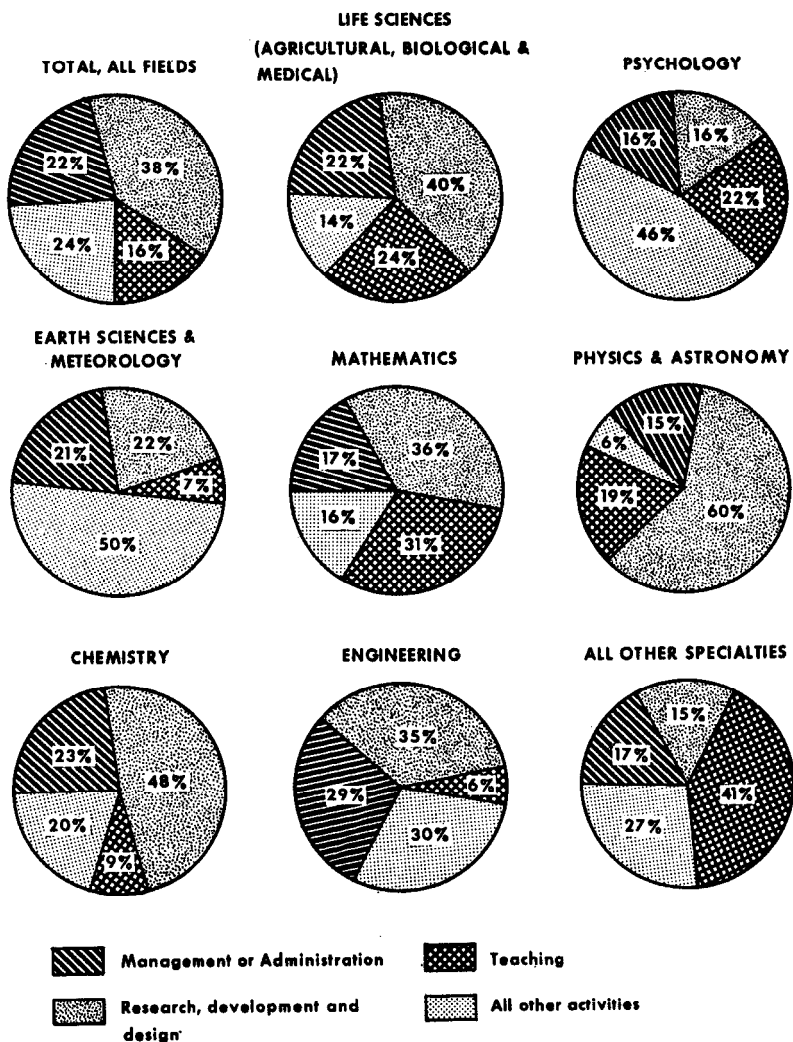
NOTE: Excludes 3,057 who gave no report of salary.

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

**Examples of Register Information Supplied During 1960**

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

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



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

\* Total of 139,865 Scientists

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

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

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

### **1960-61 National Register Program**

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

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

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

### **Scientific Manpower Studies**

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

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

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

### **Manpower Studies Underway**

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

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

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

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

<sup>1</sup> Less than 50 cases.

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

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



## **Manpower Studies Published**

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

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

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

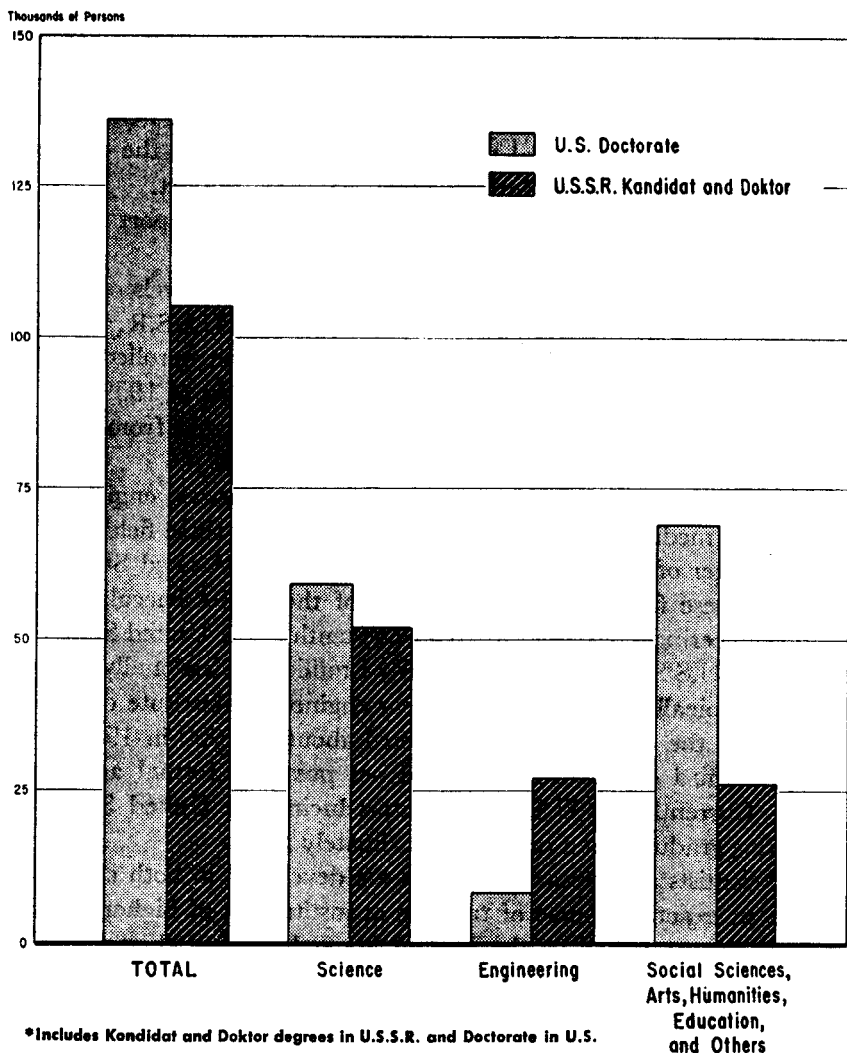
(2) Higher education in the U.S.S.R. emphasizes engineering, science, and medicine; most diplomas are granted in these fields. Less than a quarter of the baccalaureates awarded in the United States are earned in these fields. Nearly one-third of the Soviet baccalaureates are in engineering, compared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

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

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

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

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



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

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

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

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

## **DISSEMINATION OF SCIENTIFIC INFORMATION**

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

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

### **Coordination of Scientific Information Activities on a National Basis**

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

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

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

### **Coordination Within the Federal Government**

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

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

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

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

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

### **Cooperation Among Private and Professional Organizations in the United States**

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

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

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

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

### **International Cooperation**

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

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

### **Scientific Information Notes**

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

### **Documentation Research**

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

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

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

### **Use of Mechanical Aids**

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

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

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

### **Mechanical Translation**

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



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

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

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

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

#### **Patterns of Scientific Communication**

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

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

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

#### **Research Information Center and Reviews of Documentation Research**

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

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

### **Publications on Documentation Research**

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

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

### **Foreign Science Information**

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

### **Translations**

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

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

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

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

#### **Importance of Foreign Scientific Literature**

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

Examples of this activity in 1960 include:

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

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

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

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

### **Professional Society Survey of Foreign Scientific Literature**

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

### **Other Approaches**

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

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

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

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

#### **Public Law 480 Translation Activities**

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

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

#### **Studies on Foreign Scientific Information Activities**

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

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

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

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

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

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

## **Research Data and Information Services**

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

## **Science Information Exchange**

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

### **Survey of U.S. Data and Reference Services**

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

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

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

### **"Unpublished" Information**

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

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

The Foundation is supporting basic studies to determine the factors

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

### **Inventory of Federal Scientific Information Activities**

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

### **Scientific Publications**

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

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

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



1. Increased interest in finding out more about the existing situation in publishing.
2. Willingness to experiment with new publication techniques and methods.
3. Improvement of U.S. abstracting and indexing of scientific literature.
4. Discipline-wide studies of communications patterns and problems.
5. Coordination of support of scientific publications by Federal agencies.

### **Situation in Scientific Publishing**

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

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

### **Experiments with New Publication Techniques and Methods**

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

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

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

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

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

### **Discipline-Wide Studies of Communications Patterns and Problems**

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

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

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

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

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

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

#### **Coordination of Support of Scientific Publications by Federal Agencies**

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

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

## **SPECIAL INTERNATIONAL PROGRAMS**

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

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

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

### **International Geophysical Year**

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

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

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

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

### **IGY World Data Centers**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

### **Annals of the IGY**

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

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

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

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

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

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

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

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

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

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

### **Foreign Science Program**

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

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

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

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

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

### **International Science Education Program**

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

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

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



## **Program Activities**

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

### ***Curricula Development Program***

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

### ***Teacher-Training Program***

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

### ***Science Student Program***

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

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

### **Experimental Cooperative Program**

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

## **Relationships With International Science Programs of Other Government Agencies**

### **Liaison with Science Officers of the Department of State**

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

### **Cooperation with the International Cooperation Administration**

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

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

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

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

## THE NATIONAL RESEARCH AND DEVELOPMENT EFFORT, 1953-1960

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### Background of Survey Program

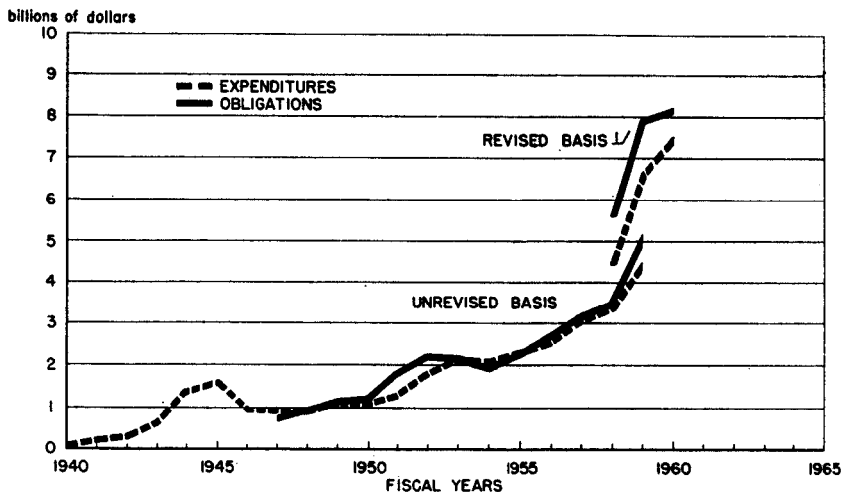
From its inception, the National Science Foundation has been concerned with the measurement and appraisal of the national research and development effort. Prior to the work undertaken by NSF in this field, little had been done. NSF's pioneering studies, conducted by its Office of Special Studies, have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

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

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

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

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



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

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

Sources: Bureau of the Budget; National Science Foundation.

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

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

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

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

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

### **Trends in Total R&D Effort**

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

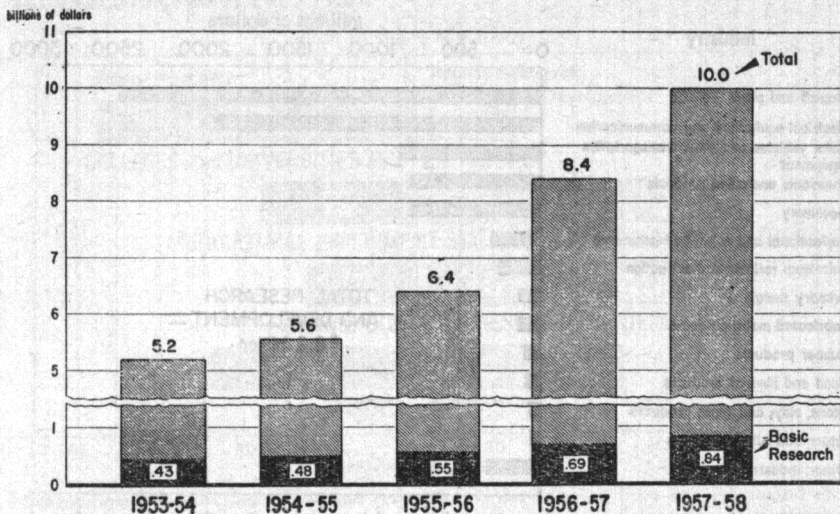
Projected estimates of national totals have been published for the years 1959 and 1960—\$11.2 and \$12.4 billion, respectively. Figure 7 shows the increase in R&D funds for each year, by sector. The increase in research and development since the base year is primarily owing to a rise of almost 160 percent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

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

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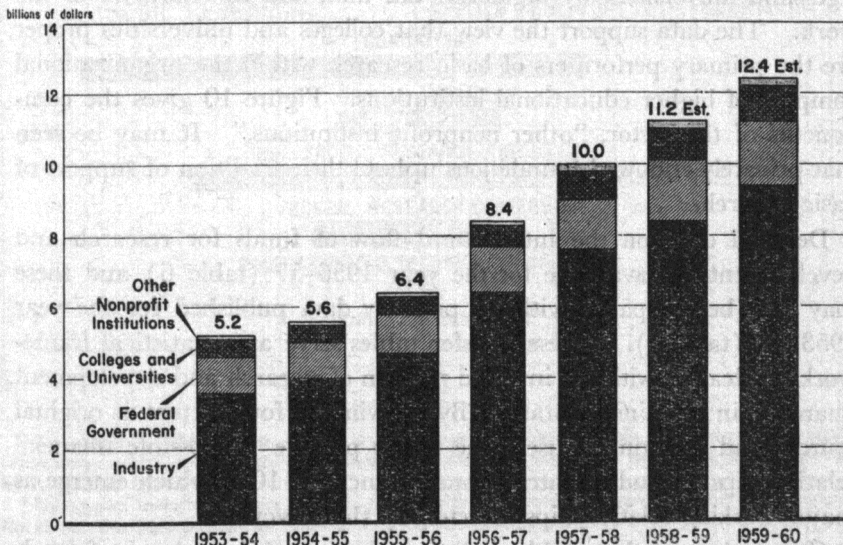
<sup>2</sup> This figure was originally estimated at \$5.4 billion but later revision places the 1953-54 estimate at \$5.2 billion.

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



Source: National Science Foundation, 1960.

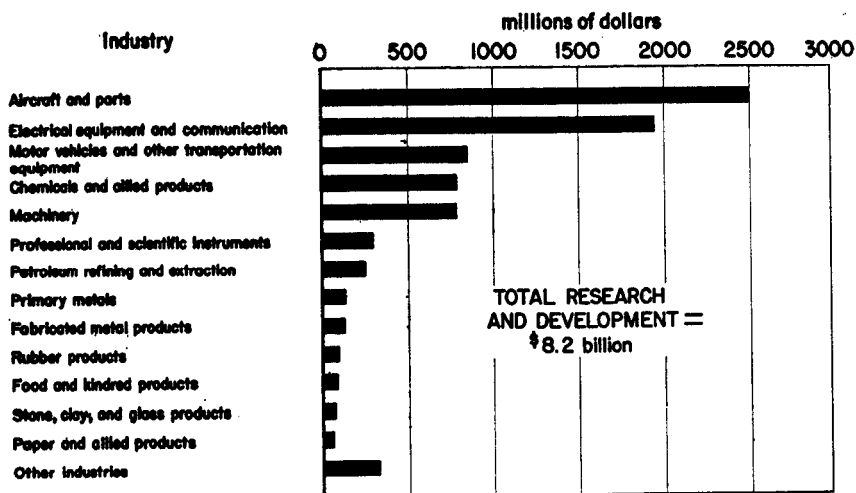
**Figure 7. Funds Used for Performance of Research and Development in the United States, by Sector, 1953-60.**



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

Source: National Science Foundation, 1960.

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



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

Source: National Science Foundation, 1960.

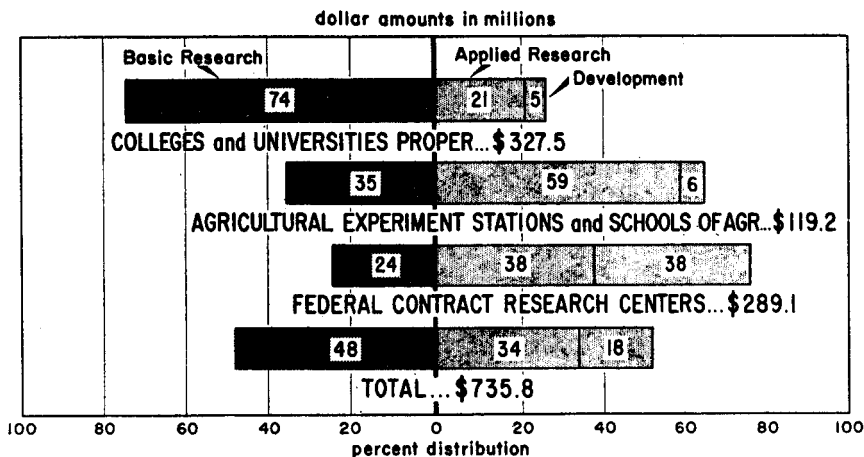
Figure 9 indicates the analysis of certain research expenditures in colleges and universities, by organizational unit, and by character of the work. The data support the view that colleges and universities proper are the primary performers of basic research within the organizational complex of higher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

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

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



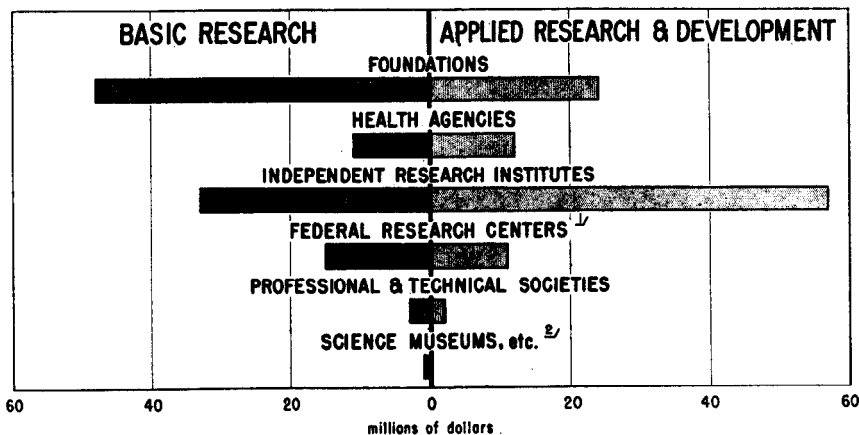
**Figure 9. Expenditures for Separately Budgeted Research and Development in Colleges and Universities, by Character of Work and Organizational Unit, Fiscal Year 1958.<sup>1</sup>**



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

Source: National Science Foundation, 1960.

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



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

<sup>2</sup> This group includes science museums, zoological and botanical gardens, and arboreturns. Not shown are \$0.3 million for applied research and development.

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

Source: National Science Foundation, 1960.

**Table 6.—Transfers of R&D funds, by sector as source and as performer, 1953-54 (revised)<sup>a</sup>**  
(Millions of dollars)

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

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

<sup>b</sup> Includes funds from the Federal Government for research centers administered by organizations in this sector under contract with Federal agencies.

<sup>c</sup> Data include State and local funds received by these institutions and used for research and development.

NOTE: Percentages based on unrounded figures.

Source: National Science Foundation, December 1959.

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

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

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

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

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

Note: Percentages based on unrounded figures.

Source: National Science Foundation, December 1959.

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

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

### **Basic Research Trends**

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

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

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

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

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

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

(Millions of dollars)

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

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

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

° Data include State and local funds received by these institutions and used for basic research.

Source: National Science Foundation, August 1960.

**Table 9.—Intersectoral transfers of funds used for performance of basic research, 1957-58 (preliminary) <sup>a</sup>**

(Millions of dollars)

Sources of basic research funds used	Basic research performers				Total	Percent distribution, basic research sources
	Federal Government	Industry	Colleges and universities	Other nonprofit institutions		
Federal Government.....	\$111	b \$42	b \$240	b \$30	\$423	51
Industry.....	.....	230	14	5	249	30
Colleges and universities <sup>a</sup> .....	.....	.....	111	.....	111	13
Other nonprofit organizations <sup>a</sup> .....	.....	.....	27	25	52	6
<b>Total.....</b>	<b>111</b>	<b>b 272</b>	<b>b 392</b>	<b>b 60</b>	<b>835</b>	<b>100</b>

Percent distribution, basic research performance.....	13	33	47	7	100
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<sup>a</sup> Data on sources of funds are based on reports by the performers. This table was published in *Reviews of Data on Research & Development*, No. 22, "Funds for the Performance of Basic Research in the United States, 1953-58," Washington 25, D.C.: Supt. of Documents, U.S. Government Printing Office, August 1960. For full information, including a description of each sector, the reader should refer to this bulletin.

<sup>b</sup> Includes funds from the Federal Government for research centers administered by organizations in this sector under contract with Federal agencies.

<sup>c</sup> Data include State and local funds received by these institutions and used for basic research.

Source: National Science Foundation, August 1960.

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

## **Instrument of Policy**

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

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

## **Impact of Research and Development**

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

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

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

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

to develop a methodology adaptable, at least experimentally, to other industrial firms.

(2) *Carnegie Institute of Technology*. A study at the Carnegie Institute of Technology has sought to understand the determinants entering into the level of research and development within the economy, particularly with reference to an individual industrial firm. Linked with this objective is the further goal of gaining insight into the diffusion of innovation within the economy.

(3) *Survey of Research Projects on Economic and Other Impacts of Scientific Research and Development*. The survey of projects pertaining to analysis of the impact of research and development has covered colleges and universities, research institutes, professional associations, and foundations. A publication on the survey pertaining to colleges and universities was released during 1960.

(4) *A Selected Annotated Bibliography on Impact of Research and Development on the Economy*. A selected annotated bibliography has been published to provide references representative of typical approaches to the study of research and development and to serve as a guide for further investigation.

(5) *Cost Index of Research and Development*. This project, in cooperation with the Department of the Army, Office of the Director of Research and Development, involves the development of an index to deflate R&D expenditures. It may offer insight on relations of various cost elements which will assist in planning and projecting research costs in constant and current dollars. The U.S. Bureau of Labor Statistics, under contract to this Office, is now undertaking to implement the index design and it is hoped that preliminary estimates of a cost index will become available during the next fiscal year.

(6) *Relation of Data on Research and Development to Overall Economic Activity*. The relation of research and development expenditures to the national income and gross national product accounts is being explored in order to obtain appropriate dollar measures of the level of scientific effort compared with total economic activity. This involves separation of the elements entering into existing measures of expenditures for both research and development and gross national product from the point of view of determining which of several types of relations are meaningful and useful for studies of scientific effort and economic growth.

## **Conclusion**

With a strong base of fundamental information about the central forces of the R&D effort, the Foundation has begun to formulate a more



specialized and analytical examination of science and technology. Activities under this broadened approach to science and technology include analyses of the magnitude and character of research and development, the education of scientists and engineers, the utilization of scientific and supporting personnel, development of scientific facilities, dissemination of scientific information, effects of technological advances, and the organization and administration of the scientific community. In addition, having dealt in the past with some of these components in laying the groundwork for overall analyses, the Foundation feels the increasing importance of viewing the totality of all scientific activities in relation to the economy. Accordingly, the Foundation plans to synthesize these elements in a broad concept of science and technology and an understanding of each of their roles.

**Appendices**

## APPENDIX A

### National Science Board, Staff, Committees, and Advisory Panels

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R. E. BOLZ, Department of Mechanical Engineering, Case Institute of Technology, Cleveland, Ohio.

C. F. BONILLA, Puerto Rico Nuclear Center, University of Puerto Rico, College Station, Mayaguez, P.R.

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

EDWARD E. DAVID, Jr., Bell Telephone Laboratories, Murray Hill, N.J.

MARIO J. GOGLIA, College of Engineering, University of Notre Dame, Notre Dame, Ind.

W. R. MARSHALL, Jr., Engineering Experiment Station, University of Wisconsin, Madison, Wis.

OSCAR T. MARZKE, United States Steel Corp., Pittsburgh, Pa.

JOHN S. MCNOWN, School of Engineering and Architecture, University of Kansas, Lawrence, Kans.

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

W. R. SEARS, Graduate School of Aeronautical Engineering, Cornell University, Ithaca, N.Y.

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

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

#### *Advisory Panel for Environmental Biology*

STANLEY A. CAIN, Conservation Department, University of Michigan, Ann Arbor, Mich.

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

LAMONT C. COLE, Department of Zoology, Cornell University, Ithaca, N.Y.

JOHN T. CURTIS, Department of Botany, University of Wisconsin, Madison, Wis.

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

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

JOHN F. REED, University of New Hampshire, Durham, N.H.

JOHN H. RYTHER, Woods Hole, Oceanographic Institution, Woods Hole, Mass.

KNUT SCHMIDT-NIELSEN, Department of Zoology, Duke University, Durham, N.C.

#### *Advisory Panel for Genetic Biology*

DAVID M. BONNER, Department of Microbiology, Yale University, New Haven, Conn.

R. E. COMSTOCK, Department of Animal Husbandry, Institute of Agriculture, University of Minnesota, St. Paul, Minn.

ROLLIN D. HOTCHKISS, The Rockefeller Institute, New York, N.Y.

GEORGE LEFEVRE, JR., Biological Laboratories, Harvard University, Cambridge, Mass.

F. HARLAN LEWIS, Department of Botany, University of California, Los Angeles, Calif.

MARCUS M. RHOADES, Department of Botany, Indiana University, Bloomington, Ind.

JACK SCHULTZ, Institute for Cancer Research, Philadelphia, Pa.

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

#### *Advisory Panel for Mathematical Sciences*

LIPMAN BERS, Institute of Mathematical Sciences, New York University, New York, N.Y.

EDWIN E. FLOYD, Department of Mathematics, University of Virginia, Charlottesville, Va.

PAUL R. HALMOS, Department of Mathematics, University of Chicago, Chicago, Ill.

NATHAN JACOBSON, Department of Mathematics, Yale University, New Haven, Conn.

JACK C. KIEFER, Department of Mathematics, Cornell University, Ithaca, N.Y.

IVAN NIVEN, Department of Mathematics, University of Oregon, Eugene, Oreg.

HANS SAMELSON, Department of Mathematics, University of Michigan, Ann Arbor, Mich.

DONALD C. SPENCER, Department of Mathematics, Princeton University, Princeton, N.J.

JOHN V. WEHAUSEN, Institute of Engineering Research, University of California, Berkeley, Calif.

#### *Advisory Panel on Medical Student Research*

ALFRED GILMAN, Department of Pharmacology, Albert Einstein College of Medicine, Yeshiva University, New York, N.Y.

REINO E. KALLIO, Department of Bacteriology, State University of Iowa, Iowa City, Iowa

HORACE W. MAGOUN, Department of Anatomy, University of California School of Medicine, Los Angeles, Calif.

ROBERT A. MOORE, New York State University Downstate Medical Center, New York, N.Y.

ALFRED E. WILHELMI, Department of Biochemistry, Emory University School of Medicine, Atlanta, Ga.

#### *Advisory Panel for Metabolic Biology*

ROBERT S. BANDURSKI, Department of Botany, Michigan State University, East Lansing, Mich.

GEORGE B. BROWN, Sloan-Kettering Institute for Cancer Research, New York, N.Y.

JACKSON W. FOSTER, Department of Bacteriology, University of Texas, Austin, Tex.

ARTHUR W. GALSTON, Department of Botany, Yale University, New Haven, Conn.

- NATHAN O. KAPLAN, Department of Biochemistry, Brandeis University, Waltham, Mass.
- FRITZ LIPMANN, Rockefeller Institute for Medical Research, New York, N.Y.
- EDWIN S. LENNOX, Department of Microbiology, New York University College of Medicine, New York, N.Y.
- BRUCE STOWE, Department of Botany, Yale University, New Haven, Conn.
- C. B. VAN NIEL, Department of Biology, Hopkins Marine Station, Pacific Grove, Calif.
- MERTON F. UTTER, Department of Biochemistry, Western Reserve University, School of Medicine, Cleveland, Ohio.
- Advisory Panel for Molecular Biology*
- ROBERT A. ALBERTY, Department of Chemistry, University of Wisconsin, Madison, Wis.
- BERNARD AXELROD, Department of Biochemistry, Purdue University, Lafayette, Ind.
- SIDNEY P. COLOWICK, Department of Microbiology, Vanderbilt University, School of Medicine, Nashville, Tenn.
- VINCENT G. DETHIER, Division of Biology, University of Pennsylvania, Philadelphia, Pa.
- JEROME GROSS, Massachusetts General Hospital, Boston, Mass.
- IRVING M. KLOTZ, Department of Chemistry, Northwestern University, Evanston, Ill.
- CYRUS LEVINTHAL, Department of Biology, Massachusetts Institute of Technology, Cambridge, Mass.
- MANUAL F. MORALES, Department of Biochemistry, Dartmouth College, Hanover, N.H.
- AARON NOVICK, Institute for Molecular Biology, University of Oregon, Eugene, Oreg.
- Advisory Panel for Physics*
- TOM W. BONNER, Department of Physics, The Rice Institute, Houston, Tex.
- ROBERT H. DICKE, Department of Physics, Princeton University, Princeton, N.J.
- W. CONYERS HERRING, Bell Telephone Laboratories, Murray Hill, N.J.
- GEORGE E. PAKE, Department of Physics, Stanford University, Stanford, Calif.
- JOHN R. PELLAM, Department of Physics, California Institute of Technology, Pasadena, Calif.
- ROBERT G. SACHS, Department of Physics, University of Wisconsin, Madison, Wis.
- EMILIO G. SEGRE, Department of Physics, University of California, Berkeley, Calif.
- JAMES A. VAN ALLEN, Department of Physics, State University of Iowa, Iowa City, Iowa.
- ROBERT R. WILSON, Department of Physics, Cornell University, Ithaca, N.Y.
- Advisory Panel for Psychobiology*
- JOHN T. EMLÉN, Department of Zoology, University of Wisconsin, Madison, Wis.
- WENDELL R. GARNER, Department of Psychology, Johns Hopkins University, Baltimore, Md.
- LLOYD G. HUMPHREYS, Department of Psychology, University of Illinois, Urbana, Ill.
- HOWARD H. KENDLER, Department of Psychology, New York University, New York, N.Y.
- DOUGLAS H. LAWRENCE, Department of Psychology, Stanford University, Stanford, Calif.
- FLOYD RATLIFF, Rockefeller Institute, New York, N.Y.
- H. E. ROSVOLD, Laboratory of Psychology, National Institute of Mental Health, Bethesda, Md.
- Advisory Panel for Regulatory Biology*
- JOHN R. BROBECK, Department of Physiology, School of Medicine, University of Pennsylvania, Philadelphia, Pa.
- FRANK DIXON, Department of Pathology, University of Pittsburgh, School of Medicine, Pittsburgh, Pa.
- DANIEL L. HARRIS, Department of Physiology, University of Chicago, Chicago, Ill.
- HOWARD C. HOPPS, Department of Pathology, University of Texas, Medical Branch, Galveston, Tex.
- ROBERT E. HUNGATE, Department of Bacteriology, University of California, Davis, Calif.
- WILLIAM VAN DER KLOOT, Department of Pharmacology, New York University, New York, N.Y.
- ARTHUR W. MARTIN, Department of Zoology, University of Washington, Seattle, Wash.
- WILBUR H. SAWYER, Department of Pharmacology, Columbia University, New York, N.Y.

FOLKE SKOOG, Department of Botany, University of Wisconsin, Madison, Wis.  
JOHN G. TORREY, Department of Botany, University of California, Berkeley, Calif.

*Advisory Panel for Scientific Manpower Information*

JAMES W. COLE, Jr., School of Chemistry, University of Virginia, Charlottesville, Va.

HAROLD GOLDSTEIN, Division of Manpower and Employment Statistics, U.S. Department of Labor, Washington, D.C.

ALBERT KAY, Office of Manpower Supply, Department of Defense, Washington, D.C.

CHARLES V. KIDD, Research Planning Branch, National Institutes of Health, Bethesda, Md.

RAY W. MAYHEW, Owens-Illinois Glass Co., Toledo, Ohio.

JAMES C. O'BRIEN, Department of Health, Education and Welfare, Washington, D.C.

PHILIP N. POWERS, Department of Nuclear Engineering, Purdue University, West Lafayette, Ind.

M. H. TRYTTEN, Office of Scientific Personnel, National Academy of Sciences-National Research Council, Washington, D.C.

J. FLETCHER WELLEMEYER, Washington, D.C.

DAEL WOLFE, American Association for the Advancement of Science, Washington, D.C.

*Advisory Panel for Special Projects in Science Education Section*

JULIAN HILL, Committee on Fellowships and Grants, E. I. du Pont de Nemours & Co., Wilmington, Del.

MARCUS HOBBS, Duke University, Durham, N.C.

JAMES JENSEN, Iowa State University, Ames, Iowa.

FREDERICK LINDVALL, Division of Engineering, California Institute of Technology, Pasadena, Calif.

WALTER F. LOEHWING, The Graduate College, State University of Iowa, Iowa City, Iowa.

ROBERT MACVICAR, Graduate School, Oklahoma State University, Stillwater, Okla.

JOSEPH PLATT, Harvey Mudd College, Claremont, Calif.

F. W. SEARS, Department of Physics, Dartmouth College, Hanover, N.H.

OSWALD TIPPO, University of Colorado, Boulder, Colo.

H. GRANT VEST, 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.

ROBERT K. ENDERS, Department of Biology, Swarthmore College, Swarthmore, Pa.

SIDNEY W. FOX, Oceanographic Institute, Florida State University, Tallahassee, Fla.

PAUL L. ILLG, Department of Zoology, University of Washington, St. Louis, Mo.

ROGERS McVAUGH, Department of Botany, University of Michigan, Ann Arbor, Mich.

HAROLD W. MANTER, Department of Zoology, University of Nebraska, Lincoln, Nebr.

GEORGE W. MARTIN, Department of Botany, State University of Iowa, Iowa City, Iowa.

ALFRED S. ROMER, Museum of Comparative Zoology, Harvard University, Cambridge, Mass.

HERBERT H. ROSS, State Natural History Survey Division, Urbana, Ill.

*Advisory Panel for University Computing Facilities*

EDWARD NOVITSKI, Department of Biology, University of Oregon, Eugene, Oreg.

NICHOLAS C. METROPOLIS, Department of Physics, University of Chicago, Chicago, Ill.

PHILIP M. MORSE, Department of Physics, Massachusetts Institute of Technology, Cambridge, Mass.

J. BARKLEY ROSSER, Department of Mathematics, Institute for Advanced Study, Princeton, N.J.

HERBERT A. SIMON, Carnegie Institute of Technology, Pittsburgh, Pa.

CHARLES V. L. SMITH, National Aeronautics and Space Administration, Goddard Space Flight Center, Washington, D.C.

FREDERICK T. WALL, Department of Chemistry, University of Illinois, Urbana, Ill.

## APPENDIX B

### Financial Report for Fiscal Year 1960

#### SALARIES AND EXPENSES APPROPRIATION

##### *Receipts*

Appropriated for fiscal year 1960-----	\$154, 773, 000
Unobligated balance from fiscal year 1959-----	4, 389, 001
Total availability-----	\$159, 162, 001

##### *Obligations*

Support of science:

Basic research:

Biological and medical sciences-----	\$24, 413, 405
Mathematical, physical, and engineering sciences-----	30, 695, 143
Social sciences-----	2, 104, 571
Subtotal -----	57, 213, 119

Basic research facilities:

Development of graduate research laboratories--	2, 153, 710
Specialized biological facilities-----	2, 828, 251
University computing facilities-----	1, 671, 500
University nuclear research facilities-----	2, 548, 958
Oceanographic research vessels-----	3, 000, 000
Subtotal -----	12, 202, 419

National research facilities:

National Radio Astronomy Observatory-----	998, 400
Kitt Peak National Observatory-----	824, 000
National Center for Atmospheric Research-----	500, 000
Subtotal -----	2, 322, 400

National research programs:

Antarctic research-----	6, 179, 598
Weather modification-----	1, 429, 640
Subtotal -----	7, 609, 238

Dissemination of scientific information-----	5, 370, 340
Special international programs-----	23, 658

Subtotal, grants and contracts-----	84, 741, 174
Program development, operation, and evaluation--	2, 136, 041

Total obligations—support of science-----	86, 877, 215
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Support of scientific manpower:	
Fellowships -----	\$13,391,316
Institutes -----	33,775,040
Research participation and scientific activities for teachers -----	2,347,946
Science education for undergraduate students-----	2,871,482
Science education for secondary school students---	4,457,736
Public understanding of science-----	316,501
Course content improvement-----	6,299,436
Science education and technical manpower information -----	891,075
International science education-----	259,697
Subtotal, grants and contracts-----	64,610,229
Program development, operation, and evaluation---	2,273,466
Total obligations—support of scientific manpower-----	66,883,695
Executive direction and management-----	2,098,300
Total obligations, NSF-----	155,859,210
Allocations to other Government agencies:	
Department of the Army-----	\$82,685
Department of Commerce-----	2,657,640
Subtotal -----	2,740,325
Total obligations, fiscal year 1960-----	158,599,535
Unobligated balance carried forward to fiscal year 1961-----	562,466
Total -----	159,162,001

#### INTERNATIONAL GEOPHYSICAL YEAR APPROPRIATIONS

##### *Receipts*

Total unobligated balance from fiscal year 1959-----	\$1,707,589	
Total availability-----		<u>\$1,707,589</u>

##### *Obligations*

Technical programs-----	\$1,475,743	
Administrative expenses, National Academy of Sciences—National Research Council-----	119,610	
Administrative expenses, National Science Foundation -----	2,232	
Total obligations, fiscal year 1960-----		1,597,585
Unobligated balance (not available for obligation in fiscal year 1961) -----		110,004
Total -----		<u>1,707,589</u>

TRUST FUND

*Receipts*

Unobligated balance from fiscal year 1959-----	\$6, 613	
Donations from private sources-----	1, 630	
	<hr/>	
Total availability-----		8, 243
		<hr/> <hr/>

*Obligations*

Total obligations, fiscal year 1960-----	\$894	
Unobligated balance carried forward into fiscal year 1961 -----	7, 349	
	<hr/>	
Total -----		8, 243
		<hr/> <hr/>

## APPENDIX C

### Grants for Basic Research

#### ANTHROPOLOGICAL SCIENCES

- AMERICAN UNIVERSITY, Washington, D.C.; Harvey C. Moore; *Acculturation and Culture Change*; 2 years; \$12,800
- UNIVERSITY OF ARIZONA, Tucson, Ariz.; Frederick S. Hulse; *Biological Characteristics of Migrants*; 2 years; \$18,200
- Marvin A. Stokes, Geochronology Laboratories; *Late Prehistory of Northern Arizona*; 1 year; \$9,500
- UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Walter Goldschmidt, Los Angeles; *Cultural Concomitants of Ecological Change*; 2 years; \$30,800
- Robert F. Helzer; *Culture History of the Western Great Basin*; 1 year; \$4,500
- John T. Hitchcock, Los Angeles; *Study of Nepalese Tribe*; 18 months; \$22,800
- Rene F. Millon; *Urbanization of Teotihuacan*; 2 years; \$9,800
- D. L. Olmsted, Davis; *Prehistory of Northern California*; 2 years; \$13,000
- John H. Rowe; *Interpretations of Peruvian Archaeology*; 1 year; \$9,900
- CARLETON COLLEGE, Northfield, Minn.; Frank C. Miller; *Acculturation Among the Chipewea*; 1 year; \$4,200
- CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; Svend Frederiksen; *Collection of Eskimo Texts*; 1 year; \$12,800
- CHICAGO NATURAL HISTORY MUSEUM, Chicago, Ill.; Paul S. Martin; *Archaeology of the Upper Little Colorado*; 1 year; \$8,500
- UNIVERSITY OF CHICAGO, Chicago, Ill.; Alan H. Jacobs; *Culture Change in the Masai*; 1 year; \$7,700
- Arthur J. Jellnek; *Prehistoric Change in New Mexico*; 1 year; \$5,600
- Norman A. McQuown; *Change and Continuity in Chiapas*; 2 years; \$25,000
- Manning Nash; *Social Change in a Plural Society*; 1 year; \$17,800
- COLUMBIA UNIVERSITY, New York, N.Y.; Ralph S. Solecki; *Prehistoric Man in Shanidar Valley, Northern Iraq*; 1 year; \$23,500
- William Duncan Strong; *Analysis of Excavation in Peru*; 1 year; \$2,800
- CORNELL UNIVERSITY, Ithaca, N.Y.; Charles F. Hockett; *Field Study of the Fijian Language*; 2 years; \$22,300
- Allan R. Holmberg; *Prehistoric Human Ecology in Peru*; 1 year; \$20,000
- DARTMOUTH COLLEGE, Hanover, N.H.; Gordon M. Day; *Study of the Abenaki Dialects*; 1 year; \$10,000
- HARTFORD SEMINARY FOUNDATION, Hartford, Conn.; Henry A. Gleason, Jr.; *Statistical Methods in Linguistic Reconstruction*; 1 year; \$6,400
- HARVARD UNIVERSITY, Cambridge, Mass.; Hallan L. Movius, Jr.; *Upper Palaeolithic Cultures in the Dordogne*; 2 years; \$85,000
- Evon Z. Vogt; *Study of Linguistic Usages*; 1 year; \$6,000
- HUMAN RELATIONS AREA FILES, New Haven, Conn.; George P. Murdock; *Atlas of Eurasian Cultures*; 1 year; \$28,800
- IDAHO STATE COLLEGE, Pocatello, Idaho; Earl H. Swanson; *Archaeological Investigations in Idaho*; 1 year; \$13,000
- UNIVERSITY OF ILLINOIS, Urbana, Ill.; Frederic K. Lehman; *Ethnographic Research in Chin Hills*; 1 year; \$9,800
- INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; Thomas A. Sebeok; *Computer Research in Psycholinguistics*; 1 year; \$15,800
- LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE, London, England; Raymond Firth; *Comparative Study of Extra-Familial Kinship*; 1 year; \$22,300
- LOS ANGELES STATE COLLEGE FOUNDATION, Los Angeles, Calif.; Robert H. Ewald and Louis C. Faron; *Ethnographic Survey in Eastern Panama*; 1 year; \$6,000
- LOUISIANA STATE UNIVERSITY, Baton Rouge, La.; William G. Haag; *Archaeological Research in the Caribbeans*; 1 year; \$13,000
- UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; James B. Griffin; *Prehistoric Occupations of the Great Lakes Area*; 1 year; \$27,000
- UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Eldon Johnson; *Archaeology of Glacial Lake Agassiz Basin*; 1 year; \$13,200
- UNIVERSITY OF NEW MEXICO, Albuquerque, N. Mex.; Frank C. Hibben; *Recovery of Prehispanic Paintings*; 1 year; \$12,800
- NORTHWESTERN UNIVERSITY, Evanston, Ill.; W. Creighton Gabel; *Ecological Adaptations in the Later Stone Age*; 2 years; \$21,900
- UNIVERSITY OF OREGON, Eugene, Oreg.; Luther S. Cressman; *Mandan Culture History*; 1 year; \$2,500
- Luther S. Cressman; *Research on Northwest Prehistory*; 2 years; \$21,700
- UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Alfred Kidder, II; *Archaeology of Tikal*; 1 year; \$23,000
- Froelich Rainey; *Research on Archaeological Techniques*; 1 year; \$27,900
- Ruben E. Reina; *Community Study in Peten*; 15 months; \$20,000
- SAN FERNANDO VALLEY STATE COLLEGE, Northridge, Calif.; Raoul Naroll; *Index of Social Development*; 1 year; \$3,000
- SMITHSONIAN INSTITUTION, Washington, D.C.; Clifford Evans; *Obsidian Dating*; 2 years; \$21,900
- Gordon D. Gibson; *Economic System of the Herero*; 1 year; \$10,000
- TEXAS TECHNOLOGICAL COLLEGE, Lubbock, Tex.; Francis E. Green; *Prehistoric Studies of Lubbock Reservoir*; 1 year; \$8,000

UNIVERSITY OF TEXAS, Austin, Tex.; T. N. Campbell; *Archaeological Salvage Project*; 1 year; \$8,200

TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; Henry Orenstein; *Indian Village Study*; 2 years; \$4,200

Robert Wauchope and E. Wyllys Andrews; *Development of Pre-Columbian Culture*; 3 years; \$40,700

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Simon Ottenberg; *Anthropological Study of Urban Nigeria*; 6 months; \$2,800

YALE UNIVERSITY, New Haven, Conn.; Isidore Dyen; *Lexicostatistical Classification of the Malayopolynesian Languages*; 1 year; \$3,450

## ASTRONOMY

AMHERST COLLEGE, Amherst, Mass.; Albert P. Linnell and Robert H. Koch; *Eclipsing Binaries*; 1 year; \$7,500

ASSOCIATION OF UNIVERSITIES FOR RESEARCH IN ASTRONOMY, INC. (AURA), Tucson, Ariz.; Aden B. Melnel, Kitt Peak National Observatory; *Preliminary Conceptual Design and Experimental Studies for Large Orbital Telescopes*; 1 year; \$252,300

BRIGHAM YOUNG UNIVERSITY, Provo, Utah; D. H. McNamara; *A Spectrographic Study of Beta Canis Majoris Stars*; 2 years; \$13,500

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; George H. Herbig, Lick Observatory, Mount Hamilton; *Design and Construction of High-Dispersion Nebular Spectrograph*; 18 months; \$30,300

Gerald E. Kron; *Photometric Investigations in the Southern Hemisphere at the Mount Stromlo Observatory, Canberra, Australia*; 1 year; \$1,800

Jerzy Neyman; *Statistical Studies of Double and Multiple Galaxies*; 1 year; \$12,100

Merle F. Walker; *Operation of the Lallemand-Type Image Converter*; 2 years; \$34,600

George Wallerstien, *Abundances of the Elements in High Velocity G Dwarf Stars*; 2 years; \$5,000

A. E. Whitford; *Application of a Pressure-Scanning Fabry-Perot Interferometer to High Resolution Stellar Spectroscopy*; 18 months; \$17,500

A. E. Whitford, Lick Observatory; *24-Inch Photometric Telescope*; 2 years; \$20,000

CARNEGIE INSTITUTION OF WASHINGTON, Washington, D.C.; Merle A. Tuve; *Development of Image Tubes for Telescopes*; 2 years; \$130,000

Merle A. Tuve; *Radio Astronomy H-Line Installation in South America*; 1 year; \$41,000

UNIVERSITY OF CHICAGO, Chicago, Ill.; Geoffrey Burbidge and E. Margaret Burbidge, Yerkes Observatory; *Spectroscopic and Photometric Studies of the Structure and Dynamics of External Galaxies*; 2 years; \$48,900

G. Van Blesbroeck; *Astrometric Investigations*; 1 year; \$8,200

Gerard P. Kuiper; *Development of Two Interferometer Telescopes*; 1 year; \$6,000

Richard H. Miller; *Equipment for Selected Photometric Observations*; 1 year; \$8,800

William W. Morgan, Yerkes Observatory; *Studies in Stellar Classification*; 4 years; \$35,700

WILLIAM C. ERICKSON, San Diego, Calif.; *A Design Study on Very Large Arrays for Radio Astronomy*; 3 months; \$1,000

UNIVERSITY OF FLORIDA, Gainesville, Fla.; Alex G. Smith; *Measurement and Analysis of Planetary Emissions at Radio Frequencies*; 2 years; \$26,500

GEORGETOWN UNIVERSITY, Washington, D.C.; Vera C. Rubin; *Photometric Reduction of Standardized Photographs of Galaxies*; 2 years; \$7,200

HARVARD UNIVERSITY, Cambridge, Mass.; David Layzer; *Theoretical Energy Levels and Transition Probabilities*; 1 year; \$17,600

William Liller; *Evolutionary Effects on the Continuous Spectra of Stars*; 1 year; \$2,700

Martha H. Liller; *Intensity Distribution in Galaxies in the Virgo Cluster*; 1 year; \$4,300

A. Edward Lilley; *Hydrogen-Line Radio Astronomy*; 6 months; \$126,600

HIGH ALTITUDE OBSERVATORY OF THE UNIVERSITY OF COLORADO, Boulder, Colo.; Walter Orr Roberts; *Equipment for New Graduate Program in Astro-Geophysics*; 1 year; \$9,060

UNIVERSITY OF ILLINOIS, Urbana, Ill.; Ivan R. King; *Dynamics of Star Clusters*; 1 year; \$4,000

A. J. Meadows; *The Rotational Velocities of Early Type Stars in Galactic Clusters*; 1 year; \$2,770

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; James Cuffey; *Light Curves, Color Curves, Periods and Changes in Periods of Short Period Variable Stars in the Globular Cluster Messier 53*; 1 year; \$5,800

John B. Irwin; *Analysis of Photoelectric Observations of Cepheids*; 1 year; \$6,900

INSTITUTE FOR ADVANCED STUDY, Princeton, N.J.; Bengt Stromgren; *Investigations of Age, Space Velocity, and Chemical Composition for 3000 A and F Stars Brighter Than 7<sup>m</sup> on the Basis of Photoelectric Narrow-Band Photometry*; 2 years; \$19,800

UNIVERSITY OF KANSAS, Lawrence, Kans.; Henry G. Horak; *Computations in Radiative Transfer and Theoretical Photometry*; 1 year; \$9,600

Louisiana State University, Pierre R. Demarque; *The Influence of Chemical Composition on Stellar Evolution*; 2 years; \$17,300

LOWELL OBSERVATORY, Flagstaff, Ariz.; Henry L. Glaser; *Proper Motion Survey of the Northern Hemisphere with the 13-inch Photographic Telescope*; 3 years; \$41,600

John S. Hall; *Transfer of the Perkins Reflector to Flagstaff, Ariz.*; 1 year; \$231,300

MARIA MITCHELL OBSERVATORY, Nantucket, Mass.; Dorrit Hoffleit; *Research on Variable Stars, Especially in Sagittarius*; 3 years; \$10,800

UNIVERSITY OF MASSACHUSETTS, Amherst, Mass.; Robert Howard; *The Reduction of Observation of Magnetic Fields and Motions on the Surface of the Sun*; 2 years; \$8,860

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Jerome B. Wiesner; *Detection of the Galactic Deuterium Line*; 19 months; \$60,000

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Orren C. Mohler; *Associations Between Terrestrial Magnetic Storms and Solar Activity*; 1 year; \$8,000

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; John R. Winckler and Edward P. Ney; *High Altitude Balloon Monitoring for Cosmic Rays and Solar Terrestrial Phenomena*; 4 months; \$54,700

MOUNT HOLYOKE COLLEGE, South Hadley, Mass.; Kenneth M. Yoss; *Relative Frequencies of G and K Giants With Weak and Strong CN Adsorption*; 1 year; \$850

NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.; G. M. Clemence; *Support of Astrometric Research in the Southern Hemisphere*; 2 years; \$25,000

OFFICE OF NAVAL RESEARCH, Washington, D.C.; Edward P. Ney and John R. Winckler; *Solar Eclipse Measurements*; 1 month; \$15,000

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; Philip C. Keenan; *Luminosities of Mira Variables and Related Variable Stars*; 2 years; \$6,300

John D. Kraus; *Completion and Instrumentation of the 360-foot Standing-Parabola, Tiltable-Flat-Sheet-Reflector Radio Telescope*; 1 year; \$71,900

W. E. Mitchell; *Photometric Atlas of the Solar Spectrum*; 1 year; \$10,300

OHIO WESLEYAN UNIVERSITY, Delaware, Ohio; Arne Slettebak; *Installation of 16/24-Inch Schmidt Telescope at Perkins Observatory*; 2 years; \$41,700

L. C. PELTIER, Delphos, Ohio; *Relocation of Observatory*; 1 year; \$1,500

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; William Biltzstein and Frank B. Wood; *Astronomical Research in the Infrared*; 1 year; \$7,700

PRINCETON UNIVERSITY, Princeton, N.J.; Martin Schwarzschild; *High Altitude Astronomy*; 2 years; \$500,000

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; J. Mayo Greenberg; *The Scattering of Light by Small Particles*; 1 year; \$24,000

Alan S. Meltzer; *Investigation of Astronomical Data Pertaining to Extinction and Polarization by Nonspherical Particles*; 1 year; \$4,900

RIPON COLLEGE, Ripon, Wis.; Dino Zel; *Possible Turbulence in Sun Spots*; 1 year; \$5,500

STANFORD UNIVERSITY, Stanford, Calif.; Ronald N. Bracewell; *Solar Radio Emission*; 1 year; \$11,160

UNIVERSITY OF TEXAS, Austin, Tex.; Frank N. Edmonds, Jr.; *An Analysis of Solar Astronomy*; 18 months; \$6,200

A. W. Straiton; *A Radio Telescope for Millimeter Wavelengths*; 1 year; \$20,900

VASSAR COLLEGE, Poughkeepsie, N.Y.; Henry Albers; *An Infrared Survey of a Region in the Scutum Cloud*; 2 months; \$2,200

WESLEYAN UNIVERSITY, Middletown, Conn.; Heinrich K. Elchhorn; *Determination of the Inner Systematic Errors of the Northern Hyderabad Zone of the Astrographic Catalogue and Redetermination of Its Plate Constants*; 1 year; \$6,700

Thornton Page; *Nebular Spectroscopy in the Southern Hemisphere*; 1 year; \$13,700

UNIVERSITY OF WISCONSIN, Madison, Wis.; Julian E. Mack; *Spectrum Line Shapes in the Solar Corona*; 2 years; \$10,900

YALE UNIVERSITY, New Haven, Conn.; Harlan J. Smith; *Planetary Nonthermal Radio Emission*; 2 years; \$33,500

## ATMOSPHERIC SCIENCES

ADELPHI COLLEGE, Garden City, N.Y.; Sherman C. Lowell; *Atmospheric Applications of Theoretical Fluid Mechanics*; 8 years; \$46,400

AMERICAN METEOROLOGICAL SOCIETY, Boston, Mass.; Kenneth C. Spengler; *Cumulative and Current Bibliography on Weather Modification and Cloud Physics*; 3 years; \$40,800

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Myron L. Corrin; *The Surface Properties of Heterogeneous Condensation Nuclei*; 3 years; \$114,900

Walter H. Evans and Robert L. Walker; *A Physical Model for the Lightning Discharge*; 3 years; \$100,300

ATMOSPHERIC RESEARCH GROUP, Altadena, Calif.; Paul B. MacGready, Jr., Theodore B. Smith, and Clement J. Todd; *Flagstaff Cumulus Cloud Studies*; 3 years; \$195,700

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Jacob Bjerknes; Los Angeles; *Sea Surface Temperature and Atmospheric Circulation*; 3 years; \$86,000

Jorgen Holmboe, Gordon MacDonald, Walter Munk, and Clarence Palmer; *Theoretical and Experimental Atmospheric Sciences*; 8 years; \$600,000

Walter H. Munk and Frank E. Snodgrass, Scripps Institution of Oceanography, La Jolla; *Oceanic and Atmospheric Tides*; 3 years; \$129,000

UNIVERSITY OF CHICAGO, Chicago, Ill.; Horace R. Byers and Roscoe R. Braham; *Physical Effects of Silver Iodide Seeding in the Great Plains*; 3 years; \$230,400

Dave Fultz; *Meteorological Experimental Hydrodynamics*; 3 years; \$215,000

George W. Platzman; *Numerical-Dynamical Studies of the Atmospheric General Circulation*; 3 years; \$79,000

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; Richard A. Schleusener; *Hail Suppression Evaluation*; 1 year; \$7,900

Richard A. Schleusener; *Study of the Characteristics and Formation of Hail Over the Western Great Plains*; 2 years; \$59,300

COLUMBIA UNIVERSITY, New York, N.Y.; William L. Donn; *Atmospheric Micro-Oscillations*; 3 years; \$75,100

Richard L. Pfeffer; *Atmospheric Dynamics*; 3 years; \$133,400

CORNELL UNIVERSITY, Ithaca, N.Y.; Ralph Bolgiano, Jr.; *Refractive Index Irregularities in Stably Stratified Atmosphere*; 8 years; \$32,700

Henry G. Booker; *Propagation of Radio Waves in and Above the F. Region*; 3 years; \$61,800

C. W. Gartlein; *Origin and Morphology of the Aurora*; 3 years; \$104,300

HARVARD UNIVERSITY, Cambridge, Mass.; Richard M. Goody; *Atmospheric Physics (Studies of Various Atmospheric Phenomena)*; 3 years; \$172,200

UNIVERSITY OF HAWAII, Honolulu, Hawaii; Walter R. Steiger; *Cosmic Ray Neutron Monitor*; 1 year; \$6,000

HIGH ALTITUDE OBSERVATORY OF THE UNIVERSITY OF COLORADO, Boulder, Colo.; Walter Orr Roberts; *Interdisciplinary Studies in Solar-Upper Atmosphere Relationships*; 3 years; \$125,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.; Glenn Stout; *Evaluation of Electric Charges Induced in the Atmosphere*; 8 months; \$12,000

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Lewis D. Kaplan; *Infrared Fluorine in the Earth's Atmosphere*; 3 years; \$139,600

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Wendell Hewson and Gerald C. Gill; *Atmospheric Diffusion in Transitional States*; 3 years; \$150,000

NATIONAL ACADEMY OF SCIENCES, Washington, D.C.; G. D. Meld; *Support of IGO Secretariat*; 1 year; \$40,000

NATIONAL BUREAU OF STANDARDS, Washington, D.C.; F. W. Brown; *Airglow Photometer IGO—1969*; 1 year; \$525

F. W. Brown; *World Data Center for Airglow and Ionosphere*; 1 year; \$65,000

H. F. McMurdie; *Silver Iodide Studies*; 2 years; \$40,000

NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY, Socorro, N. Mex.; Marvin H. Wilkening; *Radon and Its Decay Products in the Lower Atmosphere*; 3 years; \$56,100

NEW YORK UNIVERSITY, New York, N.Y.; Gerhard Neumann; *Measurements of the Reynolds Stress and Wind Stress-Wind Relationships Over the Sea Surface*; 2 years; \$50,500

OFFICE OF NAVAL RESEARCH, Washington, D.C.; B. Vonnegut, Arthur D. Little, Inc.; *Cloud Electrification Studies*; 1 year; \$50,000

B. Vonnegut and C. B. Moore; *Cloud Electrification Studies*; 1 year; \$50,000

OREGON STATE COLLEGE, Corvallis, Oreg.; F. W. Decker; *Observation of Hailfalls and Related Atmospheric Phenomena in Southern Oregon*; 2 years; \$30,400

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; H. D. Rix; *Study of Photo-detachment Cross Sections for Negative Halogen Ions*; 2 years; \$59,800

TEXAS AGRICULTURAL AND MECHANICAL RESEARCH FOUNDATION, College Station, Tex.; Donald W. Hood; *Sea-Air Interface Carbon Dioxide Exchange Phenomena*; 2 years; \$43,000

Vance Moyer; *Radar Investigation of Subtropical Precipitation*; 3 years; \$90,200

UNIVERSITY OF TEXAS, Austin, Tex.; Charles W. Tolbert; *Microwave Radiating and Reflecting Properties of Precipitation*; 3 years; \$115,000

TUFTS UNIVERSITY, Medford, Mass.; Irving Schell; *Ocean Ice-Sea Temperature-Weather Interrelations*; 3 years; \$50,700

U.S. DEPARTMENT OF AGRICULTURE—FOREST SERVICE, Ogden, Utah; D. M. Fuquay; *Investigation of Cloud Modification Techniques to the Problem of Lightning-Caused Forest Fire*; 30 months; \$63,900

U.S. WEATHER BUREAU, Washington, D.C.; F. W. Reichelderfer; *Specialized Upper Air Observations for the Santa Barbara Cloud Seeding Project*; 1 year; \$4,200

Helmut Landsberg; *World Data Center A for Meteorology and Nuclear Radiation*; 1 year; \$37,000

F. W. Reichelderfer; *Specialized Upper Air Observations at Santa Monica, Calif.*; 1 year; \$4,200

UNIVERSITY OF VERMONT AND STATE AGRICULTURAL COLLEGE, Burlington, Vt.; Richard J. Howard; *Molecular Association in Super-Saturated Vapors*; 3 years; \$52,700

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Robert G. Fleagle; *Wind, Temperature and Humidity Profiles at Sea*; 2 years; \$40,500

## CHEMISTRY

AGNES SCOTT COLLEGE, Decatur, Ga.; W. Joe Frierson; *Paper Chromatographic Separation, Spectrophotometric Determination and New Reagents for Determination of Traces of Metallic Ions*; 3 years; \$3,400

ALBION COLLEGE, Albion, Mich.; Paul L. Cook; *Hydrogenations With Nickel-Aluminum Alloy in Aqueous Alkaline Solution*; 3 years; \$10,500

ALFRED UNIVERSITY, Alfred, N.Y.; Clifford E. Myers; *Vaporization Properties of Phosphides*; 2 years; \$13,300

George J. Young; *Adsorption and Wetting Phenomena in Hydrophobic Systems*; 2 years; \$9,700

ARIZONA STATE UNIVERSITY, Tempe, Ariz.; Roland K. Robins; *Physical and Chemical Properties and Molecular Structure of Certain Purines and Purine Antagonists*; 3 years; \$55,500

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Henry Frelser; *Application of Gas-Liquid Chromatography to Inorganic Separation Processes*; 3 years; \$25,300

UNIVERSITY OF ARKANSAS, Fayetteville, Ark.; Samuel Siegel; *Stereochemistry of the Catalytic Hydrogenation of Aromatic and Hydroaromatic Compounds*; 3 years; \$29,500

Kurt H. Stern; *Interactions in Solution*; 2 years; \$11,400

BOSTON UNIVERSITY, Boston, Mass.; Norman N. Lichtin; *Chemical Kinetics, Activities and Ionization and Dissociation Equilibria of Electrolytes in Nonaqueous Media*; 3 years; \$43,500

Ronald M. Milburn; *Redox Reactions of Ligands*; 2 years; \$28,600

BOWDOIN COLLEGE, Brunswick, Maine; John E. Frey; *Solvent Properties of Compounds of Group IIIB Elements*; 2 years; \$16,600

BROWN UNIVERSITY, Providence, R.I.; Robert H. Cole; *Dielectric Properties of Inert Gases*; 18 months; \$13,300

Robert L. Kay; *Measurement of Transference Numbers in Solvents of Low Dielectric Constant*; 2 years; \$11,000

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Walter Dannhuser; *Electrical Conductivity in Polymeric Systems*; 1 year; \$5,600

Henry M. Woodburn; *Reaction of Trifluoroacetonitrile With Hydrogen-Containing Functional Groups*; 2 years; \$12,000

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; G. Wilse Robinson; *Low Temperature Chemistry*; 3 years; \$45,800

Ernest H. Swift; *Mechanisms of the Reactions Between Thioacetamide and Various Metals*; 3 years; \$29,600

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Lawrence J. Andrews and Raymond M. Keefer; *Solvent Effects on Polar Reactions of Organic Substances With Halogens*; 3 years; \$38,500

Kenneth Conrow; *Chemistry of Substituted Alkyl Tropilidene*; 2 years; \$9,000

Donald J. Cram; Los Angeles; *Chemistry of Organometallic Compounds*; 3 years; \$36,500

W. F. Glaueque; *Thermodynamic and Magnetic Properties at Low Temperatures*; 1 year; \$116,500

Eugene R. Hardwick; Los Angeles; *Scintillation Study of Radiation Damage in Crystalline Solids*; 3 years; \$18,700

James F. Horning; *Energy Transfer in Molecular Solids*; 2 years; \$20,400

- Frederick R. Jensen; *Basic Organic Chemistry*; 3 years; \$54,100
- Harry W. Johnson, Jr., Riverside; *Rearrangement of N-Bromosuccinimide to Beta-Bromopropionyl Isocyanate*; 2 years; \$10,000
- James D. McCullough; *Structural and Equilibrium Studies of Group VI B Compounds*; 2 years; \$29,900
- Donald S. Noyce; *Organic Reaction Mechanisms*; 3 years; \$54,800
- Robert L. Pecsok, Los Angeles; *Complexes of Chromium (II)*; 2 years; \$16,200
- Andrew Streltweiser, Jr.; *Theoretical Organic Chemistry*; 3 years; \$54,100
- CALVIN COLLEGE, Grand Rapids, Mich.; Roger J. Faber; *Electron Spin Resonance Study of Organic Free Radicals in Solution*; 3 years; \$11,500
- CARLETON COLLEGE, Northfield, Minn.; Helen F. Greef; *Characterization of Phenyl-Substituted Hydroxydiphenyl-Triazines*; 2 years; \$6,200
- CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; Robert B. Carlin; 2, 6-Di-substituted Phenylhydrazones in the Fischer Indole Synthesis; 42 months; \$50,300
- Robert R. Holmes; *Pentacoordinated Molecules*; 2 years; \$12,000
- Robert J. Kurland; *Chemical Studies in Nuclear Magnetic Resonance and Electron Paramagnetic Resonance*; 3 years; \$25,700
- Robert G. Parr and Frank O. Ellison; *Theoretical Studies of the Electronic Structure of Molecules*; 3 years; \$59,700
- Frederick D. Rossini; *Thermochemistry*; 2 years; \$22,800
- Phillip L. Southwick; *Stereochemistry of Conjugate Addition*; 2 years; \$18,800
- CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; Melvin J. Astle; *Catalysis of Organic Reactions With Ion Exchange Resins*; 2 years; \$17,000
- Peter Kovacic; *Reaction of Metal Halides With Organic Compounds*; 2 years; \$23,600
- P. E. Pierce; *Brownian Motion Theory for Interacting Particles*; 2 years; \$17,500
- Donald R. Whitman; *Analysis of Nuclear Magnetic Resonance Spectra*; 2 years; \$20,900
- CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; B. deB. Darwent; *The Lifetime and Reactions of Vibrationally Excited Species*; 3 years; \$36,800
- CENTRAL STATE COLLEGE, Wilberforce, Ohio; E. O. Woolfolk; *Reagents for Identification and Chromatographic Separation of Colorless Organic Compounds*; 3 years; \$10,500
- UNIVERSITY OF CHICAGO, Chicago, Ill.; Robert A. Clement; *Solvation Effects in Organic Reactions*; 30 months; \$24,800
- UNIVERSITY OF CINCINNATI, Cincinnati, Ohio; Frank R. Meeks; *Critical Phenomena in Binary Liquid Systems*; 2 years; \$11,700
- Milton Orchin; *Mechanism of Selenium-Catalyzed Dehydrogenations*; 2 years; \$1,100
- CLARK UNIVERSITY, Worcester, Mass.; Arthur E. Martell; *Metal Chlorate-Catalyzed Hydrolysis of Salicyl Phosphate and Related Compounds*; 3 years; \$22,900
- Edward N. Trachtenberg; *Mechanism of Nucleophilic Displacement in Betahaloketones, Mannich Bases and Related Compounds*; 2 years; \$12,400
- COLORADO SCHOOL OF MINES, Golden, Colo.; J. L. Hall; *Acetonitrile as a Solvent for Inorganic Reactions*; 3 years; \$19,800
- COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; John B. Rogan; *Variables Influencing the Participation of an Olefinic Bond During Solvolysis*; 14 months; \$8,800
- UNIVERSITY OF COLORADO, Boulder, Colo.; John R. Lacher and Joseph D. Park; *Vapor Phase Calorimetry*; 5 years; \$55,800
- Henry J. Richter; *Chemistry of Pyracene*; 2 years; \$11,000
- COLUMBIA UNIVERSITY, New York, N.Y.; Benjamin P. Dalley; *High Resolution Microwave Spectroscopy*; 3 years; \$53,000
- Benjamin P. Dally; *Quadrupole and Nuclear Magnetic Resonance Studies of Electronic Distributions in Organic Molecules*; 3 years; \$87,600
- Cheves Walling; *Free Radical Reactions*; 3 years; \$51,700
- UNIVERSITY OF CONNECTICUT, Storrs, Conn.; Roy J. Gritter; *Free Radical Chemistry of the Organic Ligands in Coordination Compounds*; 3 years; \$18,300
- William L. Masterton and Emil J. Slowinski; *Effect of Pressurizing Gases on Surface Tensions of Liquids*; 1 year; \$9,000
- Carl W. Moeller; *Photochemical Reactions of Transition Metal Coordination Compounds*; 3 years; \$20,000
- John T. Stock; *Voltammetric Behavior of Suspended Solids*; 2 years; \$7,500
- Roland Ward; *Chemistry of Solids*; 3 years; \$33,900
- CORNELL UNIVERSITY, Ithaca, N.Y.; S. H. Bauer and Richard F. Porter; *Determination of the Molecular Structures of Metal Oxide and Metal Halide Species in the Vapor Phase at Temperatures of 500° to 2000° K*; 18 months; \$20,000
- Peter Debye; *Investigation of Polymer Interaction by Critical Opalescence*; 1 year; \$13,800
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- EARLHAM COLLEGE, Richmond, Ind.; Wilmer J. Stratton; *Investigations of Unusual Metal Chelate Compounds With Azine Ligands*; 2 years; \$9,100
- EMORY UNIVERSITY, Atlanta, Ga.; J. H. Goldstein; *Small Computer Installation for Chemical Research*; 1 year; \$29,700
- Arthur L. Underwood, Jr.; *Photometric Titrations*; 2 years; \$13,500
- UNIVERSITY OF FLORIDA, Gainesville, Fla.; George B. Butler; *Stereochemical Studies of Polymers Obtained by Alternating Intramolecular-Intermolecular Propagation*; 3 years; \$38,600
- William M. Jones; *Kinetics and Stereochemistry of the Decomposition of Pyrazolines*; 2 years; \$21,500
- FRANKLIN AND MARSHALL COLLEGE, Lancaster, Pa.; Fred A. Snavey and Fred H. Suydam; *Structure and Properties of Azopyrazolone Dyes and Their Metal Derivatives*; 2 years; \$9,400
- FRESNO STATE COLLEGE FOUNDATION, Fresno, Calif.; George B. Kaufman; *Separation of Inorganic Ots From Trans Isomers by Chromatographic Adsorption*; 2 years; \$5,900

GEORGETOWN UNIVERSITY, Washington, D.C.; Joseph E. Earley; *Oxidation States in Metallic Ions*; 2 years; \$24,400

Francis O. Rice; *Preparation and Reactions of Free Radicals*; 1 year; \$32,300

GEORGIA INSTITUTE OF TECHNOLOGY, Atlanta, Ga.; Dewey K. Carpenter; *Adsorption of Polymer Molecules by Solid Surfaces*; 3 years; \$19,700

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Donald J. Royer; *Structure and Stereochemistry of Complex Cobalt (III) Ions Containing Trans-1,2-Cyclopentanediimine*; 2 years; \$10,800

UNIVERSITY OF GEORGIA, Athens, Ga.; William D. Jacobs; *Derivatives of Dithioamide as Reagents for Determination of Platinum Group Metals*; 2 years; \$10,200

Robert C. Lamb; *Mechanism of the Thermal Decomposition of 6-Heptenoyl Peroxide in Carbon Tetrachloride*; 2 years; \$15,800

Thomas H. Whitehead; *New Quantitative Method for the Determination of Water*; 2 years; \$6,000

GRINNELL COLLEGE, Grinnell, Iowa; William A. Nevill; *Physical Properties of Halogenated Alicyclic Acids*; 2 years; \$13,300

HARVARD UNIVERSITY, Cambridge, Mass.; Elias J. Corey; *Isoprenoid (Terpene) Research*; 3 years; \$79,600

Richard A. Holm; *Magnetic and Spectral Studies of Complexes of the Transition Elements*; 3 years; \$11,900

Robert E. Krall; *Strain and Resonance Energy in Organic Molecules*; 2 years; \$14,400

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UNIVERSITY OF HOUSTON, Houston, Tex.; John F. Oro; *Photochemical Synthesis of Biochemical Compounds*; 2 years; \$14,800

HOWARD UNIVERSITY, Washington, D.C.; Kelso B. Morris; *Electrical Conductivities and Densities for Certain Molten Systems*; 2 years; \$20,300

UNIVERSITY OF IDAHO, Moscow, Idaho; James H. Cooley; *Preparation and Properties of Hydroxamic Esters*; 2 years; \$10,300

Peter K. Freeman; *Homoallylic Carbenes*; 2 years; \$7,800

UNIVERSITY OF ILLINOIS, Urbana, Ill.; R. L. Belford; *Binding and Structure of Metal Chelates; Excited States of Gases*; 2 years; \$25,300

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.; Robert Filler; *Highly Conjugated Lactones*; 2 years; \$11,100

IOWA STATE UNIVERSITY, Ames, Iowa; Glen A. Russell; *Measurement of Solvent Effects in the Reactions of Free Radicals and Atoms by Electron Paramagnetic Resonance*; 3 years; \$37,000

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; Russell A. Bonham; *Structure of the Primary, Secondary, and Tertiary Butyl Halides by High Precision Electron Diffraction*; 3 years; \$24,000

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Harvey Diehl; *Analytical Applications of Heterocyclic Compounds Related to 1,10-Phenanthroline*; 3 years; \$45,000

Klaus Ruedenberg; *Theoretical Work on the Electronic Structure of Molecules*; 2 years; \$51,600

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Paul H. Emmett; *Catalytic Hydrogenation Over Metals*; 2 years; \$21,200

Dean W. Robinson; *Spectral Studies of Solids and Trapped Gases in the 2-40 Micron Region*; 3 years; \$42,000

Emil H. White; *Deamination Reactions of Aliphatic Amines*; 3 years; \$44,200

UNIVERSITY OF KANSAS, Lawrence, Kans.; William J. Argersinger, Jr.; *Isopiestic Studies in Aqueous Mixed Electrolyte Solutions*; 3 years; \$27,500

UNIVERSITY OF KANSAS CITY, Kansas City, Mo.; James Moffat; *Chemistry of Organic Isocyanides and Related Compounds*; 3 years; \$15,000

LEHIGH UNIVERSITY, Bethlehem, Pa.; Albert C. Zettlemoyer; *Wetting of Solids by Liquids*; 3 years; \$39,300

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Paul Delahay; *Structure of the Double Layer and Correlation With Electrode Processes*; 3 years; \$64,400

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LOYOLA UNIVERSITY, Chicago, Ill.; Carl E. Moore; *Precipitation Processes at High Temperatures and Pressures*; 2 years; \$8,600

LUTHER COLLEGE, Decorah, Iowa; Adrian Docken; *Synthesis of Cyclopentanopentene Derivatives*; 1 year; \$5,200

MARQUETTE UNIVERSITY, Milwaukee, Wis.; Norman E. Hoffman; *Catalytic Decarbonylation of Aldehydes*; 2 years; \$17,500

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UNIVERSITY OF MARYLAND, College Park, Md.; Ellis R. Lippincott; *Spectroscopic and Structural Study of Dissolved Salts*; 3 years; \$22,400

Yolanda T. Pratt; *The Chemistry of the 5,8-Quinolonequinones*; 2 years; \$13,100

Ernest F. Pratt; *Selected Solid Reactants in Organic Chemistry*; 2 years; \$17,500

Homer W. Schamp, Jr., and Edward A. Mason; *Pressure-Volume-Temperature Relationships of Gases*; 3 years; \$37,300

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Frederick D. Greene; *Decomposition of Organic Hypochlorites*; 3 years; \$27,700

Herbert O. House; *Syntheses of Gibberellic Acid*; 3 years; \$23,800

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Gordon Atkinson; *Antisotropy of Inorganic Polymer Solutions*; 2 years; \$20,500

C. E. Nordman, Robert W. Parry and R. C. Taylor; *The Bridge and Coordinate Bond in Inorganic Systems*; 2 years; \$134,200

R. Martin Stiles; *Chelation As a Driving Force in Organic Reactions*; 2 years; \$28,400

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Bryce L. Crawford; *Intensity Studies in Infrared Spectra of Crystals*; 3 years; \$62,100



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- Norman H. Cromwell; *Stereo Controls in Conjugate Additions*; 2 years; \$15,200
- UNIVERSITY OF NEW HAMPSHIRE, Durham, N.H.; Henry G. Kuivla, *Mechanisms of Reactions of Organotin Hydrides*; 4 years; \$25,200.
- Gloria G. Lyle; *Absolute Configuration of 4-Hydroxymethylcyclohexanone Oxime*; 3 years; \$16,000
- NORTHEAST LOUISIANA STATE COLLEGE, Monroe, La.; Raymond Annino; *Polarographic Investigation of Halogenated Acids and Aldehydes*; 1 year; \$4,300
- NORTHWESTERN UNIVERSITY, Evanston, Ill.; Fred Basolo; *Carbon Monoxide Exchange and Substitution Reactions of Metal Carbonyls*; 2 years; \$22,300
- Pierce W. Selwood; *Metal-Gas Surface Interactions*; 1 year; \$6,900
- Pierce W. Selwood; *Structure and Activity of Catalytic Solids*; 2 years; \$17,100
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- Vincent J. Traynells; *Mechanism of the Reaction of Aromatic N-Oxides With Acid Anhydrides*; 2 years; \$10,500
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- Melvin S. Newman; *Synthesis and Properties of Intramolecularly Overcrowded Molecules*; 3 years; \$37,000
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- Maurice Shamma; *Natural Products*; 3 years; \$13,500
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- James W. Cobble, *Thermodynamic Properties of High Temperature Solutions*; 3 years; \$45,200
- William E. Truce, *Stereochemistry and Mechanisms of Nucleophilic Reactions on Acetylenic, Olefinic and Vinyllic Halide Systems*; 3 years; \$27,400
- QUARTERMASTER RESEARCH AND ENGINEERING COMMAND, U.S. ARMY, Natick, Mass.; Louis Long, Jr.; *Relative Reactivity of the Hydroxyl Groups of Sucrose and Its Sulfonyl Derivatives*; 1 year; \$14,700
- UNIVERSITY OF REDLANDS, Redlands, Calif.; John L. Abernethy; *Resolutions and Partial Asymmetric Syntheses in Enzyme-Catalyzed Reactions Between Amido Acids and Other Basic Compounds*; 1 year; \$2,400
- RENSELAEER POLYTECHNIC INSTITUTE, Troy, N.Y.; Stanley C. Bunce; *Carbon-14 Studies of Rearrangements in the 2-Cyclopropyl-1-Ethyl System*; 2 years; \$14,600
- George J. Janz; *Raman Spectra of Molten Salts*; 2 years; \$28,100
- Robert L. Strong, *Complex Formation in the Flash Photolysis and Recombination of Halogens in Aromatic Solvents*; 3 years; \$29,400
- RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; Robert T. La Loned, College of Forestry at Syracuse; *Chemistry of Bridged Polycyclic Olefins*; 2 years; \$7,000
- Bruce McDuffie, *Linear Voltage-Scan Voltammetry with Stationary Mercury Drop Electrodes*; 2 years; \$9,200
- W. Prins; College of Forestry at Syracuse; *Crystallinity & Superstructure of Polymer Films by Means of Light-Scattering*; 3 years; \$14,900
- Fausto Ramirez, *Mechanisms of Reactions of Phosphorus Compounds*; 2 years; \$24,000
- RICE INSTITUTE, Houston, Tex.; Richard B. Turner, *Heats of Catalytic Hydrogenation in Solution*; 2 years; \$24,100

- UNIVERSITY OF ROCHESTER, Rochester, N.Y.; A. B. F. Duncan; *Electronic Structure of Some Polyatomic Molecules*; 3 years; \$24,100
- Marshall Gates, *Studies on Gelsemine*; 3 years; \$23,600
- W. Albert Noyes, *Photolysis of 2-Hexanone-5,5, d<sub>2</sub>*; 4 years; \$28,500
- D. Stanley Tarbell, *Reactions of Mixed Carbonylic-Carbonic Anhydrides and Related Compounds*; 3 years; \$59,400
- David J. Wilson; *Proton Magnetic Resonance Study of Molecular Processes*; 2 years; \$10,500
- ROOSEVELT UNIVERSITY, Chicago, Ill.; Eugene Lieber; *Elucidation of the Oxidation of Aminoguanidine in Basic Media*; 2 years; \$11,500
- RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Roderick A. Barnes; *Molecular Orbital Calculations for Solving Some Problems in Organic Chemistry*; 3 years; \$19,000
- SAN DIEGO STATE COLLEGE FOUNDATION, San Diego, Calif.; John C. Sheppard; *Kinetics of the Cobalt (III)-Iron (II) and the Cobalt (III)-Chromium (II) Reactions in Perchloric Acid*; 2 years; \$13,600
- UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; Jerome A. Berson; *Wagner-Meerwein Rearrangements*; 3 years; \$53,000
- David A. Dows, *Vibrational Spectra of Crystals*; 3 years; \$23,700
- SOUTHERN ILLINOIS UNIVERSITY, Carbondale, Ill.; Robert E. Van Atta and Douglas E. Sellers, *Electrochemical and Spectrophotometric Investigation of Various Imines*; 2 years; \$27,000
- Roger E. Beyler; *Reactions of Grignard Reagents with Steroid Epoxides*; 2 years; \$16,500
- STANFORD UNIVERSITY, Stanford, Calif.; William A. Bonner, *Mechanisms of Raney Nickel Catalyzed Hydrogenolytic Processes*; 3 years; \$26,000
- Richard H. Eastman, *Oxidation Reactions of Terpenes and Related Compounds*; 2 years; \$27,000
- E. J. Eisenbraun; *Absolute Configuration of Sesquiterpenes*; 2 years; \$19,600
- Frank E. Harris; *Quantum Mechanical Studies of Small Ions and Molecules*; 2 years; \$20,100
- STATE COLLEGE OF WASHINGTON, Pullman, Wash.; Donald S. Matteson; *Unsaturated Boronic Acids*; 2 years; \$13,000
- STATE UNIVERSITY OF IOWA, Iowa City, Iowa; Alexander I. Popov; *Physicochemical Study of Halogen Charge-Transfer Complexes*; 2 years; \$15,100
- R. T. Sanderson; *Chemistry of Calcium, Strontium, and Barium; Compounds Containing Carbon Metal Bonds*; 2 years; \$14,900
- John K. Stille; *Reactions of Tetracyclic Dienes and an Approach to the Synthesis of Pentalene*; 3 years; \$24,200
- Stanley Wawzonek; *Preparation and Properties of Aminimides*; 2 years; \$19,800
- STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N.J.; Ajay K. Bose; *Optical Rotatory Dispersion of Natural Products*; 2 years; \$24,100
- SYRACUSE UNIVERSITY RESEARCH FOUNDATION, Syracuse, N.Y.; Thomas H. Walnut; *Infrared Spectrum of Solid Sulfur (100 to 700 cm<sup>-1</sup>) and Temperature Dependence of Infrared Spectrum of Ice*; 2 years; \$15,700
- TEMPLE UNIVERSITY, Philadelphia, Pa.; Francis H. Case; *Heterocyclic Nitrogen Compounds Capable of Forming Chelates with Metals*; 3 years; \$16,600
- UNIVERSITY OF TEXAS, Austin, Tex.; Richard Fuchs; *Factors Determining the Hammett Rho Constant in Biomolecular, Nucleophilic Displacement Reactions*; 3 years; \$17,900
- TRIEB COLLEGE, Greenville, Pa.; Walter H. Puterbaugh; *Importance of the Metallic Cation in Certain Organic Reactions Effected by Strong Alkali Bases*; 2 years; \$5,300
- TUFTS UNIVERSITY, Medford, Mass.; Robert D. Stolow; *Nonchair Conformations of Cyclohexane Derivatives*; 3 years; \$15,500
- TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; Joseph H. Boyer; *The Reaction of Nitrogen Oxides and of O-Nitroso Compounds With Unsaturated Groups*; 3 years; \$28,300
- Hans B. Jonassen; *Theoretical Treatment Relating High-Frequency Paramagnetism to the Color of Molecules in  $\Sigma$  States*; 1 year; \$5,500
- URSINUS COLLEGE, Collegeville, Pa.; Roger P. Staiger; *Isatoic Anhydride: An Analytical Reagent for Characterisation of Organic Compounds*; 2 years; \$2,300
- UNIVERSITY OF UTAH, Salt Lake City, Utah; W. J. Burke; *A New Aminoalkylation Reaction*; 2 years; \$12,900
- Henry Eyring; *Transport and Thermodynamic Properties of Liquids and Study of Rate Processes*; 3 years; \$89,500
- J. Calvin Giddings; *Molecular Basis of Chromatography*; 3 years; \$28,700
- David M. Grant; *Molecular and Electron Configurational Effects on Nuclear Magnetic Resonance Spectra*; 3 years; \$36,000
- VALPARAISO UNIVERSITY, Valparaiso, Ind.; Alvin W. Melbohm; *Electrochemical Behavior of Dimethyl Sulfoxide Solutions*; 2 years; \$6,800
- VANDERBILT UNIVERSITY, Nashville, Tenn.; Mark M. Jones; *Ligand Structures and the Stability of Complex Ions*; 3 years; \$23,300
- UNIVERSITY OF VERMONT, Burlington, Vt.; Robert H. Linnel; *Interaction of Pyrrole and Oxygen*; 2 years; \$15,500
- VILLANOVA UNIVERSITY, Villanova, Pa.; Kenneth F. O'Driscoll; *Equilibrium Monomer Concentrations in Anionic Vinyl Polymerizations*; 2 years; \$22,900
- UNIVERSITY OF VIRGINIA, Charlottesville, Va.; Thomas I. Crowell; *Kinetics of Amine-Carbonyl Reactions*; 3 years; \$20,700
- Robert E. Lutz; *Structural, Steric and Conformational Effects on Conjugation and Intramolecular Interaction of Groups in Unsaturated Mono-, Di-, and Polycarbonyl Systems*; 3 years; \$37,600
- Oscar R. Rodig; *Smiles Rearrangement Involving Heterocyclic Systems; Preparation of Dipyrrothiazines*; 3 years; \$14,800
- Paul N. Schatz; *Infrared Intensity and Dispersion Studies in Solids, Liquids, and Gases*; 4 years; \$38,100
- WASHINGTON UNIVERSITY, Saint Louis, Mo.; Arthur C. Wahl; *Kinetics of Oxidation-Reduction Reactions*; 3 years; \$46,000
- UNIVERSITY OF WASHINGTON, Seattle, Wash.; David F. Eggers, Jr.; *High-Resolution Vibrational Spectra*; 3 years; \$31,000
- David M. Ritter; *Nitrosyl Oxyanion Free Radicals*; 2 years; \$7,200
- W. M. Schubert; *Acid-Base Catalysis in Strong Mineral Acid Solution*; 3 years; \$57,600

WAYNE STATE UNIVERSITY, Detroit, Mich.; Norman L. Allinger; *Conformational Effects in Medium Rings*; 3 years; \$84,500

C. L. Stevens; *Gem-Dihalides From the Hofmann Degradation Reaction*; 2 years; \$2,800

WHITMAN COLLEGE, Walla Walla, Wash.; David L. Frasco; *Vibrational Spectra of Ammonium Carbamate and Solid (NH<sub>3</sub>)<sub>2</sub>CO<sub>2</sub>*; 2 years; \$5,300

UNIVERSITY OF WISCONSIN; Madison, Wis.; John D. Ferry; *Molecular Motions in Polymers*; 3 years; \$72,000

Louis J. Gosting; *Construction and Installation of a Research Diffusionmeter*; 2 years; \$33,600

William S. Johnson; *Synthesis of Steroids and Terpenoid Types and Related Studies*; 1 year; \$37,500

Howard E. Zimmerman; *Experimental and Theoretical Approach to Mechanistic Photochemistry*; 3 years; \$36,900

UNIVERSITY OF WICHITA, Wichita, Kans.; Luther L. Lyon; *Physical Adsorption and Condensation in Capillaries*; 2 years; \$13,400

COLLEGE OF WOOSTER, Wooster, Ohio; Thomas E. Ferington; *Reactions of Halogens With Thirum Sulfides and Related Compounds*; 2 years; \$8,800

John D. Reinheimer; *London Forces in Nucleophilic Substitution Reactions*; \$8,600

YALE UNIVERSITY, New Haven, Conn.; William Von Eggers Doering; *Organic Chemistry of Divalent Carbon*; 3 years; \$60,000

Gary Griffin; *Preparation and Properties of O-Xylyene*; 2 years; \$11,700

## DEVELOPMENTAL BIOLOGY

BOSTON DISPENSARY, Boston, Mass.; Gerhard Schmidt; *Embryochemical Studies on Lipides, Proteins, and Nucleic Acids*; 3 years; \$45,700

BRANDEIS UNIVERSITY, Waltham, Mass.; M. Sussman and H. L. Ennis; *Genetics and Physiology of the Initiator Co Cell for Slime Mold Aggregation*; 3 years; \$52,400

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; C. W. Asling; *Morphogenesis of the Inner Ear*; 1 year; \$6,800

C. R. Gran, Davis; *Amino Acid Utilization by Chick Embryos*; 4 years; \$56,100

F. W. Lorenz and F. X. Ogasawara, Davis; *Physiology of the Avian Oviduct*; 3 years; \$37,300

COLLEGE OF WILLIAM AND MARY, Williamsburg, Va.; Robert E. L. Black; *Respiratory Metabolism in Marine Embryos*; 3 years; \$17,500

CORNELL UNIVERSITY, Ithaca, N.Y.; Perry W. Gilbert; *Patterns of Reproduction in Elasmobranch Fishes*; 3 years; \$25,800

DICKENSON COLLEGE, Carlisle, Pa.; Robert E. Ogren; *Biology of the Tapeworm *Hexacanth Embryo**; 3 years; \$14,200

DREXEL INSTITUTE OF TECHNOLOGY, Philadelphia, Pa.; Floyd J. Wiercinski; *Role of Calcium in Early Development of Marine Eggs*; 1 year; \$2,000

DUKE UNIVERSITY, Durham, N.C.; Kenneth S. McCarty; *Biochemistry of Homeostatic Cell Cultures*; 3 years; \$25,400

EMORY UNIVERSITY, Atlanta, Ga.; Anthony C. Clement; *Embryonic Determination in *Ilyanassa**; 2 years; \$11,500

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Charles B. Metz, Oceanographic In-

stitute; *Studies on Gametes and Embryos of Marine Invertebrate Animals*; 3 years; \$9,000

GRINNELL COLLEGE, Grinnell, Iowa; Waldo S. Walker; *Effect of Mechanical Stimulation and Etiolation on Plants*; 3 years; \$10,600

HARVARD UNIVERSITY, Cambridge, Mass.; D. W. Fawcett; *Cell Differentiation in Hydra*; 2 years; \$12,000

Ralph H. Wetmore; *Differentiation of Vascular Tissues in Plants*; 2 years; \$30,900

IDAHO STATE COLLEGE, Pocatello, Idaho; Christina M. Richards; *Factors Controlling Growth in Tadpoles*; 3 years; \$12,900

UNIVERSITY OF ILLINOIS, Urbana, Ill.; Albert S. Rouffa; *Factors Influencing Morphogenesis in the Bud*; 3 years; \$14,000

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; Martin Dworkin; *Nutrition and Developmental Physiology of Fruiting *Mycobacteria**; 2 years; \$19,895

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Frederick B. Bank; *Vertebrate Upper Respiratory Tract Anatomy*; 3 years; \$17,100

Andre T. Jagendorf; McCollum-Pratt Institute; Chloroplast Growth Process; 42 months; \$63,100

Hans Lauffer; *Differentiation of Protein Patterns During Development*; 3 years; \$35,300

Malcom S. Steinberg; *Selective Adhesion in Embryonic Cells*; 2 years; \$27,300

LE MOYNE COLLEGE, Syracuse, N.Y.; Louis D. De Gennaro; *Differentiation of the Glycogen Body of the Chick Embryo*; 2 years; \$4,400

UNIVERSITY OF MASSACHUSETTS, Amherst, Mass.; John R. Rowley; *Formation and Development of the Pollen Grain Wall*; 3 years; \$14,100

MEDICAL COLLEGE OF VIRGINIA, Richmond, Va.; Wille M. Reams, Jr.; *Differentiation of Pigment Cells in the Pet Mouse*; 3 years; \$18,400

MEDICAL COLLEGE OF SOUTH CAROLINA, Charleston, S.C.; Elsie Taber; *Differentiation, Growth and Function of Gonadal Tissue*; 3 years; \$26,200

METHODIST HOSPITAL, Houston, Tex.; Gerald L. Feldman; *Studies of Experimentally-Induced Cataracts*; 3 years; \$16,500

UNIVERSITY OF MIAMI, Coral Gables, Fla.; Casimer T. Grabowski; *Organization and Cellular Differentiation in Embryos*; 3 years; \$31,200

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Wilfrid T. Dempster; *Architectonics of the Human Skull*; 3 years; \$31,400

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; William J. L. Felts; *Study of the Skeleton of Cetaceae*; 1 year; \$13,000

Walter Fluegel; *Mycobacter Fruiting Formation*; 3 years; \$13,900

A. Glenn Richards; *Structure and Development of Insect Membranes*; 2 years; \$37,200

MONTANA STATE UNIVERSITY, Missoula, Mont.; E. W. Pfeiffer; *Origin of the Ovarian Interstitial Cells of *Dipodomys**; 1 year; \$1,000

UNIVERSITY OF MONTREAL, Montreal, Canada; Hans Selye; *Normal and Abnormal Growth in Relation to Invasiveness*; 2 years; \$16,600

- MOUNT HOLYOKE COLLEGE, South Hadley, Mass.; Jane Couffer Kaltbach; *Enzymatic Studies of Amphibian Metamorphosis*; 2 years; \$9,500
- NEW YORK UNIVERSITY, New York, N.Y.; H. Clark Dalton; *Embryological Analysis of Gene Action in Amphibian Pigment Cell Development*; 3 years; \$27,000
- UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; H. E. Lehman; *Nucleo-cytoplasmic Relationships in Embryonic Determination and Morphogenesis*; 5 years; \$59,800
- NORTHWESTERN UNIVERSITY, Evanston, Ill.; R. C. King; *Genetic Control of Oogenesis in *Drosophila Melanogaster**; 8 years; \$43,600
- OGLETHORPE UNIVERSITY, Atlanta, Ga.; Arthur L. Cohen; *Morphogenesis of the *Mycomycetes**; 1 year; \$15,800
- OREGON STATE COLLEGE, Eugene, Oreg.; Leo E. Jones; *Cytological Observations on Somatic Cells of Angiosperms in Microculture*; 3 years; \$15,700
- UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Paul B. Green; *The Physical Basis of Cell Wall Growth*; 5 years; \$57,600
- James W. Lash; *An Analysis of In Vitro Chondrogenesis*; 1 year; \$900
- Donald G. Lee; *Vascularization of the Intervertebral Disc*; 1 year; \$1,800
- Roy G. Williams; *Studies of Bone and Cartilage in Rabbits*; 3 years; \$22,400
- UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; Ian M. Sussex and Joan Eiger Gottlieb; *Morphogenesis in the Shoot of Vascular Plants*; 3 years; \$41,800
- PRINCETON UNIVERSITY, Princeton, N.J.; John T. Bonner; *Differentiation in the Cellular Slime Molds*; 5 years; \$50,800
- Lionel I. Rebhun; *Fertilization and Cleavage in Marine Invertebrate Eggs*; 5 years; \$28,100
- RESEARCH FOUNDATION, Oklahoma State University, Stillwater, Okla.; E. A. Grula; *Inhibition of Cell Division in *Erwinia**; 3 years; \$25,700
- ROCKEFELLER INSTITUTE, New York, N.Y.; Man-Chiang Niu; *Induction of Specific Protein Synthesis*; 2 years; \$33,200
- Paul Weiss; *Physical Influences in the Self Regulation of Development*; 1 year; \$6,000
- RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Charlotte J. Avers; *Cellular Differentiation in the Root Epidermis*; 3 years; \$35,300
- STANFORD UNIVERSITY, Stanford, Calif.; Clifford Grobstein; *Cell and Tissue Interactions in Development*; 5 years; \$182,800
- STATE COLLEGE OF WASHINGTON, Pullman, Wash.; E. S. E. Hafez; *Tubo-Ovarian Mechanisms of Ova Reception in Mammals*; 3 years; \$32,800
- STATE UNIVERSITY OF IOWA, Iowa City, Iowa; H. W. Beams; *Fine Structure of Cells*; 5 years; \$43,600
- UNIVERSITY OF TEXAS, Austin, Tex.; Walter V. Brown; *Fine Structure of Grass Chloroplasts*; 18 months; \$15,900
- UNION COLLEGE AND UNIVERSITY, Schenectady, N.Y.; Raymond Rappaport, Jr.; *Comparative Cytosurgical Studies of Cytokinesis*; 3 years; \$3,000
- UNIVERSITY OF VERMONT, Burlington, Vt.; Richard W. Glade; *Roles of Epidermis and Dermis in Amphibian Limb Regeneration*; 3 years; \$13,400
- VILLANOVA UNIVERSITY, Villanova, Pa.; Roman Maksymowych; *Cell Division and Tissue Differentiation During Leaf Development*; 2 years; \$10,100
- WASHINGTON UNIVERSITY, St. Louis, Mo.; Robert M. Burton; *Metabolism of the Developing Central Nervous System*; 3 years; \$49,500
- WAYNE STATE UNIVERSITY, Detroit, Mich.; Werner G. Heim; *Changes in the Serum Proteins During the Ontogeny of Mammals*; 1 year; \$5,700
- WESLEYAN UNIVERSITY, Middletown, Conn.; John B. Morrill, Jr.; *Development of Specific Proteins in the Molluscan Embryo*; 3 years; \$28,000
- UNIVERSITY OF WISCONSIN, Madison, Wis.; Robert L. Metzberg; *Nucleic Acid and Protein Metabolism During Differentiation in Lethal Mutants of *Drosophila**; 2 years; \$12,800
- YALE UNIVERSITY, New Haven, Conn.; Ian K. Ross; *Life Cycles, Cytology and Development of Selected Species of *Mycomycetes**; 3 years; \$9,800
- J. S. Nicholas; *Experimental Analysis of Rat Development*; 3 years; \$41,000
- YESHIVA UNIVERSITY, New York, N.Y.; Meyer Atlas; *Uptake of Tritiated Nucleosides by the Mouse Embryo*; 2 years; \$11,400

## EARTH SCIENCES

- UNIVERSITY OF ALASKA, College, Alaska; Troy L. Pewe; *Glaciological Investigations in Interior Alaska*; 2 years; \$21,900
- AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Norman D. Newell; *Permian-Triassic Hiatus in Marine Rocks of South-eastern Europe*; 1 year; \$1,500
- AMHERST COLLEGE, Amherst, Mass.; Bruce B. Benson; *Isotopic Analysis of Dissolved Gases in Ocean Waters*; 2 years; \$51,000
- Bruce B. Benson; *Oxygen Isotope Determinations of Ancient Surface and Bottom Temperatures of the Oceans*; 2 years; \$55,600
- ARIZONA STATE UNIVERSITY, Tempe, Ariz.; Clyde A. Crowley; *Nininger Meteorite Collection*; 1 year; \$240,000
- UNIVERSITY OF ARIZONA, Tucson, Ariz.; Duwayne M. Anderson; *Forces of Interaction Between Finely Divided Silicate Particles*; 2 years; \$21,000
- Jane Gray; *Palynology of the Tertiary Formations of the Northwestern United States*; 2 years; \$24,000
- BROWN UNIVERSITY, Providence, R.I.; Bruno J. Gilletti, F. Donald Eckelmann and Alonzo W. Quinn; *Petrologic and Geochemical Problems Relating to Mountain Building*; 3 years; \$100,000
- UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Edward J. Buehler; *Eptauna From the Hamilton Group of Western New York*; 1 year; \$7,400
- UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Daniel I. Axelrod; *Los Angeles; The Tertiary Floras of Nevada*; 3 years; \$20,000
- Daniel I. Axelrod and William S. Ting, Los Angeles; *Late Cenozoic Pollen Floras of California*; 2 years; \$18,200
- M. N. Bramlette, H. C. Urey and Gustaf Arrhenius; *Purchase of Electron Microprobe*; 1 year; \$76,500
- Perry Byerly; *Creep on the San Andreas Fault*; 3 years; \$31,750

- Frank W. Dickson, Los Angeles; *Geochemical and Field Studies of Borate Genesis*; 2 years; \$12,700
- Frank W. Dickson; *Ore Forming Processes*; 2 years; \$4,450
- J. Freeman Gilbert and Leon Knopoff, Los Angeles; *Seismic Theory and Interpretation*; 3 years; \$119,800
- William S. Fyfe; *Some Aspects of the Properties of Solids and Solutions at High Pressures and Temperatures*; 2 years; \$49,900
- J. J. Jurinak and D. H. Volman, Davis; *Thermodynamics of Water Adsorption by Kaolinite in the Monolayer Region*; 2 years; \$9,200
- J. Knauss, Scripps Institution of Oceanography, La Jolla; *Direct Current Measurements*; 1 year; \$71,400
- George C. Kennedy and Leason Adams, Los Angeles; *Rapidly-Running Transitions at Very High Pressure*; 18 months; \$33,400
- George C. Kennedy, Los Angeles; *The Evaluation of Thermoluminescence as a Geological and Archeological Tool*; 2 years; \$53,200
- John E. Tyler, Visibility Laboratory, Scripps Institution of Oceanography, La Jolla; *Hydro Optics Research*; 2 years; \$104,300
- Harold C. Urey, Scripps Institution of Oceanography, La Jolla; *Isotope Research on Paleotemperatures*; 2 years; \$23,000
- John Verhoogen; *Iron-Titanium Oxide Minerals*; 3 years; \$32,700
- Lionel E. Weiss; *Structural Geometry of the Repeatedly Deformed Rocks of the Southern Sierra Nevada*; 2 years; \$9,000
- CARTER COUNTY MUSEUM, Ekalaka, Mont.; Marshall E. Lambert; *Fossil Vertebrates of Southeastern Montana*; 5 years; \$10,000
- UNIVERSITY OF CHILE, Santiago, Chile; CInua Lomnitz; *Andean Structure*; 2 years; \$50,000
- UNIVERSITY COLLEGE OF RHODESIA AND NYASALAND, Salisbury, Southern Rhodesia; Dennis I. Gough; *Paleomagnetic Studies in Southern Rhodesia*; 3 years; \$22,900
- COLORADO SCHOOL OF MINES, Golden, Colo.; Robert M. Hutchinson; *A Petrotectonic and Radiometric Study of the North Part of Pikes Peak, Batholith, Colorado*; 2 years; \$15,600
- COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; D. B. Simons; *Model-Prototype Relationships for Flow and Sediment Transport in Alluvial Channels*; 1 year; \$5,100
- COLUMBIA UNIVERSITY, New York, N.Y.; Wallace S. Broecker; Lamont Geological Observatory; *Methods of Age Determination Based on Inequilibrium in the Uranium Decay Series*; 3 years; \$50,000
- Maurice Ewing, Lamont Geological Observatory; *Sediment Drilling in Water Covered Areas*; 1 year; \$50,000
- Maurice Ewing, Lamont Geological Observatory; *Support of the Research Vessel VEMA*; 1 year; \$184,000
- David B. Ericson, Robert J. Mezles and Alan W. H. Be, Lamont Geological Observatory, Pallsades; *Oxygen Isotope Determinations of Ancient Surfaces and Bottom Temperatures of the Oceans*; 2 years; \$57,400
- Marshall Kay; *Comparison of Paleozoic Structure and Faunas in Northwest Europe With Those in Nevada*; 8 months; \$3,000
- DARTMOUTH COLLEGE, Hanover, N.H.; Richard E. Stolber; *Minor Elements in Sulfide Minerals*; 2 years; \$11,800
- DUKE UNIVERSITY, Durham, N.C.; S. Duncan Heron, Jr.; *Nature of Clay Minerals of the Atlantic Coastal Plain*; 2 years; \$31,300
- EARLHAM COLLEGE, Richmond, Ind.; Ansel M. Gooding; *Pleistocene Geology of Eastern Indiana*; 3 years; \$17,800
- FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Lyman D. Toulmin; *Paleocene and Eocene Guide Fossils of the Coastal Plain of the Southeastern United States*; 27 months; \$20,400
- FRANKLIN AND MARSHALL COLLEGE, Lancaster, Pa.; Marvin E. Kauffman; *Jurassic Rocks in Western Montana*; 2 years; \$7,130
- UNIVERSITY OF GEORGIA, Athens, Ga.; Charles A. Salotti; *Field Investigations of Copper-Zinc Skarn Deposit at Cotopaxi, Colorado*; 2½ months; \$2,500
- John S. Schlee; *The Petrology of Basal Pennsylvanian Rocks of the Southern Appalachians*; 2 years; \$14,100
- UNIVERSITY OF HAWAII, Honolulu, Hawaii; Gordon A. Macdonald; *Geochemistry of Hawaiian Lavas*; 1 year; \$15,700
- IDAHO STATE COLLEGE, Pocatello, Idaho; Lawrence P. Richards; *Vertebrate Paleontology of the Tertiary Lake Beds of the Lemhi Valley Region, Idaho*; 1 year; \$4,800
- UNIVERSITY OF ILLINOIS, Urbana, Ill.; F. J. Steveson; *Paleobiochemical Research*; 2 years; \$19,250
- INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; John B. Droste; *Effect of Diagenesis Upon Clay Minerals in the Saline Environment*; 1 year; \$6,500
- IOWA STATE UNIVERSITY, Ames, Iowa; Don Kirkham; *Use of Deuterium in Soil-Plant Research*; 2 years; \$23,500
- JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Hans P. Eugster; *Low-Grade Metamorphic Reactions*; 2 years; \$23,000
- R. B. Montgomery; *Analysis of Serial Oceanographic Observations*; 3 years; \$43,600
- UNIVERSITY OF KANSAS, Lawrence, Kans.; William K. Hamblin; *Origin and Significance of Reverse Drag Fault Fleazure Displacement*; 18 months; \$17,000
- James A. Peoples, Jr.; *Geophysical Investigations of the Midcontinent Gravity High*; 1 year; \$12,600
- KING'S COLLEGE, Newcastle-upon-Tyne, England; Stanley Keith Runcorn; *Paleomagnetism*; 2 years; \$6,700
- LEHIGH UNIVERSITY, Bethlehem, Pa.; J. Donald Ryan; *Cloverly-Inyan Kara Paleosurface*; 2 years; \$17,500
- Bradford Willard; *Study of the Harvey Bassler Collection*; 2 years; \$6,600
- LOS ANGELES COUNTY MUSEUM, Los Angeles, Calif.; Theodore Downs; *The Vertebrate Fauna of the Late Cenozoic of the Imperial Valley Region of California*; 1 year; \$7,400
- LOS ANGELES STATE COLLEGE FOUNDATION, Los Angeles, Calif.; Perry L. Ehlrig; *Geology of the Pelona Schist*; 2 years; \$6,100
- ROYAL R. MARSHALL, Pasadena, Calif.; *Leads in Basalts and Eclogites*; 1 year; \$7,950
- MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Arthur J. Boucot; *Silurian and Lower Devonian Shelly Faunas*; 8 years; \$25,900
- Harold W. Fairbairn; *Purchase of an X-Ray Fluorescence Spectograph and Associated Equipment*; 3 months; \$20,000
- UNIVERSITY OF MASSACHUSETTS, Amherst, Mass.; George E. McGill; *Tectonic Development of the Imbricate Fault Zone of the*

- Sawtooth and Lewis and Clark Ranges*; 3 years; \$10,620  
 UNIVERSITY OF MIAMI, Coral Gables, Fla.; Cesare Emiliani; *The Marine Laboratory, Miami*; *Paleotemperature Research*; 3 years; \$50,000  
 F. F. Koczy; *Feasibility Study for a Catamaran for Oceanographic Research*; 1 year; \$18,600  
 F. F. Koczy, The Marine Laboratory, Miami; *Geochemistry of Radioactive Elements in the Marine Environment*; 1 year; \$13,000  
 F. F. Koczy; *Support of the Research Vessel GERDA*; 1 year; \$28,000  
 Gene A. Rusnak and Gote Ostlund; *Radio-carbon Dating Laboratory*; 2 years; \$63,700  
 UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; John M. DeNoyer; *Geophysical Investigations in the Huerfano Basin*; 2 years; \$15,600  
 UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Paul W. Gast; *Isotopes of Lead and Strontium*; 2 years; \$29,000  
 Frederick M. Swain; *Carbon Cycles of the Jurassic Period*; 2 years; \$10,500  
 UNIVERSITY OF MISSOURI, Columbia, Mo.; Don L. Frizzell; *Taxonomic Study of Fossil and Recent Fish Otoliths*; 2 years; \$10,700  
 MONTANA STATE UNIVERSITY, Missoula, Mont.; Robert W. Fields; *Stratigraphy and Paleontology of the Intermontane Basins of Western Montana*; 3 years; \$11,225  
 John Hower; *Comparison of Recent and Ancient Glauconites*; 1 year; \$3,000  
 NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.; John N. Adkins; *Experimental Drilling in Deep Water*; 1 year; \$172,550  
 John N. Adkins; *Study of the Problem of Drilling a Hole to the Mohorovicic Discontinuity*; 1 year; \$80,500  
 UNIVERSITY OF NEW HAMPSHIRE, Durham, N.H.; Cecil J. Schmeer; *Thermal Basis for Polytypism*; 2 years; \$20,000  
 NEW YORK UNIVERSITY, New York, N.Y.; Brooks F. Ellis; *Lithofacies and Ostracod Studies in Long Island Sound*; 1 year; \$5,000  
 UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; Virgil I. Mann; *Gravity Survey in North Carolina*; 2 years; \$12,700  
 OBERLIN COLLEGE, Oberlin, Ohio; Kathryn H. Chlshy; *Pollen Studies and Pleistocene Chronology of San Augustin Plains*; 2 years; \$3,360  
 OFFICE OF NAVAL RESEARCH, Washington, D.C.; Capt. J. C. Myers, USN; *Committee on Oceanography of the National Academy of Sciences*; 1 year; \$20,000  
 OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; R. P. Goldthwait; *Structure in the Stagnant Ice of Burroughs Glacier, Glacier Bay, Alaska*; 15 months; \$6,000  
 Leslie C. Coleman; *Ionic Substitution in Monoclinic Pyroxenes*; 2 years; \$16,400  
 Richard P. Goldthwait; *Slope Form in Relation to Micro-Climate*; 2 years; \$3,500  
 UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; Charles G. Dodd; *Clay-Mineral Geochemical Research Program Related to the Occurrence of Borates*; 1 year; \$10,400  
 H. E. Hunter; *Petrology of the Basic Intrusive Rocks of the Wichita Mountains*; 1 year; \$12,000
- OREGON STATE COLLEGE, Corvallis, Oreg.; Wayne V. Burt; *Operation of an Oceanographic Research Vessel*; 1 year; \$50,000  
 W. H. Taubeneck; *Structure and Petrogenesis of Part of the Willowa Mountains*; 4 years; \$350  
 UNIVERSITY OF OREGON, Eugene, Oreg.; J. Arnold Shotwell; Museum of Natural History; *Late Eocene Mammals of the Clarno Fauna of Oregon*; 2 years; \$13,500  
 PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; Benjamin F. Howell, Jr.; *Seismic Measurements of Crustal Thickness in the Central Appalachian Region*; 2 years; \$15,900  
 M. L. Keith; *Composition of Calcareous Fossils and Limestones*; 2 years; \$18,500  
 E. F. Osborn and Arnulf Muan; *The Role of Oxygen Pressure in the Crystallization and Differentiation of Basaltic Magma*; 3 years; \$50,000  
 Joseph V. Smith and M. E. Bell; *Mineralogy of the Amphiboles*; 1 year; \$9,200  
 O. F. Tuttle and C. W. Burnham; *Vapor Phase Composition in Granitic Magmas*; 2 years; \$70,000  
 POMONA COLLEGE, Claremont, Calif.; Gerhard F. M. Oertel; *Mechanical Anisotropy of Solids During Deformation*; 1 year; \$11,500  
 PRINCETON UNIVERSITY, Princeton, N.J.; William E. Bonini; *Seismic Crustal Measurements*; 2 months; \$9,500  
 Alfred G. Fischer; *Paleogeographic and Tectonic Developments of Part of the Northern Calcareous Alps in Early Mesozoic Time*; 3 years; \$22,900  
 John C. Maxwell; *Nature and Origin of the Rocky Mountain Crusted Structural Features*; 3 years; \$27,800  
 PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Philip F. Low; *The Relation Between Ion Diffusion in Clay Systems and the Properties of Clay-Adsorbed Water*; 3 years; \$18,000  
 RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; Samuel Katz; *Elastic Constants at High Pressure and Temperature*; 1 year; \$8,600  
 SAINT LOUIS UNIVERSITY, St. Louis, Mo.; Otto W. Nuttli; *Motion of the Earth's Surface Produced by the S. Wave of Earthquakes*; 1 year; \$8,400  
 SMITHSONIAN INSTITUTION, Washington, D.C.; E. P. Henderson; *Acquisition of Beyer Tektite Collection*; 6 months; \$8,000  
 SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.; Eugene Herrin, Dallas Seismological Observatory; *Study of Regional Variations in Seismic Travel Time Data*; 2 years; \$28,700  
 UNIVERSITY OF SOUTH DAKOTA, Vermillion, S. Dak.; Hugh D. Carlson; *The Petrology of the Tertiary Igneous Rocks of the Black Hills of South Dakota*; 2 years; \$23,000  
 UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; K. O. Emery; *Partial Support of Operation R/V Velero IV*; 2 years; \$80,000  
 Paul Saltman and K. O. Emery; *Amino Acids in Basin Sediments Off Southern California*; 1 year; \$23,300  
 SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.; Dirk de Waard; *Metamorphic-Tectonic Analysis of Precambrian Structures in the Southwestern Adirondack Mountains*; 3 years; \$32,500  
 TEXAS AGRICULTURAL AND MECHANICAL RE-

SEARCH FOUNDATION, College Station, Tex.; Richard G. Bader; *Bathymetry and Sediments of the Bay of Campeche*; 2 years; \$17,000

Donald W. Hood; *C<sup>14</sup>/C<sup>13</sup> Ratio of Organic and Inorganic Carbon Fraction of Waters of the Caribbean and Gulf of Mexico*; 1 year; \$20,000

Donald W. Hood; *The Calcium Carbonate Solubility Equilibrium in Sea Water*; 2 years; \$38,500

Hugh J. McLellan; *Aid for Operating a Research Vessel for Basic Studies in Physical Oceanography and Marine Geophysics*; 1 year; \$30,350

UNIVERSITY OF TEXAS, Austin, Tex.; Virgil E. Barnes; *Research on Composition and Origin of Tektites*; 2 years; \$36,000

Ronald K. Deford; *Study of the Petrography, Biostratigraphy*; 2 years; \$30,000

Ernest L. Lundell, Jr.; *A Paleocological and Chronological Study of the Fossil Vertebrates Faunas from the Pleistocene River Terrace Deposits of Central Texas*; 2 years; \$8,300

Keith Young; *Curating the Adkins Paleontological Collections*; 4 years; \$32,000

U.S. COAST AND GEODETIC SURVEY, Washington, D.C.; J. H. Nelson; *World Data Center for Geomagnetism, Gravity, and Seismology*; 1 year; \$35,000

Harris B. Stewart, Jr.; *Oceanographic Studies*; 1 year; \$43,500.

UNIVERSITY OF UTAH, Salt Lake City, Utah; Kenneth L. Cook; *Geophysical Studies of the Belt of Great Trenches in Utah*; 18 months; \$25,000

Armand J. Eardley; *Study of the Quaternary Sediments of the Great Salt Lake Desert*; 2 years; \$27,100

VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg, Va.; Bruce W. Nelson; *Clay Mineral Diagenesis*; 3 years; \$37,000

Charles I. Rich; *Virginia Agriculture Experiment Station; Aluminum Fixation in Interlayers of Expanded Clay Minerals*; 3 years; \$20,200

WASHINGTON UNIVERSITY, St. Louis, Mo.; H. N. Andrews, Jr.; *Paleozoic Plants*; 3 years; \$800

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Arthur W. Fairhall; *Specific C<sup>14</sup> Activity of Sequoia Wood*; 1 year; \$11,000

Richard H. Fleming; *Preliminary Mass Spectrometric Investigations*; 1 year; \$4,800

Richard H. Fleming; *Recent Sediments in Northeast Pacific*; 2 years; \$19,900

J. Hoover Macklin; *Tertiary Deformational History of the Great Basin-Colorado Plateau Transition Zone in Southwestern Utah*; 3 years; \$26,100

Francis A. Richards; *Chemical and Related Oceanographic Studies of Oxygen-Deficient Marine Environment*; 2 years; \$27,800

UNIVERSITY OF WISCONSIN, Madison, Wis.; John C. Rose; *Development of a Portable Apparatus for Determination of Absolute Gravity to One Milligal or Better*; 1 year; \$26,300

George P. Woollard; *Gravity Data in the United States*; 1 year; \$2,450

George P. Woollard, and R. P. Meyer; *Continuation of Seismic Refraction Crustal Studies in Selected Areas of Geologic Structure and/or Pronounced Gravity Anomalies*; 1 year; \$54,700

WOODS HOLE OCEANOGRAPHIC INSTITUTION, Woods Hole, Mass.; Vaughan T. Bowen;

*Chemical and Geochemical Studies in the Sea*; 2 years; \$300,000

J. B. Hersey; *Analysis of Geological Survey Data*; 1 year; \$15,700

YALE UNIVERSITY, New Haven, Conn.; Carl O. Dunbar, Peabody Museum of Natural History; *Curating Peabody Museum's Systematic Collection of Fusuline Foraminifera*; 1 year; \$6,200

Mead LeRoy Jensen; *Mass Spectroscopy as an Aid in Determining the Origin of Mineral Deposits*; 2 years; \$30,000

Karl K. Turekian; *Geochemistry of the Deep-Sea Sediments*; 2 years; \$40,000

## ECONOMIC SCIENCES

UNIVERSITY OF CHICAGO, Chicago, Ill.; Norton S. Ginsburg; *Study of Asian Urbanization*; 1 year; \$15,000

HARVARD UNIVERSITY, Cambridge, Mass.; Burton H. Klein; *Economics of Research and Development*; 1 year; \$14,400

Thomas C. Schelling; *Experimental Study of Bargaining*; 18 months; \$26,500

IOWA STATE UNIVERSITY, Ames, Iowa; George Ladd and Wayne Fuller; *Distributed Lags in Econometric Analysis*; 2 years; \$17,500

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Daniel B. Suits; *Research in Quantitative Economics*; 3 years; \$56,500

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Jacob Schmookler; *The Economics of Invention*; 2 years; \$2,850

NATIONAL BUREAU OF ECONOMIC RESEARCH, INC., New York, N.Y.; Geoffrey H. Moore; *Computer Studies of Business Cycles*; 3 years; \$96,000

PORTLAND STATE COLLEGE, Portland, Oreg.; Clarke H. Brooke, Jr.; *Geography of Famine in Tanganyika*; 1 year; \$13,000

PRINCETON UNIVERSITY, Princeton, N.J.; Fritz Machlup; *Economic Aspects of Inventions*; 2 years; \$28,136

Oskar Morgenstern; *Mathematical Methods for Time Series Analysis*; 3 years; \$50,000

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Vernon W. Rutnan; *Interrelationships Among Technological Change, Research Expenditures and Resource Requirements*; 2 years; \$18,000

UNIVERSITY OF ROCHESTER, Rochester, N.Y.; Alexander Eckstein; *Study of Economic Fluctuations*; 2 years; \$18,400

Lionel W. McKenzie; *Theory of the Competitive Economy*; 3 years; \$32,500

Richard N. Rosett; *Investigation of Household Economic Behavior*; \$1,400

Edward Zabel; *Efficient Accumulation of Capital*; 1 year; \$2,900

SACRAMENTO STATE COLLEGE, Sacramento, Calif.; David E. Sopher; *Tribal Relocation in the Chittagong Hills*; \$14,100

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Richard L. Morrill; *Simulation of Central Place Patterns*; 2 years; \$15,800

UNIVERSITY OF WISCONSIN, Madison, Wis.; Guy Orcutt; *Economic Model Formulation and Analysis*; 3 years; \$104,000

## ENGINEERING SCIENCES

UNIVERSITY OF ALASKA, College, Alaska; Donald J. Cook; *The Magnetic Susceptibilities of Principal Minerals of the Light Metal Group*; 3 years; \$39,800

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Gene M. Nordby; *Dielectric Constants of Concrete and its Constituents*; 2 years; \$20,600

Donald C. Stinson; *Frequency Multiplying in Microwave Ferrites*; 3 years; \$38,900  
ARIZONA STATE UNIVERSITY, Tempe, Ariz.; Truet B. Thompson; *Time Series Approximation Synthesis of Delay-Type Devices*; 1 year; \$11,500

UNIVERSITY OF ARKANSAS, Fayetteville, Ark.; Donald A. Gilbrech; *An Experimental and Theoretical Investigation of Laminar-Turbulent Transitions in Pulsating Flow Through Flexible-Elastic Tubes*; 2 years; \$21,600

BROWN UNIVERSITY, Providence, R.I.; Joseph Kestin and John Ross; *Experimental and Theoretical Investigations into the Thermodynamic Functions of Substances*; 3 years; \$101,200

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; Cornelius J. Pings; *Structure of Liquids*; 18 months; \$13,600

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Cyril P. Atkinson and E. M. Rosenberg; *Vibrations of Nonlinear Systems Having Two Degrees of Freedom*; 3 years; \$56,500

G. M. Corcos; *Turbulent Pressure Field in Fully Developed Pipe Flow*; 1 year; \$18,800

J. T. Gier and R. V. Dunkle, Los Angeles; *Basic Studies on Solar Energy*; 2 years; \$51,000

J. T. Gier and D. K. Edwards, Los Angeles; *Gaseous Radiation Studies*; 2 years; \$27,800

Eldon L. Knuth, Los Angeles; *Free-Molecule Transfer Processes at High Speeds*; 3 years; \$75,800

Hugh D. McNiven; *Vibrations of Finite, Elastic Rods*; 2 years; \$15,800

Joseph A. Pask; *Rheology of Non-Ideal Dispersed Systems*; 3 years; \$37,400

Donald Pederson, Charles A. Desoer and Ernest S. Kuh; *Active Circuits*; 2 years; \$38,800

R. A. Seban; *The Effect of Local Air Injection on the Heat Transfer from a Flat Plate*; 1 year; \$12,400

L. M. Tichvinsky; *Stability of and Turbulence in Lubrication Films*; 1 year; \$9,600

C. J. Vogt; *Physical Properties of Liquid Hydrocarbons at Elevated Pressure and Temperature*; 1 year; \$5,900

C. R. Wilke, Andreas Acrivos, E. E. Petersen and J. M. Prausnitz; *Mass Transfer Mechanisms*; 3 years; \$125,200

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; J. F. Osterle; *Fundamental Studies of Viscous Flow*; 2 years; \$31,400

James P. Romualdi; *Tensile Fracture Arrest in Reinforced Concrete*; 2 years; \$21,100

J. J. Stewart; *Dynamic Energy Characteristics of Soils*; 2 years; \$19,100

Herbert L. Toor; *Diffusion in Multicomponent Liquids and Diffusional Separation of Liquids*; 3 years; \$48,700

Everard M. Williams; *Transient Low Voltage Discharges in Liquid Dielectrics*; 2 years; \$16,800

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; William M. Baldwin, Jr.; *Yield Strength of Metals as a Function of Grain Size*; 3 years; \$27,600

Kenneth J. Bell; *Transient Boiling Heat Transfer*; 1 year; \$18,200

J. R. Moszynski; *An Investigation of Secondary Flow Phenomena in Oscillation*

*Type Viscometers and Measurements of the Viscosity of Gases and Liquids by the Method of Small Oscillations*; 3 years; \$57,600

CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; Eugene P. Klier; *Deformation as a Function of Temperature and Strain Rate*; 3 years; \$51,500

CENTRAL INSTITUTE FOR THE DEAF, St. Louis, Mo.; Jerome R. Cox, Jr.; *The Production of Acoustic Transients*; 1 year; \$11,900

CENTER FOR RESEARCH IN ENGINEERING SCIENCES, Kansas University Endowment Association, Lawrence, Kans.; Russell B. Mesler; *Temperature Near the Surface During Nucleate Boiling*; 30 months; \$17,800

UNIVERSITY OF COLORADO, Boulder, Colo.; Frank S. Barnes; *Beam-Type Masers for Millimeter-Wave Region*; 2 years; \$57,300

COLORADO SCHOOL OF MINES, Golden, Colo.; John S. Rinehart; *The Role of Stress Waves in Fracturing of Rock*; 3 years; \$32,400

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; Jack E. Cermak; *Shear Stress Fluctuations at a Liquid-Solid Interface by Measurement of the Electrokinetic Potential Fluctuations*; 2 years; \$30,900

George L. Smith; *Fundamental Study of a Submerged and Nonsubmerged Three Dimensional Jet Impinging Upon a Normal Plane*; 2 years; \$28,300

COLUMBIA UNIVERSITY, New York, N.Y.; Herbert Deresiewicz; *Dispersion and Dissipation of Elastic Waves in Solids*; 2 years; \$19,600

Harold G. Elrod, Jr. and Victor Paschiks; *Problems in the Development of a Combined Geometric and Network Analog Computer for Solutions of the Diffusion Equation*; 2 years; \$29,900

Ferdinand Freudenstein; *Analytical Investigation of the Burmester Points and Their Application to Linked Mechanisms*; 3 years; \$26,600

Bernard Friedland and Thomas Stern; *Modular Sequential Circuits*; 3 years; \$36,200

E. J. Gumbel; *Statistical Distribution of Extreme Values*; 2 years; \$22,900

Wan H. Kim; *Reliability and Realizability of Communication Systems*; 3 years; \$51,000

CORNELL UNIVERSITY, Ithaca, N.Y.; Benjamin Gebhart; *Transient Natural Convection Process*; 2 years; \$19,200

Howard N. McManus, Jr.; *Momentum and Energy Transport Between Plates of Unequal Roughness*; 3 years; \$35,700

George Winter; *Stress-Strain Curve and Fracture Process of Concrete and Their Influence on Performance of Reinforced Concrete Structures*; 3 years; \$51,000

UNIVERSITY OF DELAWARE, Newark, Del.; E. W. Comings and M. H. Cobble; *Measurement of the Thermal Conductivity of Gases at High Pressure*; 3 years; \$31,800

H. Kwart; *Study of Viscoelastic Fluid Systems*; 1 year; \$22,800

David E. Lamb; *Dynamics and Control of Fixed Bed Catalytic Reactors with Feed-Effluent Heat Exchange*; 1 year; \$11,500

EARTHQUAKE ENGINEERING RESEARCH INSTITUTE, Pasadena, Calif.; George W. Housner; *Support of Team to Investigate Chilean Earthquake*; 1 year; \$16,800

UNIVERSITY OF FLORIDA, Gainesville, Fla.; W. E. Lear; *Potential Distribution in an*



- Ion-Focused Electron Beam; 2 years; \$22,000**
- John H. Schmertmann; *Frictional Component of the Shear Strength of Clay Soils; 6 months; \$1,440*
- David T. Williams; *Fluid Dynamics of Ablating Bodies; 3 years; \$32,900*
- GEORGIA INSTITUTE OF TECHNOLOGY, Atlanta, Ga.; Arthur L. Bennett; *Vibration of Piezo Electric Quartz Crystals; 1 year; \$28,000*
- Thomas W. Jackson; *Viscosity of Steam at High Pressures; 3 years; \$57,600*
- GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; Nelson T. Grisamore; *Study of Methods of Improving the Reliability of Digital Systems by the Use of Redundancy; 1 year; \$26,300*
- HARVARD UNIVERSITY, Cambridge, Mass.; Howard Emmons and Arthur E. Bryson; *High Temperature Gas Dynamics Project; 3 years; \$300,000*
- Ronald W. P. King; *Studies in Electrohydrodynamics and Related Phenomena; 1 year; \$13,200*
- Forman A. Williams; *Studies of Sprays; 3 years; \$10,000*
- Tai Tsun Wu; *Scattering and Diffraction by Obstacles of Complex Shape; 3 years; \$33,600*
- UNIVERSITY OF HOUSTON, Houston, Tex.; Abraham E. Dukler; *Entrainment in Two Phase, Gas-Liquid Flow; 2 years; \$20,200*
- ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.; Lloyd H. Donnell; *Buckling of Shells Using Large Deflection Theory; 3 years; \$8,000*
- August J. Durell; *Development of Moire Methods of Stress Analysis; 2 years; \$19,100*
- Stoche P. Kezios; *Heat Transfer From Vibrating Spheres and Normally Oriented Cylinders to a Low Turbulence Air Stream; 2 years; \$41,600*
- Robert C. Kintner; *Velocity of Fall of Streams and Clouds of Drops Through Liquids in Finite Containers; 1 year; \$4,100*
- Liang-Neng Tao; *Fluid Flow Between Porous Rollers; 1 year; \$4,400*
- Ralph E. Peck; *Heat Transfer in Rarefied Gases; 2 years; \$9,200*
- Eban Vey; *Shock Wave Propagation in Soil; 2 years; \$33,800*
- UNIVERSITY OF ILLINOIS, Urbana, Ill.; Ellis Danner; *The Behavior of Vehicles in the Shoulder and Median Areas of the Roadway; 2 years; \$3,240*
- Ralph B. Peck; *Investigation of the Engineering Properties of Illite and Illitic Soils, (II); 2 years; \$39,200*
- M. S. Peters; *Mechanisms and Kinetics of Intermediate Reactions; 3 years; \$31,700*
- Paul R. Shaffer and D. U. Deere; *Engineering Properties of Glacial Deposits; 1 year; \$5,800*
- William J. Hall; *The Behavior of Structural Metals Under Slow and Rapid Reversal of Loading; 2 years; \$33,500*
- Shae-Lee Soo; *Dynamics, Stability and Transport Processes of Rotational Flow—An Analytical Study; 3 years; \$44,100*
- J. W. Westwater; *Oinephotomicroscopy of Phase Changes; 3 years; \$42,700*
- IOWA STATE UNIVERSITY, Ames, Iowa; Arthur V. Pohm; *Material and Component Research Using Thin Magnetic Films; 18 months; \$38,600*
- JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; J. L. Erickson; *Viscoelasticity and Thermoviscoelasticity; 3 years; \$48,800*
- Robert W. Fristrom; *Microstructure of Low Pressure Flame Front; 1 year; \$12,900*
- Jerome Gavis; *Properties of Viscous and Viscoelastic Fluids by Wave Propagation Experiments in Jets; 3 years; \$30,500*
- Jerome Gavis; *Transport Phenomena in Flowing Non-Newtonian Fluids; 2 years; \$28,800*
- KANSAS STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Manhattan, Kans.; Benjamin G. Kyle; *Solution Behavior in Extractive Distillation Systems Containing Fluorocarbon and Chlorofluorocarbon solvents; 2 years; \$16,900*
- M. E. Raville and P. G. Kirmser; *Vibrational Characteristics of Sandwich Material; 2 years; \$26,900*
- KENTUCKY RESEARCH FOUNDATION, Lexington, Ky.; Prasad K. Kadaba; *Relaxation Mechanism of Dipolar Liquid Mixtures at Microwave Frequencies; 1 year; \$5,900*
- LEHIGH UNIVERSITY, Bethlehem, Pa.; Roy J. Leonard; *Pozzolanic Reaction of Common Soil Minerals; 2 years; \$19,900*
- Leonard A. Wenzel; *Thermodynamics of Mixed Gases; 1 year; \$6,200*
- MANHATTAN COLLEGE, New York, N.Y.; Donald J. O'Connor; *Distribution of Non-conservative contaminants in Estuaries; 2 years; \$17,300*
- MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Jacob J. Blkerman; *Factors Determining the Strength of Adhesive Joints; 2 years; \$23,600*
- Stephen H. Crandall; *Stability of Free-Convection Boundary Layer; 1 year; \$6,500*
- Antoine M. Gaudin; *Hysteresis of Contact Angles at Solid Surfaces; 3 years; \$89,000*
- S. William Gouse; *Two-Phase, One-Component Flow; 1 year; \$14,300*
- H. C. Hottel and G. C. Williams; *Modeling of Firespread; 2 years; \$33,000*
- Alan S. Michaels; *Transmission of Gases and Vapors Through Polymer Films; 3 years; \$59,100*
- G. C. Williams and H. C. Hottel; *Stirred Reactor Kinetics; 3 years; \$73,200*
- MICHIGAN STATE UNIVERSITY, East Lansing, Mich.; Herman E. Koenig; *System Design and Synthesis; 2 years; \$28,800*
- R. K. Wen; *Inelastic Behavior of Beams Subject to Moving Loads; 3 years; \$39,000*
- T. H. Wu; *Resistance of Consolidation and Remolded Clay Minerals; 3 years; \$45,400*
- UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; John A. Clark; *The Effect of Transverse Vibrations of a Heated Surface on Heat Transfer in Free Convection; 2 years; \$30,800*
- Joseph Datsko; *Mechinability Study; 3 years; \$37,000*
- D. L. Katz; *Thermodynamic Properties of Light Hydrocarbons at High Pressure and Low Temperature; 3 years; \$37,200*
- Keeve M. Slegel; *Input Impedance for a Biconical Antenna; 6 months; \$6,600*
- Lawrence H. Van Vlack; *Plastic Deformation of Nonmetallic Phases Within Ductile Metals; 2 years; \$29,300*
- Gordon J. Van Wylen; *Nitrogen-Carbon Dioxide and Air-Carbon Dioxide Gas-Solid Equilibrium Systems; 2 years; \$20,100*
- Paul F. Zweifel; *Neutron Optics; 3 years; \$84,300*

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Neal R. Amundson; *Theoretical Analysis of Chemical Reactors*; 2 years; \$30,600

John S. Dahler; *Transport Properties of Polyatomic and Chemically Reactive Fluids*; 3 years; \$22,600

Ernst R. G. Eckert; *Radiative Heat Transfer Analyses*; 3 years; \$50,000

Laurence E. Goodman and Arthur R. Robinson; *An Investigation of Contact Stresses*; 2 years; \$34,300

Walter T. Graves; *The Rotational Characteristics of Plastic Hinges in Reinforced Concrete Members Subjected to Axial Loads and Moments*; 1 year; \$8,500

Rudolph Hermann, Hypersonic Facilities, Rosemont Aeronautical Laboratories; *Study of Dissociation Effects in Front of Blunt Aerodynamic Bodies at Hypersonic Air Speeds and Temperatures up to 5000°R*; 1 year; \$26,700

Warren E. Ibele; *Measurement of Prandtl Number and Heat Conductivity of Gases*; 2 years; \$51,200

Robert F. Lambert; *Sound Propagation of Moving Media*; 1 year; \$17,825

Arthur H. Madden, Jr.; *Coalescence Rates in Dynamic Liquid-Liquid Systems*; 3 years; \$26,700

William O. Muckenhirn; *Investigation of Thin Magnetic Films*; 2 years; \$23,400

Eugene P. Pfleider; *Behavior of Rock Under Stress*; 2 years; \$26,900

Edgar L. Piret; *Crushing and Grinding Energetics*; 8 months; \$3,000

L. E. Scriven II; *Interface Mechanics*; 2 years; \$23,400

UNIVERSITY OF MISSOURI, Columbia, Mo.; Martin E. Straumanis, Rolla; *Determination of Imperfections by the X-ray and Density Method*; 2 years; \$22,300

UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; Turgut Sarpkaya; *Vortex Formation and Drag in Unsteady Flow Past Bluff Bodies*; 3 years; \$34,100

James H. Weber; *The Continuous Dissolution of Metals and Metallic Alloys*; 30 months; \$16,500

NEW YORK UNIVERSITY, New York, N.Y.; Fred Landis; *Transient Free Convection Within Fully Enclosed Regions*; 2 years; \$30,800

H. F. Ludloff; *Three Topics Selected From the Field of Magneto-Aerodynamics*; 2 years; \$25,000

James Michalos and Edward Wilson; *Response of Flexural Systems Subjected to Moving Forcing Functions*; 2 years; \$36,200

Wheeler K. Mueller; *Natural Convection Heat Transfer Between Coaxial Horizontal Cylinders*; 2 years; \$20,000

Robert E. Treybal; *Liquid Extraction in Single-Stage Agitated Vessels*; 2 years; \$9,300

NORTH CAROLINA STATE COLLEGE, Raleigh, N.C.; William T. Snyder; *An Experimental and Analytical Investigation of Boundary Layer Effects in Combustion*; 2 years; \$25,500

Kenneth O. Beatty and Frances M. Richardson; *Photographic Study of Unusual Flow Patterns in Turbulent Shear Flow*; 1 year; \$14,000

C. A. Hart; *Mechanism of the Movement of Moisture Through Wood*; 30 months; \$50,400

NORTHWESTERN UNIVERSITY, Evanston, Ill.; S. G. Bankoff; *Subcooled Nucleate Boiling*; 2 years; \$21,800

George Thodos; *Vapor-Liquid Equilibrium Studies*; 3 years; \$24,200

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; Frank N. M. Brown; *Effects of Sound on Boundary Layer Transition*; 1 year; \$18,600

Ettore A. Peretti; *Phase Relationships in Systems Involving Semiconductors*; 3 years; \$42,700

Kwang-tzu Yang; *A Fundamental Improvement of the Integral Procedure as Applied to Problems in Boundary-Layer Theory, Transient Heat Conduction and Duct Flows With Heat Transfer*; 2 years; \$24,400

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; Robert S. Brodkey; *Turbulent Motion and Mixing*; 2 years; \$21,200

Webster B. Kay; *Phase Behavior of Mixtures*; 1 year; \$3,000

Charles F. Sepsy and Richard H. Zimmerman; *Upstream Nonuniformities (UNU) Related to Fluid Meter Performance*; 1 year; \$12,900

OHIO UNIVERSITY, Athens, Ohio; Richard S. Mayer; *Mass Diffusion Gas Separation: An Investigation of the Conviction Velocities Within a Mass Diffusion Column*; 2 years; \$7,800

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; Andrew Cosgarea, Jr.; *Vapor-Atomicity in Metals*; 3 years; \$38,600

Robert H. Perry; *Heat Transfer With Flowing Fluids in Porous Media*; 3 years; \$45,700

Robert H. Perry; *Kinetics of Gas-Liquid Reactions*; 2 years; \$18,700

C. M. Shlepevich; *Kinetic Study of the Formation of Cyclohexene at Elevated Pressures and Temperatures*; 2 years; \$17,800

OREGON STATE COLLEGE, Corvallis, Oreg.; John W. Wolfe; *Constant Soil Moisture Content During Plant Growth*; 2 years; \$17,400

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; Harry A. Atwater; *Electron Paramagnetic Resonance of Irradiated Polymer Materials*; 2 years; \$46,900

Howard L. Hartman; *The Mechanics of Brittle Fracture in Rock Under Impact Loading*; 3 years; \$32,600

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Y. H. Ku; Moore School of Electrical Engineering; *Nonlinear Electric Oscillations*; 3 years; \$69,100

Paul R. Trumpler; *Purchase and Installation of a Centrifugal Compressor*; 1 year; \$20,700

POLYTECHNIC INSTITUTE OF BROOKLYN, Brooklyn, N.Y.; Paul F. Bruins; *High Temperature Phosphate Reinforced Cements*; 1 year; \$8,200

PRINCETON UNIVERSITY, Princeton, N.J.; Robert M. Drake, Jr., and Michel Boudart; *Design, Fabrication and Utilization of a High Energy Beam*; 2 years; \$98,700

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; J. L. Bogdanoff; *Probability Distributions of the Dynamical Behavior of Some Disordered Systems*; 2 years; \$25,400

J. W. Delleur; *Mechanism of Turbulence in Free Surface Flow*; 2 years; \$21,700

John E. Gibson; *A Synthesis Procedure for Non-Linear Transfer Function of an Ele-*

ment Given the Describing Function of the Element; 1 year; \$8,800

Robert Goulard; *Integration of the Transfer of Radiant Energy into the Field of Fluid Dynamics*; 1 year; \$18,600

Rufus Oldenburger; *Signal Stabilization of Feedback Loops*; 2 years; \$24,500

RENSELAEER POLYTECHNIC INSTITUTE, Troy, N.Y.; Joseph V. Foe; *New Experimental Methods in Gasdynamics*; 1 year; \$11,000

Alfred H. Nissan; *Drying During the Falling Rate Period*; 2 years; \$43,400

Alfred H. Nissan; *Heat Transfer Between Rotating Cylindrical Concentric Surfaces With Fluids Filling the Gap Between Them*; 2 years; \$30,200

Edward A. Saibel; *A Theoretical Investigation of Unsteady Motion of Viscous Fluids*; 2 years; \$9,600

RESEARCH FOUNDATION, Oklahoma State University, Stillwater, Okla.; J. H. Boggs; *Forced Convection Local Boiling for a Binary Mixture*; 1 year; \$6,500

Milan K. Jovanic and Donald R. Haworth; *Research on the Radiation Characteristics of High Temperature, Dissociated and Ionized Gas Fields*; 2 years; \$54,100

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Marvin L. Granstrom; *The Kinetics of Formation, Oxidation-Reduction, and Disinfection Reactions Involving Chlorine Dioxide*; 3 years; \$32,800

John H. Koenig; *Correlating the Aging Phenomenon of Ceramic Ferroelectrics With Crystalline Properties of the Single Crystal*; 1 year; \$6,400

Harold T. Smyth; *Study of the Mechanical Properties of Glass*; 2 years; \$31,600

STATE UNIVERSITY OF IOWA, Iowa City, Iowa; Karl Kammermeyer; *Barrier Flow*; 3 years; \$56,400

STANFORD UNIVERSITY, Stanford, Calif.; Robert H. Eustis; *Heat Transfer From Impinging Air Jets to a Plane Wall*; 3 years; \$53,200

Robert H. Eustis; *Study of Heat Transfer to Gas Bubbles in Liquids, Part II*; 2 years; \$33,600

J. N. Goodier, *Nonlinear Automatic Controls*; 1 year; \$8,400

William H. Schwarz; *A Turbulent Mixing Problem*; 2 years; \$27,500

STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N.J.; Ernest J. Henley and Theodore Gela; *Ionization Patterns in Condensed Systems*; 1 year; \$12,900

SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.; Benjamin A. Wasil and Arthur H. Faulds; *Slab Deflection Measurements by Photogrammetric Methods*; 1 year; \$11,600

UNIVERSITY OF TEXAS, Austin, Tex.; P. M. Ferguson; *The Long Concrete Column as a Part of a Rectangular Frame*; 3 years; \$39,400

John J. McKetta; *Pressure-Volume-Temperature Relations of Gases at Low Pressures*; 3 years; \$31,800

John J. McKetta; *The Solubilities and Distribution of H<sub>2</sub>O, CO<sub>2</sub>, and H<sub>2</sub>S in Petroleum Hydrocarbon Mixtures at Elevated Pressures and Temperatures*; 3 years; \$55,500

Enrico Volterra; *Internal Constraints Applied to Dynamic Problems*; 3 years; \$28,800

Eugene H. Wissler; *Steady Flow of Non-Newtonian Fluids in Three-Dimensional Duets*; 2 years; \$12,600

TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; Murray M. Gilkeson; *The Relation of the Micropore Structure of Solid Catalysts to Mass Transfer Rates*; 2 years; \$31,400

UTAH STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Logan, Utah; Gordon H. Flammer; *Sediment Attenuation of an Ultrasonic Plane Wave*; 30 months; \$20,700

U.S. DEPARTMENT OF AGRICULTURE, Washington, D.C.; Frederick L. Browne; *Pyrolysis, Combustion, and Action of Fire Retardants in Wood and its Constituents*; 2 years; \$41,400

VANDEBILT UNIVERSITY, Nashville, Tenn.; D. Franklin Farrar and Charles E. Farrell; *The Biophysics of Bird Flight*; 4 years; \$24,000

UNIVERSITY OF VIRGINIA, Charlottesville, Va.; H. G. Larew; *Elastic Properties of Micaceous Soils*; 1 year; \$13,000

WASHINGTON UNIVERSITY, St. Louis, Mo.; James N. Holsen; *Shock Tube Studies in High Temperature Chemical Studies*; 2 years; \$20,200

UNIVERSITY OF WASHINGTON, Seattle, Wash.; C. P. Costello; *Thermal Failure of Heaters in Accelerating Nucleate Pool Boiling Systems*; 1 year; \$9,500

Albert S. Kobayashi and Emmett E. Day; *Fringe Multiplication of Birefringent Coating*; 1 year; \$9,300

Douglas H. Polons; *Transformation Studies in Copper-Rich Alloys of Copper and Silicon*; 2 years; \$15,100

Ling Y. Wei; *Diffusion in and Optical Absorption by III-V Components*; 2 years; \$32,800

UNIVERSITY OF WISCONSIN, Madison, Wis.; Byron R. Bird; *Transport Phenomena in Non-Newtonian Flow*; 3 years; \$68,800

Richard A. Dodd; *The Function of Point Defects in the Cyclic Plastic Deformation of Metals*; 3 years; \$44,000

John A. Duffie; *The Direct Conversion of Solar Energy to Power*; 2 years; \$22,500

WOODS HOLE OCEANOGRAPHIC INSTITUTION, Woods Hole, Mass.; John M. Zeligler and Robert L. Miller; *A Generalized Wave Driven Mechanism for Near-Shore Sediment Patterns*; 1 year; \$38,000

WORCESTER POLYTECHNIC INSTITUTE, Worcester, Mass.; C. W. Shipman; *Momentum and Mass Transport and Rates of Combustion Reactions in Turbulent Shear Flow*; 2 years; \$20,800

## ENVIRONMENTAL BIOLOGY

UNIVERSITY OF ALASKA, College, Alaska; J. Stenger Weeden; *Dynamics of Territory Size in *Spizella Aroreana**; 3 years; \$15,000

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Charles M. Breder, Jr.; *Ecological Adjustments of *Molliseta* and *Astyanax**; 2 years; \$9,500

Brooks F. Ellis and A. R. Messina; *Rearing Littoral Foraminifera In Defined Media*; 2 years; \$31,800

ARIZONA STATE UNIVERSITY, Tempe, Ariz.; Gerald A. Cole; *Community Metabolism in *Montezuma Well**; 2 years; \$23,200

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Paul S. Martin; *Postglacial Pollen Sequence in the Southwest*; 2 years; \$33,800

- BAYLOR UNIVERSITY, Waco, Tex.; Thomas E. Kennerly, Jr.; *Microclimatic Conditions of Geomys Habitat*; 1 year; \$4,600
- BEAUDETTE FOUNDATION FOR BIOLOGICAL RESEARCH, Solvang, Calif.; J. Laurens Barnard; *Hydrobiological Survey of San Quintin Estuary*; 1 year; \$9,800
- UNIVERSITY OF BRITISH COLUMBIA, Vancouver, Canada; Paul A. Dehnel; *Effect of Environmental Factors on Oxygen Consumption in Hemigrapsus SP.*; 3 years; \$32,800
- BROOKLYN COLLEGE, Brooklyn, N.Y.; R. H. Whittaker; *Productivities of Plant Communities in the Great Smoky Mountains*; 2 years; \$19,400
- UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; William L. Belser, Scripps Institution of Oceanography, La Jolla; *Bioassay Technique for Organic Materials in Sea Water*; 3 years; \$44,800
- Richard A. Booloottian; Los Angeles; *Influence of Environment on Reproductive Maturation in Strongylocentrotus*; 3 years; \$23,900
- Raymond B. Cowles; Los Angeles; *Thermal Response of Certain Terrestrial Vertebrates*; 3 years; \$41,300
- Carl L. Hubbs, Scripps Institution of Oceanography, La Jolla; *Ecological Conditions During Past Eruptions of Human Populations*; 3 years; \$28,500
- Carl L. Hubbs, Wheeler J. North, Institute of Marine Resources, La Jolla; *Food-Chain Intermediates Between Kelp and Fishes*; 2 years; \$25,500
- Elmer R. Noble, Santa Barbara; *Ecology of Parasitism in Marine Fishes*; 3 years; \$21,700
- D. R. Parker; *Studies in Desert Ecology*; 2 years; \$30,200
- Robert H. Parker, Scripps Institution of Oceanography, La Jolla; *Benthic Fauna of the Continental Slope*; 1 year; \$13,900
- Fred B. Phleger, Scripps Institution of Oceanography, La Jolla; *Ecology and Sedimentary Patterns of Foraminifera*; 3 years; \$57,300
- Arnold M. Schultz; *Productivity and Nutrient Cycles of Arctic Tundra Ecosystems*; 3 years; \$67,200
- W. O. Wilson and Hans Abplanalp, Davis; *Bases of Rhythm of Oviposition in Gallinacous Birds*; 3 years; \$30,000
- COLLEGE OF CHARLESTON, Charleston, S.C.; Donald W. Dery; *Life Cycle of Buccocephalus Bucculus*; 3 years; \$14,500
- COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; Ralph Baker; *Effect of Light on Sexual Reproduction in Hypomyces Solani*; 2 years; \$8,900
- Richard T. Ward and Frank B. Sallsbury; *Physiological Ecology of the Alpine*; 3 years; \$28,200
- UNIVERSITY OF COLORADO, Boulder, Colo.; Erik K. Bonde; *Physiological and Ecological Studies of Alpine Plants*; 3 years; \$20,300
- R. W. Pennak, and Kaare Elgmork; *Freshwater Ecology*; 1 year \$1,600
- COLUMBIA UNIVERSITY, New York, N.Y.; Allan W. H. Bé, Lamont Geological Observatory, Palisades, N.Y.; *Ecology of Living Planktonic Foraminifera*; 3 years; \$50,400
- CORNELL UNIVERSITY, Ithaca, N.Y.; LaMont C. Cole; *Effects of Movements on Rodent Populations*; 1 year; \$2,500
- DUKE UNIVERSITY, Durham, N.C.; J. R. Bailey; *Dynamics of Aquatic Vertebrate Populations*; 2 years; \$12,100
- W. Dwight Billings; *Comparative Physiological Ecology of Alpine and Arctic Plants*; 3 years; \$61,100
- Harold J. Humm; *Botanical Studies on Alacran Reef*; 2 years; \$14,400
- Daniel A. Livingstone; *Pleistocene Environment of the Bering—Chukchi Land Bridge*; 2 years; \$25,600
- Henry J. Oosting and W. Dwight Billings; *Ecological Field Research*; 2 years; \$11,800
- EARLHAM COLLEGE, Richmond, Ind.; James W. Joyner; *Influence of Earthworms on Soil Structure*; 3 years; \$16,000
- FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Arthur W. Ziegler; *Factors Influencing Seasonal Occurrence of Water Fungi*; 2 years; \$10,600
- UNIVERSITY OF FLORIDA, Gainesville, Fla.; Archie Carr; *Ecology of Marine Chelonia*; 3 years; \$29,300
- James N. Layne; *Population Ecology of Peromyscus Floridanus*; 1 year; \$6,100
- Carl D. Monk; *Factors Initiating Radial Tree Growth*; 3 years; \$8,600
- E. Lowe Pierce; *Distribution and Life History of Amphioxus*; 3 years; \$20,000
- FRANKLIN AND MARSHALL COLLEGE, Lancaster, Pa.; Kenneth R. John; *Ecology of Fishes in Arid Land Mountain Streams*; 2 years; \$10,200
- GEORGIA STATE COLLEGE OF BUSINESS ADMINISTRATION, Atlanta, Ga.; Helen B. Jordan; *Transmission of Saurian Malaria*; 3 years; \$10,100
- UNIVERSITY OF GEORGIA, Athens, Ga.; Lawrence R. Pomeroy, Marine Institute, Sapelo Island; *Dynamics of Phosphorus in Aquatic Systems*; 2 years; \$18,900
- W. Malcolm Reid; *Life Cycles and Physiology of Avian Cestodes*; 3 years; \$23,700
- Donald C. Scott; *Adaption of Freshwater Fishes to Low Dissolved Oxygen*; 2 years; \$19,200
- Grace Jean Thomas; *Biology of Pisidium*; 3 years; \$11,500
- GULF COAST RESEARCH LABORATORY, Ocean Springs, Miss.; Gordon Gunter; *Research at the Gulf Coast Research Laboratory*; 2 years; \$25,200
- HARVARD UNIVERSITY, Cambridge, Mass.; Hugh M. Raup; *Development of Arctic Vegetation*; 1 year; \$2,300
- HASKINS LABORATORIES, INC., New York, N.Y.; John J. A. McLaughlin and Seymour H. Hutner; *Phytoplankton Organisms of Bloom Waters*; 2 years; \$25,500
- HATHWAY SCHOOL OF CONSERVATION, Massachusetts Audubon Society, Drumlin Farm, South Lincoln, Mass.; William H. Drury, Jr.; *Quantitative Studies of Bird Migration*; 2 years; \$37,600
- UNIVERSITY OF HAWAII, Honolulu, Hawaii; James C. Moomaw; *The Role of Soil Type in the Uptake of Phosphorus by Tropical Plants*; 3 years; \$25,900
- Leonard D. Tutthill; *Ecology of Cryptotermes Brevis*; 1 year; \$3,800
- HIGHLANDS BIOLOGICAL STATION, Highlands, N.C.; Robert E. Gordon; *Locomotive Periodicity in Plethodons*; 3 years; \$24,300
- UNIVERSITY OF IDAHO, Moscow, Idaho; Phillip C. Dumas; *Rana Complex of the Pacific Northwest*; 3 years; \$18,800
- UNIVERSITY OF ILLINOIS, Urbana, Ill.; Bernard Greedberg; *Persistence of Bacteria in Biofilms*; 2 years; \$11,800
- INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; David G. Frey; *Cladocera Re-*

- mains in Lacustrine Sediments*; 3 years; \$22,700
- IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa.; Kenneth D. Carlander; *Biology of Caddis and Mayflies*; 3 years; \$22,500
- LAKELAND FOUNDATION, Chicago, Ill.; Clifford E. Ahlgren, Quetico-Superior Wilderness Research Center; *Effects of Fire in Coniferous Forests*; 2 years; \$9,800
- LA SIERRA COLLEGE, Arlington, Calif.; Earl W. Lathrop; *Ecology of the Grasslands of the Tenaja Range*; 1 year; \$2,700
- MARQUETTE UNIVERSITY, Milwaukee, Wis.; Reznert M. Darnell; *Quantitative Aspects of Secondary Production in Estuarine Fish Populations*; 2 years; \$12,000
- UNIVERSITY OF MIAMI, Coral Gables, Fla.; John E. Randall, The Marine Laboratory, Miami; *Ecology of Coral Reef Fishes*; 1 year; \$14,600
- Ruth L. Wormelle, The Marine Laboratory, Miami; *Distribution of Pteropods in the Florida Current*; 1 year; \$4,000
- Peter J. Wangersky, The Marine Laboratory; *Prediction of Population Growth Patterns*; 2 years; \$5,600
- MICHIGAN STATE UNIVERSITY, East Lansing, Mich.; E. W. Roelofs and P. O. Fromm; *Influence of Photoperiodicity and Thyroid Activity on Fish Growth*; 2 years; \$7,300
- UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Francis C. Evans; *Structure and Composition of Insect Communities*; 3 years; \$35,200
- Nelson G. Hairston; *Interspecific Relationships in Populations of Paramecium*; 4 years; \$42,800
- UNIVERSITY OF MICHIGAN RESEARCH INSTITUTE, Ann Arbor, Mich.; William S. Benninghoff and Claude W. Hibbard; *Pollen Analysis of Late Cenozoic Sediments*; 2 years; \$6,300
- UNIVERSITY OF MINNESOTA, St. Paul, Minn.; William H. Marshall; *Electronic Methods for Tracing Animal Movements*; 1 year; \$1,500
- Thomas F. Waters; *Trophic Structure of Fresh Water Stream Communities*; 3 years; \$23,200
- MONTANA STATE UNIVERSITY, Missoula, Mont.; Richard D. Taber and Robert S. Hoffman; *Ecology of Alpine Communities*; 1 year; \$2,700
- John J. Craighead; *Ecology of Ursus Horribilis*; 5 years; \$19,400
- NATIONAL PARK SERVICE, U.S. Department of the Interior, Carlsbad, N. Mex.; James K. Baker; *Biology of Petrochelidon Fulva*; 3 years; \$8,700
- UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; Robert W. Goss; *Mycorrhizae of Pinus Ponderosa in Grassland Soils*; 1 year; \$9,900
- NEW MEXICO HIGHLANDS UNIVERSITY, Las Vegas, N. Mex.; Lora M. Shields; *Algal Species in Semidesert Soils*; 1 year; \$15,600
- NEW MEXICO STATE UNIVERSITY, State College, N. Mex.; Ralph J. Raitt; *Annual Cycle of Lophortyx Gambelii*; 2 years; \$8,200
- UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; William E. Fahy; *Meristic Structures in Fishes*; 3 years; \$30,100
- Gerald S. Posner; *Dynamics of an Estuarine Plankton Population*; 3 years; \$26,500
- NORTH DAKOTA STATE COLLEGE, Fargo, N. Dak.; Gregory B. Mulkern; *Food Habits and Preferences of Acridoid Orthoptera*; 3 years; \$18,900
- UNIVERSITY OF NORTH DAKOTA, Grand Forks, N. Dak.; Paul B. Kanno; *Formicid Distribution and Populations in Relation to Environmental Factors*; 3 years; \$8,800
- UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; Robert P. McIntosh; *Quantitative Ecological Study of the Vegetation of the Catskills*; 4 years; \$15,400
- OHIO WESLEYAN UNIVERSITY, Delaware, Ohio; J. Gordon Ogden; *Pollen-Stratigraphic Studies on the Vegetational and Climatic History of Ohio*; 3 years; \$12,900
- UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; William T. Penfound; *Plant Succession in a Tall Grass Prairie*; 2 years; \$5,900
- OREGON STATE COLLEGE, Corvallis, Oreg.; W. K. Ferrell; *Photosynthetic and Respiratory Behavior of Douglas-fir Ecotypes*; 4 years; \$35,600
- Julius A. Rudinsky; *Population Dynamics of the Douglas-fir Beetle*; 2 years; \$7,000
- Charles E. Warren; *Dynamics of Simplified Stream Communities*; 3 years; \$24,500
- Ernest Wright and W. B. Bollen; *Soil Microbiology of North and South Aspects of Coast Range Forest Slopes*; 1 year; \$7,200
- UNIVERSITY OF OREGON, Eugene, Oreg.; Peter W. Frank; *A Population Study of Internal Limpets*; 3 years; \$18,900
- J. Arnold Shotwell, Museum of Natural History; *Environmental Change as a Factor in Mammalian Evolution*; 2 years; \$19,000
- UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Robert H. MacArthur; *Comparison of Bird Species, Diversity and Habitat*; 3 years; \$18,300
- UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; Richard C. Dugdale; *Phosphorus and Nitrogen Metabolism of Alaska Lakes*; 2 years; \$27,000
- PRINCIPIA COLLEGE, Elash, Ill.; Paul D. Kilburn; *Species-Area Relationships in Vegetation Types*; 3 years; \$14,300
- PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Durward L. Allen; *Dynamics and Ecology of Castor Canadensis*; 3 years; \$17,800
- RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; John G. New, State University Teachers College, Oneonta; *Life History of Percina Peltata Peltata (Stauffer)*; 3 years; \$900
- UNIVERSITY OF RHODE ISLAND, Kingston, R.I.; Nelson Marshall; *Research on Life History of Aequipecten Irradians*; 3 years; \$13,700
- RICKS COLLEGE, Rexburg, Idaho; L. C. Pearson; *Annual Energy Budgets of Arid Plant Communities*; 2 years; \$6,000
- RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Paul G. Pearson; *The Effects of Social Organization and Stress on Rodent Population*; 3 years; \$23,300
- ST. OLAF COLLEGE, Northfield, Minn.; Howard D. Orr; *Orientation of Small Mammals to Specific Areas*; 2 years; \$7,000
- UNIVERSITY OF ST. THOMAS, Houston, Tex.; J. P. Kennedy; *Reproductive Success in Scoloporus*; 2 years; \$12,500
- SAN JOSE STATE COLLEGE, San Jose, Calif.; L. Richard Mewaldt; *Migratory Restlessness in Birds*; 3 years; \$12,400
- UNIVERSITY OF SASKATCHEWAN, Saskatoon, Canada; Donald S. Rawson; *Dissolved Solids and Lake-Stream Productivity*; 2 years; \$10,100

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; Orville J. Bandy; *Paleoecology of the Tecolote Tunnel Section of the Santa Ynez Mountains*; 2 years; \$10,100

John S. Garth and Jay M. Savage; *Ecological Survey of Mid-water Marine Populations*; 1 year; \$24,500

J. L. Mohr; *Faunas of the Central Arctic Basin and the Arctic Continental Shelf*; 2 years; \$26,300

STANFORD UNIVERSITY, Stanford, Calif.; Walter C. Brown; *Herpetofauna of Philippine Tropical Forests*; 2 years; \$14,700

TENNESSEE POLYTECHNIC INSTITUTE, Cookeville, Tenn.; Thomas C. Barr, Jr.; *Speciation of Certain Carabidae in the Southern Appalachians*; 1 year; \$5,600

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; J. Orvin Mundt; *Distribution of Group D Streptococci*; 2 years; \$5,500

TEXAS TECHNOLOGICAL COLLEGE, Lubbock, Tex.; Vernon W. Proctor; *Autecology of Chara*; 3 years; \$17,400

UNIVERSITY OF TEXAS, Austin, Tex.; Bassett Maguire, Jr.; *Ecology and Genetics of Cave Dwelling Crustacea*; 3 years; \$12,500

W. N. McFarland, Institute of Marine Science, Port Aransas; *Temperature Effects on Metabolism of Marine Ecosystems*; 2 years; \$28,400

Calvin McMillan; *Comparative Studies of Grasses*; 1 year; \$42,000

Howard T. Odum, Institute of Marine Science, Port Aransas; *Ecological Microcosms*; 3 years; \$60,500

THIEL COLLEGE, Greenville, Pa.; John B. Stahl; *Biostratonomy of Profunda Dipteran Larvae*; 3 years; \$8,000

TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; Franklin Sogandares-Bernal; *Life History and Ecology of Certain Opisthorchioid Trematodes*; 3 years; \$19,600

Gerald E. Gunning; *Occupancy of Home Ranges by Centrachids*; 2 years; \$4,300

Alfred E. Smalley; *Trophic Efficiencies of Marsh Herbivores*; 2 years; \$6,800

UNIVERSITY OF UTAH, Salt Lake City, Utah; Albert W. Grundmann; *Host-Parasite Interrelationships in Different Habitats*; 2 years; \$17,500

VANDEBILT UNIVERSITY, Nashville, Tenn.; Elsie Quarterman; *Autecology of Leaquerella*; 4 years; \$19,900

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Richard H. Fleming; *Foraminifera From Northeast Pacific Cores*; 2 years; \$17,300

Dora P. Henry; *Systematics and Ecology of Eastern Pacific Barnacles*; 3 years; \$37,100

Arthur R. Kruckeberg; *Plant Life of Serpentine Soils*; 5 years; \$19,000

UNIVERSITY OF WISCONSIN, Madison, Wis.; Grant Cottam; *Structure and Dynamics of the Maple Forest Community*; 3 years; \$21,000

Arthur D. Hasler; *Migration Orientation of *Pluvialis Dominica**; 2 years; \$12,600

John T. Medler; *Population Study of *Formica Ctenerea* Mayr*; 2 years; \$8,700

WOODS HOLE OCEANOGRAPHIC INSTITUTION, Woods Hole, Mass.; Richard H. Backus; *Composition of Ocean Deep Scattering Layers*; 3 years; \$80,600

Herbert Curl, Jr.; *Ecological Physiology of Marine Plankton Organisms*; 2 years; \$42,500

John W. Kanwisher; *Energy Requirements of Benthic Marine Communities*; 3 years; \$45,600

Bostwick H. Ketchum; *Microbiological Nutriflcation in the Oceans*; 3 years; \$41,500

Bostwick H. Ketchum; *Nitrogen Cycle in the Sea*; 3 years; \$41,600

John H. Ryther; *Environmental Physiology of Marine Plankton Algae*; 3 years; \$53,300

Mary Sears; *Environmental Factors in Zooplankton Distribution*; 1 year; \$13,600

YALE UNIVERSITY, New Haven, Conn.; James M. Blaut; *An Ecological Study of Swidden Agriculture*; 1 year; \$10,000

Edward S. Deevey, Osborn Zoological Laboratory; *Paleolimnology*; 2 years \$20,000

S. Dillon Ripley, Peabody Museum of Natural History; *Comparative Analytical Study of Megapode Developmental Adaptations*; 2 years; \$6,800

Talbot H. Watermann; *Diurnal Migrations by Aphotic Zone Zooplankton*; 2 years; \$12,500

## GENETIC BIOLOGY

UNIVERSITY OF ARIZONA, Tucson, Ariz.; William B. Heed; *Evolutionary Studies in the Genus *Drosophila**; 1 year; \$9,200

BEREA COLLEGE, Berea, Ky.; Frank Seto; *Period of Action of Recessive Lethals in *Drosophila Melanogaster**; 2 years; \$5,000

BRANDEIS UNIVERSITY, Waltham, Mass.; Albert Kelner; *Spontaneous Mutation in Bacteria*; 3 years; \$30,000

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; N. H. Horowitz; *Genetic Studies on Enzyme Synthesis*; 3 years; \$76,300

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; David P. Bloch; *Histone Synthesis and Role of Histones in Cell Division and Development*; 2 years; \$29,300

Spencer W. Brown; *Nature and Evolution of *Lecano-Diaspidid* Genetic Systems*; 3 years; \$50,200

Bernard O. Phinney; Los Angeles; *Genetical Studies With Dwarf Mutants of Zea Mays*; 3 years; \$61,500

Charles M. Rick, Davis; *Cyto-Genetics of Tomato Species Hybrids*; 4 years; \$51,400

Richard W. Slegel, Los Angeles; *Analyses of Hereditary Endosymbiosis and Mating Type Determination in Paramecium*; 3 years; \$27,200

Richard Snow; Davis; *Chromosomal Rearrangement in Two Species of *Clarkia**; 2 years; \$7,800

David A. Rodgers and Gerald E. McClearn; *Ethyl Alcohol Preference of Mice*; 1 year; \$10,000

G. Ledyard Stebbins, Davis; *Developmental Genetics of Single Gene Differences in Barley*; 2 years; \$41,000

UNIVERSITY OF CHICAGO, Chicago, Ill.; Edward D. Garber; *Chromosomal and Genetic Homology in the Genus *Collinsia**; 3 years; \$30,800

Hewson Swift; *Cytochemical Studies on Nucleic Acids*; 3 years; \$73,600

CHILDREN'S CANCER RESEARCH FOUNDATION, Boston, Mass.; George Yerganian; *Genetics and Cytology of the Chinese Hamster*; 2 years; \$50,000

CITY OF HOPE MEDICAL CENTER, Duarte, Calif.; William D. Kaplan; *Sterility Component of X-Ray and Chemically Induced Dominant Lethals in D. Melanogaster*; 1 year; \$9,100

COLUMBIA UNIVERSITY, New York, N.Y.; Francis J. Ryan; *Mutation as a Macromolecular Process*; 3 years; \$48,300

J. Herbert Taylor; *Genetic and Cytological Studies on the Genus Sciara*; 1 year; \$12,800

CORNELL UNIVERSITY, Ithaca, N.Y.; L. F. Randolph; New York State College of Agriculture; *Cytogenetic Studies of Horticultural and Crop Plants*; 3 years; \$22,000

Bruce Wallace; *Studies on the Micro-growth of Neurospora Hyphae*; 1 year; \$3,300

DARTMOUTH COLLEGE, Hanover, N.H.; Raymond W. Barratt; *Collection and Maintenance of Genetic Stocks*; 3 years; \$32,300

DUKE UNIVERSITY, Durham, N.C.; Lewis E. Anderson; *Diminutive Chromosomes in Bryophytes*; 2 years; \$15,500

ELMIRA COLLEGE, Elmira, N.Y.; Ruth Z. Korman; *Genetic Studies on Staphylococci*; 3 years; \$21,300

EMORY UNIVERSITY, Atlanta, Ga.; William H. Murdy; *Relationship Between Characters of Growth, Morphology and Cytology in Maize*; 2 years; \$7,000

Charles Ray, Jr.; *Cytogenetic Studies of Tetrahymena Pyriformis*; 2 years; \$15,000

UNIVERSITY OF FLORIDA, Gainesville, Fla.; J. R. Edwardson and M. K. Corbett; *The Nature of Cytoplasmic Male-Sterility in Higher Plants*; 2 years; \$24,500

FREDERIC BURK FOUNDATION FOR EDUCATION OF SAN FRANCISCO STATE COLLEGE, San Francisco, Calif.; Sarane T. Bowen; *Genetic and Environmental Variation in Artemia Salina*; 2 years; \$6,000

UNIVERSITY OF GEORGIA, Athens, Ga.; H. Branch Howe, Jr.; *Genetic Studies on Mating Type in Neurospora Crassa*; 2 years; \$14,000

HARNELL COLLEGE, Salinas, Calif.; James F. Wilson; *Investigation of Certain Problems in the Biology of Neurospora*; 3 years; \$21,800

HARVARD UNIVERSITY, Cambridge, Mass.; R. P. Levine; *Genetics of Chlamydomonas Reinhardtii*; 2 years; \$10,700

Stephan R. Taub; *Genetics of Mating Type Inheritance in Paramecium Aurelia*; 2 years; \$13,800

UNIVERSITY OF HAWAII, Honolulu, Hawaii; H. Kamento; *Cytotaxonomy, Origin and Evolution of Orchid Species*; 2 years; \$18,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.; Jerry Hirsch; *Experimental Behavior Genetics*; 2 years; \$23,300

E. B. Patterson; *Studies of Genetic and Chromosomal Tester Stocks of Maize*; 3 years; \$43,900

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; Stanley Zimmering; *Modification of Abnormal Gametic Ratios*; 2 years; \$16,300

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Herman M. Kalcker; *Biochemical Genetics With Special Reference to Galactose Metabolism*; 3 years; \$32,300

C. A. Thomas, S. R. Siakind, and P. E. Hartman; *Mode of Replication of a Phage*; 3 years; \$59,900

C. A. Thomas; *Infectivity of Chemically*

*Degraded and Reconstituted Bacteriophage*; 3 years; \$28,900

Theodore R. F. Wright; *Basement Membranes of an Embryonic Lethal in Drosophila*; 2 years; \$13,400

KANSAS STATE UNIVERSITY, Manhattan, Kans.; Abraham Eisenstark; *Genetic Control of Protein Specificity in Phage T3*; 2 years; \$28,600

KENTUCKY RESEARCH FOUNDATION, Lexington, Ky.; Herbert Parkes Riley; *Chromosome Studies in Haworthia and Other South African Plants*; 2 years; \$6,600

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Roger D. Milkman; *Analysis of a Polygenic System in Drosophila Melanogaster*; 2 years; \$15,000

Robert R. Miller; *Speciation in Pociiliid Fishes*; 2 years; \$26,400

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Ralph E. Comstock; *Linkage in Finite Cross-Fertilizing Populations*; 3 years; \$77,200

Joseph G. Gall; *Some Structural and Chemical Features of Animal Cell Nuclei*; 5 years; \$49,300

James C. Underhill; *Variation in Meristic Characters in Fishes*; 2 years; \$7,100

UNIVERSITY OF MISSOURI, Columbia, Mo.; E. H. Coe, Jr.; *Unorthodox Inheritance in Maize*; 3 years; \$18,700

E. R. Sears; *Cytogenetic Studies With Polyploid Species of Wheat*; 3 years; \$46,300

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; B. J. Zobel; *Quantitative Genetic Studies in Loblolly Pine and Sweetgum*; 5 years; \$65,800

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; William B. McIntosh; *Comparative Genetics of the Dearmouse and the Laboratory Mouse*; 2 years; \$15,000

Henry L. Plaine; *The Nature of the Induction of Uncontrolled Growths by Specific Genes*; 1 year; \$9,300

OHIO WESLEYAN UNIVERSITY, Delaware, Ohio; Robert W. Long; *Polyplody and Sub-speciation in the Helianthus Nuttallii Complex (Compositae)*; 2 years; \$3,700

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; Gerald Braver; *Intrachromosomal Effect of Crossing Over in Drosophila Melanogaster*; 2 years; \$13,700

OREGON STATE COLLEGE, Corvallis, Oreg.; J. D. Mohler; *Phenogenetic Analysis of Gene Action in Polygenic Systems*; 2 years; \$11,300

Robert M. Storm; *Studies on Biological Characteristics and Taxogenetic Features of Rana Aurora and Rana Pretiosa*; 1 year; \$8,000

UNIVERSITY OF OREGON, Eugene, Oreg.; E. Novitski; *Genetics of Drosophila*; 3 years; \$104,900

Franklin W. Stahl; *Growth, Mutation and Recombination in Bacteriophage*; 3 years; \$85,200

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; Ellis Englesberg; *Genetics and Physiology of the Diauxic Phenomenon*; 4 years; \$62,300

PRINCETON UNIVERSITY, Princeton, N.J.; Bruce M. Eberhart; *Enzyme Activity in Neurospora Crassa*; 2 years; \$13,500

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Oliver E. Nelson; *Genetic Fine Structure of the W<sub>1</sub>/w<sub>2</sub> Region in Maize*; 2 years; \$21,200

**RESEARCH FOUNDATION, Oklahoma State University, Stillwater, Okla.;** Margaret Hoover Brooks; *Gene Action in Cytoplasmic Male Sterility in Sorghum*; 2 years; \$14,100

**ROCKEFELLER INSTITUTE, New York, N.Y.;** Rollin D. Hotchkiss; *Deoxyribonucleates Having Genetic Transforming Activity*; 8 years; \$49,500

**SAINTE LOUIS UNIVERSITY, Saint Louis, Mo.;** Irwin H. Herskowitz; *Genetic Studies of the Interaction Between Metabolism and Mutagenesis*; 1 year; \$3,000

**SANTA BARBARA BOTANIC GARDENS, Santa Barbara, Calif.;** Marta S. Walters; *A New Organella in Microsporocytes of Bromus*; 8 years; \$12,800

**SOUTHWESTERN LOUISIANA INSTITUTE, Lafayette, La.;** William L. Flannery; *Mutational Origin of Halophilic Bacteria*; 1 year; \$2,500

**UNIVERSITY OF UTAH, Salt Lake City, Utah;** Robert K. Vickery, Jr.; *Cytogenetic Studies of the Patterns of Evolution in *Mimulus**; 2 years; \$26,800

**UNIVERSITY OF WASHINGTON, Seattle, Wash.;** Howard C. Douglas; *Electron Microscopy of Microorganisms*; 2 years; \$27,900

**Herschel L. Roman;** *Transformation in Yeast*; 1 year; \$4,400

**UNIVERSITY OF WISCONSIN, Madison, Wis.;** Sewall Wright; *Evolution and Genetics of Populations*; 3 years; \$30,600

**WOMAN'S MEDICAL COLLEGE OF PENNSYLVANIA, Philadelphia, Pa.;** Max Levitan; *Population Dynamics of Linked Chromosomal Variants*; 2 years; \$15,900

**YALE UNIVERSITY, New Haven, Conn.;** John Buettner-Janusch; *Chromosomal Evolution in the Order Primates*; 2 years; \$42,400

**Norman H. Giles;** *Genetic Control of Adenine Biosynthesis*; 3 years; \$45,900

**Harry P. Rappaport;** *Relationship Between the Transforming Principle and Some Enzymes of *Bacillus Subtilis**; 2 years; \$21,800

**Charles L. Remington;** *Evolution in Natural Populations of Lepidoptera*; 3 years; \$3,400

**Charles L. Remington;** *Evolution in Natural Populations of Lepidoptera*; 2 years; \$35,000

**HISTORY AND PHILOSOPHY OF SCIENCE**

**AUGUSTANA COLLEGE, Rock Island, Ill.;** Frittof M. Fryxell; *The Hayden Survey*; 1 year; \$9,000

**Frittof M. Fryxell;** *The Hayden Survey*; 1 year; \$5,000

**UNIVERSITY OF CALIFORNIA, Berkeley Calif.;** Ernest W. Adams; *Foundations of Measurement*; 1 year; \$4,000

**IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa.;** John C. Greene; *American Science in the Age of Jefferson*; 2 years; \$7,400

**LEHIGH UNIVERSITY, Bethlehem, Pa.;** Nicholas Rescher; *Arabic Contributions to Logic*; 2 years; \$4,500

**MACMURRAY COLLEGE, Jacksonville, Ill.;** Walter B. Hendrickson; *Academies of Science in the Middle West*; 2 years; \$2,500

**UNIVERSITY OF MINNESOTA, Minneapolis, Minn.;** Paul K. Feyerabend, Minnesota Center for Philosophy of Science; *The Logic of Measurement*; 1 year; \$8,050

**SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.;** Antonio Pace; *Study of *Beccaria**; 1 year; \$3,000

**UNIVERSITY OF TEXAS, Austin, Tex.;** Richard M. Martin; *Applications of Symbolic Logic*; 1 year; \$5,900

**UNIVERSITY OF WISCONSIN, Madison, Wis.;** Erwin N. Hiebert; *Studies in Nineteenth Century Chemistry*; 15 months; \$15,200

**Robert C. Stauffer;** *Darwin and the Development of Ecology*; 15 months; \$16,400

**YALE UNIVERSITY, New Haven, Conn.;** Oystein Ore; *Early History of Probability*; 1 year; \$4,800

## MATHEMATICAL SCIENCES

**AMERICAN MATHEMATICAL SOCIETY, Providence, R.I.;** John H. Curtiss; *Finite Groups*; 4 weeks; \$53,500

**AMHERST COLLEGE, Amherst, Mass.;** Alfred B. Willcox; *Structure of Banach Algebras*; 1 year; \$4,800

**BRANDIS UNIVERSITY, Waltham, Mass.;** William L. Hoyt; *Algebraic Geometry*; 2 years; \$22,300

**R. A. Kunze;** *Harmonic Analysis in Lie Groups*; 2 years; \$23,000

**BROWN UNIVERSITY, Providence, R.I.;** R. E. Meyer; *Wave Fronts in Nonlinear Radiation*; 2 years; \$14,200

**R. S. Rivlin;** *Nonlinear Continuum Physics*; 2 years; \$65,900

**UNIVERSITY OF CALIFORNIA, Berkeley, Calif.;** Edwin P. Beckenbach and John W. Green, Los Angeles; *Convex Subadditive and Subharmonic Functions*; 1 year; \$18,200

**Robert J. Blattner;** *Representations of Topological Groups*; 1 year; \$3,100

**Hans J. Bremermann;** *Several Complex Variables*; 2 years; \$24,000

**Shing-Shen Chern and Edwin H. Spanier;** *Algebraic Topology and Differential Geometry*; 2 years; \$70,800

**R. J. DeVogelaere;** *Boundary Value Problems*; 6 months; \$4,500

**Richard C. Gilbert, Charles J. A. Halberg, Jr., and Vernon A. Kramer, Riverside;** *Perturbation of Operators*; 1 year; \$6,800

**Alfred Horn, Los Angeles;** *Eigenvalues of Sums of Hermitian Matrices*; 1 year; \$3,500

**Richard Montague, Los Angeles;** *Metamathematics*; 15 months; \$13,750

**Maxwell A. Rosenlicht;** *Algebraic Geometry*; 1 year; \$5,000

**Maxwell Rosenlicht, Los Angeles;** *Groups of Algebraic Transformations*; 1 year; \$3,200

**Edwin H. Spanier;** *Properties of Manifolds*; 2 years; \$43,300

**Ernst G. Straus, Los Angeles;** *Integer Valued Analytic Functions*; 2 years; \$13,700

**Charles J. Titus, Los Angeles;** *Extensions by Interior Mappings*; 1 year; \$3,000

**Frantisek Wolf;** *Operator Theory*; 2 years; \$55,800

**CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.;** Morris H. DeGroot; *Optimum Sequential Sampling Plans*; 2 years; \$10,500

**Henry S. Leonard, Jr.;** *Primitive Linear Groups*; 2 years; \$10,200

**CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio.;** D. P. Eckman; *Control Systems Computer*; 1 year; \$60,000

**Charles Saltzer;** *Finite Difference Operators*; 2 years; \$12,800



- CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; Eugene Lukacs; *Probability and Mathematical Statistics*; 3 years; \$43,600
- UNIVERSITY OF CHICAGO, Chicago, Ill.; A. Adrian Albert; *Research in Algebra*; 3 years; \$73,300
- William H. Kruskal; *Statistical Inference*; 2 years; \$42,400
- Richard K. Lashof and Eldon Dyer; *Algebraic Topology and Convex Surfaces*; 2 years; \$44,900
- O. F. G. Schilling; *Investigations in Valuation Theory*; 2 years; \$5,600
- Antoni Zygmund and Albert P. Calderon; *Partial Differential Equations*; 1 year; \$5,000
- COLORADO SCHOOL OF MINES, Golden, Colo.; Raymond A. Jordan; *Expansion of Computing Center (LGP-30)*; 1 year; \$5,100
- COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; Elmer E. Remmenga; *Establishment of Computing Center (IBM 650)*; 3 years; \$30,000
- COLUMBIA UNIVERSITY, New York, N.Y.; Walter C. Strodt; *Ordinary Differential Equations*; 1 year; \$12,200
- CORNELL UNIVERSITY, Ithaca, N.Y.; W. H. J. Fuchs; *Complex Function Theory and Analysis*; 1 year; \$26,500
- Simon Kochen and A. Nerode; *Mathematical Logic*; 2 years; \$37,300
- Lionel Weiss; *Nonparametric Statistical Methods*; 2 years; \$30,000
- DARTMOUTH COLLEGE, Hanover, N.H.; John G. Kemeny; *Stochastic Processes*; 2 years; \$19,800
- DUKE UNIVERSITY, Durham, N.C.; Leonard Carlitz; *Algebra and Number Theory*; 2 years; \$26,500
- John H. Roberts; *Topology*; 2 years; \$22,700
- FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Nickolas Heereman; *Power Series Rings*; 15 months; \$8,800
- Paul J. McCarthy; *Irreducibility of Polynomials*; 15 months; \$8,700
- GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; Robert S. Ledley; *Installation of Electronic Computer*; 1 year; \$30,000
- UNIVERSITY OF GEORGIA, Athens, Ga.; Thomas R. Brahana; *Local Homology and Homotopy Theories*; 3 years; \$26,300
- M. K. Fort, Jr.; *Point Set Topology*; 2 years; \$21,000
- R. P. Hunter; *Continuous Associative Multiplications*; 2 years; \$5,400
- HARVEY MUDD COLLEGE, Claremont, Calif.; Courtney S. Coleman; *Ordinary Differential Equations*; 2 years; \$4,100
- UNIVERSITY OF HAWAII, Honolulu, Hawaii; Robert W. Hiatt; *Establishment of a Computing Center (IBM 650)*; 1 year; \$50,000
- UNIVERSITY OF ILLINOIS, Urbana, Ill.; M. M. Day; *Functional Analysis*; 2 years; \$26,200
- Alex Heller; *Algebraic Topology*; 2 years; \$10,400
- Michie Suzuki; *The Structure of Finite Groups*; 2 years; \$30,800
- A. H. Taub; *Numerical Analysis and Applied Mathematics*; 1 year; \$66,400
- R. A. Wijsman, Colin Blyth, D. L. Burkholder and D. M. Roberts; *Sequential Decision Procedures*; 2 years; \$35,000
- Herbert S. Wilf; *The Stability Theory of Numerical Integration*; 1 year; \$2,300
- INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; Ernst Snapper; *Irrational Geometry*; 2 years; \$22,100
- Louis Auslander; *Subgroups of Lie Groups*; 2 years; \$21,500
- William S. Gustin; *Area Theory*; 2 years; \$18,000
- P. R. Masani; *Stochastic Problems of Communication Theory*; 2 years; \$16,200
- Andrew H. Wallace; *Real Analytic Varieties*; 2 years; \$13,700
- George Whaples; *Algebraic Number Theory and Homological Algebra*; 1 year; \$7,300
- KENTON COLLEGE, Gambler, Ohio; Otto M. Nikodym; *Operators in Hilbert Space*; 2 years; \$13,900
- LOUISIANA STATE UNIVERSITY, Baton Rouge, La.; Eugene V. Schenkman; *Group Theory*; 2 years; \$18,400
- LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; Pasquale Porcelli; *Bounded Analytic Functions*; 2 years; \$12,700
- UNIVERSITY OF MARYLAND, College Park, Md.; John W. Brace; *Functional Analysis*; 1 year; \$6,400
- R. E. Fullerton; *Problems in Functional Analysis*; 3 years; \$58,600
- James A. Hummel and Michael Zedek; *Geometric Function Theory*; 2 years; \$26,700
- Carol R. Karp; *Infinitary Formal Calculi*; 2 years; \$4,400
- UNIVERSITY OF MIAMI, Coral Gables, Fla.; Paul M. Swingle; *Nonsimple Connected Sets and Algebras*; 3 years; \$20,700
- MICHIGAN STATE UNIVERSITY, East Lansing, Mich.; Leo Katz; *Discrete Methods in Mathematical Statistics*; 2 years; \$29,800
- UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Arthur W. Burks; *Theory of Automata*; 2 years; \$50,000
- Nathaniel Coburn; *Hydromagnetic Flows*; 2 years; \$19,500
- Cecil C. Craig; *Computing and Data Processing*; 3 years; \$150,000
- Donald A. Darling; *Functional Analysis and Stochastic Processes*; 1 year; \$9,800
- Nicholas D. Kazarinoff; *Scalar Scattering by Convex Bodies*; 1 year; \$11,000
- Beaugard Stubblefield; *Product Spaces and Manifolds*; 1 year; \$8,000
- Jack E. McLaughlin; *Von Neumann and Frink Coordinations*; 1 year; \$11,700
- UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Eugenio Calabi, Hidehiko Yamabe and L. W. Green; *Structure of Manifolds*; 2 years; \$26,200
- Bernard R. Gelbaum; *Banach Algebras*; 1 year; \$12,300
- UNIVERSITY OF MISSOURI, Columbia, Mo.; Curtis L. Wilson, Rolla; *Establishment of Computing Center (LGP30)*; 3 years; \$30,000
- UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; M. A. Basoco; *Establishment of a Computing Center (Burroughs 205)*; 1 year; \$96,000
- UNIVERSITY OF NEW HAMPSHIRE, Durham, N.H.; Robert H. Owens; *Establishment of Computing Center (Recomp)*; 3 years; \$50,000
- NEW MEXICO COLLEGE OF AGRICULTURE AND MECHANIC ARTS, University Park, N. Mex.; George W. Gardner; *Computing Time for Basic Research*; 1 year; \$18,000
- NEW YORK UNIVERSITY, New York, N.Y.; Wilhelm Magnus; *Combinatorial Group Theory*; 2 years; \$64,600

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; F. Burton Jones; *Classification of Plane Continua*; 2 years; \$22,200

NORTHWESTERN UNIVERSITY, Evanston, Ill.; R. P. Boas; *Fourier Series*; 1 year; \$13,800

Bruno Harris; *Cohomology Algebras*; 15 months; \$8,700

H. C. Wang, T. Matsusaka, A. Rosenberg, D. Zelinsky, and W. M. Boothby; *Studies in Algebra and Algebraic Geometry*; 2 years; \$104,700

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; Wladimir Seldel; *Boundary Behavior of Functions*; 2 years; \$40,200

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; Charles A. Nicol; *The Ramanujan Function*; 1 year; \$3,500

OREGON STATE COLLEGE, Corvallis, Oreg.; Fritz Oberhettinger; *Infinite Series*; 2 years; \$24,500

PACIFIC UNION COLLEGE, Angwin, Calif.; Ivan R. Neilsen; *Expansion of Computing Center (Bendix G-15D)*; 1 year; \$20,000

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; David K. Harrison; *The Structure of Group Rings*; 2 years; \$6,000

POLYTECHNIC INSTITUTE OF BROOKLYN, Brooklyn, N.Y.; Warren L. McCabe; *Installation of IBM 650 Computer*; 3 years; \$80,000

PRINCETON UNIVERSITY, Princeton, N.J.; Alonzo Church and Ralph H. Fox; *Knot Theory and Metamathematics*; 2 years; \$85,900

Donald C. Spencer; *Differentiable Manifolds and Sheaves*; 1 year; \$4,500

Donald C. Spencer; *Differentiable Manifolds and Sheaves*; 1 year; \$4,200

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Lamberto Cesari; *Asymptotic Behavior and Stability of Differential Systems*; 2 years; \$27,200

Arthur H. Copeland; *Groups of Mapping Classes*; 2 years; \$12,900

J. DeGroot; *Linearization of Mappings*; 2 months; \$2,800

Johannes H. B. Kemperman; *Small Product-Sets in a Group*; 2 years; \$12,800

RESEARCH FOUNDATION, Oklahoma State University, Stillwater, Okla.; Olan H. Hamilton; *Piced Points for Plane Continua*; 2 years; \$12,200

UNIVERSITY OF ROCHESTER, Rochester, N.Y.; R. A. Raimi; *Invariant Measures on Certain Czech Compactifications*; 1 year; \$4,200

ROSB POLYTECHNIC INSTITUTE, Terre Haute, Ind.; Rheodore P. Palmer; *Establishment of Computing Center (Bendix G-15D)*; 1 year; \$15,000

SAN DIEGO STATE COLLEGE FOUNDATION, San Diego, Calif.; Charles B. Bell, Jr.; *Distribution-Free Statistics*; 2 years; \$24,200

UNIVERSITY OF SOUTH CAROLINA, Columbia, S.C.; Rufus G. Fellers; *Computer Facility*; 3 years; \$13,000

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; Herbert Busemann; *Area and Differentiability*; 1 year; \$8,000

James Dugundji; *Cohomology Operations*; 2 years; \$30,000

Albert L. Whiteman; *Theory of Cytotony*; 2 years; \$15,900

STANFORD UNIVERSITY, Stanford, Calif.; Stefan Bergman; *Several Complex Variables*; 2 years; \$46,200

Samuel Karlin; *Probability Theory and Functional Analysis*; 2 years; \$58,100

Charles Stein; *Statistical Theory and Probabilistic Models*; 2 years; \$60,000

Gabor Szegő; *Toeplitz Forms and Orthogonal Polynomials*; 3 years; \$51,000

TEACHERS COLLEGE, COLUMBIA UNIVERSITY, New York, N.Y.; Rosedith Sitgreaves; *Classification Procedures*; 3 years; \$22,900

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; William H. Fletcher; *Establishment of Computing Center (IBM 650)*; 1 year; \$50,000

TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; Alfred H. Clifford, Paul F. Conrad, Paul S. Mostert, and Alexander Doniphan Wallace; *Augmented Algebraic Systems*; 2 years; \$67,600

VANDEBILT UNIVERSITY, Nashville, Tenn.; John H. Stambaugh; *Computing Center*; 3 years; \$95,000

WASHINGTON UNIVERSITY, St. Louis, Mo.; Allen Devinatz; *Spectral Problems in Harmonic Analysis*; 2 years; \$24,100

James A. Jenkins; *Univalent Functions*; 2 years; \$29,600

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Ross A. Beaumont and Richard S. Pierce; *Structure of Modules, Rings, and Groups*; 2 years; \$41,000

Frank H. Brownell; *Differential Operators and Stochastic Processes*; 2 years; \$55,000

Douglas G. Chapman; *Statistical Models for Exploited Populations*; 21 months; \$27,600

J. M. Fell; *Representatives of Topological Groups and Algebras*; 2 years; \$12,300

Ernest A. Michael; *Abstract Spaces*; 2 years; \$41,900

WAYNE STATE UNIVERSITY, Detroit, Mich.; Samuel Kaplan; *The Second Dual of the Space of Continuous Functions*; 1 year; \$3,800

Owen G. Owens; *Elliptic Differential Equations*; 1 year; \$5,300

WESLEYAN UNIVERSITY, Middletown, Conn.; Thornton L. Page; *Establishment of Computing Center (IGP-30)*; 2 years; \$20,000

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; Walter Leighton; *Differential Equations and the Calculus of Variations*; 2 years; \$30,800

UNIVERSITY OF WISCONSIN, Madison, Wis.; R. H. Bing; *Topology of Three-Space*; 2 years; \$50,600

Edward R. Fadell; *Fiber Spaces*; 2 years; \$9,500

Edmund H. Feller; *Rings and Modules*; 1 year; \$1,800

Jacob Korevaar; *Fourier Analysis*; 3 years; \$86,400

YALE UNIVERSITY, New Haven, Conn.; G. S. Hedlund and Shizuo Kakutani; *Analysis in the Large*; 15 months; \$85,700

Nathan Jacobson; *Theory of Rings*; 1 year; \$2,350

## METABOLIC BIOLOGY

ALBANY MEDICAL COLLEGE, UNION UNIVERSITY, Albany, N.Y.; Richard A. Peabody, and Charles Hurwitz; *Mechanism of Action of Streptomycin*; 3 years; \$21,800

ALBERT EINSTEIN MEDICAL CENTER, Philadelphia, Pa.; Herman Friedman; *Role of Nucleoproteins and Subcellular Particles in Antibody Formation*; 2 years; \$14,600

Herman Friedman; *Nucleoproteins and Subcellular Particles in Antibody Formation*; 1 year; \$17,400

AMERICAN UNIVERSITY OF BEIRUT, Beirut, Lebanon; John H. Schneider; *DNA Synthesis in Normal and Regenerating Livers*; 2 years; \$9,000

BAYLOR UNIVERSITY, Waco, Tex.; Robert P. Williams, Houston; *Pigment and Porphyrin Produced by Bacillus Anthracis*; 2 years; \$10,100

BIO-RESEARCH INSTITUTE, INC.; Cambridge, Mass.; Peter Bernfeld; *Behavior of Enzymes at High Dilutions*; 2 years; \$18,000

BOSTON UNIVERSITY, Boston, Mass.; Charles Terner; *Metabolites of Isolated Tissues, Cells and Subcellular Functions*; 1 year; \$30,000

BRANDEIS UNIVERSITY, Waltham, Mass.; Morris Soodak; *Enzymatic Mechanisms Involved in Biosynthesis of Thyroglobulin, A Glycoprotein*; 3 years; \$44,200

BRIGHAM YOUNG UNIVERSITY, Provo, Utah; Jay V. Beck; *Studies on Metabolism of Thiobacillus Ferrooxidans and Other Autotrophic Bacteria*; 2 years; \$16,800

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Arthur L. Black, Davis; *Rate of Flow of Carbon Through the Tricarboxylic Acid Cycle*; 2 years; \$18,000

Roger David Cole, Davis; *Studies on Protein Synthesis During Pregnancy*; 2 years; \$15,200

S. S. Elberg; *Intramonocytic Metabolism of Brucella Melitensis in Cell Culture*; 2 years; \$26,800

David M. Greenberg; *Enzyme and Isotope Studies on One Carbon Metabolism and Methyl Group Biosynthesis*; 3 years; \$46,700

Max Kleiber, Davis; *Synthesis of Milk Components by Intact Cows*; 2 years; \$50,000

George G. Laties, Los Angeles; *Nature and Control of Cellular Development*; 3 years; \$32,800

Allen G. Marr, Davis; *Biochemical Cytology of Bacteria*; 3 years; \$35,000

R. Y. Stanier; *Physiology and Biochemistry of Bacteria*; 5 years; \$113,000

T. E. Weter and C. R. Stocking, Davis; *Ultrastructure of Chloroplasts During Changes in Cell Metabolism and Isolation*; 3 years; \$11,800

UNIVERSITY OF CHICAGO, Chicago, Ill.; Herbert S. Anker; *Mechanism of Antibody Synthesis*; 3 years; \$28,500

Wayne J. McIlrath; *Physiological Functions of Boron in Plants*; 2 years; \$15,000

UNIVERSITY OF CINCINNATI, Cincinnati, Ohio; Emily J. Bell; *Streptolysin O and Its Effects Upon Cellular Metabolism*; 1 year; \$7,500

CITY OF HOPE MEDICAL CENTER, Duarte, Calif.; Riojun Kinoshita and Jesse E. Slisken; *Metabolic Sequences in the Mitotic Cycle*; 2 years; \$23,800

UNIVERSITY OF COLORADO, Boulder, Colo.; Richard Thompson; *Microbiological Equipment*; 1 year; \$8,600

COLUMBIA UNIVERSITY, New York, N.Y.; R. F. Dawson; *Biosynthesis and Metabolism of Nicotinic Acid and Related Compounds in Nicotiana*; 3 years; \$30,600

Phillip Geglerson; *Induced Enzyme Formation in Mammalian Systems*; 2 years; \$32,000

CONNECTICUT AGRICULTURAL EXPERIMENT STATION, New Haven, Conn.; H. B. Vickery; *Organic Acids in Leaves*; 2 years; \$20,000

UNIVERSITY OF CONNECTICUT, Storrs, Conn.; Ralph P. Collins; *Identification and Metab-*

*olism of the Production of Volatile Substances Produced by Selected Fungi*; 2 years; \$8,300

CORNELL UNIVERSITY, Ithaca, N.Y.; Lemuel D. Wright; *Specialized Laboratory Equipment Required in Research*; 1 year; \$19,700

ELGIN STATE HOSPITAL, Elgin, Ill.; Lawrence I. Hochsteln; *Bacterial Oxidation of N-Acetylglucosamine*; 2 years; \$18,000

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Hans Gaffrom; *Instrumentation for Photobiological Research*; 1 year; \$26,100

UNIVERSITY OF GEORGIA, Athens, Ga.; Milton J. Cormier; *Mechanisms of Bioluminescent Reactions*; 2 years; \$31,100

Robert C. Eagon; *Biosynthesis of Bacterial Polysaccharides*; 2 years; \$12,000

William J. Payne; *Equipment for Research in Bacteriology*; 1 year; \$14,000

Alfred W. Scott; *Equipment to Support the Research Programs in Biochemistry*; 1 year; \$20,000

HARVARD UNIVERSITY, Cambridge, Mass.; Martin Lubin; *Amino-Acid Transport Systems*; 2 years; \$34,000

Frederick Neldhardt; *Regulation of Ribonucleic Acid Synthesis in Bacteria*; 3 years; \$37,000

William H. Pearlman, Boston; *Steroid Hormones: Studies Utilizing Radioisotopes*; 1 year; \$11,100

Albert E. Renold; *Control of Amino Acid and Protein Metabolism in Adipose Tissue*; 2 years; \$22,000

T. Hastings Wilson; *Cellular Uptake of Large Molecules by Intestinal Epithelium*; 4 years; \$35,000

HASKINS LABORATORIES, New York, N.Y.; S. H. Hutner; *Heterotrophic Growth of Euglena*; 2 years; \$14,400

Haverford College, Haverford, Pa.; Melvin Santer; *Environmental-Induced Changes in Ribonucleic Acid of Bacteria*; 3 years; \$21,200

HOME FOR THE JEWISH AGED, Philadelphia, Pa.; Henry Altschuler; *Laboratory Equipment for Current Research Projects*; 1 year; \$21,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.; Ralph D. DeMoss; *Origin of Glucose in Cell Walls of Leuconostoc Meseenteroides*; 2 years; \$17,500

David Gottlieb; *Physiology of Fungi*; 3 years; \$46,200

R. H. Hageman; *Physiological Basis of Hybrid Vigor in Corn*; 2 years; \$25,800

S. P. Mistry; *Biotin in Intermediary Metabolism*; 3 years; \$45,000

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; W. J. van Wagtenonk; *Nucleic Acid Turnover in Paramecium Aurelia*; 3 years; \$25,800

INSTITUT DE BIOLOGIE PHYSICO-CHIMIQUE, Paris, France; Marianne Grunberg-Manago; *Enzymatic Synthesis and Properties of Ribopolynucleotides and Natural Rna*; 1 year; \$19,000

INSTITUT PASTEUR, Paris, France; Jaques Monod; *Specific Factors in Enzyme and Protein Biosynthesis*; 1 year; \$5,000

IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa; Frederick G. Smith; *Respiratory Properties of Subcellular Particles of Fungi and Fungicide Action*; 1 year; \$4,000

KAISER FOUNDATION RESEARCH INSTITUTE, Oakland, Calif.; Mary Belle Allen; *Com-*

- Comparative Biochemistry of Photosynthetic Pigments*; 3 years; \$30,000  
 UNIVERSITY OF KANSAS MEDICAL CENTER, Kansas City, Kans.; Harold J. Nicholas; *Metabolism of Cholesterol in the Central Nervous System*; 2 years; \$20,200  
 KANSAS STATE UNIVERSITY, Manhattan, Kans.; Philip Nordin; *Metabolism of Starch Granules*; 3 years; \$14,300  
 UNIVERSITY OF KANSAS, Lawrence, Kans.; David Paretsky; *The Biochemistry of Rickettsiae*; 2 years; \$26,200  
 LOS ANGELES STATE COLLEGE FOUNDATION, Los Angeles, Calif.; Joseph A. Sacher; *Auoin-Membrane Permeability Relations*; 3 years; \$10,700  
 UNIVERSITY OF LOUISVILLE, Louisville, Ky.; Peter K. Knoefel; *Conjugation and Excretion in the Animal Body*; 1 year; \$8,000  
 John W. Brown; *Amino Acid Incorporation Into Protoplasts of *Sarcina Lutes**; 3 years; \$20,000  
 UNIVERSITY OF MASSACHUSETTS, Amherst, Mass.; D. S. Van Fleet; *Histochemical and Cytochemical Studies of Phloem*; 3 years; \$11,600  
 MICHAEL REESE HOSPITAL AND MEDICAL CENTER, Chicago, Ill.; Clarence Cohn; *Influence of Rate of Ingestion of Diet on Intermediary Metabolism*; 3 years; \$30,000  
 MICHIGAN STATE UNIVERSITY, East Lansing, Mich.; Robert P. Scheffer; *Physiology of Parasitism*; 2 years; \$17,300  
 UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; I. A. Bernstein; *Biosynthesis of Deoxyribose*; 2 years; \$24,000  
 G. R. Greenberg; *Enzyme Formation in Phage-Infected Bacteria*; 4 years; \$84,000  
 James E. Hogg; *Controlling Factors in Lipid Glyconeogenesis*; 2 years; \$16,700  
 UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Albert W. Frenkel; *Nitrogen Metabolism of Photosynthetic Bacteria*; 2 years; \$18,000  
 UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; Francis A. Haskins; *Metabolism of Coumarin and Related Compounds in Sweetclover*; 3 years; \$30,000  
 John H. Pazur; *Enzymatic Synthesis of Carbohydrates*; 2 years; \$12,600  
 George A. Young; *Utilization of Amino Acid Amides by Normal and Virus Infected Tissue Culture Cells*; 1 year; \$6,000  
 NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; Arthur Kelman; *Cellulolytic Enzyme Systems of Phytopathogenic Microorganisms*; 2 years; \$18,700  
 S. B. Tove; *Interrelationships in the Metabolism of Short Chain Fatty Acids*; 3 years; \$21,600  
 OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; Robert W. Bernlohr; *Antibiotic Production During Sporogenesis*; 2 years; \$13,000  
 UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; J. R. Sokatch; *Oxidation of the Branched Chain Amino Acids by Microorganisms*; 3 years; \$24,000  
 OREGON STATE COLLEGE, Corvallis, Oreg.; Vernon H. Cheldelin; *Metabolic Patterns in Microorganisms*; 1 year; \$10,700  
 W. David Loomis; *Biosynthesis of Terpenes*; 2 years; \$28,300  
 UNIVERSITY OF OREGON, Eugene, Oreg.; Bradley T. Scheer; *Humoral Control of Metabolism in Crustaceans*; 2 years; \$36,000  
 Jacob Straus; *Biosynthesis of Anthocyanin in Corn Endosperm Tissue Cultures*; 3 years; \$20,800  
 R. G. Wolfe, Jr.; *Enzyme Protein Structure Studies*; 2 years; \$17,400  
 UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Walter D. Bonner, Jr.; *Mechanisms of Cellular Oxidations in Plant Tissues*; 2 years; \$18,400  
 James H. Jones; *Possible Biosynthesis of Vitamins A and D by Fish*; 3 years; \$83,000  
 PHILADELPHIA GENERAL HOSPITAL RESEARCH FUND, Philadelphia, Pa.; Gerald Litwack; *Formation of Lysozyme Substrate in Cell Walls*; 1 year; \$5,400  
 PIONEERING RESEARCH DIVISION, U.S. Army Quartermaster Research and Engineering Center Laboratories; Natick, Mass.; Elwyn T. Reese; *Inducers of Cellulase and of Other Polysaccharases*; FY-60-61-62; \$20,000  
 UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; Jean A. Gross; *Development and Reproduction of the Chloroplast*; 2 years; \$9,500  
 PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Joseph Kuc and Oliver E. Nelson; *Synthesis of Lignin in Plants*; 2 years; \$19,900  
 Mark L. Tomes; *Biosynthesis of Carotenoids in the Tomato*; 2 years; \$18,400  
 RESEARCH FOUNDATION FOR MENTAL HYGIENE, Albany, N.Y.; William Sacks, Orangeburg; *Cerebral Tricarboxylic Acid Cycle Enzyme Activities*; 3 years; \$40,000  
 RESEARCH FOUNDATION, Oklahoma State University, Stillwater, Okla.; L. M. Henderson; *Equipment for Biological Research*; 1 year; \$18,700  
 RICE INSTITUTE, Houston, Tex.; James W. Campbell; *Biochemistry of Animal Parasites*; 3 years; \$21,000  
 RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; J. Oliver Lampen; *Action of Polyene Antifungal Agents on Metabolic Activities in Yeast*; 3 years; \$60,000  
 SAINT LOUIS UNIVERSITY SCHOOL OF MEDICINE, St. Louis, Mo.; Elijah Adams; *Enzymatic Degradation of Pharmacologically Active Compounds*; 2 years; \$36,600  
 SETON HALL COLLEGE OF MEDICINE AND DENTISTRY, Medical Center, Jersey City, N.J.; Katherine Lewis, Department of Biochemistry; *Lysine Biosynthesis in Fungi*; 2 years; \$17,700  
 UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; S. C. Rittenberg; *Bacterial Metabolism and Physiology*; 4 years; \$80,000  
 SOUTHWESTERN LOUISIANA INSTITUTE, Lafayette, La.; T. E. Wilson; *Priority of Enzyme Synthesis in Microorganisms*; 2 years; \$18,000  
 STANFORD UNIVERSITY, Stanford, Calif.; C. E. Clifton; *Oxidative Assimilation by Microorganisms*; 4 years; \$38,000  
 STATE UNIVERSITY OF IOWA, Iowa City, Iowa; R. E. Kallio; *High Molecular Weight Esters and Waxes in Bacterial Metabolism*; 4 years; \$37,000  
 TEMPLE UNIVERSITY, Philadelphia, Pa.; John M. Ward; *Biochemical Aspects of Morphogenesis of the Slime Mold*; 2 years; \$20,000  
 UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; D. Frank Holtman; *Amino Acids and TCA Cycle Enzyme Inhibitors*; 2 years; \$12,900  
 UNIVERSITY OF TEXAS, Austin, Tex.; James L. Larimer; *Gas Secretion and Carbonic Anhydrase*; 2 years; \$14,000

UTAH STATE UNIVERSITY, Logan, Utah; George W. Welkie; *Ribonuclease Activity in Plant Tissue*; 1 year; \$12,500

VANDERBILT UNIVERSITY, Nashville, Tenn.; Sidney P. Colowick; *Control of Carbohydrate Metabolism*; 2 years; \$91,000

VETERANS ADMINISTRATION, Washington, D.C.; Ruth G. Wittler; *Metabolic Factors Required to Promote Reversion of Mycoplasma Mycoides to Bacterial Form*; 4 months; \$5,300

VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg, Va.; C. J. Ackerman; *Cytidine Coenzymes in the Biosynthesis of Choline*; 2 years; \$14,200

WASHINGTON UNIVERSITY, St. Louis, Mo.; Howard Gest; *Comparative Biochemistry and Physiology of Autotrophic and Heterotrophic Microorganisms*; 3 years; \$40,000

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Erling J. Ordal; *Trace Inorganic Elements in the Metabolism of Bacteria*; 3 years; \$75,000

WEIZMANN INSTITUTE OF SCIENCE, Rehovoth, Israel; Theodore Winnick; *Mechanisms of Biosynthesis of Polypeptides*; 3 years; \$26,000

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; S. J. Cooperstein; *Purification and Characterization of the Cytochromes of Mammalian Tissues*; 8 years; \$31,100

Warwick Sakami; *Methyl Group Metabolism in Animals*; 3 years; \$42,500

UNIVERSITY OF WISCONSIN, Madison, Wis.; Paul J. Allen; *Relation of Metabolic Processes to the Development of Parasitic Fungi*; 2 years; \$20,000

Robert M. Bock, and Harlyn O. Halvorson; *Protein Biosynthesis at the Template Level*; 3 years; \$70,000

Dexter S. Goldman; *Fatty Acid Metabolism of the Tubercle Bacillus*; 8 years; \$30,000

W. H. McShan; *Characteristics of Particulates Isolated From Anterior Pituitary Tissue*; 2 years; \$31,000

P. W. Wilson and R. H. Burris; *Biological Fixation of Nitrogen*; 3 years; \$35,000

WORCESTER FOUNDATION FOR EXPERIMENTAL BIOLOGY, INC., Shrewsbury, Mass.; Oscar Hechter; *Mode of Action of Insulin Upon Permeability Processes in Muscle Fibers*; 2 years; \$30,000

David Stone; *The Influence of Nucleic Acid Preparations on Animal Cells in Culture*; 1 year; \$15,000

YALE UNIVERSITY, New Haven, Conn.; John A. DeMoss; *Genetic and Physiological Control of Cellular Structures*; 3 years; \$30,500

Arthur W. Galston; *Mechanism of Action of Hormones and Visible Radiations in the Control of Plant Cell Growth*; 4 years; \$73,500

William S. Hillman; *Control of Growth and Flowering in the Lamnaceae*; 3 years; \$44,700

YESHIVA UNIVERSITY, New York, N.Y.; Elsa Proehl Paulsen; *C<sub>19</sub> and C<sub>21</sub> Steroid Synthesis in the Adrenal Gland*; 3 years; \$31,800

Harold J. Strecker; *Interconversion of Glutamic Acid and Proline*; 3 years; \$21,000

## MOLECULAR BIOLOGY

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Albert Siegal; *The Relationship Between Ribonucleic Acid and Protein*; 5 years; \$95,000

Ralph W. G. Wyckoff; *Morphology and*

*Composition of Macromolecules*; 3 years; \$90,000

BARTOL RESEARCH FOUNDATION OF THE FRANKLIN INSTITUTE, Swarthmore, Pa.; William C. Denison; *Some Luminescences of Chlorophyll in Vivo and in Vitro*; 1 year; \$12,900

UNIVERSITY OF BIRMINGHAM, Birmingham, England; H. Mueller and S. V. Perry; *Protein Synthesis in Muscle*; 2 years; \$12,000

BRANDEIS UNIVERSITY, Waltham, Mass.; Nathan O. Kaplan and Saul G. Cohen; *Relation Between Structure and Function in Metalloenzymes*; 1 year; \$50,000

Harold P. Klein; *Hydrocarbons and Related Compounds of Saccharomyces Cerevisiae*; 2 years; \$16,000

Richard S. Morgan; *Structure of the Mitochondrial Particle and Related Ribonucleic Acids*; 2 years; \$13,000

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; Robert B. Corey and Linus Pauling; *Structure of Proteins*; 3 years; \$300,000

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; James Cason; *Nonantibiotic Metabolic Products of Molds*; 2 years; \$16,000

William G. Clark, Los Angeles; *Mammalian Histidine Decarboxylase*; 2 years; \$24,000

Heinz L. Fraenkel-Conrat; *Chemical Nature of Biologically Active Ribonucleic Acid*; 3 years; \$100,000

Howard K. Schachman; *Macromolecules of Biological Interest*; 5 years; \$170,000

UNIVERSITY OF CHICAGO, Chicago, Ill.; H. Burr Steinbach; *Intracellular Ion Distribution and Function*; 3 years; \$41,800

Birgit Vennesland; *Chloroplast Reactions*; 5 years; \$95,000

CHILDREN'S HOSPITAL OF BUFFALO, Buffalo, N.Y.; R. J. Martinez; *Hexokinases of Bacteria*; 2 years; \$7,000

UNIVERSITY OF CINCINNATI, Cincinnati, Ohio; Richard A. Day; *Secondary and Tertiary Structure of Proteins*; 2 years; \$9,000

COLLEGE OF CHARLESTON, Charleston, S.C.; Joseph R. Merkel; *Metal-Regulated, Photocatalytic Reactions of Flavin Systems*; 2 years; \$9,000

COLUMBIA UNIVERSITY, New York, N.Y.; Sam M. Belser, and Frederic Agate; *Properties of Steroid Hormone-Protein Conjugates*; 3 years; \$45,000

Reinhold Benesch; *Modification of Proteins*; 4 years; \$73,000

Irving Goodman; *Determinants of Biological Action*; 2 years; \$22,000

Alvin I. Krasna; *The Role of the Enzyme Hydrogenase in Hydrogen Photosynthesis*; 2 years; \$16,000

Barbara W. Low; *X-Ray Crystal Structure Studies of Insulin*; 3 years; \$50,000

Stanley L. Miller; *Mechanisms for the Synthesis of Organic Compounds on the Primitive Earth*; 2 years; \$19,000

David Nachmansohn; *Molecular Forces in Nerve Impulse Conduction*; 5 years; \$120,000

Stephen Zamenhof; *Studies on the Biochemistry of Polysulfarphosphates*; 1 year; \$11,000

CORNELL UNIVERSITY, Ithaca, N.Y.; George P. Hess; *Structural and Functional Interrelationships in Enzymes*; 1 year; \$19,000

Robert W. Holley; *Fractionation and Characterization of Ribonucleic Acid*; 3 years; \$32,000

- J. R. Vallentyne; *Ecological and Biogeochemical Studies of Amino Acids and Polypeptides*; 3 years; \$48,000  
 DARTMOUTH COLLEGE, Hanover, N.H.; Shinya Inoue; *Analysis of Fine Structure of Living Cells*; 3 years; \$280,000  
 Manuel F. Morales; *Configuration of Dissolved Proteins and Protein Models*; 5 years; \$41,900  
 Arthur J. Samuels; *Immuno-Enzymology of Muscle Proteins*; 2 years; \$11,000  
 Lucille Smith; *Oxidative Phosphorylation in Heart and Bacterial Particles*; 1 year; \$5,000  
 EARLHAM COLLEGE, Richmond, Ind.; William K. Stephenson; *Alcohol Penetration into Living Cells*; 2 years; \$13,300  
 EMORY UNIVERSITY, Atlanta, Ga.; John M. Reiner; *Mechanism of Infection and Multiplication of Bacterial Viruses*; 2 years; \$14,000  
 HAHNEMANN MEDICAL COLLEGE, Philadelphia, Pa.; Peter Oesper; *Competitive Inhibitors for 1, 3-Diphosphoglyceric Acid*; 2 years; \$14,000  
 HARVARD UNIVERSITY, Cambridge, Mass.; Konrad Bloch; *The Mechanism of Synthesis of Steroids in Biological Systems*; 3 years; \$50,000  
 Oleg Jardetsky; *Nuclear Magnetic Resonance Studies of Biologically Important Molecules*; 2 years; \$73,000  
 John H. Law; *Biochemistry of the Glycolipids*; 2 years; \$11,600  
 A. K. Solomon; *Permeability of Cellular Membranes*; 3 years; \$81,000  
 George Wald; *Research on Biochemistry of Vision*; 4 years; \$32,000  
 James D. Watson; *Structure and Function of Bacterial Microsomes*; 3 years; \$100,000  
 HEALTH RESEARCH, Inc., Buffalo, N.Y.; David Harker; *Crystal Structure of Ribonuclease*; 1 year; \$25,000  
 UNIVERSITY OF ILLINOIS, Urbana, Ill.; S. Spiegelman; *The Mechanism of Enzyme Synthesis*; 5 years; \$90,000  
 INSTITUTE FOR CANCER RESEARCH, Philadelphia, Pa.; Thomas F. Anderson; *Invasion of Host Cells by Bacterial Viruses*; 2 years; \$23,000  
 Thomas F. Anderson; *Specific Synthesis in Bacteria and Bacteriophages*; 3 years; \$159,000  
 IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa; S. Aronoff; *Inter-cellular Movements of Organic Compounds*; 2 years; \$22,000  
 David A. Metzler; *Mechanism of the Catalytic Action of Riboflavin*; 3 years; \$22,100  
 JOHANN - WOLFGANG - GOETHE - UNIVERSITÄT, Frankfurt/Main, West Germany; Erich Heinz; *Chemical and Physico-Chemical Basis of Active Transport*; 2 years; \$28,000  
 JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Michael Beer; *Electron Microscope Studies of Macromolecules and Cells*; 1 year; \$50,000  
 Thomas C. Bruce; *Synthesis of a Series of Gem Mercaptoethylamines*; 4 years; \$66,500  
 KANSAS WESLEYAN UNIVERSITY, Salina, Kans.; Orville L. Voth; *Interactions of Tocopherol with Proteins and Amino Acids*; 2 years; \$7,000  
 KENTUCKY RESEARCH FOUNDATION, Lexington, Ky.; Richard S. Schweet; *Incorporation of Amino Acids into Ribonucleic Acid*; 18 months; \$29,100  
 KYOTO UNIVERSITY, Maizuru, Japan; Hiroshi Fujita; *Differential Equation for the Ultracentrifuge*; 1 year; \$1,800  
 UNIVERSITY OF MAINE, Orono, Maine, George R. Pettit; *Alkaloid and Terpenene Components of the Labiatae*; 2 years; \$8,000  
 MANHATTAN COLLEGE, New York, N.Y.; Brother William Batt; *Lipase Purification and Kinetics*; 2 years; \$20,000  
 MARINE BIOLOGICAL LABORATORY, Woods Hole, Mass.; Morris Rockstein; *Biochemical Basis for Light Orientation of the Starfish of the Woods Hole Area*; 5 years; \$32,900  
 UNIVERSITY OF MARYLAND, College Park, Md.; R. G. Grenell, The Psychiatric Institute; *The Structure of Brain Lipide-Protein Complexes*; 1 year; \$7,000  
 Harris J. Linder; *Histochemistry of Cocoon and Egg Shell Formation*; 2 years; \$10,000  
 MASSACHUSETTS GENERAL HOSPITAL, Boston, Mass.; Jerome Gross; *Intermolecular Organization and Interactions of Normal and Abnormal Collagen*; 1 year; \$20,000  
 MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Vernon M. Ingram; *Chemical Structure of the Human Hemoglobins*; 3 years; \$56,000  
 Boris Magasanik; *Regulation of the Metabolic Processes at the Molecular Level*; 2 years; \$133,000  
 Alexander Rich; *Molecular Structural Studies on the Nucleic Acids and Related Compounds*; 3 years; \$73,000  
 UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; M. J. Coon; *Biological Hydrocarbon Oxidation*; 3 years; \$52,000  
 UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Rufus Lumry; *Kinetics Studies of Enzyme Mechanisms*; 2 years; \$25,000  
 Fred Smith; *Detailed Structure of Polysaccharides*; 4 years; \$35,000  
 UNIVERSITY OF MISSOURI, Columbia, Mo.; Owen J. Koeppel; *Mechanism of Action of Glyceraldehyde-3-Phosphate Dehydrogenases*; 3 years; \$22,000  
 MOUNT HOLYOKE COLLEGE, South Hadley, Mass.; Jytte Muus; *Chemical and Enzymatic Studies on Human Salivary Amylase*; 3 years; \$33,600  
 Curtis G. Smith; *Inhibition of Riboflavin Synthesis in *Ermothecium Ashbyi**; 2 years; \$18,800  
 NATIONAL INSTITUTE OF ARTHRITIS AND METABOLIC DISEASES, Bethesda, Md.; Hugo Bauer; *Analysis and Identification of Products of Histidine Metabolism*; 2 years; \$8,000  
 NEW YORK UNIVERSITY, New York, N.Y.; John S. Cook; *Erythrocyte Volumes and Ionic Fluxes in Solutions of the Alkali Salts of Monovalent Anions*; 21 months; \$12,600  
 C. T. O. Fong; *Chemical Aspects of Hormone-Receptor Interaction*; 1 year; \$13,000  
 Robert C. Warner; *Physical Properties of Enzymatically Synthesized Polynucleotides and of Ribonucleic Acid*; 3 years; \$51,000  
 Robert Warner Chambers; *Synthesis of Nucleotides*; 3 years; \$36,000  
 UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; Claude Plantadosi; *Chemistry and Metabolism of Plasmalogens*; 2 years; \$14,000  
 UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Britton Chance; *Experimental Studies*

on *Energy Transfer and Conservation*; 5 years; \$700,000

Mildred Cohn; *Mechanisms of Phosphorylation and Phosphate Transfer Reactions*; 2 years; \$28,000

R. E. Forster; *Diffusion of Gases and Their Simultaneous Chemical Reaction With Hemoglobin*; 2 years; \$20,000

George F. Springer and William Pepper; *Nature of Blood Group Active Substances*; 4 years; \$40,000

Elizabeth Thorogood; *Leguma Hemoproteins*; 1 year; \$11,000

PRINCETON UNIVERSITY, Princeton, N.J.; Frank Johnson; *Biochemistry of Luminescent Systems*; 3 years; \$42,000

W. J. Kauzmann and J. R. Fresco; *Physical-Chemical Investigations of Biological Macromolecules*; 1 year; \$70,000

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; Martynas Yeas and Walter S. Vincent; *Information Transfer Via Ribonucleic Acid*; 3 years; \$42,000

RETINA FOUNDATION, Boston, Mass.; Tovar Laurent; *Interaction Between Concentrated Solutions of Hyaluronic Acid and Other Macromolecules*; 2 years; \$24,000

ROCKEFELLER INSTITUTE, New York, N.Y.; Edward J. Murphy; *Electrical Conduction in Hydrogen-Bonded Substances*; 1 year; \$10,000

Edward L. Tatum and Curtis A. Williams, Jr.; *Effects of Gene Mutation of Proteins of Neurospora Crassa*; 3 years; \$65,200

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; G. S. Panson and C. E. Weill; *Liquid Thermal Diffusion of Natural Products*; 2 years; \$9,800

David Pramer; *Concentration and Characterization of Nemin*; 2 years; \$18,000

SAINT MARY'S HOSPITAL MEDICAL SCHOOL, Paddington, London, England; R. R. Porter; *Structural Basis of the Immunological Activity of Antibodies and Protein Antigens*; 5 years; \$100,000

STATE UNIVERSITY OF IOWA, Iowa City, Iowa; George Kalnitsky and John P. Hummel; *Character of the Catalytic Site of Ribonuclease*; 3 years; \$52,100

TEMPLE UNIVERSITY, Philadelphia, Pa.; Peter S. Olmsted; *Mechanism of in Vitro Polynucleotide Synthesis*; 2 years; \$20,000

TEXAS A & M RESEARCH FOUNDATION, College Station, Tex.; H. K. Zimmerman and Hans Weidman; *Fundamental Chemistry of Aminosugars*; 1 year; \$7,700

UNIVERSITY OF TEXAS, Austin, Tex.; Lester Packer; *Function of Subcellular Membranes*; 2 years; \$24,000

Austen F. Riggs; *Biochemistry of Hemoglobin and of Nitrogen Fixation*; 3 years; \$30,000

TRINITY COLLEGE, Hartford, Conn.; W. Scott Worrall; *Hypothesis on Intimate Mechanism of Proteolytic Enzymes*; 3 years; \$12,300

TUSKEGEE INSTITUTE, Tuskegee Institute, Ala.; Horace D. Graham; *Determination and Reactions of Food Gums*; 1 year; \$5,000

VANDERBILT UNIVERSITY, Nashville, Tenn.; Leon W. Cunningham; *Chemical and Enzymatic Studies of Glycopeptides*; 3 years; \$21,000

VIRGINIA INSTITUTE FOR SCIENTIFIC RESEARCH, Richmond, Va.; Anton N. J. Heyn; *Fiber and Ultrastructure Research*; 2 years; \$51,000

UNIVERSITY OF VIRGINIA, Charlottesville, Va.; Robert B. Martin; *Equilibrium and*

*Kinetic Studies of Systems of Biological Interest*; 2 years; \$15,000

WAKE FOREST COLLEGE, Winston-Salem, N.C.; Frank H. Hulcher; *Cytochrome f in Photosynthesis*; 2 years; \$18,000

WASHINGTON STATE UNIVERSITY, Pullman, Wash.; Leonard B. Kirschner; *Osmotic Regulation and the Function of Regulatory Organs*; 3 years; \$31,900

WASHINGTON UNIVERSITY, Saint Louis, Mo.; David Lipkin; *The Chemistry of Nucleic Acids and Related Substances*; 4 years; \$80,500

Mildred Cohn; *Mechanisms of Phosphorylation and Phosphate Transfer Reactions*; 3 years; \$39,000

Barry Commoner; *Molecular Basis of the Biological Properties of Tobacco Mosaic Virus*; 3 years; \$170,000

Robert K. Crane; *Utilization of Hexoses by Animal Cells*; 2 years; \$31,300

Tung-Yue Wang; *Globulin Fraction of Cell Nuclei*; 2 years; \$17,000

WAYNE STATE UNIVERSITY, Detroit, Mich.; Maurice H. Bernstein; *Functional Modifications of Sperm Structure*; 2 years; \$30,000

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; John Spizizen; *Fractionation of Deoxyribonucleic Acid*; 1 year; \$1,500

UNIVERSITY OF WISCONSIN, Madison, Wis.; Philip P. Cohen and G. W. Brown, Jr.; *Comparative Biochemistry of Urea Biosynthesis*; 2 years; \$27,000

Robert W. Fulton and Robert J. Shepherd; *Techniques for Purification of Unstable Plant Viruses*; 3 years; \$23,000

Stephen A. Kuby and Henry A. Lardy; *Enzyme Kinetics and Mechanisms*; 1 year; \$70,000

YALE UNIVERSITY, New Haven, Conn.; Henry A. Harbury; *Interactive Effects in Heme and Flavin Systems*; 3 years; \$39,200

Patricia F. Knight; *Cathepsin Specificity and Antibody Formation*; 2 years; \$15,000

Frederic M. Richards; *Relation of Structure to Function in Ribonuclease*; 4 years; \$67,200

Julian M. Sturtevant; *Physico-Chemical Studies of Proteins and Related Reactions*; 3 years; \$45,000

YESHIVA UNIVERSITY, New York, N.Y.; Sasha England; *The Structural Nature of Malic Dehydrogenase*; 2 years; \$17,000

Nathar W. Penn; *Nature and Role of the Mitochondrial Acceptor Fraction in Protein Metabolism*; 2 years; \$14,000

## PHYSICS

ADDELPHI COLLEGE, Garden City, N.Y.; Henry Brysk; *An Asymptotic Formulation in the Theory of Scattering*; 2 years; \$9,100

UNIVERSITY OF ALABAMA, University, Ala.; Charles E. Mandeville; *Structure of Nuclei*; 2 years; \$38,000

AMERICAN UNIVERSITY OF BEIRUT, Beirut, Lebanon; Frans Bruin; *Paramagnetic Resonance of Free Radicals*; 3 years; \$9,400

AMHERST COLLEGE, Amherst, Mass.; Robert H. Romer; *Nuclear Spin Resonance in Helium Solutions*; 3 years; \$21,500

BOSTON UNIVERSITY, Boston, Mass.; Edward Booth; *Nuclear Resonance Scattering of Bremsstrahlung*; 1 year; \$17,500

BOWDOIN COLLEGE, Brunswick, Maine; Myron A. Jeppesen; *Photoelectric Emission from Small Particles in Pulsed Light*; 2 years; \$26,800

- Walter D. Jones; *Semiempirical calculation of Molecular Parameters*; 2 years; \$7,000
- BRANDIS UNIVERSITY, Waltham, Mass.; Max Chretien; *Bubble Chamber Research on Elementary Particles*; 2 years; \$25,100
- BRIGHAM YOUNG UNIVERSITY, Provo, Utah; Harvey Fletcher; *Musical Acoustics*; 2 years; \$48,400
- John H. Gardner; *Gyromagnetic Ratio of the Free Electron*; 1 year; \$9,100
- John H. Gardner; *Electron Paramagnetic Resonance at Very High Pressures*; 3 years; \$51,700
- BROWN UNIVERSITY, Providence, R.I.; Phillip J. Bray; *Nuclear Magnetic Resonance Studies of Molecular and Ionic Crystals*; 3 years; \$26,800
- CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; Jesse W. M. Dumond and Harry A. Kirkpatrick; *Precision Comparison of the X-ray Wavelength Scales*; 1 year; \$16,700
- John R. Pellam; *Properties of Matter at Low Temperatures*; 2 years; \$214,100
- UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Paul H. Barrett, Santa Barbara; *Large Air Shower Detector*; 1 year; \$6,200
- Robert R. Hewitt; *Nuclear Electric Quadrupole Interactions With Metallic Environments*; 3 years; \$29,900
- M. Tinkham; *Solids at Millimeter Submillimeter Wavelength*; 3 years; \$54,900
- CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; S. A. Friedberg; *Investigations in Low Temperature Physics*; 2 years; \$21,500
- Robert T. Schumacher; *Magnetic Resonance and Electronic Properties of Solids*; 2 years; \$32,100
- CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; James G. Brennan; *Interaction of Mu Mesons With Nuclei*; 2 years; \$12,000
- Karl F. Herzfeld; *Spectrographic Study of Relaxation Processes*; 2 years; \$45,000
- UNIVERSITY OF CHICAGO, Chicago, Ill.; Clayton F. Giese; *Molecular Beam Experiments*; 2 years; \$37,300
- A. W. Lawson and Morrel H. Cohen; *Solid State Investigations*; 3 years; \$124,300
- Robert S. Mulliken and C. C. J. Roothaan; *Quantum Mechanical Studies on Molecular Structure*; 3 years; \$206,800
- R. W. Thompson; *Double Cloud Chamber for High Energy Particles*; 3 years; \$219,600
- CITY COLLEGE, New York, N.Y.; Harry Lustig; *Theoretical Analysis of Nuclear Reaction Data*; 1 year; \$8,400
- COLBY COLLEGE, Waterville, Maine; Dennison Bancroft; *Precision Measurement of the Velocity of Sound in Gases*; 2 years; \$11,500
- COLLEGE OF PUGET SOUND, Tacoma, Wash.; Martin E. Nelson; *Primary Cosmic Rays*; 2 years; \$15,400
- UNIVERSITY OF COLORADO, Boulder, Colo.; Albert A. Bartlett; *Beta-Ray Spectroscopy*; 2 years; \$39,300
- Wesley E. Brittin; *Research in Theoretical Physics*; 2 years; \$42,200
- UNIVERSITY OF CONNECTICUT, Storrs, Conn.; Arnold Russek; *Theory of High-Energy Atomic Collisions*; 2 years; \$20,500
- CORNELL UNIVERSITY, Ithaca, N.Y.; David M. Lee; *Helium Solutions at Low Temperatures*; 2 years; \$85,800
- Jay Orear; *Scattering of Muons by Nuclei*; 2 years; \$99,400
- L. G. Parratt; *X-ray Spectroscopy*; 2 years; \$34,500
- DARTMOUTH COLLEGE, Hanover, N.H.; William T. Doyle; *Color Centers in Ionic Crystals*; 2 years; \$43,700
- UNIVERSITY OF DENVER, Denver, Colo.; Byron E. Cohn; *Maintenance of the Inter-University High Altitude Laboratories*; 3 years; \$15,000
- DEPAUW UNIVERSITY, Greencastle, Ind.; Malcolm Correll; *Solar Magnetic Fields*; 3 years; \$23,100
- DUKE UNIVERSITY, Durham, N.C.; Horst Meyer; *Thermal and Magnetic Properties at Low Temperatures*; 2 years; \$48,200
- FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Harvey Hall; *Investigations in Elementary Particle Phenomena*; 2 years; \$41,500
- Joseph E. Lannutti; *High Energy Nuclear Physics*; 2 years; \$51,000
- UNIVERSITY OF FLORIDA, Gainesville, Fla.; Thomas A. Scott; *Cryogenic Investigations at High Pressures*; 2 years; \$50,900
- FORDHAM UNIVERSITY, New York, N.Y.; Joseph F. Mulligan, Alfons Weber, Joseph Shapiro, and Frederick L. Canavan; *Theoretical Analyses in Physics Research Using a Computer*; 3 years; \$51,900
- FRANKLIN INSTITUTE, Philadelphia, Pa.; Franz R. Metzger; *Resonance Fluorescence Studies Using the Centrifuge Method*; 3 years; \$117,900
- GEORGIA INSTITUTE OF TECHNOLOGY, Atlanta, Ga.; James R. Stevenson; *Photoexcitation Phenomena in Insulators*; 2 years; \$12,400
- UNIVERSITY OF GEORGIA, Athens, Ga.; Malcolm F. Steuer, and Lewis C. Thompson; *Nuclear Structure*; 1 year; \$85,800
- GOUCHER COLLEGE, Baltimore, Md.; John I. Lodge; *Interactions of Elementary Particles*; 2 years; \$8,800
- HARVARD UNIVERSITY, Cambridge, Mass.; Francis M. Pipkin; *Measurement of Nuclear Magnetic Moments and Other Properties*; 2 years; \$27,200
- Norman F. Ramsey; *Molecular Beam Studies*; 3 years; \$90,000
- HAVERFORD COLLEGE, Haverford, Pa.; Fay Ajzenberg-Selove; *Neutron Spectra and Energy Levels of Light Nuclei*; 3 years; \$47,200
- HOWARD UNIVERSITY, Washington, D.C.; Erwin M. Horl; *Structure Studies of Solidification Permanent Gases*; 2 years; \$43,900
- ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.; Thomas Erber; *Bremsstrahlung and Pair Production at High Energies*; 2 years; \$15,400
- Leonard I. Grossweiner; *Electron Density Effects in Semiconductors*; 2 years; \$22,000
- UNIVERSITY OF ILLINOIS, Urbana, Ill.; Frederick Seitz; *Theoretical Studies of Crystalline Materials*; 2 years; \$35,100
- INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; E. J. Konopinski; *The Theory and Interpretation of Elementary Particle Interactions*; 2 years; \$105,100
- INSTITUTE FOR ADVANCED STUDY, Princeton, N.J.; Robert Oppenheimer; *Theoretical Physics*; 3 years; \$180,000
- JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; G. H. Dieke; *Spectroscopy of Solids*; 2 years; \$15,700
- LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton



- Rouge, La.; J. S. Levinger; *Theoretical Nuclear Physics*; 3 years; \$50,400
- MANCHESTER COLLEGE, North Manchester, Ind.; Charles S. Morris; *Gamma Ray Spectra*; 2 years; \$21,500
- MARQUETTE UNIVERSITY, Milwaukee, Wis.; Arthur G. Barkow; *Elementary Particle Reactions in Photographic Emulsions*; 2 years; \$15,600
- Paul J. Cressman; *Lifetimes of Excited States*; 2 years; \$23,000
- UNIVERSITY OF MARYLAND, College Park, Md.; Hans R. Griem; *Experimental and Theoretical Plasmadiagnostics*; 2 years; \$21,200
- Joseph Weber; *Theoretical and Experimental Research in General Relativity*; 2 years; \$68,400
- MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Bruno Rossi; *Cosmic Ray Air Shower Research*; 30 months; \$176,100
- John C. Slater; *Research in the Field of Chemical and Solid-State Physics*; 2 years; \$399,800
- John C. Slater; *Research in Neutron Physics*; 2 years; \$199,400
- UNIVERSITY OF MASSACHUSETTS, Amherst, Mass.; Phillips R. Jones; *Atomic Collisions Below 25 KEV*; 2 years; \$26,000
- MIAMI UNIVERSITY, Oxford, Ohio; David F. Griffing; *Auger Effect in Mesonic Atoms*; 2 years; \$23,900
- MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing, Mich.; Clarence D. Hause and Thomas H. Edwards; *Near Infrared Molecular Spectroscopy*; 2 years; \$35,300
- Sherwood K. Haynes; *Low Energy Beta-Ray Spectroscopy*; 2 years; \$17,000
- UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Marcellus L. Wiedenbeck; *Structure of Neutron-Deficient Isotopes*; 1 year; \$33,800
- UNIVERSITY OF MISSISSIPPI, University, Miss.; A. J. Zuchelli; *Annihilation of Positrons in Condensed Media*; 2 years; \$37,300
- UNIVERSITY OF MISSOURI, Columbia, Mo.; Paul W. Schmidt; *X-Ray Studies of Polydisperse Colloidal Systems*; 4 years; \$53,700
- NEW MEXICO COLLEGE OF AGRICULTURE AND MECHANIC ARTS, University Park, N. Mex.; Robert E. McDaniel; *Investigation of the Heavy Nuclei Component of Cosmic Radiation and of Allied Nuclear Reactions*; 2 years; \$9,400
- NEW YORK UNIVERSITY, New York, N.Y.; Lyle B. Borst; *Neutron Resonance Scattering*; 3 years; \$96,000
- OFFICE OF NAVAL RESEARCH, Washington, D.C.; William Wright; *Fund Transfer for High Energy Cosmic Ray Project*; 1 year; \$215,000
- OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; Harold H. Nielsen; *Infrared Spectra of Polyatomic Molecules*; 3 years; \$52,500
- UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; Sybrand Broersma; *Viscous Force Constants of Objects*; 2 years; \$27,400
- J. Rud Nielsen; *Vibration of Spectra of Crystals and Polymers*; 2 years; \$12,400
- UNIVERSITY OF OREGON, Eugene, Oreg.; Dwight W. Berreman; *Study of Crystal Lattice Vibrations*; 2 years; \$10,200
- Shang-Yi Ch'en; *Narrow Diffuse Bands of Atoms Produced by Close Collisions with Foreign Particles*; 3 years; \$46,100
- PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; Edwin R. Fitzgerald; *Dynamical Properties of Metals*; 2 years; \$23,600
- Walter I. Goldberg; *Nuclear Magnetic Resonance Studies*; 2 years; \$29,700
- D. H. Rank; *Precision Infrared Spectroscopy*; 3 years; \$69,100
- UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; C. W. Ufford; *Theoretical Problems in Atomic and Nuclear Spectroscopy*; 2 years; \$61,400
- UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; Manfred A. Biondi, Gerald Chanin and Myron P. Garfunkel; *Low Temperature Studies of Metals*; 2 years; \$85,800
- Bernard L. Cohen; *Nuclear Structure and Nuclear Reactions*; 2 years; \$121,500
- C. Dean and G. A. Jeffrey; *Crystal and Molecular Structures*; 2 years; \$16,700
- Lorne A. Page; *A Multi-mode Charged Particle Analyzer*; 2 years; \$31,600
- PORTLAND STATE COLLEGE, Portland, Oreg.; Laird C. Brodie; *Impurity Effects on Oscillatory Properties*; 2 years; \$14,300
- PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Kenneth L. Andrew; *Secondary Standards in High Precision Spectroscopy*; 30 months; \$12,400
- Frederik J. Bellinfante; *Field Theory and Elementary Particles*; 3 years; \$25,100
- Hubert M. James; *Phase Transition in Molecular Crystals*; 3 years; \$44,400
- R. W. Stanley; *Primary Standards and High Precision Spectroscopy*; 30 months; \$18,400
- REED COLLEGE, Portland, Oreg.; Robert L. Martin; *Optical Properties of Silver and Thallium Halides*; 3 years; \$18,900
- RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; Edmond Brown; *Electronic Band Structure of Semiconductors*; 1 year; \$10,900
- J. P. Davidson; *Theory of Nuclear Octupole Moments*; 2 years; \$17,200
- John E. Winhold; *Fast Neutron-Induced Nuclear Reactions*; 2 years; \$24,700
- RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; Richard Mould, College on Long Island; *A Study of Location Correlations*; 1 year; \$1,800
- UNIVERSITY OF ROCHESTER, Rochester, N.Y.; R. E. Marshak; *Elementary Particle Physics*; 1 year; \$9,100
- RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Elihu Boldt; *Decay of Cosmic Ray Particles at Sea Level*; 1 year; \$14,100
- Peter Lindenfeld, Ernest A. Lynton and Bernard Serin; *Low Temperature Properties of Metals and Alloys*; 2 years; \$57,000
- Allen B. Robbins; *Proton Polarization Measurements*; 1 year; \$7,300
- H. C. Torrey and H. Y. Carr; *Nuclear Magnetic Resonance*; 2 years; \$23,700
- SAINT PETER'S COLLEGE, Jersey City, N.J.; Po Lee; *Electric Discharge Through a Metallic Capillary*; 2 years; \$16,600
- UNIVERSITY OF SANTA CLARA, Santa Clara, Calif.; William T. Duffy, Jr.; *Magnetic Susceptibilities of Free Radicals*; 2 years; \$9,800
- SEATTLE PACIFIC COLLEGE INSTITUTE FOR RESEARCH, Seattle, Wash.; Donald Karlee; *Primary Cosmic Rays and Scattering of Heavy Ions by Nuclei*; 2 years; \$25,700
- UNIVERSITY OF SOUTH CAROLINA, Columbia, S.C.; Ernst Breitenberger; *Multiple Coat-*

tering as a Random Flight Process; 2 years; \$20,600

Ronald D. Edge; *Cosmic Ray Neutrons Near the Earth's Surface*; 1 year; \$18,500  
SOUTH DAKOTA STATE COLLEGE, Brookings, S. Dak.; George H. Duffey; *Application of Quantum Mechanics to Chemical Bonding*; 2 years; \$16,000

SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.; Clifton B. Clark; *Specific Heats of Metals*; 2 years; \$12,500

STANFORD UNIVERSITY, Stanford, Calif.; William M. Fairbank; *Quantum Effects in Liquid and Solid Helium*; 2 years; \$96,700

Walter E. Meyerhof; *Nuclear Structure Research with 3 Mev Particles*; 2 years; \$6,700

George E. Pake; *Antiferromagnetic Lambda Points in Paramagnetic Organic Compounds*; 2 years; \$29,500

STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N.J.; Hans Meissner; *Studies of Superconductivity*; 2 years; \$38,100

SWARTHMORE COLLEGE, Swarthmore, Pa.; Irving E. Dayton; *Excitation Functions for Molecular Spectra*; 2 years; \$18,400

SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.; Peter G. Bergmann and Arthur Komar; *Observables in General Relativity*; 3 years; \$64,200

Nahmin Horwitz; *Properties of K-Mesons*; 1 year; \$17,600

Erich M. Harth and Jack Leitner; *Development of a Fast-Cycling Bubble Chamber*; 2 years; \$114,800

TEXAS TECHNOLOGICAL COLLEGE, Lubbock, Tex.; Henry C. Thomas; *Inner Bremsstrahlung in Electron Capture*; 2 years; \$11,600

UNIVERSITY OF TEXAS, Austin, Tex.; Walter E. Millett; *Annihilation of Positrons in Matter*; 3 years; \$38,000

TRINITY COLLEGE, Hartford, Conn.; Robert Lindsay; *Antiferromagnetic Materials*; 3 years; \$11,500

TUFTS UNIVERSITY, Medford, Mass.; Kathryn A. McCarthy; *Thermal Conductivity of Alkali Halide Crystals*; 2 years; \$87,300

TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; John R. Shewell; *Quantum Mechanics in a Noncommuting Phase Space*; 1 year; \$4,400

UNIVERSITY OF UTAH, Salt Lake City, Utah; J. W. Keuffel; *Cosmic Ray Mesons*; 3 years; \$7,100

UTICA COLLEGE OF SYRACUSE UNIVERSITY, Utica, N.Y.; Peter Fong; *Theory of Nuclear Fission*; 2 years; \$7,900

VANDERBILT UNIVERSITY, Nashville, Tenn.; Joseph H. Hamilton; *Nuclear Spectroscopy*; 2 years; \$22,100

Charles E. Roos; *Photostigma Measurements Using High Magnetic Fields*; 1 year; \$28,400

WASHINGTON UNIVERSITY, St. Louis, Mo.; Thomas A. Pond; *Weak Interactions*; 2 years; \$51,900

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Jere J. Lord; *Emulsion Study of High Energy Nuclear Interactions*; 2 years; \$24,000

Edwin A. Vehling; *Nuclear and Electronic Magnetic Relaxation in Crystals*; 2 years; \$18,600

WAYNE STATE UNIVERSITY, Detroit, Mich.; Leonard O. Roellig; *Nucleation of Bubbles in a Superheated Liquid Exposed to Ionizing Radiations*; 2 years; \$35,800

WESLEYAN UNIVERSITY, Middletown, Conn.; Forrest I. Boley; *Atmospheric Cerenkov Radiation*; 2 years; \$39,600

Edwin F. Taylor; *Investigation of Electric Field Gradients in Alkali Halide Crystals*; 2 years; \$16,400

WEST VIRGINIA UNIVERSITY, Morgantown, W. Va.; Harvey N. Rexroad, Jack D. Graybeal and Gerald C. Michael; *Microwave Spectroscopy and Electronic Magnetic Resonance*; 2 years; \$34,900

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; Gerald Tauber; *Rotation and Gravitation in Statistical Systems*; 2 years; \$24,500

WHITMAN COLLEGE, Walla Walla, Wash.; Robert B. Bennett; *Vaporization of Cesium in Argon Atmosphere*; 2 years; \$15,300

UNIVERSITY OF WICHITA, Wichita, Kans.; John B. Breazeale; *Effects of Adsorbed Gas on Photoelectric Work Function*; 2 years; \$16,800

WILLIAMS COLLEGE, Williamstown, Mass.; Fielding Brown; *Ferroelectric and Semiconducting Properties of Barium Titanate*; 2 years; \$19,900

UNIVERSITY OF WISCONSIN, Madison, Wis.; Harold W. Lewis; *Problems in Theoretical Physics*; 2 years; \$29,000

Julian E. Mack; *Structure of Atomic Spectra*; 2 years; \$42,500

R. Rollefson; *Summer Research Institute of Theoretical Physics*; 2 months; \$27,600

UNIVERSITY OF WYOMING, Laramie, Wyo.; Burton H. Muller; *Nuclear Relaxation Times in Paraffin Hydrocarbons*; 3 years; \$15,900

YALE UNIVERSITY, New Haven, Conn.; Henry A. Fairbank; *Experimental Research in Low Temperature Physics*; 3 years; \$63,900

C. T. Lane; *Rotational States in Superfluid Helium*; 3 years; \$54,800

## PSYCHOBIOLOGY

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Evelyn Shaw; *Development of Schooling Behavior*; 2 years; \$28,300

AMHERST COLLEGE, Amherst, Mass.; John W. Davenport; *Reinforcement Variables in Simple Learning Situations*; 3 years; \$14,100

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Robert W. Lansing; *Attention Changes in Man*; 2 years; \$18,600

Joe T. Marshall; *Research in Speciation*; 3 years; \$31,400

UNIVERSITY OF ARKANSAS, Fayetteville, Ark.; D. H. Kausler, and E. P. Trapp; *Interaction of Variables in Intentional and Incidental Learning*; 2 years; \$17,300

BRANDEIS UNIVERSITY, Waltham, Mass.; Richard Held; *Visual-Motor Coordination in Mammals*; 2 years; \$24,000

BROWN UNIVERSITY, Providence, R.I.; Frances L. Clayton; *Factors Influencing Strength of Secondary Reinforcers*; 2 years; \$11,100

J. W. Kling; *Factors Influencing Response Strength*; 2 years; \$14,400

Lewis P. Lipsitt; *Studies of Discrimination Learning*; 2 years; \$11,800

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Norman H. Anderson, Los Angeles; *Probabilistic Discrimination Learning*; 3 years; \$37,700

Nicholas E. Collias, Los Angeles; *Anal-*

*ysis of Nest Building in Weaverbirds*; 29 months; \$19,600

W. E. Jeffrey, Los Angeles; *Research on Discrimination Learning*; 2 years; \$20,500

Jacques W. Kaswan, Los Angeles; *Factors in Visual Perception*; 3 years; \$30,700

David Krech and Marlon C. Diamond; *Histological Correlates of Behavioral and Biochemical Measures*; 2 years; \$20,700

Peter R. Marler; *Instinctive Behavior in Vertebrates*; 2 years; \$50,800

Donald Riley, Los Angeles; *Studies of Transposition Behavior*; 3 years; \$27,000

CARLETON COLLEGE, Northfield, Minn.; Peter M. Guthrie; *Symbolic Puzzle-Bow Learning*; 1 year; \$2,400

CENTRAL INSTITUTE FOR THE DEAF, Saint Louis, Mo.; Carl E. Sherrick, Jr.; *Study of Vibratory Stimuli*; 1 year; \$4,000

UNIVERSITY OF CHICAGO, Chicago, Ill.; Robert A. Butler; *Effects of Brain Damage on Responsiveness to Visual and Auditory Incentives*; 2 years; \$21,500

CLEVELAND HEARING AND SPEECH CENTER, Cleveland, Ohio; Earl D. Schubert; *Interaural Temporal Disparity*; 1 year; \$10,700

CORNELL UNIVERSITY, Ithaca, N.Y.; J. E. Hochberg; *Dimensions of Form Perception*; 3 years; \$14,700

Peter P. Kellogg, and William C. Dilger; *Ethological Investigation of Bird Sounds*; 3 years; \$50,000

Edward C. Raney; *Behavior of Cypripidae*; 2 years; \$11,000

DARTMOUTH COLLEGE, Hanover, N.H.; William M. Smith; *Temporal Characteristics of Visual Contour Processes*; 3 years; \$22,400

DUKE UNIVERSITY, Durham, N.C.; C. Alan Boneau; *Empirical Study of the t Test*; 1 year; \$10,000

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; H. D. Baker, and J. C. Smith; *Behavioral Measurement of Visual Functions*; 1 year; \$7,700

UNIVERSITY OF FLORIDA, Gainesville, Fla.; Thomas J. Walker, Jr.; *Acoustical Behavior of Orthoptera*; 2 years; \$15,500

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; Richard D. Walk; *Study of Visual Depth Perception*; 2 years; \$15,400

UNIVERSITY OF GEORGIA, Athens, Ga.; Bernard S. Martof; *Behavior and Ecology of Amphibians*; 3 years; \$29,700

GRINNELL COLLEGE, Grinnell, Iowa; Irving Y. Fishman; *Chemoreception in Small Mammals*; 3 years; \$22,800

HARVARD UNIVERSITY, Cambridge, Mass.; Richard L. Solomon; *Experiments on Aversive Autonomic Conditioning*; 5 years; \$55,500

S. Smith Stevens; *The Construction of Sensory Scales*; 5 years; \$172,500

Edward O. Wilson; *Behavior of Dolichoderinae*; 3 years; \$12,500

UNIVERSITY OF HAWAII, Honolulu, Hawaii; A. Leonard Diamond; *Simultaneous Brightness Contrast and the Brightness Response*; 3 years; \$31,900

Maurice M. Tatsuoka; *Properties of Stochastic Learning Models*; 2 years; \$9,100

HOLLIS COLLEGE, Hollins College, Va.; Robert C. Bolles; *Stimulus Properties of Drives*; 3 years; \$20,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.; O. Hobart Mowrer; *Psychology of Learning and Thinking*; 4 years; \$14,500

Garth J. Thomas; *Behavioral Alterations*

*Following Lesions in the Rhinencephalon*; 5 years; \$82,500

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; Lloyd R. Peterson; *Short-Term Retention and Learning*; 2 years; \$9,400

INSTITUTE OF LIVING, Hartford, Conn.; John S. Stamm; *Effects of Cortical Stimulation on Learning and Retention*; 3 years; \$81,500

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; James Deese; *The Relationship Between Verbal Context and Free Recall*; 2 years; \$11,800

Wendell R. Garner; *Support of Animal Research Activities*; 1 year; \$7,000

UNIVERSITY OF KANSAS, Lawrence, Kans.; Richard F. Johnston; *Comparative Behavior of American Ground Doves*; 21 months; \$1,800

Charles D. Michener; *Origin and Evolution of the Female Castes of Bees*; 3 years; \$48,000

MARQUETTE UNIVERSITY, Milwaukee, Wis.; John I. Johnson; *Effects of Muscular Tension on Human Learning*; 1 year; \$5,700

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Kenneth N. Stevens; *Research on Speech Perception*; 2 years; \$50,500

UNIVERSITY OF MASSACHUSETTS, Amherst, Mass.; Warren H. Teicher; *Behavioral and Psychophysiological Effects of Cold Environments*; 18 months; \$17,300

UNIVERSITY OF MIAMI, Coral Gables, Fla.; Warren J. Wisby; *Anatomy and Physiology of the Visual Apparatus of Pelagic Fishes*; 13 months; \$7,300

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Mathew Alpern; *Studies of Contrast Phenomena*; 5 years; \$28,400

J. David Birch; *Role of Extinction in Reversal Learning*; 2 years; \$24,100

James Olds; *Brain Changes and Learning*; 3 years; \$62,400

Robert A. McCleary; *Studies of Interocular Transfer*; 3 years; \$50,700

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; David L. LaBerge; *Studies in Stimulus Generalization*; 1 year; \$9,000

Harold W. Stevenson; *Probability Learning*; 3 years; \$20,500

MONTANA STATE UNIVERSITY, Missoula, Mont.; Clyde E. Noble; *Analysis of Trial-and-Error Learning*; 2 years; \$9,600

UNIVERSITY OF MONTREAL, Montreal, Canada; J. P. Cordeau; *Electrophysiological and Anatomical Correlates of Recent Memory*; 2 years; \$15,000

NEW YORK STATE PSYCHIATRIC INSTITUTE, New York, N.Y.; Carney Landis; *Studies of Flicker-Fusion Determinants*; 3 years; \$47,900

NORTHWESTERN UNIVERSITY, Evanston, Ill.; Stephen E. Glickman; *Studies of Animal Behavior*; 1 year; \$5,800

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman Okla.; Irene Hulicka; *Drive and Incentive as Determinants of Performance*; 1 year; \$130

UNIVERSITY OF OREGON, Eugene, Oreg.; Robert F. Fagot; *Psychophysical Measurement*; 14 months; \$9,600

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Philip Teitelbaum; *Effect of Hypothalamic Lesions on Behavior*; 8 years; \$53,100

UNIVERSITY OF PORTLAND, Portland, Oreg.; Nissim Levy; *Effects of Omission of Reward*; 2 years; \$21,600

- PRINCETON UNIVERSITY, Princeton, N.J.; Byron A. Campbell; *Studies on Aversive and Reinforcing Properties of Stimuli*; 3 years; \$36,500
- RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; William F. Reynolds; *Role of Secondary Reinforcement in Learning*; 2 years; \$18,700
- ST. OLAF COLLEGE, Northfield, Minn.; William W. Rozeboom; *Mediation Processes in Human Avoidance Behavior*; 2 years; \$2,800
- SMITHSONIAN INSTITUTION, Washington, D.C.; Martin Moynihan; *Canal Zone Biological Area; Behavior Patterns of Certain Tropical American Carnivora*; 7 months; \$2,600
- UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; William W. Grings; *Conditioning and Perception*; 2 years; \$9,900
- STATE UNIVERSITY OF IOWA, Iowa City, Iowa; Arnold M. Small, Jr.; *Perception of Periodicity in the Auditory System*; 3 years; \$46,200
- SWARTHMORE COLLEGE, Swarthmore, Pa.; Hans Wallach; *Study of Perceptual Learning*; 3 years; \$43,000
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- UNIVERSITY OF ALASKA, College, Alaska; Laurence Irving; *Nervous Function in the Changing Temperatures of Peripheral Tissues Adapted to Cold*; 2 years; \$47,100
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- CHILDREN'S HOSPITAL RESEARCH FOUNDATION, Cincinnati, Ohio; Clark D. West; *Equipment for Studies in Antibody Production*; 1 year; \$1,650
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 Friedrich P. J. Diecke; *Olfactory Sense in Vertebrates*; 4 years; \$47,400

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*Fishes From the South Atlantic*; 1 year; \$2,500

DEPAUW UNIVERSITY, Greencastle, Ind.; T. G. Yuncker; *A Revision of the Plant Family Piperaceae*; 3 years; \$7,400

DUKE UNIVERSITY, Durham, N.C.; William L. Culberson; *Monograph of the Lichen Genus Cetraria*; 30 months; \$33,700

Robert L. Wilbur; *Systematic Collections of Greenplants*; 3 years; \$45,600

FLORIDA GEOLOGICAL SURVEY, Tallahassee, Fla.; S. J. Olsen; *Postcranial Skeletal Characters of Bison and Bos*; 1 year; \$1,800

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Adrian William Potras; *Taxonomy, Distribution and Relationships of Lignicolous and Caulicolous Fresh Water Ascomycetes and Fungi Imperfecti*; 2 years; \$12,200

UNIVERSITY OF FLORIDA, Gainesville, Fla.; Coleman J. Goin; *Systematics and Evolution of South American Tree Frogs*; 3 years; \$14,500

FUNDACION MIGUEL LILLO, Tucuman, Argentina; Rolf Singer; *Agaricales of South America*; 1 year; \$8,100

UNIVERSITY OF GEORGIA, Athens, Ga.; E. S. Luttrell; *The Developmental Morphology of the Ascomycetes in Relation to Their Taxonomy*; 5 years; \$41,400

Julian H. Miller, *Monographic Study of Genera of the "Xylariaceae" Excepting "Hypoxyylon"*; 2 years; \$18,300

UNIVERSITY OF GRONINGEN, Groningen, Netherlands; R. van der Wijk; *Index Muscorum*; 3 years; \$7,400

HARVARD UNIVERSITY, Cambridge, Mass.; Tilly Edinger; *Bibliography of Paleoneurology and Specimen Catalogue of "Fossil Brains"*; 1 year; \$4,500

C. E. Erikson; *Comparative Biology of the New World Primates*; 3 years; \$16,000

Reed C. Rollins, Gray Herbarium and Carroll E. Wood, Arnold Arboretum; *Biologically Oriented Generic Flora of the Southeastern United States*; 3 years; \$37,300

Alfred S. Romer; *Argentinian Triassic Tetrapods*; 3 years; \$25,700

UNIVERSITY OF HAWAII, Honolulu, Hawaii; Albert H. Banner; *The Alpheid Shrimp Fauna of the Gulf of Siam*; 2 years; \$4,800

Albert H. Banner; *Zoogeography of the Snapping Shrimps of the Central Pacific*; 2 years; \$3,700

D. Elmo Hardy; *Diptera of Hawaii*; 4 years; \$16,500

HUGH AVERY FREEMAN, Garland, Tex.; *Ecological and Systematic Study of the Magathymidae of North America*; 3 years; \$8,600

UNIVERSITY OF ILLINOIS, Urbana, Ill.; John O. Corliss; *Systematics and Genetics of Ciliated Protozoa*; 3 years; \$33,800

IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa; Richard W. Pohl; *Biosystematic Studies on Rheumatous American Species of Muhlenbergia*; 3 years; \$14,100

JACKSONVILLE STATE COLLEGE, Jacksonville, Ala.; Emmett W. Price; *Revision of the Monogenetic Trematodes*; 4 years; \$10,800

KAISER FOUNDATION, Oakland, Calif.; Benjamin G. Chitwood, Richmond; *Studies in Nematology and Related Sciences*; 2 years; \$12,400

KANSAS STATE TEACHERS COLLEGE, Emporia, Kans.; David F. Parmelee; *Taxonomic and Ecological Studies of the Charadriiformes of Boothia Peninsula, N.W.T.*; 1 year; \$3,800



KANSAS STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Manhattan, Kans.; Reginald H. Painter, *Study of Types of American Bombyliidae*; 2 years; \$11,000

UNIVERSITY OF KANSAS, Lawrence, Kans.; Sydney Anderson; *Mammals of Chihuahua—Their Taxonomy, Origins and Relationships*; 1 year; \$6,000

William E. Duellman; *The Systematics and Distribution of Hyllid Frogs in Middle America*; 3 years; \$10,800

Raymond C. Moore; *Completion of Treatise on Invertebrate Paleontology*; 5 years; \$210,000

Charles D. Michener; *Reclassification of Australian Bees*; 1 year; \$3,600

KENTUCKY RESEARCH FOUNDATION, Lexington, Ky.; Herbert P. Riley; *Study of Species in South African Plants by the Method of Paper Chromatography*; 2 years; \$13,600

LA SALLE COLLEGE, Philadelphia, Pa.; John S. Penny; *Descriptive and Taxonomic Study of the Plant Micro-Fossils of New Jersey*; 1 year; \$2,500

LOS ANGELES STATE COLLEGE FOUNDATION, Los Angeles, Calif.; Richard M. Straw; *Taxonomy of the Mexican Species of Penstemon*; 3 years; \$12,300

LOS ANGELES COUNTY MUSEUM, Los Angeles, Calif.; David P. Willoughby; *The Pleistocene Horse of Rancho La Brea*; 3 years; \$5,900

LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANIC COLLEGE, Baton Rouge, La.; Herbert C. Dessauer and Wade Fox, New Orleans; *Biochemical Investigation of the Phylogeny of Amphibian and Reptilian Blood*; 5 years; \$42,900

UNIVERSITY OF LOUISVILLE, Louisville, Ky.; Arland T. Hotchkies; *The Bearing of Cytological and Certain Physiological Data on the Taxonomy of the Characeae*; 2 years; \$6,200

MARYLAND DEPARTMENT OF RESEARCH AND EDUCATION, Solomons, Md.; Romeo Mansueti, Chesapeake Biological Laboratory; *Eggs, Larvae and Very Young Fishes of Chesapeake Bay Waters*; 3 years; \$34,700

MIAMI UNIVERSITY, Oxford, Ohio; Charles Helmsch; *Systematic and Comparative Anatomy of Herbaceous Dicots*; 39 months; \$20,500

UNIVERSITY OF MIAMI, Coral Gables, Fla.; C. Richard Robins, The Marine Laboratory; *The Inshore Fish Fauna of the Florida Keys*; 2 years; \$12,300

Gilbert L. Voss, The Marine Laboratory; *A Monograph on the Stomatopod Crustaceans of the Western Atlantic*; 3 years; \$21,800

MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing, Mich.; G. W. Prescott; *Systematic and Ecological Survey of North American Desmidiaceae*; 3 years; \$13,100

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Charles B. Beck; *Morphological Studies of New Albany Shale Plants*; 3 years; \$12,500

Rogers McVaugh; *Vascular Flora of Jalisco*; 4 years; \$27,100

Alexander H. Smith; *Herbarium Materials for Botanical Research*; 5 years; \$175,500

Henry K. Townes, Jr.; *Taxonomic Monographs of Nearctic Ichneumonidae*; 3 years; \$14,800

Warren H. Wagner, Jr.; *Phylogenetic Characters and Classification of the Ferns*; 4 years; \$40,300

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; A. Orville Dahl; *Fine Structure of Pollen Grains*; 3 years; \$22,200

MISSOURI BOTANICAL GARDEN, St. Louis, Mo.; George S. Bunting; *Taxonomic Studies of Philodendron and Other Aroids*; 3 years; \$3,600

UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; Warren T. Atyeo and Wallace E. LaBerge; *Rehabilitation of the Systematic Entomological Collections*; 2 years; \$20,000

Wallace E. LaBerge; *Bees of the Genus Andrena in North America*; 3 years; \$15,000

Harold W. Manter; *Digenetic Trematodes of Hawaiian Fishes*; 1 year; \$8,200

NEW YORK BOTANICAL GARDEN, New York, N.Y.; Caroline K. Allen; *American Lauraceae: Taxonomy and Geographical Distribution*; 3 years; \$23,500

Alma W. Barksdale; *Investigation of Phylogenetic Relationships*; 3 years; \$46,900

H. W. Rickett; *Proposals for Conservation of Botanical Names*; 5 years; \$12,600

NEW YORK ZOOLOGICAL SOCIETY, New York, N.Y.; Herndon G. Dowling; *A Taxonomic Study of the Ratsnakes*; 3 years; \$17,000

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; Albert E. Radford; *The Vascular Flora of North and South Carolina*; 3 years; \$25,300

Joseph St. Jean, Jr.; *Silurian and Lower Devonian Stromatoporoidea of New York State*; 3 years; \$10,900

OBERLIN COLLEGE, Oberlin, Ohio; Helen P. Foreman; *Taxonomic and Evolutionary Study of Devonian Radiolazta*; 2 years; \$4,200

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; Dwight M. DeLong; *Monographic Study of the Gyponinae*; 3 years; \$16,000

Jerome G. Rozen, Jr.; *Systematic-Evolutionary Study of the Parasitic Bee Genus Oreopasites Cockerell*; 3 years; \$19,700

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; Maxim K. Elias; *Carboniferous Bryozoa*; 2 years; \$35,000

OREGON STATE COLLEGE, Corvallis, Oreg.; Charles H. Martin; *Taxonomic Revisional Studies of the Dipterous Family Astilidae*; 3 years; \$19,200

Herman A. Scullen; *Taxonomic and Biological Studies of the Wasp Tribe*; 2 years; \$4,700

UNIVERSITY OF OREGON, Eugene, Oreg.; Mildred R. Detling; *Tidepool Foraminifera of Oregon and Their Taxonomy*; 15 months; \$3,900

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; Ronald A. Pursell; *Photogeographical Affinities of the Mosses of the North and Northwestern Gulf Coast*; 3 years; \$14,700

PORTLAND STATE COLLEGE, Portland, Oreg.; Stanley G. Jewett; *Systematic Studies in Plecoptera*; 3 years; \$2,800

James A. Macnab; *Systematic and Ecological Study of Endemic Earthworms of the Pacific Coast States*; 3 years; \$14,400

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; B. Elwood Montgomery; *New World Calopterygine Dragonflies*; 1 year; \$3,000

UNIVERSITY OF PUERTO RICO, Rio Piedras, Puerto Rico; Jenaro Maldonado Capriles; *Study of the Family Miridae of Hemipterous Insects in Puerto Rico*; 1 year; \$500

Irving Fox; *Relationship of Turdigrades to Snails*; 1 year; \$3,000

RANCHO SANTA ANA BOTANIC GARDEN, Claremont, Calif.; Verne Grant; *Pollination Systems in the Polemontaceae*; 5 years; \$15,200

RESEARCH FOUNDATION, Oklahoma State University, Stillwater, Okla.; Robert P. Celarier, *Bio systematic Studies of the Old World Bothriochloaceae (Gramineae)*; 3 years; \$22,800

George A. Moore; *Comparative Morphology of the Lateral Line in Sunfishes*; 1 year; \$5,700

UNIVERSITY OF RHODE ISLAND, Kingston, R.I.; Kerwin E. Hyland; *Distribution and Host Specificity of Nasal Mites*; 3 years; \$22,000

Richard D. Wood; *Taxonomy of Australian Characeae*; 3 years; \$9,400

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Hubert A. Lechevallier; *Ultramicroscopic Structure of Conidia of Actinomycetes*; 2 years; \$22,100

Mildred Miskimen; *A Comparative Study of Bird Syrinx Anatomy*; 2 years; \$2,200

SAN FRANCISCO STATE COLLEGE, San Francisco, Calif.; Harry D. Thiers; *The Boletoaceae of the Gulf Coastal Plain*; 18 months; \$3,800

SAN JOSE STATE COLLEGE, San Jose, Calif.; Joseph H. Young; *Comparative Morphology of the Penaeidae*; 2 years; \$12,600

SATYU YAMAQUTI, Beltsville, Md.; *Systema Helminthum*; 2 years; \$14,900

SMITHSONIAN INSTITUTION, Washington, D.C.; Robert E. Crabill, Jr.; *Systematics of Chilopoda and Diplopoda*; 2 years; \$24,700

Richard S. Boardman; *Oldest Fossil Bryozoa of the United States*; 3 years; \$10,100

C. Lewis Gazin; *Early Tertiary Mammals of North America*; 4 years; \$11,900

Ashley B. Gurney; *Revisory Study of the Blattoidea*; 3 years; \$10,600

Mason E. Hale, Jr.; *A Monograph of the Lichen Genus Parmelia*; 3 years; \$21,300

Charles O. Handley, Jr.; *Mammals of the Southeastern United States*; 5 years; \$8,300

Porter M. Kler; *Monograph of the Casiduloidea*; 1 year; \$2,200

Albert C. Smith; *The Flora of Fiji*; 5 years; \$53,300

John A. Stevenson; *Studies of the World-wide Fungus Order Ustilaginales*; 1 year; \$2,500

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; John S. Garth; *Monograph of the Euryalidae, Portunidae, Atelecyclidae and Cancridae of the Pacific American Coast*; 2 years; \$13,000

Walter E. Martin; *Life History Studies of Monogenetic Trematodes*; 2 years; \$14,200

Thomas R. Pray; *Phylogenetic Studies on Western American Cheilantheid Ferns*; 3 years; \$22,500

SOUTHERN ILLINOIS UNIVERSITY, Carbondale, Ill.; David Nicol; *Systematic Description and Analysis of the Antarctic Pelecypod Fauna*; 3 years; \$13,500

STANFORD UNIVERSITY, Stanford, Calif.; Rolf L. Bolln; *The Fishes of Hong Kong*; 3 years; \$10,000

Paul R. Ehrlich; *Comparative Internal Morphology and Evolution of the Lepidoptera*; 3 years; \$17,700

Richard W. Holm; *Monograph on the*

*American Species of Cynanchum*; 2 years; \$11,800

George S. Myers; *General Ichthyological and Herpetological Cleanup*; 3 years; \$49,100

STATE UNIVERSITY OF IOWA, Iowa City, Iowa; George W. Martin; *Monograph of Myomycetes*; 2 years; \$14,300

STEPHEN F. AUSTIN STATE COLLEGE, Nacogdoches, Tex.; Walter H. Lewis; *Cytotaxonomic Study of the Tribe Oldenlandiaceae (Rubiaceae)*; 2 years; \$9,000

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; Arthur C. Cole, Jr.; *Revisory Studies of the Ant Genus Pogonomyrmex Mayr*; 1 year; \$3,700

L. R. Hesler; *Taxonomic Study of the Agaricales of the Southeastern United States*; 3 years; \$24,700

UNIVERSITY OF TEXAS, Austin, Tex.; W. Frank Blair; *Study of Amphibian Speciation and Evolutionary Relationships*; 3 years; \$34,400

Clark Hubbs; *Interbreeding of Fish Populations in Relation to Speciation and Geographic Differentiation*; 3 years; \$20,900

Louis S. Kornicker, Institute of Marine Science, Port Aransas; *Taxonomic Classification of Ostracodes Inhabiting the Laguna Madre*; 2 years; \$12,000

ERNEST R. TINKHAM, Indio, Calif.; *Desert Sand Dune Biota*; 1 year; \$2,200

TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; George H. Penn; *Systematics of the Dwarf Crawfishes*; 2 years; \$21,500

Arthur L. Weiden; *Taxonomic Study of the Thelephoraceae of the Lesser Antilles*; 3 years; \$17,800

UNIVERSITY OF UTAH, Salt Lake City, Utah; George F. Edmunds, Jr.; *Higher Classification of the Ephemeroptera*; 2 years; \$23,400

VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg, Va.; Perry C. Holt; *Systematic Studies of the Family Branchiobdellidae*; 3 years; \$14,500

Robert D. Ross; *Systematics, Distribution and Ecology of Fishes of the Southern Appalachians*; 2 years; \$20,000

UNIVERSITY OF VIRGINIA, Charlottesville, Va.; Walter S. Flory, Jr., The Blandy Experimental Farm, Boyce; *Bio systematic Analysis of Zephyranthes and Hymenocallis*; 3 years; \$22,300

WASHINGTON STATE UNIVERSITY, Pullman, Wash.; George E. Hudson; *Appendicular Myology and Avian Taxonomy and Phylogeny*; 5 years; \$39,700

John Mooring; *A Cytogenetic and Cytotaxonomic Study of Chaenactis*; 3 years; \$16,100

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Belle A. Stevens; *Systematic Studies of Decapod Crustacea*; 3 years; \$8,000

WEST VIRGINIA UNIVERSITY, Morgantown, W. Va.; M. E. Gallegly; *Sexuality in the Genus Phytophthora*; 3 years; \$20,700

WORLD LIFE RESEARCH INSTITUTE, Colton, Calif.; Bruce W. Halstead and F. Rene Modglin; *Use of Venom Organs in Determining Phylogenetic Relationships*; 1 year; \$1,400

YALE UNIVERSITY, New Haven, Conn.; Theodore Delevoryas; *Investigation of North American Cycadeoids*; 3 years; \$18,500

June R. P. Phillips; *Middle Ordovician Bryozoa in the Type Areas of New York State*; 2 years; \$11,200

## CONTINUING ANTARCTIC RESEARCH

### Antarctic Advisory Committee

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; James H. Zumberge, *A Study of the Status of Polar Research by American Universities, and the Development of Recommendations as to How Universities and Other Academic Institutions Can Contribute the Most in Future Polar Research*; 1 year; \$12,500

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL, Washington, D.C.; G. D. Meid; *Committee on Polar Research of the Continuing U.S. Antarctic Research Program*; 1 year; \$81,200

G. D. Meid; *Activities of the Committee on Polar Research*; 1 year; \$69,303

### Aurora and Airglow

ARCTIC INSTITUTE OF NORTH AMERICA, INC., Washington, D.C.; Norman J. Oliver; *Continuation of Aurora and Airglow Research in Antarctica*; 2 years; \$198,480

Norman J. Oliver; *Correlation and Data Reduction of IGY and IGC Auroral Data From Antarctica*; 1 year; \$12,773

Norman J. Oliver; *Study of Energetic Solar Particles Associated With Disturbances and Their Effects Upon the Terrestrial Ionosphere*; 1 year; \$18,173

L. G. HANSCOMB AIR FORCE BASE, Bedford, Mass.; Norman J. Oliver; *Continuation of Patrol Spectrograph Data Reduction*; 1 year; \$45,600

### Biology and Medicine

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Robert Cushman Murphy; *Study of Pelagic Birds, Including Research Into the Behavior, Life History, Tolerances, Disturbances, and Systematic Relationships*; 1 year; \$4,721

ARCTIC INSTITUTE OF NORTH AMERICA, Washington, D.C.; William J. L. Sladen, Johns Hopkins University; *Support for Medical Microbiological Work in USARP, 1959-60*; 1 year; \$9,000

BERNICE P. BISHOP MUSEUM, Honolulu, Hawaii; J. Linsley Gressitt; *Studies of Airborne Organisms in the Antarctic Area; 1959-60*; 1 year; \$20,827

J. Linsley Gressitt; *Studies of Airborne Organisms in the Antarctic Area; 1960-61*; 1 year; \$32,039

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Karl C. Hamner, Los Angeles; *Studies of Endogenous Rhythms at the South Pole*; 1 year; \$23,923

COLLEGE OF WILLIAM AND MARY, Williamsburg, Va.; William J. Hargis, Jr.; *A Study of the Ecto- and Endo-Parasites of Antarctic Fishes*; 1 year; \$11,880

DUKE UNIVERSITY, Durham, N.C.; Knut Schmidt-Nielsen; *Continuation of Salt and Water Metabolism of Adelle Penguins*; 2 years; \$10,692

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; William M. Smith; *Antarctic Scientific Personnel Project*; 1 year; \$10,980

William M. Smith; *Observations of Individual and Group Behavior 1959-60 Antarctic Victoria Land Traverse*; 1 year; \$7,900

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; W. J. L. Sladen and Carl Eklund; *U.S. Antarctic Research Bird-Banding Program*; 2 years; \$21,850

KAISER FOUNDATION RESEARCH INSTITUTE, Richmond, Calif.; Ellsworth C. Dougherty; *Antarctic Microfauna*; 1 year; \$10,106

Ellsworth C. Dougherty; *Studies of Soil and Freshwater Microfauna and Microflora of the "Dry Valley" Region, Victoria Land, Antarctica*; 1 year; \$13,102

UNIVERSITY OF KANSAS, Lawrence, Kans.; Rufus H. Thompson and Kenneth B. Armitage; *A Biological Investigation of Fresh Water Lakes in Antarctica*; 1 year; \$18,288

STANFORD UNIVERSITY, Stanford, Calif.; Donald E. Wohlschlag; *Ecological and Physiological Studies of McMurdo Sound Marine Animals*; 18 months; \$69,715

Donald E. Wohlschlag; *Support of the Antarctic Research Laboratory NAF, McMurdo, for the continuing 1960 Biological and Medical Sciences Program*; 1 year; \$87,950

Donald E. Wohlschlag; *The Support of the Biological Laboratory at NAF McMurdo for the Continuing 1961 Biological and Medical Sciences Program*; 18 months; \$50,405

UNIVERSITY OF TEXAS, Austin, Tex.; Carl H. Oppenheimer; *The Significance of Bacteria and Organic Carbon Concentrations to the Organic Cycle of Antarctic Waters*; 18 months; \$17,729

O. B. Williams; *Study of the Airborne Bacteria and Fungi of the Antarctic*; 1 year; \$17,450

Orville Wyss; *Continuation of the Study of Bacteria, Fungi, and Other Biota, in Air, Soil, and Melt Pools in Antarctica*; 2 years; \$43,032

VIRGINIA FISHERIES LABORATORY, Gloucester Point, Va.; William J. Hargis; *Continuation of Study of Certain Parasites of Antarctic Vertebrates and Invertebrates*; 2 years; \$40,204

UNIVERSITY OF WISCONSIN, Madison, Wis.; Richard Lee Penney; *Analysis of Data Collected on the Behavior of the Adelle Penguin*; 2 years; \$4,236

Richard Lee Penney; *Study of the Behavior of the Adelle Penguin*; 1 year; \$7,800

### Cosmic Rays

FRANKLIN INSTITUTE, Philadelphia, Pa.; Martin A. Pomerantz; Bartol Research Foundation; *Investigations of Time Variations of the Primary Cosmic Radiation Near the Geomagnetic Pole*; 2 years; \$49,860

Martin A. Pomerantz; Bartol Research Foundation; *Investigations of Time Variations of the Primary Cosmic Radiation at a Geomagnetic Pole*; 1 year; \$14,800

### Geodesy and Cartography

AMERICAN GEOGRAPHICAL SOCIETY, New York, N.Y.; William Briseemelster; *Preparation of a New Map of Antarctica*; 1 year; \$17,780

### Geology

UNIVERSITY OF KANSAS, Lawrence, Kans.; Edward J. Zeller; *Determination of Age of Low Temperature Conditions in Antarctica by Thermoluminescence of Rocks: 1959-60*; 1 year; \$15,850

Edward J. Zeller; *Determination of Age of Low Temperature Conditions in Antarctica by Thermoluminescence of Rocks: 1960-61*; 18 months; \$31,955

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; J. C. Craddock; *Bedrock Geology and Geomorphology of Some Nunataks in the Transantarctic Trough*; 1 year; \$1,208  
OHIO STATE RESEARCH FOUNDATION, Columbus, Ohio; Samuel B. Treves; *Geological Investigation of Antarctic Horst Area*; 18 months; \$69,479

TUFTS UNIVERSITY, Medford, Mass.; Robert L. Nichols; *Geomorphological Field Project in the Wright, Victoria and Gran Mountain Dry Valleys*; 1 year; \$31,996

U.S. DEPARTMENT OF THE INTERIOR, Washington, D.C.; E. W. Pehrson; *Investigation of Methods and Conditions of Mineral Exploration in Isolated Areas Such as Antarctica*; 1 year; \$12,900

UNIVERSITY OF WISCONSIN, Madison, Wis.; Robert F. Black; *Study of Patterned Ground in the Antarctic*; 18 months; \$41,689

Robert H. Dott, Jr.; *Stratigraphic and Tectonic Relationships of Western Antarctica and Lower Palmer Peninsula to the Andean Mobile Belt*; 1 year; \$16,523

### Geomagnetism

U.S. COAST AND GEODETIC SURVEY, Washington, D.C.; *Conduct of the 1961 Geomagnetic Program*; 2 years; \$77,014

*Magnetic Field Surveys in Antarctica*; 2 years; \$27,820

H. Arnold Karo; *1960 Antarctic Magnetic Observatories*; 1 year; \$13,000

### Glaciology

ARCTIC INSTITUTE OF NORTH AMERICA, New York, N.Y.; Walter A. Wood; *Conduct of Station and Traverse Glaciology of the Continuing U.S. Antarctic Research Program*; 2 years; \$1,973

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; James H. Zumberg; *Ross Ice Shelf Studies: 1959-60*; 1 year; \$30,350

James H. Zumberg; *Ross Ice Shelf Studies: 1960-61*; 1 year; \$51,785

MOUNT UNION COLLEGE, Alliance, Ohio; John R. Reid, Jr.; *Ice Fabrics of a Firn Fold Near Camp Michigan, Antarctica*; 1 year; \$2,125

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; Richard P. Goldthwait; *Glaciology of Antarctic Firn*; 2½ years; \$53,972

R. P. Goldthwait; *Reduction and Analysis of Glaciology Data From Antarctica 1959-60*; 1 year; \$45,815

SNOW, ICE AND PERMAFROST RESEARCH ESTABLISHMENT, Wilmette, Ill.; *Preparation for Future Drilling and for Remeasurement of the Drill Hole at Byrd Station, Antarctica*; 1 year; \$19,000

UNIVERSITY OF WISCONSIN, Madison, Wis.; G. P. Woollard; *Reconnaissance Trail and Airborne Measurements in Glaciology and Related Studies in Antarctica—1960*; \$51,025

G. P. Woollard, E. C. Thiel and C. R. Bentley; *Support for Antarctic Traverse Program*; 2 years; \$488,342

### Gravity

UNIVERSITY OF WISCONSIN, Madison, Wis.; G. P. Woollard; *Gravimetric Connections Between Key Points in Antarctica for: (A) Changes in Elevation of the Ice Surface*

*With Time; (B) Changes in Land-Sea Relations; (C) Studies of Crustal Structure, Subice Geology and Ice Thickness*; 2 years; \$20,450

### Ionospheric Physics

NATIONAL BUREAU OF STANDARDS, Washington, D.C.; F. W. Brown, Boulder, Colo.; *Continuation of a Vertical-Incidence Antarctic Ionospheric Program*; 2 years; \$169,509

STANFORD UNIVERSITY, Stanford, Calif.; R. A. Helliwell; *Continuation and Extension of VLF Phenomena in the Antarctic*; 2 years; \$70,274

R. A. Helliwell; *Geomagnetic Latitude Control of VLF and ELF Phenomena*; 1 year; \$59,740

R. A. Helliwell; *Study of Very Low Frequency Observations at South Pole and Byrd Stations*; 1 year; \$30,450

### Meteorology

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Charles D. Keeling, Scripps Institution of Oceanography, La Jolla; *Abundance of Carbon Dioxide in the Atmosphere in Antarctica*; 2 years; \$38,652

U.S. WEATHER BUREAU, Washington, D.C.; F. W. Reichelderfer; *Antarctic Meteorological Research Program—1961*; 30 months; \$442,176

F. W. Reichelderfer; *Atmospheric-Oceanic-Glaciologic Interaction in an Antarctic Interdisciplinary Research Program*; 1 year; \$99,156

F. W. Reichelderfer; *International Antarctic Analysis Center, U.S. Participation*; 1 year; \$15,763

### Oceanography

TEXAS A & M RESEARCH FOUNDATION, College Station, Tex.; Luis Capurro; *Study of the Waters of the South Atlantic and Antarctic*; 1 year; \$21,660

U.S. NAVY HYDROGRAPHIC OFFICE, Washington, D.C.; Wm. H. Littlewood; *Ship-Based Oceanographic Studies in Antarctic and Subantarctic Regions*; 18 months; \$116,850

*Shore-Based Seasonal Oceanographic Studies at McMurdo Sound*; 2 years; \$59,950

### Polar Research Center

UNIVERSITY OF WISCONSIN, Madison, Wis.; G. P. Woollard; *Establishment of a Polar and Geophysical Research Center at the University of Wisconsin*; 1 year; \$125,490

### Related Scientific Support

ARCTIC INSTITUTE OF NORTH AMERICA, New York, N.Y.; Robert C. Faylor; *Related Scientific Support of the U.S. Antarctic Research Program*; 1 year; \$163,927

L. G. HANSCOMB AIR FORCE BASE, Bedford, Mass.; A. P. Cray; *For Travel and Per Diem*; 1 year; \$1,500

U.S. WEATHER BUREAU, Washington, D.C.; F. W. Reichelderfer; *Antarctic Field Operations*; 2 years; \$69,977

## Station Seismology

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; Hugo Benioff; *Operation, Upkeep, Replacement of South American Earth Strain Stations at Nana, Peru, and Santiago, Chile*; 1 year; \$9,758  
Frank Press; *Exchange Scientist With USSR Antarctic Expedition*; 1 year; \$25,475

Frank Press; *Operation of Wilkes Seismograph Station and Interpretation of Records for the Year 1961*; 1 year; \$6,600  
COLUMBIA UNIVERSITY, New York, N.Y.; Jack Oliver; *Conduct of Station Seismology Program—1961*; 1 year; \$1,044

U.S. COAST AND GEODETIC SURVEY, Washington, D.C.; H. A. Karo; *Antarctic Seismological Observatories—1961*; 2 years; \$10,000

## INTERNATIONAL GEOPHYSICAL YEAR

### Aurora and Airglow

UNIVERSITY OF ALASKA:  
Operational Costs of Auroral Observations ----- \$3,500

NATIONAL BUREAU OF STANDARDS:  
Airglow Data Reduction in the International Geophysical Year... 8,500

### Cosmic Rays

THE FRANKLIN INSTITUTE OF THE STATE OF PENNSYLVANIA:  
Data Reduction and Shipboard Neutron Monitor Station for the International Geophysical Year Cosmic Ray Program ----- 8,000

NEW YORK UNIVERSITY:  
Studies of the Primary Cosmic Ray Spectrum ----- 870  
Measurements of Neutrons of Solar Origin at High Altitudes ----- 822

### Glaciology

ARCTIC INSTITUTE OF NORTH AMERICA:  
Antarctic Glaciology Personnel and Data Reduction ----- 13,603

Data Reduction on McCall Glacier and Brooks Range ----- 3,500  
Study of Antarctic Glacial Geology ----- 2,055

THE OHIO STATE UNIVERSITY:  
Antarctic Data Reduction and Publication ----- 12,660

### Gravity Measurements

ARCTIC INSTITUTE OF NORTH AMERICA:  
Antarctic Gravity Personnel ----- 14,209

### Ionospheric Physics

UNIVERSITY OF ALASKA:  
Ionospheric Absorption, Cosmic Noise Method ----- 700  
Operation of an Atmospheric Whistler Station in Alaska ----- 1,326

NATIONAL BUREAU OF STANDARDS:  
Operation of South American Ionospheric Sounding Stations ----- 573  
Ionospheric Quality Control and Training ----- 269

Ionospheric Data Processing and Publication in the International Geophysical Year Ionospheric Physics Program ----- 2,000

### Longitude and Latitude

U.S. COAST AND GEODETIC SURVEY:  
Longitude and Latitude Program in Hawaii ----- 4,100

### Oceanography

COLUMBIA UNIVERSITY:  
Operations of Island Observatories ----- 15,840

Operational Cost for Radiochemistry Analysis ----- 381

TEXAS A & M RESEARCH FOUNDATION:  
Radiochemistry Analysis of Sea Water in the International Geophysical Year Oceanography Program in the Atlantic and the Gulf of Mexico ----- 4,583

### Rocketry

OFFICE OF NAVAL RESEARCH:  
Provision of a Factory Trained Representative at Aerobee Firings ----- 5,292

### Seismology

COLUMBIA UNIVERSITY:  
Seismic Measurements in the Atlantic ----- 1,902  
Operational Costs for Long Period Wave Studies ----- 699

### Solar Activity

NATIONAL BUREAU OF STANDARDS:  
Data Reductions and Publication in the International Geophysical Year Solar Activity Program --- 5,000

### World Days

NATIONAL BUREAU OF STANDARDS:  
Operation of AGEWARN and U.S. Regional Warning Centers in the International Geophysical World Days Program ----- 13,800

### General Related Scientific Support

36 Travel Grants (see international travel for listing) 12th General Assembly International Union of Geodesy and Geophysics ----- 23,145

ARCTIC INSTITUTE OF NORTH AMERICA:  
Antarctic Scientific Field Supervision Costs ----- 870

NATIONAL ACADEMY OF SCIENCES—  
NATIONAL RESEARCH COUNCIL  
ICSU Support for International Geophysical Year Symposia --- 5,378

Support of the International Geophysical Year Bulletin ----- 29,532

Support of the International Geophysical Year Documentary Film ----- 65,726

Support of International Geophysical Year Education ----- 19,455

Support of International Geophysical Year Documentation --- 13,281

Support of the International Geophysical Year Annuals ----- 54,347

Publication of International Geophysical Year Annuals and Data Interchange-----	5, 000
United States National Committee—International Geophysical Year Symposium-----	10, 000
<b>World Data Centers</b>	
UNIVERSITY OF ALASKA : Archives in Aurora-----	120, 760
AMERICAN GEOGRAPHICAL SOCIETY : Archives in Glaciology-----	58, 585
THE HIGH ALTITUDE OBSERVATORY OF THE UNIVERSITY OF COLORADO : Archives in Solar Activity-----	17, 000
UNIVERSITY OF MINNESOTA : Archives in Cosmic Rays-----	27, 868
NATIONAL ACADEMY OF SCIENCES— NATIONAL RESEARCH COUNCIL : Operation of the Data Coordination Office for the World Data Center-----	1, 080
Rocket and Satellite World Data Center A-----	48, 000
NATIONAL BUREAU OF STANDARDS : Archives in Airglow and Ionosphere-----	10, 000
AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS : Archives in Oceanography-----	83, 222
U.S. WEATHER BUREAU : Archives in Meteorology-----	40, 000
<b>Heat and Water</b>	
COLUMBIA UNIVERSITY : Correlation of Bottom Topography With Oceanic Parameters in the Interdisciplinary Research Program of the International Geophysical Year-----	10, 200
Correlation of Volcanic Ash Layers in Deep-Sea Cores From the Eastern Pacific in the Interdisciplinary Research Program of the IGY-----	7, 800
Analysis of Oceanographic and Biologic Data Obtained During the IGY in the Interdisciplinary Program-----	6, 000
OHIO STATE UNIVERSITY : Analysis of Geological Data From Spitzbergen-----	6, 664
UNIVERSITY OF WASHINGTON : Analysis of Heat Budget Data of Station Alpha in the International Geophysical Year Interdisciplinary Research Program-----	21, 927
U.S. WEATHER BUREAU : Interrrelations of Meteorological and Solar-Cosmical Phenomena in the Arctic Hemisphere-----	25, 000
<b>Upper Atmosphere</b>	
UNIVERSITY OF MINNESOTA : Charged Particle Orbits in the Earth's Magnetic Field-----	8, 748
NATIONAL BUREAU OF STANDARDS : Theoretical Studies of High Atmospheric Data in the International Geophysical Year Interdisciplinary Research Program-----	15, 000
Worldwide Mapping of Ionospheric Data by Numerical Methods in the International Geophysical Year Interdisciplinary Research Program-----	10, 000

## Special Research

CARNEGIE INSTITUTE OF TECHNOLOGY : Special Research Surveys by Distinguished Scientists From Abroad-----	80, 000
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## Earth Satellite—Scientific Experiments

LINFIELD RESEARCH INSTITUTE : Absolute Signal Strength and Frequency Measurements in the International Geophysical Year Earth Satellite Program-----	2, 100
NATIONAL BUREAU OF STANDARDS : Electron Density Profiles-----	210
RESEARCH INSTITUTE FOR ADVANCED STUDY : Development of Instrumentation for the Determination of the Flux of Heavy Primary Cosmic Ray Nuclei in the IGY Earth Satellite Program-----	14, 500

## SPECIALIZED FACILITIES

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; L. R. Aronson; <i>Construction of a Laboratory Addition for Animal Behavior Research</i> ; 2 years; \$80,000 Mont A. Cazier, Southwestern Research Station, Portal, Ariz.; <i>Construction of Housing Units</i> ; 2 years; \$17,750	
BERMUDA BIOLOGICAL STATION FOR RESEARCH, INC., Saint George's West, Bermuda; W. H. Sutcliffe, Jr.; <i>Improvements and Additions to Research Facilities of the Bermuda Biological Station</i> ; 2 years; \$111,000	
BROWN UNIVERSITY, Providence, R.I.; R. S. Rivlin; <i>Establishment of a Computing Center</i> ; 2 years; \$350,000	
UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Raymond E. Ewell; <i>Purchase of Ancillary Research Reactor Equipment</i> ; 1 year; \$139,295	
CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; G. D. McCann; <i>Digital Computing Facility</i> ; \$66,500	
UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Frank A. Beach; <i>Establishment of a Field Station for Research in Animal Behavior</i> ; 3 years; \$367,700	
D. R. Parker, Riverside; <i>Desert Research Station</i> ; 1 year; \$15,000	
Stanislavs Vasilevskis, Lick Observatory, Mount Hamilton; <i>Equipment for Surveying and Automatic Measurement of Astrographic Plates</i> ; 3 years; \$174,350	
F. P. Zachelle, Davis; <i>Construction of a Controlled Environment Chamber of New Design</i> ; 2 years; \$17,400	
CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; Alan J. Perlis; <i>Construction of a Computer</i> ; 3 years; \$250,000	
UNIVERSITY OF CHICAGO, Chicago, Ill.; H. B. Steinbach; <i>Modernization of Whitman Laboratory of Zoology</i> ; 3 years; \$60,000	
CITY OF HOPE MEDICAL CENTER, Duarte, Calif.; W. D. Kaplan; <i>Construction of Laboratory Facilities for Genetics Research</i> ; 1 year; \$11,250	
UNIVERSITY OF COLORADO, Boulder, Colo.; John W. Marr; <i>Improvement of Road to Mountain Field Stations</i> ; 1 year; \$11,850	
COLUMBIA UNIVERSITY, New York, N.Y.; Charles F. Bonilla; <i>Support of Nuclear Reactor Facility</i> ; 3 years; \$247,700	
COMMUNICATION RESEARCH INSTITUTE, Virgin Islands; John C. Lilly; <i>Construction of</i>	

**a Communications Research Laboratory; 2 years; \$107,000**

CORNELL UNIVERSITY, Ithaca, N.Y.; Henry Dietrich; *Cabinets for the Insect Collections of the Department of Entomology; 1 year; \$25,000*

UNIVERSITY OF ILLINOIS, Urbana, Ill.; William J. Fry; *Equipment for Ultrasound Research Facility; 1 year; \$69,000*

Ross J. Martin; *Assistance To Increase Reactor Research Capabilities; 1 year; \$51,097*

UNIVERSITY OF KANSAS, Lawrence, Kans.; E. R. Hall; *Construction of a Research Wing for the Museum of Natural History; 3 years; \$317,500*

Ronald L. McGregor; *Construction of an Experimental Greenhouse for Plant Taxonomy; 1 year; \$33,500*

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; T. J. Thompson; *Equipment for MIT Reactor Project; 1 year; \$235,340*

MISSOURI BOTANICAL GARDEN, Saint Louis, Mo.; F. W. Went; *Construction of a Botanical Research and Herbarium Building; 2 years; \$250,000*

UNIVERSITY OF MISSOURI, Columbia, Mo.; Elmer Ellis; *Support of a Research Reactor; 3 years; \$625,000*

MONTANA STATE COLLEGE, Bozeman, Mont.; J. H. Pepper; *Controlled Environmental Chamber for Entomological Research; 1 year; \$6,000*

MONTANA STATE UNIVERSITY, Missoula, Mont.; O. L. Stein; *Controlled Environmental Facilities; 1 year; \$5,700*

MOUNT DESERT ISLAND BIOLOGICAL LABORATORY, Salisbury Cove, Maine; Alvin W. Rleck; *Replacements, Improvements and Support of Facilities for Biological Research; 3 years; \$30,350*

NAPLES ZOOLOGICAL STATION, Naples, Italy; Peter Dohrn; *Support of Basic Research Facilities at the Naples Zoological Station; 1 year; \$12,000*

Peter Dohrn; *Support of Basic Research Facilities at the Naples Zoological Station; 4 years; \$48,000*

NEW YORK BOTANICAL GARDEN, New York, N.Y.; William C. Steere; *Partial Support for Construction of a New Library Wing; 3 years; \$300,000*

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; Forrest J. Remick; *Equipment for Expanding Basic Research in the Natural Engineering Sciences; 1 year; \$168,126*

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; William E. Stephens; *Acquisition of a 10 MEV Tandem Van De Graaff Accelerator; 2 years; \$1,041,000*

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; L. A. Cohen; *Construction of a Laboratory for the Study of Body Orientation and Motor Coordination; 2 years; \$35,000*

William B. Kehl; *New Computing Facility (IBM 7070); 2 years; \$210,000*

PRINCETON UNIVERSITY, Princeton, N.J.; A. K. Parpart; *Installation of a Sea Water System for Biological Research; \$11,500*

ROCKY MOUNTAIN BIOLOGY LABORATORY, Crested Butte, Colo.; Robert K. Enders; *Construction of Research Facilities at the Rocky Mountain Biological Laboratory; 1 year; \$9,000*

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; J. O. Lampen; *Additions to Pilot Plant Facilities; 1 year; \$46,000*

STANFORD UNIVERSITY, Stanford, Calif.; John G. Herriot; *Purchase of a Computer System; 1 year; \$295,000*

UNIVERSITY OF TEXAS, Austin, Tex.; Howard T. Odum, Institute of Marine Science, Port Aransas; *Construction of a Boat Basin for Marine Research; 1 year; \$51,000*

UNIVERSITY OF VIRGINIA, Charlottesville, Va.; Lawrence R. Quarles; *A Hot Cell for the University of Virginia Reactor Facility; 1 year; \$41,400*

UNIVERSITY OF WASHINGTON, Seattle, Wash.; David B. Dekker; *Establishment of Computing Center; 1 year; \$500,000*

Robert L. Fernald; *Expansion and Modernization of Research Facilities of the Friday Harbor Marine Laboratories; 2 years; \$350,000*

UNIVERSITY OF WISCONSIN, Madison, Wis.; R. A. Alberty; *Construction of Laboratories for Research on Macromolecules; 3 years; \$97,500*

A. D. Hasler; *Construction of a Hydrobiology Laboratory; 3 years; \$480,000*

WOODS HOLE OCEANOGRAPHIC INSTITUTION, Woods Hole, Mass.; Paul M. Fye; *Design and Construction of an Oceanographic Research Vessel; 2 years; \$3,000,000*

WORCESTER FOUNDATION FOR EXPERIMENTAL BIOLOGY, Shrewsbury, Mass.; Ralph I. Dorfman; *Construction of Solvent Distillation Facility; 1 year; \$65,000*

YALE UNIVERSITY, New Haven, Conn.; Willard D. Hartman; *Storage and Systematic Arrangement of Research Collections; 3 years; \$25,000*

## DEVELOPMENT OF GRADUATE RESEARCH LABORATORIES

UNIVERSITY OF AKRON, Akron, Ohio; Maurice Morton; *Conversion of Library Space into a Laboratory for Physico-Chemical Research in Polymer Chemistry; 1 year; \$14,400*

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Albert Slegel; *Construction of a Greenhouse and Headhouse for Plant Virus Research; 1 year; \$7,000*

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; A. D. Maynes; *Construction of a Wet Chemical Analytical Laboratory; 1 year; \$11,000*

E. H. Swift; *Construction of Facilities for Conducting Hazardous Research Experiments; 1 year; \$33,600*

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; P. R. Stout and W. C. Snyder; *Renovation of Research Laboratories for Soils and Plant Nutrition and Plant Pathology; 2 years; \$150,000*

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; R. B. Sutton; *Extension of Cyclotron Room; 1 year; \$20,000*

E. M. Williams; *Renovation of the Electrical Distribution System for Research Laboratories of the Department of Electrical Engineering; 1 year; \$10,000*

CORNELL UNIVERSITY, Ithaca, N.Y.; F. A. Long; *Modifying Two Rooms for Graduate Research in Organic and Physical Chemistry; 1 year; \$5,100*

John F. McManus; *Atmospheric Controlled Room; 1 year; \$3,000*

Robert L. Sproull; *Renovation of Graduate Research Laboratories in the Physics Building; 1 year; \$7,800*

EMORY UNIVERSITY, Atlanta, Ga.; A. E. Wilhelmi; *Improvement of Hood and Ven-*

**tilating Systems of Biochemistry Laboratories**; 1 year; \$21,000

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Seymour L. Hess; *Modernization of Graduate Research Laboratories in Meteorology*; 1 year; \$3,000

UNIVERSITY OF FLORIDA, Gainesville, Fla.; G. R. Noggle; *Controlled Environment Chamber for Plant Research*; 1 year; \$5,000

GEORGETOWN UNIVERSITY, Washington, D.C.; W. C. Hess; *Renovation of Microbiology and Pharmacology Research Laboratories*; 1 year; \$15,750

HOWARD UNIVERSITY, Washington, D.C.; Lloyd N. Ferguson; *Construction and Equipping Six Graduate Research Laboratories in the Attic of the Chemistry Building*; 1 year; \$13,800

UNIVERSITY OF ILLINOIS, Urbana, Ill.; G. M. Almy; *Construction of Research Buildings at the Betatron Laboratory*; 1 year; \$27,300

H. E. Carter; *Remodelling Program for Physical Chemistry*; 1 year; \$50,000

N. M. Newmark; *Modernization and Expansion of Graduate Research Laboratories in Civil Engineering*; 1 year; \$17,800

R. J. Winzler and S. M. Reynolds; *Remodelling Biochemistry and Anatomy Research Laboratories*; 1 year; \$17,300

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; Harry G. Day; *Renovation of Graduate Research Laboratories*; 1 year; \$16,000

Allan C. G. Mitchell; *Converting Space in New Physics Wing Into Research Laboratories*; 1 year; \$6,800

John B. Patton; *Modernization of Graduate Research Laboratories*; 30 months; \$49,600

Sid Robinson; *Modernization of Animal Facilities*; 1 year; \$34,300

IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa.; Percy H. Carr and Daniel J. Zaffarano; *Filling in Two Open Courts With Research Rooms*; 1 year; \$40,000

KANSAS STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCES, Manhattan, Kans.; Ralph G. Nevins; *Construction of Graduate Research Laboratories*; 1 year; \$5,700

Milton E. Raville; *Construction of a Graduate Research Laboratory*; 1 year; \$4,800

KENTUCKY RESEARCH FOUNDATION, Lexington, Ky.; F. L. Yost; *Renovation of Physics Research Laboratories*; 1 year; \$3,200

LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; H. B. Williams; *Renovating and Air Conditioning a Graduate Research Microanalytical Laboratory and Research Instrument Room*; 1 year; \$22,500

UNIVERSITY OF MARYLAND, College Park, Md.; George A. Snow; *Provision of a Darkroom for Use in High Energy Physics*; 1 year; \$8,000

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; L. C. Anderson; *Modernizing Eight Graduate Research Laboratories*; 1 year; \$20,000

D. E. S. Brown; *Renovation of Zoology Research Laboratories*; 1 year; \$38,000

Stuart W. Churchill, Donald R. Mason and Brymer Williams; *Renovation of Graduate Research Laboratories*; 1 year; \$11,100

Wendell E. Hewson; *Construction of an Addition to the Meteorological Laboratories*; 1 year; \$19,250

K. L. Jones; *Renovation of Plant Phys-*

*iology Research Laboratories*; 1 year; \$15,000

M. J. Sinnott; *Renovation of Graduate Research Laboratories*; 1 year; \$1,500

James T. Wilson; *Renovation and Construction of Graduate Research Laboratories in the Department of Geology*; 1 year; \$7,235

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Bryce L. Crawford; *Modernization of the Physical Chemical Instrumental Research Laboratories*; 1 year; \$50,000

E. R. Eckert; *Equipping a High Temperature Laboratory*; 1 year; \$7,500

Paul W. Gast; *Expansion of Research Laboratory Facilities in Geochemistry*; 1 year; \$2,850

J. W. Hall; *Conversion of a Greenhouse to a Paleobotanical Research Laboratory*; 1 year; \$4,800

W. G. Shepherd; *Additions to the Graduate Research Laboratories*; 1 year; \$21,500

N. T. Spratt, Jr.; *Modernization of Graduate Laboratories for Zoological Research*; 1 year; \$5,000

F. M. Swain; *Remodeling Organic Geochemistry Laboratory*; 1 year; \$8,000

Tibor Z. Zoltai; *Modernization of X-Ray Laboratory in the Department of Geology and Mineralogy*; 1 year; \$6,050

UNIVERSITY OF MISSOURI, Columbia, Mo.; Warren R. Fleming; *Renovation and Reconstruction of Zoological Research Laboratories*; 2 years; \$20,000

UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; C. E. Georgi and R. E. Hill; *Conversion of a Greenhouse to Laboratories and Construction of a Cold Room*; 1 year; \$6,500

NEW MEXICO STATE UNIVERSITY OF AGRICULTURE, ENGINEERING AND SCIENCE; George W. Gardiner; *Improvement of Research Space in the Research Center Building*; 1 year; \$12,500

UNIVERSITY OF NEW MEXICO, Albuquerque, N. Mex.; J. L. Riebsomer; *Additional Research Facilities for Organic and Physical Chemistry*; 1 year; \$11,100

Eugene W. Rypka; *Refurbishment of Laboratories for Microbiological Research*; 1 year; \$1,500

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; G. F. D'Allejo; *Conversion of Four Undergraduate Laboratories to Modern Graduate Research Laboratories*; 1 year; \$12,100

E. A. Peretti; *Modernization of Graduate Research Laboratories*; 1 year; \$14,400

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; A. B. Garrett; *Remodeling a Portion of McPherson Laboratory*; 1 year; \$55,000

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; Robert H. Perry; *Modernization of Graduate Research Facilities*; 1 year; \$6,700

UNIVERSITY OF OREGON, Eugene, Oreg.; Harry Alpert; *Renovation and Improvement of Laboratories for Research in Biological and Physical Sciences*; 1 year; \$70,175

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; M. R. Fenske; *Modernization of Graduate Research Laboratories*; 1 year; \$9,500

E. H. Ludwig; *Modernization and Furnishing of Virology and Tissue Culture Laboratories*; 1 year; \$12,500

R. L. Pike; *Furnishings for a Nutrition Research Laboratory*; 1 year; \$2,000

UNIVERSITY OF PENNSYLVANIA, Philadelphia,



Pa.; Norman Brown; *Construction of a Laboratory for Electron Microscopy*; 1 year; \$6,600

Julius Halpern; *Conversion of Storage Space for Research*; 1 year; \$12,000

Noah S. Prywes; *Renovation and Construction of a Graduate Research Laboratory in the Moore School of Electrical Engineering*; 1 year; \$9,900

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; Lorne A. Page; *Renovation of the Low-Energy Nuclear and Electron Physics Laboratory*; 1 year; \$13,700

G. A. Jeffrey; *Renovation of Crystallography Laboratory*; 1 year; \$11,000

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Henry Koffler; *Construction of Research Greenhouse*; 1 year; \$41,400

E. T. McBee; *Furnishing and Finishing of Two Large Research Laboratories*; 1 year; \$43,900

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; W. R. Beam; *Construction of Electron Physics Laboratories*; 1 year; \$19,200

James B. Cloke; *Modernizing Sixteen Graduate Research Laboratories*; 1 year; \$13,100

N. D. Greene; *Modernization of a Laboratory for Graduate Research in Corrosion and Related Phenomena*; 1 year; \$5,200

RESEARCH FOUNDATION, OKLAHOMA STATE UNIVERSITY, Stillwater, Okla.; Clark A. Dunn; *The Renovation and Modernization of the Chemical Engineering Graduate Research Laboratory*; 1 year; \$3,300

RICE INSTITUTE, Houston, Tex.; LeVan Griffls; *Renovation and Construction of Graduate Research Laboratory in Engineering*; 1 year; \$17,200

R. B. Turner; *Modernizing Three Graduate Research Laboratories*; 1 year; \$14,900

ROCKEFELLER INSTITUTE, New York, N.Y.; Frank Brink, Jr.; *Furnishing of Graduate Student Research Laboratories*; 2 years; \$32,250

UNIVERSITY OF ROCHESTER, Rochester, N.Y.; John W. Graham, Jr.; *Modernization of Graduate Research Laboratories in the College of Engineering*; 1 year; \$59,300

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; J. B. Allison; *Furnishings for Biological Research Laboratories*; 2 years; \$109,400

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; M. C. Kloetzel; *Renovation of Bacteriology Research Laboratories*; 1 year; \$48,700

STANFORD UNIVERSITY, Stanford, Calif.; David M. Mason; *Transport Processes Research Laboratory*; 1 year; \$8,000

Byrne Perry; *Small-Scale Fluid Mechanics Laboratory for Doctoral Research*; 1 year; \$2,300

O. Cutler Shepard; *Construction of a Laboratory for a Radioactive Tracer Facility*; 1 year; \$3,200

STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion, S. Dak.; F. E. Kelsey; *Furnishings for Biochemistry and Pharmacology Research Laboratories*; 1 year; \$5,000

STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N.J.; Luigi Z. Pollara; *Modernizing a Laboratory for Graduate Research in Organic Chemistry*; 1 year; \$7,500

SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.; W. R. Fredrickson; *Conversion of Unused Space Into a Physics Research Laboratory*; 1 year; \$13,500

Henry E. Wirth; *Renovation of Two Graduate Research Laboratories*; 1 year; \$11,300

TEXAS A & M RESEARCH FOUNDATION, College Station, Tex.; S. R. Wright; *Development of a Graduate Research Laboratory*; 1 year; \$16,300

TUFTS UNIVERSITY, Medford, Mass.; M. Kent Wilson; *Modification of an Old Laboratory To Provide a Modern Graduate Research Laboratory for Physical-Inorganic Chemistry Research and a Machine Shop for Research*; 1 year; \$12,500

TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; Eugene Copeland; *Remodeling and Furnishing Biology Research Laboratories*; 1 year; \$9,900

VANDERBILT UNIVERSITY, Nashville, Tenn.; Leonard B. Beach; *Improvement of New Research Space in Physics*; 1 year; \$7,000

Louis J. Birchner; *Installation of New Hoods and Laboratory Benches in Six Laboratories for Organic, Inorganic and Analytical Research*; 1 year; \$7,700

R. B. Channell and E. Quarterman; *Laboratory Renovation and Construction of a Greenhouse for Biological Research*; 1 year; \$11,600

R. R. Purdy; *Furnishings for Research Laboratories of Departments of Anatomy, Biology, Biochemistry, Microbiology, and Physiology*; 2 years; \$110,000

VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg, Va.; R. W. Engel; *Construction of Research Laboratories for Biochemistry, Nutrition and Microbiology*; 2 years; \$52,700

WASHINGTON STATE UNIVERSITY, Pullman, Wash.; J. L. Culbertson; *Modernizing of Five Graduate Research Laboratories for Organic Chemistry*; 1 year; \$9,100

J. I. Stokes and A. Hecht; *Renovation and Furnishing for Two Graduate Research Laboratories*; 1 year; \$6,700

WASHINGTON UNIVERSITY, St. Louis, Mo.; H. N. Andrews, Jr.; *Renovation and Furnishing of a Plant Histology Laboratory*; 1 year; \$1,950

UNIVERSITY OF WASHINGTON, Seattle, Wash.; E. E. Day and A. S. Kobayshi; *Modernization of the Brittle Coating Research Laboratory*; 1 year; \$1,700

WAYNE STATE UNIVERSITY, Detroit, Mich.; George Coleman; *Fixed Equipment for the Life Sciences Research Center*; 1 year; \$50,000

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; R. L. Frantz and N. Alldridge; *Renovation of Primate Behavior Laboratory and Construction of Botanical Research Laboratory*; 1 year; \$11,250

Oliver Grummitt; *Modernization of Graduate Level Research Laboratories*; 1 year; \$3,100

UNIVERSITY OF WISCONSIN, Madison, Wis.; L. A. Fraser; *Renovation of Zoological Research Laboratories*; 1 year; \$9,800

Marion L. Jackson; *Reconstruction of Two Rooms as Laboratories and Renovation of One Laboratory Room*; 1 year; \$7,450

Stephen C. Kleene; *Modernization of Facilities for Graduate Mathematics Research*; 1 year; \$50,000

Julian E. Mack; *Construction of a Spectroscopic Laboratory*; 1 year; \$6,700

Carl Olson; *Renovation of Veterinary Pathology Research Laboratory*; 1 year; \$6,000

P. C. Rosenthal; *Modernization of Graduate Research Laboratories*; 1 year; \$13,400  
J. F. Stauffer; *Renovation of Botanic Research Greenhouses*; 1 year; \$9,700

## GENERAL

BROWN UNIVERSITY, Providence, R.I.; Frederick G. Sherman; *Purchase of Equipment for Basic Research in Biology*; 1 year; \$21,200

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Sidney Shulman; *Short-Term Research by Medical Students*; 8 years; \$12,600

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; C. E. ZoBell and G. O. Arrhenius, Scripps Institution of Oceanography, La Jolla; *An Electron Microscope for Research in Cell Biology*; 2 years; \$61,400

UNIVERSITY OF CHICAGO, Chicago, Ill.; L. T. Coggshall; *Short-Term Research by Medical Students*; 3 years; \$25,920

COLLEGE OF MEDICAL EVANGELISTS, Loma Linda, Calif.; John Eric Peterson; *Short-Term Research by Medical Students*; 3 years; \$8,640

COMISION NACIONAL DE ENERGIA ATOMICA, Buenos Aires, Argentina; Jorge A. Sabato; (1) *Fabrication of Perfect Single Crystals of Alpha Uranium*, and (2) *Relationship Between Physical and Mechanical Properties and Substructures in Uranium Metal*; 6 months; \$11,700

CORNELL UNIVERSITY, Ithaca, N.Y.; Lawrence W. Hanlon; *Short-Term Research by Medical Students*; 3 years; \$21,600

Benjamin M. Siegel; *Research Training in Electron Microscopy*; 5 years; \$40,100

DUKE UNIVERSITY, Durham, N.C.; C. G. Bookhout, Duke University Marine Laboratory; *Summer Research and Training at the Duke University Marine Laboratory*; 3 years; \$26,600

EMORY UNIVERSITY, Atlanta, Ga.; Arthur P. Richardson; *Short-Term Research by Medical Students*; 3 years; \$17,280

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Leland Shanor; *Support of an Electron Microscope Facility for Research*; 2 years; \$42,200

UNIVERSITY OF GEORGIA, Athens, Ga.; Lawrence R. Pomeroy, The Marine Institute, Sapelo Island; *Equipment for Marine Biological Research at the University of Georgia Marine Institute*; 1 year; \$20,400

HARVARD UNIVERSITY, Cambridge, Mass.; Henry C. Meadow, Medical School, Boston; *Short-Term Research by Medical Students*; 3 years; \$32,400

UNIVERSITY OF ILLINOIS, Urbana, Ill.; H. O. Halvorson; *Equipment for Basic Bacteriological Research*; 2 years; \$100,000

Milan Novak, Graduate College, Chicago; *Short-Term Research by Medical Students*; 3 years; \$17,280

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; Richard C. Starr; *Culture Collection of Algae*; 5 years; \$34,600

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Thomas B. Turner; *Short-Term Research by Medical Students*; 3 years; \$21,600

LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; W. W. Frye, New Orleans; *Short-Term Research by Medical Students*; 3 years; \$12,960

MARINE BIOLOGICAL LABORATORY, Woods

Hole, Mass.; Philip B. Armstrong; *Research Training in Marine Biology*; 5 years; \$177,800

MAYO ASSOCIATION, Rochester, Minn.; Joseph B. Berkson; *Estimation Problems Bearing on Biological Problems*; 2 years; \$16,000

MEDICAL COLLEGE OF SOUTH CAROLINA, Charleston, S.C.; John T. Cuttino; *Short-Term Research by Medical Students*; 3 years; \$8,640

UNIVERSITY OF MIAMI, Coral Gables, Fla.; Lauren C. Gilman; *Maintaining Type Cultures of the Various Syngens of Paramecium Caudatum*; 3 years; \$13,800

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; William N. Hubbard, Jr.; *Short-Term Research by Medical Students*; 3 years; \$4,320

A. H. Stockard, University of Michigan Biological Station; *Research at the University of Michigan Biological Station*; 3 years; \$31,000

UNIVERSITY OF MISSOURI, Columbia, Mo.; J. C. Thaemert; *Electron Microscope for Interdisciplinary Research Use*; 1 year; \$45,300

NATIONAL ACADEMY OF SCIENCES, Washington, D.C.; Harold J. Coolidge; *Pacific Science Board*; 3 years; \$75,600

NORTHWESTERN UNIVERSITY, Evanston, Ill.; Ray L. Watterson; *Research Equipment*; 1 year; \$23,000

UNIVERSITY OF OKLAHOMA, Norman Okla.; Mark R. Everett, Oklahoma City; *Short-Term Research by Medical Students*; 3 years; \$8,640

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Thomas F. Anderson; *Support of a Program of Electron Microscopy*; 5 years; \$38,200

Julian B. Marsh; *Short-Term Research by Medical Students*; 3 years; \$21,600

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; Davis G. Johnson, Syracuse; *Short-Term Research by Medical Students*; 3 years; \$17,280

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; J. W. Bartholomew; *An Electron Microscope for Biological Research*; 1 year; \$45,400

STATE UNIVERSITY OF IOWA, Iowa City, Iowa; Norman B. Nelson; *Short-Term Research by Medical Students*; 3 years; \$8,640

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; Roland H. Aiden, Memphis; *Short-Term Research by Medical Students*; 3 years; \$15,120

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Robert L. Fernald, Friday Harbor Laboratories; *Research in Oceanography at the Friday Harbor Laboratories*; 1 year; \$4,000

WEST VIRGINIA UNIVERSITY, Morgantown, W. Va.; Edward J. Van Liere; *Short-Term Research by Medical Students*; 3 years; \$8,640

UNIVERSITY OF WISCONSIN, Madison, Wis.; H. Ris; *Summer Course in the Principles and Techniques of Tissue Culture*; 2 years; \$18,000

YALE UNIVERSITY, New Haven, Conn.; Vernon W. Lippard; *Short-Term Research by Medical Students*; 3 years; \$32,400

Daniel J. Merriman, Bingham Oceanographic Laboratory; *Research Equipment for the Bingham Oceanographic Laboratory*; 1 year; \$14,500

## APPENDIX D

### Grants Other Than Research

#### EDUCATION IN THE SCIENCES

##### ACADEMIC YEAR INSTITUTES FOR HIGH SCHOOL TEACHERS

ARIZONA STATE UNIVERSITY, Tempe, Ariz.; Alan T. Wager; 11 months; \$274,500  
ATLANTA UNIVERSITY, Atlanta, Ga.; K. A. Huggins; 9 months; \$251,400  
BOSTON COLLEGE, Chestnut Hill, Mass.; Stanley J. Bezuska; 10 months; \$222,900  
BRIGHAM YOUNG UNIVERSITY, Provo, Utah; Lane A. Compton; 9 months; \$274,500  
BROWN UNIVERSITY, Providence, R.I.; Elmer R. Smith; 12 months; \$300,700  
UNIVERSITY OF GEORGIA, Athens, Ga.; Jonathan J. Westfall; 9 months; \$277,400  
IOWA STATE TEACHERS COLLEGE, Cedar Falls, Iowa; Robert A. Rogers; 11 months; \$305,700  
UNIVERSITY OF KANSAS, Lawrence, Kans.; Lee M. Sonneborn; 9 months; \$252,300  
LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; Houston T. Karnes; 11 months; \$259,800  
MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing, Mich.; John Mason; 9 months; \$274,100  
UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Leigh C. Anderson; 11 months; \$277,800  
UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Charles Hatfield; 12 months; \$310,000  
NEW MEXICO HIGHLANDS UNIVERSITY, Las Vegas, N. Mex.; El. Gerald Meyer; 11 months; \$304,900  
UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; Edwin C. Markham; 10 months; \$294,500  
UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; Arnold E. Ross; 11 months; \$228,800  
OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Stillwater, Okla.; James H. Zant; 12 months; \$269,800  
OREGON STATE COLLEGE, Corvallis, Oreg.; Stanley E. Williamson; 12 months; \$290,300  
PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; William H. Powers; 9 months; \$272,800  
UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; William E. Arnold; 9 months; \$267,300  
UNIVERSITY OF PUERTO RICO, Rio Piedras, P.R.; Mariano Garcia; 9 months; \$110,800  
SAN DIEGO STATE COLLEGE FOUNDATION, San Diego, Calif.; John E. Eagle; 11 months; \$288,400  
STANFORD UNIVERSITY, Stanford, Calif.; Harold M. Bacon; 9 months; \$278,400  
STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion, S. Dak.; Charles M. Vaughn; 11 months; \$312,500

SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.; Alfred T. Collette; 10 months; \$288,900  
UNIVERSITY OF TEXAS, Austin, Tex.; Robbin C. Anderson; 11 months; \$297,400  
TUSKEGEE INSTITUTE, Tuskegee Institute, Ala.; W. Edward Belton; 9 months; \$260,600  
UNIVERSITY OF UTAH, Salt Lake City, Utah; Thomas J. Parmley; 12 months; \$309,300  
UNIVERSITY OF VIRGINIA, Charlottesville, Va.; James W. Cole, Jr.; 11 months; \$297,600  
WASHINGTON UNIVERSITY, St. Louis, Mo.; E. U. Condon; 9 months; \$278,200  
UNIVERSITY OF WISCONSIN, Madison, Wis.; Donald H. Bucklin; 12 months; \$305,800

##### ACADEMIC YEAR INSTITUTES FOR HIGH SCHOOL AND COLLEGE TEACHERS

HARVARD UNIVERSITY, Cambridge, Mass.; Francis Keppel; 9 months; \$326,500  
UNIVERSITY OF ILLINOIS, Urbana, Ill.; Joseph Landin; 12 months; \$299,200  
OHIO STATE UNIVERSITY, Columbus, Ohio; John S. Richardson; 9 months; \$311,200

##### IN-SERVICE INSTITUTES FOR COLLEGE TEACHERS

UNIVERSITY OF OKLAHOMA, Norman, Okla.; Richard V. Andree; 9 months; \$21,015

##### IN-SERVICE INSTITUTES FOR HIGH SCHOOL TEACHERS

ADELPHI COLLEGE, Garden City, N.Y.; Abe Shentzer; 9 months; \$28,080  
UNIVERSITY OF AKRON, Akron, Ohio; Roger F. Keller, Jr.; 9 months; \$5,280  
ALABAMA COLLEGE, Montevallo, Ala.; Paul C. Bailey; 9 months; \$13,620  
UNIVERSITY OF ALABAMA, University, Ala.; Ralph L. Chermock; 9 months; \$21,690  
ALBERTUS MAGNUS COLLEGE, New Haven, Conn.; Florence D. Jacobson; 8 months; \$9,300  
ALBRIGHT COLLEGE, Reading, Pa.; Richard J. Kohlmeyer; 9 months; \$4,270  
ALFRED UNIVERSITY, Alfred, N.Y.; E. Gordon Ogden; 9 months; \$8,450  
AMERICAN UNIVERSITY, Washington, D.C.; Leo Schubert; 9 months; \$20,870  
ARIZONA STATE COLLEGE, Flagstaff, Ariz.; Agnes M. Allen; 9 months; \$11,220  
ARIZONA STATE UNIVERSITY, Tempe, Ariz.; Ernest E. Snyder; 9 months; \$10,440

**UNIVERSITY OF ARIZONA**, Tucson, Ariz.; Robert W. Hoshaw; 9 months; \$13,230  
 Arthur H. Steimbrenner; 9 months; \$5,880  
**BALL STATE TEACHERS COLLEGE**, Muncie, Ind.; Charles Brumfel; 8 months; \$12,600  
**BOSTON COLLEGE**, Chestnut Hill, Mass.; Stanley J. Bezuska; 8 months; \$15,390  
**BOWDOIN COLLEGE**, Brunswick, Maine; Richard L. Chittim; 8 months; \$8,930  
**BOWLING GREEN STATE UNIVERSITY**, Bowling Green, Ohio; W. H. Hall; 9 months; \$12,480  
**BRIDGEWATER COLLEGE**, Bridgewater, Va.; Harry G. M. Jopson; 8 months; \$9,200  
**BROWN UNIVERSITY**, Providence, R.I.; Charles B. MacKay; 9 months; \$5,640  
**BUCKNELL UNIVERSITY**, Lewisburg, Pa.; William K. Smith; 9 months; \$5,680  
**UNIVERSITY OF BUFFALO**, Buffalo, N.Y.; Harriet F. Montague; 9 months; \$7,790  
**BUTLER UNIVERSITY**, Indianapolis, Ind.; Ralph K. Birdwhistell; 9 months; \$17,970  
**UNIVERSITY OF CALIFORNIA**, Berkeley, Calif.; Clifford Bell; Los Angeles; 9 months; \$4,070  
 Clifford Bell; Los Angeles; 9 months; \$5,060  
 Clifford Bell; Los Angeles; 9 months; \$9,000  
 Clifford Bell; Los Angeles; 9 months; \$7,970  
 Clifford Bell; Los Angeles; 9 months; \$9,580  
 Arthur F. Kip; 9 months; \$10,660  
**CENTRAL MICHIGAN UNIVERSITY**, Mount Pleasant, Mich.; Malcolm H. Filson; 9 months; \$10,140  
 Lauren G. Woodby; 9 months; \$19,010  
**CENTRAL STATE COLLEGE**, Edmond, Okla.; Earl C. Rice; 9 months; \$5,400  
**COLLEGE OF THE HOLY CROSS**, Worcester, Mass.; Raymond J. Swords; 9 months; \$8,950  
**COLLEGE OF THE PACIFIC**, Stockton, Calif.; Emerson G. Cobb; 9 months; \$7,530  
**COLLEGE OF ST. CATHERINE**, St. Paul, Minn.; Sister Seraphim; 8 months; \$4,900  
**COLLEGE OF SAINT THOMAS**, St. Paul, Minn.; Martin Allen; 8 months; \$20,460  
**COLORADO COLLEGE**, Colorado Springs, Colo.; Wilbur H. Wright; 8 months; \$4,870  
**COLORADO STATE COLLEGE**, Greeley, Colo.; Harley F. Gildden; 6 months; \$7,220  
**COLORADO STATE UNIVERSITY RESEARCH FOUNDATION**, Fort Collins, Colo.; Elmer E. Remmenga; 9 months; \$7,100  
**UNIVERSITY OF COLORADO**, Boulder, Colo.; William E. Briggs; 9 months; \$8,800  
 John M. Cleveland; 9 months; \$6,730  
**UNIVERSITY OF CONNECTICUT**, Storrs, Conn.; David J. Bilek; 9 months; \$20,850  
**DARTMOUTH COLLEGE**, Hanover, N.H.; Charles J. Lyon; 6 months; \$4,840  
**UNIVERSITY OF DELAWARE**, Newark, Del.; G. Cuthert Webber; 9 months; \$4,950  
**DE PAUL UNIVERSITY**, Chicago, Ill.; Willis B. Cator; 9 months; \$5,610  
**UNIVERSITY OF DETROIT**, Detroit, Mich.; Lyle E. Mehlenbacher; 10 months; \$13,910  
**DISTRICT OF COLUMBIA TEACHERS COLLEGE**, Washington, D.C.; Daniel B. Lloyd; 9 months; \$8,850  
**DOMINICAN COLLEGE OF SAN RAFAEL**, San Rafael, Calif.; Sister M. Augusta; 8 months; \$6,740  
**DRAKE UNIVERSITY**, Des Moines, Iowa.; Earle L. Canfield; 9 months; \$15,330  
**DUKE UNIVERSITY**, Durham, N.C.; Sherwood Githens, Jr.; 9 months; \$5,720  
**EAST TEXAS STATE COLLEGE**, Commerce, Tex.; Roy N. Jervis; 8 months; \$22,560  
 Arthur M. Pullen; 9 months; \$5,750  
**EASTERN KENTUCKY STATE COLLEGE**, Richmond, Ky.; H. H. LaFuze; 9 months; \$14,810  
**EASTERN MONTANA COLLEGE OF EDUCATION**, Billings, Mont.; Oliver W. Peterson; 8 months; \$4,770  
**EASTERN NAZARENE COLLEGE**, Wollaston, Mass.; P. Calvin Maybury; 9 months; \$6,630  
**EMORY UNIVERSITY**, Atlanta, Ga.; Charles T. Lester; 8 months; \$14,620  
 Robert H. Rohrer; 9 months; \$5,120  
**EVANSVILLE COLLEGE**, Evansville, Ind.; Clarence W. Buesking; 9 months; \$4,820  
**FENN COLLEGE**, Cleveland, Ohio; Walter R. Van Voorhis; 8 months; \$6,890  
**FISK UNIVERSITY**, Nashville, Tenn.; Edward L. Maxwell; 8 months; \$8,000  
**FLORIDA STATE UNIVERSITY**, Tallahassee, Fla.; J. Stanley Marshall; 9 months; \$37,440  
**UNIVERSITY OF FLORIDA**, Gainesville, Fla.; N. Eldred Bingham; 9 months; \$27,430  
**FORDHAM UNIVERSITY**, New York, N.Y.; Henry F. DeBaggis; 9 months; \$11,370  
**FURMAN UNIVERSITY**, Greenville, S.C.; J. A. Southern; 9 months; \$7,190  
**GEORGE PEABODY COLLEGE FOR TEACHERS**, Nashville, Tenn.; H. Craig Sipe; 9 months; \$4,870  
**UNIVERSITY OF GEORGIA**, Athens, Ga.; Gerald B. Huff; 9 months; \$7,450  
**UNIVERSITY OF HAWAII**, Honolulu, Hawaii; Jimmie B. Smith; 8 months; \$4,930  
**HOLY NAMES COLLEGE**, Spokane, Wash.; Sister M. Eugene Gautreaux; 8 months; \$6,700  
**UNIVERSITY OF HOUSTON**, Houston, Tex.; Martin Wright; 9 months; \$13,080  
**HOWARD PAYNE COLLEGE**, Brownwood, Tex.; Leonard R. Danfel; 9 months; \$5,980  
**HUMBOLDT STATE COLLEGE FOUNDATION**, Arcata, Calif.; Orval M. Klose; 8 months; \$9,950  
**ILLINOIS INSTITUTE OF TECHNOLOGY**, Chicago, Ill.; Haim Reingold; 9 months; \$49,350  
**INCARNATE WORD COLLEGE**, San Antonio, Tex.; Sister Joseph Marie; 9 months; \$9,880  
**INDIANA CENTRAL COLLEGE**, Indianapolis, Ind.; Robert M. Brooker; 9 months; \$7,720  
**INDIANA STATE TEACHERS COLLEGE**, Terre Haute, Ind.; John C. Hook; 8 months; \$7,050  
**JOHNS HOPKINS UNIVERSITY**, Baltimore, Md.; David M. Raup; 9 months; \$7,060  
**KANSAS STATE COLLEGE OF PITTSBURG**, Pittsburg, Kans.; R. G. Smith; 9 months; \$15,100  
**KANSAS STATE TEACHERS COLLEGE**, Emporia, Kans.; Ted F. Andrews; 9 months; \$19,800  
**KENT STATE UNIVERSITY**, Kent, Ohio; Kenneth B. Cummins; 9 months; \$7,130  
**KNOXVILLE COLLEGE**, Knoxville, Tenn.; Robert H. Harvey; 8 months; \$16,330  
**LAKE FOREST COLLEGE**, Lake Forest, Ill.; Harold C. Jensen; 9 months; \$5,800  
**LE MOYNE COLLEGE**, Memphis, Tenn.; Marvin L. Head; 9 months; \$9,100  
**LEWIS AND CLARK COLLEGE**, Portland, Oreg.; Elvy Frederickson; 9 months; \$5,870  
**LONG BEACH STATE COLLEGE FOUNDATION**, Long Beach, Calif.; John J. Baird; 9 months; \$11,580

LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; Henry G. Jacob, Jr.; 9 months; \$12,400

LOYOLA UNIVERSITY, New Orleans, La.; F. A. Benedetto; 9 months; \$9,610

MANHATTAN COLLEGE, New York, N.Y.; Luke V. Titone; 9 months; \$10,750

Bernard Alfred Welch; 9 months; \$10,870

UNIVERSITY OF MARYLAND, College Park, Md.; Howard Laster; 9 months; \$19,440

MCNEESE STATE COLLEGE, Lake Charles, La.; S. M. Spencer; 9 months; \$5,750

UNIVERSITY OF MIAMI, Coral Gables, Fla.; J. H. Curtiss; 9 months; \$12,230

MISSISSIPPI COLLEGE, Clinton, Miss.; Archie H. Germany; 9 months; \$16,840

MISSISSIPPI STATE UNIVERSITY, State College, Miss.; R. D. Boswell, Jr.; 8 months; \$13,960

MISSOURI BOTANICAL GARDEN, Saint Louis, Mo.; Norton H. Nickerson; 9 months; \$8,560

UNIVERSITY OF MISSOURI, Columbia, Mo.; Harold Q. Fuller; 8 months; \$3,830

MONTCLAIR STATE COLLEGE, Upper Montclair, N.J.; Max A. Soble, 10 months; \$6,150

MOUNT MERCY COLLEGE, Pittsburgh, Pa.; William A. Uricchio; 8 months; \$6,640

MUNICIPAL UNIVERSITY OF OMAHA, Omaha, Nebr.; Merle E. Brooks; 9 months; \$16,850

MURRAY STATE COLLEGE, Murray, Ky.; Alfred Wolfson; 9 months; \$9,780

NEBRASKA WESLEYAN UNIVERSITY, Lincoln, Nebr.; Walter R. French, Jr.; 9 months; \$9,300

UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; James A. Rutledge, University High School; 9 months; \$8,240

UNIVERSITY OF NEVADA, Reno, Nev.; E. M. Beesley; 10 months; \$14,860

NEWARK COLLEGE OF ENGINEERING RESEARCH FOUNDATION, Newark, N.J.; Henry Zatzkis; 9 months; \$5,820

UNIVERSITY OF NEW HAMPSHIRE, Durham, N.H.; M. Evans Munroe; 9 months; \$7,720

NEW YORK STATE SOCIETY FOR MEDICAL RESEARCH, INC., New York, N.Y.; Albert S. Kuperman; New York University; 9 months; \$6,100

NEW YORK UNIVERSITY, New York, N.Y.; Morris Kline; 10 months; \$17,340

Morris H. Shamos; 8 months; \$8,890

L. E. Spock; 8 months; \$7,400

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; H. V. Park; 9 months; \$6,540

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; William A. White; 9 months; \$8,810

NORTHEAST MISSOURI STATE TEACHERS COLLEGE, Kirksville, Mo.; Dean A. Rosebery; 9 months; \$7,930

NORTH TEXAS STATE COLLEGE, Denton, Tex.; Robert C. Sherman; 8 months; \$8,300

NORTHERN MICHIGAN COLLEGE, Marquette, Mich.; Holmes Boynton; 8 months; \$12,500

NORTHLAND COLLEGE, Ashland, Wis.; Jesse M. Caskey; 9 months; \$11,470

Jesse M. Caskey, 9 mos.; \$11,130

NORTHWESTERN STATE COLLEGE, Alva, Okla.; Joe W. Melton; 9 months; \$9,180

NORTHWESTERN UNIVERSITY, Evanston, Ill.; E. H. C. Hildebrandt; 9 months; \$9,100

OHIO STATE UNIVERSITY, Columbus, Ohio, William R. Riley; 9 months; \$7,430

UNIVERSITY OF OKLAHOMA, Norman Okla.; Richard V. Andree; 9 months; \$23,310

OREGON STATE COLLEGE, Corvallis, Ore.; Albert R. Poole; 9 months; \$3,500

UNIVERSITY OF OREGON, Eugene, Ore.; A. F. Moursund; 8 months; \$3,570

PACE COLLEGE, New York, N.Y.; Edward Ritter; 8 months; \$6,280

PAN AMERICAN COLLEGE, Edinburg, Tex.; Sidney S. Draeger; 9 months; \$11,670

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; William H. Powers; 9 months; \$29,890

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; J. E. Hazel; 9 months; \$11,760

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; Peter Gray; 8 months; \$7,780

David Halliday; 8 months; \$7,840

John C. Knipp; 8 months; \$8,320

PRAIRIE VIEW AGRICULTURAL AND MECHANICAL COLLEGE, Prairie View, Tex.; E. E. O'Banion; 9 months; \$18,640

UNIVERSITY OF PUERTO RICO, Rio Piedras, P.R.; Virgilio Biaggi, Jr.; Mayaguez; 9 months; \$13,660

Augusto Bobonis; 9 months; \$1,260

Augusto Bobonis; 1 year; \$250

Augusto Bobonis; 9 months; \$14,400

Juan D. Curet; 9 months; \$12,700

PURDUE UNIVERSITY, Lafayette, Ind.; M. Wiles Keller; 9 months; \$36,400

UNIVERSITY OF REDLANDS, Redlands, Calif.; Paul R. Gleason; 8 months; \$9,460

TEACHERS COLLEGE, COLUMBIA UNIVERSITY, New York, N.Y.; Howard F. Fehr; 8 months; \$8,460

REED COLLEGE, Portland, Ore.; Arthur H. Livermore; 9 months; \$18,340

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; F. Reese Nevin, College of Education at Plattsburgh; 10 months; \$9,790

RICKS COLLEGE, Rexburg, Idaho; Merle R. Fisher; 8 months; \$7,100

UNIVERSITY OF ROCHESTER, Rochester, N.Y.; John J. Montean; 8 months; \$6,330

John J. Montean; 8 months; \$6,320

John J. Montean; 8 months; \$6,610

ROCKHURST COLLEGE, Kansas City, Mo.; William C. Doyle; 9 months; \$5,800

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Emory P. Starke; 9 months; \$11,670

Emory P. Starke; 9 months; \$14,070

Emory P. Starke; 9 months; \$800

SACRAMENTO STATE COLLEGE FOUNDATION, Sacramento, Calif.; H. Stewart Moredock; 9 months; \$20,880

ST. LOUIS UNIVERSITY, Saint Louis, Mo.; John J. Andrews; 9 months; \$3,370

ST. PETER'S COLLEGE, Jersey City, N.J.; Frank J. McMaekin; 9 months; \$9,450

UNIVERSITY OF SAN FRANCISCO, San Francisco, Calif.; Edward J. Farrell; 9 months; \$6,430

SAN JOSE STATE COLLEGE, San Jose, Calif.; Max Kramer; 9 months; \$12,950

Laurence E. Wilson; 9 months; \$5,550

UNIVERSITY OF SANTA CLARA, Santa Clara, Calif.; Irving Sussman; 9 months; \$23,800

SARAH LAWRENCE COLLEGE, Bronxville, N.Y.; Edward J. Cogan; 8 months; \$1,000

Edward J. Cogan; 8 months; \$17,960

UNIVERSITY OF SCRANTON, Scranton, Pa.; Joseph A. Rock, S.J.; 9 months; \$5,590

Joseph A. Rock, S.J.; 9 months; \$3,950

SHORTER COLLEGE, Rome, Ga.; Emma Lewis Lipps; 9 months; \$16,650

SMITH COLLEGE, Northampton, Mass.; Kenneth W. Sherck; 9 months; \$30,150

SOUTH CAROLINA STATE COLLEGE, Orange-

burg, S.C.; George W. Hunter; 9 months; \$30,470  
**UNIVERSITY OF SOUTH CAROLINA**, Columbia, S.C.; A. P. French; 9 months; \$14,570  
**SOUTHEASTERN STATE COLLEGE**, Durant, Okla.; Leslie A. Dwight; 9 months; \$5,120  
 Ernest Sturch, Jr.; 9 months; \$3,950  
**SOUTHERN UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE**, Baton Rouge, La.; Russell M. Ampey; 9 months; \$14,040  
**SOUTHWESTERN LOUISIANA INSTITUTE**, Lafayette, La.; James R. Oliver; 9 months; \$25,390  
**STATE TEACHERS COLLEGE**, Salem, Mass.; Thomas I. Ryan; 8 months; \$12,030  
**STATE UNIVERSITY OF SOUTH DAKOTA**, Vermillion, S. Dak.; Theodore L. Reid; 9 months; \$20,800  
**STEVENS INSTITUTE OF TECHNOLOGY**, Hoboken, N.J.; Robert H. Seavy; 9 months; \$17,700  
**TEMPLE UNIVERSITY**, Philadelphia, Pa.; Leonard Muldewer; 9 months; \$15,300  
**TENNESSEE AGRICULTURAL AND INDUSTRIAL STATE UNIVERSITY**, Nashville, Tenn.; William N. Jackson; 9 months; \$17,620  
**TEXAS WOMAN'S UNIVERSITY**, Denton, Tex.; Harold T. Baker; 9 months; \$3,300  
**UNIVERSITY OF TEXAS**, Austin, Tex.; E. J. Knapp, Texas Western College of the University of Texas, El Paso; 9 months; \$5,500  
**UNIVERSITY OF TOLEDO**, Toledo, Ohio; Archie N. Solberg; 9 months; \$12,210  
**TOUGALOO SOUTHERN CHRISTIAN COLLEGE**, Tougaloo, Miss.; A. A. Branch; 8 months; \$16,300  
**UNION COLLEGE AND UNIVERSITY**, Schenectady, N.Y.; C. W. Graves; 8 months; \$14,200  
**UNION UNIVERSITY**, Jackson, Tenn.; Ralph T. Donnell; 9 months; \$3,930  
**UTAH STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE**, Logan, Utah; Joe Ellich; 9 months; \$10,080  
 John K. Wood; 9 months; \$7,080  
**UNIVERSITY OF UTAH**, Salt Lake City, Utah; E. Allan Davis; 9 months; \$7,670  
**UNIVERSITY OF VIRGINIA**, Charlottesville, Va.; William C. Lowry; 9 months; \$13,680  
**WAKE FOREST COLLEGE**, Winston-Salem, N.C.; Ben M. Seelbinder; 9 months; \$6,380  
**UNIVERSITY OF WASHINGTON**, Seattle, Wash.; Arthur D. Welander; 8 months; \$1,200  
**WAYNE STATE UNIVERSITY**, Detroit, Mich.; Karl W. Polley; 8 months; \$11,190  
 William V. Mayer; 8 months; \$8,620  
**WEST VIRGINIA UNIVERSITY**, Morgantown, W. Va.; I. Dee Peters; 9 months; \$4,440  
**WESTERN KENTUCKY STATE COLLEGE**, Bowling Green, Ky.; Ward C. Sumpter; 9 months; \$12,580  
**WESTERN MICHIGAN UNIVERSITY**, Kalamazoo, Mich.; George G. Mallinson; 9 months; \$12,400  
**WESTERN RESERVE UNIVERSITY**, Cleveland, Ohio; Stefan Machlup; 9 months; \$9,120  
**WESTERN WASHINGTON COLLEGE OF EDUCATION**, Bellingham, Wash.; Marie B. Pabst; 8 months; \$8,870  
**WILKES COLLEGE**, Wilkes-Barre, Pa.; Thomas R. Richards; 9 months; \$4,630  
**WILLIAM JEWELL COLLEGE**, Liberty, Mo.; Wallace A. Hilton; 9 months; \$11,400  
**WISCONSIN STATE COLLEGE**, Eau Claire, Wis.; Lawrence F. Wahlstrom; 9 months; \$12,040  
**WOMAN'S COLLEGE OF THE UNIVERSITY OF**

**NORTH CAROLINA**, Greensboro, N.C.; Hollis J. Rogers; 9 months; \$21,590  
**WORCESTER POLYTECHNIC INSTITUTE**, Worcester, Mass.; Richard F. Morton; 9 months; \$9,270  
**YALE UNIVERSITY**, New Haven, Conn.; Sturart R. Brinkley; 8 months; \$14,510  
**YESHIVA UNIVERSITY**, New York, N.Y.; A. Gelbart; 9 months; \$49,960  
**YOUNGSTOWN UNIVERSITY**, Youngstown, Ohio; Clair L. Worley; 9 months; \$7,620

#### IN-SERVICE INSTITUTES FOR ELEMENTARY SCHOOL TEACHERS AND ADMINISTRATORS

**AMERICAN MUSEUM OF NATURAL HISTORY**, New York, N.Y.; Franklyn M. Branley; 5 months; \$2,710  
**UNIVERSITY OF ARIZONA**, Tucson, Ariz.; Arthur H. Steinbrenner; 9 months; \$5,530  
**BEMIDJI STATE COLLEGE**, Bemidji, Minn.; Richard E. Beltzel; 9 months; \$5,250  
**EAST TEXAS STATE COLLEGE**, Commerce, Tex.; Roy N. Jervis; 9 months; \$5,830  
**IOWA STATE TEACHERS COLLEGE**, Cedar Falls, Iowa; Flenadine Gibb; 7 months; \$5,200  
**KANSAS STATE TEACHERS COLLEGE**, Emporia, Kans.; Ted F. Andrews; 9 months; \$6,520  
**MILLERSVILLE STATE COLLEGE**, Millersville, Pa.; William B. McIlwaine; 9 months; \$5,360  
**NORTHERN ILLINOIS UNIVERSITY**, De Kalb, Ill.; Eugene W. Hellmich; 9 months; \$5,650  
**NORTHWESTERN UNIVERSITY**, Evanston, Ill.; E. H. C. Hildebrandt; 8 months; \$8,610  
**OREGON STATE COLLEGE**, Corvallis, Oreg.; Albert L. Leeland; 9 months; \$5,750  
**SAINT JOSEPH COLLEGE**, West Hartford, Conn.; Sister Maria Clare Markham; 9 months; \$5,480  
**SAN JOSE STATE COLLEGE CORPORATION**, San Jose, Calif.; John L. Marks; 9 months; \$6,100  
**TEXAS WOMAN'S UNIVERSITY**, Denton, Tex.; Dixie Young; 9 months; \$6,000

#### SUMMER INSTITUTES FOR COLLEGE TEACHERS

**AMERICAN UNIVERSITY**, Washington, D.C.; Leo Schubert; 6 weeks; \$45,350  
**ARIZONA STATE UNIVERSITY**, Tempe, Ariz.; Gordon L. Bender; 6 weeks; \$39,700  
**BUCKNELL UNIVERSITY**, Lewisburg, Pa.; Charles Hestin Coder, Jr.; 6 weeks; \$44,000  
**UNIVERSITY OF CALIFORNIA**, Berkeley, Calif.; John W. Green; Los Angeles; 8 weeks; \$66,300  
 George Jura; 7 weeks; \$22,600  
**CLEMSON COLLEGE**, Clemson, S.C.; Robert W. Moorman; 8 weeks; \$53,500  
**COLORADO STATE UNIVERSITY RESEARCH FOUNDATION**, Fort Collins, Colo.; Milton E. Bender; 10 weeks; \$63,800  
**UNIVERSITY OF COLORADO**, Boulder, Colo.; Robert W. Pennak; 6 weeks; \$44,900  
**EMORY UNIVERSITY**, Atlanta, Ga.; William H. Jones; 9 weeks; \$43,680  
**UNIVERSITY OF FLORIDA**, Gainesville, Fla.; Herbert A. Meyer; 6 weeks; \$50,100  
**FORT LEWIS AGRICULTURAL AND MECHANICAL COLLEGE**, Durango, Colo.; Herbert D. Hart; 5 weeks; \$35,900  
**INDIANA UNIVERSITY**, Bloomington, Ind.; Wayne R. Lowell; 6 weeks; \$31,400

IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa; Glenn Murphy; 6 weeks; \$46,400

KANSAS STATE COLLEGE OF PITTSBURG, Pittsburg, Kans.; Leon C. Heckert; 8 weeks; \$51,500

LOUISIANA POLYTECHNIC INSTITUTE, Ruston, La.; Melvin A. Nobles; 9 weeks; \$36,900

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Gordon L. Brownell; 6 weeks; \$29,000

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Melvin Levine; 8 weeks; \$19,800

NEW YORK UNIVERSITY, New York, N.Y.; Joseph D. Gettler; 8 weeks; \$51,700

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; H. F. Robinson; 6 weeks; \$41,400

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; H. D. Crockford; 6 weeks; \$56,400

OAK RIDGE INSTITUTE OF NUCLEAR STUDIES, Oak Ridge, Tenn.; Ralph T. Overman; 4 and 6 weeks; \$20,600

OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Stillwater, Okla.; Jan T. Tuma; 9 weeks; \$46,300

OREGON STATE COLLEGE, Corvallis, Oreg.; Howard H. Hilleman; 8 weeks; \$67,000

Albert V. Logan; 6 weeks; \$48,800

UNIVERSITY OF OREGON, Eugene, Oreg.; Richard C. Castenholz; 8 weeks; \$36,100

REED COLLEGE, Portland, Oreg.; Kenneth E. Davis; 6 weeks; \$50,950

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; A. A. K. Booth; 4 weeks; \$19,300

A. A. K. Booth; 4 weeks; \$19,200

SAN JOSE STATE COLLEGE CORPORATION, San Jose, Calif.; W. H. Myers; 6 weeks; \$47,700

STANFORD UNIVERSITY, Stanford, Calif.; Harold M. Bacon; 6 weeks; \$52,200

STATE UNIVERSITY OF IOWA, Iowa City, Iowa; Titus Carr Evans; 8 weeks; \$19,000

STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N.J.; Robert H. Seavy; 6 weeks; \$39,900

SYRACUSE UNIVERSITY, Syracuse, N.Y.; Marshall W. Jennison; 6 weeks; \$14,500

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; George K. Schweitzer; 4 weeks; \$29,000

TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; John K. Hampton, Jr.; 8 weeks; \$19,200

UNIVERSITY OF WISCONSIN, Madison, Wis.; H. Van Engen; 8 weeks; \$44,700

#### SUMMER INSTITUTES FOR TECHNICAL INSTITUTE TEACHERS

UNIVERSITY OF HOUSTON, Houston, Tex.; Herbert H. Curry; 8 weeks; \$51,200

OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Stillwater, Okla.; High Lineback; 8 weeks; \$49,700

#### SUMMER INSTITUTES FOR HIGH SCHOOL AND COLLEGE TEACHERS

BROWN UNIVERSITY, Providence, R.I.; Lealyn B. Clapp; 6 weeks; \$39,400

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Edward L. Triplett; 6 weeks; \$36,850

CLARK UNIVERSITY, Worcester, Mass.; Charles T. Bumer; 6 weeks; \$54,900

COLLEGE OF WILLIAM AND MARY, Williamsburg, Va.; Melvin A. Pittman; 8 weeks; \$97,200

COLORADO COLLEGE, Colorado Springs, Colo.; Richard G. Beidleman; 8 weeks; \$77,900

COLORADO STATE UNIVERSITY, Fort Collins, Colo.; John J. Faris; 8 weeks; \$94,000

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Charles W. Edgington; 8 weeks; \$19,000

UNIVERSITY OF HAWAII, Honolulu, Hawaii; Sidney C. Hsiao; 6 weeks; \$13,050

UNIVERSITY OF KANSAS, Lawrence, Kans.; Russell N. Bradt; 8 weeks; \$101,875

KENYON COLLEGE, Gambier, Ohio; Eric S. Graham; 7 weeks; \$41,600

MICHIGAN STATE UNIVERSITY, East Lansing, Mich.; Wayne Taylor; 11 weeks; \$151,700

MISSISSIPPI STATE UNIVERSITY, State College, Miss.; Clyde Quitman Sheely; 11 weeks; \$146,600

UNIVERSITY OF MISSISSIPPI, University, Miss.; George Vaughan; 10 weeks; \$137,800

NEBRASKA WESLEYAN UNIVERSITY, Lincoln, Nebr.; Walter R. French, Jr.; 8 weeks; \$62,500

OREGON STATE COLLEGE, Corvallis, Oreg.; Albert R. Poole; 8 weeks; \$61,500

PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE, Philadelphia, Pa.; Arthur Osol; 6 weeks; \$27,300

PRINCETON UNIVERSITY, Princeton, N.J.; J. G. Bradshaw; 6 weeks; \$39,500

J. G. Bradshaw; 6 days; \$39,100

REED COLLEGE, Portland, Oreg.; Arthur H. Livermore; 6 weeks; \$38,000

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Emory P. Starke; 6 weeks; \$82,100

UNIVERSITY OF SOUTH CAROLINA, Columbia, S.C.; W. L. Williams; 8 weeks; \$82,825

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; D. Victor Steed; 6 weeks; \$44,900

TEMPLE UNIVERSITY, Philadelphia, Pa.; Elmer L. Offenbacher; 8 weeks; \$86,000

UNIVERSITY OF VERMONT AND STATE AGRICULTURAL COLLEGE, Burlington, Vt.; N. James Schoonmaker; 7 weeks; \$68,600

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Arthur D. Welander; 8 weeks; \$40,800

#### SUMMER INSTITUTES FOR HIGH SCHOOL TEACHERS

ADELPHI COLLEGE, Garden City, N.Y.; Howard A. Robinson; 6 weeks; \$86,450

AGRICULTURAL AND TECHNICAL COLLEGE OF NORTH CAROLINA, Greensboro, N.C.; Gerald A. Edwards; 6 weeks; \$58,800

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station, Tex.; Coleman M. Loyd; 12 weeks; \$1,200

ALABAMA COLLEGE, Montevallo, Ala.; Paul C. Bailey; 6 weeks; \$55,000

UNIVERSITY OF ALABAMA, University, Ala.; Charles K. Arey; 11 weeks; \$39,400

Charles K. Arey; 11 weeks; \$73,500

UNIVERSITY OF ALASKA, College, Alaska; William R. Cashen; 8 weeks; \$67,400

ALBANY STATE COLLEGE, Albany, Ga.; Alexander A. Hall; 6 weeks; \$46,200

ALLEGHENY COLLEGE, Meadville, Pa.; Robert E. Bugbee; 7 weeks; \$67,000

**AMERICAN MUSEUM OF NATURAL HISTORY**, New York, N.Y.; C. Bruce Hunter; 4 weeks; \$14,100  
**AMERICAN UNIVERSITY**, Washington, D.C.; Leo Schubert; 8 weeks; \$65,100  
**ANTIOCH COLLEGE**, Yellow Springs, Ohio; James F. Corwin; 8 weeks; \$86,600  
**APPALACHIAN STATE TEACHERS COLLEGE**, Boone, N.C.; I. W. Carpenter, Jr.; 6 weeks; \$43,100  
**ARIZONA STATE COLLEGE**, Flagstaff, Ariz.; Agnes M. Allen; 8 weeks; \$59,200  
**UNIVERSITY OF ARIZONA**, Tucson, Ariz.; Millard G. Seeley; 8 weeks; \$78,700  
 Arthur H. Steinbrenner; 8 weeks; \$56,600  
**ARIZONA STATE UNIVERSITY**, Tempe, Ariz.; Alan T. Wager; 8 weeks; \$70,100  
**UNIVERSITY OF ARKANSAS**, Fayetteville, Ark.; Billy J. Attebery; 6 weeks; \$38,900  
 Lowell F. Bailey; 6 weeks; \$58,200  
**UNIVERSITY OF ARKANSAS MEDICAL CENTER**, Little Rock, Ark.; Horace N. Marvin; 7 weeks; \$17,000  
**ATLANTA UNIVERSITY**, Atlanta, Ga.; K. A. Huggins; 9 weeks; \$64,500  
**AUBURN UNIVERSITY**, Auburn, Ala.; Ernest Williams; 10½ weeks; \$128,500  
**BALL STATE TEACHERS COLLEGE**, Muncie, Ind.; Charles Brumfiel; 10 weeks; \$80,600  
 Jerry J. Nisbet; 10 weeks; \$81,100  
**BENEDICT COLLEGE**, Columbia, S.C.; T. J. Hanberry; 6 weeks; \$51,400  
**BIRMINGHAM-SOUTHERN COLLEGE**, Birmingham, Ala.; Wiley S. Rogers; 8 weeks; \$71,000  
**BOSTON COLLEGE**, Chestnut Hill, Mass.; Stanley J. Bezuska, S.J.; 6 weeks; \$52,625  
 Stanley J. Bezuska, S.J.; 6 weeks; \$61,500  
**BOSTON UNIVERSITY**, Boston, Mass.; George P. Fulton; 6 weeks; \$54,450  
**BOWDOIN COLLEGE**, Brunswick, Maine; Samuel E. Kamerling; 6 weeks; \$36,400  
 Reinhard L. Korgen; 6 weeks; \$60,550  
 Noel C. Little; 6 weeks; \$14,500  
**BOWLING GREEN STATE UNIVERSITY**, Bowling Green, Ohio; Bruce R. Vogell; 5 weeks; \$41,200  
**BRADLEY UNIVERSITY**, Peoria, Ill.; A. Wayne McGaughey; 6 weeks; \$41,700  
**BRIGHAM YOUNG UNIVERSITY**, Provo, Utah; Lane A. Compton, Eyring Science Center; 8 weeks; \$19,000  
 L. Edwin Hirschi, Stewart School; 7 weeks; \$33,200  
 Reed M. Izatt; 8 weeks; \$43,800  
**BROWN UNIVERSITY**, Providence, R.I.; Elmer R. Smith; 6 weeks; \$58,800  
 Elmer R. Smith; 6 weeks; \$61,400  
**BUCKNELL UNIVERSITY**, Lewisburg, Pa.; Lester Kleff; 6 weeks; \$62,500  
**UNIVERSITY OF BUFFALO**, Buffalo, N.Y.; Harriet F. Montague; 6 weeks; \$47,300  
**UNIVERSITY OF CALIFORNIA**, Berkeley, Calif.; F. E. Blacet; Los Angeles; 6 weeks; \$93,100  
 Raymond L. Libby; Los Angeles; 6 weeks; \$14,500  
 Robert A. Rice; 7 weeks; \$92,800  
 Edward D. Roessler; Davis; 8 weeks; \$101,900  
 Martinus Van Waynen; 8 weeks; \$101,500  
**CARLETON COLLEGE**, Northfield, Minn.; Robert T. Mathews; 6 weeks; \$45,500  
 Arild J. Miller; 6 weeks; \$47,200  
 Frank L. Wolf; 6 weeks; \$48,300  
**CASE INSTITUTE OF TECHNOLOGY**, Cleveland, Ohio; Paul E. Guenther; 6 weeks; \$52,300  
**CATHOLIC UNIVERSITY OF PUERTO RICO**, Santa Maria, P.R.; Joseph W. Stander; 6 weeks; \$33,800  
**CENTRAL CONNECTICUT STATE COLLEGE**, New Britain, Conn.; Kenneth G. Fuller; 6 weeks; \$48,400  
**CENTRAL MICHIGAN UNIVERSITY**, Mt. Pleasant, Mich.; Lester H. Serler; 6 weeks; \$50,300  
 Lester H. Serler; 6 weeks; \$49,800  
**CENTRAL MISSOURI STATE COLLEGE**, Warrensburg, Mo.; Sam P. Hewitt; 8 weeks; \$72,800  
**UNIVERSITY OF CHATTANOOGA**, Chattanooga, Tenn.; J. Horace Coulliette; 7 weeks; \$69,300  
**CHICO STATE COLLEGE FOUNDATION**, Chico, Calif.; Robbins S. King; 6 weeks; \$61,600  
**CLAFLIN COLLEGE**, Orangeburg, S.C.; Hampton D. Smith, Sr.; 9 weeks; \$76,800  
**CLARKSON COLLEGE OF TECHNOLOGY**, Potsdam, N.Y.; F. Gordon Lindsey; 8 weeks; \$78,200  
**CLEMSON COLLEGE**, Clemson, S.C.; Floyd I. Brownley, Jr.; 6 weeks; \$58,300  
**COLBY COLLEGE**, Waterville, Maine; Evans B. Reid; 6 weeks; \$79,900  
**COLGATE UNIVERSITY**, Hamilton, N.Y.; Carl Munshower; 6 weeks; \$47,900  
 Carl Munshower; 6 weeks; \$48,500  
 Oran B. Stanley; 6 weeks; \$58,600  
**COLLEGE OF THE HOLY CROSS**, Worcester, Mass.; Raymond J. Swords, S.J.; 6 weeks; \$55,300  
**COLLEGE OF THE PACIFIC**, Stockton, Calif.; Herschel Frye; 10 weeks; \$75,100  
**COLORADO STATE COLLEGE**, Greeley, Colo.; John A. Beel; 8 weeks; \$62,900  
**UNIVERSITY OF COLORADO**, Boulder, Colo.; Charles R. Bitter; 7 weeks; \$46,800  
 John M. Cleveland; 8 weeks; \$53,900  
 Newell Younggren; 6 weeks; \$47,200  
**COLUMBIA COLLEGE**, Columbia, S.C.; Phillip E. Graef; 8 weeks; \$61,600  
**UNIVERSITY OF CONNECTICUT**, Storrs, Conn.; David J. Bilck; 6 weeks; \$79,400  
**CONVERSE COLLEGE**, Spartansburg, S.C.; Walter James Wyatt; 8 weeks; \$76,900  
**CORNELL UNIVERSITY**, Ithaca, N.Y.; R. William Shaw; 6 weeks; \$54,200  
**DARTMOUTH COLLEGE**, Hanover, N.H.; Richard S. Pieters; 8 weeks; \$75,525  
**UNIVERSITY OF DELAWARE**, Newark, Del.; John A. Brown; 8 weeks; \$37,000  
**UNIVERSITY OF DENVER**, Denver, Colo.; Earl A. Engle; 9 weeks; \$74,900  
**DEPAUL UNIVERSITY**, Chicago, Ill.; Willis B. Caton; 6 weeks; \$25,200  
**DEPAUW UNIVERSITY**, Greencastle, Ind.; Donald J. Cook; 6 weeks; \$44,100  
**UNIVERSITY OF DETROIT**, Detroit, Mich.; Everette L. Henderson; 6 weeks; \$54,200  
 Lyle E. Mehlenbacher; 6 weeks; \$41,000  
**DRAKE UNIVERSITY**, Des Moines, Iowa; B. E. Gillam; 6 weeks; \$46,500  
**DUKE UNIVERSITY**, Durham, N.C.; Lewis E. Anderson; 9 weeks; \$115,400  
 Donald J. Fluke; 8 weeks; \$19,000  
 Thomas D. Reynolds; 9 weeks; \$134,000  
**EASTERN ILLINOIS UNIVERSITY**, Charleston, Ill.; Weldon N. Baker; 8 weeks; \$76,400  
**EASTERN MICHIGAN UNIVERSITY**, Ypsilanti, Mich.; James M. Barnes; 6 weeks; \$60,200  
**EASTERN NEW MEXICO UNIVERSITY**, Portales, N. Mex.; Ruth B. Thomas; 8 weeks; \$61,300  
**EAST TENNESSEE STATE COLLEGE**, Johnson City, Tenn.; Douglas G. Nicholson; 8 weeks; \$73,300



**EAST TEXAS STATE COLLEGE**, Commerce, Tex.; Roy N. Jervls; 6 weeks; \$33,300  
**EMMANUEL MISSIONARY COLLEGE**, Berrien Springs, Mich.; Harold T. Jones; 8 weeks; \$42,200  
**EMORY UNIVERSITY**, Atlanta, Ga.; Trevor Evans; 7 weeks; \$39,400  
**FLORIDA STATE UNIVERSITY**, Tallahassee, Fla.; Dwight B. Goodner; 8 weeks; \$51,300  
 Dwight B. Goodner; 8 weeks; \$55,200  
**UNIVERSITY OF FLORIDA**, Gainesville, Fla.; N. E. Bingham; 8 weeks; \$110,700  
**FORDHAM UNIVERSITY**, New York, N.Y.; Frederick L. Canavan, S.J.; 6 weeks; \$49,800  
 Henry F. DeBaggis; 6 weeks; \$49,600  
 Henry F. DeBaggis; 6 weeks; \$49,600  
**PORT HAYS KANSAS STATE COLLEGE**, Hays, Kans.; W. Toalson; 8 weeks; \$45,600  
**FRANKLIN AND MARSHALL COLLEGE**, Lancaster, Pa.; Bernard Jacobson; 6 weeks; \$29,800  
 John H. Moss; 8 weeks; \$40,800  
 Richard I. Weller; 6 weeks; \$23,900  
**GEORGE PEABODY COLLEGE FOR TEACHERS**, Nashville, Tenn.; H. Craig Sipe; 10 weeks; \$129,300  
**GEORGETOWN UNIVERSITY**, Washington, D.C.; Malcolm W. Oliphant; 8 weeks; \$50,000  
**GEORGE WASHINGTON CARVER FOUNDATION OF TUSKEGEE INSTITUTE**, Tuskegee Institute, Ala.; James H. M. Henderson; 8 weeks; \$19,000  
**GEORGE WASHINGTON UNIVERSITY**, Washington, D.C.; David Nelson; 8 weeks; \$49,300  
**UNIVERSITY OF GEORGIA**, Athens, Ga.; T. H. Whitehead; 6 weeks; \$48,600  
 T. H. Whitehead; 9 weeks; \$60,100  
 T. H. Whitehead; 9 weeks; \$68,700  
**GRAMBLING COLLEGE**, Grambling, La.; Archie L. Lacey; 8 weeks; \$44,500  
**HAMILTON COLLEGE**, Clinton, N.Y.; Brewster H. Gere; 6 weeks; \$47,600  
**UNIVERSITY OF HAWAII**, Honolulu, Hawaii; Albert J. Bernatowicz; 6 weeks; \$71,000  
**HOPE COLLEGE**, Holland, Mich.; Jay Folkert; 6 weeks; \$38,900  
**HOWARD PAYNE COLLEGE**, Brownwood, Tex.; Leonard R. Daniel; 6 weeks; \$48,400  
**HOWARD UNIVERSITY**, Washington, D.C.; Marie C. Taylor; 8 weeks; \$49,400  
**HUMBOLDT STATE COLLEGE**, Arcata, Calif.; E. Charles Parke; 6 weeks; \$60,700  
**HUNTER COLLEGE OF THE CITY OF NEW YORK**, New York, N.Y.; Jewell Hughes Bushey; 6 weeks; \$47,400  
**UNIVERSITY OF IDAHO**, Moscow, Idaho; K. A. Bush; 8 weeks; \$41,400  
 Edgar H. Grahn; 8 weeks; \$74,200  
 Edgar H. Grahn; 8 weeks; \$94,200  
**ILLINOIS INSTITUTE OF TECHNOLOGY**, Chicago, Ill.; Halm Reingold; 8 weeks; \$101,200  
**ILLINOIS STATE NORMAL UNIVERSITY**, Normal, Ill.; Clyde T. McCormick; 8 weeks; \$30,700  
**ILLINOIS WESLEYAN UNIVERSITY**, Bloomington, Ill.; Wayne W. Wantland; 8 weeks; \$70,700  
**UNIVERSITY OF ILLINOIS**, Urbana, Ill.; Max Beberman; 8 weeks; \$31,700  
 Roger K. Brown; 8 weeks; \$61,500  
 Peter E. Yankwich; 8 weeks; \$36,200  
**INDIANA STATE TEACHERS COLLEGE**, Terre Haute, Ind.; John C. Hook; 10 weeks; \$87,100  
**INDIANA UNIVERSITY**, Bloomington, Ind.; Robert B. Fischer; 8 weeks; \$50,900  
 Shelby D. Gerking; 6 weeks; \$38,300  
 L. S. McClung; 4 weeks; \$21,600  
 Marie S. Wilcox; Thomas Carr Howe High School; 6 weeks; \$50,500

**INTERAMERICAN UNIVERSITY OF PUERTO RICO**, San German, P.R.; Ismael Velez; 7 weeks; \$49,200  
**IOWA STATE TEACHERS COLLEGE**, Cedar Falls, Iowa; Irvin Brune; 8 weeks; \$69,600  
**IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY**, Ames, Iowa; J. J. L. Hinrichsen; 6 weeks; \$39,200  
 Orlando C. Kreider; 6 weeks; \$90,900  
**JOHNS HOPKINS UNIVERSITY**, Baltimore, Md.; William Kelso Morrill, Sr.; 6 weeks; \$47,800  
**KANSAS STATE COLLEGE OF PITTSBURG**, Pittsburg, Kans.; R. G. Smith; 8 weeks; \$63,200  
**KANSAS STATE TEACHERS COLLEGE**, Emporia, Kans.; Otto M. Smith; 12 weeks; \$201,500  
**KANSAS STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE**, Manhattan, Kans.; J. R. Chelikowsky; 8 weeks; \$54,900  
 Leonard E. Fuller; 8 weeks; \$88,700  
**UNIVERSITY OF KANSAS**, Lawrence, Kans.; Edward L. Shaw; 8 weeks; \$19,800  
**KENT STATE UNIVERSITY**, Kent, Ohio; Kenneth B. Cummins; 8 weeks; \$66,200  
**KNOX COLLEGE**, Galesburg, Ill.; Herbert Priestley; 6 weeks; \$51,200  
 Rothwell Stephens; 6 weeks; \$50,700  
**LAFAYETTE COLLEGE**, Easton, Pa.; Fred V. Roeder; 6 weeks; \$62,800  
**LEHIGH UNIVERSITY**, Bethlehem, Pa.; H. R. Gault; 6 weeks; \$37,200  
**LONGWOOD COLLEGE**, Farmville, Va.; Blanche C. Badger; 4 weeks; \$16,500  
**LOUISIANA POLYTECHNIC INSTITUTE**, Ruston, La.; John A. Moore; 9 weeks; \$69,100  
**LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE**, Baton Rouge, La.; Hulen B. Williams; 9 weeks; \$54,200  
 Hulen B. Williams; 9 weeks; \$72,100  
**LOYOLA UNIVERSITY OF LOS ANGELES**, Los Angeles, Calif.; Berthold R. Wicker; 6 weeks; \$35,900  
**MACALESTER COLLEGE**, Saint Paul, Minn.; Russell B. Hastings; 8 weeks; \$72,100  
**UNIVERSITY OF MAINE**, Orono, Maine; S. H. Kimball; 6 weeks; \$48,100  
**MARQUETTE UNIVERSITY**, Milwaukee, Wis.; Clarence F. Dineen; 6 weeks; \$36,900  
 L. J. Heider; 6 weeks; \$34,700  
**MARSHALL FOUNDATION, INC.**, Huntington, W. Va.; Donald C. Martin; 11 weeks; \$76,700  
 Donald C. Martin; 11 weeks; \$77,800  
**UNIVERSITY OF MARYLAND**, College Park, Md.; Joshua R. C. Brown; 7 weeks; \$83,800  
 Joshua R. C. Brown; 7 weeks; \$84,625  
 Richard A. Good; 6 weeks; \$33,800  
**MEMPHIS STATE UNIVERSITY**, Memphis, Tenn.; J. W. Fox; 8 weeks; \$66,800  
 H. S. Kaltenborn; 8 weeks; \$61,400  
**MIAMI UNIVERSITY**, Oxford, Ohio; Bruce V. Weldner; 8 weeks; \$66,200  
**MICHIGAN COLLEGE OF MINING AND TECHNOLOGY**, Houghton, Mich.; Donald G. Yerg; 8 weeks; \$48,800  
**UNIVERSITY OF MICHIGAN**, Ann Arbor, Mich.; Frank R. Bellaire; 6 weeks; \$43,100  
**MIDDLE TENNESSEE STATE COLLEGE**, Murfreesboro, Tenn.; J. Eldred Wisner; 11 weeks; \$86,900  
**UNIVERSITY OF MINNESOTA**, Minneapolis, Minn.; William H. Marshall; 5 weeks; \$20,400  
 Francis A. Spurrell; 6 weeks; \$14,500  
 Frank Verbrugge; 8 weeks; \$105,960  
**MISSISSIPPI SOUTHERN COLLEGE**, Hattiesburg, Miss.; B. O. Van Hook; 9 weeks; \$103,200

**UNIVERSITY OF MISSOURI, Columbia, Mo.;**  
 R. F. Brooks; 8 weeks; \$62,500  
 Paul B. Burcham; 8 weeks; \$50,200  
 Paul B. Burcham; 8 weeks; \$49,300  
 Harold Q. Fuller; Rolla; 8 weeks; \$93,200  
 Louis V. Holroyd; 8 weeks; \$62,600  
**MONTANA STATE COLLEGE, Bozeman, Mont.;**  
 L. O. Binder, Jr.; 5 weeks; \$53,400  
**MONTANA STATE UNIVERSITY, Missoula, Mont.;**  
 LeRoy H. Harvey; 8 weeks; \$14,400  
 Frederick H. Young; 10 weeks; \$53,300  
**MONTCLAIR STATE COLLEGE, Upper Montclair, N.J.;**  
 Max A. Sobel; 6 weeks; \$73,500  
**MOREHEAD STATE COLLEGE, Morehead, Ky.;**  
 William B. Owsley; 8 weeks; \$61,200  
**MORGAN STATE COLLEGE, Baltimore, Md.;**  
 Thomas P. Fraser; 6 weeks; \$55,100  
**MURRAY STATE COLLEGE FOUNDATION, Murray, Ky.;**  
 Alfred Wolfson; Murray State College; 8 weeks; \$80,900  
**UNIVERSITY OF NEBRASKA, Lincoln, Nebr.;**  
 John R. DeMuth; 8 weeks; \$89,300  
**UNIVERSITY OF NEVADA, Reno, Nev.;**  
 George Barnes; 8 weeks; \$66,100  
**UNIVERSITY OF NEW HAMPSHIRE, Durham, N.H.;**  
 Harold A. Iddles; 8 weeks; \$83,500  
 Harold A. Iddles; 8 weeks; \$85,100  
 M. Evans Munroe; 8 weeks; \$61,600  
**NEW MEXICO COLLEGE OF AGRICULTURE AND MECHANIC ARTS, University Park, N. Mex.;**  
 E. L. Cleveland; 8 weeks; \$115,900  
**NEW MEXICO HIGHLANDS UNIVERSITY, Las Vegas, N. Mex.;**  
 James P. Zietlow; 8 weeks; \$59,300  
**UNIVERSITY OF NEW MEXICO, Albuquerque, N. Mex.;**  
 Frank C. Gentry; 8 weeks; \$62,200  
 Loren D. Potter; 9 weeks; \$21,300  
**UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.;**  
 Edward A. Cameron; 6 weeks; \$104,100  
 Victor A. Greulich; 6 weeks; \$88,400  
**NORTH DAKOTA STATE COLLEGE, Fargo, N. Dak.;**  
 F. L. Minnear; 8 weeks; \$93,700  
**UNIVERSITY OF NORTH DAKOTA, Grand Forks, N. Dak.;**  
 J. Donald Henderson; 8 weeks; \$80,400  
**NORTH TEXAS STATE COLLEGE, Denton, Tex.;**  
 Robert C. Sherman; 6 weeks; \$47,200  
**NORTHEAST LOUISIANA STATE COLLEGE, Monroe, La.;**  
 Aaron Seamster; 9 weeks; \$44,300  
**NORTHERN ILLINOIS UNIVERSITY, DeKalb, Ill.;**  
 Martin W. Reinemann; 8 weeks; \$62,600  
 Frederick W. Rolf; 8 weeks; \$64,300  
**NORTHERN MICHIGAN COLLEGE, Marquette, Mich.;**  
 Holmes Boynton; 6 weeks; \$58,000  
**NORTHWESTERN STATE COLLEGE, Natchitoches, La.;**  
 W. G. Erwin; 9 weeks; \$49,900  
**NORTHWESTERN UNIVERSITY, Evanston, Ill.;**  
 E. H. C. Hildebrandt; 8 weeks; \$64,200  
**UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.;**  
 Emil T. Hofman; 7 weeks; \$64,400  
 Emil T. Hofman; 7 weeks; \$71,400  
 Arnold E. Ross; 7 weeks; \$143,100  
**OAK RIDGE INSTITUTE OF NUCLEAR STUDIES, Oak Ridge, Tenn.;**  
 Ralph T. Overman; 4 weeks; \$31,300  
**OSBERLIN COLLEGE, Oberlin, Ohio;**  
 Wade Ellis; 8 weeks; \$112,000  
**OHIO STATE UNIVERSITY, Columbus, Ohio;**  
 John S. Richardson; 8 weeks; \$124,700  
**OHIO UNIVERSITY, Athens, Ohio;**  
 L. P. Eblin; 6 weeks; \$57,700  
**OHIO WESLEYAN UNIVERSITY, Delaware, Ohio;**  
 Robert A. Roberts; 6 weeks; \$38,000  
 Leonard N. Russell; 8 weeks; \$75,300

**OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Stillwater, Okla.;**  
 Imy V. Holt; 9 weeks; \$67,100  
 James H. Zant; 8 weeks; \$63,900  
**UNIVERSITY OF OKLAHOMA, Norman, Okla.;**  
 Horace H. Bliss, Oklahoma Science Service; 4 weeks; \$40,700  
 Horace H. Bliss, Oklahoma Science Service; 8 weeks; \$43,900  
 Horace H. Bliss, Oklahoma Science Service; 8 weeks; \$44,500  
 Horace H. Bliss, Oklahoma Science Service; 8 weeks; \$75,300  
**OREGON STATE COLLEGE, Corvallis, Oreg.;**  
 Stanley E. Williamson; 8 weeks; \$600  
**UNIVERSITY OF OREGON, Eugene, Oreg.;**  
 A. F. Moursund; 8 weeks; \$63,300  
**PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.;**  
 William H. Powers; 6 weeks; \$108,450  
**UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.;**  
 J. F. Hazel; 6 weeks; \$80,800  
**PRAIRIE VIEW AGRICULTURAL AND MECHANICAL COLLEGE, Prairie View, Tex.;**  
 E. E. O'Banion; 6 weeks; \$48,300  
**PRATT INSTITUTE, Brooklyn, N.Y.;**  
 John Michael O'Gorman; 6 weeks; \$39,800  
**PRINCETON UNIVERSITY, Princeton, N.J.;**  
 J. G. Bradshaw; 6 weeks; \$43,100  
**UNIVERSITY OF PUERTO RICO, Rio Piedras, P.R.;**  
 Augusto Bobonis; 8 weeks; \$68,300  
 F. Bueso; 6 weeks; \$57,800  
 J. A. Ramos; Mayaguez; 6 weeks; \$13,900  
**PURDUE UNIVERSITY, Lafayette, Ind.;**  
 John E. Christian; 6 weeks; \$14,700  
 D. A. Davenport; 8 weeks; \$44,600  
 D. A. Davenport; 8 weeks; \$46,100  
 M. Wiles Keller; 8 weeks; \$57,300  
 R. W. Lefler; 8 weeks; \$41,200  
 R. W. Lefler; 8 weeks; \$45,700  
 R. W. Lefler; 8 weeks; \$46,800  
 J. R. Singleton; 8 weeks; \$58,500  
**RANDOLPH-MACON WOMAN'S COLLEGE, Lynchburg, Va.;**  
 Paul A. Walker; 6 weeks; \$60,400  
**UNIVERSITY OF REDLANDS, Redlands, Calif.;**  
 Judson Sanderson; 9 weeks; \$49,800  
**REED COLLEGE, Portland, Oreg.;**  
 Burrowes Hunt; 8 weeks; \$48,800  
**RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.;**  
 Emery L. Will; State University College of Education, Oneonta; 6 weeks; \$48,800  
 Edgar W. Flinton, New York State College for Teachers, Albany; 6 weeks; \$48,900  
 Alexander G. Major, State University College of Education at Potsdam; 6 weeks; \$46,400  
**UNIVERSITY OF RHODE ISLAND, Kingston, R.I.;**  
 Elmer A. Palmatier; 6 weeks; \$34,400  
**UNIVERSITY OF ROCHESTER, Rochester, N.Y.;**  
 William A. Fullagar; 6 weeks; \$47,200  
**RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.;**  
 Alan A. Boyden; 6 weeks; \$41,050  
 Helgi Johnson; 6 weeks; \$41,800  
 Robert L. Sells; 7 weeks; \$50,470  
 Emory P. Starke; 6 weeks; \$84,950  
**SACRAMENTO STATE COLLEGE FOUNDATION, Sacramento, Calif.;**  
 Carl E. Ludwig, Sacramento State College; 6 weeks; \$62,500  
**SAINT AUGUSTINE'S COLLEGE, Raleigh, N.C.;**  
 Prezell R. Robinson; 6 weeks; \$50,600  
**ST. CLOUD STATE COLLEGE, St. Cloud, Minn.;**  
 Harold Hopkins; 5 weeks; \$50,900  
**SAINT LOUIS UNIVERSITY, St. Louis, Mo.;**  
 Theo. A. Ashford; 6 weeks; \$28,500  
 Francis Reagan; 6 weeks; \$48,100

UNIVERSITY OF SAN FRANCISCO, San Francisco, Calif.; Edward J. Farrell; 6 weeks; \$46,500

SAN JOSE STATE COLLEGE CORP., San Jose, Calif.; John L. Marks; 6 weeks; \$48,600

Charles E. Smith, Jr.; 6 weeks; \$26,300  
UNIVERSITY OF SANTA CLARA, Santa Clara, Calif.; Abraham P. Hillman; 6 weeks; \$40,700

SEATTLE UNIVERSITY, Seattle, Wash.; Ernest P. Bertin, S.J.; 8 weeks; \$75,900

SETON HILL COLLEGE, Greensburg, Pa.; Sister Mary Thaddeus; 6 weeks; \$42,100

SIMMONS COLLEGE, Boston, Mass.; Philip M. Richardson; 6 weeks; \$24,400

John A. Timm; 6 weeks; \$24,400  
SOUTH CAROLINA STATE COLLEGE, Orangeburg, S.C.; George W. Hunter; 8 weeks; \$80,100

UNIVERSITY OF SOUTH CAROLINA, Columbia, S.C.; W. L. Williams; 8 weeks; \$83,425

SOUTH DAKOTA SCHOOL OF MINES AND TECHNOLOGY, Rapid City, S. Dak.; Howard C. Peterson; 8 weeks; \$127,600

SOUTH DAKOTA STATE COLLEGE, Brookings, S. Dak.; Kenneth Howard; 8 weeks; \$62,400

SOUTHEASTERN STATE COLLEGE, Durant, Okla.; Leslie A. Dwight; 8 weeks; \$46,500

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; Willard Geer; 6 weeks; \$38,700

Jay M. Savage; 6 weeks; \$46,650  
SOUTHERN ILLINOIS UNIVERSITY, Carbondale, Ill.; W. C. McDaniel; 8 weeks; \$49,800

I. L. Shechmeister; 8 weeks; \$54,000

SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.; Joe P. Harris, Jr.; 6 weeks; \$30,500

SOUTHERN UNIVERSITY, Baton Rouge, La.; J. Warren Lee; 8 weeks; \$55,000

SOUTHWEST MISSOURI STATE COLLEGE, Springfield, Mo.; Carl V. Fronabarger; 6 weeks; \$27,200

SOUTHWESTERN LOUISIANA INSTITUTE, Lafayette, La.; James R. Oliver; 9 weeks; \$55,400

James R. Oliver; 9 weeks; \$79,800  
SOUTHWESTERN STATE COLLEGE, Weatherford, Okla.; Earl A. Reynolds; 8 weeks; \$48,400

SPRING HILL COLLEGE, Mobile, Ala.; Francis J. Kearley, Jr.; 6 weeks; \$29,400

STANFORD UNIVERSITY, Stanford, Calif.; Harold M. Bacon; 6 weeks; \$47,250

Paul Kirkpatrick; 6 weeks; \$60,500

STATE TEACHERS COLLEGE, California, Pa.; Gabriel P. Betz; 9 weeks; \$55,400

STATE UNIVERSITY OF IOWA, Iowa City, Iowa; Titus Carr Evans; 8 weeks; \$19,770

STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion, S. Dak.; M. M. Hasse; 8 weeks; \$64,200

M. M. Hasse; 8 weeks; \$77,100

STEPHEN F. AUSTIN STATE COLLEGE, Nacogdoches, Tex.; Alvin F. Shinn; 6 weeks; \$28,700

STETSON UNIVERSITY, De Land, Fla.; Gene W. Medlin; 8 weeks; \$59,800

STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N.J.; Robert H. Seavy; 6 weeks; \$59,400

SYRACUSE UNIVERSITY, Syracuse, N.Y.; John G. Burdick; 6 weeks; \$51,050

John G. Burdick; 6 weeks; \$51,000

William R. Frederickson; 6 weeks; \$79,800

William R. Frederickson; 6 weeks; \$61,400

TEACHERS COLLEGE, COLUMBIA UNIVERSITY, New York, N.Y.; Myron F. Roskopf; 6 weeks; \$49,300

TEMPLE UNIVERSITY, Philadelphia, Pa.; Elmer L. Offenbacher; 8 weeks; \$87,900

David S. Sarnar; 6 weeks; \$30,400

TENNESSEE AGRICULTURAL AND INDUSTRIAL STATE UNIVERSITY, Nashville, Tenn.; Rugherford H. Adkins; 8 weeks; \$51,600

TEXAS CHRISTIAN UNIVERSITY, Forth Worth, Tex.; Ben F. Goldbeck; 6 weeks; \$91,400

TEXAS TECHNOLOGICAL COLLEGE, Lubbock, Tex.; Earl D. Camp; 9 weeks; \$86,000

Earl D. Camp; 9 weeks; \$86,000

TEXAS SOUTHERN UNIVERSITY, Houston, Tex.; Robert J. Terry; 12 weeks; \$93,800

TEXAS WOMAN'S UNIVERSITY, Denton, Tex.; Harold T. Baker; 6 weeks; \$47,400

UNIVERSITY OF TEXAS, Austin, Tex.; Addison E. Lee; 9 weeks; \$117,100

THIEL COLLEGE, Greenville, Pa.; Bela G. Kolossvary; 6 weeks; \$42,000

UNIVERSITY OF TOLEDO, Toledo, Ohio; Robert R. Buell; 8 weeks; \$59,600

TUFTS UNIVERSITY, Medford, Mass.; M. Kent Wilson; 6 weeks; \$49,100

TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; E. Peter Volpe; 6 weeks; \$46,300

TUSKEGEE INSTITUTE, Tuskegee Institute, Ala.; W. Edward Belton; 8 weeks; \$59,700

W. Edward Belton; 8 weeks; \$59,700

UNION COLLEGE AND UNIVERSITY, Schenectady, N.Y.; D. K. Baker; 8 weeks; \$130,800

D. K. Baker; 8 weeks; \$130,800

UTAH STATE UNIVERSITY, Logan, Utah; Joe Ellich; 10 weeks; \$76,800

VANDERBILT UNIVERSITY, Nashville, Tenn.; E. Baylis Shanks; 8 weeks; \$110,400

UNIVERSITY OF VERMONT AND STATE AGRICULTURAL COLLEGE, Burlington, Vt.; Nelson L. Walbridge; 8 weeks; \$78,700

N. James Schoonmaker; 7 weeks; \$67,300

VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg, Va.; Robert C. Krug; 8 weeks; \$54,000

VIRGINIA STATE COLLEGE, Petersburg, Va.; Richard H. Dunn; 8 weeks; \$100,350

UNIVERSITY OF VIRGINIA, Charlottesville, Va.; James W. Cole, Jr.; 8 weeks; \$72,500

WASHINGTON STATE UNIVERSITY, Pullman, Wash.; Alfred B. Butler; 8 weeks; \$89,700

Sidney G. Hacker; 8 weeks; \$58,100

Sidney G. Hacker; 8 weeks; \$60,100

UNIVERSITY OF WASHINGTON, Seattle Wash.; L. A. Sanderman; 8 weeks; \$60,000

WAYNE STATE UNIVERSITY, Detroit, Mich.; Walter Chavin; 8 weeks; \$19,000

Karl W. Polley; 8 weeks; \$66,100

WESLEYAN UNIVERSITY, Middletown, Conn.; Joseph S. Daltry; 6 weeks; \$94,400

Joseph S. Daltry; 6 weeks; \$96,500

WESTERN KENTUCKY STATE COLLEGE, Bowling Green, Ky.; Ward C. Sumpter; 8 weeks; \$76,200

WESTERN MICHIGAN UNIVERSITY, Kalamazoo, Mich.; George G. Mallinson; 8 weeks; \$48,100

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; Ralph H. Petrucci; 11 weeks; \$129,900

WEST TEXAS STATE COLLEGE, Canyon, Tex.; Hollis L. Cook; 12 weeks; \$89,100

WEST VIRGINIA UNIVERSITY, Morgantown, W. Va.; James B. Hickman; 6 weeks; \$92,900

WEST VIRGINIA WESLEYAN COLLEGE, Buckhannon, W. Va.; John C. Wright; 6 weeks; \$59,800

UNIVERSITY OF WICHITA, Wichita, Kans.; Clarence G. Stuckwisch; 6 weeks; \$27,000

WILLIAM JEWELL COLLEGE, Liberty, Mo.; Frank G. Edson; 8 weeks; \$78,100

WISCONSIN STATE COLLEGE, River Falls, Wis.; Richard J. Delorit; 8 weeks; \$39,000

WISCONSIN STATE COLLEGES, State Capitol, Madison, Wis.; Eugene R. McPhee; 6 weeks; \$42,200

UNIVERSITY OF WISCONSIN, Madison, Wis.; Robert A. Jaggard; 6 weeks; \$46,735

Peter J. Salamun; Milwaukee; 6 weeks; \$39,400

WITTENBERG UNIVERSITY, Springfield, Ohio; Everett H. Bush; 8 weeks; \$44,100

WOMAN'S COLLEGE OF THE UNIVERSITY OF NORTH CAROLINA, Greensboro, N.C.; Hollis J. Rogers; 6 weeks; \$48,200

WORCESTER POLYTECHNIC INSTITUTE, Worcester, Mass.; 8 weeks; \$600

UNIVERSITY OF WYOMING, Laramie, Wyo.; Carl A. Cinnamon; 8 weeks; \$19,000

Palmer O. Steen; 8 weeks; \$78,300

XAVIER UNIVERSITY, Cincinnati, Ohio; John B. Hart; 6 weeks; \$38,800

YALE UNIVERSITY, New Haven, Conn.; Stuart R. Brinkley; 6 weeks; \$87,300

Dirk Brouwer; 6 weeks; \$38,425

#### SUMMER INSTITUTES FOR ELEMENTARY SCHOOL TEACHERS AND ADMINISTRATORS

COLLEGE OF ST. CATHERINE, St. Paul, Minn.; Sister Seraphim; 6 weeks; \$34,400

DEPAUW UNIVERSITY, Greencastle, Ind.; Donald J. Cook; 6 weeks; \$28,500

UNIVERSITY OF KANSAS, Lawrence, Kans.; Robert W. Ridgway; 8 weeks; \$51,800

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Joseph N. Payne; 4 weeks; \$27,700

NORTHERN ILLINOIS UNIVERSITY, DeKalb, Ill.; Frederick W. Rolf; 8 weeks; \$49,900

NORTHERN MICHIGAN COLLEGE, Marquette, Mich.; Henry S. Heimonen; 6 weeks; \$37,700

UNIVERSITY OF RHODE ISLAND, Kingston, R.I.; Elmer A. Palmatier; 6 weeks; \$31,500

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Guido G. Weigand; 6 weeks; \$38,100

SAN FERNANDO VALLEY STATE COLLEGE FOUNDATION, Northridge, Calif.; Ruth L. Roche; 6 weeks; \$37,700

SAN JOSE STATE COLLEGE CORPORATION, San Jose, Calif.; James R. Smart; 6 weeks; \$38,500

UNIVERSITY OF SOUTH CAROLINA, Columbia, S.C.; Frederick H. Giles, Jr.; 6 weeks; \$27,700

SOUTHERN UNIVERSITY, Baton Rouge, La.; Woodrow H. Jones; 8 weeks; \$31,500

TEACHERS COLLEGE, Columbia University, New York, N.Y.; Frederick L. Fitzpatrick; 6 weeks; \$29,600

UNIVERSITY OF TEXAS, Austin, Tex.; W. T. Guy, Jr.; 6 weeks; \$31,400

#### SUMMER CONFERENCES

AMERICAN UNIVERSITY, Washington, D.C.; Matthew F. Norton; *Summer Conference in Stratigraphy and Structure of the Appalachians for College Teachers of Geology and Earth Sciences*; 14 days; \$17,800

BUTLER UNIVERSITY, Indianapolis, Ind.; Ralph K. Birdwhistell; *Summer Conference in the Recent Developments in Nonaqueous Solvents for College Teachers of Undergraduate Chemistry*; 14 days; \$14,500

CARLETON COLLEGE, Northfield, Minn.; Robert A. Reitz; *Summer Conference in Solid-State Physics for College Teachers of Physics*; 13 days; \$10,600

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; Burton V. Dean; *Summer Conference on New Applications of Mathematics and Statistics in the Design and Operation of Complex Systems for College Teachers of Mathematics and Engineering*; 19 days; \$27,300

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; Donal R. Wood; *Summer Conference in Genetics for College Teachers of Genetics*; 19 days; \$14,600

CORNELL COLLEGE, Mount Vernon, Iowa; Cecil F. Dam; *Summer Conference in Radioisotopes and Their Uses for Junior College Teachers of Biology, Chemistry, and Physics*; 12 days; \$16,700

UNIVERSITY OF DETROIT, Detroit, Mich.; Paul M. Reinhard; *Summer Conference in Scientific Engineering for College Teachers of Engineering in Graphics, Mechanics, Physics and Mathematics*; 12 days; \$8,400

UNIVERSITY OF FLORIDA, Gainesville, Fla.; Wallace S. Brey; *Summer Conference in Nuclear Resonance for College Teachers of Chemistry and Physics*; 12 days; \$12,400

GEORGETOWN UNIVERSITY, Washington, D.C.; Matthew P. Thekaekara, S.J.; *Summer Conference in the Recent Advances in Astro-Geophysics for College Teachers of Physics and Astronomy*; 24 days; \$20,800

LONG ISLAND BIOLOGICAL ASSOCIATION, Cold Springs Harbor, N.Y.; Paul Margolin; *Summer Conference in the Recent Developments in Molecular and Developmental Genetics for College Teachers of Genetics*; 20 days; \$15,300

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; Victor A. Greulich; *Summer Conference in Botany, With Emphasis on Plant Evolution and Plant Evolution and Plant Physiology for Junior College and College Teachers of General Biology and General Botany*; 19 days; \$13,800

UNIVERSITY OF OKLAHOMA, Norman, Okla.; William Viavant; *Summer Conference in Computer Programming and Related Mathematics for College Teachers of Science and Mathematics*; 25 days; \$29,700

PURDUE UNIVERSITY, Lafayette, Ind.; Warren W. Brandt; *Summer Conference in Chromatography: Theory and Practice for College Teachers of Chemistry*; 13 days; \$14,400

SACRAMENTO STATE COLLEGE FOUNDATION, Sacramento, Calif.; George N. Beaumarriage; *Summer Conference in Recent Developments in Mathematics and the Teaching of Arithmetic for College Teachers and Elementary School Supervisors of Arithmetic*; 13 days; \$21,700

TUFTS UNIVERSITY, Medford, Mass.; M. Kent Wilson; *Summer Conference in the Recent Advances in Chemical Bonding for College Teachers of Chemistry*; 11 days; \$16,100

WASHINGTON UNIVERSITY, Saint Louis, Mo.; Gerald L. Esterson; *Summer Conference in*

*Systems Engineering Theory for Chemical Engineering Teachers*; 24 days; \$22,310

## SUMMER SCIENCE TRAINING PROGRAM FOR SECONDARY SCHOOL STUDENTS

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station, Tex.; Melvin C. Schroeder; 5 weeks; \$12,400

John J. Sperry; 6 weeks; \$4,703

AGRICULTURAL AND TECHNICAL COLLEGE OF NORTH CAROLINA, Greensboro, N.C.; B. T. White; 6 weeks; \$22,110

UNIVERSITY OF ALASKA, College, Alaska; William S. Wilson; 3 weeks; \$11,040

AMERICAN ACADEMY OF ARTS AND SCIENCES, Boston, Mass.; Gordon O. Thayer, Thayer Academy; 10 weeks; \$25,220

AMERICAN METEOROLOGICAL SOCIETY, Boston, Mass.; Vincent J. Schaefer; 7 weeks; \$21,490

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Franklin M. Branley; 8 weeks; \$8,950

APPALACHIAN STATE TEACHERS COLLEGE, Boone, N.C.; F. Ray Derrick; 5 weeks; \$13,830

ARIZONA STATE COLLEGE, Flagstaff, Ariz.; J. Harvey Butchart; 5 weeks; \$7,340

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Henry Frelser; 10 weeks; \$40,450

BENNETT COLLEGE, Greensboro, N.C.; J. Henry Sayles; 6 weeks; \$32,740

BOWLING GREEN STATE UNIVERSITY, Bowling Green, Ohio; W. H. Hall; 5 weeks; \$4,760

UNIVERSITY OF BRIDGEPORT, Bridgeport, Conn.; Willard P. Berggren; 7 weeks; \$25,040

BROOKLYN COLLEGE, Brooklyn, N.Y.; Samuel Borofsky; 6 weeks; \$7,350

BROWN UNIVERSITY, Providence, R.I.; Charles B. MacKay; 6 weeks; \$20,430

BUCKNELL UNIVERSITY, Lewisburg, Pa.; Lester Kleff; 6 weeks; \$16,620

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Robert Guthrie; 8 weeks; \$12,570

BUHL PLANETARIUM AND INSTITUTE OF POPULAR SCIENCE, Pittsburgh, Pa.; Arthur L. Draper; 6 weeks; \$3,500

BUTLER UNIVERSITY, Indianapolis, Ind.; William H. Bessey; 7 weeks; \$7,010

CALIFORNIA STATE POLYTECHNIC COLLEGE, San Luis Obispo, Calif.; William Thurmond; 4 weeks; \$15,990

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Clifford Bell; Los Angeles; 6 weeks; \$5,820

Norris W. Rakestraw, Scripps Institution of Oceanography, La Jolla; 10 weeks; \$7,470

D. M. Reynolds; Davis; 6 weeks; \$17,900

Robert A. Rice; 6 weeks; \$19,130

UNIVERSITY OF CHICAGO, Chicago, Ill.; William H. Meyer; 6 weeks; \$53,500

COLGATE UNIVERSITY, Hamilton, N.Y.; Robert E. Todd; 6 weeks; \$14,890

COLLEGE OF THE PACIFIC, Stockton, Calif.; Jesse S. Binford, Jr.; 6 weeks; \$4,310

COLORADO COLLEGE, Colorado Springs, Colo.; Richard G. Beldeman; 8 weeks; \$9,320

COLORADO SCHOOL OF MINES, Golden, Colo.; James L. Hall; 6 weeks; \$17,820

COMMITTEE FOR ADVANCED SCIENCE TRAINING, INSTITUTE FOR MEDICAL RESEARCH, Cedars of Lebanon Hospital, Los Angeles, Calif.; Harry Sobel; 10 months; \$6,700

COOPER UNION FOR THE ADVANCEMENT OF SCIENCE AND ART, New York, N.Y.; Edward M. Griswold; 6 weeks; \$28,900

CORNELL UNIVERSITY, Ithaca, N.Y.; Thomas R. Nielsen; 6 weeks; \$36,010

UNIVERSITY OF DENVER, Denver, Colo.; H. P. Lehigh, Jr.; 9 weeks; \$6,650

UNIVERSITY OF DETROIT, Detroit, Mich.; Jon J. Kabara; 8 weeks; \$250

EAST TEXAS STATE COLLEGE, Commerce, Tex.; Roy N. Jervis; 5 weeks; \$6,100

EASTERN MONTANA COLLEGE OF EDUCATION, Billings, Mont.; Oliver W. Peterson; 8 weeks; \$2,880

EMORY AND HENRY COLLEGE, Emory, Va.; Marius Blesi; 5 weeks; \$6,800

EMORY UNIVERSITY, Atlanta, Ga.; J. G. Lester; 5 weeks; \$23,735

FISK UNIVERSITY, Nashville, Tenn.; Samuel P. Massie; 6 weeks; \$14,120

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Dwight B. Goodner; 6 weeks; \$9,220

UNIVERSITY OF FLORIDA, Gainesville, Fla.; Luther A. Arnold; 8 weeks; \$14,630

GENEVA COLLEGE, Beaver Falls, Pa.; Roy M. Adams; 9 weeks; \$6,120

UNIVERSITY OF GEORGIA, Athens, Ga.; T. H. Whitehead; 6 weeks; \$10,020

GODDARD COLLEGE, Plainfield, Vt.; George Beecher; 5 weeks; \$8,540

UNIVERSITY OF HAWAII, Honolulu, Hawaii; Donald C. McGulre; 7 weeks; \$13,470

HIRAM COLLEGE, Hiram, Ohio; Edward B. Rosser; 5 weeks; \$6,380

UNIVERSITY OF HOUSTON, Houston, Tex.; John C. Allred; 6 weeks; \$11,270

HOWARD PAYNE COLLEGE, Brownwood, Tex.; Leonard R. Daniel; 5 weeks; \$7,850

HOWARD UNIVERSITY, Washington, D.C.; Herman Branson; 8 weeks; \$15,270

HUMBOLDT STATE COLLEGE FOUNDATION, Arcata, Calif.; John M. Borgerson; 4 weeks; \$14,030

HUNTER COLLEGE, New York, N.Y.; Melvin S. Schwartz; 6 weeks; \$6,390

Henry D. Thompson; 5 weeks; \$5,880

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.; Haim Reingold; 34 weeks; \$18,960

UNIVERSITY OF ILLINOIS, Urbana, Ill.; J. S. Dobrovolny; 6 weeks; \$13,700

INDIANA UNIVERSITY, Bloomington, Ind.; Paul Klinge; 2 weeks; \$27,220

INTER AMERICAN UNIVERSITY OF PUERTO RICO, San German, P.R.; Ismael Velez; 9 weeks; \$15,620

KANSAS STATE TEACHERS COLLEGE, Emporia, Kans.; Otto M. Smith; 6 weeks; \$14,790

UNIVERSITY OF KANSAS, Lawrence, Kans.; Robert W. Baxter; 3 weeks; \$17,240

KEENE TEACHERS COLLEGE, Keene, N.H.; Alan N. Hall; 6 weeks; \$26,930

KENYON COLLEGE, Gambier, Ohio; William R. Transue; 4 weeks; \$12,080

KNOX COLLEGE, Galesburg, Ill.; Paul H. Shepard; 3 weeks; \$17,290

KNOXVILLE COLLEGE, Knoxville, Tenn.; Joseph M. Reyes; 8 weeks; \$35,890

LEHIGH UNIVERSITY, Bethlehem, Pa.; Albert Wilansky; 6 weeks; \$5,010

LOUISIANA POLYTECHNIC INSTITUTE, Ruston, La.; T. J. Laswell; 8 weeks; \$19,060

LOUISIANA STATE UNIVERSITY, Baton Rouge, La.; Harry J. Bennett; 10 weeks; \$8,530

John F. Christman; 9 weeks; \$19,040

LOYOLA UNIVERSITY OF LOS ANGELES, Los Angeles, Calif.; Clarence J. Wallen; 9 months; \$3,040

**MANHATTAN COLLEGE**, New York, N.Y.; Leonard O'Conner, F.S.C.; 6 weeks; \$11,450  
**MANKATO STATE COLLEGE FOUNDATION, INC.**, Mankato, Minn.; James A. Andersen; 4 weeks; \$16,940  
**UNIVERSITY OF MARYLAND**, College Park, Md.; Howard Laster; 12 weeks; \$4,320  
**UNIVERSITY OF MIAMI**, Coral Gables, Fla.; C. P. Idyll; The Marine Laboratory, Miami; 9 weeks; \$10,060  
**MICHIGAN COLLEGE OF MINING AND TECHNOLOGY**, Houghton, Mich.; U. J. Noblet; 5 weeks; \$13,810  
**UNIVERSITY OF MICHIGAN**, Ann Arbor, Mich.; Leigh C. Anderson; 6 weeks; \$19,270  
**UNIVERSITY OF MISSISSIPPI**, University, Miss.; Samuel F. Clark; 4 weeks; \$14,460  
**MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE**, East Lansing, Mich.; M. Isobel Blyth; 6 weeks; \$35,260  
**UNIVERSITY OF MISSOURI**, Columbia, Mo.; John E. Peterson; 2 weeks; \$7,000  
 Charles E. Remington, Jr.; 7 weeks; \$14,850  
**MONTANA STATE COLLEGE**, Bozeman, Mont.; James W. Cusick; 4 weeks; \$17,810  
**MOREHEAD STATE COLLEGE**, Morehead, Ky.; Margaret B. Heaslip; 4 weeks; \$5,370  
**MORGAN STATE COLLEGE**, Baltimore, Md.; John W. King; 8 weeks; \$20,300  
**MORRIS BROWN COLLEGE**, Atlanta, Ga.; Prince Wilson; 9 weeks; \$25,660  
**MURRAY STATE COLLEGE**, Murray, Ky.; W. E. Blackburn; 8 weeks; \$19,240  
**NATIONAL CHILDREN'S CARDIAC HOSPITAL**, Miami, Fla.; Milton S. Saslaw; 40 weeks; \$3,760  
**UNIVERSITY OF NEBRASKA**, Lincoln, Nebr.; Donald G. Hanway; 9 weeks; \$7,500  
**NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY**, Campus Station, Socorro, N. Mex.; Burrell L. Wood; 9 weeks; \$24,070  
**NEW YORK BOTANICAL GARDEN**, New York, N.Y.; Arthur Cronquist; 5 weeks; \$12,690  
**NEW YORK UNIVERSITY**, New York, N.Y.; Harry A. Charipper; 6 weeks; \$6,120  
**NORTH CAROLINA COLLEGE AT DURHAM**, Durham, N.C.; James S. Lee; 6 weeks; \$17,100  
**NORTH CAROLINA STATE COLLEGE**, Raleigh, N.C.; W. A. Reid; 6 weeks; \$16,740  
**NORTH DAKOTA AGRICULTURAL COLLEGE**, Fargo, N. Dak.; J. A. Callenbach; 10 weeks; \$1,530  
**UNIVERSITY OF NORTH DAKOTA**, Grand Forks, N. Dak.; K. B. MacKichan; 2 weeks; \$5,690  
**NORTHERN MICHIGAN COLLEGE**, Marquette, Mich.; Henry S. Helmonen; 4 weeks; \$10,820  
**NORTHWESTERN STATE COLLEGE OF LOUISIANA**, Natchitoches, La.; Rene J. Bienvenu; 9 weeks; \$4,920  
 Alan H. Crosby; 9 weeks; \$6,280  
**NORTHWESTERN UNIVERSITY**, Evanston, Ill.; F. G. Seulberger; 5 weeks; \$21,770  
**UNIVERSITY OF NOTRE DAME**, Notre Dame, Ind.; A. E. Ross; 7 weeks; \$16,480  
**OHIO UNIVERSITY**, Athens, Ohio; William G. Gambill, Jr.; 3 weeks; \$17,030  
**OKLAHOMA STATE UNIVERSITY**, Stillwater, Okla.; L. F. Sheerar; 6 weeks; \$10,280  
**OREGON STATE COLLEGE**, Corvallis, Oreg.; R. E. Gaskell; 7 weeks; \$18,450  
**PAN AMERICAN COLLEGE**, Edinburg, Tex.; Paul R. Engle, Observatory and Astro-Science Center; 6 weeks; \$8,550  
**UNIVERSITY OF PITTSBURGH**, Pittsburgh, Pa.; John R. Jablonski; 13 weeks; \$4,030  
**POLYTECHNIC INSTITUTE OF BROOKLYN**, Brooklyn, N.Y.; C. G. Overberger; 8 weeks; \$7,560  
**PRAIRIE VIEW AGRICULTURAL AND MECHANICAL COLLEGE**, Prairie View, Tex.; E. E. O'Banion; 6 weeks; \$7,550  
 Israel E. Glover; 6 weeks; \$6,240  
 Charles H. Nicholas; 6 weeks; \$7,080  
**UNIVERSITY OF PUERTO RICO**, Rio Piedras, P.R.; Francisco Garriga; 6 weeks; \$9,470  
 Eddie Ortiz Muniz; Mayaguez; 6 weeks; \$10,500  
**PURDUE UNIVERSITY**, Lafayette, Ind.; George A. Gries; 8 weeks; \$16,390  
**RENSSELAER POLYTECHNIC INSTITUTE**, Troy, N.Y.; John McCarthy; 6 weeks; \$13,140  
**ROSCOE B. JACKSON MEMORIAL LABORATORY**, Bar Harbor, Maine; John L. Fuller; 10 weeks; \$13,010  
**ROSWELL PARK MEMORIAL INSTITUTE**, Buffalo, N.Y.; E. A. Mirand; 8 weeks; \$9,640  
**RUTGERS, THE STATE UNIVERSITY**, New Brunswick, N.J.; Charles H. Stevens; 3 weeks; \$10,960  
**ST. CLOUD STATE COLLEGE**, St. Cloud, Minn.; Phillip Younger; 4 weeks; \$14,420  
**ST. JOHN'S UNIVERSITY**, Jamaica, N.Y.; Daniel M. Lilly; 6 weeks; \$11,610  
**ST. LOUIS UNIVERSITY**, St. Louis, Mo.; John J. Andrews; 4 weeks; \$4,660  
**ST. MARY'S COLLEGE OF CALIFORNIA**, St. Mary's College, Calif.; Albert B. Costa; 6 weeks; \$8,740  
**ST. OLAF COLLEGE**, Northfield, Minn.; Albert E. Finholt; 8 weeks; \$28,730  
**SAN JOSE STATE COLLEGE**, San Jose, Calif.; Wilbur Sprain; 4 weeks; \$8,730  
**UNIVERSITY OF SANTA CLARA**, Santa Clara, Calif.; Arthur T. Phelps; 6 weeks; \$13,390  
**SOUTH DAKOTA STATE COLLEGE**, Brookings, S. Dak.; Stanley Sundet; 6 weeks; \$6,350  
**SOUTHERN ILLINOIS UNIVERSITY**, Carbondale, Ill.; Leo Kaplan; 6 weeks; \$18,550  
**SOUTHERN METHODIST UNIVERSITY**, Dallas, Tex.; Frank J. Palas; 5 weeks; \$6,940  
**STATE UNIVERSITY OF IOWA**, Iowa City, Iowa; Robert Yager; 8 weeks; \$23,920  
**STATE UNIVERSITY OF SOUTH DAKOTA**, Vermillion, S. Dak.; Sherwood Cummings; 2 weeks; \$7,660  
**STEPHEN F. AUSTIN STATE COLLEGE**, Nacogdoches, Tex.; E. L. Miller; 6 weeks; \$8,750  
**STETSON UNIVERSITY**, De Land, Fla.; Harland C. Merriam; 8 weeks; \$22,830  
**UNIVERSITY OF TENNESSEE**, Knoxville, Tenn.; James F. Davidson; 8 weeks; \$7,070  
 J.H. Wood; 6 weeks; \$15,630  
**TEXAS WOMAN'S UNIVERSITY**, Denton, Tex.; Robert W. Higgins; 8 weeks; \$16,410  
**UNIVERSITY OF TEXAS**, Austin, Tex.; H. J. Ettinger; 6 weeks; \$9,910  
 Bennie R. Ferrone; 6 weeks; \$10,320  
 Grant Taylor, Anderson Hospital and Tumor Institute, Houston; 6 weeks; \$3,970  
**UNIVERSITY OF TULSA**, Tulsa, Okla.; F. T. Gardner; 6 weeks; \$5,120  
**UNIVERSITY OF UTAH**, Salt Lake City, Utah; E. Allan Davis; 4 weeks; \$5,070  
**VIRGINIA STATE COLLEGE**, Petersburg, Va.; Paul L. Brown; 6 weeks; \$11,930  
**WALDEMAR MEDICAL RESEARCH FOUNDATION, INC.**, Port Washington, N.Y.; Norman Molomut; 8 weeks; \$18,040  
**WASHINGTON UNIVERSITY**, St. Louis, Mo.; Owen J. Sexton; 5 weeks; \$3,050  
**WEST VIRGINIA UNIVERSITY**, Morgantown, W. Va.; O. J. Burger; 4 weeks; \$7,280  
**WEST VIRGINIA WESLEYAN COLLEGE**, Buckhannon, W. Va.; John C. Wright; 3 weeks; \$8,900

WESTERN KENTUCKY STATE COLLEGE, Bowling Green, Ky.; Tate C. Page; 8 weeks; \$28,280  
 WESTERN MICHIGAN UNIVERSITY, Kalamazoo, Mich.; George G. Mallinson; 6 weeks; \$13,340  
 WILEY COLLEGE, Marshall, Tex.; Gertrude C. Ridgel; 6 weeks; \$6,500  
 WISCONSIN STATE COLLEGE, Superior, Wis.; Howard Thomas; 4 weeks; \$6,960  
 WISCONSIN STATE COLLEGE, La Crosse, Wis.; Robert H. Uber; 6 weeks; \$8,560  
 WOFFORD COLLEGE, Spartanburg, S.C.; James C. Loftin; 8 weeks; \$12,600  
 WORCESTER FOUNDATION FOR EXPERIMENTAL BIOLOGY, Shrewsbury, Mass.; Hudson Hoagland; 9 weeks; \$21,680  
 YESHIVA UNIVERSITY, New York, N.Y.; Moses D. Tendler; 8 weeks; \$14,320

## RESEARCH PARTICIPATION FOR TEACHER TRAINING

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station, Tex.; J. B. Page; 3 months; \$20,950  
 UNIVERSITY OF ARIZONA, Tucson, Ariz.; A. B. Weaver; 3 months; \$23,150  
 BOYCE THOMPSON INSTITUTE FOR PLANT RESEARCH, Inc., Yonkers, N.Y.; Lawrence P. Miller; 3 months; \$8,900  
 BRIGHAM YOUNG UNIVERSITY, Provo, Utah; K. LeRoI Nelson; 3 months; \$19,925  
 BROOKLYN COLLEGE, Brooklyn, N.Y.; Louis G. Moriber; 3 months; \$4,800  
 UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Howard Tieckelmann; 3 months; \$14,790  
 UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Donald C. Bryant; 3 months; \$30,745  
 CLARK UNIVERSITY, Worcester, Mass.; Arthur E. Martell; 3 months; \$12,265  
 CLARKSON COLLEGE OF TECHNOLOGY, Potsdam, N.Y.; F. Gordon Lindsey; 3 months; \$18,690  
 COLLEGE OF THE PACIFIC, Stockton, Calif.; Joel W. Hedgpeh, Pacific Marine Station; 3 months; \$11,870  
 COLLEGE OF WOOSTER, Wooster, Ohio; John D. Reinheimer; 3 months; \$1,250  
 COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; 3 months; \$19,265  
 UNIVERSITY OF COLORADO, Denver, Colo.; William C. Strickler; 3 months; \$35,010  
 UNIVERSITY OF COLORADO, Boulder, Colo.; Bert M. Tolbert; 3 months; \$24,345  
 CORNELL UNIVERSITY, Ithaca, N.Y.; Philip G. Johnson; 3 months; \$33,990  
 UNIVERSITY OF DELAWARE, Newark, Del.; James C. Kakavas; 3 months; \$18,655  
 DRAKE UNIVERSITY, Des Moines, Iowa; Leland P. Johnson; 3 months; \$16,660  
 FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Leland Shanor; 3 months; \$19,680  
 FURMAN UNIVERSITY, Greenville, S.C.; J. A. Southern; 3 months; \$15,985  
 UNIVERSITY OF GEORGIA, Athens, Ga.; Robert A. McRorie; 3 months; \$23,000  
 GOSHEN COLLEGE, Goshen, Ind.; Henry D. Weaver, Jr.; 3 months; \$6,145  
 HIGH ALTITUDE OBSERVATORY OF THE UNIVERSITY OF COLORADO, Boulder, Colo.; Donald E. Billings; 3 months; \$4,425  
 HIGHLANDS BIOLOGICAL STATION, Inc., Highlands, N.C.; Thelma Howell; 3 months; \$5,095

HOWARD UNIVERSITY, Washington, D.C.; Lloyd N. Ferguson; 3 months; \$21,605  
 ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.; Leslie B. Hedrick; 3 months; \$12,525  
 INDIANA UNIVERSITY, Bloomington, Ind.; Paul Klinge; 3 months; \$24,400  
 INSTITUTE FOR PAPER CHEMISTRY, Appleton, Wis.; George D. Jernegan; 3 months; \$8,050  
 IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa; Paul F. Romberg; 3 months; \$28,850  
 KANSAS STATE TEACHERS COLLEGE, Emporia, Kans.; Ted F. Andrews; 3 months; \$13,580  
 UNIVERSITY OF KANSAS, Lawrence, Kans.; C. A. VanderWerf; 3 months; \$21,400  
 KENTUCKY RESEARCH FOUNDATION, Lexington, Ky.; E. M. Spokes; 3 months; \$3,660  
 KNOX COLLEGE, Galesburg, Ill.; Russell Sutton; 3 months; \$6,420  
 LONG BEACH STATE COLLEGE FOUNDATION, Long Beach, Calif.; Darwin L. Mayfield; 3 months; \$10,510  
 LOUISIANA STATE UNIVERSITY, Baton Rouge, La.; John F. Christman; 3 months; \$26,010  
 UNIVERSITY OF MARYLAND, College Park, Md.; Howard Laster; 3 months; \$7,280  
 UNIVERSITY OF MASSACHUSETTS, Amherst, Mass.; D. S. Van Fleet; 3 months; \$5,855  
 MIAMI UNIVERSITY, Oxford, Ohio; Harry Weller; 3 months; \$18,070  
 UNIVERSITY OF MISSISSIPPI, University, Miss.; Barton Milligan; 3 months; \$10,650  
 MONTANA STATE UNIVERSITY, Missoula, Mont. Ludvig G. Browman; 3 months; \$4,585  
 NEWARK COLLEGE OF ENGINEERING RESEARCH FOUNDATION, Newark, N.J.; James A. Bradley; \$13,515  
 NEW MEXICO HIGHLANDS UNIVERSITY, Las Vegas, N. Mex.; E. Gerald Meyer; 3 months; \$19,665  
 UNIVERSITY OF NEW MEXICO, Albuquerque, N. Mex.; Phillip E. Bocquet; 3 months; \$19,435  
 NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; Homer C. Folks; 3 months; \$26,940  
 NORTH DAKOTA STATE COLLEGE, Fargo, N. Dak.; J. A. Callenbach; 3 months; \$23,685  
 UNIVERSITY OF NORTH DAKOTA, Grand Forks, N. Dak.; Francis A. Jacobs; 3 months; \$16,100  
 UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; Milton Burton; 3 months; \$11,060  
 NORTH TEXAS STATE COLLEGE, Denton, Tex.; Robert C. Sherman; 3 months; \$16,960  
 OHIO STATE UNIVERSITY, Columbus, Ohio; F. E. Deatherage; 3 months; \$8,795  
 OKLAHOMA STATE UNIVERSITY, Stillwater, Okla.; Robert MacVicar; 3 months; \$18,410  
 UNIVERSITY OF OKLAHOMA, Norman, Okla.; Horace Bliss, Oklahoma Science Service; 3 months; \$17,355  
 Carl D. Riggs, Biological Station, Willis; 3 months; \$16,480  
 OREGON STATE COLLEGE, Corvallis, Oreg.; A. T. Lonseth; 3 months; \$8,415  
 PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; W. Conrad Fernelius; 3 months; \$20,085  
 UNIVERSITY OF REDLANDS, Redlands, Calif.; Robert H. Maybury; 3 months; \$10,080  
 RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; R. L. Strong; 3 months; \$17,110  
 RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; Edwin C. John, Syracuse; 3 months; \$11,125

UNIVERSITY OF RHODE ISLAND, Kingston, R.I.; Eugene C. Winslow; 3 months; \$8,195  
 UNIVERSITY OF ROCHESTER, Rochester, N.Y.; 2 months; \$23,060  
 ROSWELL PARK MEMORIAL INSTITUTE, Buffalo, N.Y.; Edwin A. Mirand; 3 months; \$14,950  
 ST. JOHN'S UNIVERSITY, Jamaica, N.Y.; Paul T. Medici; 3 months; \$15,130  
 UNIVERSITY OF SOUTH CAROLINA, Columbia, S.C.; Peyton C. Teague; 3 months; \$20,240  
 UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; Edgar Warnhoff; 3 months; \$17,325  
 STANFORD UNIVERSITY, Stanford, Calif.; O. Cutler Shepard; 3 months; \$10,965  
 STATE UNIVERSITY OF IOWA, Iowa City, Iowa; Ralph L. Shriner; 3 months; \$13,745  
 STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion, S. Dak.; George P. Scott; 3 months; \$16,590  
 TEMPLE UNIVERSITY, Philadelphia, Pa.; David S. Sarner; 3 months; \$14,710  
 UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; W. E. Jefferson; Memphis; 3 months; \$7,105  
 TEXAS SOUTHERN UNIVERSITY, Houston, Tex.; L. L. Woods; 3 months; \$6,715  
 UNIVERSITY OF TEXAS, Austin, Tex.; Addison E. Lee; 3 months; \$17,615  
 UNIVERSITY OF UTAH, Salt Lake City, Utah; W. J. Burke; 3 months; \$20,110  
 VANDERBILT UNIVERSITY, Nashville, Tenn.; Larry C. Hall; 3 months; \$21,030  
 UNIVERSITY OF VERMONT, Burlington, Vt.; Howard M. Smith, Jr.; 3 months; \$17,935  
 VIRGINIA FISHERIES LABORATORY, Gloucester Point, Va.; Robert S. Bailey; 3 months; \$21,525  
 UNIVERSITY OF VIRGINIA, Charlottesville, Va.; Stephan Berko; 3 months; \$9,645  
 Jacques J. Rappaport; 3 months; \$6,040  
 Bart Van't Riet; 3 months; \$11,135  
 WAYNE STATE UNIVERSITY, Detroit, Mich.; Karl H. Gayer; 3 months; \$15,750  
 WESTERN STATE COLLEGE, Gunnison, Colo.; C. G. Warren; 3 months; \$1,370  
 UNIVERSITY OF WISCONSIN, Madison, Wis.; Donald H. Bucklin; 1 year; \$48,635  
 YALE UNIVERSITY, New Haven, Conn.; Harlan J. Smith; 3 months; \$1,370

#### UNDERGRADUATE RESEARCH PARTICIPATION PROGRAM

ADELPHI COLLEGE, Long Island, N.Y.; 9 months; \$4,890  
 AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station, Tex.; 1 year; \$3,400  
 2 years; \$9,545  
 AGRICULTURAL AND TECHNICAL COLLEGE OF NORTH CAROLINA, Greensboro, N.C.; 1 year; \$4,220  
 1 year; \$5,175  
 ALBRIGHT COLLEGE, Reading, Pa.; 1 year; \$1,845  
 ALFRED UNIVERSITY, Alfred, N.Y.; 3 months; \$5,485  
 ALLEGHENY COLLEGE, Meadville, Pa.; 1 year; \$3,595  
 AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; 1 year; \$22,925  
 AMERICAN UNIVERSITY, Washington, D.C.; 3 months; \$3,740  
 AMHERST COLLEGE, Amherst, Mass.; 3 months; \$4,090  
 ARIZONA STATE UNIVERSITY, Tempe, Ariz.; 1 year; \$2,635

UNIVERSITY OF ARIZONA, Tucson, Ariz.; 1 year; \$10,350  
 UNIVERSITY OF ARKANSAS, Fayetteville, Ark.; 1 year; \$13,995  
 ARLINGTON STATE COLLEGE, Arlington, Tex.; 9 months; \$575  
 ASBURY COLLEGE, Wilmore, Ky.; 1 year; \$3,220  
 AUBURN UNIVERSITY, Auburn, Ala.; 1 year; \$6,930  
 BARNARD COLLEGE, New York, N.Y.; 2 years; \$6,840  
 2 years; \$6,900  
 1 year; \$4,095  
 BARTOL RESEARCH FOUNDATION OF THE FRANKLIN INSTITUTE, Swarthmore, Pa.; 2 years; \$5,695  
 BOSTON COLLEGE, Chestnut Hill, Mass.; 1 year; \$5,890  
 BOSTON UNIVERSITY, Boston, Mass.; 1 year; \$7,175  
 1 year; \$7,590  
 BOWDOIN COLLEGE, Brunswick, Maine; 2 years; \$5,010  
 3 months; \$920  
 BRANDEIS UNIVERSITY, Waltham, Mass.; 1 year; \$4,830  
 2 years; \$8,650  
 1 year; \$6,670  
 2 years; \$7,650  
 BRIDGEWATER COLLEGE, Bridgewater, Va.; 2 years; \$4,140  
 BROWN UNIVERSITY, Providence, R.I.; 1 year; \$19,380  
 12 months; \$10,280  
 BRYN MAWR COLLEGE, Bryn Mawr, Pa.; 3 months; \$4,140  
 2 years; \$9,640  
 3 months; \$4,865  
 BUCKNELL UNIVERSITY, Lewisburg, Pa.; 3 months; \$5,500  
 9 months; \$715  
 9 months; \$715  
 UNIVERSITY OF BUFFALO, Buffalo, N.Y.; 3 months; \$1,960  
 BUTLER UNIVERSITY, Indianapolis, Ind.; 9 months; \$2,590  
 CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; 3 months; \$7,130  
 2 years; \$8,280  
 2 years; \$10,350  
 2 years; \$10,350  
 UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; 3 months; \$4,565  
 3 months; \$16,820  
 1 year; \$5,740  
 1 year; \$8,840  
 1 year; \$9,235  
 1 year; \$23,665  
 2 years; \$9,000  
 CANISUS COLLEGE, Buffalo, N.Y.; 3 months; \$5,950  
 CARLETON COLLEGE, Northfield, Minn.; 3 months; \$1,380  
 CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; 3 months; \$4,830  
 3 months; \$7,900  
 9 months; \$2,690  
 1 year; \$3,330  
 1 year; \$5,890  
 1 year; \$7,350  
 CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; 3 months; \$5,875  
 CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; 1 year; \$4,815  
 3 months; \$3,120



UNIVERSITY OF CHICAGO, Chicago, Ill.; 3 months; \$13,210  
 3 months; \$5,615  
 UNIVERSITY OF CINCINNATI, Cincinnati, Ohio; 1 year; \$3,450  
 CITY COLLEGE OF THE COLLEGE OF THE CITY OF NEW YORK, New York, N.Y.; 9 months; \$9,810  
 3 months; \$11,040  
 CLARKSON COLLEGE OF TECHNOLOGY, Potsdam, N.Y.; 1 year; \$5,750  
 COE COLLEGE, Cedar Rapids, Iowa; 9 months; \$495  
 3 months; \$1,365  
 COLBY COLLEGE, Waterville, Maine; 3 months; \$565  
 COLGATE UNIVERSITY, Hamilton, N.Y.; 1 year; \$8,715  
 COLLEGE OF CHARLESTON, Charleston, S.C.; 1 year; \$3,360  
 COLLEGE OF NOTRE DAME OF MARYLAND, Baltimore, Md.; 9 months; \$4,255  
 COLLEGE OF WOOSTER, Wooster, Ohio; 2 years; \$5,090  
 2 years; \$11,590  
 COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; 3 months; \$5,610  
 1 year; \$3,795  
 1 year; \$6,230  
 UNIVERSITY OF COLORADO, Boulder, Colo.; 3 months; \$12,215  
 3 months; \$13,410  
 1 year; \$7,670  
 COLUMBIA UNIVERSITY, New York, N.Y.; 3 months; \$2,530  
 2 years; \$7,385  
 UNIVERSITY OF CONNECTICUT, Storrs, Conn.; 1 year; \$2,760  
 2 years; \$5,175  
 COOPER UNION FOR THE ADVANCEMENT OF SCIENCE, New York, N.Y.; 1 year; \$6,025  
 CORNELL COLLEGE, Mount Vernon, Iowa; 1 year; \$3,570  
 2 years; \$4,140  
 CORNELL UNIVERSITY, Ithaca, N.Y.; 3 months; \$10,350  
 CREEDMOOR INSTITUTE FOR PSYCHOLOGIC STUDIES, Jamaica, N.Y.; 2 years; \$6,495  
 DARTMOUTH COLLEGE, Hanover, N.H.; 9 months; \$175  
 1 year; \$5,175  
 2 years; \$3,680  
 2 years; \$4,320  
 2 years; \$9,150  
 2 years; \$11,390  
 UNIVERSITY OF DENVER, Denver, Colo.; 1 year; \$4,770  
 UNIVERSITY OF DETROIT, Detroit, Mich.; 1 year; \$7,940  
 DICKINSON COLLEGE, Carlisle, Pa.; 1 year; \$6,040  
 DILLARD UNIVERSITY, New Orleans, La.; 1 year; \$5,575  
 DREXEL INSTITUTE OF TECHNOLOGY, Philadelphia, Pa.; 3 months; \$3,450  
 3 months; \$5,855  
 DUKE UNIVERSITY, Durham, N.C.; 2 yrs.; \$10,005  
 DUQUESNE UNIVERSITY, Pittsburgh, Pa.; 2 years; \$10,320  
 EARLHAM COLLEGE, Richmond, Ind.; 3 months; \$8,680  
 EASTERN NAZARENE COLLEGE, Wollaston, Mass.; 2 years; \$10,400  
 EVANSVILLE COLLEGE, Evansville, Ind.; 2 years; \$8,855

FAIRFIELD UNIVERSITY, Fairfield, Conn.; 2 years; \$7,590  
 FLORIDA AGRICULTURE AND MECHANICAL UNIVERSITY, Tallahassee, Fla.; 1 year; \$4,750  
 FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; 1 year; \$12,880  
 FORDHAM UNIVERSITY, New York, N.Y.; 1 year; \$14,490  
 FRANKLIN AND MARSHALL COLLEGE, Lancaster, Pa.; 3 months; \$8,050  
 2 years; \$9,810  
 FURMAN UNIVERSITY, Greenville, S.C.; 1 year; \$7,480  
 GEORGE WASHINGTON CARVER FOUNDATION OF THE TUSKEGEE INSTITUTE, Tuskegee Institute, Ala.; 1 year; \$15,990  
 GEORGIA INSTITUTE OF TECHNOLOGY, Atlanta, Ga.; 2 years; \$11,730  
 UNIVERSITY OF GEORGIA, Athens, Ga.; 1 year; \$3,335  
 1 year; \$6,440  
 9 months; \$1,060  
 GRINNELL COLLEGE, Grinnell, Iowa; 3 months; \$4,740  
 GUSTAVUS ADOLPHUS COLLEGE, St. Peter, Minn.; 9 months; \$1,495  
 HAMILTON COLLEGE, Clinton, N.Y.; 3 months; \$4,120  
 HAMPDEN-SYDNEY COLLEGE, Hampden-Sydney, Va.; 3 months; \$1,000  
 HARVARD UNIVERSITY, Cambridge, Mass.; 3 months; \$17,250  
 HAVERFORD COLLEGE, Haverford, Pa.; 2 years; \$4,620  
 3 months; \$760  
 UNIVERSITY OF HAWAII, Honolulu, Hawaii; 1 year; \$4,025  
 3 months; \$4,445  
 HOLLINS COLLEGE, Hollins College, Va.; 9 months; \$6,555  
 HOWARD UNIVERSITY, Washington, D.C.; 9 months; \$5,425  
 HUMBOLDT STATE COLLEGE, Arcata, Calif.; 1 year; \$5,170  
 ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.; 3 months; \$6,610  
 1 year; \$5,520  
 9 months; \$1,700  
 1 year; \$5,640  
 UNIVERSITY OF ILLINOIS, Urbana, Ill.; 3 months; \$8,045  
 9 months; \$6,605  
 1 year; \$8,970  
 2 years; \$6,275  
 IMMACULATE HEART COLLEGE, Los Angeles, Calif.; 1 year; \$10,810  
 IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa; 1 year; \$9,690  
 1 year; \$13,205  
 JOHN CARROLL UNIVERSITY, Cleveland, Ohio; 1 year; \$2,765  
 JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; 1 year; \$4,195  
 1 year; \$9,400  
 JUNIATA COLLEGE, Huntingdon, Pa.; 1 year; \$8,220  
 KANSAS STATE COLLEGE OF PITTSBURG, Pittsburg, Kans.; 3 months; \$2,725  
 9 months; \$2,210  
 1 year; \$5,030  
 KANSAS STATE TEACHERS COLLEGE, Emporia, Kans.; 1 year; \$5,900  
 KANSAS STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Manhattan, Kans.; 3 months; \$2,690  
 3 months; \$3,620

9 months; \$770  
 1 year; \$4,830  
 1 year; \$5,235  
 1 year; \$5,750  
 1 year; \$6,130  
 1 year; \$9,720  
 2 years; \$8,805  
 UNIVERSITY OF KANSAS, Lawrence, Kans.;  
 1 year; \$22,880  
 KENTUCKY RESEARCH FOUNDATION, Lexington, Ky.; 1 year; \$33,015  
 1 year; \$1,825  
 KENYON COLLEGE, Gambier, Ohio; 9 months; \$750  
 1 year; \$850  
 KNOX COLLEGE, Galesburg, Ill.; 2 years; \$7,265  
 LAFAYETTE COLLEGE, Easton, Pa.; 3 months; \$975  
 2 years; \$3,795  
 LAMAR STATE COLLEGE OF TECHNOLOGY, Beaumont, Tex.; 3 months; \$6,930  
 LA VERNE COLLEGE, La Verne, Calif.; 2 years; \$7,880  
 LEBANON VALLEY COLLEGE, Annville, Pa.; 3 months; \$4,140  
 LEHIGH UNIVERSITY, Bethlehem, Pa.; 3 months; \$4,360  
 1 year; \$4,105  
 1 year; \$4,430  
 2 years; \$11,220  
 LINFIELD RESEARCH INSTITUTE, McMinnville, Oreg.; 2 years; \$5,775  
 LONG ISLAND BIOLOGICAL ASSOCIATION, Cold Spring Harbor, N.Y.; 3 months; \$8,685  
 LOUISIANA POLYTECHNIC INSTITUTE, Ruston, La.; 9 months; \$595  
 MANHATTAN COLLEGE, New York, N.Y.; 9 months; \$1,210  
 9 months; \$1,840  
 2 years; \$5,540  
 UNIVERSITY OF MARYLAND, College Park, Md.; 3 months; \$3,740  
 1 year; \$7,935  
 MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; 9 months; \$5,500  
 MERCYHURST COLLEGE, Erie, Pa.; 3 months; \$2,115  
 MIAMI UNIVERSITY, Oxford, Ohio; 3 months; \$8,170  
 2 years; \$7,590  
 UNIVERSITY OF MIAMI, Coral Gables, Fla.; 2 years; \$7,935  
 MICHIGAN COLLEGE OF MINING AND TECHNOLOGY, Houghton, Mich.; 3 months; \$750  
 3 months; \$3,400  
 9 months; \$900  
 1 year; \$6,800  
 MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing, Mich.; 1 year; \$5,295  
 9 months; \$1,840  
 1 year; \$16,270  
 1 year; \$12,650  
 1 year; \$9,495  
 1 year; \$4,875  
 UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; 1 year; \$3,050  
 3 months; \$1,025  
 UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; 3 months; \$4,090  
 3 months; \$9,240  
 1 year; \$11,650  
 1 year; \$12,125  
 MISSISSIPPI STATE UNIVERSITY, State College, Miss.; 9 months; \$1,840  
 9 months; \$2,485  
 3 months; \$3,105  
 2 months; \$4,025  
 3 months; \$4,220  
 UNIVERSITY OF MISSOURI, Columbia, Mo.; 9 months; \$2,115  
 9 months; \$2,500  
 MONTANA STATE UNIVERSITY, Missoula, Mont.; 2 years; \$3,515  
 2 years; \$4,865  
 MOREHOUSE COLLEGE, Atlanta, Ga.; 2 years; \$6,015  
 MOUNT HOLYOKE COLLEGE, South Hadley, Mass.; 3 months; \$4,785  
 MUHLENBERG COLLEGE, Allentown, Pa.; 2 years; \$5,635  
 UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; 1 year; \$4,365  
 2 years; \$9,660  
 NEWARK COLLEGE OF ENGINEERING RESEARCH FOUNDATION, Newark, N.J.; 9 months; \$2,015  
 NEW JERSEY NEURO-PSYCHIATRIC INSTITUTE, Princeton, N.J.; 1 year; \$2,130; 1 year; \$3,945  
 NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY, Socorro, N. Mex.; 3 months; \$9,780  
 NEW MEXICO STATE UNIVERSITY, University Park, N. Mex.; 1 year; \$23,380  
 NEW YORK UNIVERSITY, New York, N.Y.; 9 months; \$3,050  
 3 months; \$5,510  
 NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; 9 months; \$5,395  
 9 months; \$8,225  
 1 year; \$3,340  
 1 year; \$4,545  
 1 year; \$7,075  
 UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; 3 months; \$3,315  
 3 months; \$5,540  
 3 months; \$6,210  
 3 months; \$6,625  
 1 year; \$5,005  
 2 years; \$9,945  
 NORTH DAKOTA AGRICULTURAL COLLEGE, Fargo, N. Dak.; 1 year; \$15,675  
 1 year; \$5,275  
 1 year; \$4,210  
 UNIVERSITY OF NORTH DAKOTA, Grand Forks, N. Dak.; 3 months; \$570  
 3 months; \$3,100  
 9 months; \$245  
 9 months; \$750  
 9 months; \$855  
 9 months; \$1,150  
 2 years; \$3,600  
 2 years; \$5,725  
 2 years; \$8,715  
 9 months; \$730  
 NORTHEASTERN UNIVERSITY, Boston, Mass.; 9 months; \$4,500  
 NORTHERN ILLINOIS UNIVERSITY, De Kalb, Ill.; 3 months; \$2,990  
 NORTHWEST NAZARENE COLLEGE, Nampa, Idaho; 1 year; \$3,720  
 NORTHWESTERN STATE COLLEGE OF LOUISIANA, Natchitoches, La.; 9 months; \$575  
 NORTHWESTERN UNIVERSITY, Evanston, Ill.; 3 months; \$14,730  
 3 months; \$4,140  
 1 year; \$9,395  
 UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; 9 months; \$1,670  
 3 months; \$955  
 OBERLIN COLLEGE, Oberlin, Ohio; 3 months; \$4,485

OHIO STATE UNIVERSITY, Columbus, Ohio; 1 year; \$7,015  
 9 months; \$900  
 OHIO UNIVERSITY, Athens, Ohio; 2 years; \$9,655  
 UNIVERSITY OF OKLAHOMA, Norman, Okla.; 2 years; \$3,930  
 OREGON FOREST RESEARCH CENTER, Corvallis, Ore.; 3 months; \$2,610  
 OREGON STATE COLLEGE, Corvallis, Ore.; 3 months; \$5,060  
 9 months; \$480  
 9 months; \$1,840  
 9 months; \$2,635  
 1 year; \$3,710  
 1 year; \$4,335  
 1 year; \$4,740  
 1 year; \$7,070  
 1 year; \$7,200  
 2 years; \$4,305  
 UNIVERSITY OF OREGON, Eugene, Ore.; 1 year; \$31,820  
 PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; 1 year; \$4,370  
 UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; 1 year; \$4,530  
 2 years; \$8,310  
 2 years; \$9,660  
 2 years; \$10,350  
 UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; 2 years; \$10,120  
 POLYTECHNIC INSTITUTE OF BROOKLYN, Brooklyn, N.Y.; 9 months; \$4,515  
 3 months; \$10,465  
 POMONA COLLEGE, Claremont, Calif.; 1 year; \$14,185  
 UNIVERSITY OF PORTLAND, Portland, Ore.; 2 years; \$4,830  
 PRINCETON UNIVERSITY, Princeton, N.J.; 1 year; \$14,625  
 UNIVERSITY OF PUERTO RICO, Rio Piedras, Puerto Rico; 9 months; \$2,800  
 PURDUE UNIVERSITY, Lafayette, Ind.; 1 year; \$6,270  
 UNIVERSITY OF REDLANDS, Redlands, Calif.; 1 year; \$6,130  
 REED COLLEGE, Portland, Ore.; 1 year; \$5,835  
 RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; 3 months; \$3,865  
 3 months; \$4,200  
 3 months; \$6,660  
 2 years; \$3,740  
 2 years; \$4,050  
 2 years; \$4,830  
 2 years; \$7,875  
 RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; 3 months; \$13,540  
 UNIVERSITY OF RHODE ISLAND, Kingston, R.I.; 3 months; \$1,070  
 3 months; \$1,070  
 3 months; \$1,185  
 3 months; \$1,245  
 RICE INSTITUTE, Houston, Tex.; 1 year; \$5,405  
 UNIVERSITY OF ROCHESTER, Rochester, N.Y.; 3 months; \$6,215  
 2 years; \$9,840  
 ROCKY MOUNTAIN BIOLOGICAL LABORATORY, Crested Butte, Colo.; 3 months; \$9,730  
 ROLLINS COLLEGE, Winter Park, Fla.; 1 year; \$5,670  
 ROSCOE B. JACKSON MEMORIAL LABORATORY, Bar Harbor, Maine; 3 months; \$22,170  
 ROSEMONT COLLEGE, Rosemont, Pa.; 3 months; \$3,250  
 RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; 9 months; \$3,565  
 SAINT JOSEPH COLLEGE, West Hartford, Conn.; 2 years; \$9,570  
 ST. LOUIS UNIVERSITY, St. Louis, Mo.; 3 months; \$2,705  
 9 months; \$1,655  
 9 months; \$2,070  
 1 year; \$4,990  
 2 years; \$4,005  
 2 years; \$6,550  
 SAINT MARY'S COLLEGE, Winona, Minn.; 1 year; \$5,100  
 1 year; \$7,870  
 ST. OLAF COLLEGE, Northfield, Minn.; 1 year; \$9,150  
 SAN DIEGO STATE COLLEGE FOUNDATION, San Diego, Calif.; 1 year; \$5,465  
 UNIVERSITY OF SAN FRANCISCO, San Francisco, Calif.; 1 year; \$4,200  
 SAN JOSE STATE COLLEGE, San Jose, Calif.; 1 year; \$10,600  
 UNIVERSITY OF SCRANTON, Scranton, Pa.; 3 months; \$4,430  
 2 years; \$8,460  
 SEATTLE UNIVERSITY, Seattle, Wash.; 1 year; \$1,520  
 12 months; \$4,890  
 SMITH COLLEGE, Northampton, Mass.; 1 year; \$4,890  
 UNIVERSITY OF SOUTH CAROLINA, Columbia, S.C.; 1 year; \$5,500  
 1 year; \$6,210  
 2 years; \$4,485  
 2 years; \$4,830  
 SOUTH DAKOTA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Brookings, S. Dak.; 1 year; \$3,420  
 2 years; \$11,040  
 UNIVERSITY OF THE SOUTH, Sewanee, Tenn.; 1 year; \$5,140  
 SOUTHERN ILLINOIS UNIVERSITY, Carbondale, Ill.; 1 year; \$6,795  
 1 year; \$2,590  
 SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.; 9 months; \$4,390  
 SOUTHERN MISSIONARY COLLEGE, Colledale, Tenn.; 1 year; \$6,040  
 SOUTHERN UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; 9 months; \$1,225  
 SOUTHWESTERN AT MEMPHIS, Memphis, Tenn.; 2 years; \$5,735  
 STANFORD UNIVERSITY, Stanford, Calif.; 3 months; \$6,255  
 2 years; \$9,660  
 STEPHEN F. AUSTIN STATE COLLEGE, Nacogdoches, Tex.; 2 years; \$11,105  
 STATE UNIVERSITY OF IOWA, Iowa City, Iowa; 3 months; \$3,450  
 9 months; \$865  
 1 year; \$4,165  
 1 year; \$4,315  
 SWARTHMORE COLLEGE, Swarthmore, Pa.; 3 months; \$8,165  
 2 years; \$10,895  
 3 months; \$5,865  
 SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.; 3 months; \$1,800  
 1 year; \$11,915  
 TENNESSEE AGRICULTURAL AND INDUSTRIAL STATE UNIVERSITY, Nashville, Tenn.; 9 months; \$900  
 TENNESSEE POLYTECHNIC INSTITUTE, Cookeville, Tenn.; 9 months; \$4,830

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; 1 year; \$4,280  
 9 months; \$500  
 1 year; \$2,490  
 TEXAS CHRISTIAN UNIVERSITY, Fort Worth, Tex.; 1 year; \$4,200  
 TEXAS LUTHERAN COLLEGE, Seguin, Tex.; 1 year; \$7,590  
 TEXAS WOMAN'S UNIVERSITY, Denton, Tex.; 1 year; \$2,660  
 UNIVERSITY OF TEXAS, Austin, Tex.; 8 months; \$2,025  
 2 years; \$4,155  
 2 years; \$8,325  
 UNIVERSITY OF TOLEDO, Toledo, Ohio; 9 months; \$920  
 TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; 9 months; \$7,985  
 UTAH STATE UNIVERSITY, Logan, Utah; 8 months; \$3,915  
 UNIVERSITY OF UTAH, Salt Lake City, Utah; 3 months; \$10,120  
 8 months; \$10,280  
 1 year; \$2,460  
 VANDERBILT UNIVERSITY, Nashville, Tenn.; 1 year; \$4,300  
 VASSAR COLLEGE, Poughkeepsie, N.Y.; 2 years; \$5,985  
 UNIVERSITY OF VERMONT, Burlington, Vt.; 1 year; \$5,405  
 1 year; \$3,850  
 VIRGINIA FISHERIES LABORATORY, Gloucester Point, Va.; 3 months; \$8,055  
 WABASH COLLEGE, Crawfordsville, Ind.; 2 years; \$11,805  
 WASHINGTON STATE UNIVERSITY, Pullman, Wash.; 1 year; \$2,210  
 2 years; \$4,705  
 UNIVERSITY OF WASHINGTON, Seattle, Wash.; 2 years; \$9,390  
 WESLEYAN UNIVERSITY, Middletown, Conn.; 2 years; \$3,395  
 WEST VIRGINIA UNIVERSITY, Morgantown, W. Va.; 1 year; \$5,520  
 1 year; \$7,360  
 WESTERN MICHIGAN UNIVERSITY, Kalamazoo, Mich.; 1 year; \$6,465  
 WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; 1 year; \$22,340  
 WESTERN STATE COLLEGE OF COLORADO, Gunnison, Colo.; 2 years; \$11,820  
 WHEATON COLLEGE, Norton, Mass.; 8 months; \$1,710  
 WHITTIER COLLEGE, Whittier, Calif.; 2 years; \$4,350  
 UNIVERSITY OF WICHITA, Wichita, Kans.; 9 months; \$345  
 1 year; \$2,400  
 WILKES COLLEGE, Wilkes-Barre, Pa.; 2 years; \$4,850  
 UNIVERSITY OF WISCONSIN, Madison, Wis.; 3 months; \$875  
 1 year; \$11,350  
 WORCESTER POLYTECHNIC INSTITUTE, Worcester, Mass.; 3 months; \$2,185  
 8 months; \$8,400  
 XAVIER UNIVERSITY, Cincinnati, Ohio; 1 year; \$4,025  
 9 months; \$460  
 YALE UNIVERSITY, New Haven, Conn.; 3 months; \$11,270  
 1 year; \$3,450  
 1 year; \$5,520  
 1 year; \$6,705  
 2 years; \$10,985  
 2 years; \$11,890

**UNDERGRADUATE RESEARCH TRAINING PROGRAM**

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station, Tex.; 3 months; \$2,550  
 AGRICULTURAL AND TECHNICAL COLLEGE OF NORTH CAROLINA, Greensboro, N.C.; 3 months; \$5,650  
 UNIVERSITY OF ARKANSAS, Fayetteville, Ark.; 9 months; \$1,610  
 ARLINGTON STATE COLLEGE, Arlington, Tex.; 3 months; \$1,600  
 9 months; \$575  
 1 year; \$3,095  
 BELOIT COLLEGE, Beloit, Wis.; 1 year; \$5,595  
 BETHANY COLLEGE, Bethany, W. Va.; 1 year; \$5,900  
 BRADFORD DURFEE COLLEGE OF TECHNOLOGY, Fall River, Mass.; 1 year; \$4,805  
 CARROLL COLLEGE, Waukesha, Wis.; 1 year; \$3,345  
 CENTRAL COLLEGE, Pella, Iowa; 1 year; \$4,500  
 CHAPMAN COLLEGE, Orange, Calif.; 1 year; \$3,580  
 COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; 2 years; \$7,755  
 1 year; \$4,220  
 1 year; \$7,420  
 CORNELL UNIVERSITY, Ithaca, N.Y.; 3 months; \$7,635  
 DARTMOUTH COLLEGE, Hanover, N.H.; 9 months; \$5,750  
 3 months; \$6,255  
 DEFIANCE COLLEGE, Defiance, Ohio; 1 year; \$3,550  
 UNIVERSITY OF DENVER, Denver, Colo.; 2 years; \$3,570  
 DREW UNIVERSITY, Madison, N.J.; 3 months; \$6,255  
 EARLHAM COLLEGE, Richmond, Ind.; 3 months; \$5,925  
 GENEVA COLLEGE, Beaver Falls, Pa.; 1 year; \$7,900  
 GRINNELL COLLEGE, Grinnell, Iowa; 3 months; \$6,130  
 HAMPTEN-SYDNEY COLLEGE, Hampton-Sydney, Va.; 2 years; \$3,300  
 HARVEY MUDD COLLEGE, Claremont, Calif.; 1 year; \$6,900  
 IDAHO STATE COLLEGE, Pocatello, Idaho; 9 months; \$955  
 9 months; \$1,415  
 IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, Ames, Iowa; 2 years; \$7,750  
 2 years; \$8,370  
 JUNIATA COLLEGE, Huntingdon, Pa.; 9 months; \$3,195  
 UNIVERSITY OF KANSAS, Lawrence, Kans.; 3 months; \$3,635  
 9 months; \$3,105  
 KENYON COLLEGE, Gambler, Ohio; \$400  
 KING'S COLLEGE, Wilkes-Barre, Pa.; 2 years; \$8,420  
 LAFAYETTE COLLEGE, Easton, Pa.; 1 year; \$8,655  
 2 years; \$3,795  
 LA VERNE COLLEGE, La Verne, Calif.; 1 year; \$3,625  
 LOYOLA UNIVERSITY, New Orleans, La.; 1 year; \$5,430  
 MARIAN COLLEGE, Indianapolis, Ind.; 9 months; \$2,875  
 MEXICO CITY COLLEGE, Carretera Mexico Toluca, Mexico; 8 months; \$5,250

MILLSAPS COLLEGE, Jackson, Miss.; 2 years; \$34,065  
MISSISSIPPI STATE UNIVERSITY, State College, Miss.; 9 months; \$2,215  
3 months; \$4,345  
MOUNT MARY COLLEGE, Milwaukee, Wis.; 9 months; \$500  
NEWARK COLLEGE OF ENGINEERING, Newark, N.J.; 3 months; \$2,755  
3 months; \$4,755  
NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; 1 year; \$4,455  
UNIVERSITY OF NORTH DAKOTA, Grand Forks, N. Dak.; 9 months; \$1,405  
NOTRE DAME COLLEGE, Cleveland, Ohio; 2 years; \$7,885  
OCCIDENTAL COLLEGE, Los Angeles, Calif.; 2 years; \$6,690  
OHIO WESLEYAN UNIVERSITY, Delaware, Ohio; 1 year; \$3,235  
2 years; \$9,670  
OREGON STATE COLLEGE, Corvallis, Oreg.; 3 months; \$4,250  
9 months; \$770  
9 months; \$705  
9 months; \$730  
PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; 3 months; \$805  
UNIVERSITY OF PUERTO RICO, Rio Piedras, P.R.; 2 years; \$7,710  
REED COLLEGE, Portland, Oreg.; 1 year; \$5,405  
RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; 1 year; \$3,855  
ST. JOHN'S UNIVERSITY, Collegeville, Minn.; 1 year; \$2,500  
ST. JOSEPH COLLEGE, Emmitsburg, Md.; 1 year; \$2,240  
ST. JOSEPH'S COLLEGE FOR WOMEN, Brooklyn, N.Y.; 1 year; \$3,070  
ST. MARY'S COLLEGE, Notre Dame, Ind.; 2 years; \$8,115  
SAN DIEGO STATE COLLEGE FOUNDATION, San Diego, Calif.; 1 year; \$9,920  
1 year; \$8,395  
SKIDMORE COLLEGE, Saratoga Springs, N.Y.; 2 years; \$3,000  
SMITH COLLEGE, Northampton, Mass.; 2 years; \$8,825  
SOUTHEAST MISSOURI STATE COLLEGE, Cape Girardeau, Mo.; 1 year; \$8,715  
SOUTHWESTERN AT MEMPHIS, Memphis, Tenn.; 2 years; \$8,295  
1 year; \$7,820  
STETSON UNIVERSITY, De Land, Fla.; 9 months; \$2,015  
UNIVERSITY OF TAMPA, Tampa, Fla.; 3 months; \$1,755  
TEXAS WOMAN'S UNIVERSITY, Denton, Tex.; 2 years; \$11,385  
UNIVERSITY OF TOLEDO, Toledo, Ohio; 1 year; \$14,590  
VASSAR COLLEGE, Poughkeepsie, N.Y.; 1 year; \$4,260  
VILLANOVA UNIVERSITY, Villanova, Pa.; 1 year; \$2,990  
9 months; \$1,300  
VIRGINIA STATE COLLEGE, Petersburg, Va.; 1 year; \$6,160  
WASHINGTON STATE UNIVERSITY, Pullman, Wash.; 9 months; \$920  
WAYNE STATE UNIVERSITY, Detroit, Mich.; 3 months; \$6,480  
WESLEYAN UNIVERSITY, Middletown, Conn.; 3 months; \$3,335  
WEST VIRGINIA WESLEYAN COLLEGE, Buckhannon, W. Va.; 2 years; \$5,340

WILKES COLLEGE, Wilkes-Barre, Pa.; 1 year; \$3,045  
UNIVERSITY OF WISCONSIN, Madison, Wis.; 1 year; \$9,205  
WYFFORD COLLEGE, Spartanburg, S.C.; 9 months; \$560  
XAVIER UNIVERSITY, Cincinnati, Ohio; 3 months; \$1,840  
YALE UNIVERSITY, New Haven, Conn.; 1 year; \$2,880  
1 year; \$5,865

#### VISITING SCIENTIST PROGRAM

AMERICAN ANTHROPOLOGICAL ASSOCIATION, Washington, D.C.; Leslie A. White; *Program of Visiting Lecturers in Anthropology*; 1 year; \$21,670  
AMERICAN CHEMICAL SOCIETY, Washington, D.C.; Donald J. Cook; *Program of Visiting Scientists in Chemistry*; 1 year; \$10,900  
Donald J. Cook; *Visiting Scientists Program to Secondary Schools*; 1 year; \$17,500  
AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Washington, D.C.; Hiden T. Cox; *Program of Visiting Lecturers in Biology to High Schools*; 1 year; \$7,475  
Hiden T. Cox; *Program of Visiting Scientists in Biology*; June 30, 1961; \$76,070  
Hiden T. Cox; *Program of Visiting Lecturers in Biology to High Schools*; 1 year; \$26,680  
AMERICAN INSTITUTE OF PHYSICS, New York, N.Y.; Elmer Hutchisson; *Program of Visiting Scientists in Physics to High Schools*; 1 year; \$29,730  
AMERICAN PSYCHOLOGICAL ASSOCIATION, Washington, D.C.; John G. Darley; *Program of Visiting Lecturers in Psychology*; 1 year; \$25,030  
ARKANSAS ACADEMY OF SCIENCE, ARKANSAS STATE TEACHERS COLLEGE, Conway, Ark.; John W. Keese; *Visiting Scientists Program for the High Schools in Arkansas*; 1 year; \$10,730  
COLORADO-WYOMING ACADEMY OF SCIENCE, UNIVERSITY OF WYOMING, Laramie, Wyoming; Richard G. Beldleman; *Colorado-Wyoming Visiting Science Lectureship Program*; 1 year; \$3,480  
INDIANA ACADEMY OF SCIENCE, PURDUE UNIVERSITY, Lafayette, Ind.; Howard M. Michaud; *Visiting Scientists Program for High Schools*; 1 year; \$17,150  
MARYLAND ACADEMY OF SCIENCES, Baltimore, Md.; Thomson King; *Visiting Scientists Program*; 1 year; \$1,220  
MINNESOTA ACADEMY OF SCIENCE, ST. OLAF COLLEGE, Northfield, Minn.; Harold W. Hansen; *Visiting Scientists Program and Science Teachers Institute*; 1 year; \$22,700  
MONTANA ACADEMY OF SCIENCES, MONTANA STATE COLLEGE, Bozeman, Mont.; E. W. Anacker; *Visiting Scientists Program for High Schools*; 1 year; \$12,880  
NEBRASKA ACADEMY OF SCIENCES, INC., CONCORDIA COLLEGE, Seward, Nebr.; James A. Rutledge; *Visiting Scientists Program*; 1 year; \$15,550  
NEW MEXICO ACADEMY OF SCIENCE, NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY, Socorro, N. Mex.; Burrell L. Wood; *Visiting Scientist Program for the High Schools in New Mexico*; 2 years; \$5,110  
OHIO ACADEMY OF SCIENCE, Columbus, Ohio; Kenneth B. Hobbs; *Visiting Scientists Program for the Public and Private Schools of Ohio*; 1 year; \$21,970

SOCIETY OF AMERICAN FORESTERS, Washington, D.C.; Henry Clepper; *A Visiting Scientists Program*; 1 year; \$15,730

SOCIETY OF WOOD SCIENCE AND TECHNOLOGY, UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Fred B. Dickinson, University of California; *Program of Visiting Scientists in Wood Science and Technology*; 3 years; \$13,720

TEXAS ACADEMY OF SCIENCE, TEXAS INSTRUMENTS, INC., Dallas, Tex.; Addison E. Lee; *Texas Academy of Science Visiting Scientists Program*; 1 year; \$25,300

UTAH ACADEMY OF SCIENCE, ARTS AND LETTERS, UNIVERSITY OF UTAH, Salt Lake City, Utah; Orson A. Young; *Visiting Scientist Program for the High Schools in Utah*; 1 year; \$7,570

VIRGINIA ACADEMY OF SCIENCE, WASHINGTON AND LEE UNIVERSITY, Lexington, Va.; John C. Forbes; *Visiting Scientists Program*; 1 year; \$4,890

WEST VIRGINIA ACADEMY OF SCIENCE, FAIRMONT STATE COLLEGE, Fairmont, W. Va.; John C. Wright, West Virginia Wesleyan College; *Visiting Scientists Program for West Virginia High Schools*; 1 year; \$5,880

#### VISITING FOREIGN SCIENTIST PROGRAM

AMERICAN ASTRONOMICAL SOCIETY, New York, N.Y.; Joseph M. Chamberlain; 1 year; \$28,875

Joseph M. Chamberlain; 2 years; \$56,090

AMERICAN CHEMICAL SOCIETY, Washington, D.C.; Samuel P. Massie, 7 months; \$25,000

Donald J. Cook; June 30, 1961; \$35,000

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Washington, D.C.; Hiden T. Cox; 1 year; \$50,300

AMERICAN INSTITUTE OF PHYSICS, New York, N.Y.; Elmer Hutchisson; 1 year; \$27,270

AMERICAN MATHEMATICAL SOCIETY, Providence, R.I.; Gordon L. Walker; 1 year; \$25,000

Kenneth C. Spengler; 1 year; \$46,800

ENGINEERS JOINT COUNCIL, New York, N.Y.; Josef Wischeldt, Jr.; 7 months; \$25,000

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL, Washington, D.C.; Robert C. Stephenson, American Geological Institute; 2 years; \$57,000

#### COURSE CONTENT IMPROVEMENT

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Washington, D.C.; John R. Mayor; *Study of the Feasibility of a Major Effort to Improve Science Courses in Elementary and Junior High School Grades*; 1 year; \$58,310

AMERICAN ASSOCIATION OF PHYSICS TEACHERS, DARTMOUTH COLLEGE, Hanover, N.H.; F. W. Sears; *Conference in Three Meetings to Develop a National Program for the Improvement of College Physics Courses*; 6 months; \$69,000

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Washington, D.C.; H. Bentley Glass; *Continuation of the Secondary Program of the Biological Sciences Curriculum Study*; 1 year; \$1,280,000

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, New York, N.Y.; F. J. Van Antwerpen; *Study of Curricula in Chemical Engineering*; 16 months; \$23,150

AMERICAN INSTITUTE OF PHYSICS, New York, N.Y.; Elmer Hutchisson; *Apparatus Drawings Project*; 1 year; \$31,280

AMERICAN METEOROLOGICAL SOCIETY, Boston, Mass.; K. C. Spengler; *Development of Educational Motion Pictures and Lantern Slides in Meteorology*; 1 year; \$89,700

Kenneth C. Spengler; *Development of a Monograph Series in Meteorology*; 1 year; \$14,950

BUCKNELL UNIVERSITY, Lewisburg, Pa.; Bennett R. Willeford, Jr.; *Conference on the Undergraduate Training of Chemistry Majors*; 1 week; \$14,190

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Robert Karplus, and Leo Brewer; *Continuation of a Study of Course Content Improvement in Elementary-School Science*; 1 year; \$51,750

A. L. Kroeber and S. A. Barrett; *Documentary Sound Color Films and Sound Systems and for Student Training in This Specialized Work*; 1 year; \$78,000

David G. Mandelbaum; *Conference on Educational Resources in Anthropology*; during the spring of 1961; \$13,750

Donald M. Reynolds; *Production of Short Motion Picture Films for University Level Instruction in Microbiology*; 1 year; \$38,590

Glenn T. Seaborg; *Organization of a Chemical Education Materials Study*; 7 months; \$125,000

Glenn T. Seaborg; *Preliminary Conference of the Steering Committee of the Proposed Chemical Education Materials Study (CHEM)*; 3 days; \$9,775

Glenn T. Seaborg; *Organization of a Chemical Education Materials Study*; 1 year; \$475,000

B. G. Sherburne; *Production of Eight Thirty-Minute Films on the Nature of Viruses*; 1 year; \$109,980

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; James R. Hooper, Jr.; *Workshop on Materials in Electrical Engineering Education*; 5 days; \$3,300

UNIVERSITY OF CONNECTICUT, Storrs, Conn.; J. T. Stock; *Development of Apparatus for Chemical Analyses and Preparations on the Micro- and Semimicro-Scale*; 5 years; \$13,460

COOPER UNION FOR THE ADVANCEMENT OF SCIENCE AND ART, New York, N.Y.; F. A. Wallace; *A Study of the Scope and Content of Undergraduate Curricula in Civil Engineering*; 1 year; \$43,410

DARTMOUTH COLLEGE, Hanover, N.H.; John W. Dewdney; *Development of a Basic Mass Spectrometer*; 1 year; \$5,930

UNIVERSITY OF DAYTON, Dayton, Ohio; Raymond J. Stith; *Development of Inexpensive, Transparent, Flexible Models for Observation and Demonstration of Internal Deformation Patterns, for Courses in Mechanics of Materials*; 1 year, \$4,170

DUKE UNIVERSITY, Durham, N.C.; F. W. Woods; *Laboratory Exercises for the Study of Stratification in Forest Microclimates*; 1 year; \$5,630

EARLHAM COLLEGE, Richmond, Ind.; Laurence E. Strong; *An Introductory Chemistry Course Based on the Chemical Bond Approach*; 9 months; \$443,550

EDUCATIONAL SERVICES INCORPORATED, Watertown, Mass.; Jerrold R. Zacharias; *Extension of PSSC Films to 45 Minutes for TV and Classroom Use*; 1 year; \$87,500

Jerrold R. Zacharias; *The Development of a Secondary-School Physics Course by the Physical Science Study Committee*; 1 year; \$350,000

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; Raymond R. Fox; *Development of a Vortex Tank-Tunnel, Visual Pipe Network, Dynamic Model and Portable Vibration Simulator as Civil Engineering Teaching Aids*; 10 months; \$1,960

HARVARD UNIVERSITY, Cambridge, Mass.; J. O. Brew, Peabody Museum; *Visual Anthropology*; 3 years; \$110,170

George Wald; *Introductory College Course in Biology*; 3 years; \$59,100

UNIVERSITY OF HOUSTON, Houston, Tex.; T. N. Hatfield; *Development of Apparatus for Experiments on Momentum in Introductory Physics Courses*; 1 year; \$6,210

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.; B. S. Swanson; *The Development of Equipment and a Manual for Laboratory Instruction in Automatic Process Control*; 1 year; \$15,520

UNIVERSITY OF ILLINOIS, Urbana, Ill.; David A. Page; *Experimental Motion Pictures for Mathematics Teachers*; 1 year; \$57,240

J. Myron Atkin and Stanley P. Wyatt, Jr.; *Elementary-School Science Course Content Improvement Project*; 1 year; \$40,600

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; Lloyd M. Bates; *Development of a Model X-ray Circuit*; 1 year; \$4,660

LEHIGH UNIVERSITY, Bethlehem, Pa.; James B. Hartman; *Development of Educational Aids in Mechanical Engineering*; 2 years; \$21,670

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Rolf Eliassen; *A Study Conference on Sanitary Engineers and Scientists on the Improvement of Graduate Curricula for Sanitary Engineers*; 2 days; \$15,000

Kurt S. Lion; *Development Program for a Laboratory Course in Instrumentation*; 1 year; \$24,500

MATHEMATICAL ASSOCIATION OF AMERICA, UNIVERSITY OF WASHINGTON, Seattle, Wash.; R. C. Buck; *Committee on the Undergraduate Program in Mathematics*; 2 years; \$350,000

MICHIGAN STATE UNIVERSITY, East Lansing, Mich.; F. B. Dutton; *Development of Large-Scale Lecture-Table Thermometer and Voltmeter*; 1 year; \$5,980

MINNESOTA ACADEMY OF SCIENCE, St. Paul, Minn.; Paul C. Rosenbloom; *Summer Television Program for Teachers of Mathematics*; 7 months; \$105,800

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Lorenz G. Straub; *Production of Instructional Motion Pictures in Fluid Mechanics*; 1 year; \$19,750

MISSOURI BOTANICAL GARDEN, St. Louis, Mo.; F. W. Went; *Design of a Simple Classroom Plant Growth Chamber*; 1 year; \$8,400

MONTANA STATE COLLEGE, Bozeman, Mont.; William B. Cook; *Conference on Course Content and Philosophy of General Chemistry for Nonscience Majors*; 1 week; \$11,580

NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS, Washington, D.C.; Frank B. Allen, Lyons Township High School and Junior College, La Grange, Ill.; *Regional Conferences on School Supervisors of the New Curriculum in Mathematics*; 1 year; \$48,350

NEW MEXICO HIGHLANDS UNIVERSITY, Las

Vegas, N. Mex.; G. W. Ewing; *Equipment Development for College and University Courses in Instrumental Methods in Chemical Analysis, Physical Chemistry and Related Fields*; 2 years; \$20,320

NEW YORK UNIVERSITY, New York, N.Y.; Isidor Auerbach; *Development of a Fluorescent Lamp System for Teaching Alternating Current Circuits in High School and College Physics*; 1 year; \$5,860

Louis Auerbach; *Development of New Types of Christiansen Filters and a Spectrophotometer Based Upon Them*; 1 year; \$7,650

NORTH CAROLINA STATE COLLEGE, Raleigh, N.C.; John F. Lee; *Disciplinary Study and Revision of the Content of Courses in Experimental Mechanical Engineering*; 2 years; \$85,200

NORTHWESTERN UNIVERSITY, Evanston, Ill.; D. D. DeFord; *Development of Multipurpose Instrument for Quantitative Analysis and Quantitative Chemical Measurements*; 3 years; \$37,790

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; Robert S. Elkenberry; *The Design of an Educational Smoke Tunnel for Air-Flow Visualization*; 1 year; \$4,790

V. P. Goddard; *Development of Supersonic Streamline Visualization*; 1 year; \$9,410

OHIO STATE UNIVERSITY, Columbus, Ohio; Alfred Lande; *A New Approach to the Teaching of Quantum Mechanics*; 6 months; \$2,000

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; Melvin S. Newman and William N. White; *Study Aimed at Improvement of Laboratory Causes in Organic Chemistry*; 1 year; \$8,240

OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Stillwater, Okla.; Scott T. Poage; *Development of a Mechanical Model of the Binary Adder*; 7 months; \$2,390

Scott T. Poage; *Development of a Waiting Line Simulator*; 1 year; \$3,900

OREGON COLLEGE OF EDUCATION, Monmouth, Oreg.; Allen L. Fulmer; *Development of Inexpensive Digital Computers and Logical Building Blocks*; 2 years; \$18,160

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; John A. Fox; *Design and Construction of a Small Laboratory and Demonstration Hypersonic Wind Tunnel*; 1 year; \$12,520

POLYTECHNIC INSTITUTE OF BROOKLYN, Brooklyn, N.Y.; Paul R. DeCicco; *Design and Construction of a Portable Electronic Analog Simulator-Computer Demonstrator*; 14 months; \$13,050

PRINCETON UNIVERSITY, Princeton, N.J.; Hubert N. Aleya; *Projection Techniques for Lecture Demonstrations in Science*; 13 months; \$11,110

QUEENS COLLEGE, Flushing, N.Y.; Morris B. Abramson; *Development of Apparatus and an Instructional Manual for Classroom Demonstrations and Laboratory Experiments in Simple Harmonic Motion, Vibration of the Spring, Formation of Sine Waves, A.C. Voltages and Propagation of Waves*; 1 year; \$7,550

REED COLLEGE, Portland, Oreg.; F. D. Tabbutt; *Development of Equipment and Experiments for Teaching Instrumental Chemical Analysis*; 1 year; \$6,080

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; Walter Eppensteln; *Demonstrations for Use With the Overhead Projector in Physics Lectures*; 1 year; \$5,750

Heinrich Medicus; *Workshop for Demonstration Lectures in Physics*; 6 months; \$20,850

Robert Resnick; *Summer Program for the Study of Introductory Physics Courses in Colleges*; 1 year; \$29,900

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; William M. Harlow; *Production of a Motion Picture on the Mechanism of Moisture Movement in Wood*; 2 years; \$14,210

UNIVERSITY OF ROCHESTER, Rochester, N.Y.; Everett M. Hafner; *Development of Equipment for Lecture Demonstrations, Laboratory Instruction and Corridor Demonstrations for Undergraduate Physics Courses*; 14 months; \$9,550

SACRAMENTO STATE COLLEGE FOUNDATION, Sacramento, Calif.; G. N. Beaumariage, Jr.; *Aids, Models, Overlays and Laboratory Furnaces for Demonstrating Atomic and Molecular Relationships in the Study of Phase, Crystal and Other Properties of Engineering Materials*; 1 year; \$8,920

SOCIETY OF WOOD SCIENCE AND TECHNOLOGY, UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Stephen B. Preston; *Study of Education in Wood Science and Technology*; 2 years; \$29,900

SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.; Frank W. Tippitt; *Design and Development of Small-Scale Demonstration Tape-Control Unit for a Machine Tool*; 1 year; \$4,780

SOUTHWESTERN AT MEMPHIS, Memphis, Tenn.; Jack Conrad; *Development of a Basic Slide Collection for Anthropology Courses*; 4 months; \$4,400

STATE UNIVERSITY OF IOWA, Iowa City, Iowa; T. R. Porter; *Production of Instructional Films on "Slime Molds" and "Teacher Materials on Slime Molds"*; 2 years; \$7,420

Hunter Rouse; *Production of Instructional Motion Pictures in Fluid Mechanics*; 1 year; \$14,000

UNIVERSITY OF VIRGINIA, Charlottesville, Va.; Clifford M. Siegel; *Development of Laboratory Aids for the Teaching of Electrical Engineering*; 1 year; \$6,590

WEST VIRGINIA UNIVERSITY, Morgantown, W. Va.; Charles C. Boyer and T. Walley Williams; *Development of Stereophotomicrography and Other Methods for the Study and Teaching of Submacroscopic Anatomy*; 1 year; \$8,170

YALE UNIVERSITY, New Haven, Conn.; E. G. Begle; *School Mathematics Study Group*; 1 year; \$1,750,000

A. D. Patterson, Jr. and David G. Anderson; *A Film Program for Courses in General Chemistry at Advanced Secondary School and College Levels*; 3 years; \$150,000

YESHIVA UNIVERSITY, New York, N.Y.; Roman Vishniac, Albert Einstein College of Medicine; *Living Biology, Film Series*; 18 months; \$112,840

## OTHER EDUCATION IN THE SCIENCES GRANTS

ACADEMY OF SCIENCE OF ST. LOUIS, St. Louis, Mo.; Muri Deusing; *Science Careers Program*; 1 year; \$17,850

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station, Tex.; E. B. Middleton; *Secondary School Science Teacher Training Program for Retired Military Personnel*; 30 months; \$22,435

K. M. Rae; *Supplementary Training for Teachers*; 4 weeks; \$27,185

Melvin C. Schroeder; *Four-Week College Workshop in Rocks and Minerals for Junior High School and Elementary School Teachers*; 1 year; \$25,400

AGRICULTURAL RESEARCH SERVICE, U.S. DEPARTMENT OF AGRICULTURE, Washington, D.C.; H. A. Rodenhiser; *Animal Husbandry Exchange Mission to the USSR*; 6 weeks; \$1,500

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Washington, D.C.; Hilary J. Deason; *Traveling High School Science Library Program*; 1 year; \$248,000

Dael Wolfe; *Traveling Science Libraries*; 1 year; \$248,090

William P. Viall; *Study of Qualifications and Teaching Loads of Secondary Teachers of Science and Mathematics*; 14 months; \$56,000

AMERICAN CHEMICAL SOCIETY, Washington, D.C.; R. E. Henze; *Preparation, Printing and Distribution of a Career Information Booklet on Chemistry*; 1 year; \$11,250

AMERICAN FOUNDATION FOR CONTINUING EDUCATION, Chicago, Ill., Jerome M. Ziegler; *Program of Citizen Education in Science*; 2 years; \$96,900

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Washington, D.C.; Hiden T. Cox; *Preparation of a Biological Science Career Manuscript*; 1 year; \$5,980

Harold F. Osborne, Biology News Bureau; *Conferences on Science Information*; 3 days; \$15,000

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, New York, N.Y.; F. J. Van Antwerpen; *One-Day Special Lecture Program in Advanced Engineering Concepts Pertaining to Process Development by Statistical Methods*; 1 day; \$3,100

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, New York, N.Y.; Grant C. Riggle; *New Challenges to Electrical Engineers from Medical and Biological Problems*; 1 day; \$450

AMERICAN INSTITUTE OF PHYSICS, New York, N.Y.; Sanborn C. Brown; *International Conference on Physics Education*; 1 year; \$14,000

Elmer Hutchisson; *Career Information Literature in Physics*; 1 year; \$9,430

Elmer Hutchisson; *Three Seminars for Science Writers*; 1 day each; \$8,450

Wallace Waterfall; *Translation of Russian Physics Lecture Demonstration Manuals*; 1 year; \$9,000

AMERICAN MATHEMATICAL SOCIETY, Providence, R.I.; Gordon L. Walker; *Four-Week Special Field Institute in Modern Physical Theories and Associated Mathematical Developments*; 4 weeks; \$18,250

AMERICAN METEOROLOGICAL SOCIETY, Boston, Mass.; Vincent J. Schafer; *Supplementary Student Science Project*; 6 weeks; \$9,280

Kenneth C. Spengler; *Career Guidance Literature in Meteorology*; 1 year; \$8,740

AMERICAN PHYSIOLOGICAL SOCIETY, Washington, D.C.; Ray G. Dages; *Two Week Workshop on the Teaching of Physiology in Undergraduate Colleges During the Month*



- of August in the Summers of 1961-62-63; 3 years; \$23,745
- AMERICAN SOCIETY OF LIMNOLOGY AND OCEANOGRAPHY, INC., Woods Hole, Mass.; Bostwick H. Ketchum; *Education and Recruitment Committee*; 1 year; \$13,000
- AMERICAN SOCIETY OF ZOOLOGISTS, STATE UNIVERSITY OF IOWA, Iowa City, Iowa; S. J. Segal, The Rockefeller Institute; *Refresher Course in Metamorphosis in the Animal Kingdom*; 2 days; \$4,900
- AMERICAN SOCIETY OF ZOOLOGISTS, STANFORD UNIVERSITY, Stanford, Calif.; Victor C. Twitty; *Printing and Distributing a Brochure "Careers in Animal Biology"*; 1 year; \$2,456
- ARIZONA ACADEMY OF SCIENCE, PHOENIX, ARIZ.; Howard K. Gloyd; *Traveling Science Institute*; 1 year; \$21,110
- ASIA FOUNDATION, San Francisco, Calif.; William L. Eilers; *Travel of Foreign Participants in 1960 Summer Institutes*; 8 months; \$10,400
- BOSTON COLLEGE, Chestnut Hill, Mass.; Stanley J. Bezuska, S. J.; *Correspondence Course in Elementary Algebra Treated From the Standpoint of Modern Algebra*; 10 months; \$10,500
- BOTANICAL SOCIETY OF AMERICA, INC., New York, N.Y.; Harold C. Bold; *Career Information Booklet in the Field of Botany*; 1 year; \$5,000
- BRANDEIS UNIVERSITY, Waltham, Mass.; Kenneth W. Ford; *Special Field Institute in Theoretical Physics*; 6 weeks; \$32,860
- BUFFALO SOCIETY OF NATURAL SCIENCES, BUFFALO MUSEUM OF SCIENCE, Buffalo, N.Y.; Fred T. Hall; *Supplementary Science Program in Biology*; 1 year; \$12,380
- UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Jerzy Neyman; *Young Scholars to Attend the Fourth Berkeley Symposium on Mathematical Statistics and Probability*; 6 weeks; \$8,540
- Charles T. Singleton; *Study Program in Public Education in Science and Technology*; 1 year; \$29,925
- Myron Tribus, Los Angeles; *Special Field Institute on Information Theory Applied to Modern Physics and Engineering*; 2 weeks; \$5,820
- CANISUS COLLEGE, Buffalo, N.Y.; Herman A. Szymanski; *Institute and Symposium on Gas Chromatography*; 3 days; \$3,220
- CARLETON COLLEGE, Northfield, Minn.; Bruce Pollock; *Seminar on Science and the News*; 3 days; \$10,150
- CENTRAL STATE COLLEGE, Wilberforce, Ohio; B. H. Johnson; *Laboratory Training Program for Secondary School Teachers*; 3 months; \$16,215
- CENTRO BRASILEIRO DE PESQUISAS FISICAS, Rio de Janeiro, Brazil; J. Leite Lopes; *Support of U.S. Participants at the Latin American School of Physics*; 6 months; \$5,500
- CHICAGO ACADEMY OF SCIENCES, Chicago, Ill.; William J. Beecher; *Science Club and Workshop Project*; 1 year; \$11,040
- UNIVERSITY OF CHICAGO, Chicago, Ill.; Francis S. Chase; *Six Day Special Program of Participation by Selected High School Teachers of Science as a Part of the Darwin Centennial Celebration*; 6 days; \$14,000
- CLEVELAND MUSEUM OF NATURAL HISTORY, Cleveland, Ohio; Daniel E. Snow; *Symposium on the Educational Use of Plane Partials*; 3 days; \$5,575
- UNIVERSITY OF COLORADO, Boulder, Colo.; Wesley E. Brittin; *Special Field Institute for Theoretical Physics*; 10 weeks; \$38,720
- COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; Walter R. Benson; *Laboratory Training Program for Secondary School Teachers*; 3 months; \$12,670
- Herman M. Weisman; *Science News Writing Seminar*; 6 days; \$13,660
- COOPER UNION, New York, N.Y.; James N. Eastham; *The Mathematics Speakers' Bureau for Providing Speakers for High School Student Groups and Staffs*; 1 year; \$4,110
- CORNELL UNIVERSITY, Ithaca, N.Y.; Philip G. Johnson, New York State College of Agriculture; *Academic Year Research Participation Program*; 10 months; \$14,370
- COUNCIL OF CHIEF STATE SCHOOL OFFICERS, Washington, D.C.; Edgar Fuller; *Project for Production of a Supplement to the Purchase Guide to Assist in the Wise Purchase and Use of Materials and Apparatus in Science, Mathematics, and Modern Foreign Languages*; 1 year; \$9,700
- DAVIDSON COLLEGE, Davidson, N.C.; W. G. McGavock; *Nonresident Summer Institute in Mathematics for High School Teachers*; 6 weeks; \$1,000
- UNIVERSITY OF DENVER, Denver, Colo.; Byron E. Cohn; *Coordinating Program of 1960 National Science Foundation Summer Institutes Visiting Foreign Staff Projects*; 10 months; \$15,550
- DUKE UNIVERSITY, Durham, N.C.; J. J. Gergen; *Experimental Program in the Retraining of Armed Services Officers for Teaching Mathematics*; 1 year; \$11,600
- EAST TEXAS STATE COLLEGE, Commerce, Tex.; J. H. Clements; *Laboratory Training Program for Secondary School Teachers*; 3 months; \$7,730
- EDUCATIONAL SERVICES, INC., Watertown, Mass.; Gilbert Oakley, Jr.; *One Week Training Conference for the Instructional Staffs of Institutes Dealing With the Physics Course Prepared by the Physical Science Study Committee*; 1 week; \$25,225
- Jerrold R. Zacharias; *Activities of the Physical Science Study Committee Relating to the Use or Adaptation of PSSC Materials by Foreign Governments or Foreign Educational Institutions*; 1 year; \$24,800
- EMORY UNIVERSITY, Atlanta, Ga.; Charles T. Lester; *Program Involving a Television Course on Science for Elementary School Teachers*; 1 year; \$60,320
- ENGINEERS JOINT COUNCIL, New York, N.Y.; H. K. Justice; *University of Cincinnati; U.S. Mission to the Updat Pan American Congress on Engineering Education*; 1 year; \$11,350
- Robert M. Mahoney; *U.S. Exchange Mission to Study the Utilization of Engineers and Engineering Technicians and Their Interrelationship in the Industrial Composite of the USSR*; 6 months; \$26,500
- William H. Miernyk, Northeastern University; *Analysis of 1960 Salary and Other Professional Earnings of Engineering Faculty Members*; 9 months; \$7,460
- UNIVERSITY OF FLORIDA, Gainesville, Fla.; Per-Olov Lowdin; *Special Field Winter Institute in Quantum Chemistry and Solid-State Physics*; 5 weeks; \$65,500
- Rae O. Weiner; *Southern Regional Science Seminar*; 3 days; \$19,175

- GEORGE PEABODY COLLEGE FOR TEACHERS, Nashville, Tenn.; Bessie Carmichael; *Co-operative College School Program*; 6 weeks; \$53,090
- HAWAIIAN ACADEMY OF SCIENCES, Honolulu, Hawaii; Donald C. McGuire, University of Hawaii; *Hawaiian Science Clubs Service*; 1 year; \$19,650
- James Moomaw; *Teachers' Science Seminar Series*; 1 year; \$1,370
- IDAHO ACADEMY OF SCIENCE, UNIVERSITY OF IDAHO, Moscow, Idaho; Elmer K. Raunio; *Program To Encourage Science Education in Idaho High Schools*; 1 year; \$15,650
- ILLINOIS STATE ACADEMY OF SCIENCE, Jacksonville, Ill.; Robert C. Wallace, MacMurray College; *Illinois Junior Academy of Science Program*; 1 year; \$15,000
- UNIVERSITY OF ILLINOIS, Urbana, Ill.; Samuel Schrage; *Chemistry High School-College Teachers Conference*; 1 day; \$300
- INDIANA ACADEMY OF SCIENCES, INDIANA UNIVERSITY, Bloomington, Ind.; J. Crawford Polley; *Program of the Indiana School and College Committee on Mathematics*; 1 year; \$13,710
- IOWA ACADEMY OF SCIENCE, GRINNEL COLLEGE, Grinnel, Iowa; T. R. Porter, University High School, State University of Iowa; *Visiting Scientist Program and Publication of Selected Scientific Papers*; 1 year; \$25,690
- JUNIOR ENGINEERING TECHNICAL SOCIETY, East Lansing, Mich.; J. D. Ryder, Michigan State University; *Preparation and Distribution of Statewide Academic Units Pertaining to Vocational Guidance Toward Engineering and Technology*; 1 year; \$17,590
- KANSAS ACADEMY OF SCIENCE, KANSAS STATE COLLEGE OF PITTSBURG, Pittsburg, Kans.; J. M. Jewett, State Geological Survey, University of Kansas; *Science Teaching Improvement Program*; 1 year; \$31,350
- KANSAS STATE UNIVERSITY, Manhattan, Kans.; Ralph R. Lashbrook; *Public Understanding of Science*; 5 days; \$9,960
- KANSAS STATE TEACHERS COLLEGE, Emporia, Kans.; Otto Smith; *Conference of Principals, Supervisors and School Board Members of the Science and Mathematics Teachers Enrolled in the 1960 Summer Institute*; 1 day; \$1,200
- UNIVERSITY OF KANSAS, Lawrence, Kans.; George R. Waggoner; *Conference on Special Programs in Science for the Gifted Undergraduate Student in Large Public Universities*; 2 days; \$11,040
- KENTUCKY RESEARCH FOUNDATION, Lexington, Ky.; Douglas W. Schwartz, Museum of Anthropology; *Institute in Kentucky Archaeology*; 2 Saturdays; \$650
- LOUISIANA ACADEMY OF SCIENCE, LOUISIANA STATE UNIVERSITY, Baton Rouge, La.; Harry J. Bennett; *Expansion and Implementation of Junior Academies of Science*; 1 year; \$27,750
- UNIVERSITY OF LOUISVILLE, Louisville, Ky.; William J. McGlathlin; *Science Reporting Workshop*; 2 days; \$4,500
- MARYLAND ACADEMY OF SCIENCES, Baltimore, Md.; Thomson King; *Course in Astro-nautics for Teachers of Science in High Schools of Maryland*; 1 year; \$3,160
- Thomson King; *The Creation and Circulation of Mobile Science Exhibits Among the Schools of Maryland*; 1 year; \$15,900
- UNIVERSITY OF MARYLAND, College Park, Md.; Joshua R. C. Brown; *Visiting Foreign Staff Project for 1960 Summer Institutes in Biological Sciences*; 2 months; \$30,000
- MATHEMATICAL ASSOCIATION OF AMERICA, UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Edward A. Cameron, University of North Carolina; *Conference for Summer Institute Teachers of Mathematics*; 3 days; \$49,000
- MATHEMATICAL ASSOCIATION OF AMERICA, TEACHERS COLLEGE, Columbia University, New York, N.Y.; Howard F. Fehr; *Survey of European Mathematical Education—Part II*; 1 year; \$9,200
- MATHEMATICAL ASSOCIATION OF AMERICA, UNIVERSITY OF BUFFALO, Buffalo, N.Y.; John R. Mayor, American Association for the Advancement of Science; *Program of Visiting Lecturers to Secondary Schools in Mathematics*; 2 years; \$100,000
- METALLURGICAL SOCIETY OF AIME, New York, N.Y.; John Chipman; *Careers in Metallurgy*; 1 year; \$7,500
- MICHIGAN ACADEMY OF SCIENCE, ARTS, AND LETTERS, MUSEUM OF PALEONTOLOGY, UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Wayne Taylor; *Project To Improve the Status of Science and Mathematics Education in the State of Michigan*; 1 year; \$20,990
- MICHIGAN COLLEGE OF MINING AND TECHNOLOGY, Houghton, Mich.; M. E. Vollin; *Laboratory Training Program for Secondary School Teachers*; 3 months; \$2,720
- MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing, Mich.; F. B. Dutton; *Traveling Science Demonstration Lecture Program*; 1 year; \$225,655
- E. D. Devereux; *Workshop in Microbiology for Secondary School Teachers*; 2 weeks; \$8,300
- MISSISSIPPI ACADEMY OF SCIENCES, INC., DELTA STATE COLLEGE, Cleveland, Miss.; Clyde Q. Sheely; *Program To Encourage and Improve Science Education in the High Schools*; 1 year; \$34,730
- UNIVERSITY OF MISSOURI, Columbia, Mo.; R. E. Peck; *Conference on College Science Teachers*; 1 day, \$1,600
- MUSEUM OF ART, SCIENCE AND INDUSTRY, Bridgeport, Conn.; Earle W. Newton; *Mobile Exhibit Trailer Project*; 1 year; \$8,000
- MUSEUM OF NEW MEXICO, Santa Fe, N. Mex.; Fred Wendorf; *Special Field Institute in Archaeology*; 8 weeks; \$7,840
- NASSON COLLEGE, Springvale, Maine; Roger C. Gay; *Supplementary Student Science Projects Program*; 6 weeks; \$18,000
- NATIONAL ACADEMY OF SCIENCE—NATIONAL RESEARCH COUNCIL, Washington, D.C.; S. S. Wilks; *Printing and Distributing 500,000 Copies of a Pamphlet Entitled "Careers in Mathematics"*; 30 months; \$21,000
- NATIONAL MERIT SCHOLARSHIP, Evanston, Ill.; John M. Stalnaker; *Study of Institutional Characteristics Related to College Productivity*; 2 years; \$50,000
- NATIONAL OPINION RESEARCH CENTER, Chicago, Ill.; Peter H. Rossi; *Planning Statement on Post Enumeration Studies of the 1960 Census of Population*; 3 months; \$2,500
- NEW HAMPSHIRE ACADEMY OF SCIENCE, DARTMOUTH COLLEGE, Hanover, N.H.; Allen L. King; *Program To Assist Science Teachers and Students in the Secondary*

- Schools in New Hampshire*; 1 year; \$6,040  
 UNIVERSITY OF NEW HAMPSHIRE, Durham, N.H.; M. Evans Munroe; *Special Field Institutes*; 1 month; \$3,500  
 NEW YORK STATE SOCIETY FOR MEDICAL RESEARCH, INC., New York, N.Y.; Brian F. Hoffman; *Summer Workshop on Laboratory Experiments in Physiology*; 6 weeks; \$13,150  
 NEW YORK UNIVERSITY, New York, N.Y.; Hillier Kriehbaum; *Science Writers Seminar*; 2 weeks; \$13,400  
 Hillier Kriehbaum; *Seminary for Science Writers*; 2 weeks; \$16,800  
 NORTH CAROLINA ACADEMY OF SCIENCE, Raleigh, N.C.; Herbert E. Speece; *Short-Term Science Institutes for High School Teachers in North Carolina*; 1 year; \$19,390  
 NORTH CAROLINA STATE COLLEGE, Raleigh, N.C.; T. E. Maki; *Special Field Institute in Forest Biology*; 4 weeks; \$27,500  
 UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; Norval Nell Luxon; *Science Writers Institute*; 3 days; \$25,000  
 Robert G. Carson, Jr.; *North Carolina State College—Other College Cooperative Association for Science Teachers*; 1 year; \$24,770  
 NORTH TEXAS STATE COLLEGE, Denton, Tex.; L. F. Connell, Jr.; *Radiological Science Conference for Summer Institute Instructors*; 6 months; \$9,400  
 OAK RIDGE INSTITUTE OF NUCLEAR STUDIES, INC., Oak Ridge, Tenn.; W. W. Grigorleff; *Traveling Science Demonstration Lecture Program*; 1 year; \$296,300  
 OBERLIN COLLEGE, Oberlin, Ohio; Wade Ellis; *Visiting Foreign Staff Project for 1960 Summer Institutes in Mathematics*; 10 months; \$29,750  
 OHIO ACADEMY OF SCIENCE, Columbus, Ohio; Gerald Acker, Bowling Green State University; *The Development and Operation of Science Days in the State of Ohio*; 1 year; \$6,800  
 OKLAHOMA ACADEMY OF SCIENCE, UNIVERSITY OF OKLAHOMA, Norman, Okla.; Robert C. Fite; *Oklahoma Junior Academy of Science Program*; 1 year; \$2,320  
 J. Teague Self; *Consultation Service for Community Sponsored Improvement Programs in Science Education*; 1 year; \$30,010  
 OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Stillwater, Okla.; Robert C. Fite; *Traveling Science Demonstration Lecture Program*; 1 year; \$250,890  
 OREGON MUSEUM OF SCIENCE AND INDUSTRY, Portland, Oreg.; Raymond E. Barrett; *Field Research Program for Teachers*; 1 year; \$6,180  
 OREGON STATE COLLEGE, Corvallis, Oreg.; Vernon H. Cheldelin; *Biology Colloquium*; 1½ days; \$6,000  
 UNIVERSITY OF OREGON, Eugene, Oreg.; E. G. Ebbighausen; *Traveling Science Demonstration Lecture Program*; 1 year; \$221,750  
 John L. Hulteng; *Conference on Interpreting Modern Science to the Public*; 3 days; \$8,500  
 ORGANIZATION OF AMERICAN STATES, Washington, D.C.; Jesse D. Perkinson; *Cooperative Program for an Inter-American Exchange of Scientists*; 2 years; \$65,000  
 Jesse D. Perkinson; *Travel of Foreign Participants in 1960 Summer Institutes*; 2 months; \$700  
 ORGANIZATION FOR EUROPEAN ECONOMIC COOPERATION, Paris, France; L. Vincent,
- Travel of Foreign Participants in 1960 Summer Institutes*; 2 months; \$6,500  
 PACIFIC SOUTHWEST ASSOCIATION OF CHEMISTRY TEACHERS, San Mateo, Calif.; James A. Ice; *Conference on Recent Advances in Chemistry*; 6 days; \$10,825  
 PEMBROKE STATE COLLEGE, Pembroke, N.C.; Henry Tamar; *Laboratory Training Program for Secondary School Teachers*; 3 months; \$11,695  
 PENNSYLVANIA ACADEMY OF SCIENCE, Pittsburgh, Pa.; Charles L. Bikle; *Program of the Junior Academy of Science in Pennsylvania*; 1 year; \$5,910  
 UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Hsuan Yeh; *Six-Day Special Field Institute on Fluid Mechanics in Engineering*; 6 days; \$9,000  
 PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; William H. Powers; *Three-Day Conference of Teachers in 1960 Summer Institutes Devoted to the Earth and Space Sciences*; 3 days; \$3,000  
 POLYTECHNIC INSTITUTE OF BROOKLYN, Brooklyn, N.Y.; John J. Drophkin; *Extension of a Project for the Preparation of Foreign-Trained Engineers to Teach Engineering Mathematics, Physics and Chemistry*; 6 months; \$5,750  
 UNIVERSITY OF PUERTO RICO, Rio Piedra, P.R.; Hermilio Lugo Lugo; *Traveling Lecture Program*; 1 year; \$10,700  
 PURDUE UNIVERSITY, Lafayette, Ind.; George A. Hawkins; *Symposium on Engineering Applications of Probability*; 2 days; \$6,000  
 H. A. Smith; *Program To Prepare Retired Armed Service Personnel To Teach Basic Collegiate Mathematics*; 14 months; \$10,680  
 UNIVERSITY OF RHODE ISLAND, Kingston, R.I.; James E. Casey; *Program of Saturday Seminars for Selected High School Students*; 6 months; \$6,325  
 UNIVERSITY OF ROCHESTER, Rochester, N.Y.; Norma D. Miller; *Conference on Graduate Training for Research in the Processes of Vision*; 7 days; \$22,510  
 ST. LAWRENCE UNIVERSITY, Canton, N.Y.; Donald C. Peckham; *Conference for College Teachers of Physics To Stimulate Research in the Physics of Elastic Constants*; 5 days; \$6,350  
 ST. MARY'S COLLEGE, Winona, Minn.; Brother Charles, F.S.C.; *Laboratory Training Program for Secondary School Teachers*; 3 months; \$15,700  
 Brother Charles, F.S.C.; *Summer Field Course in Biology*; 2 weeks; \$11,800  
 SCANDINAVIAN COUNCIL OF APPLIED RESEARCH, Blindern, Norway; Elin Tornudd; *United States Participation in the Second Year of the Growing Points Program in the Scandinavian Countries*; 1 year; \$15,125  
 SCIENCE SERVICE, Washington, D.C.; Watson Davis; *National Science Youth Program*; 1 year; \$25,000  
 SOCIETY OF AMERICAN BACTERIOLOGISTS, UNIVERSITY OF WISCONSIN, Madison, Wis.; L. S. McClung; *Career Information Literature in Bacteriology*; 1 year; \$9,690  
 SOUTH DAKOTA ACADEMY OF SCIENCE, AUGUSTANA COLLEGE, Sioux Falls, S. Dak.; F. E. Kelsey; *State Academy of Science Project*; 1 year; \$15,770  
 STANFORD UNIVERSITY, Stanford, Calif.; Lawrence R. Blinks, Hopkins Marine Station, Pacific Grove; *Summer Field Institute for Marine Biology*; 10 weeks; \$20,050

*Motion Picture Depicting the Nature and Importance of Basic Research*; 1 year; \$40,000

SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.; W. R. Le Page; *Conference on Electrical Engineering Education*; 2 days; \$4,880

SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Collendale Campus, Syracuse, N.Y.; Alfred T. Collett; *Visiting Foreign Staff Project for Academic Year Institutes During 1960-61*; 1 year; \$51,500

TEMPLE UNIVERSITY, Philadelphia, Pa.; Elmer L. Offenbacher; *Visiting Foreign Staff Project for 1960 Summer Institutes in Physical Sciences*; 10 months; \$34,950

TENNESSEE ACADEMY OF SCIENCE, VANDERBILT UNIVERSITY, Nashville, Tenn.; Myron S. McCay; *Expansion and Implementation of the Program of Science*; 1 year; \$10,000

Arlo I. Smith; *Short Term Science Institutes for High School Teachers*; 1 year; \$16,870

TEXAS ACADEMY OF SCIENCE, UNIVERSITY OF TEXAS, Austin, Tex.; Charles La Motte, A & M College of Texas; *Research Conference for Promising Science Students in the Junior and Small Senior College of Texas*; 1 year; \$10,750

UNIVERSITY OF TEXAS, Austin, Tex.; Howard T. Odum, Institute of Marine Science; *Special Field Institute*; 2 months; \$4,000

UNIVERSITY OF UPPSALA, Uppsala, Sweden; Per-Olov Lowdin; *1960 International Summer Institute in Quantum Chemistry*; 6 months; \$9,000

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, Washington, D.C.; Lawrence S. Derthick; *1960 Students Enrolled for Advanced Degrees*; 1 year; \$18,000

UNIVERSITY OF VERMONT, Burlington, Vt.; Howard M. Smith, Jr.; *Symposium on Educational Frontiers in Biomedical Engineering*; 2 days; \$7,000

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Joseph L. McCarthy; *Program for College-University Association in the Teaching of Science*; 1 year; \$50,360

WESTERN KENTUCKY STATE COLLEGE, Bowling Green, Ky.; Kelly Thompson; *Conference on Teacher Participation in Science*; 2 days; \$3,750

WHEELING COLLEGE, Wheeling, W. Va.; Joseph A. Duke; *Monthly One-Day Workshop in Chemistry for Science Teachers*; 7 months; \$2,875

UNIVERSITY OF WISCONSIN, Madison, Wis.; Donald M. Bucklin; *Two-Day Special Meeting of 1959-60 High School Teacher Research Participants*; \$450

R. D. Wagner; *In-Service Program of Studies of Basic Concepts of Mathematics by Directed Group and Individual Study Using Correspondence Study Materials*; 1 year; \$40,700

WOODS HOLE OCEANOGRAPH INSTITUTION, Woods Hole, Mass.; W. V. R. Malkus; *Three Month Summer Program of Theoretical Studies in Geophysical Fluid Dynamics*; 3 months; \$13,450

WASHINGTON ACADEMY OF SCIENCES, Washington, D.C.; John K. Taylor; *Science Education Program*; 1 year; \$34,990

WASHINGTON STATE UNIVERSITY, Pullman, Wash.; William W. Elmendorf; *Field School in Ethnography*; 8 weeks; \$5,665

## POLICY STUDIES

COMMISSION OF LABOR STATISTICS, Washington, D.C.; Ewan Clague; *Cost Index Applicable to Research and Development Budgets*; 7 to 8 months; \$18,000

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL, Washington, D.C.; S. D. Cornell; *Activities of the Committee on Atmospheric Sciences*; 1 year; \$36,800

U.S. BUREAU OF THE CENSUS, DEPARTMENT OF COMMERCE, Washington, D.C.; Robert W. Burgess; *Study of 250 Industrial Firms Reporting More Than \$50,000 in Basic Research During 1957 to Determine Extent of Publications of Research*; 1 year; \$4,900

Robert W. Burgess; *Survey of Research and Development Costs of Industry-Oriented Organizations—During 1958*; 1 year; \$11,000

Max R. Conklin; *Survey of Research and Development Costs of Industry-Oriented Organizations*; 1 year; \$75,000

## SCIENTIFIC MANPOWER

ENGINEERS JOINT COUNCIL, New York, N.Y.; William H. Miernyk; *Analysis of 1960 Salary and Other Professional Earnings of Engineering Faculty Members*; 9 months; \$7,460

LIBRARY OF CONGRESS, Washington, D.C.; Leo Orleans; *Study of Communist China's Scientific Technical Manpower*; fiscal year 1960-61; \$500

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL, Washington, D.C.; M. H. Trytten; *Continuation of Revision of Study on Soviet Professional Manpower*; 6 months; \$12,125

NATIONAL SCIENCE TEACHERS ASSOCIATION, Washington, D.C.; Robert H. Carleton; *Registry of High School Science and Mathematics Teachers*; 6 months; \$21,500

Robert H. Carleton; *1960-61 Registry of High School Science and Mathematics Teachers*; 1 year; \$31,000

U.S. BUREAU OF LABOR STATISTICS, DEPARTMENT OF LABOR, Washington, D.C.; Ewan Clague; *1960 Survey of Industrial Employment of Scientific and Technical Personnel*; 1 year; \$85,000

U.S. OFFICE OF EDUCATION, DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, Washington, D.C.; Clayton D. Hutchins; *Federal Funds for Science Education*; \$38,000

U.S. WEATHER BUREAU, Washington, D.C.; Roy L. Fox, National Weather Records Center, Asheville, N.C.; *Computing Program for the 1956-59 National Register of Scientific and Technical Personnel Data*; 1 year; \$9,000

## FOREIGN SCIENCE EVALUATION SURVEYS

CARL O. SAUER, Berkeley, Calif.; *Survey of Geography in Western Germany, Switzerland and Austria*; 3 months; \$3,500

UNIVERSITY OF TEXAS, Austin, Tex.; Jackson W. Foster; *Review of Microbiology in Japan*; 4 months; \$5,358

A. D. WALLACE, TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; *Preparation of a Report on Mathematical Activity in Poland*; 3 months; \$100

## CONFERENCES IN SUPPORT OF SCIENCE

AMERICAN INSTITUTE OF NUTRITION, Washington, D.C.; Milton O. Lee; *Fifth International Congress on Nutrition*; 6 days; \$20,000

AMERICAN MATHEMATICAL SOCIETY, Providence, R.I.; Gordon L. Walker; *Conference on Differential Geometry*; 2 days; \$6,500

Gordon L. Walker; *Directors of University Computing Laboratories*; June 1960; \$18,100

AMERICAN PHYSICAL SOCIETY, Princeton, N.J.; Shirley L. Quimby; *Conference on Plasma Physics*; 3 days; \$600

AMERICAN SOCIETY OF ZOOLOGISTS, STATE UNIVERSITY OF IOWA, Iowa City, Iowa; Emil Witschi; *Regional Developmental Biology Conferences*; 1 year; \$4,000

UNIVERSITY OF ARIZONA, Tucson, Ariz.; A. R. Kassander; *Conference on the Surface Chemistry of Ice Nucleation*; 18 months; \$12,500

BERNICE P. BISHOP MUSEUM, Honolulu, Hawaii; Alexander Spoehr; *Tenth Pacific Science Congress*; 2 years; \$53,300

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Kenneth L. Downes, Jr.; *Second International Symposium on Rarefied Gas Dynamics*; 4 days; \$6,500

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; J. J. Nassau; *Conference on Astronomical Observations From Above the Earth's Atmosphere*; 1 day; \$1,400

UNIVERSITY OF CHICAGO, Chicago, Ill.; T. R. Hogness; *Symposium on Optical Spectrometric Measurements of High Temperatures*; 1 year; \$7,500

N. Rashevsky; *International Symposium Mathematical Theories of Biological Phenomena*; 1 year; \$5,500

Eric R. Wolf; *Conference on Archaeological Research in the Valley of Mexico*; 4 months; \$2,000

UNIVERSITY OF COLORADO, Boulder, Colo.; Frank Kreth; *Heat Transfer Conference at the Annual ASME Meeting (1960)*; 1 year; \$4,600

COLUMBIA UNIVERSITY, New York, N.Y.; George K. Smelser; *The Structure of the Eye*; 1 week; \$9,900

GEOCHEMICAL SOCIETY, GEOPHYSICAL LABORATORY, Washington, D.C.; Robert M. Garrels, Massachusetts Institute of Technology; *Conference on Geochemistry of Carbonate Minerals and Rocks*; 5 days; \$4,980

GORDON RESEARCH CONFERENCES, UNIVERSITY OF RHODE ISLAND, Kingston, R.I.; W. George Parks; *Gordon Conference on Photonicuclear Reactions*; 5 days; \$6,000

HARVARD UNIVERSITY, Cambridge, Mass.; L. L. Engel and C. A. Villee, Massachusetts General Hospital, Boston; *Conference on Mechanisms of Action of Steroid Hormones*; 3 days; \$6,800

Wassily W. Leontief; *International Conference on Input-Output Analysis*; 7 days; \$20,400

HIGH ALTITUDE OBSERVATORY OF THE UNIVERSITY OF COLORADO, Boulder, Colo.; Walter Orr Roberts; *International Cross-Field Seminar on Solar-Weather Relationships*; 8 days; \$13,000

HISTOCHEMICAL SOCIETY, WASHINGTON UNIVERSITY, St. Louis, Mo.; Oliver H. Lowry; *Symposium on the Histochemistry of the Nervous System*; 1 year; \$800

HISTORY OF SCIENCE SOCIETY, Ithaca, N.Y.; Henry Guerlac; *10th International Congress of the History of Science*; Summer, 1960; \$40,000

HISTORY OF SCIENCE SOCIETY, CORNELL UNIVERSITY, Ithaca, N.Y.; Nathan Reingold; *Conference on Science Manuscripts*; 2 days; \$5,000

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; William D. McElroy, Mergenthaler Laboratory for Biology; *Symposium on Light and Life*; 4 days; \$7,000

LONG ISLAND BIOLOGICAL ASSOCIATION, Cold Spring Harbor, N.Y.; Arthur Chovnick; *Symposium on Biological Clocks and Animal Navigation*; 10 days; \$7,635

LOWELL OBSERVATORY, Flagstaff, Ariz.; J. S. Hall; *Conference on Polarization of Starlight*; 1 day; \$2,400

MANHATTAN COLLEGE, New York, N.Y.; W. Wesley Eckenfelder, Jr.; *Third Biological Waste Treatment Conference*; 3 days; \$5,200

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Walter A. Rosenblith; *The Role of Computer Techniques in Research on Brain Functions and Behavior*; 2 days; \$10,000

METALLURGICAL SOCIETY OF AIME, New York, N.Y.; John Chipman; *Conference on Response of Materials to High Velocity Deformation*; 1 year; \$3,500

Kempton H. Roll; *First International Powder Metallurgy Conference*; 1 year; \$3,000

MIDWEST RESEARCH INSTITUTE, Kansas City, Mo.; Bruce Daniel; *1960 International Conference on the Nature of Solid Friction*; September 1960; \$5,300

MISSOURI BOTANICAL GARDEN, Saint Louis, Mo.; Robert L. Dressler; *A Conference on Systematics at the Missouri Botanical Garden*; 1 year; \$1,800

UNIVERSITY OF MISSOURI, Columbia, Mo.; G. B. Clark; *Sixth Annual Symposium on Mining Research*; 1 week; \$7,000

NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.; Frank L. Campbell; *Symposia (1) On Mutations (Fall 1960) and (2) On Statistics (Spring 1961) In Genetics*; \$15,000

Frank L. Campbell; *Symposium on Comparative Studies of Ionizing, Ultraviolet, and Visible Radiation*; 4 days; \$15,500

Frank L. Campbell; *Tropical Botanical Problems of Concern to the United States*; 3 days; \$9,100

John S. Coleman; *Committee on Symbols, Units and Nomenclature (Sun)*; 2 years; \$5,000

John S. Coleman; *Conference on Atomic Masses*; \$3,000

John S. Coleman; *Survey of the Transportation Problem, Woods Hole, Massachusetts*; 1 year; \$35,000

John S. Coleman; *Symposium on Magneto-Fluid Dynamics*; 7 days; \$10,000

John S. Coleman; *U.S. Committee of the International Union of Pure and Applied Physics*; 2 years; \$5,000

John S. Coleman; *Third Astrometric Conference; Argentina*; 1 week; \$7,000

G. D. Meld; *Support of COSPAR*; 1 year; \$5,000

Richard C. Vetter; *Support to the Special Committee on Oceanic Research of the International Council of Scientific Unions*; 1 year; \$47,400

UNIVERSITY OF NEW MEXICO, Albuquerque, N. Mex.; Guido H. Daub; *Organic Scintillation Detectors*; 3 days; \$4,400

NEW YORK STATE VETERINARY COLLEGE, CORNELL UNIVERSITY, Ithaca, N.Y.; Morley

R. Kare; *Physiological and Behavioral Aspects of Taste*; 1 year; \$1,000  
 UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.;  
 N. E. Wagman; *Symposium on Subwary Stars*; 1 day; \$2,680  
 PROVISIONAL INTERNATIONAL COMPUTATION CENTRE, Roma-Zona dell'E.U.R., Italy; *Symposium—Numerical Treatment of Ordinary Differential, Integral and Integro-Differential Equations*; 5 days; \$7,000  
 PURDUM RESEARCH FOUNDATION, Lafayette, Ind.; Solomon Gartenhaus; *Midwest Conference on Theoretical Physics*; 2 days; \$2,000  
 RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Michael Heidelberger and Otto J. Plecia; *Immuno-Chemical Approaches to Problems in Microbiology*; 3 days; \$12,250  
 Leslie A. Stauber; *Conference on the Physiology of Parasitism*; 2 days; \$1,600  
 SOCIAL SCIENCE RESEARCH COUNCIL, New York, N.Y.; Joseph H. Greenberg; *Conference on Language Universals*; 1 year; \$10,900  
 SOCIETY FOR THE STUDY OF DEVELOPMENT AND GROWTH, BRANDEIS UNIVERSITY, Waltham, Mass.; Edgar Zwilling; *Nineteenth Growth Symposium*; 3 days; \$5,000  
 SOILS SCIENCE SOCIETY OF AMERICA, Madison, Wis.; Emil Truog; *General Support of the VII International Soil Science Congress*; 6 months; \$10,000  
 STANFORD RESEARCH INSTITUTE, Menlo Park, Calif.; Nevin K. Hlester; *International Symposium on High Temperature Technology*; 3 days; \$8,500  
 UNIVERSITY OF TEXAS, Austin, Tex.; T. C. Hsu, M. D. Anderson Hospital and Tumor Institute; *Support of a Symposium on the Cell Physiology or Neoplasia*; 3 days; \$6,700  
 WASHINGTON UNIVERSITY, St. Louis, Mo.; Herman N. Eisen; *Continuing Workshop on Antibody Synthesis*; 1 year; \$8,400  
 UNIVERSITY OF WASHINGTON, Seattle, Wash.; Ernst Florey; *International Symposium on Nervous Inhibition*; 7 days; \$18,000  
 WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; Arthur G. Steinberg; *A Symposium on Genetics*; 1 month; \$20,900  
 WORCESTER POLYTECHNIC INSTITUTE, Worcester, Mass.; Arthur B. Bronwell; *Conference on Research Goals*; 2 days; \$8,600

#### ATTENDANCE AT INTERNATIONAL MEETINGS

Advanced Study Institute Sponsored by the North Atlantic Treaty Organization, Corfu, Greece:  
 Jules de Launay, Naval Research Laboratory, Washington, D.C.;  
 J. Robert Schrieffer, Universitetets Institut for Teoretisk Fysk, Copenhagen, Denmark  
 All-Union Conference on Organic Catalysis, Moscow, Russia;  
 Robert L. Burwell, Jr.; Northwestern University, Evanston, Ill.  
 Carbon-14 Conference, Groningen, Netherlands:  
 Meyer Rubin, Geochemistry and Petrology Branch, United States Geological Survey, Washington, D.C.  
 Colloquium of the Research Film Section of the International Scientific Film Association, Roscoff, France:

Leslie P. Greenhill, Pennsylvania State University, University Park, Pa.  
 Colloquium on Thin Shell Structures, Delft, Holland:  
 Nicholas John Hoff, Stanford University, Stanford, Calif.  
 Committee on International Pharmaceutical Documentation, Zurich, Switzerland:  
 Winifred Sewell, Librarian, Squibb Institute for Medical Research, New Brunswick, N.J.  
 Conducting Lectures at the Universities of Hamburg and Erlaudeen, Hamburg and Erlaudeen, West Germany:  
 Otton M. Nikodym, Kenyon College, Gambler, Ohio  
 Conference on Computing Methods and the Phase Problem in X-ray Crystal Analysis, Glasgow, Scotland:  
 William N. Lipscomb, Harvard University, Cambridge, Mass.  
 Yoshiharu Okaya, Pennsylvania State University, University Park, Pa.  
 Raymond Pepinsky, Pennsylvania State University, University Park, Pa.  
 Vladimir Vand, Pennsylvania State University, University Park, Pa.  
 Conference on Functional Analysis, Warsaw, Poland:  
 Richard F. Arens, University of California, Los Angeles, Calif.  
 Edwin Hewitt, University of Washington, Seattle, Wash.  
 Robert C. James, Harvey Mudd College, Claremont, Calif.  
 Ernest A. Michael, University of Washington, Seattle, Wash.  
 B. J. Pettis, University of North Carolina, Chapel Hill, N.C.  
 Elias M. Stein, University of Chicago, Chicago, Ill.  
 Marshall H. Stone, University of Chicago, Chicago, Ill.  
 Conference on Magnetism of the British Institute of Physics, Scheffield, England:  
 Richard M. Bozorth, Bell Telephone Laboratories, Murray Hill, N.J.  
 Conference on Metabolism and Synthesis of DNA, Liege, Belgium:  
 Frederick H. Kasten, Texas Agricultural and Mechanical College, College Station, Tex.  
 Conference on Sensory Anomalies in Strabismus, Berne, Switzerland:  
 Hermann N. Burian, State University of Iowa, Iowa City, Iowa  
 Conference of the Society on Biological Rhythms, Siena, Italy:  
 Franz Halberg, University of Minnesota Medical School, Minneapolis, Minn.  
 Collin S. Pittendrigh, Princeton, N.J.  
 Course on Mathematics, Programming and Technical Aspects of Electronic Computing Installations, Technical University, Darmstadt, Germany:  
 Ross H. Flenner, Digital Computer Laboratory, University of Illinois, Urbana, Ill.  
 Donald A. Ludwig, New York University, New York, N.Y.  
 Course for Physics Teachers in Secondary Schools, Vienna and Salzburg, Austria:  
 William S. Burton, George School, Bucks County, Pa.  
 Robert Lagemann, Munchen, Germany  
 Uri Haber-Schaim, Education Services, Inc., Cambridge, Mass.

Delivering a Series of Lectures in Polish Universities:

Mark Kac, Cornell University, Ithaca, N.Y.

Dynamic Systems and Ergodic Theories, Varenna, Italy:

Paul R. Halmos, The University of Chicago, Chicago, Ill.

Ecological Symposium on Productivity of Plant Communities, Stuttgart-Hohenheim, Germany:

Lawrence C. Bliss, University of Illinois, Urbana, Ill.

Eighteenth General Assembly, International Pharmaceutical Federation, Copenhagen, Denmark:

Anne McCann, Squibb Institute for Medical Research, New Brunswick, N.J.

Eighth Congress of the International Society of Hematology, Tokyo, Japan:

International Society of Hematology, Brookline, Mass.

Eighth International Grassland Congress, Reading, England:

Arthur L. Brundage, Alaska Agricultural Experiment Station, Palmer, Alaska

Marvin P. Bryant, Agricultural Research Center, Beltsville, Md.

Douglas S. Chamblee, North Carolina State College, Raleigh, N.C.

Lorin E. Harris, Utah State University, Logan, Utah

Wilton W. Heinemann, Washington State University, Prosser, Wash.

Donald F. Hervey, Colorado State University, Fort Collins, Colo.

Carl Soren Hoveland, Auburn University, Auburn, Ala.

Horton M. Laude, University of California, Davis, Calif.

Henry L. Lucas, Jr., North Carolina State College, Raleigh, N.C.

Marshall E. McCullough, Georgia Experiment Station, Experiment, Ga.

Gerald O. Mott, Purdue University, Lafayette, Ind.

Charles E. Olmsted, University of Chicago, Chicago, Ill.

Maurice L. Peterson, University of California, Davis, Calif.

J. Thomas Reid, Cornell University, Ithaca, N.Y.

Damon C. Shelton, West Virginia University, Morgantown, W. Va.

Edwin W. Tisdale, University of Idaho, Moscow, Idaho.

John B. Washko, Pennsylvania State University, University Park, Pa.

Eighth Plenary Meeting of ISO/TC 46-Documentation, International Organization for Standards, London, England:

Henry J. Dubester, Library of Congress, Washington, D.C.

XIth International Congress of Entomology, Vienna, Austria:

Entomological Society of America, Washington, D.C.

Eleventh International Congress of Historical Sciences, Stockholm, Sweden:

Pedro Armillas, University of Michigan, Ann Arbor, Mich.

Enzyme Commission, Cambridge, England and Paris, France:

Sidney P. Colowick, Vanderbilt University, Nashville, Tenn.

Albert L. Lehninger, Johns Hopkins School of Medicine, Baltimore, Md.

Evaluation of the Soviet Research and Training Program in Geography, Association of American Geographers, Army Research Officer, OCRD, Department of the Army, Washington, 25, D.C.:

Francis L. Friedman, Physical Science Study Committee, Educational Services Incorporated, Cambridge, Mass.

Exchange of Scientists Between the U.S. and U.S.S.R.:

National Academy of Sciences—National Research Council, Washington, D.C.

Exchange Visit—Russia; East-West Contacts Program:

Richard M. Bosorth, Bell Telephone Laboratories, Murray Hill, N.J.

Executive Committee and Bureau of the International Union on Pure and Applied Chemistry, Leningrad, Russia:

William Albert Noyes, Jr., University of Rochester, Rochester, N.Y.

Faraday Society Conference on Cell Nucleus, Cambridge, England:

Walter S. Vincent, Marine Biological Laboratory, Woods Hole, Mass.

Faraday Society Discussions on "Oxidation-Reduction Reactions in Ionizing Solvents,"

Newcastle-on-Tyne, England:

Rudolph A. Marcus, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.

W. K. Wilmarth, University of Southern California, Los Angeles, Calif.

Faraday Society Discussions on the Physical Chemistry of Aerosols, Bristol, England:

Frank T. Gucker, Indiana University, Bloomington, Ind.

Federation Internationale de Documentation, Warsaw, Poland:

Karl F. Huemann, Office of Scientific Documentation, National Academy of Sciences—National Research Council, Washington, D.C.

Milton O. Lee, Federation of American Societies for Experimental Biology, Washington, D.C.

Fifth Austrian Congress of Mathematicians, Innsbruck, Austria:

Victor L. Klee, Jr., Matematisk Institut, Copenhagen, Denmark

Erwin Kleinfeld, Ohio State University, Columbus, Ohio

Fifth International Conference on Semiconductors, Prague, Czechoslovakia:

Ephraim Banks, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.

Raymond Bowers, Cornell University, Ithaca, N.Y.

Ralph Bray, Purdue University, Lafayette, Ind.

Frederick C. Brown, University of Illinois, Urbana, Ill.

Joseph Callaway, University of Miami, Coral Gables, Fla.

Arnold Honig, Syracuse University, Syracuse, N.Y.

Stefan Machlup, Western Reserve University, Cleveland, Ohio

Fifth International Congress of Biochemistry, Moscow, Russia:

U.S. National Committee for the International Union of Biochemistry, University of Utah, Salt Lake City, Utah

- First All-Union Congress on Theoretical and Applied Mechanics, Moscow, Russia :**  
Wallace D. Hayes, Princeton University, Princeton, N.J.  
Nicholas J. Hoff, Stanford University, Stanford, Calif.
- First Congress, International Federation of Automatic Control, Moscow, Russia :**  
Sheldon S. L. Chang, New York University, New York, N.Y.  
Manfred E. Clynes, Rockland State Hospital, Orangeburg, N.Y.  
Robert Lien Cosgriff, Ohio State University, Columbus, Ohio  
Arthur M. Hopkin, University of California, Berkeley, Calif.  
Richard W. Jones, Northwestern University, Evanston, Ill.  
Louis Frank Kazda, University of Michigan, Ann Arbor, Mich.  
Ralph J. Kochenburger, University of Connecticut, Storrs, Conn.  
Shih-Ying Lee, Massachusetts Institute of Technology, Cambridge, Mass.  
Yao Tzu Li, Massachusetts Institute of Technology, Cambridge, Mass.  
James M. Mozley, Johns Hopkins Hospital, Baltimore, Md.
- First International Congress of Endocrinology, Copenhagen, Denmark :**  
Endocrine Society, Oklahoma City, Okla.
- First South American Congress of Zoology, La Plata, Argentina :**  
James Arthur Peters, San Fernando Valley State College, Northridge, Calif.
- 48th Annual Meeting of the International Council for the Exploration of the Sea, Moscow, Russia :**  
Donald P. de Sylva, University of Delaware, Newark, Del.  
Edward C. Raney, Cornell University, Ithaca, N.Y.
- 47th Session of Indian Science Congress, Bombay, India, and the Pakistani Science Conference, Sind, Pakistan :**  
Elbert Payson Little, Physical Science Study Committee, Educational Services Incorporated, Cambridge, Mass.  
Arnold B. Grobman, Biological Sciences Curriculum Study, University of Colorado, Boulder, Colo.
- Fourth International Congress, European Organization of Quality Control, London, England :**  
George E. P. Box, University of Wisconsin, Madison, Wis.  
Ellis R. Ott, Rutgers, The State University, New Brunswick, N.J.
- Fourth International Symposium on the Reactivity of Solids, Amsterdam, Netherlands :**  
Joseph A. Pask, University of California, Berkeley, Calif.
- Fourth Symposium on Cosmical Gas Dynamics, Varenna, Italy :**  
Leverett Davis, Jr., California Institute of Technology, Pasadena, Calif.  
Armin J. Deutsch, Carnegie Institution of Washington, Pasadena, Calif.  
Robert B. Leighton, California Institute of Technology, Pasadena, Calif.  
Hans W. Liepmann, California Institute of Technology, Pasadena, Calif.  
Mahinder S. Uberoi, University of Michigan, Ann Arbor, Mich.  
Olin C. Wilson, Carnegie Institution of Washington, Pasadena, Calif.
- Fourth Symposium on Virus Diseases of Fruit Trees in Europe, Copenhagen, Denmark :**  
John A. Milbrath, Oregon State College, Corvallis, Oreg.  
Daniel F. Millikan, University of Missouri, Columbia, Mo.  
George Nyland, University of California, Davis, Calif.  
Gilbert L. Stout, Bureau of Plant Pathology, State of California, Sacramento, Calif.
- Glossary Subcommittee of the International Committee of Coal Petrology, Madrid, Spain :**  
Gilbert Haven Cady, Illinois State Geological Survey, Champaign-Urbana, Ill.  
William Spackman, The Pennsylvania State University, University, Pa.
- Hungarian Academy of Science and the Mathematics Department of Charles University, Prague, Czechoslovakia :**  
Jacob Wolfowitz, Cornell University, Ithaca, N.Y.
- International Association of Geomagnetism and Aeronomy, Copenhagen, Denmark :**  
Francis N. Frenkiel, David Taylor Model Basin, Washington, D.C.  
Morris Nelburger, Lutry, Switzerland
- International Colloquium on Biochemistry of Glucosides, Paris, France :**  
David S. Feingold, University of California, Berkeley, Calif.  
Dexter French, Iowa State College, Ames, Iowa  
William Zev Hassid, University of California, Berkeley, Calif.  
Jack L. Strominger, Washington University Medical School, St. Louis, Mo.  
Annamaria Torriani Gorini, Massachusetts Institute of Technology, Cambridge, Mass.  
Henry M. Tsuchiya, University of Minnesota, Minneapolis, Minn.  
Roy L. Whistler, Purdue University, Lafayette, Ind.  
Melville L. Wolfrom, The Ohio State University, Columbus, Ohio
- International Colloquium on Differential Geometry and Topology, Zurich, Switzerland :**  
Louis Auslander, Indiana University, Bloomington, Ind.  
Raoul Bott, Harvard University, Cambridge, Mass.  
John W. Milnor, The University of California, Berkeley, Calif.  
Hans Samelson, University of Michigan, Ann Arbor, Mich.  
Shing-shen Chern, University of Chicago, Chicago, Ill.  
Stephen Smale, Instituto de Matematica Pura e Aplicada, Rio de Janeiro, Brazil
- International Colloquium on the Evolution of Lower and Nonspecialized Mammals, Brussels, Belgium :**  
Everett C. Olson, University of Chicago, Chicago, Ill.  
Bryan Patterson, Harvard University, Cambridge, Mass.  
Alfred S. Romer, Harvard University, Cambridge, Mass.
- International Colloquium on Fast Reactions, Hahnenklee, Germany :**  
Stanley Atsworth, University of Illinois, Urbana, Ill.



- George H. Czerlinski, University of Pennsylvania, Philadelphia, Pa.**  
**International Colloquium on Function Theory, Bombay, India:**  
 Lipman Bers, Institute of Mathematical Sciences, New York University, New York, N.Y.  
 Louis Nirenberg, Institute of Mathematical Sciences, New York University, New York, N.Y.
- International Commission for the Nomenclature of Cultivated Plants, Cambridge, England:**  
 George H. M. Lawrence, Cornell University, Ithaca, N.Y.  
 Martin G. Weiss, Plant Industry Station, Beltsville, Md.
- International Conference on Functional Analysis, Warsaw, Poland:**  
 Victor L. Klee, Jr., Matematisk Institut, Copenhagen, Denmark
- International Conference on Hall Storms, Verona, Italy:**  
 Louis J. Batten, The University of Arizona, Tucson, Ariz.  
 Horace R. Byers, The University of Chicago, Chicago, Ill.  
 Robert D. Elliott, North American Weather Consultants, Goleta, Calif.  
 Charles L. Hosler, Jr., The Pennsylvania State University, University Park, Pa.  
 Heinz W. Kasemir, Neptune, N.J.  
 Paul B. Mac Cready, Jr., Atmospheric Research Group, Altadena, Calif.  
 Vincent J. Schaefer, American Meteorological Society, Schenectady, N.Y.  
 Richard A. Schlessener, Colorado State University, Fort Collins, Colo.
- International Conference on Many-Body Problems, Utrecht, the Netherlands:**  
 A. E. Glassgold, The University of California, Berkeley, Calif.  
 Abraham Klein, University of Pennsylvania, Philadelphia, Pa.  
 Joaquin M. Luttinger, University of Pennsylvania, Philadelphia, Pa.  
 David Pines, University of Illinois, Urbana, Ill.  
 J. Robert Schrieffer, University of Illinois, Urbana, Ill.  
 Harry Suhl, Bell Telephone Laboratories, Murray Hill, N.J.
- International Conference on Physics Education, Paris, France:**  
 Meiba Phillips, Washington University, St. Louis, Mo.
- International Conference on Science in the Advancement of New States, Rehovoth, Israel:**  
 Louis J. Batten, The University of Arizona, Tucson, Ariz.  
 Lloyd V. Berkner, Associated Universities, Inc., New York, N.Y.  
 W. C. Lowdermilk, Berkeley, Calif.  
 Alvin M. Weinberg, Oak Ridge National Laboratory, Oak Ridge, Tenn.  
 Jerrold E. Zacharias, Massachusetts Institute of Technology, Cambridge, Mass.
- International Conference on the Teaching of Anthropology, Burg Wartenstein, Austria:**  
 Ethel M. Albert, University of California, Berkeley, Calif.
- International Congress of Embryology, Italy:**  
 National Academy of Sciences—National Research Council, Washington, D.C.
- International Congress on Histochemistry, Paris, France:**  
 National Academy of Sciences—National Research Council, Washington, D.C.
- International Congress on Microwave Tubes, Munich, Germany:**  
 Walter R. Beam, Rensselaer Polytechnic Institute, Troy, N.Y.  
 Abraham Bers, Research Laboratory of Electronics, Cambridge, Mass.  
 Charles K. Birdsall, University of California, Berkeley, Calif.  
 Karl R. Spangenberg, Stanford University, Stanford, Calif.
- International Congress on Photobiology, Copenhagen, Denmark:**  
 National Academy of Sciences—National Research Council, Washington, D.C.
- International Federation for Documentation Conference, Rio de Janeiro, Brazil:**  
 Brian C. Vickery, Herts, England
- International Information Theory Meeting, London, England:**  
 Murray Eden, Massachusetts Institute of Technology, Cambridge, Mass.  
 Merrill M. Flood, University of Michigan, Ann Arbor, Mich.  
 Edmund M. Glaser, The Johns Hopkins University, Baltimore, Md.  
 David M. Green, Massachusetts Institute of Technology, Cambridge, Mass.  
 Robert G. Grossman, Walter Reed Army Institute of Research, Washington, D.C.  
 Kenneth E. Iverson, Harvard University, Cambridge, Mass.  
 F. Reza, Syracuse, N.Y.  
 Sze-Hou Chang, Electrical Engineering Department and Electronic Research Laboratories, Boston, Mass.
- International Institute of Refrigeration, Commission 2; Commission 9 and Technical Board, Belgrade, Yugoslavia:**  
 Carl F. Kayan, Columbia University, New York, N.Y.
- International Kolloquium Uber Endliche Gruppen, Oberwolfach, West Germany:**  
 William W. Boone, University of Illinois, Urbana, Ill.  
 John Griggs Thompson, Institute for Defense Analyses, Princeton, N.J.
- International Meeting on Veterinary Education, London, England:**  
 Mark Whittier Allam, University of Pennsylvania, Philadelphia, Pa.  
 Glenn C. Holm, Oklahoma State University, Stillwater, Okla.
- International Mineralogy Association, Zurich, Switzerland:**  
 Brian H. Mason, The American Museum of Natural History, New York, N.Y.
- International Organization for Standards—Fourth Plenary Meeting, Technical Committee ISO/TC37—Terminology, West Berlin, Germany:**  
 Jerrold Orne, The University of North Carolina, Chapel Hill, N.C.
- International Summer Institute in Quantum Chemistry, Uppsala, Sweden:**  
 Norman W. Bazley, University of Maryland, College Park, Md.  
 David W. Fox, University of Maryland, College Park, Md.

**International Symposium on the Chemistry of Natural Products, Melbourne, Canberra, and Sydney, Australia :**

Roger Adams, University of Illinois, Urbana, Ill.  
Klaus Biemann, Massachusetts Institute of Technology, Cambridge, Mass.  
William B. Cook, Montana State College, Bozeman, Mont.  
William C. Dauben, The University of California, Berkeley, Calif.  
Carl Djerassi, Stanford University, Stanford, Calif.  
Jerome F. Eastham, University of Tennessee, Knoxville, Tenn.  
Theodore A. Geissman, The University of California, Los Angeles, Calif.  
Robert E. Ireland, University of Michigan, Ann Arbor, Mich.  
S. Morris Kupchan, The University of Wisconsin, Madison, Wis.  
Nelson J. Leonard, University of Illinois, Urbana, Ill.  
Carl R. Noller, Stanford University, Stanford, Calif.  
S. William Pelletier, The Rockefeller Institute, New York, N.Y.  
Paul J. Scheuer, University of Hawaii, Honolulu, Hawaii  
George H. Stout, University of Washington, Seattle, Wash.

**International Symposium on Drugs Affecting Lipid Metabolism, Milan, Italy :**

Roslyn B. Alfin-Slater, The University of California, Los Angeles, Calif.  
Nicholas R. DiLuzio, University of Tennessee, Memphis, Tenn.  
James F. Mead, The University of California Medical Center, Los Angeles, Calif.  
Erwin H. Mosbach, Columbia University Research Service, New York, N.Y.  
David A. Turner, Biochemistry Research Division, Baltimore, Md.

**International Symposium on Macromolecular Chemistry, Moscow, Russia :**

Werner W. Brandt, Illinois Institute of Technology, Chicago, Ill.  
Paul Doty, Harvard University, Cambridge, Mass.  
Frederick R. Eirich, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.  
Paul J. Flory, Mellon Institute, Pittsburgh, Pa.  
Jan Hermans, State University, College of Forestry at Syracuse University, Syracuse, N.Y.  
Maurice Higgins, Stanford Research Institute, Menlo Park, Calif.  
Carl S. Marvel, University of Illinois, Urbana, Ill.  
Robert Simha, University of Southern California, Los Angeles, Calif.  
Robert Ullman, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.

**International Symposium on Macromolecules, Wiesbaden, Germany :**

Gaetano F. D'Alelio, University of Notre Dame, Notre Dame, Ind.  
Walter H. Stockmayer, Massachusetts Institute of Technology, Cambridge, Mass.

**International Symposium on *Pseudomonas/Achromobacter*, Bangor, Wales :**

John C. Ayres, Iowa State University, Ames, Iowa

**International Symposium on Vitamins, Poznan, Poland :**

B. Connor Johnson, University of Illinois, Urbana, Ill.  
**International Union of Crystallography, Cambridge, England :**  
Sidney C. Abrahams, Brookhaven National Laboratories, Upton, N.Y.  
Leroy E. Alexander, Mellon Institute, Pittsburgh, Pa.  
Masao Atoji, Iowa State University, Ames, Iowa  
Harry Brumberger, Syracuse University, Syracuse, N.Y.  
Martin J. Buerger, Massachusetts Institute of Technology, Cambridge, Mass.  
Lawrence F. Dahl, University of Wisconsin, Madison, Wis.  
J. C. Grosskreutz, Midwest Research Institute, Kansas City, Mo.  
David Harker, Roswell Park Memorial Institution, Buffalo, N.Y.  
Edward W. Hughes, California Institute of Technology, Pasadena, Calif.  
George A. Jeffrey, University of Pittsburgh, Pittsburgh, Pa.  
James D. McCullough, The University of California, Los Angeles, Calif.  
Lynne L. Merritt, Jr., Indiana University, Bloomington, Ind.  
A. L. Patterson, The Institute for Cancer Research, Philadelphia, Pa.  
Benjamin Post, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.  
Paul W. Schmidt, University of Missouri, Columbia, Mo.  
Martin E. Straumanis, University of Missouri, Rolla, Mo.  
Bertram E. Warren, Massachusetts Institute of Technology, Cambridge, Mass.  
Jurg Waser, California Institute of Technology, Pasadena, Calif.  
Elizabeth A. Wood, Bell Telephone Laboratories, Murray Hill, N.J.  
Ralph W. G. Wyckoff, University of Arizona, Tucson, Ariz.  
W. H. Zachariasen, The University of Chicago, Chicago, Ill.

**International Volcanological Association, International Union of Geodesy and Geophysics, Paris, France :**

Gordon A. Macdonald, Volcano, Hawaii  
Lectures on Molecular Quantum Mechanics, Sao Paulo, Rio de Janeiro, Brazil, and Buenos Aires, Argentina :

Martin Karplus, University of Illinois, Urbana, Ill.

**Lecture at Several Universities in Poland During the Month of June 1960 :**

John P. Miller, Harvard University, Cambridge, Mass.

**Meeting of the Bureau (Officers and Council) of the Federation Internationale de Documentation, Paris, France :**

Milton O. Lee, Federation of American Societies for Experimental Biology, Washington, D.C.

**Meeting of the Commission on Pharmacy Abstracts, Copenhagen, Denmark :**

Winifred Sewell, Squibb Institute for Medical Research, New Brunswick, N.J.

**Meeting of the Federation Internationale de Documentation, Warsaw, Poland :**

Fred R. Cagle, Research Coordinator, Tulane University of Louisiana, New Orleans, La.

Meeting of the International Society of Horticulture Science, Rotterdam, Holland:  
H. B. Tukey, Michigan State University, East Lansing, Mich.

Mathematical Institute of the Polish Academy of Sciences, Warsaw, Poland:  
Antonio Zygmund, The University of Chicago, Chicago, Ill.

NATO Advanced Study Institute, Breukelen, The Netherlands:  
Robert Alden Fish, Chicago, Ill.  
John Eldon Gaustad, Princeton University, Princeton, N.J.  
George Richard Huguenin, Cambridge, Mass.  
John McKim Malville, University of Colorado, Boulder, Colo.  
Dimitri M. Mihalas, California Institute of Technology, Pasadena, Calif.  
Robert A. R. Parker, California Institute of Technology, Pasadena, Calif.  
Peter Oliver Vandervoort, National Radio Astronomy Observatory, Greenbank, W. Va.  
Andrew Tipton Young, Harvard College Observatory, Cambridge, Mass.

NATO Advanced Study Institute, Edinburgh, Scotland:  
Michael J. Moravcsik, University of California, Livermore, Calif.  
William C. Ramsay, University of California, Los Angeles, Calif.

NATO Advanced Study Institute, Les Houches, France:  
Thomas Laurence Trueman, Chicago, Ill.

NATO Advanced Study Institute, Manchester, England:  
Charles T. Prewitt, Massachusetts Institute of Technology, Cambridge, Mass.  
Richard H. Stanford, Jr., California Institute of Technology, Pasadena, Calif.  
Bernhardt John Wuensch, Massachusetts Institute of Technology, Cambridge, Mass.

NATO Advanced Study Institute, Varenna, Italy:  
John T. Lyman, The University of California, Berkeley, Calif.  
Jan Polissar, Harvard University, Boston, Mass.

Natural Rubber Research Conference, Kuala Lumpur, Malaya:  
Howard J. Teas, University of Florida, Gainesville, Fla.

Nineteenth International Geographical Congress, Stockholm, Sweden:  
Wallace E. Akin, Drake University, Des Moines, Iowa  
Carleton P. Barnes, U.S. Department of Agriculture, Washington, D.C.  
Lloyd D. Black, U.S. Department of Commerce, Garrett Park, Md.  
David J. M. Hooson, University of Maryland, College Park, Md.  
Pelce F. Lewis, The Pennsylvania State University, University Park, Pa.  
Duane F. Marble, University of Pennsylvania, Philadelphia, Pa.  
E. Willard Miller, The Pennsylvania State University, University Park, Pa.  
Peter H. Nash, University of Cincinnati, Cincinnati, Ohio  
Laurence H. Nobles, Northwestern University, Evanston, Ill.

Theodore Shabad, American Geographical Society, New York, N.Y.  
John C. Sherman, University of Washington, Seattle, Wash.  
David A. Smith, The Pennsylvania State University, University Park, Pa.  
David D. Smith, Coastal Studies Institute, Manteo, N.C.  
Edwin N. Thomas, State University of Iowa, Iowa City, Iowa  
Edward L. Ullman, Washington University, Saint Louis, Mo.  
James E. Vance, Jr., University of California, Berkeley, Calif.

Phase Transitions and Anomalous Dispersion, Osaka, Japan:  
Thomas H. Doyne, Department of Chemistry, Villanova University, Villanova, Pa.

Photonuclear Conference, Karlsruhe, Germany:  
Heinrich A. Medicus, Rensselaer Polytechnic Institute, Troy, N.Y.  
Paul F. Yergin, Rensselaer Polytechnic Institute, Troy, N.Y.  
Daniel J. Zaffarano, Iowa State University, Ames, Iowa

Physical Chemistry of Aerosols, Bristol, England:  
Frank T. Gucker, Indiana University, Bloomington, Ind.

Preliminary Field Survey and Planning of Nubian Archaeology, Los Angeles, California to Nubia, Egypt:  
Clement W. Meighan, the University of California, Los Angeles, Calif.

Preparation of a Volume of Mathematical Tables Required by Statisticians, London, England:  
Herman Otto Hartley, Iowa State University, Ames, Iowa

Scientific Conference of the Department of Fluid Mechanics, Augustow, Poland:  
Frederick Sterling Sherman, the University of California, Berkeley, Calif.

Second All-Union Conference on Nuclear Reactions at Low and Intermediate Energies, Moscow, Russia:  
R. V. Pound, Harvard University, Cambridge, Mass.

Second Hungarian Mathematical Congress, Budapest, Hungary:  
Einar Hille, Yale University, New Haven, Conn.  
Victor L. Klee, Jr., Matematisk Institut, Copenhagen, Denmark

Second International Congress of Bioclimatology and Biometeorology, London, England:  
A. Nelson Dingle, the University of Michigan, Ann Arbor, Mich.  
Edwin W. King, Clemson College, Clemson, S.C.  
Frederick Sargent, II, University of Illinois, Urbana, Ill.  
Richard David Schein, the Pennsylvania State University, University Park, Pa.  
John A. Sealander, Jr., University of Arkansas, Fayetteville, Ark.  
Gerald B. Spurr, the University of Tennessee College of Medicine, Memphis, Tenn.  
George G. Zabka, State University of Iowa, Iowa City, Iowa

**Second International Congress on Catalysis, Paris, France:**

John E. Benson, the Pennsylvania State University, University Park, Pa.  
Robert L. Burwell, Jr., Northwestern University, Evanston, Ill.  
John J. Chessick, Lehigh University, Bethlehem, Pa.  
Joseph D. Danforth, Grinnell College, Grinnell, Iowa  
H. E. Farnsworth, Brown University, Providence, R.I.  
Joseph A. Feighan, Saint Joseph's College, Philadelphia, Pa.  
Gwan Kim, Princeton University, Princeton, N.J.  
Knut Axel Krieger, University of Pennsylvania, Philadelphia, Pa.  
Ernest M. Loeb, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.  
Giuseppe Parravano, the University of Michigan, Ann Arbor, Mich.  
Herman Pines, Northwestern University, Evanston, Ill.

**Second International Course of Lyophilization, Lyon, France:**

John W. McTigue, Washington, D.C.  
Second World Conference on Earthquake Engineering, Tokyo and Kyoto, Japan:

**Glen V. Berg, University of Michigan, Ann Arbor, Mich.**

Ray William Clough, the University of California, Berkeley, Calif.  
C. Martin Duke, the University of California, Los Angeles, Calif.  
Donald E. Hudson, California Institute of Technology, Pasadena, Calif.  
Richard L. Jennings, University of Illinois, Urbana, Ill.  
Frank Neumann, University of Washington, Seattle, Wash.  
Joseph Penzlen, Massachusetts Institute of Technology, Cambridge, Mass.  
Karl V. Stehnbrugge, the University of California, Berkeley, Calif.  
William T. Thomson, the University of California, Los Angeles, Calif.  
Merit P. White, University of Massachusetts, Amherst, Mass.

**Seminar on Aerial Survey Methods and Equipment Economic Commission for Asia and the Far East (ECAFE), Bangkok, Thailand:**

Shirley V. Griffith, Executive Office of the President, Bureau of the Budget, Washington, D.C.

**Seminar on the Status and Development of the Teaching of Chemistry:**

Robert Rice, Berkeley High School, Berkeley, Calif.  
J. Arthur Campbell, Harvey Mudd College, Claremont, Calif.  
Laurence E. Strong, Earlham College, Richmond, Ind.  
Paul Westmeyer, University of Illinois, Urbana, Ill.

**Seventh International Conference on Coastal Engineering, The Hague, Netherlands:**

Donald R. F. Harieman, Massachusetts Institute of Technology, Cambridge, Mass.  
Douglas Lamar Inman, the University of California, La Jolla, Calif.  
Joe W. Johnson, the University of California, Berkeley, Calif.  
Robert L. Wiegel, the University of California, Berkeley, Calif.

**Seventeenth International Congress of Pure and Applied Science, Munich, Germany:**

John C. Ballar, Jr., University of Illinois, Urbana, Ill.

**Sixteenth International Congress of Psychology, Bonn, Germany:**

R. C. Davis, Indiana University, Bloomington, Ind.  
Richard deCharms, Washington University, St. Louis, Mo.  
Donelson E. Dulany, Jr., University of Illinois, Urbana, Ill.  
Horace B. English, Ohio State University, Columbus, Ohio  
Joshua A. Fishman, University of Pennsylvania, Philadelphia, Pa.  
Edwin A. Fleishman, Yale University, New Haven, Conn.  
Donald G. Forgas, Rutgers, The State University, New Brunswick, N.J.  
Jacob L. Gewirtz, The Hebrew University, Jerusalem, Israel  
Eleanor J. Gibson, Cornell University, Ithaca, N.Y.  
J. C. Gilchrist, University of Wisconsin, Madison, Wis.

Albert E. Goss, University of Massachusetts, Amherst, Mass.

Harold Gulliksen, Princeton University, Princeton, N.J.

Davis H. Howes, Massachusetts Institute of Technology, Cambridge, Mass.  
Eugene Jacobson, Michigan State University, East Lansing, Mich.

Tracy S. Kendler, Columbia University, New York, N.Y.

Nathan Kogan, Educational Testing Service, Princeton, N.J.

Sheldon J. Korchin, National Institute of Mental Health, Bethesda, Md.

Herschel W. Leibowitz, University of Wisconsin, Madison, Wis.

Kenneth MacCorquodale, University of Minnesota, Minneapolis, Minn.

William J. McGill, Columbia University, New York, N.Y.

Walter Mischel, Harvard University, Cambridge, Mass.

Alvin John North, Southern Methodist University, Dallas, Tex.

Carl Pfaffman, Brown University, Providence, R.I.

Bertram H. Raven, The University of California, Los Angeles, Calif.

Harold Schlosberg, Brown University, Providence, R.I.

Arnold M. Small, Jr., State University of Iowa, Iowa City, Iowa

John S. Stamm, Institute of Living, Hartford, Conn.

Joseph Charles Stevens, Harvard University, Cambridge, Mass.

John W. Thibaut, The University of North Carolina, Chapel Hill, N.C.

Wilse B. Webb, University of Florida, Gainesville, Fla.

Philip G. Zimbardo, Yale University, New Haven, Conn.

**Sixth International Congress of Anthropological and Ethnological Sciences, Paris, France:**

Joseph B. Casagrande, Social Science Research Council, New York, N.Y.

Donald Collier, Chicago Natural History Museum, Chicago, Ill.

Henry B. Collins, Smithsonian Institution, Washington, D.C.

Edward P. Dozier, Bagulo City, Philippines

Gordon F. Ekholm, American Museum of Natural History, New York, N.Y.

Emil W. Haury, University of Arizona, Tucson, Ariz.

E. Adamson Hoebel, University of Minnesota, Minneapolis, Minn.

John J. Honigsmann, University of North Carolina, Chapel Hill, N.C.

Alfred Kidder II, University of Pennsylvania, Philadelphia, Pa.

Keith R. Porter, Cytology Department, The Rockefeller Institute, New York, N.Y.

Sixth National Conference of the Czechoslovakian Society for Electron Microscopy, Smolenice, Czechoslovakia:

Betty J. Meggers, American Anthropological Association, Washington, D.C.

Carlyle Shreeve Smith, Museum of Natural History, Lawrence, Kans.

William C. Sturtevant, Smithsonian Institution, Washington, D.C.

Richard B. Woodbury, University of Arizona, Tucson, Ariz.

Leslie A. White, University of Michigan, Ann Arbor, Mich.

Structure of Graphite and Kinetics of Its Reactions, Paris, France:

Stanislaw Mrozowski, University of Buffalo, Buffalo, N.Y.

Summer Institute of Physics, San Carlos de Bariloche, Argentina:

Donald W. Connor, Argonne National Laboratory, Lemont, Ill.

Support of Travel of American Scientists to the University of Oxford Symposium on the History of Science, Oxford, England:

I. B. Cohen, Harvard University, Cambridge, Mass.

Survey of Biometeorology in Europe:

Helmut E. Landsberg, U.S. Weather Bureau, Washington, D.C.

Symposium on the Biology of Space Travel, London, England:

Harlow Shapley, Peterborough, N.H.

Symposium on Linear Spaces, Jerusalem, Israel:

Richard F. Arens, the University of California, Los Angeles, Calif.

Leon Ehrenpreis, Yeshiva University, New York, N.Y.

Henry Helson, the University of California, Berkeley, Calif.

Victor L. Klee, Jr. Matematisk Institut, Kobehavn, Denmark

Peter Lax, New York University, New York, N.Y.

Wilhelmus A. J. Luxemburg, California Institute of Technology, Pasadena, Calif.

George W. Mackey, Harvard University, Cambridge, Mass.

Ralph S. Phillips, the University of California, Los Angeles, Calif.

Angus E. Taylor, the University of California, Los Angeles, Calif.

John Wermer, Brown University, Providence, R.I.

Symposium on Macromolecular Structure and Biological Function, Stockholm, Sweden:

Vincent G. Allfrey, the Rockefeller Institute, New York, N.Y.

Daniel I. Arnon, the University of California, Berkeley, Calif.

Erwin Chargaff, Columbia University, New York, N.Y.

Albert Dorfman, University of Chicago, Chicago, Ill.

Albert W. Frenkel, University of Minnesota, Minneapolis, Minn.

David E. Green, the University of Wisconsin, Madison, Wis.

F. Edmund Hunter, Jr., Washington University Medical School, Saint Louis, Mo.

Andre T. Jagendorf, the Johns Hopkins University, Baltimore, Md.

Martin D. Kamen, Brandeis University, Waltham, Mass.

Henry A. Lardy, the University of Wisconsin, Madison, Wis.

Albert L. Lehninger, the Johns Hopkins School of Medicine, Baltimore, Md.

George E. Palade, the Rockefeller Institute, New York, N.Y.

Gertrude E. Perlmann, Rockefeller Institute, New York, N.Y.

Keith R. Porter, the Rockefeller Institute, New York, N.Y.

Maynard E. Pullman, the Public Health Research Institute, New York, N.Y.

Thomas P. Singer, Edsel B. Ford Institute for Medical Research, Detroit, Mich.

Birgit Vennesland, University of Chicago, Chicago, Ill.

Christophe Henri Werner, Brookhaven National Laboratory, Upton, N.Y.

Symposium on Membrane Transport and Metabolism, Prague, Czechoslovakia:

Emil Aschheim, New York, N.Y.

Halvor N. Christensen, the University of Michigan, Ann Arbor, Mich.

Vincent Paul Cirillo, Seton Hall College of Medicine and Dentistry, Jersey City, N.J.

Robert K. Crane, Washington University Medical School, Saint Louis, Mo.

Robert E. Davies, University of Pennsylvania, Philadelphia, Pa.

George Eisenman, Eastern Pennsylvania Psychiatric Institute, Philadelphia, Pa.

Ernest C. Foulkes, the May Institute for Medical Research, Cincinnati, Ohio

H. O. Halvorson, College of Agriculture, Madison, Wis.

Lowell E. Hokin, University of Wisconsin, Madison, Wis.

Bernard L. Horecker, New York University College of Medicine, New York, N.Y.

Alexander Leaf, Harvard Medical School, Boston, Mass.

Charles R. Park, Vanderbilt University Medical School, Nashville, Tenn.

Robert L. Post, Vanderbilt University Medical School, Nashville, Tenn.

Howard V. Rickenberg, University of Washington, Seattle, Wash.

Symposium on the Methodics of the Mammalia Investigation, Brno, Plotni, Czechoslovakia:

E. Raymond Hall, University of Kansas, Lawrence, Kans.

Symposium on Metrology (Standardization) of Radionuclides, Vienna, Austria:

George G. Manov, Technical Director, Tracerlab, Incorporated, Richmond, Calif.

Brian David Pate, Washington University, Saint Louis, Mo.

Symposium on the Numerical Treatment of Ordinary Differential Equations, Integral and Integro-Differential Equations, Rome, Italy:

H. A. Antosiewicz, University of Southern California, Los Angeles, Calif.  
Richard Courant, New York University, New York, N.Y.  
Joaquin B. Diaz, University of Maryland, College Park, Md.  
Jim Douglas, Jr., Rice Institute, Houston, Texas  
Paul K. Garabedian, New York University, New York, N.Y.  
Jurgen Moser, New Rochelle, N.Y.  
John Todd, California Institute of Technology, Pasadena, Calif.

Symposium of Polarization of Nucleons, Basel, Switzerland:

Fred H. Schmidt, University of Washington, Seattle, Wash.

Symposium on Protein Biosynthesis, Amsterdam, Netherlands:

James Bonner, California Institute of Technology, Pasadena, Calif.  
Fritz Lipmann, the Rockefeller Institute, New York, N.Y.  
Alfred B. Mirsky, the Rockefeller Institute, New York, N.Y.  
George C. Webster, the Ohio State University, Columbus, Ohio  
Paul C. Zamecnik, Harvard University, Cambridge, Mass.

Symposium on Scientific Problems of Plant Protection, Budapest, Hungary:

Robert N. Goodman, University of Missouri, Columbia, Mo.

Symposium on the Visual System, Freiburg, Germany:

Russell L. De Valois, Indiana University, Bloomington, Ind.  
Robert W. Doty, the University of Michigan, Ann Arbor, Mich.  
Dorothea J. Hurvich, New York University, New York, N.Y.  
Edward F. MacNichol, Jr., the Johns Hopkins University, Baltimore, Md.

Symposium at the Weizmann Institute, Rehovoth, Israel and Lecture Series in Utrecht, Holland:

S. M. Ulam, Los Alamos Scientific Laboratory, Los Alamos, N. Mex.

Tenth International Astrophysical Symposium, Liege, Belgium:

Joseph Wyan Chamberlain, the University of Chicago, Williams Bay, Wis.  
Thomas Gold, Cornell University, Ithaca, N.Y.  
Leo Goldberg, the University of Michigan, Ann Arbor, Mich.  
William Liller, the University of Michigan, Ann Arbor, Mich.  
A. E. Lilley, Harvard University, Cambridge, Mass.  
William A. Rense, University of Colorado, Boulder, Colo.  
Fritz Rohrlich, State University of Iowa, Iowa City, Iowa  
Edward P. Todd, University of Colorado, Boulder, Colo.

Tenth International Congress of Applied Mechanics, Stresa, Italy:

Ferdinand P. Beer, Lehigh University, Bethlehem, Pa.  
Maurice A. Brill, University of Pennsylvania, Philadelphia, Pa.  
Stephen H. Crandall, Massachusetts Institute of Technology, Cambridge, Mass.

Yuan Cheng Bertram Fung, California Institute of Technology, Pasadena, Calif.

Werner Goldsmith, the University of California, Berkeley, Calif.

George H. Handelman, Rensselaer Polytechnic Institute, Troy, N.Y.

Robert M. Haythornthwaite, the University of Michigan, Ann Arbor, Mich.

Rudolf Herman, University of Minnesota, Minneapolis, Minn.

Miklos Hetenyi, Northwestern University, Evanston, Ill.

Stephen Juhasz, Southwest Research Institute, San Antonio, Tex.

Martin Lessen, University of Pennsylvania, Philadelphia, Pa.

Geoffrey S. S. Ludford, University of Maryland, College Park, Md.

Joseph Marlin, The Pennsylvania State University, University Park, Pa.

Ernest F. Masur, The University of Michigan, Ann Arbor, Mich.

Julius Mikiowitz, California Institute of Technology, Pasadena, Calif.

John W. Miles, University of California, Los Angeles, Calif.

Paul R. Paslay, Rice Institute, Houston, Tex.

Milton S. Plesset, California Institute of Technology, Pasadena, Calif.

Shan-fu Shen, University of Maryland, College Park, Md.

Walter W. Soroka, University of California, Berkeley, Calif.

Walter G. Vincenti, Stanford University, Stanford, Calif.

Jerome Harris Weiner, Columbia University, New York, N.Y.

Alexander Weinstein, University of Maryland, College Park, Md.

Max L. Williams, Jr., California Institute of Technology, Pasadena, Calif.

Tenth International Congress for Cell Biology, Paris, France:

National Academy of Sciences—National Research Council, Washington, D.C.

Third International Conference on Medical Electronics, London, England:

A. L. Hopkins, Western Reserve University, Cleveland, Ohio

Third Symposium on Gas Chromatography, Edinburgh, Scotland:

Warren W. Brandt, Purdue University, Lafayette, Ind.

Henry Freiser, The University of Arizona, Tucson, Ariz.

Thirteenth General Assembly, International Scientific Radio Union, London, England:

Nicolaas Bloembergen, Harvard University, Cambridge, Mass.

Rufus G. Fellers, University of South Carolina, Columbia, S.C.

Roy Walter Gould, California Institute of Technology, Pasadena, Calif.

Edward C. Jordan, University of Illinois, Urbana, Ill.

Laurence A. Manning, Stanford University, Stanford, Calif.

Nathan Marcovitz, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.

Arthur A. Oliner, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.

Allan M. Peterson, Stanford University, Stanford, Calif.

Samuel Silver, The University of California, Berkeley, Calif.

Louis D. Smullin, Massachusetts Institute of Technology, Cambridge, Mass.  
John Bridges Smyth, Smyth Research Associates, San Diego, Calif.  
Aldert van der Ziel, University of Minnesota, Minneapolis, Minn.  
Alan T. Waterman, Jr., Stanford University, Stanford, Calif.  
Arthur H. Waynick, Pennsylvania State University, University Park, Pa.

Thirteenth Congress of the International Scientific Film Association, London and Oxford University, England :

Robert Eugene Green, Advisory Board on Education, National Academy of Sciences, Washington, D.C.  
Willard Webb, Reader and Stack Division, the Library of Congress, Washington, D.C.

Thirty-second International Congress of Industrial Chemistry, Barcelona, Spain :

Eugene G. Rochow, Harvard University, Cambridge, Mass.

Thirty-second Session International Statistical Institute, Tokyo, Japan :

Leo Katz, Office of Naval Research, New York, N.Y.

Twelfth General Assembly, International Union of Geodesy and Geophysics, Helsinki, Finland :

William C. Ackermann, Illinois State Water Survey, Urbana, Ill.  
Carl I. Aslakson, Bethesda, Md.  
Werner A. Baum, the Florida State University, Tallahassee, Fla.  
Bruce B. Benson, Amherst College, Amherst, Mass.

George S. Benton, the Johns Hopkins University, Baltimore, Md.

Jacob Bjerknes, the University of California, Los Angeles, Calif.

William E. Bonini, Princeton, N.J.

Wallace S. Broecker, Columbia University, Palisades, N.Y.

Horace R. Byers, the University of Chicago, Chicago, Ill.

D. E. Carritt, the Johns Hopkins University, Baltimore, Md.

Jule G. Charney, Massachusetts Institute of Technology, Cambridge, Mass.

Samuel Epstein, California Institute of Technology, Pasadena, Calif.

Rhodes W. Fairbridge, Columbia University, New York, N.Y.

Donald R. Fitzgerald, the University of Chicago, Chicago, Ill.

Robert G. Fleagle, University of Washington, Seattle, Wash.

Francois N. Frenkiel, David Taylor Model Basin, Washington, D.C.

Irving Friedman, U.S. Geological Survey, Washington, D.C.

Paul W. Gast, University of Minnesota, Minneapolis, Minn.

Richard M. Goody, Harvard University, Cambridge, Mass.

Donald R. F. Harleman, Massachusetts Institute of Technology, Cambridge, Mass.

Bernhard Haurwitz, University of Colorado, Boulder, Colo.

Bruce C. Heezen, Columbia University, Palisades, N.Y.

Seymour L. Hess, the Florida State University, Tallahassee, Fla.

Charles L. Hosler, Jr., the Pennsylvania State University, University Park, Pa.

Benjamin F. Howell, Jr., the Pennsylvania State University, University Park, Pa.

Roman K. C. Johns, Baird-Atomic, Inc., Cambridge, Mass.

F. F. Kocoy, University of Miami, Virginia Key, Miami, Fla.

Heinz H. Lettau, the University of Wisconsin, Madison, Wis.

Ray K. Linsley, Stanford University, Stanford, Calif.

Joanne S. Malkus, Woods Hole Oceanographic Institution, Woods Hole, Mass.

John F. Mink, Honolulu, Hawaii

W. Bradley Myers, Rome, Italy

Morris Neiburger, Lutry, Switzerland

Gerhard Neumann, New York University, New York, N.Y.

Alfred O. C. Nier, University of Minnesota, Minneapolis, Minn.

Sverre Petterssen, the University of Chicago, Chicago, Ill.

George W. Platzman, the University of Chicago, Chicago, Ill.

D. W. Pritchard, the Johns Hopkins University, Baltimore, Md.

Collin S. Ramage, University of Hawaii, Honolulu, Hawaii

Joseph L. Reid, Jr., Scripps Institution of Oceanography, La Jolla, Calif.

Walter Orr Roberts, University of Colorado, Boulder, Colo.

Zdenek Sekera, the University of California, Los Angeles, Calif.

Verner Edward Suomi, the University of Wisconsin, Madison, Wis.

David K. Todd, the University of California, Berkeley, Calif.

Karl K. Turekian, Yale University, New Haven, Conn.

Willem van der Bijl, Kansas State University, Manhattan, Kans.

Robert C. Wentworth, University of Maryland, College Park, Md.

James T. Wilson, the University of Michigan, Ann Arbor, Mich.

Warren S. Wooster, the University of California, Los Angeles, Calif.

James H. Zumberge, the University of Michigan, Ann Arbor, Mich.

Twelfth General Assembly International Union of Geodesy and Geophysics :

K. Aki, California Institute of Technology, Pasadena, Calif.

C. R. Allen, California Institute of Technology, Pasadena, Calif.

R. G. Bader, Agricultural and Mechanical College of Texas, College Station, Tex.

C. R. Bentley, Antarctic Research Center, Madison, Wis.

J. N. Brune, Lamont Geological Observatory, Palisades, N.Y.

K. C. Clark, University of Washington, Seattle, Wash.

P. C. Dalrymple, Quartermaster Research and Engineering Command, Natick, Mass.

T. N. Davis, University of Alaska, College, Alaska

H. J. Dorman, Lamont Geological Observatory, Palisades, N.Y.

D. B. Ericson, Lamont Geological Observatory, Palisades, N.Y.

C. T. Fray, Lamont Geological Observatory, Palisades, N.Y.

**Twelfth General Assembly International Union of Geodesy and Geophysics—Continued**

R. C. Haynes, New York University, New York, N.Y.

J. F. Hennon, Lamont Geological Observatory, Palisades, N.Y.

D. W. Hood, Agricultural and Mechanical College of Texas, College Station, Tex.

R. Howard, University of Massachusetts, Amherst, Mass.

J. W. Kenwisher, Woods Hole Oceanographic Institute, Woods Hole, Mass.

J. A. Knauss, University of California, La Jolla, Calif.

W. B. Krieb, California Institute of Technology, Pasadena, Calif.

E. R. LaChapelle, University of Washington, Seattle, Wash.

M. G. Landismen, Lamont Geological Observatory, Palisades, N.Y.

H. Leinbach, University of Alaska, College, Alaska

S. Matsushit, University of Colorado, Boulder, Colo.

R. P. Meyer, University of Wisconsin, Madison, Wis.

F. O. Ostopoff, Department of Commerce, Washington, D.C.

E. C. Ray, State University of Iowa, Iowa City, Iowa

M. H. Rees, University of Alaska, College, Alaska

R. O. Reid, Agricultural and Mechanical College of Texas, College Station, Tex.

M. K. Robinson, University of California, La Jolla, Calif.

R. L. Shreve, University of California, Los Angeles, Calif.

W. Stander, Department of Geophysics and Geophysical Engineering, St. Louis, Mo.

T. Takahashi, Box 1164, Alfred, N.Y.

E. Thiel, University of Wisconsin, Madison, Wis.

S. B. Treves, University of Nebraska, Lincoln, Nebr.

W. W. Vickara, Ohio State University, Columbus, Ohio

V. Herson, Scripps Institution of Oceanography, La Jolla, Calif.

L. Wallace, University of Chicago, Williams Bay, Wis.

**Twenty-fifth International Congress of Orientalists, Moscow, Russia :**

Fred Adelman, University of Pittsburgh, Pittsburgh, Pa.

Richard K. Beardsley, the University of Michigan, Ann Arbor, Mich.

Morton H. Fried, Columbia University, New York, N.Y.

Lawrence Krader, American University, Washington, D.C.

**Twenty-first International Geological Congress, Copenhagen, Denmark :**

Victor T. Allen, Saint Louis University, St. Louis, Mo.

Orville L. Bandy, University of Southern California, Los Angeles, Calif.

Herman F. Becker, the New York Botanical Garden, New York, N.Y.

Carl S. Benson, University of Alaska, College, Alaska

William B. N. Berry, University of California, Berkeley, Calif.

D. L. Blackstone, Jr., University of Wyoming, Laramie, Wyo.

William F. Brace, Massachusetts Institute of Technology, Cambridge, Mass.

Wallace M. Cady, Montpelier, Vt.

Kenneth E. Caster, University of Cincinnati, Cincinnati, Ohio

Charles W. Chessman, California State Department of Natural Sciences, San Francisco, Calif.

Alvin J. Cohen, Mellon Institute, Pittsburgh, Pa.

Byron N. Cooper, Virginia Polytechnic Institute, Blacksburg, Va.

Dwight F. Crowder, U.S. Geological Survey, Denver, Colo.

Richard V. Dietrich, Virginia Polytechnic Institute, Blacksburg, Va.

J. Thomas Duto, Jr., U.S. Geological Survey, Washington, D.C.

Gordon P. Eaton, University of California, Riverside, Calif.

D. Jerome Fisher, University of Chicago, Chicago, Ill.

Clifford Frondel, Harvard University, Cambridge, Mass.

Julian R. Goldsmith, University of Chicago, Chicago, Ill.

Warren B. Hamilton, U.S. Geological Survey, Denver, Colo.

Cornelius S. Hurlbut, Jr., Harvard University, Cambridge, Mass.

Thor N. V. Karlstrom, U.S. Geological Survey, Washington, D.C.

Benjamin F. Leonard, III, U.S. Geological Survey, Denver, Colo.

Grover E. Murray, Louisiana State University, Baton Rouge, La.

Robert B. Neuman, U.S. Geological Survey, Washington, D.C.

Willard H. Parsons, Wayne State University, Detroit, Mich.

Troy L. Pewe, University of Alaska, College, Alaska

Ralph K. Roberts, U.S. Geological Survey, Menlo Park, Calif.

Francis P. Shepard, Scripps Institution of Oceanography, La Jolla, Calif.

E. H. Timothy Whitten, Northwestern University, Evanston, Ill.

Harry B. Whittington, Harvard University, Cambridge, Mass.

**Twenty-sixth Conference, International Federation for Documentation, Rio de Janeiro, Brazil :**

Allen Kent, Western Reserve University, Cleveland, Ohio

**UNESCO Arid Lands Symposium, Paris, France :**

William D. Schorger, the University of Michigan, Ann Arbor, Mich.

**Visit and Lecture at the Czechoslovakian Academy of Biological Sciences, Prague, Czechoslovakia :**

Paul H. Maurer, University of Pittsburgh, Pittsburgh, Pa.

**Visiting European Centers of Child Research :**

Paul H. Mussen, University of California, Berkeley, Calif.

**Visiting Soviet Laboratories, U.S.S.R. :**

Richard M. Foose, Stanford Research Institute, Menlo Park, Calif.

**Visiting and Working in Laboratories in the U.S.S.R. During the Summer of 1960, Leningrad and Moscow, Russia :**

Jack Frumlin, Basle, Switzerland



## SCIENTIFIC INFORMATION SERVICE

ACTA METALLURGICA, Schenectady, N.Y.; Translation and Publication of Five Russian Journals; *Doklady Akademii Nauk SSSR*; *Obogashchénie (Ore Beneficiation)*; *Ognepopy (Refractories)*; *Metallovedenie i Obrabotka Metallov (Metal Science and Treatment)*; and *Metallurgy*; 1 year; \$60,787

The Translation and Publication of the 1959 Issues of the Physics of Metals and Metallurgy and the Journal of Abstracts Metallurgy, Parts A and B; 1 year; \$49,213

Translation and Publication of Three Russian Books and/or Monographs From Scientific Literature of the Soviet Union Related to Materials Science and Engineering; 1 year; \$23,046

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Washington, D.C.; Symposium on the Sciences in Communist China; 7 months; \$29,925

AMERICAN AUTOMATIC CONTROL COUNCIL, PURDUE UNIVERSITY, Lafayette, Ind.; Partial Support for Publication of the Proceedings of the First International Federation of Automatic Control; 1 year; \$20,000

AMERICAN CERAMIC SOCIETY, Inc., Columbus, Ohio; Translation and Publication of the Russian Journal, "Glass and Ceramics"; 4 years; \$19,960

AMERICAN DOCUMENTATION INSTITUTE, Bethesda, Md.; Full-Time Executive Secretariat at the American Documentation Institute; 8 years; \$49,500

AMERICAN FISHERIES SOCIETY, Ann Arbor, Mich.; Publication of a List of Common and Scientific Names of Fishes From the United States and Canada; 1 year; \$4,775

AMERICAN GEOGRAPHICAL SOCIETY, New York, N.Y.; Translation and Dissemination of "Soviet Geographical Literature"; 1 year; \$38,042

AMERICAN GEOPHYSICAL UNION, Washington, D.C.; English Edition of the Russian Bulletin of the U.S.S.R., 1959 Geophysics Series; 1 year; \$53,860

Preparation and Publication of Reviews of U.S. Geophysics for the Twelfth General Assembly of IUGG; 6 months; \$9,400

Translation and Publication of the Russian Journal, "Geodesy and Cartography" Beginning With the 1959 Issues; 1 year; \$25,466

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Washington, D.C.; Basic Problems of Biological Aging; 1 year; \$9,100

Continued Support of the Translation and Publication of an English Edition of the 1959 Issues of the Russian Journal "Entomological Review"; 1 year; \$32,293

Preparation of a Supplement to the "Bibliography of Eastern Asiatic Botany," by E. D. Merrill and E. H. Walker; \$25,130

Study of the Feasibility of Establishing a Joint Editorial-Business Managerial Office for Certain Biological Periodicals; 1 year; \$9,100

Supplementary Support of the Translation of Publication of the Russian Journal, "Soil Science"; 3 months; \$42,654

Translation and Publication of the 1959 Issues of "Doklady" (Biological Sciences and Botanical Sciences Sections), "Microbiology," and "Plant Physiology"; 1 year; \$75,133

Translation and Publication of the 1959 Issues of the Russian Journal, "Soil Science"; 1 year; \$49,464

AMERICAN INSTITUTE OF PHYSICS, New York, N.Y.; Partial Support of a Decennial Index to "The Journal of the Acoustical Society of America"; 1 year; \$31,800

Study of Physics Publishing Problems; 3 years; \$108,700

Support of an English Edition of the 1960 Issues of the Russian Journal of Acoustics; 1 year; \$6,900

Support of the 1960 Issues of an English Edition of the Russian Journal of Technical Physics; 1 year; \$17,600

Support of the 1960 Issues of the Translation and Publication of the Physics Section of the Russian Journal, *Doklady*; 1 year; \$23,700

Support for the Translation and Publication of the 1960 Issues of the Russian Journal of Experimental and Theoretical Physics; 1 year; \$52,500

The 1959 Issues of an English Edition of the Russian Journal "Crystallography"; 1 year; \$15,725

The Translation and Publication of the 1959 Issues of the Russian Journal "Astronomy"; 1 year; \$28,650

Translation and Publication of the 1959 Issues of a New Russian Journal "Solid State Physics"; 1 year; \$50,860

Translation and Publication of the Russian Journal, "Progress of Physical Sciences"; 1 year; \$39,000

AMERICAN MATHEMATICAL SOCIETY, Providence, R.I.; Continued Partial Support for the Publication of "Mathematical Reviews"; 1 year; \$54,800

Emergency Support of the Transactions of the American Mathematical Society; 1 year; \$13,400

Extension of the Translation of Selected Russian Mathematical Articles Project; 1 year; \$25,576

Survey of Contemporary Chinese Mathematical Research To Study Translation Needs and the Preparation of Reviews of Chinese Mathematical Articles; 1 year; \$43,105

Translation and Publication of Three Russian Books: "Some Applications of Functional Analysis in Mathematical Physics," "Some Questions in the Theory of Moments," and "Theory of Analytic Functions of Several Complex Variables"; 1 year; \$13,105

Translation of the Pure Mathematics Section of "The Proceedings of the U.S.S.R. Academy of Science—Doklady"; 5 months; \$11,887

AMERICAN METEOROLOGICAL SOCIETY, Boston, Mass.; Preparation and Publication of a Backlog of Abstracts and a Decennial Index for "Meteorological Abstracts and Bibliography"; 2 years; \$155,250

AMERICAN MICROSCOPICAL SOCIETY, MONTANA STATE COLLEGE, Bozeman, Mont.; Harold W. Manter; Partial Support for Reprinting Back Issues of the Transactions of the American Microscopical Society; 3 years; \$11,250

AMERICAN MICROSCOPICAL SOCIETY, THE UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; Preparation and Publication of a Cumulative Index to Volumes 1-80 of the "Transactions of the American Microscopical Society"; 2 years; \$10,000

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; *Publication of Two Monographs on Texas Permian Invertebrates*; 1 year; \$6,000

AMERICAN PHILOSOPHICAL ASSOCIATION, NEW YORK UNIVERSITY, New York, N.Y.; *Translation and Critique of Selected Works of Some Leading Polish Logicians*; 1 year; \$8,500

AMERICAN ROCKET SOCIETY, INC.; New York, N.Y.; *Selected Translation of Russian Material in the Field of Astronautics*; 1 year; \$55,408

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, New York, N.Y.; *Continued Support for the Translation and Publication of the Russian Journal "Applied Mathematics and Mechanics, 1960 Series"*; 1 year; \$33,000

*Partial Support for the Publication of a "Bibliography on Gas Turbines 1896-1948"*; 1 year; \$4,500

*Translation and Publication of the 1958 Issues of the Russian Journal, "Trenie i Ienos V Mashinab" (Friction and Wear in Machinery)*; 1 year; \$6,300

AMERICAN STATISTICAL ASSOCIATION, Washington, D.C.; *Publication of an Analytical Index to the "Journal of the American Statistical Association, Volumes 35-50 (1940-55)"*; 1 year; \$18,000

ARCTIC INSTITUTE OF NORTH AMERICA, Washington, D.C.; *Translation and Publication of Russian Language Publications in Anthropology*; 1 year; \$38,734

ASSOCIATION FOR ASIAN STUDIES, Ann Arbor, Mich.; *A Study of Publishing and Information Services in the Social, Natural and Applied Sciences in Mainland China for the Period 1949-59*; 2 years; \$25,530

ASSOCIATION OF SPECIAL LIBRARIES AND INFORMATION BUREAUS, London, England; *Comparative Efficiency of Indexing Systems*; 18 months; \$16,700

BERNICE P. BISHOP MUSEUM, Honolulu, Hawaii; *Establishment of a Pacific Science Information Center*; 1 year; \$8,500

BIOLOGICAL ABSTRACTS, UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; *Continued Expansion of Coverage of "Biological Abstracts"*; 1 year; \$150,000

BOISE JUNIOR COLLEGE, Boise, Idaho; *A Study of Reproductive Cycles in California Acoelidae*; 6 months; \$300

BOSTON UNIVERSITY, Boston, Mass.; *Publication of "A Study of Navaho Windway"*; 2 years; \$4,000

BUREAU OF THE CENSUS, Washington, D.C.; *Bibliography of Social Science Periodicals and Monographs Published in Selected Difficult Languages*; 1 year; \$45,000

CALIFORNIA BOTANICAL SOCIETY, SAN FRANCISCO STATE COLLEGE, San Francisco, Calif.; *"Index to Plant Chromosome Numbers"*; 2 years; \$3,150

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; *Preparation of Illustrations for Volume II of "Catalogue of Galaxies and Clusters of Galaxies"*; 1 year; \$5,750

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; *Completion of the Manuscript "The Nervous System in Invertebrates"*; 20 months; \$15,000

CAMBRIDGE LANGUAGE RESEARCH UNIT, Cambridge, England; *New Logico-Mathematical Methods for the Analysis of Languages for Machine Translation*; 1 year; \$5,500

*New Techniques for Classification: The Theory of Clumps*; 1 year; \$14,800

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; *Compilation of a Bibliography of Statistical Computer Routines*; 1 year; \$12,700

*An Operations-Research Study of the Scientific Reading Practices of Chemists and Physicists and an Analysis of Economics of Publication of Leading Chemical Journals*; 3 months; \$5,000

*Research on Measurement of Value of Recorded Scientific Information*; 6 months; \$16,800

CHEMICAL ABSTRACTS SERVICE, THE OHIO STATE UNIVERSITY, Columbus, Ohio; *Research on Chemical Documentation—Project I*; 1 year; \$69,800

*Research on the Semantic Content of Chemical Literature*; 1 year; \$57,900

*Study of a New Publication "Key Work in Chemical Context," KWICC*; 1 year; \$150,000

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; *Study Leading to the Establishment of an Abstracting Service Covering Soil and Water*; 9 months; \$22,000

CORNELL UNIVERSITY, Ithaca, N.Y.; *Continued Support of the Bibliography of Extraterrestrial Radio Noise*; 16 months; \$18,500

ENGINEERS JOINT COUNCIL, New York, N.Y.; *An Investigation, Evaluation, and Report on the Current Availability of Polytechnical Dictionaries and Technical Glossaries, and an Examination of the Need for Additional Dictionaries in Engineering and Scientific Fields*; 5 months; \$175

ENTOMOLOGICAL SOCIETY OF AMERICA, College Park, Md.; *Partial Support for the Compilation of Noncurrent Volumes of the "Index to the Literature of American Economic Entomology"*; 2 years; \$26,300

FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY, Washington, D.C.; *Partial Support for the Office of Biological Handbooks*; 2 years; \$40,000

FORDHAM UNIVERSITY, New York, N.Y.; *Preparation of a Book on the Chemistry and Biochemistry of Lignin*; 1 year; \$4,000

FREE UNIVERSITY OF BRUSSELS, Brussels, Belgium; *Continued Support for the Physico-Chemical Constants of Binary Systems in Concentrated Solutions*; 2 years; \$15,000

GEOCHEMICAL SOCIETY, Washington, D.C.; *Publication of Geobotanical Methods for Geological Investigations*; 1 year; \$1,510

*Translation of Five Russian Monographs on Earth Sciences*; 1 year; \$18,500

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; *The Biology of the Clostridia*; 6 months; \$5,925

UNIVERSITY OF GEORGIA, Athens, Ga.; *Publication of a World Monograph of the Genus Hypoxylon*; 1 year; \$5,200

HARVARD UNIVERSITY, Cambridge, Mass.; *Preparation and Publication of a "Reference Catalogue of Bright Galaxies"*; 1 year; \$8,880

*Publication of "Index Nominum Lichenum Annis 1934-58 Vulgatorium"*; 1 year; \$11,850

*Research on Automatic Translation of Russian Into English*; 1 year; \$200,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.; *Publication of the Monograph "Sex and Age Ratios in North American Ducks"*; 1 year; \$4,600

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; *Symposium Concerning a National Program for the Systematic Evaluation, Selection, Abstracting, and/or Translation, Publication, and Dissemination of Russian and East European Linguistic Literature*; 1 year; \$6,325

INSTITUTE FOR THE ADVANCEMENT OF MEDICAL COMMUNICATION, New York, N.Y.; *Extension and Completion of a Previously Initiated Survey Entitled "Metabolism of New Scientific Information"*; 1 year; \$2,500

INSTITUTE OF MATHEMATICAL STATISTICS, Princeton, N.J.; *Preparation and Publication of an Index-Guide to Volumes 1-30 of the "Annals of Mathematical Statistics"*; 2 years; \$22,550

INSTRUMENT SOCIETY OF AMERICA, Pittsburgh, Pa.; *1959 Issues of Four Russian Journals: "Automation and Remote Control," "Measurement Techniques," "Instruments and Experimental Techniques," and "Industrial Laboratory"*; 1 year; \$112,981

IOWA STATE UNIVERSITY, Ames, Iowa; *Revision of Handbook of Freshwater Fishery Biology*; 1 year; \$12,900

IOWA STATE UNIVERSITY PRESS, Ames, Iowa; *Publication of "Flora of Missouri" by Julian A. Steyermark*; 1 year; \$15,000

JOURNAL OF CHEMICAL EDUCATION, Wooster, Ohio; *Preparation and Publication of a Ten-Year Cumulative Index*; 1 year; \$8,000

LIBRARY OF CONGRESS, Washington, D.C.; *Assembling of a Union Card Catalog of Oriental Vernacular Serials in the U.S. and Canadian Libraries*; 1 year; \$11,000

*Preparation and Publication of a Guide to International Information Facilities in Science, Technology, Medicine and Agriculture*; 1 year; \$27,730

*Publication of Part I of a Monthly "World List of Future International Meetings"*; 1 year; \$18,500

*Publication of the Monthly Index of Russian Accessions and East European Accessions Index*; 1 year; \$66,000

*Reference Center for Reports on Government-Supported Scientific Research*; 1 year; \$22,000

LINGUISTIC SOCIETY OF AMERICA, UNIVERSITY OF CALIFORNIA AT LOS ANGELES, Los Angeles, Calif.; *Partial Support of the Ninth International Congress of Linguists*; 3 months; \$25,000

LOYD LIBRARY AND MUSEUM, Cincinnati, Ohio; *Publication of Bibliography of American Paleobotany: 1952-57*; 1 year; \$500

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; *Basic Research on Methods of Translating Languages by Machine*; 1 year; \$126,000

*Continued Support for the Translation and Publication of 1959 Issues of English Editions of Three Russian Journals; Radio Engineering; Radio Engineering and Electronics; and Telecommunications*; 1 year; \$71,000

*Study Into the Dissemination of Scientific and Technical Information in the U.S.S.R.*; 2 years; \$44,217

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; *Publication of "Essays in the Science of Culture" Edited by Dole and Carneiro*; 1 year; \$4,675

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; *Partial Support for the Preparation of Annual Critical Reviews of Heat Transfer Research*; 2 years; \$8,000

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL, Washington, D.C.; *Office of Documentation*; 1 year; \$86,920

*Publication of Biological and Ecological Study of Rats on Pacific Islands*; 1 year; \$3,000

*Study of Scientific Information and Communication*; 1 year; \$26,134

*Publication of the Journal, "International Geology Review"*; 1 year; \$55,825

*Support of Office of Documentation*; 1 year; \$41,400

*Translation of the "Doklady Geology Series—1959 Volume Year"*; 1 year; \$83,130

*Translation and Publication of an English Edition of the 1959 Issues of the Russian Bulletin (Izvestiya) of the Academy of Sciences of the U.S.S.R.: Geology Series*; 1 year; \$49,000

NATIONAL BUREAU OF STANDARDS, Washington, D.C.; *Research Information Center and Advisory Service on Information Processing*; 1 year; \$50,000

NATIONAL DIET LIBRARY, Tokyo, Japan; *Translation and Printing of Quarterly "Index to Periodical Articles, Natural Sciences Section Into English"*; 1 year; \$16,000

NATIONAL FEDERATION OF SCIENCE ABSTRACTING AND INDEXING SERVICES, Philadelphia, Pa.; *Visit to the Soviet All-Union Institute of Scientific and Technical Information*; 1 month; \$4,880

NEW YORK BOTANICAL GARDEN, New York, N.Y.; *Pilot Study of Application of Electronic Data Processing Devices to Systematic and Economic Botany*; 4 months; \$4,750

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; *Preparation and Publication of "Bibliography of Hydrometry"*; 1 year; \$25,000

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; *Preparation and Publication of "An Anthropological Bibliography of the Eastern Seaboard" Volume II*; 2 years; \$12,800

OLOF LARSELL, Portland, Oreg.; *Completion of the Manuscript of a Monograph "The Cerebellum From Mycinoids to Man"*; 1 year; \$1,500

OPERATIONS RESEARCH SOCIETY OF AMERICA, Cambridge, Mass.; *Preparation of an Annotated Bibliography on Operations Research 1958-60*; 2 years; \$53,300

OPTICAL SOCIETY OF AMERICA, Washington, D.C.; *Translate and Publish the 1960 Issues of an English Edition of the Russian Journal "Optics and Spectroscopy"*; 1 year; \$50,000

OREGON STATE COLLEGE, Corvallis, Oreg.; *Preparation for Publication of Revised Edition of "A Manual of the Higher Plants of Oregon"*; 1 year; \$3,000

ORGANIC ELECTRONIC SPECTRAL DATA, INC., Rensselaer, N.Y.; *Preparation for Publication of Organic Electronic Spectral Data 1956-57 (Volume III)*; 1 year; \$4,000

ORGANIZATION OF AMERICAN STATES, Washington, D.C.; *A Cooperative Study of the Resources, Services and Potential for Expansion of Documentation Centers of Latin America*; 2 months; \$1,362

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; *Compilation and Publication of an Illustrated "Catalog of Fossil Spores and Pollen"*; 1 year; \$21,800

*Publication of "Underwater Acoustics Handbooks"*; 1 year; \$7,300

ROSCOE B. JACKSON MEMORIAL LABORATORY, Bar Harbor, Maine; *Continued Support for a Subject-Strain Bibliography and a Gene*

*Bibliography of the Mouse*; 2 years; \$9,200  
SAINT LOUIS UNIVERSITY, Saint Louis, Mo.;  
*Completion of Part IV of the "Bibliography  
on the Genetics of Drosophila;"* 4 years;  
\$3,750

SCIENCE SERVICE, Washington, D.C.; *Editing,  
Printing, and Mailing a 16-Page Supple-  
ment to the Science News Letter on Main-  
land Chinese Science*; 3 months; \$4,236  
SMITHSONIAN INSTITUTION, Washington,  
D.C.; *Classification and Multiplicity of  
Growth Layers in the Branches of Trees*;  
1 year; \$4,500

*Operating Expenses of the Biosciences In-  
formation Exchange*; 1 year; \$45,000

*Partial Support for the Mechanization of  
the Biosciences Information Exchange*; 1  
year; \$40,000

SOCIAL SCIENCE RESEARCH COUNCIL, New  
York, N.Y.; *Project to Enable the Joint  
Committee on Contemporary China of the  
American Council of Learned Societies and  
the Social Science Research Council to As-  
sist U.S. Research Libraries to Obtain Those  
Materials Relating to Mainland China Which  
Are Currently Being Produced by the U.S.  
Joint Publications Research Service*; 3  
years; \$15,000

UNIVERSITY OF SOUTHERN CALIFORNIA, LOS  
Angeles, Calif.; *Preparation of Bibliography  
of the Geology and Mineral Resources of  
California, 1937 to 1959*; 1 year; \$11,500

SPECIAL LIBRARIES ASSOCIATION, New York,  
N.Y.; *Continued Support for the Operation  
of the Scientific Translation Center*; 1 year;  
\$24,000

*Survey of Translation Activities in Tech-  
nology*; 1 year; \$34,105

STANFORD UNIVERSITY PRESS, Stanford,  
Calif.; *Preparation for Publication of a Re-  
vised, English Edition of "Hydrodynamics  
of Lubrication" by N. Tîpet*; 1 year; \$15,400

*Translation of "Hydroaerodynamics of  
Lubrication," by N. Tîpet from Romanian to  
English*; 1 year; \$3,625

STANFORD UNIVERSITY, Stanford, Calif.;  
*Proposed Translation and Publication of Dr.  
E. M. Savitsky's Book Entitled "The In-  
fluence of Temperature on the Mechanical  
Properties of Metals and Alloys"*; 6 months;  
\$5,980

TEXAS RESEARCH FOUNDATION, Renner, Tex.;  
*Publication of Part VI (the Saliaceae and  
Indee) of Volume 3 of "Flora of Texas"*; 1  
year; \$2,600

UNIVERSITY OF TOLEDO, Toledo, Ohio; *Com-  
pletion of the Manuscript for a New Edition  
of "The Physical Chemistry of the Sul-  
fates"*; 2 years; \$11,000

U.S. DEPARTMENT OF AGRICULTURE, Wash-  
ington, D.C.; *A Study of the Availability  
and Utilization of Oriental Scientific Pub-  
lications in the USDA Library*; 2 years;  
\$25,000

U.S. DEPARTMENT OF COMMERCE, Wash-  
ington, D.C.; *Dissemination of Government  
Scientific Reports*; 1 year; \$55,000

*Reproduction and Distribution of Air  
Information Division (AID) Abstracts*; 6  
months; \$38,762

U.S. DEPARTMENT OF STATE, Washington,  
D.C.; *Employment of a Polish National at  
the United States Embassy in Warsaw,  
Poland*; 8 months; \$460

U.S. JOINT PUBLICATIONS RESEARCH SER-  
VICE, New York, N.Y.; *Translation of  
"Referateny Zhurnal Biologiya"*; 1 month;  
\$38,374

WASHINGTON STATE UNIVERSITY, Pullman,  
Wash.; *Publication of a Monograph on the  
Genus Tilletia*; 1 year; \$3,400

UNIVERSITY OF WASHINGTON, Seattle, Wash.;  
*A Chinese-English Mechanical Translation  
Project for Research in the Lexicographical  
and Structural Problems of the Chinese Lan-  
guage*; 1 year; \$53,700

WAYNE STATE UNIVERSITY, Detroit, Mich.;  
*Partial Support of a Working Conference on  
Mechanical Translation During July 1960,  
at Princeton, New Jersey*; 4 days; \$5,000

WESTERN RESERVE UNIVERSITY, Cleveland,  
Ohio; *Test Program To Evaluate Notation  
Systems for Chemical Structural Formulas*;  
1 year; \$5,800

*Test Program for Evaluating Procedures  
for the Exploitation of Literature of Inter-  
est to Metallurgists*; 1 year; \$159,200

UNIVERSITY OF WISCONSIN, Madison, Wis.;  
*Translation and Foreign Scientific Center in  
the Fields of Geophysics, Glaciology and  
Geology (Polar Research)*; 2 years; \$42,936

## APPENDIX E

### Fellowship Awards Offered

National Science Foundation Fellowship Awards, by Type and Field, Fiscal Year 1960

Field	Graduate	Cooperative graduate	Graduate teaching assistants	Post-doctoral regular	Post-doctoral senior	Science faculty	Secondary teachers	Total
<b>Life Sciences:</b>								
Agriculture.....	4	17	8	1	1	4	0	35
Anthropology.....	19	4	7	6	1	0	0	37
Biochemistry.....	40	36	4	18	8	3	5	114
Biophysics.....	13	2	0	3	1	1	0	20
Botany.....	15	19	19	4	2	13	9	81
General Biology.....	5	12	1	0	0	8	134	160
Genetics.....	15	22	9	2	7	1	0	56
Medical Sciences.....	19	10	0	17	0	8	0	63
Microbiology.....	9	6	6	5	1	1	1	29
Psychology.....	32	67	23	7	2	1	1	133
Zoology.....	62	59	57	11	5	22	23	239
Subtotal.....	233	254	143	74	28	62	173	967
<b>Physical Sciences:</b>								
Astronomy.....	12	9	2	5	1	3	0	32
Chemistry.....	192	237	145	35	7	31	39	686
Earth Sciences.....	24	43	47	9	5	9	1	188
Engineering Sciences.....	202	268	76	9	5	88	0	646
Mathematical Sciences.....	168	171	99	25	11	63	226	703
Physics.....	298	173	51	20	18	31	15	606
General.....	0	0	0	0	0	0	0	0
Subtotal.....	946	901	420	103	47	223	281	2,931
<b>Social Sciences:</b>								
General.....	21	35	17	3	0	0	0	76
<b>Natural Sciences:</b>								
General.....	0	0	0	0	0	0	46	46
<b>Total.....</b>	<b>1,200</b>	<b>1,190</b>	<b>580</b>	<b>180</b>	<b>75</b>	<b>285</b>	<b>500</b>	<b>4,010</b>

### *Names, Residences, and Fields of Study of Individuals Offered National Science Foundation Fellowships*

#### ALABAMA

##### *Graduate*

BURGESS, EDWARD M., Birmingham, Chemistry.  
 COULTER, CLAUDE A., Phenix City, Physics.  
 GUNTER, THOMAS E., Tallahassee, Physics.  
 HOLMES, CHARLES H., Lafayette, Engineering.  
 JONES, LAWRENCE H., Mobile, Biochemistry.  
 MACNAMARA, JOHN P., Mobile, Zoology.  
 MAGUIRE, JOHN A., II, Birmingham, Chemistry.  
 MILLER, EDWARD J., Mobile, Zoology.  
 MORAN, MARTIN T., Mobile, Physics.  
 SANDBERSON, JACK T., Birmingham, Physics.

##### *Cooperative Graduate*

ALLEN, LEON H., Jr., Opelika, Agriculture.  
 BENTLEY, WILLIAM H., Huntsville, Engineering.

COGGINS, JAMES L., Brundidge, Engineering.  
 COOPER, GARY P., Springhill, Medical Sciences.  
 COULTER, PHILIP W., Phenix City, Physics.  
 CUTCHEN, JOHN T., Dothan, Physics.  
 FLOYD, THOMAS D., Birmingham, Engineering.  
 GARRETT, WILLIAM R., Birmingham, Physics.  
 MCKENZIE, HOYT W., Jr., Anniston, Chemistry.  
 MULLINS, PEGGY J., Huntsville, Mathematics.  
 PROPST, FRANKLIN M., Anniston, Physics.  
 SMITH, CLOYD V., Jr., Sylacauga, Engineering.

##### *Postdoctoral*

HILL, PAUL D., Dadeville, Mathematics.

##### *Science Faculty*

PARKER, JEAN T., Florence, Mathematics.  
 WHITTEN, KENNETH W., Dawson, Chemistry.

**ALABAMA—Continued****Summer Fellowships for Graduate Teaching Assistants**

BROWN, JULIA D., Trussville, Mathematics.  
 FRANCIS, ROBERT C., Jr., Hartselle, Engineering.  
 GILBERT, JIMMIE D., Auburn, Mathematics.  
 MANLEY, LILLIAN C., Demopolis, Zoology.  
 SHEPPARD, ALBERT P., Tuscaloosa, Physics.  
 WHITT, RICHARD E., Auburn, Engineering.

**Summer Fellowships for Secondary School Teachers**

BARKLEY, MARK ERNEST, Autaugaville, Mathematics.  
 GLENN, MOSES LEONARD, Montgomery, Mathematics.  
 HUMPHREYS, DOUGLAS D., Helena, Mathematics.  
 JONES, ERNEST L., Orrville, General Sciences.  
 NANCARROW, DOROTHY V., Birmingham, Biology.  
 NORRIS, CHARLES W., Andalusia, Mathematics.  
 SABOL, SR. M. TERESITA, Montgomery, Chemistry.

**ALASKA****Science Faculty**

JOHNSON, ALBERT W., Fairbanks, Botany.  
 KNIGHT, GEORGE R., Fairbanks, Engineering.

**ARIZONA****Graduate**

ANDERSON, LORAN C., Page, Botany.  
 BISSETT, DAVID H., Prescott, Earth Sciences.  
 COOK, DON B., Scottsdale, Chemistry.  
 DOLE, JIM W., Phoenix, Zoology.  
 LANGE, ROBERT V., Phoenix, Physics.  
 LEWIS, RICHARD B., Douglas, Physics.  
 NEVILLE, MELVIN K., Tucson, Chemistry.  
 NOYES, ROY B., Tucson, Engineering.  
 WEXLER, JONATHAN D., Tempe, Mathematics.

**Cooperative Graduate**

BARTS, ALBERT E., Tucson, Psychology.  
 BROWN, KEITH S., Jr., Amado, Chemistry.  
 BRYANT, MARTHA L., Tucson, Chemistry.  
 COSTA, BARBARA M., Tucson, Engineering.  
 FENWICK, CHARLES A., Phoenix, Psychology.  
 FENWICK, ROBERT B., Phoenix, Engineering.  
 GREGORY, BOB L., Phoenix, Engineering.  
 MOORES, ELDRIDGE M., Globe, Earth Sciences.  
 O'CONNELL, CONSTANCE J., Tucson, Psychology.  
 PEAKE, EDMUND J., Jr., Phoenix, Mathematics.  
 ROTH, RICHARD L., Tucson, Mathematics.  
 WAIT, JOHN V., Tucson, Engineering.

**Postdoctoral**

CONRAD, DAVID A., Tucson, Engineering.

**Science Faculty**

HOSHAW, ROBERT W., Tucson, Botany.  
 MEES, QUENTIN M., Tucson, Engineering.

**Summer Fellowships for Graduate Teaching Assistants**

MONROE, JAMES E., Prescott, Zoology.  
 VANEK, POLLY H., Tucson, Astronomy.  
 WALTER, EVERETT L., Mesa, Mathematics.

**Summer Fellowships for Secondary School Teachers**

DAVY, ROGER H., Phoenix, Zoology.  
 SHOWLEY, DEVON LEE, Scottsdale, Physics.  
 TOOHEY, JACK V., Phoenix, Biology.

**ARKANSAS****Graduate**

ARNOLD, RICHARD C., Fayetteville, Physics.  
 CHRISTIE, JOE H., Magnolia, Chemistry.  
 HILL, JOHN W., Fayetteville, Chemistry.  
 RUSSELL, CHARLES D., El Dorado, Chemistry.

**Cooperative Graduate**

ATTERBERRY, PHILIP R., Van Buren, Physics.  
 CHILDS, WILLIAM V., Magnolia, Chemistry.  
 DMUCHOVSKY, BASIL, Fayetteville, Chemistry.  
 HALPERN, LYNDA S., Fayetteville, Genetics.  
 ISGRIG, FREDERICK A., Little Rock, Psychology.  
 SEAY, BILLY M., Magnolia, Psychology.  
 WEAR, JAMES O., Fayetteville, Chemistry.

**Science Faculty**

IMHOFF, JOHN L., Fayetteville, Mathematics.  
 RADLEY, EDWARD T., Conway, Chemistry.  
 WEBB, BRYAN JR., Fayetteville, Engineering.

**Summer Fellowships for Graduate Teaching Assistants**

BLASKOVICS, KAY H., Stuttgart, Mathematics.  
 FREEMAN, THOMAS J., Jr., Little Rock, Earth Sciences.  
 GALLOWAY, LOUIE A. III, Pine Bluff, Physics.  
 MACE, KENNETH D., North Little Rock, Botany.  
 SPARKS, BRYAN, Fayetteville, Chemistry.

**Summer Fellowships for Secondary School Teachers**

BLEVINS, EULA L., North Little Rock, Biology.  
 BOZONE, DAISY LOUISE, Junction City, Mathematics.  
 DOBSON, JACK T., Lonoke, Biology.  
 GARNER, BERNICE L., Norphlet, Biology.  
 JORDAN, CHESTER L., Fort Smith, General Science.  
 McDERMOTT, CECIL W., Little Rock, Mathematics.  
 MILLER, MARIE WARD, McCrory, Biology.  
 NEWTON, MCKINLEY, Tuckerman, General Science.  
 PURTLE, IDA M., Prescott, Biology.

**CALIFORNIA****Graduate**

ABERS, ERNEST S., San Francisco, Physics.  
 AITKEN, DONALD W., Jr., Palo Alto, Physics.  
 ALBINI, FRANK A., Altadena, Engineering.  
 ALBRIGHT, NORMAN W., Pasadena, Physics.  
 ANDERSON, DONALD W., Van Nuys, Mathematics.  
 ARNQVIST, CLIFFORD W., Playa Del Rey, Mathematics.  
 AUGUST, GERALD, Berkeley, Engineering.  
 AWBREY, FRANK T., Riverside, Zoology.  
 BACHER, ANDREW D., Pasadena, Astronomy.  
 BANKS, PHILIP O., Sacramento, Earth Sciences.  
 BAUER, ANDREW B., Palo Alto, Engineering.  
 BERNICK, ROBERT L., Los Angeles, Physics.  
 BLANDFORD, ROBERT R., Pasadena, Earth Sciences.  
 BLOOMFIELD, VICTOR A., Cotati, Chemistry.  
 BORGMAN, LEON E., Los Angeles, Mathematics.  
 BOULWARE, DAVID G., Lafayette, Physics.  
 BOYD, ROBERT G., Riverside, Physics.  
 BRONZAN, JOHN B., Los Angeles, Physics.  
 BROWN, LOWELL S., Visalia, Physics.

BROWN, STEPHEN L., Palo Alto, Physics.  
 BURNETT, DONALD S., Berkeley, Chemistry.  
 CHONG, DELANO P., San Francisco, Chemistry.  
 CLARK, ALAN R., San Jose, Physics.  
 COHEN, JULIA H., Menlo Park, Zoology.  
 CRICHTON, JAMES H., Berkeley, Physics.  
 DASHEN, ROGER F., Redding, Physics.  
 DAYBELL, MELVIN D., Pasadena, Physics.  
 DOLBY, RAY M., Cupertino, Physics.  
 DOUGLASS, ROGER L., Albany, Physics.  
 DRAGT, ALEX J., Berkeley, Physics.  
 DUKE, MICHAEL B., Los Angeles, Earth Sciences.  
 ENDBERTON, HERBERT B., San Jose, Mathematics.  
 ENRIGHT, JAMES T., San Diego, Zoology.  
 ERSKINE, MELVILLE C., Jr., San Jose, Earth Sciences.  
 EVENSEN, DAVID A., Pasadena, Engineering.  
 FISH, ROBERT A., Los Altos, Chemistry.  
 GAGE, DONALD H., Durham, Engineering.  
 GIBSON, EDWARD G., Pasadena, Engineering.  
 GILLESPIE, BARBARA C., Los Altos, Botany.  
 GODDARD, WILLIAM A., Los Angeles, Engineering.  
 GRAHAM, RONALD L., Berkeley, Mathematics.  
 GRIFFITHS, ROBERT B., Stanford, Physics.  
 GRIMES, CHARLES C., Berkeley, Physics.  
 GRISWOLD, RALPH E., Palo Alto, Engineering.  
 GRZESIK, JAN A., Inglewood, Physics.  
 GUNCKEL, THOMAS L. II, Pomona, Engineering.  
 HAGADORN, IRVINE R., Albany, Zoology.  
 HALES, ALFRED W., Pasadena, Mathematics.  
 HARDMAN, MARTHA J., Palo Alto, Anthropology.  
 HARRINGTON, DAVID M., Los Angeles, Mathematics.  
 HASSLER, FRANCES J., Los Angeles, Anthropology.  
 HAYLER, DONALD A., Belmont, Physics.  
 HEARST, JOHN E., Pasadena, Chemistry.  
 HEILBRON, JOHN L., Berkeley, Social Sciences.  
 HENDRICKS, TEREAH J., Berkeley, Physics.  
 HERMSEN, ROBERT W., Berkeley, Engineering.  
 HERRMANN, LEONARD R., Albany, Engineering.  
 HOLDAWAY, MICHAEL J., Berkeley, Earth Sciences.  
 HONE, DANIEL W., San Francisco, Physics.  
 HUDSON, DOHERTY B., San Francisco, Medical Sciences.  
 HULTGREN, GLEN O., Berkeley, Chemistry.  
 HUNDLEY, RICHARD O., San Gabriel, Physics.  
 IRVINE, WILLIAM M., Beverly Hills, Physics.  
 JANSSENS, THOMAS J., Santa Clara, Physics.  
 JOHNSON, DEAN M., Pasadena, Earth Sciences.  
 JOHNSON, HARMON W., Santa Clara, Engineering.  
 JORGENSEN, NORMAN E., Oakland, Physics.  
 KEESING, ROGER M., Stanford, Anthropology.  
 KEIGHTLEY, WILLARD O., Pasadena, Engineering.  
 KENNEDY, KENNETH A. R., San Francisco, Anthropology.  
 KENT, WILLIAM L., San Diego, Mathematics.  
 KING, JACK L., Antioch, Genetics.  
 KIRK, WILLIAM L., Jr., Los Angeles, Psychology.  
 KLOTZ, EUGENE A., Costa Mesa, Mathematics.  
 KOHL, ELIZABETH N., Arcadia, Chemistry.  
 KONRAD, MICHAEL W., Berkeley, Biophysics.  
 KRASNE, FRANKLIN R., Sausalito, Psychology.  
 KRUSE, ROBERT L., Upland, Mathematics.  
 LAMARCHE, VALMORE C., Jr., Berkeley, Earth Sciences.  
 LANDGREBE, JOHN A., San Francisco, Chemistry.  
 LANDSBERG, ARNE, National City, Engineering.  
 LAYMAN, WILLIAM E., Wicovina, Engineering.  
 LEBOVITZ, NORMAN R., Van Nuys, Physics.  
 LEITNER, PHILIP, Orinda, Zoology.  
 LEVINE, IRA N., Van Nuys, Chemistry.  
 LEWIS, FRANCIS H., Menlo Park, Physics.  
 LIBBY, WILLIAM J., Berkeley, Genetics.  
 LINDSAY, SANDRA L., Walnut Creek, Genetics.  
 LINDQUIST, EVERT E., Berkeley, Zoology.  
 LINSON, LEWIS M., Oakland, Physics.  
 MACINTYRE, FERREN, Riverside, Chemistry.  
 MARSHALL, J. HOWARD, III, Pasadena, Physics.  
 MATCHETT, MARY D., San Carlos, Biophysics.  
 MATTHEWS, JUNE L., Altadena, Physics.  
 MCVIVOR, IVOR K., Stanford, Engineering.  
 MCLEAN, NORMAN, Jr., Berkeley, Zoology.  
 MCMANIGAL, PAUL G. M., South Pasadena, Physics.  
 MIHALAS, DIMITRI M., Los Angeles, Astronomy.  
 MILDER, DAVID M., N. Hollywood, Physics.  
 MOCK, WILLIAM L., Santa Ana, Chemistry.  
 MUFFLER, LEROY J. P., Claremont, Earth Sciences.  
 MUIRBOOK, NEWELL K., Ogden, Engineering.  
 MUNSON, JOHN H., Burbank, Physics.  
 MURRAY, BETTIE E., Fontana, Biochemistry.  
 NEARING, JAMES C., Hawthorne, Physics.  
 NEIGHBOR, JAMES E., Walnut Creek, Physics.  
 NELSON, KEITH B., Berkeley, Zoology.  
 NELSON, WAYNE B., Pasadena, Physics.  
 NEVILLE, DONALD E., Los Angeles, Physics.  
 NG, JUDITH, Oakland, Mathematics.  
 OGLESBY, LARRY C., Atascadero, Zoology.  
 PALMER, LEIGH H., Sacramento, Physics.  
 PAOLILLO, DOMINICK J., Jr., Davis, Botany.  
 PARKER, PETER D. M., Monterey Park, Physics.  
 PAULIKAS, GEORGE A., Berkeley, Physics.  
 PEARSON, GERALD A., Redondo Beach, Chemistry.  
 PECK, CHARLES W., Pasadena, Physics.  
 PEEKEMA, RICHARD M., Gridley, Chemistry.  
 PIERCE, WILLIAM H., Los Altos, Engineering.  
 PITZER, RUSSELL M., Berkeley, Chemistry.  
 RABINOWITZ, LAWRENCE, Berkeley, Medical Sciences.  
 RALLS, KENNETH M., Stanford, Engineering.  
 RAPAPORT, SEYMOUR A., Los Angeles, Medical Sciences.  
 RAPIER, JERRY L., Baldwin Park, Physics.  
 RENEAU, LEON R., San Mateo, Engineering.  
 ROTHKOPF, MICHAEL H., Beverly Hills, Social Sciences.  
 ROYCE, EDWIN B., Pasadena, Physics.  
 SCHULTZ, CLAUDE H., Davis, Physics.  
 SCHWEITZER, GLENN E., Los Angeles, Engineering.  
 SEARLES, RICHARD B., Berkeley, Botany.  
 SEIELSTAD, GEORGE A., Corte Madera, Physics.  
 SIMPSON, PAUL G., Wilmington, Chemistry.  
 SINOFF, WILLIAM A., Los Angeles, Engineering.  
 SMITH, DAVID H., Alhambra, Social Sciences.  
 SMITH, EARNEST E., Sepulveda, Physics.  
 SNIVELY, FRANK T., Pasadena, Physics.  
 SOKOL, OTTO M., Palo Alto, Zoology.

CALIFORNIA—Continued

SOULES, GEORGE W., Jr., Van Nuys, Mathematics.  
 SPARKS, MARSHALL S., Jr., Berkeley, Physics.  
 STREET, ROBERT L., San Diego, Engineering.  
 SWENEY, DARYL C., El Cerrito, Zoology.  
 THIBEAUX, MARTIAL L., Jr., Whittier, Physics.  
 THOE, DALE W., Sunnyvale, Mathematics.  
 THOMASSEN, KEITH I., Stanford, Engineering.  
 THORNTON, MELVIN C., San Diego, Mathematics.  
 TRAFTON, LAURENCE M., Los Angeles, Astronomy.  
 VALERGA, ANTONIO J., Oakland, Chemistry.  
 VIDAYER, WILLIAM E., San Mateo, Botany.  
 VLASES, GEORGE C., Pasadena, Engineering.  
 WAGNER, TERRY J., Albany, Engineering.  
 WATERS, JAMES F., Santa Barbara, Zoology.  
 WEILL, DANIEL F., Berkeley, Earth Sciences.  
 WEINSTEIN, JOSEPH M., Oakland, Mathematics.  
 WEISBERG, HOWARD L., Los Angeles, Physics.  
 WERTHAMER, NATHAN R., Berkeley, Physics.  
 WIGLEY, NEIL M., Albany, Mathematics.  
 WILLEMSSEN, ELEANOR W., Palo Alto, Psychology.  
 WILLIAMSON, ROBERT E., Jr., Berkeley, Mathematics.  
 WILLIS, EDWIN O., Berkeley, Zoology.  
 WILSON, DONALD R., Los Angeles, Chemistry.  
 WOLLMER, RICHARD D., Los Angeles, Mathematics.  
 WRIGHT, JOHN M., Pasadena, Chemistry.  
 WULF, DANIEL L., Arcadia, Chemistry.  
 YOUNG, LAEL M., Mentone, Mathematics.  
 YURA, HAROLD T., Pasadena, Physics.  
 ZISK, STANLEY H., Stanford, Engineering.

*Cooperative Graduate*

AHLERS, GUENTER, Berkeley, Chemistry.  
 ALLEN, WILLIAM V., Palo Alto, Biology.  
 BAHN, ALFRED J., Redwood City, Engineering.  
 BALL, GEOFFREY H., Bell, Engineering.  
 BARBER, MARY L., Los Angeles, Biochemistry.  
 BECK, MYRL E., Jr., Beaumont, Earth Sciences.  
 BELKIN, DANIEL A., Los Angeles, Zoology.  
 BLACK, NEVILLE A., Los Angeles, Physics.  
 BLAKELY, LAWRENCE M., San Marcos, Botany.  
 BOHN, ROBERT K., Sebastopol, Chemistry.  
 BOND, FREDERICK T., Berkeley, Chemistry.

*Cooperative Graduate*

BOWMAN, THOMAS E., Burlingame, Engineering.  
 BOWSER, CARL J., Pomona, Earth Sciences.  
 BOYLE, RICHARD P., Spring Valley, Social Sciences.  
 BROWN, MELANCTHON S., Palo Alto, Chemistry.  
 BURCHFIELD, BURRELL C., Long Beach, Earth Sciences.  
 CALFEE, ROBERT C., Los Angeles, Psychology.  
 CARLYLE, JACK W., Berkeley, Engineering.  
 CARTER, NEVILLE L., Culver City, Earth Sciences.  
 CAULEY, JOSEPH M., Pasadena, Physics.  
 CHAPPIE, WILLIAM M., La Jolla, Earth Sciences.  
 COCIVERA, MICHAEL, Los Angeles, Chemistry.  
 DANFORTH, CHARLES G., Glendale, Medical Sciences.  
 DAVIS, GREGORY A., Berkeley, Earth Sciences.  
 DELEY, GARY W., Altadena, Engineering.  
 FELDMAN, MARTIN R., Los Angeles, Chemistry.

FLYGARE, WILLIS H., Berkeley, Chemistry.  
 FRITSCH, ALBERT E., Los Angeles, Earth Sciences.  
 GIANCOLI, DOUGLAS C., Berkeley, Physics.  
 GLUSKOTER, HAROLD J., Berkeley, Earth Sciences.  
 GROSS, FLETCHER I., La Canada, Mathematics.  
 HAINLINE, LYDIA J., San Bernardino, Anthropology.  
 HAMILTON, GORDON W., Berkeley, Physics.  
 HARTMANN, RICHARD W., Santa Monica, Agriculture.  
 HEEGER, ALAN J., Berkeley, Physics.  
 HEINRICHS, DONALD F., Bakersfield, Earth Sciences.  
 HILLIER, FREDERICK S., Palo Alto, Engineering.  
 HOLLAND, WILLIAM R., Gardena, Earth Sciences.  
 HOWARD, CHARLES M., Los Angeles, Mathematics.  
 KAHN, PAUL M., Fairfax, Mathematics.  
 KEISLER, H. JEROME, Pasadena, Mathematics.  
 KENNEDY, ROBERT P., La Canada, Engineering.  
 KLEIN, WILLIAM M., Jr., Claremont, Botany.  
 KOCH, KAY F., Berkeley, Chemistry.  
 LANE, CHARLES A., Berkeley, Chemistry.  
 LANG, SIDNEY B., San Francisco, Engineering.  
 LENDARIS, GEORGE G., Albany, Engineering.  
 LOCKARD, ROBERT B., Bakersfield, Psychology.  
 MAGEE, PATRICK M., Los Angeles, Engineering.  
 MANDELLE, RICHARD L., Rosemead, Engineering.  
 MULLIGAN, JAMES A., Oakland, Zoology.  
 NAZAROFF, GEORGE V., San Francisco, Chemistry.  
 QUELLETTE, ROBERT J., Berkeley, Chemistry.  
 PARKER, ROBERT A., Monterey Park, Astronomy.  
 PATTERSON, JOHN D., Santa Rosa, Engineering.  
 PENE, JACQUES J., Los Angeles, Genetics.  
 PRICE, KENDALL O., San Francisco, Psychology.  
 RAND, JOAN E., Santa Barbara, Mathematics.  
 RIGGS, ARTHUR D., San Bernardino, Biochemistry.  
 RODIN, BURTON, Los Angeles, Mathematics.  
 ROE, ARNOLD, Los Angeles, Engineering.  
 ROELOF, EDMOND C., Granada Hills, Physics.  
 RONY, PETER R., Los Angeles, Engineering.  
 SELTZER, EDWIN C., Encino, Physics.  
 SHAIN, STEPHEN A., Albany, Engineering.  
 SHIER, JOHN S., Pasadena, Physics.  
 SIMMONS, JERRY L., Rosemead, Engineering.  
 SMITH, RICHARD G., St. Glendora, Engineering.  
 SMITH, ROBERT B., Berkeley, Chemistry.  
 STELMAN, DAVID, Berkeley, Chemistry.  
 STEVENS, DAVID F., Los Angeles, Mathematics.  
 STONE, CHARLES J., Van Nuys, Mathematics.  
 STRATTON, ROBERT A., Alturas, Chemistry.  
 SWINEHART, JAMES H., Covina, Chemistry.  
 THEIOS, JOHN M., San Bernardino, Psychology.  
 THORNB, VICTOR E., Los Angeles, Social Sciences.  
 TOCHER, JAMES L., Albany, Engineering.



WAGNER, WILLIAM G., South Pasadena, Physics.

WEISS, ROBERT J., Empire, Mathematics.

WERNER, NEWTON D., Los Angeles, Chemistry.

WYMAN, MELVIN J., Los Angeles, Psychology.

#### *Postdoctoral*

BENNYHOFF, JAMES A., Quincy, Anthropology.

BONIC, ROBERT A., Los Angeles, Mathematics.

CANTOR, DAVID G., Van Nuys, Mathematics.

CARTERETTE, EDWARD C., Studio City, Physics.

CHAN, SUNNEY I., San Francisco, Physics.

CLEMENS, WILLIAM A., Jr., Berkeley, Earth Sciences.

CRAWLEY, PETER L., Alhambra, Mathematics.

CZAMANSKE, GERALD K., Palo Alto, Earth Sciences.

DEMPESEY, WALTER B., San Francisco, Biochemistry.

EMERY, THOMAS F., San Anselmo, Biochemistry.

FELDMAN, JACOB, Berkeley, Mathematics.

GARRIOTT, OWEN K., Mountain View, Physics.

GHELARDI, RAYMOND J., La Jolla, Zoology.

GOLDENBERG, HAROLD M., Los Angeles, Physics.

GOLDSBOROUGH, JOHN P., Stanford, Physics.

HANNA, MELVIN W., Pasadena, Chemistry.

HILL, ELGIN A. III, Pasadena, Chemistry.

JORDAN, PETER C., Los Angeles, Chemistry.

LAU, FRANCIS Y., Hayward, Medical Sciences.

LUBLINER, JACOB, Los Angeles, Engineering.

LYSER, KATHERINE M., Lafayette, Zoology.

MARSHALL, ALBERT W., Palo Alto, Mathematics.

MCCONKEY, EDWIN H., Berkeley, Biochemistry.

MECHANIC, ARNOLD, Berkeley, Psychology.

MICHEL, FRANCIS W., Palo Alto, Medical Sciences.

PARIS, OSCAR H., Jr., Albany, Zoology.

PICKERING, RANARD J., Mountain View, Earth Sciences.

RAVEN, PETER H., Los Angeles, Botany.

ROBOWSKY, ANDRE, Beverly Hills, Chemistry.

VOGEL, MARTIN, Los Angeles, Chemistry.

WILDE, DOUGLASS J., Berkeley, Engineering.

ZWANZIGER, DANIEL E., San Diego, Physics.

#### *Senior Postdoctoral*

CROWELL, JOHN C., Los Angeles, Earth Sciences.

FOWLER, CHARLES A., Jr., Claremont, Physics.

FRETTER, WILLIAM B., Berkeley, Chemistry.

KARLIN, SAMUEL, Stanford, Mathematics.

KNOPOFF, LEON, Los Angeles, Earth Sciences.

OPPENHEIM, ANTONI K., Berkeley, Engineering.

STENT, GUNTHER S., Berkeley, Biophysics.

#### *Science Faculty*

ALLEN, C. FREEMAN, Claremont, Biochemistry.

ARMIN, L. CLAIR, Reedley, Zoology.

BAILEY, WARREN H., Redding, Botany.

BOURNE, HENRY C., Jr., Berkeley, Engineering.

BOYER, WILLIAM E., Upland, Physics.

BURGY, ROBERT H., Davis, Engineering.

BUSSELL, BERTRAM, Los Angeles, Engineering.

COOPER, GRANT S., Walnut, Chemistry.

DAVIS, WARD B., Whittier, Biochemistry.

DOUGLAS, ALLAN G., Chico, Zoology.

FISCHER, EGBERT D., Glendale, Physics.

HARTSEVELDT, RICHARD J., San Jose, Agriculture.

HILEMAN, JACK C., El Camino College, Chemistry.

HUNZIKER, RODNEY W., Chico, Astronomy.

KABAT, HERBERT R., San Luis Obispo, Physics.

KRAUSKOFF, KONRAD B., Stanford, Chemistry.

MACH, GEORGE R., San Luis Obispo, Mathematics.

NEWKIRK, GAIL A., Lancaster, Zoology.

PARKE, EDWARD C., Jr., Arcata, Physics.

PIPKIN, BERNARD W., El Camino College, Earth Sciences.

RATTERMAN, BREEN, San Mateo, Medical Sciences.

RENARD, ROBERT J., Monterey, Earth Sciences.

VENUTI, WILLIAM J., San Jose, Engineering.

VOSS, Sr., ANNA, Belmont, Biology.

WILLIG, WARREN C., Chanoga Park, Mathematics.

#### *Summer Fellowships for Graduate Teaching Assistants*

ANDELIN, JOHN P., Jr., Los Angeles, Physics.

BEUS, STANLEY S., Los Angeles, Earth Sciences.

BLANKS, ROBERT F., Berkeley, Engineering.

BURTON, GILBERT W., Temple City, Chemistry.

CARTER, NEVILLE L., Culver City, Earth Sciences.

CLARKE, WILLIAM C., Berkeley, Earth Sciences.

COLONELL, JOSEPH M., San Diego, Engineering.

DODGE, HARRY W., Jr., Los Angeles, Earth Sciences.

EISELEN, EVERETT T., Stockton, Engineering.

HAMBERGER, KIMBALL L., Berkeley, Engineering.

HOLMES, ROBERT E., Castro Valley, Chemistry.

JUNKER, HANS H., Oakland, Engineering.

KLUGE, ARNOLD G., Los Angeles, Zoology.

KOHLER, JOSEPH, Pasadena, Mathematics.

KREPS, THEODORA C., Palo Alto, Anthropology.

LAETSCH, WATSON M., Stanford, Botany.

LEDER, HANS H., Los Altos, Anthropology.

LINDQUIST, EVERT E., Berkeley, Zoology.

LLOYD, JAMES R., Cucamonga, Engineering.

LUMPKIN, OSCAR J., Los Angeles, Physics.

LYTTON, JACK L., Berkeley, Engineering.

MCKEE, EDWIN H., Berkeley, Earth Sciences.

MIER, MILLARD G., Los Angeles, Physics.

MULLIGAN, JAMES A., Oakland, Zoology.

NASATIR, DAVID, Berkeley, Social Sciences.

NEUMAN, ROBERT C., Jr., Whittier, Chemistry.

NG, JUDITH, Oakland, Mathematics.

PADGETT, WELDON M. II, Berkeley, Chemistry.

PENE, JACQUES J., Los Angeles, Genetics.

PRICE, KENDALL O., San Francisco, Psychology.

RICHMOND, RUTH J., Los Angeles, Microbiology.

RUMSEY, HOWARD C., Jr., Alhambra, Mathematics.

**CALIFORNIA—Continued**

RUPPERT, RICHARD W., Pasadena, Social Sciences.  
 RYFF, JOHN V., Palo Alto, Mathematics.  
 SCHULTZ, CLAUDE H., Davis, Physics.  
 SHELLHAMMER, HOWARD S., Woodland, Zoology.  
 SIBLEY, MURRAY J., Stanford, Chemistry.  
 SIGGEL, JAMES T., Berkeley, Anthropology.  
 SPILERMAN, SEYMOUR, Los Angeles, Mathematics.  
 SPILLERS, WILLIAM R., Fresno, Engineering.  
 SPIRO, THOMAS G., Los Angeles, Chemistry.  
 STERNLICHT, HIMAN, Pasadena, Chemistry.  
 TAYLOR, CHARLES M., Pasadena, Earth Sciences.  
 TUCKER, VANCE A., Los Angeles, Zoology.  
 WERNER, NEWTON D., Los Angeles, Chemistry.  
 WERTHEIM, GEORGE A., Menlo Park, Psychology.  
 WITKOVSKY, PAUL, Los Angeles, Zoology.  
 WIDVEN, THEODORE, Jr., Modesto, Chemistry.  
 YENGOYAN, ARAM A., Fresno, Anthropology.  
*Summer Fellowships for Secondary School Teachers*  
 ANSON, HERBERT F., Ventura, Mathematics.  
 BEEMAN, ROBERT DAVID, Walnut, Zoology.  
 BLOSSER, JOHN E., San Diego, General Sciences.  
 BREHMER, ROGER B., Oakland, General Sciences.  
 BRENNAN, Sr., M. ELAINE, San Rafael, General Sciences.  
 BRYANT, HARRY DELWYN, Davis, Zoology.  
 CLARK, BURNICE V., Bakersfield, Mathematics.  
 COMMINS, Sr., M. VICTORIA, San Francisco, Biochemistry.  
 DAVID, IRA A., Brea, General Sciences.  
 ENYART, JESSIE JAMES, Dorris, Mathematics.  
 FASSELL, GERALD N., Culver City, Botany.  
 FELDMAN, BERNARD, Canoga Park, Mathematics.  
 GAFFNEY, Sr., ELEANOR M., Belmont, Zoology.  
 GUNSTREAM, STANLEY E., Pasadena, Biology.  
 HAINLINE, VAN KEITH, San Bernardino, Biology.  
 HARDEN, WILLARD W., El Segundo, Zoology.  
 HEGJI, RONALD R., REDDING, Mathematics.  
 HERMSMEIER, KENNETH R., Bakersfield, Mathematics.  
 HYATT, HERMAN R., Los Angeles, Mathematics.  
 JOHNSON, VIRGINIA MAE, Monterey, Mathematics.  
 KARLIN, SOL ALLEN, Reseda, Botany.  
 KIFER, JACK RUDOLPH, Van Nuys, Mathematics.  
 KILPATRICK, JEREMY, Berkeley, Mathematics.  
 LAURENZANA, LOUIS G., San Diego, Biology.  
 MAGNUSSON, LLOYD N., La Mirada, Chemistry.  
 NELSON, CARL C., Sanger, Biology.  
 PARKER, JOHN O., Palo Alto, Mathematics.  
 RASHFORD, Sr., M. ROSE D., Oakland, Mathematics.  
 SMARCY, BERNARD E., San Bernardino, Zoology.  
 SIEBERT, MERLE M., Fresno, Mathematics.  
 TRITMAN, STANLEY S., Colton, General Sciences.  
 WARD, HARRY JOHNSON, Bakersfield, Mathematics.

WILSON, CHARLES ORIN, Manhattan Beach, Zoology.  
 WOODHEAD, ROBERT JAMES, Sutter, General Sciences.

**COLORADO***Graduate*

CORNWALL, JOHN M., Denver, Physics.  
 HUTSON, RICHARD L., Boulder, Earth Sciences.  
 IRWIN, HENRY J., Denver, Anthropology.  
 MCKINNIS, RALPH W., Boulder, Mathematics.  
 NEEPER, DONALD A., Monte Vista, Physics.  
 O'CONNOR, JOSEPH T., Boulder, Earth Sciences.  
 PICKEN, JAMES S., Loveland, Engineering.  
 SHARP, JOHN V., Grand Junction, Earth Sciences.  
 STONE, GEORGE T., Cowdrey, Earth Sciences.  
 WEBB, GEORGE D., Denver, Medical Sciences.  
 WILSON, ALLEN M., Colorado Springs, Agriculture.

*Cooperative Graduate*

BIRKY, CARL W., Jr., Fort Collins, Genetics.  
 ELSBY, Sr., MARGARET G., Loretto, Mathematics.  
 GILLESPIE, JOHN R., Denver, Physics.  
 KOMMA, DONALD J., Nunn, Genetics.  
 OHL, ARDEN W., Greeley, Social Sciences.  
 SHAW, MARION L., Colorado Springs, Physics.  
 SHOTWELL, DAVID A., Boulder, Mathematics.  
 WILCOX, RALPH M., Boulder, Physics.

*Postdoctoral*

NATHENSON, STANLEY G., Denver, Medical Sciences.

*Science Faculty*

FECHNER, GILBERT H., Fort Collins, Genetics.  
 GATELEY, WILSON Y., Boulder, Mathematics.  
 JOHNSON, DONALD L., Canoga Park, Engineering.  
 MURPHY, BETH, Canyon City, Medical Sciences.

*Graduate Teaching Assistants*

BECKETT, ROBERT L., Golden, Earth Sciences.  
 BUSH, PATRICIA E., Longmont, Mathematics.  
 CONNOR, JON J., Boulder, Earth Sciences.  
 LOTT, LAYMAN A., Fort Collins, Physics.  
 STONE, GEORGE T., Cowdrey, Earth Sciences.

*Summer Fellowships for Secondary School Teachers*

BAKER, CLAUDE KENNETH, Englewood, General Sciences.  
 BLUBAUGH, HAROLD E., Aurora, Chemistry.  
 JEFFREYS, JAMES A., Denver, Mathematics.  
 MORRISON, ROBERT G., Denver, Physics.  
 STEEN, MARSHALL T., Meeker, Earth Sciences.

**CONNECTICUT***Graduate*

BALDWIN, DAVID M., West Hartford, Physics.  
 BRISTOL, MELVIN L., Collinsville, Genetics.  
 CRAMPTON, STUART B., Greenwich, Physics.  
 DOLLARD, JOHN D., Hamden, Physics.  
 FISHER, GEORGE W., Hamden, Earth Sciences.  
 FLEISCHER, EVERLY B., Branford, Chemistry.  
 FLYNN, GEORGE W., Jr., Hartford, Chemistry.  
 FOOTE, CHRISTOPHER S., West Hartford, Chemistry.  
 GAUTHIER, HOWARD L., Jr., Meriden, Social Sciences.  
 JOHNSTON, JOAN E., Ansonia, Zoology.

KLEY, RONALD J., New Britain, Earth Sciences.  
MASSO, JOSEPH F., Darien, Physics.  
MATTHYSSE, STEVEN W., Danbury, Physics.  
MERMIN, JOEL L., New Haven, Mathematics.  
MERMIN, N. DAVID, New Haven, Physics.  
PEASE, ROGER W., Jr., New Britain, Biology.  
PLANK, DONALD L., Rockville, Mathematics.  
SIMPSON, JAMES E., New Haven, Mathematics.  
STEPHENSON, ROBERT R., Mount Carmel, Engineering.  
TURBO, NICHOLAS J., Jr., Middletown, Chemistry.  
YOUNG, DAVIDA M., Wilton, Psychology.

#### *Cooperative Graduate*

AVERY, DONALD H., West Hartford, Earth Sciences.  
BERKNER, KLAUS H., Stratford, Physics.  
BRANDT, RICHARD G., Bristol, Physics.  
CHAMBERS, DONALD S., Colchester, Zoology.  
DIMMOCK, JOHN O., Branford, Physics.  
DOOLITTLE, RUSSELL F., North Haven, Biochemistry.  
HIRTH, HAROLD F., Rockville, Zoology.  
KOWALEWSKI, ALEXANDER J., Norwich, Engineering.  
KRAUSS, JEAN C., Norwich, Biology.  
PARIZEK, RICHARD R., West Willington, Earth Sciences.  
PERKINS, FRANCIS W., Jr., West Hartford, Physics.  
SWEET, MERRILL H., Storrs, Zoology.  
TOTH, LOUIS E., Easton, Engineering.

#### *Postdoctoral*

BRIGGS, THOMAS, South Norwalk, Biochemistry.  
BRUNER, EDWARD M., New Haven, Anthropology.  
GROSS, LEONARD, New Haven, Mathematics.  
HAJIAN, ARSHAG B., New Haven, Mathematics.  
MEIGS, ROBERT A., Newington, Medical Sciences.  
REPPY, JOHN D., New Haven, Physics.

#### *Science Faculty*

HOUSE, LAWRENCE C., Storrs, Mathematics.  
SLOWINSKI, EMIL J., Jr., Storrs, Chemistry.

#### *Summer Fellowships for Graduate Teaching Assistants*

CHAMBERS, DONALD S., Colchester, Zoology.  
CHRISTENSEN, RICHARD M., New Haven, Engineering.  
GRAHAM, JOHN D., New Haven, Chemistry.  
LIPMAN, PETER W., Cannondale, Earth Sciences.  
MACLACHLAN, JAMES A., Jr., New Haven, Physics.  
PROVOST, PHILIP J., Bristol, Microbiology.  
READ, MARY E., Fairfield, Anthropology.  
SIMPSON, TRACY L., New Haven, Zoology.  
STANLEY, ROLFE S., Cheshire, Earth Sciences.

#### *Summer Fellowships for Secondary School Teachers*

BERUBE, Sr., CLAIRE P., New London, Biology.  
CAPPEL, DAN, Wilton, Botany.  
CARLOW, CHESTER D., Branford, Mathematics.  
DI BLASI, Sr., ST. M. ANTH, Stamford, Biology.

GUILBAULT, Sr., ST. LUCILL, Stamford, Mathematics.

POWELL, JOHN J., Clinton, General Science.  
STONE, GEORGE NORTON, Lakeville, Mathematics.

#### DELAWARE

##### *Graduate*

DAY, BENJAMIN D., Newark, Physics.  
GALT, JAMES C., Newark, Engineering.  
KING, MERRILL K., Claymont, Engineering.  
LORAND, JOHN P., Wilmington, Chemistry.

##### *Cooperative Graduate*

BOLLINGER, ROBERT E., Newark, Engineering.  
FOSTER, GAIL E., Seaford, Mathematics.  
JORDAN, DAVID M., Wilmington, Chemistry.  
MCGRATH, PAUL A., Wilmington, Chemistry.  
WEBER, CAROLYN J., New Castle, Zoology.  
YELIN, TOBIAS O., Wilmington, Medical Sciences.

##### *Senior Postdoctoral*

KWART, HAROLD, Newark, Chemistry.

##### *Summer Fellowships for Graduate Teaching Assistants*

ARCHER, ROBERT A., Wilmington, Chemistry.  
THORNTON, ROGER L., New Castle, Chemistry.

##### *Summer Fellowships for Secondary School Teachers*

MAHAN, RALPH EUGENE, Seaford, Mathematics.  
MITCHELL, MO. FRAN DES, Wilmington, Biology.

#### DISTRICT OF COLUMBIA

##### *Graduate*

ELIOT, FRANK C., Engineering.  
HACKMAN, MORTON M., Mathematics.  
HOFFMAN, FREDERICK, Mathematics.  
MUCKENTHALER, FLORIAN A., Zoology.  
MYERS, GARDINER H., Chemistry.  
OLIVER, DAVID W., Physics.  
QUACKENBUSH, WILLIAM L., Engineering.  
RINEHART, GEORGE S., Mathematics.  
TRUESDELL, ALFRED H., Earth Sciences.  
WILSON, KENT R., Chemistry.

##### *Cooperative Graduate*

COURTNEY, JOHN C., Engineering.  
DEHN, JAMES T., Physics.  
INGLEY, JOHN S., Engineering.  
JUMONVILLE, PRESTON C., Psychology.  
MARLOW, ADDICKS R., Astronomy.  
YOUNG, FRANK C., Physics.

##### *Postdoctoral*

RENKIN, BARBARA Z., Medical Sciences.

##### *Senior Postdoctoral*

FAUL, HENRY, Earth Sciences.  
PIEN, PAO C., Engineering.  
RENKIN, EUGENE M., Zoology.

##### *Science Faculty*

HENDERSON, RALPH S., Physics.  
WHITE, DAVID G., Chemistry.

##### *Summer Fellowships for Graduate Teaching Assistants*

O'NEILL, BERNARD V., Mathematics.  
SCOTT, THOMAS M., Engineering.  
WALSH, JOSEPH H., Chemistry.

DISTRICT OF COLUMBIA—Continued

*Summer Fellowships for Secondary School Teachers*

FRITSCH, Sr., MARY CLARE, Biology.  
MAURY, MARGARET H., General Sciences.  
MCKEON, BRO. EUGENE PETE, Chemistry.  
MCNABB, Sr. M. DESALES, Mathematics.

FLORIDA

*Graduate*

BOBBOR, ARTHUR C., Tallahassee, Zoology.  
COBB, JOHN I. III, Tallahassee, Mathematics.  
ECHOLS, RONALD J., Naples, Earth Sciences.  
FOGEL, JOSEPH S., Pompano Beach, Chemistry.  
FOX, EVELYN, North Miami Beach, Physics.  
JOHNSON, BEN L., Lake Worth, Engineering.  
KAUFMAN, MYRON J., North Miami Beach, Physics.  
KUH, HARLAND L., Hawthorne, Engineering.  
LAMBERT, JERRY R., Live Oak, Engineering.  
RAMSPOTT, LAWRENCE D., Neptune Beach, Earth Sciences.  
ROBERTS, CHARLES S., Miami, Chemistry.  
SHAFFER, CHARLES V., Gainesville, Engineering.  
SHOLTES, ROBERT S., Gainesville, Engineering.

*Cooperative Graduate*

BAKER, MICHAEL B., Gainesville, Astronomy.  
CROUCH, HARRY R., Jr., Port Orange, Physics.  
DEEDS, JOSEPH B., Sarasota, Mathematics.  
GOODMAN, ROE W., Lakeland, Mathematics.  
HUDSON, FREDERICK M., Miami, Chemistry.  
LUNDBERG, GAIL K., Orlando, Social Sciences.  
MCKINLEY, MARVIN D., Gainesville, Engineering.  
MOOS, HENRY W., Gainesville, Physics.  
NEALY, DAVID L., Sarasota, Chemistry.  
SAPPENFIELD, DALE S., Miami, Chemistry.  
SCHUCKMAN, HAROLD, Tallahassee, Psychology.  
SEGRAVES, WILLIAM A., Jacksonville, Engineering.  
YANN, BRYANT K., Jr., Jacksonville, Engineering.  
WHITTEN, JERRY L., Bartow, Chemistry.  
WORTH, ROY E., Jacksonville, Mathematics.

*Science Faculty*

COOLEY, IRWIN D., Gainesville, Engineering.

*Summer Fellowships for Graduate Teaching Assistants*

HELLIER, THOMAS R., Jr., Jensen Beach, Zoology.  
HERBST, LAURENCE J., North Miami Beach, Mathematics.  
HOOKS, JAMES E., Tallahassee, Earth Sciences.  
LUTZ, RAYMOND P., Jupiter, Chemistry.  
MACINNIS, AUSTIN J., Tallahassee, Zoology.  
MEACHEM, ANNE, Daytona Beach, Zoology.  
SMITH, PAULINE C., Jacksonville, Social Sciences.

*Summer Fellowships for Secondary School Teachers*

ARDOIN, BRO. MICHAEL D., Miami, Biology.  
BROUSE, BETTY JEAN, Vero Beach, Biology.  
CAMPBELL, ROY F., Ft. Lauderdale, Biology.  
EINEM, GERALD EUGENE, Melbourne, Biochemistry.  
FARMER, JOE ALLEN, Panama City, Botany.

HAYGOOD, AUSTIN NIMROD, Sarasota, Mathematics.

MARTIN, JOEL MANN, Key West, Biology.  
MOHR, PAUL B., St. Petersburg, Mathematics.  
O'BRIEN, LELAND M., Summerfield, Biology.  
WHITTON, ETTA MAE, Tallahassee, Mathematics.  
WOOLFEVER, JOHN D., Sarasota, Biology.  
WORTHINGTON, CAROLYN B., Miami, Mathematics.

GEORGIA

*Graduate*

EICHERG, JOSEPH, Jr., Atlanta, Medical Sciences.  
GREENE, MYRON T., Adairsville, Physics.  
HOLLEY, EDWARD R., Jr., Atlanta, Engineering.  
JOHNSON, CHARLES S., Jr., Albany, Chemistry.  
MCLAIN, DAVID K., Buford, Physics.  
MORGAN, WILLIAM J., Savannah, Physics.  
NESS, SANDRA G., East Point, Mathematics.  
TIDWELL, THOMAS T., Atlanta, Chemistry.

*Cooperative Graduate*

ALVAREZ, LAURENCE R., Valdosta, Mathematics.  
ANDERSON, WYATT W., Brunswick, Zoology.  
BOUTWELL, GORDON P., Jr., Albany, Engineering.  
COVINGTON, DALE W., Marietta, Mathematics.  
GASKINS, HENRIANNE, Griffin, Zoology.  
HOBGOOD, RICHARD T., Jr., Calhoun, Chemistry.  
PHILP, ROBERT H., Jr., Rabun Gap, Chemistry.  
PROSSER, FRANKLIN P., Atlanta, Chemistry.  
ROBERTS, CHARLES D., Atlanta, Mathematics.  
SACKER, ROBERT J., Doraville, Mathematics.  
SEYMOUR, ROSALIE, Atlanta, Mathematics.  
SHARP, HOMER F., Jr., Covington, Zoology.  
WILSON, RAYMOND B., Decatur, Chemistry.

*Postdoctoral*

MURE, BROWN L., Jr., Atlanta, Chemistry.  
O'TOOLE, JAMES T., Columbus, Chemistry.

*Science Faculty*

BALL, WILFRED R., Athens, Zoology.  
FINCHER, JAMES R., Atlanta, Engineering.  
JEWETT, JOHN W., Athens, Mathematics.  
MODER, JOSEPH J., Atlanta, Mathematics.  
PURDY, KENNETH R., Atlanta, Engineering.  
YOUSE, BEVAN K., Emory University, Mathematics.

*Summer Fellowships for Graduate Teaching Assistants*

DOWNING, ROCHELLE D., Athens, Chemistry.  
MOUNT, ROBERT H., Albany, Zoology.  
SPADAFINO, LEONARD P., Athens, Chemistry.  
WILLIAMS, BRITAIN J. III, Athens, Mathematics.  
WOROBYT, THEODORE S., Columbus, Physics.

*Summer Fellowships for Secondary School Teachers*

DELOACH, JESSIE C., Folkston, Mathematics.  
FLEMING, MYRTLE M., Franklin Spring, Zoology.  
POLLER, FRANCINE I., Waycross, Mathematics.  
SHARROCK, RUTH Y., Smyrna, Mathematics.  
WILSON, MONTINE C., Cartersville, General Sciences.

## HAWAII

### Graduate

FURUMOTO, AUGUSTINE S., Honolulu, Earth Sciences.

STORY, ALFRED E., Puunene, Engineering.

### Cooperative Graduate

DEVERILL, ROBERT S., Hilo, Chemistry.

JAY, BARBARA K., Honolulu, Physics.

KITAMURA, MORRIS Y., Honolulu, Physics.

NISHIMURA, JOYCE S., Honolulu, Biochemistry.

TAKASHIMA, HERBERT T., Lahaina Maui, Chemistry.

### Science Faculty

DALTON, PATRICK D., Jr., Oahu, Agriculture.

### Summer Fellowships for Graduate Teaching Assistants

PLUCKNETT, DONALD L., Honolulu, Agriculture.

## IDAHO

### Graduate

BURDICK, GLENN A., Pocatello, Physics.

MACKI, JACK W., Mullan, Mathematics.

MURPHY, RICHARD A., Twin Falls, Zoology.

### Cooperative Graduate

CONANT, DONALD R., Caldwell, Chemistry.

JONES, LEON L., Caldwell, Chemistry.

KRUEGER, KENNETH W., Coeur d'Alene, Botany.

VERNER, JARED, Moscow, Zoology.

### Science Faculty

CROWLEY, WARD, Moscow, Mathematics.

WEEKS, OWEN B., Moscow, Microbiology.

## ILLINOIS

### Graduate

ALBERTS, BRUCE M., Glencoe, Biochemistry.

ANDRES, RONALD P., Elmhurst, Engineering.

ASH, MICHAEL E., Winnetka, Mathematics.

AUST, RICHARD B., Elmhurst, Engineering.

AUVIL, PAUL R., Jr., Wayne, Physics.

BACON, PHILIP, Wheaton, Mathematics.

BALDWIN, JOHN E., Oak Park, Chemistry.

BARNES, WILLIAM C., Glen Ellyn, Earth Sciences.

BERTONI, HENRY L., Chicago, Engineering.

BLISS, JAMES C., Chicago Heights, Engineering.

BOURGIN, MARCIA A., Urbana, Biophysics.

BROOKS, PHILIP R., Hazel Crest, Chemistry.

BUCCINO, ALPHONSE, Chicago, Mathematics.

BUDICK, BOYCE, Evanston, Physics.

BUSHNELL, JAMES C., Urbana, Physics.

CABHART, RICHARD A., Evanston, Physics.

CARR, WAYNE E., Freeburg, Physics.

COLEMAN, SIDNEY R., Chicago, Physics.

COFFOLA, PATRICIA T., Greenville, Zoology.

CUSHING, JAMES T., Chicago, Physics.

DAVIS, MICHAEL M., Peoria, Astronomy.

DOMROESE, KENNETH A., Chicago, Zoology.

DONAHUE, JACK D., West Chicago, Earth Sciences.

DOUGLAS, ROY R., Northfield, Mathematics.

DOVE, WILLIAM F., Jr., Oak Park, Biochemistry.

ECKSTEIN, SHULAMITH G., Chicago, Physics.

EDIDIN, MICHAEL A., Chicago, Zoology.

EHLERT, DAVID L., Bellwood, Mathematics.

FRAENKEL, DAN G., Urbana, Medical Sciences.

FRYXELL, REDWOOD T. W., Rock Island, Earth Sciences.

GLADISE, YVONNE C., Waukegan, Biochemistry.

GOLIN, STUART J., Chicago, Physics.

GUSTAFSON, ROBERT D., Elmhurst, Engineering.

HALPERN, HERBERT P., Chicago, Mathematics.

HUMPHREYS, TOM D. II., Chicago, Zoology.

KERMICLE, JERRY L., Dundas, Genetics.

KEYSER, LEON F., Waukegan, Chemistry.

KLEMENT, WILLIAM, Jr., Bensenville, Engineering.

KRAMER, SHELDON J., Chicago, Engineering.

KRAWCZYK, GERALD R., Carbondale, Agriculture.

LEDBERER, CHARLES M., Chicago, Chemistry.

LELAND, KENNETH O., Chicago, Mathematics.

LEVINE, MICHAEL J., Chicago, Physics.

MARKS, SUZANNE C., Edwardsville, Zoology.

MASSEY, JAMES L., Ottawa, Engineering.

MCCRIMMON, KEVIN M., Urbana, Mathematics.

MIKULECKY, DONALD C., Berwyn, Medical Sciences.

MILGRAM, RICHARD J., Chicago, Mathematics.

MULLIN, MICHAEL M., Mount Carroll, Zoology.

NEFF, CAROL J., Chicago, Zoology.

NORTON, KARL K., Urbana, Mathematics.

OLSON, KENNETH E., Chicago, Engineering.

PAV, PETER A., Berwyn, Physics.

PRICE, JOHN C., Deerfield, Physics.

READEY, DENNIS W., Aurora, Engineering.

REINTS, ROBERT E., Jr., Sycamore, Engineering.

RIPPERGER, WILLIAM C., Bensenville, Mathematics.

ROWND, ROBERT H., Chicago, Medical Sciences.

RUDNICK, STANLEY J., Berkeley, Physics.

SACKETT, JAMES R., Northbrook, Anthropology.

SANDEL, VERNON R., Evanston, Chemistry.

SCHERTZ, DONALD R., Lowpoint, Engineering.

SHANKS, WESLEY L., Northlake, Physics.

SHEPARD, HARVEY K., Chicago, Physics.

SHREFFLER, DONALD C., Kankakee, Genetics.

SIEGEL, DANIEL M., Chicago, Physics.

SIMON, NANCY J., La Grange, Physics.

SWANK, ROBERT K., Urbana, Physics.

SWENTON, LYDIA, Chicago, Chemistry.

SWIDER, ANNA M., Chicago, Physics.

TINKLER, JACK D., Lansing, Engineering.

TREDWELL, JOHN, Chicago, Engineering.

UEBBING, JOHN J., Chicago, Engineering.

VOLZ, RICHARD A., Woodstock, Engineering.

WEINER, JOHN L., Chicago, Earth Sciences.

WILKINS, JOHN W., Oak Park, Physics.

ZIMMERMAN, JOHN L., Champaign, Zoology.

### Cooperative Graduate

ACKERMAN, BEBNICE, Chicago, Earth Sciences.

AHRENKIEL, RICHARD K., Athens, Physics.

ALLEN, RICHARD R., Belleville, Physics.

BEUSCHLEIN, MURIEL L., Chicago, Zoology.

BLUS, LAWRENCE J., Tilden, Zoology.

BRANDON, RONALD A., Champaign, Zoology.

BROWN, BERNARD T., O'Fallon, Engineering.

BRYA, WILLIAM J., Chicago, Engineering.

CARLSON, DONALD E., Tampico, Engineering.

CHLOUPEK, FRANK J., Berwyn, Chemistry.

ILLINOIS—Continued

CLAUSING, ARTHUR M., Palatine, Engineering.  
 CLERON, VICTOR, Urbana, Chemistry.  
 COATES, ROBERT M., Palatine, Chemistry.  
 CURRIE, NEVA L., Loda, Zoology.  
 DAMMANN, JAMES E., Wood River, Social Sciences.  
 DORN, GORDON L., Chicago, Genetics.  
 DUDLEY, RICHARD M., Flossmoor, Mathematics.  
 FELDMAN, ALBERT, Chicago, Physics.  
 FITZGERALD, THOMAS J., Chicago, Engineering.  
 FOX, WILLIAM T., Evanston, Earth Sciences.  
 GRADY, LEE T., Chicago, Chemistry.  
 GRAFF, GEORGE C., Urbana, Mathematics.  
 GRIEVES, ROBERT B., Chicago, Engineering.  
 GRIFFIN, JOHN R., Du Quoin, Engineering.  
 GROSSMAN, NATHANIEL, Aurora, Mathematics.  
 GWYNN, DONALD E., Urbana, Chemistry.  
 HAGEN, CARL R., Chicago, Physics.  
 HANNON, WILLARD J., Elk Grove Vill, Earth Sciences.  
 JOHNSON, GLENN R., Geneseo, Agriculture.  
 JONES, ROBERT M., Urbana, Engineering.  
 KASER, JOHN D., Lemont, Engineering.  
 KERRISK, JERRY F., Chicago, Engineering.  
 KIRBY, DAVID B., Urbana, Engineering.  
 KLEIN, HARVEY S., Chicago, Chemistry.  
 LAPP, DOUGLAS M., Springfield, Physics.  
 LARSON, JOHN G., Knoxville, Chemistry.  
 LASAINE, ALFRED D., Chicago, Mathematics.  
 LEE, KATHARINE W., Chicago, Biochemistry.  
 LYDI, DAVID L., Wilmington, Chemistry.  
 MALVICK, ALLAN J., Oak Lawn, Engineering.  
 MATHEWS, WESLEY N., Jr., Champaign, Physics.  
 McCLAUGHRY, JOHN T., Paris, Engineering.  
 McCOBMICK, NORMAN J., Normal, Engineering.  
 MERCIER, JOHN A., Oak Lawn, Engineering.  
 MEYER, JOHN S., Lamolille, Mathematics.  
 MEYER, MARSHALL D., Beardstown, Engineering.  
 MORAN, DANIEL A., Chicago, Mathematics.  
 MORRISON, JAMES D., Evanston, Chemistry.  
 MORSE, THEODORE F., Evanston, Engineering.  
 NUTTALL, RONALD L., Downers Grove, Psychology.  
 O'CONNELL, EDWARD J., Jr., Evanston, Psychology.  
 PERLMUTTER, DAVID M., Glencoe, Social Sciences.  
 PERONE, SAM P., Rockford, Chemistry.  
 REED, WILLIAM A., Evanston, Physics.  
 REHM, RONALD G., Glen Ellyn, Engineering.  
 REISS, LEWIS P., Urbana, Engineering.  
 ROSENKRANTZ, WALTER A., Chicago, Mathematics.  
 RUTLEDGE, ROBERT B., III, St. Louis, Mathematics.  
 SATER, VERNON E., Chicago, Engineering.  
 SATHRE, NORMAN F., Elmhurst, Engineering.  
 SCHMALFELD, HAROLD W., Schiller Park, Agriculture.  
 SMITH, HARRIET J., Chicago, Botany.  
 SPITZLER, THOMAS M., Chicago, Chemistry.  
 STEINMETZ, RICHARD, Evanston, Earth Sciences.  
 SWENSON, GEORGE W., Chicago, Chemistry.  
 SWOFFORD, HAROLD S., Jr., Champaign, Chemistry.  
 SYLVESTER, RAYMOND M., Chicago, Chemistry.  
 TRETS, DAVID W., Champaign, Biochemistry.

TRAPP, CHARLES A., Chicago, Chemistry.  
 TURNER, FRED A., Chicago, Chemistry.  
 VILLAREJO, MEBNA R., Chicago, Biochemistry.  
 WADE, DAVID C., Champaign, Engineering.  
 WALLER, DAVID W., Bellwood, Zoology.  
 WATSON, HOWARD L., Jr., Arlington Heights, Mathematics.  
 WEINER, HOWARD J., Chicago, Physics.  
 WIEDEMANN, ALFRED M., Naperville, Agriculture.  
 WILLIAMS, GLENN F., Chicago, Psychology.  
 WINNICK, JACK, Chicago, Engineering.  
 WITT, GERALD L., Alton, Physics.  
 WOOD, ALLEN D., Palos Heights, Engineering.  
 WYSOCKI, ALLEN J., Chicago, Chemistry.

*Postdoctoral*

BAKER, ROBERT H., Jr., Evanston, Biochemistry.  
 BECK, JAMES R., Champaign, Chemistry.  
 BISCHOFF, KENNETH B., Chicago, Engineering.  
 BJORKEN, JAMES D., Park Ridge, Physics.  
 COONEY, DAVID P., Evanston, Medical Sciences.  
 GALLAGHER, JAMES J., Champaign, Psychology.  
 GOLDBERG, JAY M., Chicago, Psychology.  
 HAGER, EDWARD B., Hubbard Woods, Medical Sciences.  
 HARRIS, BRUNO, Evanston, Mathematics.  
 HARRIS, SAMUEL M., Chicago, Physics.  
 KATOH, ARTHUR K., Urbana, Zoology.  
 KINZEY, WARREN G., Chicago, Anthropology.  
 KLEIN, MILES V., Chicago, Physics.  
 MATCHETT, WILLIAM H., Elgin, Genetics.  
 MINN, FREDRICK L., Waukegan, Chemistry.  
 MOERILL, RICHARD L., Evanston, Social Sciences.  
 OLOFSON, ROY A., Chicago, Chemistry.  
 SCHLESSINGER, DAVID, Chicago, Biochemistry.  
 STEINHART, JOHN S., Chicago, Earth Sciences.  
 TALBOTT, RICHARD L., Elmhurst, Chemistry.  
 WARD, HAROLD R., Mt. Vernon, Chemistry.  
 WEISS, GUIDO L., Chicago, Mathematics.  
 WOLF, NORMAN S., Chicago, Medical Sciences.

*Senior Postdoctoral*

ATWOOD, KIMBALL C., Chicago, Genetics.  
 BOGORAD, LAWRENCE, Chicago, Biochemistry.  
 LASHOF, RICHARD K., Chicago, Mathematics.  
 YANKWICH, PETER E., Urbana, Chemistry.

*Science Faculty*

BEACH, NEIL W., Lake Forest, Zoology.  
 BERGSTROM, ROBERT C., Cicero, Earth Sciences.  
 CARNRY, ROSE A., Lisle, Physics.  
 CLARK, HELEN M., Evanston, Mathematics.  
 EMBREE, EARL O., Alton, Mathematics.  
 HARMET, KENNETH H., De Kalb, Botany.  
 LANDIN, JOSEPH, Urbana, Mathematics.  
 LINDBECK, WENDELL A., De Kalb, Chemistry.  
 MARK ABRAHAM M., Carbondale, Mathematics.  
 MILLER, ROBERT L., Urbana, Chemistry.  
 MOSBORG, ROBERT J., Urbana, Engineering.  
 MURPHY, KENNETH H., Urbana, Mathematics.  
 MURPHY, KENNETH W., Macomb, Physics.  
 PALTER, ROBERT M., Chicago, Physics.  
 SILBER, JACK, Chicago, Mathematics.  
 STOECKER, WILBERT F., Urbana, Engineering.

WIESINGER, FREDERICK P., Urbana, Engineering.

*Summer Fellowships for Graduate Teaching Assistants*

BAER, WALTER S., Glencoe, Physics.  
BARKER, JOHN L., Jr., Chicago, Chemistry.  
BAUMAN, STEVEN F., Urbana, Mathematics.  
BIELLER, LARRY G., East Carondelet, Earth Sciences.

BLINN, WALTER C., Chicago, Zoology.  
BURDI, ALPHONSE R., Chicago, Medical Sciences.

CARL, JAMES D., Centralia, Earth Sciences.  
CHITTENDEN, DAVID H., Hazel Crest, Engineering.

DEMARR, RALPH A., Jacksonville, Mathematics.

DERWENT, JOHN E., Chicago, Mathematics.  
DYBVIK, DOUGLAS H., Champaign, Chemistry.  
FISHER, WILLIAM L., Marion, Earth Sciences.

FOELL, WESLEY K., Elgin, Physics.  
FORD, JAMES A., Glenview, Engineering.  
FRAMBS, FRANK A., Urbana, Zoology.  
GABRL, NORMAN W., Chicago, Chemistry.  
GERMANAS, DALIA, St. Charles, Chemistry.  
GOLDMAN, JACK L., Chicago, Chemistry.  
GURNEY, DONALD P., Jr., Chicago, Engineering.

HAYNES, LEROY W., Urbana, Chemistry.  
HREN, JOHN A., Glen Ellyn, Engineering.  
IWASYK, JOHN M., Bellwood, Engineering.  
JOESTEN, MELVIN D., Rochelle, Chemistry.  
KENT, JOHN C., Arlington Heights, Engineering.

LANGBERG, GEORGE, Champaign, Mathematics.  
LARSON, CARL S., Urbana, Engineering.  
LEAF, GARY K., Champaign, Mathematics.  
LIBER, TED, Chicago, Engineering.  
LYDY, DAVID L., Wilmington, Chemistry.  
NEALE, ROBERT S., Champaign, Chemistry.  
NEMETH, EDWARD M., S.J., Chicago, Chemistry.

NEWCOMER, RICHARD J., Princeton, Zoology.  
O'BRIEN, RONALD J., Chicago, Physics.  
O'NEIL, JAMES R., Chicago, Chemistry.  
PETERS, JOSEPH A., Urbana, Mathematics.  
PINTER, ROBERT B., Evanston, Engineering.  
PRANGER, WALTER A., Jr., Cicero, Mathematics.

RIGGS, ELLIOTT A., Urbana, Earth Sciences.  
SARLES, HARVEY B., Chicago, Anthropology.  
SNITKER, MARTHA L., Ohlman, Chemistry.  
STEINMETZ, RICHARD, Evanston, Earth Sciences.

STOCKMAN, DAVID L., Charleston, Chemistry.  
STUEBEN, EDWIN F., Chicago, Mathematics.  
SWOFFORD, HAROLD S., Jr., Champaign, Chemistry.

TIPTON, CHARLES M., Champaign, Medical Sciences.

WAHL, ARNOLD C., Chicago, Chemistry.  
WALLER, THOMAS R., Elmwood Park, Earth Sciences.

WARD, HAROLD R., Mt. Vernon, Chemistry.  
WEINER, HOWARD J., Chicago, Physics.  
WITTHOFT, WILLIAM G., Chicago, Mathematics.

*Summer Fellowships for Secondary School Teachers*

BAUER, Sr. M. DARIA, Chicago, Biology.  
BUCKLER, WILLIAM F., Aurora, Mathematics.  
BURNS, ROBERT BYRON, Peoria, General Sciences.

BURROW, GEORGE IRVING, Port Byron, General Sciences.

CHRISTIAN, RAYMOND E., Chicago, Chemistry.  
DEVINE, DONALD F., Park Forest, Mathematics.

EGOLF, THOMAS HENRY, Belleville, Physics.  
HALL, RICHARD LOWELL, Evanston, Chemistry.

HART, HUGH E., Evanston, Mathematics.  
HELM, HERBERT WOOLF, Chicago, Mathematics.

HIMES, EDWARD N., Maywood, Mathematics.  
HOOVER, JAMES M., Batavia, Botany.

JAMES, BRUCE P., Winnetka, Mathematics.  
KOHLEY, Sr. EVANGELISTA, Lagrange Park, Biology.

KRYCH, Sr. M. ANNELDE, Chicago, Biology.  
LADD, NORMAN ELMER, Des Plaines, Mathematics.

LEATHERS, LEO J., Northbrook, Biology.  
LINDHORN, ROBERT C., Berwyn, Mathematics.  
MCNEAL, MOTH. MATTHIAS, Decatur, Biology.  
MUCKERMANN, Sr. M. ALPHON, Breese, Biology.

MUELLER, PAUL NEAL, Arlington Heights, General Sciences.

MUNSON, NORMA F., Libertyville, Biology.  
ROYE, JAMES PAUL, Dongola, Biology.

RUD, Sr. BERNARD MARY, Chicago, Biology.  
RUDOLPH, EARL S., Decatur, Chemistry.

RUEFF, LAWRENCE E., Decatur, Biology.  
SCHERRER, ROBERT HOWELL, Decatur, Biology.

STRETTON, WILLIAM C., Lagrange, Mathematics.  
TENNEY, ARTHUR EDWARD, Winnetka, Mathematics.

WALKER, ELISABETH M., Hinsdale, Mathematics.

ZALOKAR, RONALD S., Roseville, Biology.  
ZBOROWSKI, RICHARD A., Riverside, Mathematics.

ZIMMERMAN, ROBERT M., East Moline, Mathematics.

INDIANA

*Graduate*

BELINFANTE, JOHAN G., W. Lafayette, Physics.

COLEMAN, WILLIAM II, Vincennes, Social Sciences.

FISCH, MICHAEL H., Indianapolis, Chemistry.

FISHER, THORNTON R., Indianapolis, Physics.  
KOKINDA, JOHN J., Gary, Engineering.

KOVATS, THOMAS A., Ft. Wayne, Physics.  
LARNER, DANIEL M., Indianapolis, Social Sciences.

LEGG, JAMES C., Windfall, Physics.  
MARTIN, EDWARD S., Terre Haute, Chemistry.

MILES, GLEN A., Cloverdale, Engineering.  
NADING, LEWIS K., Indianapolis, Genetics.

NEUMANN, HOLM W., Bloomington, Anthropology.

PARR, JAMES T., Lebanon, Mathematics.  
PETERS, PHILIP C., Chesterton, Physics.

POHL, WILLIAM F., Michigan City, Mathematics.

PURSOLEY, STEPHEN A., Indianapolis, Engineering.

RAGLAND, THOMAS E., North Salem, Biochemistry.

RIGG, ROBERT G., Hammond, Engineering.  
ROOT, FORREST K., Bedford, Earth Sciences.

SANDERS, WILLIAM A., Oxford, Chemistry.  
SCHERRER, KIRBY V., Jr., Evansville, Chemistry.

INDIANA—Continued

SCHMALBERGER, DONALD C., Bloomington, Astronomy.  
 SHEERWOOD, BRUCE A., W. Lafayette, Physics.  
 SIMS, CHARLES C., Elkhart, Mathematics.  
 VANDEVELDE, JOSEPH R., West Baden Springs, Mathematics.

*Cooperative Graduate*

BLACKWELL, FREDERICK W., Elkhart, Mathematics.  
 BOEHMAN, LOUIS I., St. Meinrad, Engineering.  
 BROSHAAR, WAYNE C., Crawfordsville, Physics.  
 BRUNNER, PHILIP W., Ossian, Engineering.  
 CHIDDISTER, JERRY L., Goshen, Engineering.  
 COLB, MICHAEL, Bloomington, Psychology.  
 CORK, MAX J., Terre Haute, Engineering.  
 DAVIDSON, ERNEST R., Bloomington, Chemistry.  
 DAY, GEORGE W., W. Lafayette, Mathematics.  
 DEHAAN, FRANKLIN P., W. Lafayette, Chemistry.  
 DERUDDER, RONALD D., Bloomington, Earth Sciences.  
 DILLING, WENDELL L., W. Lafayette, Chemistry.  
 EMMERSON, JOHN L., Owensville, Medical Sciences.  
 FULLER, RAY W., W. Lafayette, Biochemistry.  
 GROSSMAN, RICHARD F., Marlon, Chemistry.  
 KELLAM, JOHN M. Jr., Indianapolis, Engineering.  
 KENDALL, STEPHEN B., Marlon, Psychology.  
 KNILL, RONALD J., Notre Dame, Mathematics.  
 LAWVERE, FRANCIS W., Jr., Upland, Mathematics.  
 LINBLEY, WILLIAM T., Ft. Wayne, Engineering.  
 MCCARTY, CHARLES B., Lawrenceburg, Engineering.  
 MOSBY, JAMES F., Indianapolis, Engineering.  
 O'NEILL, RONALD C., Lafayette, Mathematics.  
 PEALE, STANTON J., Indianapolis, Engineering.  
 RHODE, JASPER I., Lafayette, Physics.  
 THOMPSON, MAYNARD D., Michigan City, Mathematics.  
 WHEELER, JOSEPH D., W. Lafayette, Engineering.

*Postdoctoral*

WILLIAMS, ROBERT F., W. Lafayette, Mathematics.  
 ZEFS, VALDIS J., Bloomington, Social Sciences.

*Senior Postdoctoral*

AXELROD, BERNARD, Lafayette, Biochemistry.  
 ROSS, MARC H., Bloomington, Physics.  
 TRUESDELL, CLIFFORD A., Bloomington, Mathematics.

*Science Faculty*

BRETSCHER, MIRIAM E., Valparaiso, Mathematics.  
 DOEDEN, GERALD E., Muncie, Chemistry.  
 EMERY, ALDEN H., Jr., Lafayette, Engineering.  
 MARTIN, Sr. M. CELINE, Fort Wayne, Biology.  
 MURPHY, FR. MICHAEL J., Notre Dame, Earth Sciences.  
 PASCHALL, HOMER D., Muncie, Zoology.

SCHAAPE, WARD B., Bloomington, Chemistry.  
 TELFAIR, DAVID, Richmond, Physics.  
 TRESSLER, JOHN B., Angola, Physics.

*Summer Fellowships for Graduate Teaching Assistants*

BURLINGTON, ROY F., W. Lafayette, Zoology.  
 COLEMAN, WILLIAM II., Vincennes, Social Sciences.  
 DENISE, RICHARD W., W. Lafayette, Engineering.  
 DERUDDER, RONALD D., Bloomington, Earth Sciences.  
 GREEN, JOHN W., Garrett, Chemistry.  
 HANSON, GEORGE P., Bloomington, Genetics.  
 JOHNSON, LOWELL B., W. Lafayette, Botany.  
 KEITH, JAMES E., Plymouth, Chemistry.  
 KELSEY, CHARLES A., South Bend, Physics.  
 KIRK, WILLIAM A., Reelsville, Mathematics.  
 MAXON, MARSHALL S., Bloomington, Physics.  
 MCDOWELL, JOHN W., Jr., Bloomington, Chemistry.  
 MENOLD, ERNEST R., South Bend, Engineering.  
 RICKTER, DONALD O., W. Lafayette, Chemistry.  
 UECKER, FRANCIS A., Fort Wayne, Botany.  
 WILDIN, MAURICE W., W. Lafayette, Engineering.  
 WILSON, HOWARD L., Bloomington, Physics.  
 YAQUB, FAWZI M., W. Lafayette, Mathematics.

*Summer Fellowships for Secondary School Teachers*

ALLEN JESSE BYRON, Whiting, Mathematics.  
 BUDENSIEK, RONALD KEITH, Muncie, Chemistry.  
 CRABILL, L. DELMAR, Logansport, Mathematics.  
 DENNE, GILBERT, Michigan City, Biology.  
 DEYOUNG, PETER J., W. Lafayette, Mathematics.  
 FLANSBURG, GLENN E., Hammond, Mathematics.  
 FREDERICK, TERRY JOE, Vincennes, Mathematics.  
 GOODNIGHT, FREDRICK H., North Judson, Biology.  
 KINCAID, WAYNE H., Indianapolis, General Sciences.  
 PAYNE, KENNETH EARL, Terre Haute, Biology.  
 RAMSEY, VIOLA ALICE, Indianapolis, Mathematics.  
 RICE, JACK ALLEN, Logansport, Mathematics.  
 SCHILLING, ROBERT G., Frankfort, Mathematics.  
 SMITH, MARVIN DELBERT, Indianapolis, Biology.  
 SMITH, MARY CAROLYN, Hoagland, Mathematics.  
 WHITE, STANLEY A., Clarksville, Mathematics.

IOWA

*Graduate*

ANDERSON, JAMES R., Ames, Physics.  
 BERGE, GLENN L., Decorah, Astronomy.  
 BERRY, JOHN C., Ames, Engineering.  
 EGGER, CARL T., Monticello, Engineering.  
 HALL, GRACE W., Iowa City, Chemistry.  
 HANDY, Sr. M. ANTONIA, Dubuque, Genetics.  
 HANSON, FRANK E., Jr., Hawarden, Zoology.  
 KOHLMAN, DAVID L., Lamoni, Engineering.



LANDWEBER, PETER S., Iowa City, Mathematics.  
LILLEHOJ, EIVIND B., Kimballton, Botany.  
NICOLSON, DAN H., Shenandoah, Botany.  
POLKING, JOHN C., Breda, Mathematics.  
PULLEY, ARDEN O., Ames, Biochemistry.  
SARGENT, PETER B., Cedar Rapids, Chemistry.  
STUDIER, FREDERICK W., Waverly, Biophysics.  
SUNDBERG, RICHARD J., Linn Grove, Chemistry.  
THOMAS, BRUCE R., Guthrie Center, Physics.  
TOGEAS, JAMES B., Fort Dodge, Chemistry.  
WEIDLER, DONALD J., New Hampton, Zoology.

#### *Cooperative Graduate*

BERGSON, JOHN E., Sioux City, Physics.  
BOVBERG, ANN M., Iowa City, Zoology.  
CARLSON, CLARENCE A., Jr., Ames, Zoology.  
CHASE, JOHN W., Council Bluffs, Chemistry.  
COONCE, HARRY B., Ames, Mathematics.  
DAHM, ARNOLD J., Pella, Physics.  
DANKLEFF, MARY A., Cedar Falls, Chemistry.  
DILLMAN, NORMAN G., Ames, Engineering.  
DIVEBIS, JAMES E., Iowa City, Genetics.  
DIXON, CHRIST D., Corning, Mathematics.  
FRANK, LOUIS A., Fort Madison, Physics.  
GABRIELSON, JAMES E., Cedar Rapids, Engineering.  
GOBEN, CHARLES A., Charlton, Engineering.  
GOODMAN, MAJOR M., Des Moines, Genetics.  
GURALNIK, GERALD S., Cedar Falls, Physics.  
HAENSEL, HUBERT D., Ames, Botany.  
HOFFMAN, LARRY R., Sigourney, Botany.  
HORNOCKER, MAURICE G., Allerton, Zoology.  
HOVERSTEN, ESTIL V., Ames, Engineering.  
HOWREY, EUGENE P., Fairfield, Social Sciences.  
JOHNSON, KENT E., Davenport, Earth Sciences.

KLEESE, ROGER A., Ames, Agriculture.  
KRISTIANSON, BRYANT N., Ogden, Engineering.  
LIGON, JAMES T., Ames, Engineering.  
MARSHALL, MARILYN E., Iowa City, Psychology.  
MARTIN, JOSEPH M., Keokuk, Mathematics.  
MATHRE, DONALD E., Ames, Botany.  
PETRO, JOHN W., Iowa City, Mathematics.  
RATLIFF, LOUIS J., Jr., Marion, Mathematics.  
RIDDELL, NANCY C., Ames, Zoology.  
SAYLOR, LEROY C., Cedar Rapids, Genetics.  
SMALLEY, KATHERINE N., Iowa City, Zoology.  
SMITH, KEITH P., Boone, Mathematics.  
TRAPOLD, MILTON A., Iowa City, Psychology.  
WATSON, GEORGE A., Knoxville, Engineering.  
WAUER, JOHN C., Sioux City, Engineering.  
WOODY, ROBERT W., Newton, Chemistry.

#### *Postdoctoral*

ROBERTS, WALDEN K., Lamoni, Biochemistry.

#### *Senior Postdoctoral*

GOOD, ROLAND H., Jr., Iowa City, Physics.  
THORNE, ROBERT F., Iowa City, Botany.

#### *Science Faculty*

ANDERSON, PAUL M., Iowa City, Engineering.  
HAGAN, Sr. MARY M., Dubuque, Chemistry.  
KENNELLY, Sr. MARY M., Dubuque, Chemistry.  
STREIB, WILLIAM J., Iowa City, Engineering.

#### *Summer Fellowships for Graduate Teaching Assistants*

BATHIE, WILLIAM W., Ames, Engineering.  
BIRKENHOLZ, DALE E., Prairie City, Zoology.

BUEKER, ROBERT C., Ames, Mathematics.  
CLAMPITT, PHILIP T., Des Moines, Zoology.  
GORTLER, LEON B., Des Moines, Chemistry.  
JOHNSON, BRUCE L., Ames, Engineering.  
KLAPPER, GILBERT J., Iowa City, Earth Sciences.  
LUTHER, NORMAN Y., Iowa City, Mathematics.  
MARTIN, JOSEPH M., Keokuk, Mathematics.  
MCINTOSH, THOMAS H., Ames, Agriculture.  
MITCHELL, ROGER L., Grinnell, Agriculture.  
MULFORD, CHARLES L., Iowa Falls, Social Sciences.  
RICHARDSON, WILLIAM H., Ames, Mathematics.

ROISEN, BENJAMIN A., Northwood, Mathematics.

SCHMITZ, FRANCIS J., Jesup, Chemistry.  
SMALLEY, KATHERINE N., Iowa City, Zoology.  
SMITH, KEITH P., Boone, Mathematics.  
THOMAS, ROBERT W., Jr., Ames, Social Sciences.

#### *Summer Fellowships for Secondary School Teachers*

CROSSWHITE, F. JOE, Keokuk, Mathematics.  
EBERT, WAYNE E., Clarion, Biology.  
FETT, GORDON F., Aurelia, Mathematics.  
HOHLFELD, JOSEPH F., Cedar Falls, Mathematics.  
MAUSETH, HARRY A., Iowa City, Biology.  
OHL, LLOYD EUGENE, Fort Madison, Biology.  
OSHER, ROBERT ELMER, Marshalltown, Mathematics.  
SCHAUB, RUSSELL E., Titonka, Mathematics.  
SNYDER, JOHN D., Carroll, Mathematics.  
TRUMP, RICHARD F., Ames, Zoology.

#### KANSAS

##### *Graduate*

BERRY, WILLIAM H., Kansas City, Mathematics.  
CEDERBERG, JAMES W., Herndon, Physics.  
DAVIS, JOHN A., Jr., Topeka, Engineering.  
ENOS, PAUL P., Perry, Earth Sciences.  
FIEOCK, FRANK D., Lawrence, Physics.  
FRITZE, BERNARD H., Emporia, Zoology.  
HARMS, CLARENCE E., Hillsboro, Zoology.  
HAYS, BYRON G., Wichita, Chemistry.  
JOHNSON, MILFORD A., Jr., Iola, Engineering.  
KEVAN, LARRY J., Kansas City, Chemistry.  
MANTHEY, JOHN P., Sharon Springs, Engineering.  
ONTJES, DAVID A., Hutchinson, Medical Sciences.  
RAMSAY, ARLAN B., Dodge City, Mathematics.  
REYNOLDS, WYNETKA A., Emporia, Zoology.  
RICHERT, ANTON S., Wichita, Physics.  
ROOT, JOHN W., Shawnee, Chemistry.  
SETSER, DONALD W., Hudson, Chemistry.  
SINKHORN, RICHARD D., Wichita, Mathematics.  
TEMPLIN, ANNETTE, St. John, Microbiology.  
UNRUH, WESLEY P., Lawrence, Physics.  
WHITEHEAD, C. THOMAS, Columbus, Engineering.  
ZIMMERMAN, JOHN F., Lawrence, Chemistry.

##### *Cooperative Graduate*

BRYAN, DAVID R., Elkhart, Mathematics.  
BUTLER, RONALD D., Manhattan, Chemistry.  
DAVIS, ELMER E., Haviland, Mathematics.  
DEALY, JOHN M., Wichita, Engineering.  
FOULKE, LARRY R., Kiowa, Engineering.  
HANNA, JOSEPH F., Dighton, Mathematics.

## KANSAS—Continued

HOBSON, ARTHUR S., Manhattan, Physics.  
HORNE, FREDERICK H., Mission, Chemistry.  
JUSTICE, WAYMAN P., Manhattan, Genetics.  
MAIER, RICHARD A., Manhattan, Psychology.  
MAILEN, JAMES C., Wichita, Engineering.  
MANAHAN, STANLEY E., Peabody, Chemistry.  
McCARTY, CHARLES G., Wichita, Chemistry.  
PLATT, DWIGHT R., Newton, Zoology.  
RUMPEL, MAX L., Ogallah, Chemistry.  
SENECAL, REV. GERARD, Atchison, Physics.  
SKINNER, JAMES L., Lincoln, Engineering.  
STUTH, CHARLES J., Lawrence, Mathematics.  
TUCKER, PATRICIA A., Emporia, Mathematics.  
WEIDMAN, DONALD R., Kansas City, Mathematics.  
ZAHNLEY, JAMES C., Manhattan, Biochemistry.

### Science Faculty

CLARKE, ROBERT F., Emporia, Zoology.  
LINDLY, EDWIN C., Manhattan, Engineering.  
PROPHET, CARL W., Emporia, Zoology.  
SIMPKIN, WILLIAM E., Wichita, Engineering.

### Summer Fellowships for Graduate Teaching Assistants

BROWN, SHANNON R., Topeka, Social Sciences.  
FISH, VERNON R., Parsons, Engineering.  
GAUGHAN, EDWARD D., Lawrence, Mathematics.  
HISS, WILLIAM L., Phillipsburg, Earth Sciences.  
JOHNSON, RALPH T., Jr., Salina, Physics.  
JONES, DELBERT M., Great Bend, Physics.  
LONG, JOHN B., Topeka, Psychology.  
MANUEL, OLIVER K., Wichita, Chemistry.  
ROGERS, GARY B., Manhattan, Engineering.  
STUTH, CHARLES J., Lawrence, Mathematics.

### Summer Fellowships for Secondary School Teachers

ALDRIDGE, BILLY G., Bethel, Physics.  
DAVIDSON, JOSEPH G., Bethel, Biology.  
EDER, RICHARD LEE, Scott City, Biology.  
EISELE, GEORGE ANTHONY, Quinter, Mathematics.  
HENDRIX, JULIA C., Kansas City, Mathematics.  
HUNT, STANLEY L., Wichita, Biology.  
JANDER, JOHN C., Liberal, Mathematics.  
MILLS, ROBERT B., Topeka, Biology.  
PETERS, WILLARD H., Wichita, Biology.

## KENTUCKY

### Graduate

ALVERSON, WILLIAM K., Lexington, Engineering.  
HARDIN, BOBBY O., Lexington, Engineering.  
KONSLER, THOMAS R., Henderson, Biology.  
LAYSON, WILLIAM M., Millersburg, Physics.  
MELTON, CHARLES G., Jr., Henderson, Biology.  
PORTER, MARCELLUS C., Louisville, Engineering.  
RIEHM, CHARLES E., Jr., Louisville, Engineering.  
SUICH, JOHN E., Louisville, Engineering.  
WESSEL, WILLIAM L., Louisville, Physics.  
WHITESIDES, GEORGE M., Anchorage, Chemistry.

### Cooperative Graduate

ADE, FREDERICK C., Louisville, Engineering.  
BEALS, RALPH E., Lexington, Social Sciences.  
CAMMACK, FLOYD M., Lexington, Anthropology.

CHAVENS, NORMAN Y., Owensboro, Engineering.  
CRAWFORD, THOMAS H., Louisville, Chemistry.  
HOCHSTRASSER, DONALD L., Fisherville, Anthropology.  
HOHMAN, SR. BENEDICT, Louisville, Chemistry.  
INMAN, WILLIAM C., Lexington, Psychology.  
KAFESJIAN, RALPH, Louisville, Engineering.  
LAMB, RICHARD C., Lexington, Physics.  
MATTOX, DONALD M., Lexington, Physics.  
MEITMAN, JAMES R., Louisville, Agriculture.  
MONROE, BURT L., Jr., Anchorage, Zoology.  
MOORE, GEORGE C., Bowling Green, Physics.  
RAMBY, KERMIT C., Lexington, Chemistry.  
RICHARDS, HUBERT L., Lexington, Chemistry.  
SLAUGHTER, GEORGE T., Hardyville, Engineering.  
SLEDD, WILLIAM T., Murray, Mathematics.  
STAPLES, CODY E., Louisville, Chemistry.  
WITTE, C. GAY, Louisville, Psychology.

### Postdoctoral

GRAY, HARRY B., Bowling Green, Chemistry.

### Science Faculty

CHEATHAM, NELL SUE, Morehead, Zoology.  
JENKINS, LEO B., Jr., Louisville, Engineering.  
MARSHALL, MAURICE K., Lexington, Engineering.  
SMITH, CHARLES G., Paducah, Zoology.  
STRICKLER, THOMAS D., Berea, Physics.

### Summer Fellowships for Graduate Teaching Assistants

BYRD, DAVID S., Louisville, Chemistry.  
COLEMAN, DONALD B., Owensboro, Mathematics.  
KING, JERRY P., Murray, Mathematics.  
REKMR, JOSEPH R., Louisville, Engineering.  
SLEDD, WILLIAM T., Murray, Mathematics.  
TILFORD, SHELBY G., Clarkson, Chemistry.

### Summer Fellowships for Secondary School Teachers

HEMMERLE, SR. M. CAROLINE, Covington, Biology.  
KIMBEL, SR. M. EVA, Louisville, Chemistry.  
KLINGENBERG, SR. J. M., Covington, Mathematics.  
MADDEN, SR. M. CAECILLA, Covington, Physics.  
ROSE, VIRGIL UHLAN, Louisville, Biology.  
STALLINGS, SR. M. CONSOLA, Springfield, Mathematics.  
STURMAN, DOLLY G., Louisville, Mathematics.  
SYKES, HARRY N., Lexington, Mathematics.  
WARE, WILLA C., Louisville, Mathematics.

## LOUISIANA

### Graduate

BERGERON, WILLIAM J., Eunice, Engineering.  
CARROLL, KEITH J., New Iberia, Physics.  
FRICKEN, RAYMOND L., New Orleans, Physics.  
GRAHAM, EDWARD W., Natchitoches, Chemistry.  
MURRILL, PAUL W., Lake Charles, Engineering.  
NIX, JAMES R., Natchitoches, Physics.  
PENNEY, DAVID E., New Orleans, Mathematics.

SMITH, WARREN D., Deridder, Engineering.  
WILLIS, DONALD E., Baton Rouge, Chemistry.

#### *Cooperative Graduate*

BLEICHER, MICHAEL N., New Orleans, Mathematics.  
DECK, RONALD J., New Orleans, Physics.  
EIDSON, WILLIAM W., New Orleans, Physics.  
ELDER, ELEANOR S., Baton Rouge, Chemistry.  
GONOR, JEFFERSON J., Lafayette, Zoology.  
HOLLAND, WILBUR C., New Orleans, Mathematics.  
HUSSEY, ROBERT G., Shreveport, Physics.  
MALONE, DAVID H., New Orleans, Social Sciences.  
SAY, GEOFFREY R., Baton Rouge, Engineering.  
SAY, ROBERT L., Baton Rouge, Engineering.  
YOUNG, WARREN L., Eunice, Chemistry.

#### *Science Faculty*

AUCOIN, CLAYTON V., LaFayette, Mathematics.  
BUSSELL, WILLIAM H., Ruston, Engineering.  
CRAIG, WILLIAM W., Baton Rouge, Earth Sciences.  
EDWARDS, CHARLES H., Jr., Ruston, Engineering.  
ESHELMAN, HOWARD C., LaFayette, Chemistry.  
FREDERICK, LAFAYETTE, Baton Rouge, Botany.  
TIMON, WILLIAM E., Jr., Natchitoches, Mathematics.

#### *Summer Fellowships for Graduate Teaching Assistants*

DARST, RICHARD B., Baton Rouge, Mathematics.  
GONOR, JEFFERSON J., LaFayette, Zoology.  
LARKIN, JOEL M., New Orleans, Chemistry.  
LEWIS, LORALEE I., New Orleans, Zoology.  
SHOOP, C. ROBERT, New Orleans, Zoology.  
SIMMONS, LEONARD M., Jr., Baton Rouge, Physics.  
WHARTON, JAMES H., Monroe, Chemistry.  
WILLARD, THOMAS M., New Orleans, Chemistry.

#### *Summer Fellowships for Secondary 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, Physics.  
MYHRMAN, MATTS A., Lewiston, Earth Science.  
O'CONNOR, BRIAN R., Lewiston, Chemistry.  
SCOTT, SARAH V., Bar Harbor, Anthropology.  
TURNER, JAMES H., Skowhegan, Physics.

#### *Cooperative Graduate*

AGATHOS, LOUIS, Orono, Engineering.  
BARON, ROSE M., Orono, Social Sciences.  
BROOKS, KARL M., Thomaston, Psychology.  
FURROW, STANLEY D., Bangor, Chemistry.  
ORCUTT, RONALD H., Rockland, Chemistry.  
PERRIN, CARLETON E., Falmouth, Chemistry.  
THORPE, JOHN A., Auburn, Mathematics.

#### *Science Faculty*

DODGE, CLAYTON W., Orono, Mathematics.  
LACASSE, ELROY O., Jr., Brunswick, Physics.

#### *Summer Fellowships for Graduate Teaching Assistants*

BARKER, DANIEL S., North Whitefield, Earth Sciences.  
HART, JEAN G., Orono, Mathematics.  
HARTT, JOHN K., Fort Kent, Physics.  
RICH, NATHAN H. III, Old Town, Physics.  
SOTTEY, THEODORE W., Orono, Chemistry.

## MARYLAND

#### *Graduate*

ANDERSON, DON L., Baltimore, Earth Sciences.  
BIRDSALL, WILLIAM C., Baltimore, Social Sciences.  
BROWN, ROBERT L., Kensington, Chemistry.  
BROWN, STANLEY G., Kensington, Physics.  
CURTIS, EDWARD B., Annapolis, Mathematics.  
DENHARDT, DAVID T., Baltimore, Biophysics.  
DOBSON, PETER N., Jr., Baltimore, Physics.  
DUNLEAVY, Sr., M. ROSALEEN, Baltimore, Microbiology.  
Dwyer, THOMAS F., Baltimore, Engineering.  
FERGUSON, JOHN D., Bishop Head, Mathematics.  
FOY, WADE H., Jr., Baltimore, Engineering.  
HAUK, PETER, Chevy Chase, Chemistry.  
HOLLAND, NICHOLAS D., Chevy Chase, Zoology.  
LICHT, ARTHUR L., Silver Spring, Physics.  
MECKEL, LAWRENCE D., Jr., Baltimore, Earth Sciences.  
MILLERD, WILLIAM H., Jr., Baltimore, Physics.  
MORRIS, JOHN E., Silver Spring, Biotechnology.  
SHARNOFF, MARK, Chevy Chase, Physics.  
SIGER, ALVIN, Baltimore, Biophysics.  
SMITH, DAVID A., Pocomoke City, Mathematics.  
VANTREES, HARRY L., Jr., Glen Burnie, Engineering.  
WARNER, JONATHAN R., Bethesda, Biophysics.  
WELLS, ROBERT, Bethesda, Mathematics.  
WHITLOCK, HOWARD W., Jr., University Park, Chemistry.  
ZIPP, EDWARD C., Jr., Baltimore, Physics.

#### *Cooperative Graduate*

AKS, STANLEY, College Park, Physics.  
BERK, KENNETH N., Hyattsville, Physics.  
BURSEY, MAURICE M., Baltimore, Chemistry.  
DORN, CONRAD P., Jr., Baltimore, Chemistry.  
FINK, DONALD L., Baltimore, Engineering.

**MARYLAND—Continued**

FORMAN, RICHARD T., Easton, Botany.  
 FULLEB, GERALD L., West Hyattsville, Engineering.  
 JONES, DONALD G., Takoma Park, Chemistry.  
 KANTOR, PAUL B., Silver Spring, Physics.  
 LAMPE, DONALD R., Baltimore, Engineering.  
 LEON, MELVIN, West Hyattsville, Physics.  
 MADSEN, ERNEST L., District Heights, Physics.  
 MARTIN, RICHARD L., Baltimore, Engineering.  
 MULLALLY, JANET J., Bethesda, Mathematics.  
 QUIN, ROBERT G., Hagerstown, Physics.  
 RAWLINGS, HOWARD P., Baltimore, Mathematics.  
 SACKS, ROBERT C., Baltimore, Engineering.  
 SOMERLOCK, CHARLES R., Baltimore, Engineering.  
 WEBBER, HARRY W., Jr., Baltimore, Chemistry.

*Postdoctoral*

ADAMS, WILLIAM H., Glen Burnie, Chemistry.  
 FISKE, RICHARD S., Baltimore, Earth Sciences.  
 HOFFMANN, LOUIS G., Baltimore, Microbiology.  
 STOKES, ARNOLD P., Baltimore, Mathematics.

*Senior Postdoctoral*

AMES, BRUCE N., Bethesda, Biochemistry.  
 MADANSKY, LEON, Baltimore, Physics.  
 WASHNITZER, GERARD, Baltimore, Mathematics.

*Science Faculty*

EMERSON, DON A., LaVale, Zoology.  
 KEBSCHNER, JEAN, Westminster, Medical Sciences.  
 MUMA, HAROLD E., Baltimore, Zoology.  
 SCHICK, IRVIN H., Takoma Park, Engineering.

*Summer Fellowships for Graduate Teaching Assistants*

ADAMS, EDWARD F., Hyattsville, Engineering.  
 BRIERLEY, GERALD P., Greenbelt, Biochemistry.  
 BRIDY, ROBERT G., Hagerstown, Chemistry.  
 FORMAN, RICHARD T., Easton, Botany.  
 HURLBUTT, HENRY W., College Park, Zoology.  
 MADSEN, ERNEST L., District Heights, Physics.  
 STOUT, JOHN F., Takoma Park, Zoology.  
 WENZINGER, GEORGE R., Chevy Chase, Chemistry.  
 WRIGHT, THOMAS L., Baltimore, Earth Sciences.

*Summer Fellowships for Secondary School Teachers*

CAREY, HELEN SIMMONS, Catonsville, Mathematics.  
 FARLEY, WILLIAM J., Baltimore, Mathematics.  
 FITZPATRICK, SR. ANCILLA, Baltimore, Zoology.  
 GENTRY, SR. DORIS ANN, Baltimore, Mathematics.  
 HOFHERR, SR. MARGARET, Baltimore, Mathematics.  
 HOPKINS, BELVA H., Beltsville, Mathematics.  
 JOHNSON, PATRICIA L., Wheaton, Mathematics.  
 O'NEILL, BRO. GODFREY C., Baltimore, Mathematics.

STARK, WILLIAM DAVID, Silver Spring, General Sciences.

**MASSACHUSETTS***Graduate*

ALPERIN, JONATHAN L., Newton, Mathematics.  
 BIRMINGHAM, THOMAS J., Milford, Physics.  
 BLUMENTHAL, RALPH B., Cambridge, Physics.  
 BROWN, MARIANNE S., Waltham, Mathematics.  
 CARROLL, ALAN S., Cambridge, Physics.  
 CHASE, THEODORE, JR., Dover, Biochemistry.  
 CLEARY, RICHARD T., Boston, Biochemistry.  
 COMLY, JAMES B., Cambridge, Engineering.  
 COVITZ, FRANK H., Dorchester, Chemistry.  
 DIAMOND, JARED M., Brookline, Medical Sciences.  
 DIX, MICHAEL W., Wayland, Zoology.  
 DOBBINS, ROBERT R., Boston, Physics.  
 FEDERER, CHARLES A. III, Belmont, Agriculture.  
 FUCHS, NORMAN H., Boston, Physics.  
 FULTON, ROBERT L., East Weymouth, Chemistry.  
 GERSTEIN, IRA S., Cambridge, Physics.  
 GIBBS, SARAH P., Belmont, Zoology.  
 GLOWACKI, ELLEN R., Winchester, Biochemistry.  
 GOLD, LEWIS P., Brockton, Chemistry.  
 GOODRICH, ROBERT L., Cambridge, Physics.  
 GUILLEMIN, VICTOR W., Belmont, Mathematics.  
 HOWLAND, JOHN L., Quincy, Microbiology.  
 HUNT, THOMAS K., Belmont, Physics.  
 INGRAHAM, JOHN C., Boston, Physics.  
 JAMESON, PAUL W., Cambridge, Engineering.  
 JOLLY, HENRY P., JR., Boston, Physics.  
 KNIGHT, WILLIAM S., West Springfield, Chemistry.  
 LANDE, ALEXANDEB, Cambridge, Physics.  
 LOCKSHIN, RICHARD A., Northampton, Zoology.  
 MARK, ROGER G., Chestnut Hill, Engineering.  
 MOORE, CHARLES B., Beverly Farms, Chemistry.  
 NELSON, RALPH D., JR., Westboro, Chemistry.  
 NESSON, MICHAEL H., Brighton, Microbiology.  
 POULTNEY, SHERMAN K., Leominster, Physics.  
 ROZIN, PAUL N., Cambridge, Psychology.  
 SAVIN, HARRIS B., Newton Highland, Psychology.  
 SCHEINBAUM, MONTE L., Cambridge, Chemistry.  
 SCHELL, ALLAN C., Medford, Engineering.  
 SCHOWEN, RICHARD L., Cambridge, Chemistry.  
 SULLIVAN, JEREMIAH D., Foxboro, Physics.  
 THORNTON, ROBERT M., Cambridge, Botany.  
 WARD, HAROLD N., Cambridge, Mathematics.  
 WAXMAN, NAHUM J., Cambridge, Anthropology.  
 WHITIER, DEAN P., Millbury, Botany.  
 WILLIAMS, DAVID C., Belmont, Chemistry.  
 YEGIAN, CHARLES D., Amherst, Biophysics.

*Cooperative Graduate*

ADLER, DAVID, Cambridge, Physics.  
 AVERNER, MELVIN J., Newtonville, Zoology.  
 BELL, JERRY A., Cambridge, Chemistry.  
 BONVINI, GLADYS H., West Medway, Genetics.

BURSTYN, HAROLD L., Cambridge, Social Sciences.

CHIN, GILBERT Y., Boston, Engineering.

CONLEY, BRENDA S., Cambridge, Biology.

DALBY, HENRY O., Jr., Braintree, Chemistry.

DURGIN, CHARLES B., Waltham, Engineering.

ELLETT, MILDRED H., Boston, Biology.

FOGLESONG, GEORGE M., Newtonville, Physics.

FORD, DWAIN L., Lancaster, Biochemistry.

FORSLUND, DONALD C., Norwell, Engineering.

FORSLUND, ROBERT P., Norwell, Engineering.

GOODMAN, NELSON S., Allston, Zoology.

HOHENBERG, PIERRE C., Cambridge, Physics.

HOWE, NORMAN M., Jr., Princeton, Engineering.

KABASAKALIAN, LEVON, Newtonville, Psychology.

KUSIK, CHARLES L., Richmond, Engineering.

LEYON, ROBERT E., Wellesley Hills, Chemistry.

MIDTTUN, OLE H., New Bedford, Engineering.

MILLS, WAYNE A., Natick, Physics.

NORDTVEDT, KENNETH L., Jr., Boston, Physics.

NOSHKIN, VICTOR E., Jr., Worcester, Chemistry.

PASTERCEYK, FRANCIS W., Chicopee Falls, Engineering.

PHILLIPS, E. ALAN, South Lincoln, Physics.

PHILLIPS, ROGER C., Boston, Chemistry.

PLOCKE, DONALD J., Boston, Biophysics.

PLUTA, PHILIP R., Brockton, Engineering.

RHOADES, RICHARD G., Northampton, Engineering.

RUSSELL, ANTHONY P., Boston, Zoology.

SANDERSON, RICHARD B., Cambridge, Physics.

SCHMIDT, JOHN P., Holyoke, Engineering.

SEIDMAN, AARON, Cambridge, Genetics.

SIMON, JOSEPH L., Lexington, Zoology.

SMITH, ALAN B., Belmont, Engineering.

SMITH, KENNETH A., Winthrop, Engineering.

STOLZENBERG, LOUIS G., Boston, Mathematics.

STRAUSS, RICHARD A., Revere, Engineering.

VONBUSICH, STEFANIE, Framingham, Social Sciences.

#### Postdoctoral

BAYM, GORDON A., Pittsfield, Physics.

HOOD, WILLIAM B., Jr., Boston, Medical Sciences.

#### Senior Postdoctoral

CALDWELL, DAVID O., Cambridge, Physics.

FRISCH, DAVID H., Cambridge, Physics.

GROSS, EUGENE P., Waltham, Physics.

MOVIUS, HALLAM L., Jr., Cambridge, Anthropology.

POLLACK, IRWIN, Cambridge, Psychology.

RAPER, JOHN R., Cambridge, Genetics.

SHAPIRO, ARNOLD S., Waltham, Mathematics.

TWAROG, BETTY M., Cambridge, Zoology.

#### Science Faculty

BRAUNER, PHYLLIS A., Boston, Chemistry.

CLAYTON, JOE T., Amherst, Engineering.

FREEMAN, HAROLD A., Cambridge, Mathematics.

GOLDMAN, OSCAR, Waltham, Mathematics.

LIGHT, TRUMAN S., West Roxbury, Chemistry.

MCBRIEN, VINCENT O., Worcester, Mathematics.

SCOTT, WILLIAM T., Northampton, Physics.

SHEINHART, EDNA, Sheffield, Mathematics.

WHITNEY, ROBERT B., Amherst, Chemistry.

#### Summer Fellowships for Graduate Teaching Assistants

ALPERIN, JONATHAN L., Newton, Mathematics.

BOUTILIER, ROBERT F., North Andover, Earth Sciences.

BURKE, JAMES J., Jr., Northampton, Chemistry.

DERMARDEROSIAN, ARA H., Somerville, Chemistry.

FACTOR, ARNOLD, Mattapan, Chemistry.

KELLSHER, CATHERINE F., Medford, Chemistry.

KNEE, DAVID I., Cambridge, Mathematics.

LIBERA, RICHARD J., Thorndike, Mathematics.

MACKUN, STANLEY, East Walpole, Social Sciences.

MANNIS, FRED, Brookline, Chemistry.

MCCORD, JAMES R. III, Cambridge, Mathematics.

MILLER, MURRAY S., Boston, Zoology.

OLVER, JOHN W., Cambridge, Chemistry.

SAGAL, MATTHEW W., Brookline, Chemistry.

SAUL, FRANK P., Cambridge, Anthropology.

WARD, JEANNE A., Arlington, Chemistry.

YATES, ROBERT A., Southbridge, Engineering.

YOUNG, NANCY, Pittsfield, Genetics.

#### Summer Fellowships for Secondary School Teachers

ALVES, Sr. M. MENRIC, Boston, Mathematics.

CREIGHTON, WILLIAM A., Milton, Biology.

ECCLES, FRANK M., Andover, Mathematics.

FALLA, Sr. M. ANNATA, Brighton, Mathematics.

HONNEN, Sr. JAMES F., Springfield, Biology.

KELLETT, JEREMIAH J., Weston, Mathematics.

LANDEB, ALAN, Avon, Chemistry.

LUX, JOHN R., Andover, Mathematics.

MCDONNELL, Sr. IMMACULATA, Worcester, Mathematics.

MCGARRY, Sr. M. ADRIA, Waltham, Chemistry.

#### MICHIGAN

##### Graduate

ANDERSEN, CARL M., Richmond, Physics.

BACHMANN, ROGER W., Ann Arbor, Zoology.

BALL, RICHARD J., Owosso, Psychology.

BALZARINI, DAVID A., Iron Mountain, Physics.

BAYMA, ROBERT W., Detroit, Engineering.

BECK, WILLIAM F., Lansing, Engineering.

BICKEL, THOMAS F., Detroit, Mathematics.

BROWN, ROBERT T., Milan, Physics.

BUFFE, CHARLES G., Sault Ste. Marie, Earth Sciences.

BUTCHER, SAMUEL S., Gaylord, Chemistry.

BUYAN, JON R., Detroit, Engineering.

BUZZELLI, DONALD E., Detroit, Engineering.

CARROLL, ROBERT L., Mason, Biology.

CORNWELL, GEORGE W., Three Oaks, Zoology.

DE WITT, CALVIN B., Ann Arbor, Zoology.

DEIBERT, MAX C., St. Johns, Engineering.

DUCMANIS, JOHN A., Kalamazoo, Physics.

EDMONDS, KATHERYN, Kalamazoo, Chemistry.

MICHIGAN—Continued

EVELY, SUSAN J., Grosse Pointe, Mathematics.  
 FISCHER, PATRICK C., Ann Arbor, Mathematics.  
 FOX, KENNETH, Detroit, Physics.  
 FRAYER, DOROTHY A., Detroit, Biochemistry.  
 GIGNAC, DONALD A., Detroit, Mathematics.  
 GOODMAN, JOHN M., Dearborn, Physics.  
 HEISLER, ALAN A., Big Rapids, Mathematics.  
 HUBER, LEE M., Plymouth, Chemistry.  
 KESSLER, DAVID P., Ann Arbor, Engineering.  
 KLANDERMAN, BRUCE H., Grand Rapids, Chemistry.  
 LAZAROV, CONNOR, Detroit, Mathematics.  
 LILLYA, CLIFFORD P., Ann Arbor, Chemistry.  
 LITWIN, GEORGE H., Detroit, Psychology.  
 MATWYIOFF, NICHOLAS A., Rogers City, Chemistry.  
 MCBRIDE, DAVID W., Dearborn, Chemistry.  
 MCILRATH, THOMAS J., East Lansing, Physics.  
 MITCHELL, LAWRENCE C., Ann Arbor, Chemistry.  
 MORRISON, BARBARA M., Ann Arbor, Botany.  
 OWENS, JAMES C., Grosse Pointe, Physics.  
 PALMER, PAUL, Ann Arbor, Chemistry.  
 PAYNE, ROBERT B., Niles, Zoology.  
 PIATKOWSKI, THOMAS F., Ann Arbor, Engineering.  
 POUTSMA, MARVIN L., Grand Rapids, Chemistry.  
 REINHARD, DOUGLAS N., Birmingham, Engineering.  
 ROBERTSON, WAYNE M., Fremont, Engineering.  
 ROSS, DAVID W., Detroit, Physics.  
 RUSKIN, ARNOLD M., Ann Arbor, Engineering.  
 SLOBIN, DAN I., Detroit, Psychology.  
 SMITH, GENE E., Ann Arbor, Engineering.  
 SQUIRE, MARY A., Ypsilanti, Psychology.  
 STENGER, ROBERT A., Midland, Chemistry.  
 STREET, JAMES R., Detroit, Engineering.  
 TREADO, PAUL A., Ann Arbor, Physics.  
 VEECH, WILLIAM A., Pleasant Ridge, Mathematics.  
 WEBSTER, DALE A., Wynnndotte, Biochemistry.  
 WESTON, ELIZABETH A., Detroit, Biochemistry.  
 WIDEMAN, JAMES M., Detroit, Medical Sciences.  
 WIEGERT, RICHARD G., Whitmore Lake, Zoology.  
 WISER, NATHAN, Detroit, Physics.  
 WOOD, RODNEY D., Charlotte, Engineering.  
 ZIER, ROBERT E., Detroit, Physics.

*Cooperative Graduate*

ALLARD, MARVEL J., Grosse Pte. Wood, Psychology.  
 ARCHBOLD, NORBERT L., Ann Arbor, Earth Sciences.  
 AUBEL, JOSEPH L., Lansing, Physics.  
 BALDWIN, RANSOM L., East Lansing, Agriculture.  
 BAYS, KENNETH L., Shelby, Engineering.  
 BECK, JONATHAN M., Lansing, Mathematics.  
 BENKARD, JOHN P., Ann Arbor, Mathematics.  
 BETZ, ROBERT S., Huntington Wood, Social Sciences.  
 BLASS, WILLIAM E., East Lansing, Physics.  
 BUCKMASTER, MARLIN D., Ann Arbor, Chemistry.

CLIFFORD, LELAND T., Ann Arbor, Psychology.  
 CROSS, DAVID V., Ann Arbor, Psychology.  
 DANIELS, EDWARD I., Grand Ledge, Engineering.  
 DEHARDT, DORIS C., East Lansing, Psychology.  
 DEJONGH, DON C., Burnips, Chemistry.  
 DINGLE, RICHARD D. H., Pinckney, Zoology.  
 DUNLAP, ROBERT W., Farmington, Engineering.  
 FINNEY, ROSS L., Ann Arbor, Mathematics.  
 FOULIS, LINDA M., Detroit, Mathematics.  
 FOULSER, DAVID A., Ann Arbor, Mathematics.  
 GARLAND, HOWARD, Oak Park, Mathematics.  
 GELLENBECK, SR. MARY M., Detroit, Microbiology.  
 GRAHAM, ROLLYN G., Birmingham, Engineering.  
 GREENMAN, DAVID L., Lansing, Zoology.  
 GULLAHORN, JEANNE E., East Lansing, Psychology.  
 HAAS, TERRY E., St. Johns, Chemistry.  
 HANNA, MARTIN S., Birmingham, Mathematics.  
 HARACZ, RICHARD D., Dearborn, Physics.  
 HESS, CHARLES F., Dearborn, Social Sciences.  
 HOGH, GOTTFRIED, Detroit, Zoology.  
 HOOVERMAN, ROGER H., Saginaw, Physics.  
 HUANG, JUSTIN C., East Lansing, Physics.  
 HUNT, ROBERT H., Ann Arbor, Physics.  
 KERR, JOHN P., Ann Arbor, Zoology.  
 KNUDSEN, KAREL G., Gwinn, Psychology.  
 KUZMA, DENNIS C., Lincoln Park, Engineering.  
 LA POINTE, CLAYTON W., Detroit, Engineering.  
 LINDMAN, HAROLD R., Dearborn, Psychology.  
 MASON, JOHN L., North Muskegon, Engineering.  
 PATTERSON, DONALD J., Birmingham, Engineering.  
 PETERSON, RUTH A., Frankfort, Chemistry.  
 PLOURDE, GAIL R., Norway, Chemistry.  
 ROSENFELD, ROBERT L., Jackson, Engineering.  
 ROTHENBERG, THOMAS J., Detroit, Social Sciences.  
 SCHUMACHER, CLIFFORD R., Detroit, Physics.  
 SCHWARTZ, ALAN S., Detroit, Engineering.  
 SHETLER, STANWYN, G., Ann Arbor, Botany.  
 SILBAE, RICHARD R., Fenton, Physics.  
 SMITH, GLEN C., Morenci, Engineering.  
 SPEAKE, NEAL M., Ann Arbor, Mathematics.  
 STEVENS, ALDRED L., Brown City, Engineering.  
 STREET, DAVID P., Ann Arbor, Social Sciences.  
 TRABASSO, THOMAS R., East Lansing, Psychology.  
 VANDYKE, JOHN W., Jr., Holland, Chemistry.  
 WAKELEY, JOHN H., East Lansing, Psychology.  
 WARNER, HUBER R., Ann Arbor, Biochemistry.  
 WILSON, CAROL M., Detroit, Chemistry.  
 WOLSEY, WAYNE C., Battle Creek, Chemistry.  
 ZERBA, ROSE D., Ferndale, Psychology.

*Postdoctoral*

BROWN, MORTON, Ann Arbor, Mathematics.  
 CARLSON, EDWARD H., Lansing, Physics.  
 CLOSSON, WILLIAM D., Pontiac, Chemistry.  
 DAVENPORT, RICHARD, Battle Creek, Zoology.  
 SCHLESINGER, MILTON J., Ann Arbor, Biochemistry.

### Senior Postdoctoral

ALLER, LAWRENCE H., Ann Arbor, Astronomy.  
BANDURSKI, ROBERT S., East Lansing, Biochemistry.  
BERNSTEIN, RICHARD B., Ann Arbor, Physics.  
CHAVIN, WALTER, Detroit, Zoology.  
STEINER, ERICH E., Ann Arbor, Genetics.

### Science Faculty

BRIDGMAN, ROBERT J., Ypsilanti, Mathematics.  
CARSON, RALPH S., Belding, Engineering.  
CZYZAK, STANLEY J., Detroit, Astronomy.  
DIRASIAN, HENRY A., Detroit, Engineering.  
GERBEN, ALAN I., Grand Rapids, Botany.  
HAAS, VIOLET, Detroit, Mathematics.  
HEDGES, HARRY G., East Lansing, Engineering.  
KERWIN, Sr. M. ALICIA, Detroit, Mathematics.  
KNELLER, WILLIAM A., Ypsilanti, Earth Sciences.  
LEONARD, THOMAS C., Houghton, Engineering.  
MACKSON, CHESTER J., East Lansing, Engineering.  
METZGER, ROBERT W., Flint, Engineering.  
WILCOX, LYLE C., East Lansing, Engineering.

### Summer Fellowships for Graduate Teaching Assistants

ALLARD, MARVEL J., Grosse Pointe Woods, Psychology.  
BORCHERTS, ROBERT H., Ann Arbor, Engineering.  
BOYD, JOHN W., East Lansing, Physics.  
BRAGG, ARTHUR E., Ann Arbor, Mathematics.  
CALHOUN, ROLAND L., Ann Arbor, Psychology.  
DAUGHERTY, NED A., East Lansing, Chemistry.  
DAVIS, JAMES H., East Lansing, Psychology.  
DEVRIES, DONALD L., Zeeland, Chemistry.  
DUBES, RICHARD C., East Lansing, Engineering.  
HALPERN, JAMES D., Detroit, Mathematics.  
HOOVER, WILLIAM G., Ann Arbor, Chemistry.  
KAPLAN, STEPHEN, Ann Arbor, Psychology.  
KORFHAGE, ROBERT R., Ann Arbor, Mathematics.  
LEININGER, WILLIAM J., Marquette, Social Sciences.  
LOUTTIT, RICHARD T., Ann Arbor, Psychology.  
MARTENS, HINRICH R., East Lansing, Engineering.  
MEYER, VICTOR E., East Lansing, Chemistry.  
MOHRIG, JERRY R., Grand Rapids, Chemistry.  
NOSSAL, NANCY G., Ann Arbor, Biochemistry.  
OBANNON, JAMES Y., Jr., Ann Arbor, Medical Sciences.  
PALMER, LIBBY, Ann Arbor, Mathematics.  
PHILLIPS, BARRIE M., Jackson, Medical Sciences.  
SCHWARTZ, ARTHUR J., Detroit, Mathematics.  
SEBASTIAN, LOIS P., Ann Arbor, Psychology.  
TRABASSO, THOMAS R., East Lansing, Psychology.  
WALDEN, MARVIN E., Troy, Mathematics.  
WIRTH, JOHN L., Three Oaks, Engineering.

### Summer Fellowships for Secondary School Teachers

BAUER, ERNEST A., Grosse Pointe, Mathematics.

COMISKY, Sr. JEAN K., Utica, Biology.  
CONVERSE, Sr. M. JR. DARC, Grand Rapids, Biology.  
HAGER, DAVID L., Mason, Biology.  
HAM, JOHN B., Grand Rapids, Biology.  
HARMON, MOTH. MARYELLEN, Grosse Pointe, Chemistry.  
HAUENSTEIN, JOHN L., Niles, Biology.  
KOHLEPP, JOHN GRAM, Flint, Mathematics.  
LABATT, DEE W., Mendon, Biology.  
LOYET, CHARLES E., Flint, Mathematics.  
MANDOSIAN, ADRIENNE, Detroit, Botany.  
MATSON, WILLIAM F., Montague, Biology.  
MICHIELS, Bro. CYRIL LEO, Detroit, Chemistry.  
MOORE, CALVIN V., Detroit, Zoology.  
MULLINIX, DARREL D., Wayne, Biology.  
NYROFF, VERNON, D., Muskegon, Mathematics.  
PHILLIPS, GENE A., Corunna, Mathematics.  
RAKOZY, Sr. M. ANDREETA, Hamtramck, Chemistry.  
SHULL, JERRY L., Ann Arbor, Biology.  
SMITKA, JOHN M., Jr., Detroit, Biology.  
TSCHIRHART, WILLIAM, Warren, Mathematics.  
VAN ANTWERP, ALAN E., Big Rapids, Mathematics.  
WODETZKI, Sr. CATHERINE, Flint, Chemistry.  
ZYLSTRA, GERALD GERBEN, Kalamazoo, Biology.

### MINNESOTA

#### Graduate

AIBERN, PATRICK R., St. Paul, Mathematics.  
ARNESON, RICHARD M., Minneapolis, Zoology.  
BERG, JOHN C., Hopkins, Engineering.  
CONE, RICHARD A., St. Paul, Physics.  
DARLEY, JOHN M., Minneapolis, Psychology.  
DEUTSCHE, CRAIG W., Minneapolis, Chemistry.  
DICKELMAN, THEODORE E., Minneapolis, Chemistry.  
EFRON, BRADLEY, St. Paul, Mathematics.  
FRISTEDT, BERT E., Hopkins, Mathematics.  
GAMBLIN, THEODORE W., Robbinsdale, Mathematics.  
KIRCHNER, ROGER B., Edina, Mathematics.  
LOWRY, THOMAS H., Minneapolis, Chemistry.  
MCKENZIE, DOUGLAS H., Minneapolis, Anthropology.  
MOFFET, ALAN T., Rochester, Astronomy.  
NAESETH, ROXANNE, Waukegan, Mathematics.  
OLSON, EDWIN S., Cannon Falls, Chemistry.  
OSTBY, CARL M., Jr., McIntosh, Mathematics.  
PEIKERT, ERNEST W., Minneapolis, Earth Sciences.  
RENSINK, MARVIN E., Austin, Physics.  
SOUTHWICK, DAVID L., Rochester, Earth Sciences.  
SPANGLER, JOHN D., Atwater, Physics.  
SWANSON, STANLEY M., St. Paul, Physics.  
SYVERSON, MYRON W., Minneapolis, Mathematics.  
TAUER, Sr. RITA J., St. Paul, Mathematics.  
TRUBNAUER, PETER G., St. Paul, Physics.  
TORGERSON, RONALD T., Minneapolis, Physics.  
WHITE, ROSCOE B., Minneapolis, Physics.  
WILDER, STEPHEN P., Minneapolis, Engineering.  
WILLETT, ROGER D., Northfield, Chemistry.

#### Cooperative Graduate

BENT, ANNE M., Minneapolis, Botany.  
CAHOON, ELIZABETH J., Minneapolis, Botany.

**MINNESOTA—Continued**

CARLSON, ROBERT L., Duluth, Chemistry.  
 CLAYTON, LEE S., Lockhart, Earth Sciences.  
 COTTON, RICHARD F., Duluth, Microbiology.  
 DAWES, CLINTON J., Robbinsdale, Botany.  
 DUSSERE, PAUL L., Moorhead, Mathematics.  
 FILLMORE, JAY P., Minneapolis, Mathematics.  
 FLYNN, PATRICK F., Regal, Engineering.  
 GAUSTAD, JOHN E., Minneapolis, Astronomy.  
 HAIGHT, CHARLES H., Minneapolis, Engineering.  
 HEDIN, ALAN E., St. Paul, Physics.  
 HELLING, ROBERT B., Madella, Genetics.  
 JOHNSON, DONALD C., St. Paul, Chemistry.  
 JOHNSON, RICHARD R., Minneapolis, Psychology.  
 JOHNSON, WILLIAM W., Minneapolis, Genetics.  
 JONES, DUANE A., Northfield, Chemistry.  
 KRENAN, JOHN R., St. Paul, Chemistry.  
 KONCOS, ROBERT, Minneapolis, Chemistry.  
 MAHER, LOUIS J., Jr., Minneapolis, Earth Sciences.  
 OAKES, THOMAS R., Minneapolis, Chemistry.  
 ORIEL, PATRICK J., Stillwater, Chemistry.  
 REAY, NEVILLE W., Jr., Minneapolis, Physics.  
 REITER, RUSSELL J., Cold Spring, Medical Sciences.  
 RIES, RICHARD R., New Ulm, Physics.  
 SCHALGER, LARRY L., Minneapolis, Chemistry.  
 SOMMER, DAVID C., St. Paul, Mathematics.  
 VENNIX, ALAN J., St. Paul, Engineering.  
 VISTE, ALEN E., Austin, Chemistry.  
 YAPEL, ANTHONY F., Jr., Soudan, Chemistry.

**Postdoctoral**

MUELLER, AUGUST P., Mahnomon, Microbiology.

**Senior Postdoctoral**

SPITZER, FRANK L., Minneapolis, Mathematics.  
 YENNIE, DONALD R., Minneapolis, Physics.

**Science Faculty**

RAMETTE, RICHARD W., Northfield, Chemistry.  
 RUDD, MILLARD E., Moorhead, Physics.  
 WOLF, FRANK L., Northfield, Mathematics.

**Summer Fellowships for Graduate Teaching Assistants**

DOMHOLT, LOWELL C., Minneapolis, Engineering.  
 DUSSERE, PAUL L., Moorhead, Mathematics.  
 EMERSON, KENNETH, Minneapolis, Chemistry.  
 HELLING, JOHN F., Madella, Chemistry.  
 HUEBE, CHARLES V., Bertha, Mathematics.  
 JOHNSON, DONALD C., St. Paul, Chemistry.  
 JONES, DUANE A., Northfield, Chemistry.  
 LARSON, HOMER R., Pencer, Zoology.  
 NORDLIE, FRANK G., New London, Zoology.  
 FLORDE, DONALD E., Fairmont, Chemistry.  
 RATZ, JAMES W., Detroit Lakes, Engineering.  
 SATHRE, DUANE P., Minneapolis, Mathematics.  
 SCHALEGER, LARRY L., Minneapolis, Chemistry.  
 SILVERMAN, WILLIAM, Minneapolis, Mathematics.  
 STORMS, HOWARD A., Ada, Chemistry.

**Summer Fellowships for Secondary School Teachers**

ACQUARD, RICHARD H., Austin, Mathematics.  
 COULTER, JOHN C., Mound, Biology.  
 DINGLE, JAMES H., Elk River, Mathematics.  
 HAUGEN, LYLE J., Pelican Rapids General Science.  
 HENDRICKSON, ARTHUR D., Tower, Mathematics.  
 HITI, LUDWIG F., Cloquet, Mathematics.  
 OLSON, ALLAN L., South St. Paul, Mathematics.  
 PROUSE, HOWARD LEE, Mankato, Mathematics.  
 SCHROEDER, DENNIS S., Waseca, Chemistry.  
 THEIS, Sr., JEAN M., Wabasha, Biology.  
 VAN LOON, RUSSELL JOE, Robbinsdale, Mathematics.

**MISSISSIPPI****Graduate**

BALGORD, WILLIAM D., Jackson, Earth Sciences.  
 CERNY, JOSEPH III, University, Chemistry.  
 NAMKOONG, GENE, Gulfport, Genetics.

**Cooperative Graduate**

BARRETT, CARL R., Jr., Jackson, Engineering.  
 BRADOW, JUDITH M., University, Chemistry.  
 BUNTIN, ROBERT R., Gulfport, Engineering.  
 EATHERLY, BILLY J., Jackson, Social Sciences.  
 FAGOT, HACKER J., Pass Christian, Psychology.  
 FITCH, DAVID C., Gulfport, Engineering.  
 GILMER, ROBERT W., Jr., Pontotoc, Mathematics.  
 HOLLINGSWORTH, JOHN G., Decatur, Mathematics.  
 MANSFIELD, CLIFTON T., Winona, Chemistry.  
 POUNDS, DONNIE J., Bonneville, Engineering.  
 RUSSELL, LYNN D., Pontotoc, Engineering.  
 WALLICK, EARL T., Grenada, Chemistry.

**Postdoctoral**

DAVIS, JAMES E., State College, Biochemistry.

**Science Faculty**

AVEN, RUSSELL E., University, Engineering.  
 BLAKNEY, SIMMIE S., Waynesboro, Mathematics.  
 MCKIE, WILL T., Jr., State College, Engineering.

**Summer Fellowships for Graduate Teaching Assistants**

BRADOW, JUDITH M., University, Chemistry.  
 BRYAN, EDWARD E., Oxford, Chemistry.  
 LEWIS, JOHN T. III, Jackson, Psychology.  
 MCCRONE, ELINOR J., Vicksburg, Genetics.

**Summer Fellowships for Secondary School Teachers**

AUSTIN, GLADYS, Meridian, Biology.  
 BEGLEY, GRACE B., Jackson, General Sciences.  
 DANIEL, ARMY, Jr., Jackson, General Sciences.  
 GOODGAME, LUCILE H., Laurel, Mathematics.  
 JONES, DOROTHY LOUISE, Canton, Biology.  
 LEWIS, ROBERT L., Hattiesburg, Microbiology.  
 LEWIS, RUTH TODD, Okolona, General Sciences.  
 TILLMAN, MARGARET H., Bruce, General Sciences.



WILSON, WILLIAM RAY, Port Gibson, Mathematics.

## MISSOURI

### *Graduate*

ANDREWS, JAMES S., Columbia, Psychology.  
BRIDGER, ROBERT F., Joplin, Chemistry.  
CONDON, JOSEPH H., St. Louis, Physics.  
CUSHING, EDWARD J., Steelville, Earth Sciences.

DAVID, RICHARD F., St. Louis, Engineering.  
DETCHMENDY, DAVID M., St. Louis, Engineering.

ELSON, ELLIOT L., Ladue, Biochemistry.  
HARDEBECK, HARRY E., Rolla, Engineering.  
PARKHURST, LAWRENCE J., Kansas City, Chemistry.

HARTING, GARY L., Kirkwood, Engineering.  
JORDAN, ROBERT W., St. Louis, Chemistry.  
JORDAN, THOMAS M., Falcon, Physics.  
KORNFIELD, ROSALIND H., Olivette, Biochemistry.

KREBS, CHARLES J., St. Louis, Zoology.  
KWENTUS, GERALD K., Kirkwood, Engineering.

LEMMON, ALAN V., University City, Mathematics.  
MAHONEY, MARY A., Ferguson, Social Sciences.

MCMAHON, LEE E., St. Louis, Psychology.  
MIDGLEY, JAMES E., Kansas City, Physics.  
MUNCH, JOHN H., Webster Groves, Chemistry.

MUTCHLER, GORDON S., St. Louis, Physics.  
NANCE, JON R., Springfield, Physics.  
NAUMAN, EDWARD B., Kansas City, Engineering.

ROTH, RICHARD F., St. Louis, Physics.  
STONE, HAROLD S., Clayton, Engineering.

### *Cooperative Graduate*

ANDALAFTE, EDWARD Z., Springfield, Mathematics.

BARNETT, DONALD L., Hannibal, Mathematics.

BAUMILLER, ROBERT C., St. Louis, Genetics.  
BERGER, ROGER L., Webster Groves, Engineering.

BERRY, IVAN L., Columbia, Engineering.  
BLACK, ALBERT W. III, Kirkwood, Engineering.

BLAIR, JAMES E., Kansas City, Chemistry.  
BLAKE, WILLIAM H., Jr., Clayton, Social Sciences.

BORISON, SIDNEY L., St. Joseph, Physics.  
BROERMAN, JAMES G., St. Louis, Physics.

BROWN, LARRY N., Springfield, Zoology.  
CANTWELL, JOHN C., St. Louis, Mathematics.  
COOK, ROBERT A., University City, Mathematics.

CURNUTT, JERRY H., Springfield, Social Sciences.

DIETRICH, ROBERT G., St. Louis, Engineering.

ECKERT, CHARLES A., St. Louis, Engineering.

ENGLAND, NOAH C., Myrtle, Agriculture.  
FRESE, RAYMOND W., Foristell, Mathematics.

GAVAN, JOHN C., St. Louis, Chemistry.  
GURSER, JOHN L., St. Louis, Engineering.  
HAGEN, DAVID C., St. Louis, Engineering.

HANSEN, SPENST M., Rolla, Earth Sciences.  
HORTON, HORACE R., Columbia, Biochemistry.

JOHNSON, JAMES W., Rolla, Engineering.

JONES, FRANK N., Carthage, Chemistry.  
KOLKER, HAROLD J., University City, Chemistry.

KRONE, WILLIAM J., Normandy, Engineering.

LINDAUER, GUSTAV A., Richmond Heights, Engineering.

MCCOOL, DONALD K., Cameron, Engineering.

MEIER, ALBERT H., Columbia, Zoology.  
SCHBU, JOHN E., Hannibal, Engineering.

SCHULTZ, JOHN E., Auxvasse, Chemistry.  
WALTMAN, PAUL E., St. Louis, Mathematics.

WEIDMAN, STUART W., St. Louis, Chemistry.  
WEINBERG, DAVID S., University City, Chemistry.

WELCH, DAVID O., University City, Engineering.

### *Postdoctoral*

BUTLER, WILLIAM T., Webster Groves, Medical Sciences.

DREITLEIN, JOSEPH F., Ferguson, Physics.

### *Senior Postdoctoral*

DEVINATZ, ALLEN, St. Louis, Mathematics.  
MARSHALL, CHARLES E., Columbia, Agriculture.

STALKER, HARRISON D., St. Louis, Genetics.

### *Science Faculty*

AYER, MIRIAM C., Columbia, Mathematics.  
BAHN, EMIL L., Jr., Cape Girardeau, Chemistry.

CONNELL, J. BRIAN, St. Louis, Engineering.  
DREIFKE, GERALD E., St. Louis, Engineering.

HILL, JOHN J., Kansas City, Physics.  
KIPPENHAN, CHARLES J., St. Louis, Engineering.

MILES, JOHN B., Rolla, Engineering.  
OSCHWALD, KARAMANEH I., Maryville, Mathematics.

*Summer Fellowships for Graduate Teaching Assistants*

BAILEY, DENNIS M., St. Louis, Chemistry.  
BELL, RONALD E., Kennett, Biochemistry.

CLINGER, BARBARA A., Strafford, Mathematics.

DRENNAN, OLLIN J., Kirksville, Social Sciences.

GREEN, GEORGE R., Fairfax, Social Sciences.  
HANSEN, SPENST M., Rolla, Earth Sciences.

HART, JOHN H., Kansas City, Botany.  
KESSLER, NEIL J., Olivette, Engineering.

MEIER, ALBERT H., Columbia, Zoology.  
OFTDAHL, MARVIN L., St. Louis, Chemistry.

SEXTON, CAROL A., Sullivan, Mathematics.  
SMITH, DAVID D., Kansas City, Earth Sciences.

SMITH, NANCY L., Kansas City, Biology.  
STARB, NORTON L., Kansas City, Mathematics.

STEINER, EUGENE F., St. Louis, Mathematics.  
TROY, DANIEL J., Kirkwood, Mathematics.

WELLING, DAN J., Kansas City, Physics.  
ZEY, ROBERT L., St. Clair, Chemistry.

*Summer Fellowships for Secondary School Teachers*

DEALL, LOUIS, St. Louis, Physics.  
DREBS, CHARLES B., Chesterfield, Mathematics.

FACETTE, BRO. JAMES L., St. Louis, Physics.  
GUNDRUM, BRO. HOWARD, Kirkwood, Mathematics.

**MISSOURI—Continued**

HIX, Sr. PATRICIA M., St. Louis, Mathematics.  
 HOGER, CHARLES E., St. Louis, Zoology.  
 MAGRUDER, WILLIS J., Kirksville, General Sciences.  
 MCCORMICK, Sr. M. AUSTINA, St. Louis, Biology.  
 MORRIS, MARY E., Webster Groves, Mathematics.  
 OSCHWALD, RICHARD A., Maryville, Mathematics.  
 PARKER, JOHN DOYLE, Herculaneum, Biology.  
 PIERCE, CORNELL DAVID, Webster Groves, Mathematics.  
 SREH, Sr. M. EDWARD PAUL, St. Louis, Chemistry.  
 TUCKER, Sr. MARGARET E., St. Louis, Biology.  
 WATSON, ROBERT N., Ferguson, Biology.  
 WILLIAMS, GEORGE IRVIN, Maryville, General Sciences.

**MONTANA***Graduate*

BECRAFT, LLOYD G., Billings, Engineering.  
 CALVERT, JAMES B., Billings, Physics.  
 VINCELETTE, RICHARD R., Billings, Earth Sciences.  
 WOODWARD, LEE A., Missoula, Earth Sciences.

*Cooperative Graduate*

DECKERT, KENNETH L., Richey, Mathematics.  
 FRITZ, RAYMOND R., Bozeman, Engineering.  
 HILL, JAMES R., Livingston, Engineering.  
 LEBRAND, ROGER J., Bozeman, Chemistry.  
 MANIS, MERLE E., Missoula, Mathematics.  
 MCRAE, DANIEL G., Missoula, Mathematics.  
 MITCHELL, WILLIAM W., Roundup, Botany.  
 PARKER, RONALD C., Missoula, Earth Sciences.  
 SWENSON, ROBERT J., Bozeman, Physics.  
 VANHORN, SARALEE N., Lewistown, Zoology.  
 YALE, IRL K., Missoula, Mathematics.

*Science Faculty*

BOOTH, WILLIAM E., Bozeman, Botany.  
 HOYT, BERNARD W., Bozeman, Engineering.

*Summer Fellowships for Secondary School Teachers*

COYLE, Sr. PAUL J., Butte, Mathematics.  
 LEPLEY, JOHN G., Fort Benton, Biology.  
 STEFFEN, Sr. M. LUCIANA, Ashland, Biology.

**NEBRASKA***Graduate*

ALLINGTON, ROBERT W., Lincoln, Engineering.  
 ANDERSEN, JOHN P., Omaha, Mathematics.  
 CASSEL, DAVID G., Ainsworth, Physics.  
 JONES, NOEL D., Hastings, Chemistry.  
 KROTTER, ALISON A., Pallsade, Mathematics.  
 MCARTHUR, DONALD E., Atlanta, Physics.  
 SHUEY, ELDON W., Lincoln, Biochemistry.  
 WHEAT, MARY L., Hastings, Mathematics.  
 WITTE, ALFRED H., Jr., Lincoln, Engineering.

*Cooperative Graduate*

BOLAR, MARLIN L., Lincoln, Botany.  
 ERICKSON, LARRY E., Wahoo, Engineering.  
 GROSS, MILDRED L., Lincoln, Mathematics.  
 KEZLAN, THOMAS P., Omaha, Mathematics.  
 LANG, WAYNE W., Lincoln, Physics.

PARK, JOHN T., Lincoln, Physics.  
 SWANSON, JAMES A., Lincoln, Chemistry.

*Science Faculty*

HANSEN, PAUL V., Jr., Blair, Chemistry.  
 MARLETTE, RALPH R., Lincoln, Engineering.

*Summer Fellowships for Graduate Teaching Assistants*

FLEHARTY, EUGENE D., Hastings, Zoology.

*Summer Fellowships for Secondary School Teachers*

ADAMY, NICK L., Beaver City, Biology.  
 ALBERDING, ARTHUR P., Jr., Ord, Mathematics.  
 GROSS, Sr., M. STEPHANIE, Fremont, Biology.  
 HEFFNER, Sr., M. CLARETTA, Greeley, Chemistry.  
 HEISER, MARION S., Omaha, Mathematics.  
 JOHNSON, DONALD B., Omaha, Mathematics.  
 STONES, IVAN D., Morrill, Mathematics.  
 VANOVER, BENJAMIN, Holdrege, Biology.

**NEVADA***Graduate*

SEANKLAND, THOMAS J., Boulder City, Physics.  
 SIBBALD, GARTH H., Reno, Social Sciences.

*Cooperative Graduate*

CROOK, JOSEPH R., Sparks, Chemistry.  
 HILL, FREDERICK J., Boulder City, Engineering.

*Summer Fellowships for Graduate Teaching Assistants*

CROOK, JOSEPH R., Sparks, Chemistry.  
 WISE, WILLIAM S., Carson City, Earth Sciences.

*Summer Fellowships for Secondary School Teachers*

ANDERSON, HOWARD V., Hawthorne, Mathematics.  
 STEERE, BOB FARREL, Las Vegas, Biology.

**NEW HAMPSHIRE***Graduate*

KING, ROBERT B., Rochester, Chemistry.  
 MARSHALL, ALAN C., Laconia, Engineering.  
 ROBINSON, PETER, Hanover, Earth Sciences.  
 WILLIAMS, DONALD J., Jaffrey, Physics.

*Cooperative Graduate*

BARIL, EARL F., Manchester, Biology.  
 KIMBALL, RICHARD M., Greenville, Engineering.  
 O'MALLEY, ROBERT E., Jr., Somersworth, Mathematics.  
 TUTTLE, ELIZABETH R., Conway, Astronomy.  
 ZEVOB, NICHOLAS, Manchester, Chemistry.  
 ZIMMERMAN, CARLE C., Jr., Laconia, Engineering.

*Science Faculty*

BOWEN, DOUGLAS M., Hanover, Chemistry.  
 COPENHAVER, JOHN H., Jr., Hanover, Biochemistry.  
 MURDOCH, JOSEPH B., Durham, Engineering.

*Summer Fellowships for Graduate Teaching Assistants*

BEAUDOIN, RICHARD L., Nashua, Zoology.  
 GILMAN, RICHARD A., Concord, Earth Sciences.

*Summer Fellowships for Secondary School Teachers*

COSTELLO, Sr., M. BEATRICE, Manchester, Biology.  
PELLETIER, Sr., MARIE C., Hudson, Biology.

**NEW JERSEY**

*Graduate*

ALLYN, JANE E., Stanford, Psychology.  
BARTH, ROBERT H., Jr., Ridgewood, Zoology.  
BENNETT, JAMES H., Princeton, Mathematics.  
BERNER, ROBERT A., Leonia, Earth Sciences.  
BRANT, DAVID A., Summit, Chemistry.  
BRAULT, JAMES W., Princeton, Physics.  
CALDWELL, DENNIS J., Penns Grove, Chemistry.  
CARLSMITH, JAMES M., Summit, Psychology.  
CHAIKEN, JAN M., Rahway, Physics.  
COBURN, STEPHEN P., Summit, Biochemistry.  
COHEN, WILLIAM D., Weehawken, Zoology.  
CONDON, PAUL E., Princeton, Physics.  
CONRAD, PETER W., East Rutherford, Engineering.  
DAVIS, BRIAN T., Princeton, Earth Sciences.  
FAHNNY, DAVID E., Fort Lee, Biochemistry.  
FRENCH, BEVAN M., Nutley, Earth Sciences.  
FREUND, ROBERT S., Maplewood, Chemistry.  
FRIEDMAN, KENNETH A., Highland Park, Physics.  
GLUCK, HERMAN R., Princeton, Mathematics.  
GRAF, RONALD E., Passaic, Physics.  
GREENLEAF, NEWCOMB, Short Hills, Mathematics.  
GRIFFIN, DAVID H., Oakland, Botany.

*Graduate*

HALL, DANIEL N., Princeton, Chemistry.  
HAND, BRYCE M., Jersey City, Earth Sciences.  
HAYS, JAMES F., Short Hills, Earth Sciences.  
HOLZWARTH, GEORGE M., Westfield, Biophysics.  
HUBER, DAVID L., Toms River, Physics.  
JOHNSON, JOSEPH L., Jr., Upper Montclair, Mathematics.  
KAYSER, BORIS J., Lakewood, Physics.  
KEENAN, EDWARD M., East Orange, Mathematics.  
KENNELL, JOHN G., Point Pleasant, Physics.  
KOCH, JOHN F., Oakhurst, Physics.  
KOVER, WARNER B., Rochelle Park, Chemistry.  
KOWAL, NORMAN E., Rochelle Park, Botany.  
KOWAL, ROBERT E., Rochelle Park, Botany.  
KREPS, RODNEY E., Princeton, Physics.  
LARSEN, DAVID M., Hawthorne, Physics.  
MATHER, WILLIAM B., Jr., Princeton, Chemistry.  
MERRILL, DRANE W., Jr., South Orange, Physics.  
MILLMAN, MICHAEL G., Summit, Physics.  
MOLLOW, BENJAMIN R., Union, Physics.  
OCH, ROSEMARY P., Madison, Engineering.  
PILLA, MICHAEL A., Trenton, Engineering.  
POLLOCK, WILLIAM A., Lincoln Park, Engineering.  
RICHTER, WAYNE H., Leonia, Mathematics.  
SEYBOLD, PAUL G., Collingswood, Physics.  
SILVERS, STUART J., South Orange, Biochemistry.  
SOVERS, OFARS J., Princeton, Chemistry.  
STEVENS, RICHARD M., Audubon, Chemistry.  
TRETIAK, OLEG J., Passaic, Engineering.  
VILMS, JURI, Seabrook, Engineering.  
WALDRON, SIDNEY R., Ringwood, Anthropology.

*Cooperative Graduates*

ABRAHAM, BARBARA W., Madison, Physics.  
BRADEN, ROBERT T., Princeton, Physics.  
BUNYAN, MARY W., Highland Park, Mathematics.  
CAMPBELL, NEIL C., Teaneck, Engineering.  
CANN, ROSS S., Ridgewood, Earth Sciences.  
CHARLAP, LEONARD S., Penns Grove, Mathematics.  
COHEN, EDWARD M., East Orange, Chemistry.  
DAMATO, ANNE, Jersey City, Mathematics.  
DEDOMINICIS, ALEX J., Union City, Chemistry.  
DOUGHTY, KAY M., Indian Mills, Chemistry.  
FEDORS, ROBERT F., Bayonne, Chemistry.  
GERRISH, JOHN B., Orange, Engineering.  
GILL, HELEN K., West Englewood, Biochemistry.  
GOLD, HARRY S., Pennsauken, Engineering.  
GOODWIN, ELIZABETH B., Hopewell, Psychology.  
GOULD, EDWIN, Short Hills, Zoology.  
HALPERN, GERALD M., Jersey City, Physics.  
HERSH, MICHAEL S., Newark, Engineering.  
HOPKINS, PAUL D., Wenonah, Chemistry.  
HUTCHINSON, JOHN W., Bridgeton, Engineering.  
JEFFERSON, JAMES W., Westwood, Medical Sciences.  
JONES, WILLIAM R., Haddon Heights, Mathematics.  
KOROS, ROBERT M., Haddonfield, Engineering.  
LASIEWSKI, ROBERT C., Maywood, Zoology.  
MINERO, RICHARD H., Clifton, Engineering.  
MULLER, ROBERT A., Rutherford, Earth Sciences.  
MURPHY, JAMES J., River Edge, Physics.  
NISHIMURA, RUTH, New Brunswick, Psychology.  
O'NEILL, JOHN J., Jersey City, Chemistry.  
PEPPER, STEPHEN V., Margate City, Physics.  
PERRY, CLARK W., Ridgefield, Chemistry.  
POAGE, JAMES F., Morristown, Engineering.  
RIEGER, PHILIP H., Teaneck, Chemistry.  
ROSENTHAL, ELI, Newark, Chemistry.  
ROTH, SHIRLEY H., Lakewood, Chemistry.  
SEITCHEK, JEROLD A., Merchantville, Physics.  
SILVESTRI, ANTHONY J., Glassboro, Chemistry.  
SMITH, DONALD E., Bergenfield, Chemistry.  
TURNER, ROBERT E. L., Montclair, Mathematics.  
VILL, JOHN J., Highland Park, Chemistry.  
WILL, THEODORE A., Montclair, Physics.  
WIMER, CYNTHIA C., New Brunswick, Psychology.  
WORMSER, HENRY C., Vineland, Chemistry.  
WRIGHT, RICHARD T., Haddonfield, Biology.

*Postdoctoral*

DHEEDENE, ROBERT N., New Vernon, Mathematics.  
KIMMEL, DONALD L., Jr., Woodbury, Medical Sciences.  
SHUSTER, CHARLES W., Glen Rock, Biochemistry.  
SKALAK, RICHARD, Leonia, Engineering.

*Senior Postdoctoral*

STIX, THOMAS H., Princeton, Physics.

*Science Faculty*

FANALE, LOUISA P., East Orange, Medical Sciences.  
HOYER, HORST W., Lake Hiawatha, Biophysics.

**NEW JERSEY—Continued**

SCOTT, DONALD A., Madison, Chemistry.  
 SLABY, STEVE M., Princeton, Engineering.  
 WHITE, MYRON E., Hoboken, Mathematics.

*Summer Fellowships for Graduate Teaching Assistants*

BECKER, DOROTHY G., Rahway, Mathematics.  
 CAMPBELL, NEIL C., Teaneck, Engineering.  
 CHARLAP, LEONARD S., Penns Grove, Mathematics.  
 DEITZ, ROBERT J., New Brunswick, Zoology.  
 DEKORTE, ART, Prospect Park, Chemistry.  
 FORREEST, HELEN F., Upper Montclair, Zoology.  
 FRANK, CHARLES H., Bloomfield, Mathematics.  
 FRIEDMAN, EDWARD A., Bayonne, Physics.  
 GIBSON, DANIEL M., Jr., Trenton, Engineering.  
 HOPKINS, PAUL D., Wenonah, Chemistry.  
 HORROCKS, WILLIAM D., Jr., Moorestown, Chemistry.  
 KALLENBACH, NEVILLE R., West New York, Chemistry.  
 KOWAL, NORMAN E., Rochelle Park, Botany.  
 KUMPEL, PAUL G., Jr., Delanco, Mathematics.  
 KUFELIAN, ROBERT H., Bridgeton, Botany.  
 MANNING, ROBERT E., Paramus, Chemistry.  
 MATLACK, LOUIS R., Princeton, Chemistry.  
 O'NEILL, JOHN J., Jersey City, Chemistry.  
 ORNA, MARY V., Nutley, Chemistry.  
 PERRY, CLARK W., Ridgefield, Chemistry.  
 PORTER, GERALD J., Rahway, Mathematics.  
 SEMBER, JOHN J., Phillipsburg, Mathematics.  
 STEWART, CHARLES G., Jr., Chatham, Psychology.  
 STRUZYNSKI, RAYMOND E., Jersey City, Physics.  
 VEZZETTI, DAVID J., Hoboken, Physics.  
 VILL, JOHN J., Highland Park, Chemistry.

*Summer Fellowships for Secondary School Teachers*

BARBARITO, EDWARD R., Paterson, Chemistry.  
 COLLARD, ARTHUR L., Hackensack, Mathematics.  
 DARLINGTON, C. LEROY, Maplewood, Chemistry.  
 DAVIDOWSKI, ANTHONY F., Mountain Lakes, Mathematics.  
 DRISCOLL, Bro. MICHAEL P., Newark, Physics.  
 FIAMINGO, MARGARET, Vineland, Mathematics.  
 FOX, B. MERLDENE, Tenafly, Mathematics.  
 HEROLD, VINCENT R., Ramsey, Biology.  
 KELLER, Sr. PAUL M., North Wildwood, Biology.  
 LAJEWSKI, Sr. M. FIRMINA, Sparta, Mathematics.  
 LUTZKE, HARRY, Newark, Biology.  
 McDONNELL, Sr. M. PHILOTH, Bayonne, Biology.  
 MCGUINNESS, ROBERT A., Jersey City, Mathematics.  
 SALERNO, SALVATORE W., Newark, Mathematics.  
 SCHOEN, Sr. M. MYRONA, North Plainfield, Mathematics.  
 SELTZER, MORTON, Newark, Mathematics.  
 WALDSTEIN, MORRIS, Paterson, Physics.

**NEW MEXICO**

*Graduate*

BREGSTRESSER, THOMAS K., Los Alamos, Physics.  
 DIEBOLD, ROBERT E., Los Lunas, Physics.  
 DOWDLE, JOHN R., Deming, Mathematics.  
 LUNSFORD, JAMES S., Albuquerque, Engineering.  
 ROEDER, DAVID W., Albuquerque, Mathematics.  
 WALSH, JOSEPH M., Santa Fe, Biochemistry.  
 WELLOCK, ROBERT E., Albuquerque, Mathematics.

*Cooperative Graduate*

DEAN, RAYMOND H., Sandia Base, Engineering.  
 MUNSON, DIANA H., Las Cruces, Zoology.  
 NEWMAN, DAVID S., Albuquerque, Mathematics.  
 ROBINSON, JOHN P., Carlsbad, Engineering.  
 SPERRY, PAUL L., Santa Fe, Mathematics.  
 SPIEGEL, ZANE, Santa Fe, Earth Sciences.  
 SPRUELL, ROY O., Las Cruces, Mathematics.

*Senior Postdoctoral*

WABER, JAMES T., Los Alamos, Engineering.

*Summer Fellowships for Graduate Teaching Assistants*

CARVER, ALFRED C., Silver City, Mathematics.  
 JONES, CLYDE J., Albuquerque, Zoology.  
 KEYES, CONRAD G., Jr., Las Cruces, Engineering.  
 POORBAUGH, JOHN H., Roswell, Zoology.  
 WILLIAMS, FRANK M., University Park, Mathematics.

*Summer Fellowships for Secondary School Teachers*

BONHAGEN, FREDERICK H., Santa Fe, Mathematics.  
 CLEBK, NATHAN H., Sr., Hagerman, Mathematics.  
 MCCRARY, OLLIE W., Silver City, Botany.  
 MITCHELL, ROBERT C., Anthony, Physics.

**NEW YORK**

*Graduate*

ALFF, CYNTHIA E., Long Island City, Physics.  
 AMORUSO, MICHAEL J., Flushing, Physics.  
 ANDERSON, CHARLES H., Briarcliff Manor, Physics.  
 ARNUSH, DONALD, New York, Physics.  
 AUER, HENRY E., New Rochelle, Biochemistry.  
 BARAFF, GENE A., Elmhurst, Physics.  
 BARTLETT, DAVID F., New York, Physics.  
 BATT, RUSSELL H., Jamestown, Chemistry.  
 BATTERMAN, STEVEN C., Brooklyn, Engineering.  
 BECK, BERNARD, Bronx, Social Sciences.  
 BERGER, ROBERT, Freeport, Engineering.  
 BLOOM, DAVID M., New York, Mathematics.  
 BOYLAN, EDWARD S., New York, Mathematics.  
 BRANCAZIO, PETER J., Long Island City, Engineering.  
 BRATER, HEBBERT J., New York, Earth Sciences.  
 BRESLAU, MICHAEL, Troy, Engineering.  
 BRUSH, JOAN O., Sidney, Chemistry.  
 BUHRE, CARL F., Hempstead, Chemistry.  
 BUTENSKY, MARTIN, Brooklyn, Engineering.  
 CARROLL, VERN, Patchogue, Anthropology.  
 CASSY, KENNETH P., Jackson Heights, Mathematics.

COHEN, NATALIE S., Floral Park, Medical Sciences.

CONE, ALBERT A., Shrub Oak, Physics.

CONN, CAROLYN, Syracuse, Chemistry.

CONRATH, DAVID W., Rye, Social Sciences.

COOK, DAVID M., Troy, Physics.

COTTLER, RHEA J., Brooklyn, Zoology.

DAWSON, ROBERT L., Rochester, Chemistry.

DESSAU, RALPH, Far Rockaway, Chemistry.

DJOURU, FRANS M., Jr., Ithaca, Mathematics.

DOLEN, RICHARD, New York, Physics.

DOUGHERTY, HARRY W., Brooklyn, Biochemistry.

DRISCOLL, MICHAEL J., Buchanan, Engineering.

DWORIN, LOWELL, Brooklyn, Physics.

EASTON, PAUL D., New York, Physics.

ECKHART, WALTER, Yonkers, Biophysics.

EINBINDER, HERBERT M., Far Rockaway, Physics.

EISENBERG, JUDAH M., Forest Hills, Physics.

ENGELS, JOAN C., Malverne, Earth Sciences.

FELDMAN, MARTIN, Brooklyn, Physics.

FINE, TERENCE L., New York, Engineering.

FRANCO, VICTOR, New York, Physics.

FREED, JACK H., Brooklyn, Chemistry.

FREY, JEFFREY I., Brooklyn, Engineering.

FRUCHTBAUM, HAROLD, Brooklyn, Social Sciences.

GALLANT, JONATHAN A., Mount Vernon, Genetics.

GEORGE, ALBERT R., Jr., Carle Place, Engineering.

GILBERT, IRA H., Jamaica Physics.

GINSBERG, EDWARD S., New York, Physics.

GOLDBERG, CHARLES H., Brooklyn, Mathematics.

GOLDREICH, PETER M., New York, Physics.

GOLUB, ROBERT, New York, Engineering.

GRAPPEL, SAHAR F., Brooklyn, Microbiology.

GREER, RICHARD J., Johnson City, Engineering.

GREIBACH, SHEILA A., New Rochelle, Mathematics.

GRELICK, ARTHUR E., New York, Engineering.

GROSS, LUCY M., Williamsville, Chemistry.

GRUHN, RUTH E., Cornwall Hudson, Anthropology.

GUNTHER, LEON, Brooklyn, Physics.

HALPERN, ALVIN M., Bronx, Physics.

HANDEL, DAVID, Brooklyn, Mathematics.

HARMAN, MARY E., Brooklyn, Zoology.

HARRINGTON, DAVID R., North Tonawanda, Physics.

HARRIS, CHARLES S., Great Neck, Long Island, Psychology.

HECKEL, PHILIP H., Rochester, Earth Sciences.

HENSON, CARL P., Snyder, Biochemistry.

HERZOG, STANLEY, New York, Engineering.

HILL, CHARLES G., Jr., Elmira, Engineering.

HOFF, MARCIAN E., Jr., Rochester, Engineering.

HOLTZMAN, ERIC, Bronx, Zoology.

HORTMANN, ALFRED G., Woodside, Chemistry.

ISAACS, I. M., Bronx, Mathematics.

KAHN, DANIEL S., Brooklyn, Mathematics.

KAHN, PETER J., Forest Hills, Mathematics.

KAHN, ROBERT E., Flushing, Engineering.

KAPLAN, LEONARD, Bronx, Chemistry.

KARG, GERHART M., New York, Chemistry.

KENDALL, ROBERT L., Rochester, Zoology.

KENNISON, JOHN F., St. Albans, Mathematics.

KORENMAN, VICTOR, Brooklyn, Physics.

KRANTZ, DAVID H., Buffalo, Psychology.

KRIEGER, JOSEPH B., Brooklyn, Physics.

KRIPKA, BERNARD R., Scarsdale, Mathematics.

KUBIS, JOSEPH J., Brooklyn, Physics.

LAMPORTE, LESLIE B., New York, Mathematics.

LANFORD, OSCAR E. III, New York, Physics.

LARABEE, ALLAN R., Great Neck, Biochemistry.

LEERMAKERS, PETER A., Rochester, Chemistry.

LEVY, JEROME F., Mount Vernon, Chemistry.

LEVY, PETER M., New York, Engineering.

LEWIN, RUTH L., New York, Chemistry.

LICHTENBAUM, STEPHEN, Brooklyn, Mathematics.

LIEBLING, GERALD R., Brooklyn, Chemistry.

LOWENTHAL, FRANKLIN, New York, Physics.

LUBKIN, SAUL, Brooklyn, Mathematics.

LUKS, EUGENE M., Brooklyn, Mathematics.

LYNCH, BEN E., Horseheads, Physics.

MAGID, RONALD M., Rego Park, Chemistry.

MARIANO, CHARLES F., Long Island City, Physics.

MASTERS, MILLICENT R., Flushing, Biochemistry.

MAYER, ALAN L., Flushing, Mathematics.

MCLEOD, DONALD W., Ithaca, Physics.

MEININGHAUS, ARLYN R., Lancaster, Chemistry.

MEYER, WERNER F., Bronx, Mathematics.

MONSKY, PAUL, Queens, Mathematics.

MYERS, ROBERT A., Mount Vernon, Physics.

NIBLACK, WALTER K., Buffalo, Physics.

NICOL, MALCOLM F., Briarcliff Manor, Chemistry.

OFFENHARTZ, PETER O., Bronx, Chemistry.

PALKA, JOHN M., Jackson Heights, Zoology.

PANKIWSKYJ, KOST A., Larchmont, Earth Sciences.

PARSEGAN, VOZKEN A., Troy, Biophysics.

PASSMAN, DONALD S., Bronx, Mathematics.

PEDERSEN, CHARLES R., Brooklyn, Engineering.

PELTZMAN, SAM, Brooklyn, Social Sciences.

PENNISTEN, JOHN W., Kenmore, Mathematics.

PERRIN, ROBERT P., New York, Physics.

PHINNEY, ROBERT A., Rochester, Earth Sciences.

POLLACK, JAMES, B., Woodmere, Long Island, Physics.

REYNOLDS, BRO. JOSEPH, Troy, Engineering.

ROSE, RICHARD M., Port Washington, Psychology.

ROSEN, ALLAN J., New York, Chemistry.

RUBENFELD, FRANK A., New York, Psychology.

RUNG, ROBERT, College Point, Engineering.

RUSSIN, BRENDA S., Brooklyn, Psychology.

SACKS, GERALD E., Ithaca, Mathematics.

SALTRE, STANLEY N., Brooklyn, Zoology.

SAXE, BERNHARD D., Flushing, Chemistry.

SCHHEEL, GEORGE F., Yonkers, Engineering.

SCHIFF, LEONARD, Brooklyn, Engineering.

SCHILDKRAUT, CARL L., Woodmere, Long Island, Chemistry.

SCHULMAN, JEROME M., New Rochelle, Chemistry.

SCHULTZ, JONAS, New York, Physics.

NEW YORK—Continued

SCHWARTZ, ALAN W., Brooklyn, Biochemistry.  
 SCHWEITZER, PAUL A., Pelham, Mathematics.  
 SEGAL, JOHN S., Valley Stream, Chemistry.  
 SEGRE, GINO C., Peekskill, Physics.  
 SHARP, DAVID H., Buffalo, Physics.  
 SHELUPSKY, DAVID I., Brooklyn, Physics.  
 SHEPP, LAWRENCE A., Brooklyn, Mathematics.  
 SIGMAN, DAVID S., Rego Park, Chemistry.  
 SILVER, BETTE, New York, Social Sciences.  
 SILVERSTONE, HARRIS J., Harrison, Chemistry.  
 SNELGROVE, RICHARD A., Mt. Vernon, Chemistry.  
 SOCOLOW, ROBERT H., New York, Physics.  
 SPIVAK, MICHAEL D., Jamaica, Mathematics.  
 ST. GEORGE, JOHN P., New York, Chemistry.  
 STOLLER, GERALD S., Brooklyn, Mathematics.  
 STRAHS, GERALD, Elmhurst, Chemistry.  
 STRAUSS, WALTER A., Kew Gardens, Mathematics.  
 SUSSMAN, RUTH P., New York, Biochemistry.  
 SUTHERLAND, IVAN E., Scarsdale, Engineering.  
 TANNENBAUM, MICHAEL J., Bronx, Physics.  
 THOMPSON, PHILIP A., Berlin, Engineering.  
 TOWELL, DAVID G., Fillmore, Earth Sciences.  
 WAHLIG, MICHAEL A., Woodside, Physics.  
 WATSON, GEORGE E. III, New York, Biology.  
 WEBB, JULIAN P., Rochester, Physics.  
 WEINMAN, ROBERT W., Brooklyn, Physics.  
 WEISS, GERALD, Far Rockaway, Anthropology.  
 WIGGIN, ROBERT T., Feura Bush, Mathematics.  
 WOLLMAN, HERBERT B., Flushing, Engineering.  
 WORTIS, MICHAEL, New York, Physics.  
 ZIMMERMAN, SETH I., New York, Mathematics.  
 ZVENGROWSKI, PETER D., Bronx, Mathematics.

*Cooperative Graduate*

ACTON, NANCY V., Baldwin, Chemistry.  
 ARBY, ALICE L., Great Neck, Biology.  
 ALEXANDER, ALEXANDER A., Buffalo, Biology.  
 ALLISON, SUSAN V., Yonkers, Biology.  
 AMBROGI, RAYMOND R., Brooklyn, Engineering.  
 AX, JAMES B., New York, Mathematics.  
 BAIBERLEIN, RALPH F., Hartsdale, Physics.  
 BALCH, MICHAEL S., Brooklyn, Mathematics.  
 BARBOUR, DAVID, Patchogue, Engineering.  
 BEDNAREK, ALEXANDER R., Buffalo, Mathematics.  
 BEHRENS, EARL W., Rensselaer, Earth Sciences.  
 BELL, HOWARD E., Medusa, Mathematics.  
 BELLICOURT, SK. KATHLEEN, Troy, Mathematics.  
 BERGER, CHARLES A., Brooklyn, Mathematics.  
 BERGLAS, HILDA, Spring Valley, Medical Science.  
 BERNOLD, STANLEY, Flushing, Earth Sciences.  
 BLEISTEIN, NORMAN, Jamaica, Mathematics.  
 BLOCH, GENE E., Buffalo, Mathematics.  
 BOLKER, ETHAN D., Brooklyn, Mathematics.

BOOKER, JOHN F., Ithaca, Engineering.  
 BRAGG, LINCOLN E., Orchard Park, Mathematics.  
 BRANDSTEIN, ALFRED G., Brooklyn, Mathematics.  
 BRIGGS, JAMES E., Glen Cove, Engineering.  
 BRONWITZ, LAURENCE E., Fredonia, Engineering.  
 COHEN, SHELDON M., Bronx, Psychology.  
 CORNER, MICHAEL A., New York, Biology.  
 CRUCE, WILLIAM J., Brooklyn, Chemistry.  
 CURRIE, DOUGLAS G., Rochester, Physics.  
 CUREY, VIRGINIA A., White Plains, Biology.  
 DE NEUFVILLE, RICHARD L., Nyack, Engineering.  
 DELESSIO, NOEL, Brooklyn, Engineering.  
 DENNER, BRUCE, Riverdale, Psychology.  
 DIAMENT, PAUL, Brooklyn, Engineering.  
 DICARLO, JAMES A., Buffalo, Physics.  
 DIETZ, RUSSELL N., Wantagh, Engineering.  
 DUHL, DAVID, Staten Island, Engineering.  
 EIDSON, JOHN C., Scarsdale, Engineering.  
 FADEN, ARNOLD M., Bronx, Social Sciences.  
 FALK, THEODORE J., Dryden, Engineering.  
 FAWCETT, JAMES T., Yonkers, Psychology.  
 FEINLEIB, JULIUS, Brooklyn, Physics.  
 FELDMAN, PAUL D., Floral Park, L.I., Physics.  
 FINKLER, PAUL, Brooklyn, Physics.  
 FINLEY, KAY T., Penfield, Chemistry.  
 FINNERTY, ANTHONY E., Brooklyn, Chemistry.  
 FLACKS, RICHARD, Brooklyn, Psychology.  
 FLEISCHER, HENRY, Jackson Heights, Chemistry.  
 FOSTER, EDWARD J., Syracuse, Physics.  
 FOX, JOEL S., Brooklyn, Engineering.  
 FRAIR, WAYNE, Briarcliff Manor, Microbiology.  
 FRANK, ERNEST C., Astoria, Agriculture.  
 FRANKLIN, ALLAN D., Brooklyn, Physics.  
 FRASCATORE, ROBERT C., Amsterdam, Mathematics.  
 FREUND, ISAAC, New York, Chemistry.  
 FRIEDMAN, DAVID H., Long Beach, Engineering.  
 FRIEDMAN, JOSEF N., Brooklyn, Physics.  
 FUCHS, EDWARD, Jamaica, Engineering.  
 GARDNER, LAURENCE T., Jr., New York, Mathematics.  
 GARRELL, MARTIN H., Brooklyn, Physics.  
 GARROD, CLAUDE, New York, Physics.  
 GEISS, GUNTHER R., Richmond Hill, Engineering.  
 GELMAN, HARRY, New York, Physics.  
 GERSHENSON, HILLEL H., New York, Mathematics.  
 GLICKFELD, BARNETT W., New York, Mathematics.  
 GOLD, PHILLIP J., New York, Mathematics.  
 GOLDSTEIN, ROBERT P., Binghamton, Engineering.  
 GOODE, ROBERT P., New York, Zoology.  
 GREEN, MICHAEL E., Brooklyn, Biochemistry.  
 GREENBLATT, ROBERT, Brooklyn, Mathematics.  
 GREENE, SAMUEL L., Syracuse, Physics.  
 HAMMER, ROBERTA E., Brooklyn, Chemistry.  
 HARD, JOHN S., Red Hook, Zoology.  
 HARRINGTON, JOSEPH J., Brooklyn, Engineering.  
 HAYNE, CHARLES A., Douglas, Mathematics.  
 HERMAN, HARVEY B., Brooklyn, Chemistry.  
 HERZBERG, NORMAN P., Brooklyn, Mathematics.  
 HILL, DAVID B., Brooklyn, Engineering.  
 HOUCK, DAVID J., Buffalo, Biology.

JOHNSON, STANLEY L., Ithaca, Biochemistry.  
 JORDAN, THOMAS F., Rochester, Physics.  
 KALANTAR, ALFRED H., Ithaca, Chemistry.  
 KATZBER, MEYER, Bronx, Physics.  
 KENNEY, DONALD M., Endicott, Chemistry.  
 KLAWANSKY, SIDNEY, Brooklyn, Physics.  
 KNIGHT, LONNIE W., New York, Chemistry.  
 KNOBE, PEARL A., Bronx, Psychology.  
 KRAMER, BARRY F., New York, Mathematics.  
 KRUMBEIN, SIMON J., Brooklyn, Chemistry.  
 KUBY, GEORGE H., Bronx, Mathematics.  
 LASHER, RICHARD J., Germantown, Engineering.  
 LAUFER, KENNETH S., Queens, Zoology.  
 LEVINE, IRENE S., New York, Psychology.  
 LEVINE, JAMES L., Neponset, Physics.  
 LEVY, HAROLD, New York, Engineering.  
 LEVY, PAUL F., Bronx, Biochemistry.  
 LIFF, ALLAN I., New York, Engineering.  
 LINDZEN, RICHARD S., New York, Mathematics.  
 LINTON, FRED E., New York, Mathematics.  
 LOGCHER, ROBERT D., Scarsdale, Engineering.  
 LOSTAGLIO, VINCENT J., Elmhurst, Long Island, Chemistry.  
 LUBIN, JONATHAN D., Staten Island, Mathematics.  
 LUTOMIRSKI, RICHARD F., Brooklyn, Engineering.  
 LUTZ, CHARLES A., West Hempstead, Chemistry.  
 MAHONEY, JAMES R., Syracuse, Earth Sciences.  
 MAZO, JAMES E., Syracuse, Physics.  
 MCINERNEY, THOMAS J., New York, Mathematics.  
 MCLAUGHLIN, JOHN P., Bronx, Psychology.  
 MEYER, RICHARD M., Snyder, Mathematics.  
 MIGLIORE, JOSEPH J., New York, Zoology.  
 MILSTEIN, SANDRA, New York, Psychology.  
 MINKUS, JEROME B., Brooklyn, Mathematics.  
 MOSHER, ROBERT E., Larchmont, Mathematics.  
 MOSS, ROBERT A., Brooklyn, Chemistry.  
 MULDOON, JAMES F., Brooklyn, Engineering.  
 NAGER, JOEL A., Jamaica, Mathematics.  
 NEWMAN, STEVEN S., Baldwin, Physics.  
 NIDDERCORN, JOHN H., Pearl River, Social Sciences.  
 NOE, RALPH W., New York, Chemistry.  
 NOVICK, AARON J., Brooklyn, Physics.  
 OLSHAKER, ARNOLD E., Brooklyn, Engineering.  
 O'MALLEY, THOMAS F., New York, Physics.  
 PARKER, ALFRED B., Jamestown, Earth Sciences.  
 PARMENTER, CHARLES S., Rochester, Chemistry.  
 PENCHINA, CLAUDE M., New York, Physics.  
 PEREL, JAMES M., Bronx, Chemistry.  
 PERRY, FREDERICK W., Holley, Engineering.  
 PETERSON, SUZANNE C., Jamestown, Chemistry.  
 PINCUS, EDWARD R., New York, Social Sciences.  
 PITTARO, MAURO J., Jr., Long Island, Engineering.  
 RADER, CHARLES M., Brooklyn, Engineering.  
 RADINSKY, LEONARD B., Staten Island, Earth Sciences.  
 RAFFEL, HELEN, New York, Social Sciences.  
 RAND, GEORGE, Bronx, Psychology.  
 REIFENBERG, GERALD H., Brooklyn, Chemistry.  
 REILLY, Sr. MARGUERITE, Hoosick Falls, Zoology.

REPETSKI, JAMES E., Buffalo, Engineering.  
 RIBNER, AARON, Brooklyn, Chemistry.  
 RICKERT, RICHARD M., Brooklyn, Engineering.  
 ROSE, ROBERT M., Flushing, Engineering.  
 ROSEN, ERWIN S., New York, Psychology.  
 ROST, ERNEST S., New Paltz, Physics.  
 ROTHENBERG, RONALD I., Bronx, Engineering.  
 ROTHLEDER, STEPHEN D., Bronx, Engineering.  
 ROTHSCHILD, WALTER G., New York, Chemistry.  
 SALKIND, JEANNETTE, Bronx, Mathematics.  
 SALOMONE, RAMON A., New York, Chemistry.  
 SAMARITANO, JOHN, Elmhurst, Engineering.  
 SCHEARFF, RAYMOND, Brooklyn, Zoology.  
 SCHULZE, ARTHUR W., Forest Hills, Chemistry.  
 SIBNER, ROBERT J., Brooklyn, Mathematics.  
 SILBERT, WILLIAM L., New York, Physics.  
 SLADE, EDWIN, Riverdale, Engineering.  
 SNOW, WOLFE, Brooklyn, Mathematics.  
 SNYGG, JOHN M., Oswego, Mathematics.  
 SOBELL, ALAN, Brooklyn, Physics.  
 SOLOVAY, ROBERT M., Brooklyn, Mathematics.  
 STELL, GEORGE R., New York, Mathematics.  
 SWEENEY, DONALD R., Floral Park, Psychology.  
 TEIGER, MARTIN L., Brooklyn, Physics.  
 TIERNEY, MYLES, New York, Mathematics.  
 TILSON, SEYMOUR, New York, Earth Science.  
 TONRA, PATRICK J., Brooklyn, Mathematics.  
 VANDERSTOUW, GERALD G., Rochester, Chemistry.  
 WALTON, DANIEL C., Syracuse, Botany.  
 WARTEN, RALPH M., Levittown, Mathematics.  
 WEINGOLD, HARRIS D., Bronx, Engineering.  
 WEISS, ETHEL, New York, Psychology.  
 WEISS, JONAS, New York, Chemistry.  
 WIRTENSON, MARY E., Nyack, Zoology.  
 WORTIS, ROCHELLE P., New York, Psychology.

#### Postdoctoral

BARLAND, PETER, Forest Hills, Medical Sciences.  
 BOEZI, JOHN A., Binghamton, Microbiology.  
 BRAY, RICHARD C., New York, Biochemistry.  
 CEBRA, JOHN J., New York, Biochemistry.  
 CHOROVER, STEPHEN L., New York, Psychology.  
 DOLLIVER, JAMES S., Ithaca, Botany.  
 ECKERT, ROGER O., New York, Zoology.  
 GOLDBERG, ABRAHAM, Staten Island, Physics.  
 GREENDLINGER, MARTIN, Brooklyn, Mathematics.  
 KADANOFF, LEO P., New York, Physics.  
 LONG, LEON E., Fallsides, Earth Sciences.  
 NASS, MARGIT M., Long Beach, Zoology.  
 NOVIN, DONALD, Brooklyn, Psychology.  
 PASTO, DANIEL J., Erin, Chemistry.  
 RICKARD, CHARLES G., Ithaca, Agriculture.  
 STRAUSS, HERBERT L., Kew Gardens, Chemistry.  
 TSANG, WING, Forest Hills, Chemistry.  
 TULLY, EDWARD J., Jr., Mastic Beach, Mathematics.  
 VINCOW, GERSHON, Brooklyn, Chemistry.  
 WENDT, RICHARD H., West Henrietta, Medical Sciences.

#### Senior Postdoctoral

BARKSDALE, W. LANE, New York City, Microbiology.  
 DE WIRE, JOHN W., Ithaca, Physics.

**NEW YORK—Continued**

GREGORY, JOHN D., New York City, Biochemistry.  
 HOLE, GEORGE G., Jr., Syracuse, Zoology.  
 KOLCHIN, ELLIS R., New York, Mathematics.  
 MARCUS, RUDOLPH A., New York, Mathematics.  
 MEINWALD, JERROLD, Ithaca, Chemistry.  
 OSTER, GERALD, New York, Chemistry.  
 ROSS, ARCHIBALD F., Ithaca, Botany.  
 SALPETER, EDWIN H., Ithaca, Astronomy.  
 SRB, ADRIAN M., Ithaca, Genetics.  
 SUNYAR, ANDREW W., Long Island, Physics.

*Science Faculty*

ALLARD, Sr., MARY J., Buffalo, Chemistry.  
 BATTIN, WILLIAM J., Jr., Potsdam, Engineering.  
 BRAISTED, PAUL W., Syracuse, Engineering.  
 CALHOON, STEPHEN W., Jr., Houghton, Chemistry.  
 DORATO, PETER E., Brooklyn, Engineering.  
 EISENSTADT, RAYMOND, Schenectady, Engineering.  
 JACOBSON, EUGENE D., New York, Physics.  
 KOCHERSBERGER, ROBERT C., Jamestown, Zoology.  
 LANNI, ROBERT P., New York, Physics.  
 LABSSON, ROBERT D., Potsdam, Mathematics.  
 MIKOCHIK, STEPHEN T., Brooklyn, Engineering.  
 NANGEBONI, LOUIS L., Ithaca, Agriculture.  
 POMILLA, FRANK R., Brooklyn, Physics.  
 POURING, ANDREW A., Farmingdale, Engineering.  
 PRENOWITZ, WALTER, Brooklyn, Mathematics.  
 SEELY, NATHAN T., Jr., Mamaroneck, Mathematics.  
 SIGLER, LAURENCE E., New York, Mathematics.  
 SOEHNGEN, HENRY F., Brooklyn, Engineering.  
 STOTZ, KERWIN C., Troy, Engineering.

*Summer Fellowships for Graduate Teaching Assistants*

BALLARD, KAITH E., New York, Social Sciences.  
 BARILE, RAYMOND C., New York, Chemistry.  
 BARTLETT, JEANNE S., Troy, Chemistry.  
 BASILE, DOMINICK V., Yonkers, Botany.  
 BRESTERFELDT, HERMAN J., Woodhaven, Mathematics.  
 BLEYMAN, LEA K., New York, Zoology.  
 BOOKER, JOHN F., Ithaca, Engineering.  
 BOTTOMLEY, CHARLES G., Ithaca, Chemistry.  
 BURTON, DONALD J., Ithaca, Chemistry.  
 CARR, ROBERT W., Rochester, Chemistry.  
 CASSIDY, MARTIN M., Pleasantville, Earth Sciences.  
 CHILTON, BRUCE L., Tonawanda, Mathematics.  
 DITTRICK, JOHN W., Great Neck, Chemistry.  
 ERBIG, IRMA B., Brooklyn, Mathematics.  
 FINK, RICHARD D., New Rochelle, Chemistry.  
 GARDNER, ALBERT H., Syracuse, Psychology.  
 GARDNER, LAURENCE T., Jr., New York, Mathematics.  
 GOICBERG, ASHER D., Rochester, Psychology.  
 GORMAN, ANTHONY L. F., Rochester, Psychology.  
 GRAFF, ROBERT A., New York, Engineering.  
 GRIERSON, JAMES D., Jr., Ithaca, Botany.  
 HAPKE, BRUCE W., Ithaca, Engineering.  
 HETZEL, HOWARD R., Webster, Zoology.  
 HUMPHREY, HOWARD T., Buffalo, Mathematics.  
 ISAACSON, ROBERT B., New York, Chemistry.

KATZ, MAURICE J., New York, Physics.  
 KAUFMAN, SHELDON E., Bronx, Physics.  
 KINLOCH, JOHN, New York, Mathematics.  
 KONZ, MARVIN J., Naples, Chemistry.  
 KOVAL, LESLIE R., Ithaca, Engineering.  
 KEAMER, BARRY F., New York, Mathematics.  
 LAPALME, DONALD W., Valley Stream, Chemistry.  
 MARSHALL, PATRICIA A., Whitestone, Chemistry.  
 MAZO, JAMES E., Syracuse, Physics.  
 MCKEON, BRENDA C., Brooklyn, Mathematics.  
 MCMANUS, LAWRENCE R., Ithaca, Zoology.  
 MEGAHAN, WALTER F., Merrick, Agriculture.  
 MILLER, EDWARD G., Ithaca, Chemistry.  
 MORSE, J. EDWIN, Brooklyn, Agriculture.  
 NIXON, JAMES, Ithaca, Chemistry.  
 OTREMBIA, EDWARD D., Lackawanna, Chemistry.  
 PETERSON, BRUCE B., Syracuse, Mathematics.  
 PIERCE, FELIX J., Ithaca, Engineering.  
 PUTZ, HERBERT B., Brooklyn, Mathematics.  
 RHOADES, RICHARD W., Port Washington, Botany.  
 RIEFFEL, MARC A., Manhasset, Mathematics.

*Graduate Teaching Assistants*

BOZYCKI, EUGENE P., Cheektowaga, Mathematics.  
 RUSZKAY, RICHARD J., New York, Engineering.  
 SANDVIK, ERIK I., Rochester, Chemistry.  
 SCHER, HARVEY, Syracuse, Physics.  
 SCHWARTZ, BRIAN B., Brooklyn, Physics.  
 SCHWARTZ, LEONARD H., New York, Chemistry.  
 STUBER, JOAN E., Yonkers, Chemistry.  
 TEICHMAN, PAUL, Brooklyn, Physics.  
 TILSON, SEYMOUR, New York, Earth Sciences.  
 TOMLINSON, PERCIVAL A. S., Brooklyn, Psychology.

*Summer Fellowships for Secondary School Teachers*

BADER, ABRAM, Brooklyn, Physics.  
 BECHTOLD, CHARLES A., New York, Mathematics.  
 BLUM, HAMILTON S., Farmingdale, Mathematics.  
 BOROWSKY, NATHAN, New York, Physics.  
 BROOKS, LUCILE E., Marcellus, Psychology.  
 CISM, FRANKLYN P., Harpursville, Chemistry.  
 DODES, IRVING ALLEN, New York, Mathematics.  
 DRILLING, ELMO V., Buffalo, Mathematics.  
 FEIT, JULIUS, North Bellmore, Physics.  
 FRANKEL, BELLA R., New York, General Sciences.  
 GAFFNEY, Sr., KATHERINE B., Bardonia, Chemistry.  
 GERLOCK, FRANK GEORGE, Nyack, Biology.  
 GESLAK, FRANK W., Chateaugay, General Sciences.  
 GIANTURCO, ANGELO J., Buffalo, General Science.  
 GLICKSMAN, ABRAHAM M., New York, Mathematics.  
 GRELL, EINAR F., Huntington Station, Biology.  
 GROSSMAN, ISRAEL, New Rochelle, Mathematics.  
 HALSEY, ANNE E., Hyde Park, General Sciences.  
 JAFFE, BENJAMIN, New York, Mathematics.  
 KELLNER, Sr., MARIA, Rochester, Chemistry.



KLEIN, MELVIN PHILIP, New York, Mathematics.  
 LENCHNER, GEORGE, Franklin Square, Mathematics.  
 LESTER, WELLINGTON F., Hancock, Biology.  
 LOEB, Sr., M. RAYMOND, Brooklyn, Mathematics.  
 MAGDALIN, ROBERT S., Queens, Mathematics.  
 MALONEY, ST. JOANNE T., New York, Mathematics.  
 MCINTYRE, PATRICK J., New Hyde Park, Chemistry.  
 MCGOWAN, LAURENCE J., White Plains, Biochemistry.  
 MICHEL, ROBERT H., New York, Mathematics.  
 MILLER, ROBERT R., Sr., Plattsburgh, Zoology.  
 ORTNER, Sr. M. CONRAD, New York, Chemistry.  
 PARVER, HARRY, Brooklyn, Chemistry.  
 POELKER, Sr. M. LEONARD, New York, Mathematics.  
 REMERY, Sr. FRANCES A., Auburn, Biology.  
 RITZ, WILLIAM C., Snyder, Biology.  
 RUDERMAN, RUTH M., New York, Mathematics.  
 SAKS, NORMAN MARTIN, Brooklyn, Biology.  
 SCHMEER, Sr. M. ROSARIO, New York, Biology.  
 SKLAR, SAMUEL E., New York, Mathematics.  
 SKLENARIK, ROBERT F., Unadilla, Biology.  
 SMITH, JOHN E., Nyack, Chemistry.  
 SONEN, RALPH PAUL, Northport, Biology.  
 STEDMAN, EARL D., Glen Head, Chemistry.  
 TAFT, MARJORIE LANG, Woodmere, Mathematics.  
 WAGNER, DANIEL, New Rochelle, Biology.  
 WALTER, ROGER W., Clyde, General Sciences.  
 WEISS, EMANUEL, New York, Physics.  
 WEISS, RICHARD, New York, Zoology.  
 WEISSMAN, SIMON A., Brooklyn, Chemistry.  
 YONIS, LEONARD, New York, Mathematics.  
 ZIMMERMAN, ROBERT F., Dewitt, Biology.

## NORTH CAROLINA

### Graduate

BLAKE, ROY B., Jr., Winston-Salem, Engineering.  
 BYRANT, DAVID R., Greensboro, Chemistry.  
 CARLTON, TERRY S., Reidsville, Chemistry.  
 CONRY, MURPHY B., Rockwell, Chemistry.  
 DAVIS, HOWARD T., Hendersonville, Chemistry.  
 GIBBS, HYATT M., North Wilkesboro, Physics.  
 GRIFFITHS, PHILLIP A., Raleigh, Mathematics.  
 HAPPER, WILLIAM, Lenoir, Physics.  
 HUBBARD ROBERT L., Chapel Hill, Physics.  
 LOBE, LAWRENCE L., Jr., Kings Mountain, Chemistry.  
 NANNEY, CECIL A., Black Mountain, Physics.  
 NORSWORTHY, DAVID R., Chapel Hill, Social Sciences.

### Cooperative Graduate

CARROLL, FRANK I., Chapel Hill, Chemistry.  
 COWARDIN, ROBERT L., Raleigh, Engineering.  
 DABBS, JAMES M., Jr., Mayesville, Psychology.  
 FALLAW, WALLACE C., Hillsboro, Earth Sciences.  
 HALL, ELIZABETH A., Salisbury, Chemistry.  
 HILLS, FRANCIS A., Battleboro, Earth Sciences.  
 KIMEL, JACOB D., Jr., Winston-Salem, Physics.

OWEN, GORDON, N. Jr., Raleigh, Engineering.  
 SCHUTZ, WILFRED M., Raleigh, Genetics.  
 STONECYPHER, ROY W., Raleigh, Genetics.  
 WORK, STEWART D., Durham, Chemistry.

### Postdoctoral

KING, HARRY F., Greensboro, Chemistry.  
 KORNEGAY, WADE M., Mount Olive, Chemistry.  
 WESSELS, NORMAN K., Winston-Salem, Zoology.

### Senior Postdoctoral

OKUN, DANIEL A., Chapel Hill, Engineering.  
 PALMATIER, EVERETT D., Chapel Hill, Physics.

### Science Faculty

BEATTY, OZELL K., Salisbury, Botany.  
 ELLER, JAMES G., Cullowee, Zoology.  
 HARRELL, JOHN D., Jr., Greensboro, Mathematics.  
 HARRISBERGER, LEE EDGAR, Raleigh, Engineering.  
 MANN, WILLIAM R., Chapel Hill, Mathematics.  
 SHUFORD, FLORENCE V., Hickory, Mathematics.  
 VICK, ALPHONSO R., Winston-Salem, Botany.  
*Summer Fellowships for Graduate Teaching Assistants*  
 ADAMS, DAVID A., Raleigh, Botany.  
 ASHBROOK, BETTY J., Cullowee, Mathematics.  
 BRUCE, RICHARD C., Durham, Zoology.  
 CROWDER, BILLY L., Greensboro, Chemistry.  
 DOVE, LEWIS D., Durham, Botany.  
 GARCIA, BERTRAM H., Jr., Raleigh, Engineering.  
 GORFORTH, SAMUEL T., Jr., Raleigh, Engineering.  
 LOVEN, ANDREW W., Crossnore, Chemistry.  
 PEARSON, JOSEPH T., Jr., Raleigh, Engineering.

### Summer Fellowships for Secondary School Teachers

CHEEK, WILLIAM E., Matthews, Chemistry.  
 DRAKE, REUBEN C., Concord, Mathematics.  
 HAGAMAN, WALTER H., Mooresville, Mathematics.  
 LAVINDER, ELIZABETH E., Henderson, Mathematics.  
 SCHULTZ, NANCY W., Winston-Salem, Biology.  
 TESTER, JOEL CALAWAY, Gastonia, Biology.  
 YONGUE, WILLIAM H., Charlotte, Biology.

## NORTH DAKOTA

### Graduate

SPANDE, THOMAS F., Mayville, Chemistry.  
 UTGAARD, JOHN E., Minot, Earth Sciences.

### Cooperative Graduate

LUNSETTER, WAYNE B., Fargo, Biochemistry.  
 MCHOSE, JAMES H., Fargo, Psychology.  
 MUNRO, JANE A., Fargo, Zoology.  
 ONSAGER, JEROME A., West Fargo, Zoology.

### Postdoctoral

THOMAS, PAUL E., Fargo, Mathematics.

### Science Faculty

OLSON LLOYD D., State College, Mathematics.  
 YEAGER, VERNON L., Grand Forks, Medical Sciences.

**NORTH DAKOTA—Continued***Summer Fellowships for Graduate Teaching Assistants*

BARES, WILLIAM A., Beach, Engineering.  
 BEATTY, JAMES W., Jr., Fargo, Chemistry.  
 BERGER, THOMAS J., Fargo, Zoology.  
 NELSON, DELBERT R., Ellendale, Medical Sciences.  
 PETERSON, CARL M., Backoo, Engineering.  
 SOBOLIK, RONALD C., Grand Forks, Mathematics.

*Summer Fellowships for Secondary School Teachers*

JACOBSON, ROBERT L., Grand Forks, Mathematics.  
 OLLENBURGER, ALVIN W., Wimbledon, Mathematics.

**OHIO***Graduate*

ARGUS, CAROL J., Columbus, Physics.  
 BARGER, JAMES E., Toledo, Engineering.  
 BEISNER, HENRY M., Tiffin, Physics.  
 BERNDT, DONALD C., Toledo, Chemistry.  
 BRABSON, BENNET B., Findlay, Physics.  
 CARROLL, TOM W., Cincinnati, Engineering.  
 CHANEY, ROBIN W., Columbus, Mathematics.  
 COOPER, PAUL D., Worthington, Earth Sciences.  
 DEUTSCH, ELIZABETH J., Shaker Heights, Zoology.  
 DOUGLAS, RONALD G., Cincinnati, Mathematics.  
 ELLIS, DAVID G., Marietta, Physics.  
 FARISON, JAMES B., McClure, Engineering.  
 FETTIS, HENRY E., Dayton, Mathematics.  
 FROMMER, GABRIEL P., Cincinnati, Psychology.  
 GANS, DANIEL J., University Heights, Physics.  
 GIBSY, DANIEL P., Columbus, Mathematics.  
 GLESER, LEON J., Cincinnati, Mathematics.  
 GORDON, ALICE M., Columbus, Psychology.  
 GREENBERG, WILLIAM M., Toledo, Physics.  
 HEMPEL, WALTER P., Cincinnati, Microbiology.  
 HORN, WILLIAM A., Cincinnati, Mathematics.  
 KEHOE, JAC S., Dayton, Psychology.  
 KRAPP, PAUL J., Springfield, Chemistry.  
 KREIMER, HERBERT F., Jr., Cincinnati, Mathematics.  
 KUEMPEL, PETER L., Cincinnati, Biochemistry.  
 KUTCHER, JAMES W., East Cleveland, Physics.  
 LAEDINS, DAGNIJA, Delaware, Chemistry.  
 LEBOR, ANDREW S., Cincinnati, Physics.  
 LEVY, RICHARD M., Cincinnati, Chemistry.  
 MACMAHON, JAMES A., Dayton, Zoology.  
 McDONOUGH, JOSEPH A., Cincinnati, Engineering.  
 MENGERT, PETER H., Painesville, Physics.  
 MENNINGER, JOHN R., Dayton, Biophysics.  
 MILLER, STEVEN R., Bay Village, Chemistry.  
 MYERS, ALAN L., Cincinnati, Engineering.  
 NETTING, ROBERT M., Cincinnati, Anthropology.  
 PATTY, RICHARD R., Columbus, Physics.  
 PRICE, ELLEN J., East Cleveland, Chemistry.  
 REILLY, BERNARD E., Cleveland, Genetics.  
 RIX, JOHN R., Bay Village, Physics.  
 SHAFER, DAVID M., Cincinnati, Mathematics.  
 SORRELL, CHARLES A., Hamilton, Earth Sciences.  
 SUGAR, ROBERT L., Beachwood, Physics.

SWEENEY, THOMAS L., Cleveland, Engineering.

TAYLOR, LYNN J., Cuyahoga Falls, Chemistry.  
 TSCHANZ, JOHN F., Lima, Physics.  
 VANDENEYNDEN, CHARLES L., St. Bernard, Mathematics.  
 VERDERBER, JOSEPH A., Cleveland, Engineering.  
 WEBB, DAVID K., Jr., Chillicothe, Earth Sciences.  
 WILKINS, CORNELIUS K., Jr., Bedford, Chemistry.  
 WILLIAMS, FRANCIS D., Columbus, Mathematics.

*Cooperative Graduate*

ADAM, WALDEMAR, Cincinnati, Chemistry.  
 ALMONEY, JUDY A., Dayton, Zoology.  
 ANDERSON, CHARLES T., Columbus, Mathematics.  
 BEARD, JAMES B., Bradford, Agriculture.  
 BESHINSKE, RAYMOND J., Cleveland, Chemistry.  
 BLOOM, SANFORD G., Columbus, Engineering.  
 BROWN, THOMAS A., Dayton, Mathematics.  
 BRUECKNER, DAVID A., Miamisburg, Microbiology.  
 BRUNNER, CARL A., Cincinnati, Engineering.  
 CARPENTER, RICHARD N., Cleveland, Chemistry.  
 CONNOLLY, JOHN W., Cincinnati, Chemistry.  
 CORELL, SAM R., Greenfield, Chemistry.  
 CORNELL, DOUGLAS W., Bowling Green, Chemistry.  
 CORNELL, ROSS H., Bowling Green, Mathematics.  
 CRANO, JOHN C., Euclid, Chemistry.  
 CRUDEN, ROBERT W., Berea, Botany.  
 DAUGHERTY, PATRICIA A., Columbus, Genetics.  
 DAWSON, WALLACE D., Jr., Columbus, Genetics.  
 FALB, RICHARD D., Columbus, Chemistry.  
 FINZEL, JEAN E., Westlake, Zoology.  
 FREVERT, PETER W., Utica, Social Sciences.  
 FRIIHAUF, EDWARD J., Burton, Chemistry.  
 GIFFORD, PHILLIP H. II, Worthington, Engineering.  
 GOULD, ROBERT L., Shaker Heights, Engineering.  
 HABERMAN, CAROL B., Cleveland Heights, Chemistry.  
 HERBERT, NICHOLAS C., Columbus, Physics.  
 HOFFMAN, RALPH B., Washington Court House, Engineering.  
 HOLMES, FREDERIC L., Cincinnati, Social Sciences.  
 JACOBS, GERALD D., Perrysburg, Chemistry.  
 JOYCE, WILLIAM B., Columbus, Physics.  
 JULYAN, FREDERICK J., Columbus, Zoology.  
 KEHOE, BRANDT, Dayton, Physics.  
 KELLEY, FRANK N., Suffield, Chemistry.  
 KRAUSE, DANIEL J., Columbus, Engineering.  
 KULINSKI, EDMUND S., Cleveland, Engineering.  
 KVARDA, BETTY L., Lakeside, Mathematics.  
 LARSEN, ARTHUR B., Parma Heights, Engineering.  
 MARCUS, JULIUS L., Cleveland, Engineering.  
 MCGAUGHY, ROBERT E., Cleveland, Physics.  
 MILLER, HARRY G., Defiance, Physics.  
 MURZYN, DOROTHY P., Parma, Chemistry.  
 PFLIBER, WILLIAM L., Columbus, Zoology.  
 POLITZER, PETER A., Cleveland, Chemistry.  
 POOS, WILMA J., Eaton, Biochemistry.

ROBINSON, DAVID P., Cincinnati, Chemistry.  
 SCHOEN, THOMAS A., Dayton, Mathematics.  
 SCHROEBER, DIETRICH, Enon, Physics.  
 SECOY, DIANE M., Troy, Zoology.  
 SKAATES, JAMES M., Worthington, Engineering.  
 SOKPOVICH, NICHOLAS J., Canfield, Physics.  
 THOMAS, DAVID T., Barnesville, Engineering.  
 WAGNER, PHILIP L., Cleveland Heights, Chemistry.  
 WALTERS, VIRGINIA F., Cleveland, Physics.  
 WAMPLER, DALE L., Lima, Chemistry.  
 WEISGERBER, DAVID W., Delphos, Chemistry.  
 WHITLOCK, RICHARD T., Cleveland, Physics.  
 WIEGAND, KARL L., Columbus, Psychology.  
 WILCOX, JOHN P., Columbus, Engineering.  
 WILLIAMS, ROBERT L., Coshocton, Engineering.

ZERLA, FREDRIC J., Dillonvale, Mathematics.  
*Postdoctoral*  
 CARRUTHERS, PETER A., Middletown, Physics.  
 CHATO, JOHN C., Dayton, Engineering.  
 EGGERT, DONALD A., Parma, Botany.  
 FOOTE, JOEL L., Cleveland, Biochemistry.  
 KOENIG, DONALD F., Cuyahoga Falls, Biophysics.  
 SAUER, KENNETH H., East Cleveland, Chemistry.  
 WOOLLEY, DOROTHY E., Wapakoneta, Medical Sciences.  
 ZWOLENIK, JAMES J., Cleveland, Chemistry.

*Senior Postdoctoral*  
 GOLDBERG, JOSHUA N., Trotwood, Physics.  
 UTTER, MERTON, F., Cleveland, Biochemistry.  
 ZEISS, HAROLD H., Dayton, Chemistry.

*Science Faculty*  
 BRUMBAUGH, JOE H., Greenville, Biology.  
 CONLON, HOWARD E., Cleveland, Engineering.  
 DILLON, THADDEUS III, Youngstown, Mathematics.  
 GOLDBERG, SAMUEL, Oberlin, Mathematics.  
 LOEHR, RAYMOND C., Cleveland, Engineering.  
 LUDEMAN, JOHN F., New Concord, Psychology.  
 LUTZ, ARTHUR L., Springfield, Physics.  
 MAJOR, JOHN K., Cleveland, Physics.  
 MILLER, WILLIAM R., Cleveland, Engineering.  
 ROGERS, KAY T., Oberlin, Medical Science.  
 SHIVELY, RALPH L., Cleveland, Mathematics.  
 STEVENS, RICHARD H., Cincinnati, Mathematics.  
 TRANSUE, WILLIAM R., Gambier, Mathematics.  
 VANCE, ELBRIDGE P., Oberlin, Mathematics.  
 WEBSTER, ELEANOR R., Cleveland, Chemistry.  
 YOZWIAK, BERNARD J., Youngstown, Mathematics.

*Summer Fellowships for Graduate Teaching Assistants*  
 BACHOP, WILLIAM E., Columbus, Zoology.  
 BRANDTS, JOHN F., Celina, Chemistry.  
 CASTLE, RICHARD T., Urbana, Physics.  
 CHERRY, ROBERT H., Jr., Columbus, Engineering.  
 COPPAGE, WILLIAM E., Columbus, Mathematics.  
 CORIBILL, SAM R., Greenfield, Chemistry.

DAUGHERTY, PATRICIA A., Columbus, Genetics.  
 FINEGAN, JOEL D., Cleveland, Physics.  
 FREVERT, PETER W., Utica, Social Sciences.  
 GLASER, FREDERIC M., Fostoria, Chemistry.  
 GRUNDER, JOHN R., Minerva, Chemistry.  
 GUSTAFSON, LEWIS B., Lakewood, Earth Sciences.  
 HUBSCHMAN, JERRY H., Columbus, Zoology.  
 MAHIG, JOSEPH, Columbus, Engineering.  
 MARTIN, FRANK B., Berea, Mathematics.  
 MCEWEN, MICHAEL C., Toledo, Earth Sciences.  
 MCMENNAMIN, MARGARET A., Wadsworth, Biochemistry.  
 MERRYMAN, EARL L., St. Clairsville, Chemistry.  
 MILLER, STEVEN R., Bay Village, Chemistry.  
 MURPHY, CHARLES T., Oberlin, Physics.  
 PATTEE, PETER A., Columbus, Microbiology.  
 POLT, JAMES M., Lancaster, Psychology.  
 RITZ, HARRY L., Columbus, Genetics.  
 ROBERTSON, ANDREW E., Toledo, Microbiology.  
 SHIELDS, ROBERT J., Columbus, Zoology.  
 SMITH, DONALD E., Columbus, Zoology.  
 STEUGAR, DANIEL, Cleveland, Chemistry.  
 WILLKE, THOMAS A., Columbus, Mathematics.  
 ZEPF, THOMAS H., Cincinnati, Physics.

*Summer Fellowships for Secondary School-teachers*  
 BAIRD, ST. THOMAS MORE, Columbus, Biology.  
 BARGE, JACK HAROLD, Delaware, General Sciences.  
 BARKER, WILLIAM W., Avonlake, Biology.  
 BARNES, JAMES N., Wickliffe, Biology.  
 BENESH, BRO. JOHN JAMES, Akron, Mathematics.  
 BROWNSON, WALTER M., Nova, Biology.  
 CAITO, ST. M. GEMMA, Columbus, Biology.  
 CONDIT, JOHN M., Columbus, Zoology.  
 COSTA, ROBERT R., Youngstown, Biology.  
 CYGNAR, BRO. ADRIAN, Gates Mills, Biology.  
 DECHANT, ST. 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, ST. M. EDWINA, Cincinnati, Chemistry.  
 NEUENDORF, EDWARD J., Cincinnati, Mathematics.  
 NIKLAS, ST. M. JOHANNA, Piqua, Mathematics.  
 OLIVE, JOHN HENRY, Chagrin Fall, Zoology.  
 PRIMMER, MERL, Logan, Biology.  
 SCHROEB, ST. M. MICHEL, Norwood, Biology.  
 SELWAY, KENNETH, Cleveland Heights, Mathematics.  
 SHURLOW, HAROLD J., Columbus, Mathematics.  
 WELLINGER, ST. M. LEONARD, Rocky River, Biochemistry.  
 WILSON, MARILYN A., Hayesville, Mathematics.

## OKLAHOMA

### Graduate

ADAMS, ROY B., Wewoka, Physics.  
BARNES, ROBERT F., Jr., Enid, Mathematics.  
BLADE, RICHARD A., Bartlesville, Mathematics.  
BUTLER, LARRY G., Ochelata, Biochemistry.  
COOPER, JANE E., Tulsa, Genetics.  
FRETWELL, LYMAN J., Jr., Tulsa, Physics.  
GARLAND, JOHN K., Ponca City, Chemistry.  
GILBERT, M. CHARLES, Lawton, Earth Sciences.  
GOLDWYN, ROGER M., Tulsa, Engineering.  
HURST, GERALD L., Oklahoma City, Chemistry.  
JONES, WILLIAM B., Tulsa, Mathematics.  
KIRMSB, DALE W., Alva, Engineering.  
KRUGER, ROBERT A., Oklahoma City, Engineering.  
LIPP, WILLIAM D., Bristow, Anthropology.  
PAUL, JOHNNY C., Fairview, Engineering.  
PONSOR, KENNETH C., Oklahoma City, Engineering.  
ROBINSON, ROBERT L., Jr., Muskogee, Engineering.  
SANMANN, EVERETT E., Geronimo, Physics.  
SHOVER, EDWARD F., Tulsa, Earth Sciences.  
TECH, JACK L., Oklahoma City, Astronomy.  
WOOD, DAVID E., Seminole, Chemistry.  
ZAVODNY, EUGENE N., Red Rock, Engineering.

### Cooperative Graduate

BATH, THOMAS D., Midwest City, Engineering.  
BODINE, JOHN J., Oklahoma City, Anthropology.  
CRAWFORD, JOHN C., Ponca City, Physics.  
DAVIS, ALLEN S., Oklahoma City, Mathematics.  
DUGGER, HARRY A., Oklahoma City, Chemistry.  
EDWARDS, JIMMIE G., Stillwater, Chemistry.  
FRIEDRICH, HENRY B., Clinton, Chemistry.  
FULTON, JAMES W., Norman, Engineering.  
GREEN, DON W., Tulsa, Engineering.  
HOWELL, MERLIN B., Guymor, Biochemistry.  
JEFFREY, JOHN R., Bartlesville, Chemistry.  
McCORMICK, BAILIE J., Stillwater, Chemistry.  
McCRACKEN, CURTIS W., Vici, Astronomy.  
SANDERS, DONALD C., Stillwater, Biochemistry.  
SLAUGHTER, EUGENE E., Jr., Durant, Mathematics.

### Science Faculty

CALVERT, FLOYD O., Norman, Engineering.  
DEAL, ROY B., Jr., Stillwater, Mathematics.  
LOVE, TOM J. Jr., Norman, Engineering.  
POOL, RICHARD B., Norman, Engineering.  
SMITH, GORDON G., Stillwater, Engineering.

### Summer Fellowships for Graduate Teaching Assistants

CECIL, DAVID R., Tulsa, Mathematics.  
CRONBLE, WILLIAM R., Bartlesville, Earth Sciences.  
DAVIS, KENNETH J., Lawton, Engineering.  
FINLEY, RICHARD D., Tablequah, Mathematics.  
FRIDAY, JOHN R., Cleveland, Engineering.  
GARLAND, JOHN K., Ponca City, Chemistry.  
GILBERT, M. CHARLES, Lawton, Earth Sciences.  
McCROSKY, JACK E., Stillwater, Agriculture.

SMELY, DONALD R., Norman, Earth Sciences.  
WHITWORTH, WALTER R., Stillwater, Zoology.  
WILLIAMS, CURTIS, Allen, Agriculture.  
WILLIAMS, DONALD R., Morrison, Mathematics.

### Summer Fellowships for Secondary School Teachers

BOTTOMS, GERALD DOYLE, Holdenville, Biology.  
BRANDENBURG, ROBERT L., Alva, Zoology.  
CROOKS, THOMAS C., Lindsay, Mathematics.  
DAVIS, JOHN F., Muskogee, General Sciences.  
DUFFER, WILLIAM R., Stratford, Botany.  
EPPERSON, DONALD M., Claremore, Mathematics.  
GUTHRIE, BENNETT M., Sr., Tablequah, Zoology.  
JOB, JOHN MARSHALL, Ponca City, Mathematics.  
JOHNSTON, RICHARD M., Tulsa, Mathematics.  
TROUT, VERDINE E., Sand Springs, Biology.  
WEITNER, W. CLEO, Davidson, Mathematics.

## OREGON

### Graduate

AMMANN, EUGENE O., Portland, Engineering.  
BROWN, ROBERT B., Portland, Mathematics.  
BURROUGHS, JOHN D., Salem, Engineering.  
DIXON, RICHARD W., Woodburn, Engineering.  
DURYEE, FRANCES L., North Bend, Microbiology.  
EMRICH, ROBERT L., Eugene, Anthropology.  
KERR, JAMES R., Portland, Engineering.  
MACINTYRE, ROSS J., Yachats, Zoology.  
MAHAN, GERALD D., Portland, Physics.  
MCNEAL, BRIAN L., Corvallis, Agriculture.  
MOURSUND, DAVID G., Eugene, Mathematics.  
ORNDUFF, ROBERT, Portland, Botany.  
PERSON, JAMES C., Salem, Chemistry.  
RUSSELL, DALE A., Enterprise, Earth Sciences.  
STOUT, EDGAR L., Grants Pass, Mathematics.  
WETHERELL, CLYDE E., Hood River, Earth Sciences.

### Cooperative Graduate

BIBBER, ALLAN L., Corvallis, Biochemistry.  
GEORGE, MARJORY C., Tillamook, Chemistry.  
GRITTON, GEORGE V., Corvallis, Chemistry.  
HINRICHS, LOWELL A., Portland, Mathematics.  
LEONETTI, FRED R., Portland, Engineering.  
LORRE, THOMAS R., Vancouver, Physics.  
LOWE, JAMES N., McMinnville, Chemistry.  
LYNN, ELIZABETH, Eugene, Psychology.  
MADDEN, JAMES P., Malin, Social Sciences.  
ODEN, LAURANCE L., Nyssa, Chemistry.  
PARKER, JERALD V., Portland, Physics.  
PEARSON, GARY A., Portland, Physics.  
PETERSEN, ROBERT J., Hillsboro, Chemistry.  
PRAG, ARTHUR B., Portland, Physics.  
SILVERMAN, ROY S., Portland, Mathematics.

### Senior Postdoctoral

HILL, TERRELL L., Eugene, Physics.

### Science Faculty

BOND, CARL E., Corvallis, Biology.  
DAWSON, JAMES R., Ashland, Botany.  
WEBER, LEONARD J., Corvallis, Engineering.  
WICKS, CHARLES E., Corvallis, Engineering.

*Summer Fellowships for Graduate Teaching Assistants*

BAILEY, DUANE W., Creswell, Mathematics.  
GOEBEL, JACK B., Corvallis, Mathematics.  
HERMAN, WILLIAM S., Portland, Zoology.  
MALEKUS, WILLIAM, Eugene, Physics.  
NEUMANN, HERSCHEL, Eugene, Physics.  
WILLIAMS, PETER S., Corvallis, Engineering.  
WILSON, JIM D., Wecoma Beach, Agriculture.  
WITCRAFT, DON A., Corvallis, Mathematics.

*Summer Fellowships for Secondary School Teachers*

BIEDERMAN, ARTHUR A., Tigard, General Sciences.  
MCCORD, WILLIAM M., Portland, General Sciences.  
OVERTON, YEARL H., Lakeview, Mathematics.  
ROGERS, JAMES V., Portland, Mathematics.  
STAPLETON, CHRISTOPHER, Portland, General Sciences.

PENNSYLVANIA

*Graduate*

ADLER, RONALD J., Pittsburgh, Physics.  
ANDERSON, ANSEL C., North Warren, Physics.  
ANDERSON, JAMES B., State College, Engineering.  
BARR, MICHAEL, Drexel Hill, Mathematics.  
BEALS, RICHARD W., Erie, Mathematics.  
BERMON, STUART, Philadelphia, Physics.  
BOOK, DAVID L., Norristown, Physics.  
BRAINERD, WILLIAM R., Newtown Square, Physics.  
BRAUMAN, JOHN I., Pittsburgh, Chemistry.  
BRODSKY, ALAN R., Philadelphia, Mathematics.  
CARROLL, CLARK E., Pittsburgh, Physics.  
CHILTON, WILLIAM S., Lansdowne, Chemistry.  
DAVIES, KENNETH T., Pittsburgh, Physics.  
DOLUISIO, JAMES T., Bethlehem, Chemistry.  
EARLE, CLIFFORD J., Jr., Abington, Mathematics.  
FENSELAU, ALLAN H., Norristown, Biochemistry.  
FETTER, ALEXANDER L., Philadelphia, Physics.  
FLIEGEL, HENRY F., Havertown, Astronomy.  
FRASER, MALCOLM D., Pittsburgh, Engineering.  
GEISSINGER, LADNOR D., Zionsville, Mathematics.  
GRAY, DONALD M., Milton, Biophysics.  
GREAVES, JAMES R., Pittsburgh, Physics.  
GREEN, JOHN P., Jr., Philadelphia, Engineering.  
GROOM, DONALD E., Turtle Creek, Physics.  
HALLIDAY, ROBERT P., Pittsburgh, Medical Sciences.  
HARTENBAUM, BRUCE, Philadelphia, Engineering.  
HARTSHORNE, ROBERT C., Pittsburgh, Mathematics.  
HOROWITZ, DANIEL H., State College, Earth Sciences.  
HOUGHTON, DAVID D., Media, Earth Sciences.  
HUDOCK, GEORGE A., Norristown, Genetics.  
HUGUENIN, GEORGE R., Buck Hill Falls, Astronomy.  
HUNT, RICHARD L., Doylestown, Chemistry.  
INFANGER, ST. ANN M., Greensburg, Genetics.

JOHNS, LEWIS E., Jr., Pittsburgh, Engineering.  
JOSEPH, PETER M., Chester, Physics.  
KAUFFMAN, JOEL M., Huntingdon Valley, Chemistry.  
KAUFMANN, HARRY, Clifton Heights, Psychology.  
KEVLES, DANIEL J., Philadelphia, Social Sciences.  
KRALL, ALLAN M., State College, Mathematics.  
LAISON, GARY B., Philadelphia, Mathematics.  
LARKIN, FRANCIS P., Middletown, Mathematics.  
LEITH, JOHN D., Jr., Bethlehem, Zoology.  
LEWIS, RONALD M., State College, Earth Sciences.  
LUDWIG, OLIVER G., Philadelphia, Chemistry.  
MANDELBAUM, ELI M., Philadelphia, Mathematics.  
MCNUTT, DOUGLAS P., Philadelphia, Physics.  
MITCHEL, BARRY J., Pittsburgh, Engineering.  
MITRONOVAS, WALTER, Erie, Earth Sciences.  
MORAN, PAUL R., Coudersport, Physics.  
MOYER, ROBERT D., Allentown, Mathematics.  
NOBLE, ROBERT W., Jr., Ardmore, Biochemistry.  
OSTERHOLTZ, FREDERICK D., Drexel Hill, Chemistry.  
PHILIPS, THOMAS O., Lansdowne, Physics.  
PUSEY, WALTER C. III, Springfield, Earth Sciences.  
RICE, ALAN W., Bridgeville, Engineering.  
ROSENBERG, RONALD C., Philadelphia, Engineering.  
RYSZ, WALTER R., Old Forge, Chemistry.  
SCHICK, WILLIAM C., Jr., Pittsburgh, Physics.  
SCHNABEL, GEORGE A., Ambler Post Office, Engineering.  
SEIDERS, VICTOR M., York, Earth Sciences.  
SEKERKA, ROBERT F., Pittsburgh, Physics.  
SHABAKER, ROBERT H., Media, Engineering.  
SHAFFER, RUSSELL A., Philadelphia, Physics.  
SHANAHAN, PATRICIA A., Bethel Park, Psychology.  
SHORT, JAMES J., Philadelphia, Social Sciences.  
SMITH, ALLAN L., Jenkintown, Chemistry.  
SQUIRES, ROBERT G., Ambridge, Engineering.  
STENING, RAE F., Pittsburgh, Physics.  
STONER, JOHN O., Berlin, Physics.  
SUNA, ANDRIS, Broomall, Physics.  
TELLER, DAVID C., Wilkes-Barre, Biology.  
THORINGTON, RICHARD W., Wynnewood, Biology.  
TRAHANOVSKY, WALTER S., Conemaugh, Chemistry.  
TRUEMAN, THOMAS L., Media, Physics.  
WEISS, CHARLES, Jr., Philadelphia, Biochemistry.  
WHINSTON, ANDREW B., Pittsburgh, Social Sciences.  
WILLIAMS, DEBORAH C., Moylan, Zoology.  
WILMOT, WILLIAM H. II, Pittsburgh, Chemistry.  
WOLL, EDWIN J., Jr., Pittsburgh, Physics.  
WOOD, DON J., Corry, Engineering.  
WRIGHT, ARTHUR W., Broomall, Social Sciences.  
YOST, PATRICIA A., Sugarloaf, Psychology.  
YOUNG, FREDERICK D., Marianna, Engineering.  
ZARTMAN, ROBERT E., Lititz, Earth Sciences.

PENNSYLVANIA—Continued

*Cooperative Graduate*

AARON, RONALD, Philadelphia, Physics.  
 ANGSTADT, CAROL N., Ardmore, Biochemistry.  
 BARRETT, JOSEPH J., Scranton, Physics.  
 BATCHELLOB, ROBERT W., Glenside, Chemistry.  
 BEAN, RALPH J., Pittsburgh, Mathematics.  
 BETZ, JOHN V., Bala-Cynwyd, Microbiology.  
 BLUM, ROBERT A., Wynnewood, Engineering.  
 BROGAN, MARIANNE C., Jim Thorpe, Chemistry.  
 BURRAS, FAY B., York, Mathematics.  
 CAMPBELL, MARY K., Havertown, Chemistry.  
 CAREY, FRANCIS A., Philadelphia, Chemistry.  
 CARMAN, ROBERT A., Pittsburgh, Psychology.  
 CAWLEY, ROBERT G., Dunmore, Physics.  
 CRAVER, GLENN P., Barnesboro, Chemistry.  
 CRISTOFALO, VINCENT J., Philadelphia, Zoology.  
 DARDENNE, WALTER H., Jenkintown, Engineering.  
 DEYRUP, JAMES A., West Chester, Chemistry.  
 DIENER, DAVID A., West Reading, Engineering.  
 DORNSEIFER, THEODORE P., Huntingdon Valley, Biochemistry.  
 DURKO, MICHAEL P., State College, Mathematics.  
 FERNELIUS, NILS C., State College, Physics.  
 FISCH, FRED J., Bethlehem, Engineering.  
 FLEMING, GORDON N., Philadelphia, Physics.  
 FONDY, THOMAS P., Pittsburgh, Biochemistry.  
 FRIED, IRVING M., Philadelphia, Chemistry.  
 FRIEDMAN, GILBERT H., State College, Engineering.  
 GALLAGHER, WILLIAM P., Pittsburgh, Chemistry.  
 GOLDMAN, AARON S., Red Lion, Mathematics.  
 GREEN, MELVIN H., Pittsburgh, Biochemistry.  
 GREENLEAF, FREDERICK P., Allentown, Mathematics.  
 GRINAWAX, GEORGE, Shamokin, Biochemistry.  
 HARMAN, GILBERT H., Philadelphia, Social Sciences.  
 HARRISON, PAUL C., Jr., Montrose, Psychology.  
 HAY, JAMES E., Pittsburgh, Physics.  
 HAYWEISER, LOIS J., Pittsburgh, Psychology.  
 HEINDEL, NED D., Red Lion, Chemistry.  
 HENNRICH, CARL W., Havertown, Engineering.  
 HILL, DAVID G., Tarentum, Physics.  
 HORSTMAN, CLIFFORD C., Jr., Sharpsville, Engineering.  
 HOYLAND, JAMES R., Pittsburgh, Chemistry.  
 IBANEZ, MANUEL L., University Park, Microbiology.  
 IFFT, EDWARD M., Butler, Physics.  
 KAFRISSEN, EDWARD, Philadelphia, Engineering.  
 KAPLAN, RICHARD E., Upper Darby, Engineering.  
 KORSH, JAMES F., Upper Darby, Engineering.  
 LANDY, RICHARD A., State College, Earth Sciences.  
 LEBOW, PHOEBE S., Bryn Mawr, Biochemistry.  
 LONG, MORGAN A., Sugarloaf, Mathematics.  
 MALINAUSKAS, ANTHONY P., Ashley, Chemistry.  
 MARIK, ROBERT H., Pittsburgh, Engineering.  
 MASTASCUSA, EDWARD J., Pittsburgh, Engineering.

MAYER, RAYMOND A., Jr., Philadelphia, Mathematics.  
 MICHEL, GERTRUDE M., Radnor, Zoology.  
 MILLER, MELVYN H., Philadelphia, Engineering.  
 MORRIS, CLIFTON, Fredericktown, Botany.  
 MUDD, SAMUEL A., Gettysburg, Psychology.  
 NILER, PEARN P., Fombell, Engineering.  
 NYSTROM, WILLIAM A., Emporium, Engineering.  
 PACHMAN, JERROLD M., State College, Earth Sciences.  
 PERRIN, CHARLES L., Pittsburgh, Chemistry.  
 PIERCE, RUSSELL D., Homer City, Physics.  
 POWIDSKI, MARCIA J., Reading, Chemistry.  
 RANCK, JOHN P., St. Thomas, Chemistry.  
 REINSE, THOMAS A., Philadelphia, Social Sciences.  
 RICHMAN, FRED, Philadelphia, Mathematics.  
 RIPSOM, GEORGE A., Weatherly, Engineering.  
 ROVNYAK, JAMES L., Ford City, Mathematics.  
 SCHELL, KERRY F., Pine Grove Mill, Agriculture.  
 SCHULTZ, ALBERT B., Philadelphia, Engineering.  
 SEYLER, RICHARD G., Dubois, Physics.  
 SHERWOOD W. CULLEN, Bethlehem, Earth Sciences.  
 SKEATH, JAMES E., Williamsport, Mathematics.  
 SLATER, JOHN G., Stoneboro, Social Sciences.  
 SWEET, EDWARD E., Jr., Pittsburgh, Genetics.  
 TABAK, MARK D., Wyncote, Engineering.  
 TAYLOR, BARRY N., Philadelphia, Physics.  
 TEMIN, PETER, Philadelphia, Social Sciences.  
 TIETJEN, JAMES J., State College, Engineering.  
 TORRENCE, ROBERT J., Pittsburgh, Physics.  
 WAGNER, ROBERT G., Johnstown, Engineering.  
 WANER, JAMES F., Philadelphia, Astronomy.  
 WARDEN, ROBERT B., Swarthmore, Engineering.  
 WILLIAMS, JOHN E., Clarion, Zoology.  
 WINTER, WILLIAM H., Drexel Hill, Engineering.

*Postdoctoral*

BLACK, SAMUEL H., Hershey, Microbiology.  
 FAITH, CARL C., University Park, Mathematics.  
 GRIM, SAMUEL O., Dallastown, Chemistry.  
 HARE, CURTIS R., Clifton Heights, Chemistry.  
 JONES, RICHARD H., Ridley Park, Mathematics.  
 MCFADDEN, JAMES T., State College, Zoology.  
 VON, FRANKENBERG CARL A., Philadelphia, Chemistry.

*Senior Postdoctoral*

TUTTLE, O. FRANK, University Park, Earth Sciences.

*Science Faculty*

BORTREE, ALFRED L., University Park, Agriculture.  
 DEMOTT, HOWARD E., Selinsgrove, Botany.  
 FABIAN, MICHAEL W., Beaver Falls, Zoology.  
 FULTON, PAUL F., Pittsburgh, Engineering.  
 HEIMER, RALPH T., University Park, Mathematics.  
 JACOBS, ALAN M., University Park, Physics.  
 LEMONICK, AARON, Haverford, Physics.

LESTZ, SAMUEL S., University Park, Engineering.  
 MANGELSDORF, CLARK P., Swarthmore, Engineering.  
 MCLENNAN, JAMES A., Jr., Bethlehem, Physics.  
 MOORE, JOSEPH H., University Park, Engineering.  
 MOTT, THOMAS E., University Park, Mathematics.  
 POLAK, EMIL J., Lewisburg, Astronomy.  
 PRAGER, PHILIP C., Swarthmore, Engineering.  
 SMITH, MANNING A., Lewisburg, Chemistry.  
 SNYDER, ROBERT D., Lancaster, Mathematics.  
 STAVSETH, RICHARD M., Philadelphia, Physics.  
 TOBIN, THOMAS V., Wilkes-Barre, Biology.  
 WALTER, ROBERT I., Haverford, Chemistry.  
 WESTERN, DONALD W., Lancaster, Mathematics.  
 WISNER, ROBERT J., Haverford, Mathematics.

*Summer Fellowships for Graduate Teaching Assistants*

BACHMAN, JERALD G., Philadelphia, Psychology.  
 BRIMHALL, JAMES E., Pittsburgh, Physics.  
 BROGAN, MARIANNE C., Jim Thorpe, Chemistry.  
 CHARLESWORTH, LLOYD J., Allentown, Earth Sciences.  
 COLEBOB, CAROLE J., Pittsburgh, Mathematics.  
 DEPUE, ROBERT H., Jr., Swarthmore, Microbiology.  
 DERSARKISSIAN, MICHAEL, State College, Physics.  
 DETIO, ROBERT H., Pittsburgh, Engineering.  
 DIEFENDERFER, ALFRED J., North Braddock, Chemistry.  
 DIMEO, FRANK N., Philadelphia, Engineering.  
 DUNCAN, ROBERT L., Bellefonte, Mathematics.  
 FORSMAN, WILLIAM C., Lansdowne, Chemistry.  
 GORDON, ALBERT M., New Brighton, Physics.  
 GRIFFIN, RODGER W., Jr., Verona, Chemistry.  
 GRIM, SAMUEL O., Dallastown, Chemistry.  
 GUBER, ALBERT L., Bridgeville, Earth Sciences.  
 HAGER, ROBERT B., Huntingdon Valley, Chemistry.  
 HARRISON, PAUL C., Jr., Montrose, Psychology.  
 HOROWITZ, DANIEL H., State College, Earth Sciences.  
 JENNINGS, STEPHEN O., Allison Park, Engineering.  
 KELLER, GEORGE E., II, State College, Engineering.  
 LONEY, LAURA L., Havertown, Chemistry.  
 MALINAUSKAS, Anthony P., Ashley, Chemistry.  
 MATSEN, JOHN M., Lincoln University, Engineering.  
 MAY, JON R., Bainbridge, Medical Sciences.  
 MEIER, JOSEPH F., Sharon, Chemistry.  
 MILLER, HARVEY I., Philadelphia, Medical Sciences.  
 MORRIS, JOHN R., II, Harrisburg, Chemistry.  
 MOTT, THOMAS E., Bellefonte, Mathematics.  
 NICHOLAS, ROBERT D., Reading, Chemistry.  
 OPLINGER, CARL S., Walnutport, Zoology.  
 REBER, LARRY H., Pittsburgh, Physics.

SENNETT, ROBERT E., Lansdowne, Engineering.  
 SJOBERG, BERNARD M., Jr., McKeesport, Psychology.  
 SWEET, EDWARD E., Jr., Pittsburgh, Genetics.  
 TORRENCE, ROBERT J., Pittsburgh, Physics.  
 VON FRANKENBERG, CARL A., Philadelphia, Chemistry.  
 WELSH, ROBERT E., Pittsburgh, Physics.  
 WIER, KAREN E., Bryn Mawr, Earth Sciences.  
 WITOWSKI, JOHN J., Olyphant, Microbiology.  
 WUNDERLICH, FRANCIS J., Narberth, Chemistry.

*Summer Fellowships for Secondary School Teachers*

ACKERMAN, Sr. M. ALICE I., Philadelphia, Biology.  
 AMMERMAN, EDWARD G., Philipsburg, General Sciences.  
 ANSELMO, SHIRLEY M., New Castle, Biology.  
 ARTHUR, ROBERT S., Pittsburgh, Mathematics.  
 ATTY, ALEX G., Windber, General Sciences.  
 BEAM, Sr. M. ALBIXNE, Pittsburgh, Biology.  
 BENDER, EARL ARTHUR, Slatington, Biology.  
 BONNER, Sr. M. CATHERINE, Philadelphia, General Sciences.  
 CALLANAN, MO. DOLORES M., Philadelphia, Mathematics.  
 DEMITRAS, BRO. GREGORY C., Philadelphia, Chemistry.  
 DOTTERER, STANLEY S., Elizabethtown, Mathematics.  
 DOUBET, M. MARK, Sr., Erie, Mathematics.  
 EVANS, EDWARD WILLIAM, West Lawn, Mathematics.  
 HERMAN, RICHARD P., Hatboro, Mathematics.  
 HOUGH, RAYMOND EARLE, Monongahela, Mathematics.  
 JONES, DOROTHY LOIS, St. College, Mathematics.  
 KEISER, RICHARD L., Jim Thorpe, Mathematics.  
 KNOCK, Sr. MARTIN DE. P., Altoona, Biology.  
 KUHN, RALPH EDWARD, Emmaus, Mathematics.  
 LATHAM, WILLIAM S., Philadelphia, Biology.  
 MALESKEY, PAUL E., Allentown, Chemistry.  
 MAMARY, ALBERT, Shillington, Mathematics.  
 MARKLEY, FRED ALLEN, Shippensburg, General Sciences.  
 MCLAUGHLIN, JANE ANN, Harrisburg, Mathematics.  
 MOYER, STUART F., York, Mathematics.  
 PATTERSON, Bro. D. STEPHEN, Pittsburgh, Mathematics.  
 PETRARCA, Sr. M. JEAN, Greensburg, Mathematics.  
 SAUKAITIS, Sr. M. P., Corapolis, Zoology.  
 SCHILLINGER, Sr. M. J., Pittsburgh, Biology.  
 SCHRODER, KENNETH E., Geo. School, Zoology.  
 SHARKAN, WILLIAM W., Allentown, Chemistry.  
 SNELL, JANIS ROSE, York, Mathematics.  
 SPILLANE, DANIEL PAUL, Pittsburgh, Mathematics.  
 TATE, GLADYS, Erie, Mathematics.  
 WEISS, Sr. M. OLIVETTE, Lancaster, General Sciences.  
 ZICCARDI, VINCENT, New Hope, Biology.  
 ZIMMERMAN, PATRICIA V., Elkins Park, Mathematics.

## RHODE ISLAND

### Graduate

ALMGREN, FREDERICK J., Jr., Providence, Mathematics.  
BRAUDET, ROBERT A., Woonsocket, Chemistry.  
DUCKETT, STEVEN W., Providence, Physics.  
FINE, ARTHUR D., Providence, Mathematics.  
NAVAS, JUDITH I., Riverside, Botany.  
PIKE, ARTHUR C., Warwick, Earth Sciences.

### Cooperative Graduate

BROCHU, RONALD L., Narragansett, Engineering.  
CRETELLA, JOHN P., Providence, Engineering.  
MOORHOUSE, ARNOLD S., Westerly, Agriculture.  
SALTZMAN, RICHARD M., Providence, Engineering.  
SCARBEL, MARCEL P., Providence, Engineering.

### Senior Postdoctoral

BUCHSBAUM, DAVID A., Providence, Mathematics.

### Science Faculty

KLINE, JACOB, Kingston, Engineering.  
NACCI, VITO A., Kingston, Engineering.

### Summer Fellowships for Graduate Teaching Assistants

ALMGREN, FREDERICK J., Jr., Providence, Mathematics.  
CAPOSTO, AUGUSTINE, Jr., Cranston, Chemistry.  
DIPIPPO, ASCANIO G., Providence, Chemistry.  
SHERMAN, EDWARD O., Jr., North Providence, Chemistry.

### Summer Fellowships for Secondary School Teachers

SCHUMANN, MO. VIRGINIA M., Providence, Mathematics.  
WALSH, Sr. M. TERENCE, Riverside, Mathematics.

## SOUTH CAROLINA

### Graduate

ARRINGTON, CHARLES A., Jr., Clemson, Chemistry.  
COLEMAN, EDMUND B., Jr., Abbeville, Psychology.  
CONNOR, LAURENCE N., Jr., Barnwell, Engineering.  
PERKINS, HAROLYN KING, Marion, Chemistry.  
PYRON, RAYMOND S., Taylors, Chemistry.

### Cooperative Graduate

BARTON, KENNETH R., Spartanburg, Chemistry.  
BOWERS, KERRY W., Columbia, Chemistry.  
FOLEY, JOHN M., Anderson, Psychology.  
GETTYS, WILLIAM E., Union, Physics.  
HASKELL, PETER L., West Columbia, Engineering.  
JONES, EDWIN R., Jr., Dillon, Physics.  
KELLETT, JAMES C., Jr., Spartanburg, Chemistry.  
OVERBECK, JAMES W., Aiken, Physics.  
OVERTON, JAMES R., Columbia, Chemistry.  
RUGHEIMER, JOHN H., Charleston, Physics.  
STANLEY, WILLIAM D., Columbia, Engineering.

STRICKLAND, ERASMUS H., Columbia, Biophysics.

WENGROW, HENRY R., Columbia, Engineering.

WHITE, HAROLD M., Clemson, Chemistry.

### Science Faculty

KING, DONALD A., Clemson, Mathematics.  
NOLAND, J. HUBERT, Jr., Columbia, Engineering.  
SNELL, ABSALOM W., Clemson, Engineering.

### Summer Fellowships for Graduate Teaching Assistants

BARTON, KENNETH R., Spartanburg, Chemistry.  
CATHEY, WADE T., Jr., Campobello, Engineering.  
DREHER, THAD W., Jr., Columbia, Engineering.  
FARMER, LARRY B., Travelers Rest, Chemistry.  
PARNELL, JAMES F., Timmonsville, Zoology.  
TILLER, WILLIAM E., Anderson, Physics.

### Summer Fellowships for Secondary School Teachers

JENKINS, FAYE E., Anderson, Mathematics.  
KURTZ, MARGARET G., Columbia, Mathematics.

## SOUTH DAKOTA

### Graduate

BUSWELL, LINDA M., Aberdeen, Psychology.  
HURWITZ, CHARLES E., Sioux Falls, Engineering.  
KRETSINGER, ROBERT H., Pickstown, Medical Sciences.  
MINEHART, RALPH C., Mitchell, Physics.  
RASMUSSEN, GARY H., Clark, Chemistry.  
RAYMOND, LEE R., Watertown, Engineering.

### Cooperative Graduate

BENSON, ROBERT H., Vermillion, Mathematics.  
FISCHBACH, THOMAS J., Rapid City, Social Sciences.  
FULLER, ALBERT W., Madison, Mathematics.  
JOHNSON, PATRICIA E., Raymond, Mathematics.  
NELSON, ALLAN D., Dallas, Mathematics.  
PIERCE, ROBERT L., Huron, Mathematics.  
RAPP, DELVIN G., Brookings, Engineering.

### Science Faculty

ALLUM, MARVIN O., Vermillion, Zoology.  
DORNBUSH, JAMES N., Vermillion, Engineering.  
SHAW, ROSS F., Wessington Springs, Zoology.

### Summer Fellowships for Graduate Teaching Assistants

DUGLE, DAVID L., Vermillion, Chemistry.  
FANSLAW, DONALD J., Yankton, Zoology.  
MATSON, ARTHUR J., Hetland, Social Sciences.  
MYERS, GERALD A., Brookings, Botany.  
ROBINSON, THOMAS A., Hot Springs, Chemistry.

### Summer Fellowships for Secondary School Teachers

CONKLIN, AUGUST, Aberdeen, Biology.  
CONWAY, JOHN V., Yankton, Mathematics.  
HILLS, CARROLL L., Mitchell, Biochemistry.



## TENNESSEE

### *Graduate*

BACH, GALE R., Gatlinburg, Physics.  
BANKS, THOMAS H., Nashville, Earth Sciences.  
BLOOMER, JAMES L., Knoxville, Chemistry.  
CAMPBELL, ALPHEUS N., Martin, Biochemistry.  
CARMICHAEL, HALBERT H., Oak Ridge, Chemistry.  
DIETRICH, FRANK S., Memphis, Physics.  
GOTTO, ANTONIO M., Jr., Nashville, Biochemistry.  
HINTON, DON B., Savannah, Mathematics.  
KLOW, JANET S., Memphis, Biochemistry.  
MCCALL, JOHN T., Jr., Nashville, Mathematics.  
MCCALLUM, CHARLES E., Memphis, Mathematics.  
RITTENBERG, ALAN, Nashville, Physics.  
THOMPSON, JAMES R., Memphis, Mathematics.

### *Cooperative Graduate*

BEAUCHAMP, NICHOLAS A., Nashville, Physics.  
BURT, PHILIP B., Memphis, Physics.  
DORMAN, ED S., Memphis, Physics.  
HAMM, ROBERT N., Ramer, Physics.  
HEIMBERG, LAURA K., Nashville, Psychology.  
JENSEN, DONALD R., Goodlettsville, Agriculture.  
JOHNSON, JOSEPH A. III, Nashville, Physics.  
KERCE, ROBERT H., Nashville, Mathematics.  
KOEN, FRANK M., Nashville, Psychology.  
MCCLEURE, JOSEPH A., Jr., Nashville, Physics.  
MCDANIEL, WILLIAM L., Jefferson City, Social Sciences.  
RADER, CHARLES P., Knoxville, Chemistry.  
SMITH, ALPHONSO L., Memphis, Mathematics.  
TERRY, CLAUDE E., Jr., Cleveland, Genetics.  
TODD, AARON W., Murphreesboro, Chemistry.  
WALLER, JOHN W., Johnson City, Engineering.  
WOODY, CHARLES O., Jr., Somerville, Agriculture.

### *Postdoctoral*

COOK, CLARENCE E., Jefferson City, Chemistry.

### *Senior Postdoctoral*

LINDSEY, DAN L., Oak Ridge, Genetics.  
SCHWARTZ, DREW, Oak Ridge, Genetics.  
SMITH, LAWTON H., Oak Ridge, Zoology.  
THOMAS, DAVID G., Oak Ridge, Engineering.

### *Science Faculty*

BOND, LORA, Knoxville, Biology.  
GEORGE, TED M., Murray, Physics.  
JOHNSON, CARROLL D., Memphis, Engineering.  
KRUPP, BRO. ROBERT H., Memphis, Physics.  
RAWLS, JOHN M., Clarksville, Medical Sciences.  
THIGPEN, CHARLES C., Knoxville, Mathematics.  
WILSON, ROBERT L., Chattanooga, Earth Sciences.

### *Summer Fellowships for Graduate Teaching Assistants*

DOWNING, ROLAND G., Nashville, Chemistry.  
GINTER, DOROTHY E. S., Nashville, Chemistry.  
HARRIS, ROY H., Nashville, Medical Sciences.

NORRIS, DANIEL H., Knoxville, Botany.  
PURCELL, WILLIAM P., Memphis, Chemistry.  
SUTHERLAND, IAN D. W., Jefferson City, Zoology.

### *Summer Fellowships for Secondary School Teachers*

FORTUNE, JIMMIE C., Bartlett, Mathematics.  
SWEITZER, MAURINE W., Maryville, Biology.  
TOBRNCE, MARTHA W., Antioch, Mathematics.

## TEXAS

### *Graduate*

ANDERSON, JOHN E., Austin, Engineering.  
BARBIN, ALLEN R., Beaumont, Engineering.  
BARNES, VIROIL E. II, Austin, Physics.  
BECHTEL, NORBERT G., Jr., Groves, Engineering.  
BERKMAN, MARTIN R., Dallas, Engineering.  
BEYERS, ROBERT J., Austin, Zoology.  
BOTT, JERRY F., Tyler, Engineering.  
CLARK, BARRY G., Canyon, Astronomy.  
COLLIER, ROBERT J., Fort Worth, Microbiology.  
COLLINS, FRANCIS A., Austin, Physics.  
DAHM, DAVID M., Dallas, Mathematics.  
DOLGOFF, ABRAHAM, Houston, Earth Sciences.  
DORROH, JAMES R., Kingsville, Mathematics.  
DOUGHARTY, NEIL A., Jasper, Engineering.  
DREWRY, GEORGE E., Austin, Zoology.  
GRABNER, SANDY, Pharr, Mathematics.  
GROSS, MEREDITH G., Jr., Amarillo, Earth Sciences.  
HALE, LEONARD A., Lubbock, Engineering.  
HANES, HAROLD B., Jr., Fort Worth, Mathematics.  
HYDER, MONTE L., Rockdale, Chemistry.  
JAMES, ROBERT L., El Paso, Engineering.  
JOHNSON, CLAIBORNE H., Jr., Dallas, Mathematics.  
JONES, BENJAMIN F., Houston, Mathematics.  
MANUEL, THOMAS A., Austin, Chemistry.  
MOORE, EDWIN N., Dallas, Physics.  
MOORE, ROBERT E., Austin, Zoology.  
MYERS, RALPH L. II, Wichita Falls, Earth Sciences.  
NISBET, ALEX R., San Angelo, Chemistry.  
RANDOL, BURTON S., San Antonio, Mathematics.  
SIMMONS, MARVIN G., Carrollton, Earth Sciences.  
STOVER, HARRY L., Dallas, Physics.  
STUBBLEFIELD, TRAVIS E., Denton, Medical Sciences.  
VAN AUKEN, THOMAS V., Alpine, Chemistry.  
WILEY, FREDERICK G., Garland, Chemistry.  
WILSON, ROBERT W., Houston, Astronomy.  
WISDOM, NORVELL E., Jr., Crane, Chemistry.  
  
*Cooperative Graduate*  
ABLES, PAULA R., Dublin, Biochemistry.  
AMES, WILLIAM A., Longview, Chemistry.  
BAGBY, ROLAND M., Texas City, Medical Sciences.  
BARLOW, CARL A., Jr., San Antonio, Physics.  
BOEHME, HOLLIS C., Mabank, Physics.  
BROWN, JUDITH C., Bryan, Chemistry.  
CHESNUT, DWAYNE A., Houston, Chemistry.  
COLLINS, CARL B., Jr., San Antonio, Physics.  
COOPER, JOHN N., San Antonio, Chemistry.  
CRAMER, JOHN G., Jr., Houston, Physics.  
CUEBRINGTON, AARON M., Bryan, Engineering.  
CYPRUS, JOEL H., Houston, Engineering.

TEXAS—Continued

DABBY, RONALD, Dallas, Engineering.  
 DAVENPORT, MONTY, E., Lubbock, Engineering.  
 ELLISON, TOMMY R., Dallas, Chemistry.  
 FINCH, RAY N., Bay City, Engineering.  
 FORT, JAMES G., San Antonio, Physics.  
 FRITZ, ROSE M. Mc., Houston, Chemistry.  
 GOLDSBERRY, TOMMY G., Jacksonville, Mathematics.  
 HAASE, DONALD J., Nixon, Engineering.  
 HARVEY, JERRY B., Austin, Psychology.  
 HASTY, ROBERT A. II, Dallas, Chemistry.  
 HOLDEN, MARETTA P., San Antonio, Chemistry.  
 KIMBALL, AUBREY P., Houston, Biochemistry.  
 LADNER, SIDNEY J., Houston, Chemistry.  
 LEB, WILLIAM J., Sweetwater, Engineering.  
 LYTTON, ROBERT L., San Antonio, Engineering.  
 MCGUIRE, MICHAEL L., College Station, Chemistry.  
 MOTT, DAVID L., El Paso, Physics.  
 OTTMERS, DELBERT M., San Marcos, Engineering.  
 PERRY, PATRICIA L., Corpus Christi, Psychology.  
 QUADE, CHARLES R., Dallas, Physics.  
 REYNA, EDDIE, Bryan, Physics.  
 REYNOLDS, TOM D., Austin, Engineering.  
 RICHARDSON, RICHARD H., Mexia, Agriculture.  
 RUCHELMAN, MARYON W., Bellaire, Chemistry.  
 RUNNELS, LYNN K., Houston, Chemistry.  
 SALZMAN, PAUL K., Austin, Engineering.  
 TOMBELLO, THOMAS A., Dallas, Physics.  
 TUCKER, RICHARD L., Hereford, Engineering.  
 WILLIAMS, MARTHA S., Austin, Psychology.  
 ZUMWALT, ROBERT E., Hallettsville, Engineering.

*Postdoctoral*

OSBORNE, WEYMAR Z., Pampa, Physics.  
 VANDUZER, THEODORE, Corpus Christi, Engineering.

*Senior Postdoctoral*

ADAMS, JOHN A. S., Houston, Earth Sciences.  
 RIGGS, AUSTEN F. II, Austin, Biochemistry.

*Science Faculty*

ALBRITTON, OSCAR W., College Station, Engineering.  
 BARTEL, HERBERT H., Jr., Dallas, Engineering.  
 EADS, EWIN A., Beaumont, Chemistry.  
 EPPES, BILL G., Austin, Engineering.  
 HARMON, GERALD S., College Station, Physics.  
 MARMION, KEITH R., Lubbock, Engineering.  
 MASCH, FRANK D., Jr., San Antonio, Engineering.  
 MORELAND, ROBERT A., Jr., Lubbock, Mathematics.  
 POLLARD, JAMES J., Austin, Engineering.  
 SYBERT, JIM R., Denton, Physics.  
 WESTBURY, JOHN E., Houston, Mathematics.  
 WOOD, JOHN W., Lubbock, Earth Sciences.

*Summer Fellowships for Graduate Teaching Assistants*

ATCHISON, THOMAS A., Richland Spring, Mathematics.  
 AVERITT, ROBERT T., Austin, Social Sciences.  
 COFFMAN, JOHN E., Nederland, Engineering.  
 CRAM, IRA H., Jr., Houston, Earth Sciences.  
 DALTON, CHARLES, Pasadena, Engineering.

FRANKENY, JULIUS L., Houston, Engineering.  
 HOPKINS, OTHO N., Jr., Waco, Earth Sciences.  
 HUBBARD, WILLIAM M., Houston, Physics.  
 MCCRADY, WILLIAM B., Forreton, Genetics.  
 NESBITT, LYLE E., Lubbock, Chemistry.  
 PERRYMAN, JOHN K., Austin, Mathematics.  
 POZZI, ANTHONY L., Jr., Victoria, Engineering.  
 RAMSEY, JERRY D., College Station, Engineering.  
 STEPHENSON, ROBERT W., Austin, Engineering.  
 WHITE, JOHN T., Austin, Mathematics.  
 WILHELM, PAUL E., Austin, Engineering.  
 YOBS, M. G. Jr., Waco, Social Sciences.

*Summer Fellowships for Secondary School Teachers*

ALLEN, Sr. M. BOSCO, Wichita Falls, Mathematics.  
 BALL, FRED, Jr., San Antonio, Mathematics.  
 BENNETT, NORMAN J., Sherman, Mathematics.  
 BREHONY, Sr. M. CATHERINE, Corpus Christi, Mathematics.  
 CONTRERAS, JOE, Falfurrias, Mathematics.  
 DAUNIS, GERALDINE, Fort Worth, Mathematics.  
 GIBBS, SARAH M., Houston, Mathematics.  
 HAVERY, Sr. VINCENT, Bellaire, Mathematics.  
 HERNANDEZ, MATILDE L., Corpus Christi, Mathematics.  
 HUDMAN, JOHN T., Beeville, Physics.  
 LUCAS, BENNY WAYNE, Seminole, Mathematics.  
 MAHAN, EARL RAPHAEL, El Paso, Mathematics.  
 MATTHEWS, WILMOTH C., El Paso, Chemistry.  
 MINNER, Sr. JEANNE, Corpus Christi, Biology.  
 OREAR, NOLAN LARRY, Alice, Mathematics.  
 SANSOM, IRA R., Kerrville, Mathematics.  
 SCHULZ, HERBERT W., Waller, General Sciences.  
 TITUS, Bro. GILBERT R., San Antonio, General Sciences.  
 WALKER, SHERRELL G., Gladewater, Mathematics.

UTAH

*Graduate*

BERGESON, HAVEN E., Salt Lake City, Physics.  
 BREWER, JOHN M., Salt Lake City, Biochemistry.  
 EVERETT, GLEN E., St. George, Physics.  
 FOOTE, ARIEL, Moab, Chemistry.  
 GILES, EUGENE, Salt Lake City, Anthropology.  
 IVIE, EVAN L., Ogden, Engineering.  
 LAWRENCE, GEORGE M., SALT LAKE CITY, Physics.  
 MORTIMER, ROBERT G., Logan, Chemistry.  
 RUNNELS, DONALD D., Salt Lake City, Earth Sciences.  
 TOLMAN, CHADWICK, A., Salt Lake City, Chemistry.

*Cooperative Graduate*

ALLEN, ROBERT L., Ogden, Engineering.  
 ANDERSEN, TERRELL N., Salt Lake City, Chemistry.

BOYACK, JAMES R., Salt Lake City, Chemistry.  
BRYNER, JOHN C., Salt Lake City, Physics.  
HEMPFL, JOHN P., Salt Lake City, Mathematics.  
JOHNSON, OWEN W., Salt Lake City, Physics.  
PETERSON, ELLIS R., Ephraim, Chemistry.  
WAGNER, RICHARD L., Jr., Salt Lake City, Physics.  
WOODBURY, ELROD T., Monroe, Engineering.

*Postdoctoral*

JOHNSON, HOLLIS R., Garland, Astronomy.

*Senior Postdoctoral*

VERNON, LEO P., Provo, Biochemistry.

*Science Faculty*

HANSEN, APTON M., Ephraim, Zoology.

*Summer Fellowships for Graduate Teaching Assistants*

ALBRECHTSEN, RULON S., Emery, Genetics.  
BEST, MYRON G., Salt Lake City, Earth Sciences.  
BRYNER, JOHN C., Salt Lake City, Physics.  
LAMBERT, VIRGINIA M., Roosevelt, Social Sciences.  
MOYLE, RICHARD W., American Fork, Earth Sciences.  
MUSSEY, ROSEMOND, J., Salt Lake City, Zoology.  
SMITH, KAY H., Provo., Psychology.  
TEERLINK, WILFORD J., Salt Lake City, Chemistry.  
WAGNER, RICHARD L., Jr., Salt Lake City, Physics.

*Summer Fellowships for Secondary School Teachers*

KING, A. LAVELL, Orem, Zoology.

VERMONT

*Graduate*

GUILMETTE, LEE M., Richford, Mathematics.

*Cooperative Graduate*

CARPENTER, JAMES E., Springfield, Engineering.  
GIBBS, GERALD V., Windsor, Earth Sciences.  
SARGENT, GEORGE D., Barre, Chemistry.

*Postdoctoral*

ABRAHAM, RALPH H., Burlington, Mathematics.

*Science Faculty*

WEBB, MARTIN L., Northfield, Engineering.

VIRGINIA

*Graduate*

ADAMS, JOHN B., Charlottesville, Physics.  
ADLBERGER, ERIC G., Arlington, Physics.  
BARKER, ROBERT G., Charlottesville, Mathematics.  
CHILTON, FRANK M., Jr., Arlington, Physics.  
DOUGHTY, WILLIAM C., Willis Wharf, Physics.  
EVERAGE, THOMAS B., Big Stone Gap, Engineering.  
GARRICK, MICHAEL D., Hampton, Biochemistry.  
GRAY, FRANCES E., Richmond, Chemistry.  
HALEY, JOSEPH A., Ashland, Mathematics.  
HARTMAN, RICHARD L., Norfolk, Physics.

LOUTZENHEISER, CARL B., Arlington, Engineering.

MONTGOMERY, CHARLES G., Hollins College, Physics.

MURRAY, JOSEPH J., Jr., Lexington, Genetics.  
O'BRIEN, WALTER F., Jr., Roanoke, Engineering.

RENNINGS, GEORGE H., Fredericksburg, Physics.

STEPHENS, STEPHEN V., Falls Church, Physics.

*Cooperative Graduate*

BAIRD, HUGH R., Christiansburg, Medical Sciences.

BAKER, THOMAS N., III, Petersburg, Chemistry.

BARNARD, MARLENE B., Richmond, Chemistry.  
BECKER, PHILIP M., Falls Church, Engineering.

DAVIS, HAWTHORNE A., Quinton, Physics.  
GIBERT, ANNE J., Falls Church, Zoology.

GIBSON, ROBERT H., Charlottesville, Psychology.

HUDSON, CECIL I., Jr., Charlottesville, Physics.

HUMMON, MARGARET R., Oakton, Botany.

HUNT, LOIS T., Hopewell, Zoology.

JEFFREY, JACKSON E., Richmond, Medical Sciences.

MCCLANAHAN, CHARLENE, Grundy, Genetics.  
MCDIARMID, ROBERT C., Vienna, Engineering.

NORDQUIST, PAUL E. R., Jr., Arlington, Chemistry.

PLEASANTS, BEVERLY A., Richmond, Genetics.

THAXTON, GEORGE D., Richmond, Physics.  
TOLBERT, CHARLES R., Richmond, Astronomy.

WALKER, WILLIAM S., Charlottesville, Physics.

*Postdoctoral*

LIGHT, ROBLEY J., Roanoke, Biochemistry.

*Science Faculty*

BAUM, PARKER B., Williamsburg, Chemistry.  
HALL, ANITA B., Hampton, Zoology.

HOPKINS, MANSSELL H., Jr., Blacksburg, Engineering.

MONAHAN, IRENE P., Blacksburg, Mathematics.

PALMER, VIOLA G., Hampton, Medical Sciences.

PINSCHMIDT, W. C., Jr., Charlottesville, Biology.

STEWART, ROBERTA A., Hollins College, Chemistry.

*Summer Fellowships for Graduate Teaching Assistants*

ALBERT, EUGENE, Charlottesville, Mathematics.

BERRY, JAMES W., Abingdon, Zoology.

BOWEN, LAWRENCE H., Lynchburg, Chemistry.

NORDQUIST, PAUL E. R., Jr., Arlington, Chemistry.

RUSSELL, STEPHEN M., Abingdon, Zoology.

TOLBERT, CHARLES R., Richmond, Astronomy.

WADDILL, MARCELLUS E., Meherrin, Mathematics.

*Summer Fellowships for Secondary School Teachers*

BAKER, LOUIS CALVIN, Arlington, Biology.  
HAACK, LOUISE B., Annandale, Mathematics.

**VIRGINIA—Continued**

HAUSER, Sr. M. ANN JOSEPH, Alexandria, Mathematics.  
 MILLIKEN, HAROLD ROY, New Market, Biology.  
 RION, JAMES W., Manassas, Mathematics.  
 STINE, MARY E., Alexandria, Mathematics.  
 TIBINGER, CLAUDE G., Dayton, General Sciences.

**WASHINGTON****Graduate**

ALVORD, RICHARD P., Centralia, Earth Sciences.  
 ARMSTRONG, RICHARD L., Seattle, Earth Sciences.  
 BIRKELAND, PETER W., Bellevue, Earth Sciences.  
 BROOKS, FLOYD L., Jr., Seattle, Chemistry.  
 BROWN, RONALD E., Everett, Physics.  
 CRASWELL, KEITH J., Port Orchard, Mathematics.  
 ESPER, HILDEGARD, Seattle, Zoology.  
 FARIS, WILLIAM G., Seattle, Mathematics.  
 GERBRACHT, ROBERT J., Seattle, Physics.  
 HENDRICKSON, ALICE J., Seattle, Psychology.  
 JENKINS, DAVID A., Seattle, Engineering.  
 KARLINSEY, KURTLEE J., Jr., Tacoma, Engineering.  
 KROON, JOHN D., Seattle, Mathematics.  
 LANPHERE, MARVIN A., Spokane, Earth Sciences.  
 LARSON, DONALD C., Seattle, Engineering.  
 LAWLER, RONALD G., Seattle, Chemistry.  
 LEPSE, PAUL A., Seattle, Chemistry.  
 LUBAN, MARSHALL, Seattle, Physics.  
 MACLAHREN, MALCOLM D., Seattle, Mathematics.  
 MCNEILL, DALE A., Tacoma, Physics.  
 MILLER, RONALD E., Seattle, Social Sciences.  
 RUSTAD, NORMAN E., Poulsbo, Chemistry.  
 SHACKLEFORD, WILLIAM L., Seattle, Engineering.  
 TOBLER, WALDO R., Edmonds, Social Sciences.  
 WRIGHT, JON A., Tacoma, Physics.

**Cooperative Graduate**

ALLEY, EARL G., Hooper, Chemistry.  
 ATKINSON, REILLY, Medina, Physics.  
 CALVO, JOSEPH M., Seattle, Biochemistry.  
 CURRENT, JERRY H., Seattle, Chemistry.  
 DAVIS, JAMES W., Winslow, Engineering.  
 DRAKE, DARRELL M., Seattle, Physics.  
 GERHOLD, GEORGE A., Seattle, Chemistry.  
 HARDY, ROBERT J., Port Angeles, Physics.  
 HENRIE, DAVID L., Seattle, Physics.  
 HODGE, ROBERT W., Port Angeles, Social Sciences.  
 MALOFSKY, BERNARD M., Seattle, Chemistry.  
 MATHEWS, WILLIAM G., Wenatchee, Astronomy.  
 MOORE, GARY L., Gig Harbor, Earth Sciences.  
 PERENSINI, ANTHONY L., Pullman, Mathematics.  
 PIERSON, STUART O., Seattle, Social Sciences.  
 PILKEY, ORRIN H., Richland, Earth Sciences.  
 UPPER, CHRISTEN D., Kent, Biochemistry.  
 WAKE, DAVID B., Parkland, Zoology.

**Postdoctoral**

FRITZ, WILLIAM H., Cathlamet, Earth Sciences.  
 GEARING, FREDERICK O., Seattle, Anthropology.  
 HODGE, PAUL W., Snohomish, Astronomy.  
 JANS, JAMES P., Seattle, Mathematics.

**Senior Postdoctoral**

ANDERSON, ARTHUR G., Jr., Seattle, Chemistry.  
 FAREWELL, GEORGE W., Seattle, Physics.  
 HEWITT, EDWIN, Seattle, Mathematics.  
 WAGNER, EDWARD L., Pullman, Chemistry.

**Science Faculty**

FORD, JAMES M., Mount Vernon, Biology.  
 HAZLET, STEWART E., Pullman, Chemists.  
 JOPPA, ROBERT G., Seattle, Engineering.  
 LADD, ARTHUR F., Ellensburg, Physics.  
 MANLEY, DONALD L., Walla Walla, Physics.  
 RICHEY, EUGENE P., Seattle, Engineering.  
 SMITH, LYNWOOD S., Bremerton, Zoology.  
 VIGERS, ROBERT F., Seattle, Engineering.

**Summer Fellowships for Graduate Teaching Assistants**

HARDY, ROBERT J., Port Angeles, Physics.  
 LARSEN, JOHN H., Jr., Tacoma, Zoology.  
 MEREDITH, FARRIS R., Pullman, Botany.  
 MERWIN, HARRIET J., Seattle, Zoology.  
 PARMENTER, VADEN R., Pullman, Botany.  
 ROBBERS, JAMES E., Everett, Medical Sciences.

**Summer Fellowships for Secondary School Teachers**

CALLOW, WALLACE G., Seattle, Mathematics.  
 JACOBSON, RICHARD W., Sunnyside, Mathematics.  
 LASLEY, CORNELIA B., Tacoma, Mathematics.  
 MARTINSEN, WESLEY D., Ferndale, General Sciences.  
 MAYER, NORMAN WILLIAM, Tacoma, Zoology.  
 PERCY, LOYD RAY, Tacoma, Mathematics.  
 POST, RICHARD LINN, Aberdeen, Mathematics.  
 SMITH, JOHN MARTIN, Aberdeen, General Sciences.  
 UNDEM, ROY MARTIN, Aberdeen, Mathematics.

**WEST VIRGINIA****Graduate**

CAMPBELL, LAURENCE J., Huntington, Physics.  
 FRIEDLY, JOHN C., Jr., Moundsville, Engineering.  
 HIRST, LESTER L., Jr., Morgantown, Physics.  
 LILLY, JULIUS Q., Montgomery, Engineering.  
 MANN, JAMES E., Jr., Bluefield, Engineering.  
 TICE, RUSSELL L., Huntington, Biochemistry.

**Cooperative Graduate**

BALL, EDWIN D., Philippi, Physics.  
 BONAR, DANIEL D., Murraysville, Mathematics.  
 LONG, ANDREW F., Jr., Morgantown, Mathematics.  
 PRICE, ALSON K., South Charleston, Chemistry.  
 RAY, JAMES P., Princeton, Mathematics.  
 THOMAS, KEITH S., Weyers Cave, Physics.  
 WRIGHT, CARL L., Morgantown, Chemistry.

**Science Faculty**

BAER, CHARLES H., Morgantown, Botany.  
 BAUSERMAN, THOMAS, Huntington, Mathematics.  
 HAMILTON, JAMES F., Morgantown, Engineering.

LA RUB, JAMES A., Fairmont, Mathematics.  
SMITH, NELSON S., Jr., Morgantown, Engineering.

*Summer Fellowships for Graduate Assistants*  
CHAMBERS, WILLIAM L., Morgantown, Engineering.

GONANO, JOHN R., Hedgesville, Physics.  
MILLER, FRANK D., Morgantown, Psychology.

*Summer Fellowships for Secondary School Teachers*

ADALIS, DOROTHY, Weirton, Biology.  
BIRD, RALPH SIDNEY, Matoaka, Chemistry.  
NUNLEY, ROBERT GRAY, Williamsburg, Biology.  
SCHELL, DELMAR L., Petersburg, Biology.

## WISCONSIN

### *Graduate*

FAY, ROBERT C., Kenosha, Chemistry.  
FREA, JAMES I., Sturgeon Bay, Microbiology.  
GAGGIOLI, RICHARD A., Madison, Engineering.  
GOTTLIEB, JUDITH A., Madison, Medical Sciences.  
HARRIMAN, JOHN E., Appleton, Chemistry.  
HARTMAN, THOMAS F., Madison, Psychology.  
HOBEN, ALLAN, Milwaukee, Anthropology.  
HUNDHAUSEN, ARTHUR J., Wausau, Physics.  
IMHOF, VIOLET I., South Milwaukee, Chemistry.  
JACOBS, STANLEY J., Hartland, Mathematics.

JEANNOTTE, DEXTER A., Milwaukee, Engineering.

KADLEC, ROBERT H., Racine, Engineering.  
KESTNER, NEIL R., Muskegon, Chemistry.  
KNUTH, DONALD E., Milwaukee, Mathematics.  
KRUSACK, ARNOLD J., Clintonville, Chemistry.

LINK, JOHN K., Madison, Physics.  
MAHOWALD, ANTHONY P., Milwaukee, Zoology.

MAKOFIS, WALTER L., Wauwatosa, Psychology.

MILLER, GERALD R., Milwaukee, Chemistry.  
MORZENTI, VIRGINIA M., Montreal, Biology.  
PFEIFFER, RUSSELL R., Milwaukee, Engineering.

POMRANING, GERALD C., Oshkosh, Engineering.

ROESLER, FREDERICK L., Milwaukee, Physics.  
SMITH, DOUGLAS L., Madison, Chemistry.  
SMITH, TIMOTHY A., Milwaukee, Psychology.  
SUTTON, PAUL W., Sparta, Chemistry.  
TREICHEL, PAUL M., Jr., Madison, Chemistry.  
WAGNER, CURTIS A., Monroe, Physics.  
WAGNER, EUGENE R., Madison, Chemistry.

### *Cooperative Graduate*

BANASZAK, LEONARD J., Milwaukee, Biochemistry.

BERMAN, NEIL S., Milwaukee, Engineering.  
BJERKE, CONRAD C., Osseo, Engineering.  
BRINKMAN, GAIL L., Colfax, Biochemistry.  
BRINKMAN, LEONARD W., Jr., La Crosse, Social Sciences.

BRONKOWSKI, THOMAS A., Milwaukee, Chemistry.

BRUENING, GEORGE E., South Milwaukee, Biochemistry.

CANNON, LAWRENCE O., Madison, Mathematics.

DE GROOT, RODNEY C., Union Grove, Botany.  
DRUFENBROCK, Sr. MADEIRA, Milwaukee, Mathematics.

GILLMAN, DAVID S., Madison, Mathematics.  
GRIMM, ROBERT A., Two Rivers, Chemistry.  
JONSON, RONALD C., Milwaukee, Chemistry.  
KRAUSE, EUGENE F., Kenosha, Mathematics.  
MANDELKER, MARK W., Milwaukee, Mathematics.

MARTEN, GORDON C., Wausau, Agriculture.  
MAY, DANIEL S., Racine, Biochemistry.

McCLURE, CHARLES W., Beloit, Engineering.  
MEYER, Sr. GREGORY M., Milwaukee, Mathematics.

PITTERLE, THOMAS A., Milwaukee, Engineering.

POPPE, CARL H., Madison, Physics.  
RIEDL, JOHN O., Jr., Milwaukee, Mathematics.

SEGUN, CHARLES P., Madison, Mathematics.

SEIHER, LOWELL A., Iola, Zoology.

SOULEN, THOMAS K., Madison, Biochemistry.

VANKYZIN, JOHN R., Milwaukee, Mathematics.

VERETTE, RALPH M., Wauwatosa, Engineering.

WHATLEY, MALCOLM C., Madison, Physics.  
WIDMIER, JOHN M., Madison, Earth Sciences.

ZAWADZKI, JOSEPH F., Withee, Chemistry.

*Postdoctoral*

AUSTIN, SAMUEL M., Columbus, Physics.  
BRANDT, JOHN C., Williams Bay, Astronomy.  
SAGAN, CARL E., Madison, Astronomy.

SPENCER, THOMAS A., Jr., Madison, Chemistry.

SUTTIE, JOHN W., Madison, Biochemistry.  
VANDERVOORT, PETER O., Williams Bay, Astronomy.

*Senior Postdoctoral*

ARCHER, E. JAMES, Madison, Psychology.

*Science Faculty*

DOEMLAND, HARVEY H., Madison, Engineering.

GREENE, JACK B., Milwaukee, Physics.  
KUNNY, BARTHOLOMEW K., Beloit, Zoology.  
MEZGER, JAMES P., Milwaukee, Engineering.  
STEWART, JAMES C., Appleton, Mathematics.  
VANDERLIN, CARL J., Jr., Whitewater, Mathematics.

*Summer Fellowships for Graduate Teaching Assistants*

CARLSON, DAVID H., Madison, Mathematics.

GIBSON, THOMAS G., Wauwatosa, Earth Sciences.

HICKS, GEORGE P., Madison, Chemistry.  
HUTCHINS, JAMES P., Madison, Engineering.

MEISTERS, GEORGE J., Milwaukee, Chemistry.

NASH, ALLAN J., Wauwatosa, Psychology.  
NORDMAN, JAMES E., Madison, Engineering.

NOVOYNY, DONALD W., Madison, Engineering.

PIEHL, MARTIN A., Medford, Botany.

PONTRELLI, GENE J., McFarland, Chemistry.

SARGENT, THEODORE D., Madison, Zoology.

SORAUF, JAMES E., Wauwatosa, Earth Sciences.

SPINK, CHARLES H., Platteville, Chemistry.  
TISCHER, THOMAS N., Milwaukee, Chemistry.

TREMAINE, DORIS E., Clinton, Mathematics.  
VANRYZIN, JOHN R., Milwaukee, Mathematics.  
WHITE, KEITH L., Madison, Botany.  
ZAWADZKI, JOSEPH F., Withee, Chemistry.

WISCONSIN—Continued

Summer Fellowships for Secondary School Teachers

ASHENFELTER, JOHN R., Janesville, Biology.  
 BATHA, JOHN VINCENT, Muskego, Biology.  
 BRADWAY, KENNETH W., Edgar, Mathematics.  
 BRUNNER, VINCENT F., Milwaukee, Mathematics.  
 GROMME, ROY O., Glendale, Biology.  
 LANDIS, JOHN R., Appleton, Mathematics.  
 LEMAN, HARRY WARREN, Casco, Botany.  
 LONG, JOHN W., Menasha, Mathematics.  
 MCCLOSKEY, DONALD G., Madison, Mathematics.  
 O'MALLEY, Sr. M. LORAN, Madison, Mathematics.  
 PATTERSON, Sr. M. ADELBER, Wilwaukee, Biology.  
 REINHOLZ, HARVEY H., Appleton, Biology.  
 TREBBIOSKI, Sr. M. GABR, Stevens Point, Biology.  
 WEINBERGER, F. RICHARD, Muskego, Mathematics.  
 WOLFF, HARRY LUDWIG, Janesville, Mathematics.  
 ZWENG, MARILYN J., Madison, Mathematics.

WYOMING

Graduate

DODSON, WILLIAM H., Casper, Engineering.  
 SADLER, JOHN R., Riverton, Biochemistry.

Cooperative Graduate

BEATTY, DAVID D., Laramie, Zoology.  
 GUYTON, JAMES W., Laramie, Earth Sciences.

Science Faculty

BEATTY, RICHARD L., Laramie, Mathematics.  
 BOYD, DONALD W., Laramie, Biology.  
 LAMB, DONALD R., Laramie, Earth Sciences.

Summer Fellowships for Graduate Teaching Assistants

GUYTON, JAMES W., Laramie, Earth Sciences.

Summer Fellowships for Secondary School Teachers

NIELSEN, LENUS A., Sheridan, General Sciences.

PUERTO RICO

Science Faculty

WEHMHOEFER, Sr. MARIE C., Santa Maria, Botany.

Institutes Chosen by Fellowship Awardees

[Key to table: A. Cooperative Graduate Fellowship Program. B. Graduate Fellowship Program. C. Postdoctoral Fellowship Program. D. Senior Postdoctoral Fellowship Program. E. Science Faculty Fellowship Program. F. Summer Fellowships for Secondary School Teachers Program. G. Summer Fellowships for Graduate Teaching Assistants Program.]

	A	B	C	D	E	F	G
Adelphi College, Garden City, N.Y.	1						
Akron, University of, Akron, Ohio	3						1
Alabama, University of, University, Ala.	3					3	3
American University, Washington, D.C.						2	
Appalachian State Teachers College, Boone, N.C.						2	
Arizona State College, Flagstaff, Ariz.						3	
Arizona State University, Tempe, Ariz.						3	
Arizona, University of, Tucson, Ariz.	6	2			2	2	1
Arkansas, University of, Fayetteville, Ark.	6	1				7	4
Atlanta University, Atlanta, Ga.						2	
Auburn University, Auburn, Ala.	3						4
Baylor University, Waco, Tex.						1	2
Boston College, Chestnut Hill, Mass.	2					2	3
Boston University, Boston, Mass.	4						2
Brandeis University, Waltham, Mass.	6	2					
Brigham Young University, Provo, Utah						1	2
Brooklyn, Polytechnic Institute of, Brooklyn, N.Y.	13	1			1	3	3
Brown University, Providence, R.I.	6	6			2		2
Bryn Mawr College, Bryn Mawr, Pa.	4						3
Buffalo, University of, Buffalo, N.Y.	5					3	3
California Institute of Technology, Pasadena, Calif.	15	103	5	2	1		8
California, University of, Berkeley, Calif.	43	106	10		17		19
California, University of, Davis, Calif.		1			2	1	
California, University of, La Jolla, Calif.			1				
California, University of, Los Angeles, Calif.	18	8		2	5	5	5
California, University of, San Francisco, Calif.		2			2		
California, University of Southern, Los Angeles, Calif.	1	2	2		1		1
Carleton College, Northfield, Minn.					2		2
Carnegie Institute of Technology, Pittsburgh, Pa.	9	17	1				3
Case Institute of Technology, Cleveland, Ohio	6	1			1		1
Catholic University of America, Washington, D.C.	5	2			1	15	1
Chicago, University of, Chicago, Ill.	21	40	2	1	2	9	10
Cincinnati, University of, Cincinnati, Ohio	3	1					
Claremont College, Claremont, Calif.		1					
Claremont Graduate School, Claremont, Calif.	2				1		
Clark University, Worcester, Mass.	5						1
Clemson Agricultural College, Clemson, S.C.	3	1					2
Colorado School of Mines, Golden, Colo.						2	1
Colorado State College, Greeley, Colo.							
Colorado State University, Fort Collins, Colo.	2						4
Colorado, University of, Boulder, Colo.	7	7	1		3	18	4
Columbia University, New York, N.Y.	32	33	2		9	8	16
Columbia University Teachers College, New York, N.Y.						3	
Connecticut, University of, Storrs, Conn.	3				1		1
Cornell University, Ithaca, N.Y.	27	20	1		3		13

*Institutes Chosen by Fellowship Awardees—Continued*

	A	B	C	D	E	F	G
Creighton University, Omaha, Nebr.						2	
Delaware, University of, Newark, Del.	6	3				1	3
Denver, University of, Denver, Colo.						2	
De Paul University, Chicago, Ill.						1	
Detroit, University of, Detroit, Mich.						4	
Dominican College of San Rafael, San Rafael, Calif.						2	
Duke University, Durham, N.C.	5	7			2	3	4
Duquesne University, Pittsburgh, Pa.	2						1
East Texas State College, Commerce, Tex.						1	
Eastern Pennsylvania Psychiatric Institute, Philadelphia, Pa.			1				
Emory University, Atlanta, Ga.	4					2	
Fairleigh Dickinson College, Rutherford, N.J.						1	
Florida State University, Tallahassee, Fla.	6	2			2	3	2
Florida, University of, Gainesville, Fla.	6	8			2	3	3
Fordham University, New York, N.Y.	4	1			1	8	3
Fresno State College, Fresno, Calif.						1	
George Peabody College for Teachers, Nashville, Tenn.	1					4	2
George Washington University, Washington, D.C.	2						
Georgetown University, Washington, D.C.	3	1					4
Georgia Institute of Technology, Atlanta, Ga.	6				2		1
Georgia, University of, Athens, Ga.	6	1				1	3
Hahnemann Medical College, Philadelphia, Pa.							2
Harvard University, Cambridge, Mass.	21	173	11		4	2	6
Hawaii, University of, Honolulu, Hawaii.	3						1
Houston, University of, Houston, Tex.	6						3
Howard University, Washington, D.C.						1	
Hunter College, New York, N.Y.						1	
Illinois Institute of Technology, Chicago, Ill.	5				3		5
Illinois, University of, Urbana, Ill.	48	41	2		12	5	24
Indiana State Teachers College, Terre Haute, Ind.						2	
Indiana University, Bloomington, Ind.	8	7			3	2	5
Institute for Advanced Study, Princeton, N.J.			12	4	2		
Iowa State University of Science and Technology, Ames, Iowa.							10
Iowa State, University of, Iowa City, Iowa.	21	7			5	3	
Iowa State Teachers College, Cedar Falls, Iowa.	14	5			1	5	7
John Carroll University, Cleveland, Ohio.						1	
Johns Hopkins University, Baltimore, Md.	8	20	2				3
Kansas State Teachers College, Emporia, Kans.						6	
Kansas State University, Manhattan, Kans.	7					1	3
Kansas, University of, Lawrence, Kans.	8	9				5	5
Kent State University, Kent, Ohio.	6					2	
Kentucky, University of, Lexington, Ky.	6						4
Lehigh University, Bethlehem, Pa.	5		1		2	1	3
Long Beach State College, Long Beach, Calif.						1	
Louisiana Polytechnic Institute, Ruston, La.						3	
Louisiana State University and Agricultural and Mechanical College, Baton Rouge, La.	9	6			1		5
Louisville, University of, Louisville, Ky.	3					1	2
Loyola University, Chicago, Ill.	6						4
Madison College, Madison College, Tenn.						1	
Maine, University of, Orono, Maine.	6						4
Marquette University, Milwaukee, Wis.						4	
Maryland, University of, College Park, Md.	11	3			4	5	7
Massachusetts Institute of Technology, Cambridge, Mass.	46	114	3		5		23
Massachusetts, University of, Amherst, Mass.						1	
Medical College of Virginia, Richmond, Va.	3						
Miami University, Oxford, Ohio.						1	
Miami, University of, Coral Gables, Fla.		1				2	
Michigan College of Mining and Technology, Houghton, Mich.		1					
Michigan State University, East Lansing, Mich.	20	1			5	6	11
Michigan, University of, Ann Arbor, Mich.	42	34	2		20	14	21
Minnesota, University of, Minneapolis, Minn.	28	10	1		3	12	14
Mississippi College, Clinton, Miss.						1	
Mississippi Southern College, Hattiesburg, Miss.						1	
Mississippi State University, State College, Miss.	6						
Mississippi, University of, University, Miss.	1					3	3
Missouri, University of, Columbia, Mo.	10	1			3	1	6
Montana State College, Bozeman, Mont.	4	1					
Montana State University, Missoula, Mont.	6				1	1	
Montclair State College, Upper Montclair, N.J.						1	
Nebraska, University of, Lincoln, Nebr.	6	4			3	2	4
New Hampshire, University of, Durham, N.H.	3					1	2
New Mexico Institute of Mining and Technology, Socorro, N. Mex.	1		1				
New Mexico State University, State College, N. Mex.	5					3	4
New Mexico, University of, Albuquerque, N. Mex.		2			1	1	3
New School for Social Research, New York, N.Y.	2						
New York State, University of, Syracuse, N.Y.	5						2
New York State, University of, Teachers College at New Paltz, N.Y.						1	
New York University, New York, N.Y.	30	5	1	1	2	13	

*Institutes Chosen by Fellowship Awardees—Continued*

	A	B	C	D	E	F	G
North Carolina State College of Agriculture and Engineering, Raleigh, N.C.	7	3			1	1	4
North Carolina, University of, Chapel Hill, N.C.	7	4			5	2	1
North Carolina, Woman's College of the University, Greensboro, N.C.						1	
North Dakota Agricultural College, State College, N. Dak.	5						
North Dakota, University of, Grand Forks, N. Dak.	3					3	4
North Texas State College, Denton, Tex.						1	
Northeast Missouri State Teachers College, Kirksville, Mo.						1	
Northern Illinois University, Dekalb, Ill.						3	
Northwestern State College of Louisiana, Natchitoches, La.						1	
Northwestern University, Evanston, Ill.	15	12	1		3	7	6
Notre Dame, University of, Notre Dame, Ind.	6	2			3	35	3
Ohio State University, Columbus, Ohio	27	8			4	7	15
Ohio University, Athens, Ohio	2						1
Ohio Wesleyan University, Delaware, Ohio						1	
Oklahoma State University of Agriculture and Applied Sciences, Stillwater, Okla.	8	3			2	7	5
Oklahoma, University of, Norman, Okla.	7	2			2	6	5
Oregon State College, Corvallis, Oreg.	9	2			3	7	6
Oregon, University of, Eugene, Oreg.	6	2			1		4
Pacific, College of the, Stockton, Calif.							1
Pennsylvania State University, University Park, Pa.	20	7	1		6	22	11
Pennsylvania, University of, Philadelphia, Pa.	14	12	1			6	6
Peter Bent Brigham Hospital, Boston, Mass.			1				
Philadelphia College of Pharmacy and Science, Philadelphia, Pa.	1						6
Pittsburgh, University of, Pittsburgh, Pa.	10	1			6	4	7
Princeton University, Princeton, N. J.	12	87	5	1	4		7
Purdue University, Lafayette, Ind.	34	10			15	19	17
Radcliffe College, Cambridge, Mass.	4	9					
Redlands, University of, Redlands, Calif.						6	
Rensselaer Polytechnic Institute, Troy, N. Y.	7	2			2		4
Rhode Island, University of, Kingston, R. I.	6	6					3
Rice Institute, Houston, Tex.	6	6					2
Rochester, University of, Rochester, N. Y.	8	2					5
Rockefeller Institute, New York City, N. Y.			1				
Rutgers, The State University, New Brunswick, N. J.	9	2			1		6
St. Bonaventure University, St. Bonaventure, N. Y.	1					1	
St. Johns University, Jamaica, N. Y.	3					3	3
St. Louis University, St. Louis, Mo.	6	1			1	5	3
St. Mary College, Xavier, Kans.						1	
San Francisco State College, San Francisco, Calif.						2	
San Francisco, University of, San Francisco, Calif.		1					
Smith College, Northampton, Mass.	1						
South Carolina, University of, Columbia, S. C.	5					1	2
South Dakota State College of Agriculture and Mechanical Arts, Brookings, S. Dak.	1					1	1
South Dakota, State University of, Vermillion, S. Dak.	3					2	2
Southern Illinois University, Carbondale, Ill.	1	1			1	1	
Southern Methodist University, Dallas, Tex.						1	
Southern University, Baton Rouge, La.						2	
Southwestern Louisiana Institute, Lafayette, La.							
Stanford University, Stanford, Calif.	22	60	8		12	6	12
Stevens Institute of Technology, Hoboken, N. Y.	7						2
Syracuse University, Syracuse, N. Y.	7	1			2	3	4
Temple University, Philadelphia, Pa.	3						
Tennessee, University of, Knoxville, Tenn.	8	6			4	1	3
Texas, Agricultural and Mechanical College of, College Station, Tex.	3	1			3	1	3
Texas Christian University, Fort Worth, Tex.						1	
Texas Southern University, Houston, Tex.						2	
Texas Technological College, Lubbock, Tex.		1				1	1
Texas, University of, Austin, Tex.	18	7		1	4	6	10
Toledo, University of, Toledo, Ohio		2					
Trinity University, San Antonio, Tex.						1	
Tufts University, Medford, Mass.							1
Tulane University, New Orleans, La.	6	1			1		4
Utah State University, Logan, Utah	4				2		
Utah, University of, Salt Lake City, Utah	7	1					4
Vanderbilt University, Nashville, Tenn.	6				3		4
Villanova University, Villanova, Pa.						9	
Virginia Polytechnic Institute, Blacksburg, Va.	3	1			2		1
Virginia, University of, Charlottesville, Va.	6	2			1		1
Washington State University, Pullman, Wash.	4	1			1	1	4
Washington University, St. Louis, Mo.	7	2	1		5	3	3
Washington, University of, Seattle, Wash.	14	10		1	5	7	4
Wayne State University, Detroit, Mich.	6					2	4
Wesleyan University, Middletown, Conn.						1	
West Virginia University, Morgantown, W. Va.	4				1	5	3
Western Illinois University, Macomb, Ill.						1	
Western Michigan University, Kalamazoo, Mich.						3	
Western Reserve University, Cleveland, Ohio	6	1				3	2
Western Washington College of Education, Bellingham, Wash.						2	



*Institutes Chosen by Fellowship Awardees—Continued*

	A	B	C	D	E	F	G
Wisconsin, University of, Madison, Wis.....	41	40	3	-----	9	18	21
Worcester Polytechnic Institute, Worcester, Mass.....	2	-----	-----	-----	-----	-----	-----
Wyoming, University of, Laramie, Wyo.....	2	-----	-----	-----	-----	4	1
Xavier University, Cincinnati, Ohio.....	-----	-----	-----	-----	-----	4	-----
Yale University, New Haven, Conn.....	20	34	4	-----	6	-----	9
Yeshiva University, New York, N.Y.....	2	-----	1	-----	-----	-----	-----

*Foreign Institutions*

Foreign institutions	Graduate	Post doctoral	Senior post-doctoral	Science faculty
Athens National University, Greece.....	-----	1	-----	-----
Australian National University, Australia.....	-----	1	1	-----
Basel, University of, Switzerland.....	-----	1	-----	-----
Bern, University of, Switzerland.....	-----	-----	1	-----
Birmingham, University of, England.....	-----	-----	1	-----
Bologna, University of, Italy.....	-----	-----	1	-----
Bonn, University of, Germany.....	-----	1	-----	-----
Bordeaux, University of, France.....	-----	-----	1	-----
Bristol, University of, England.....	-----	-----	2	-----
Brussels, University of, Belgium.....	-----	2	-----	-----
Cambridge, University of, England.....	5	9	9	1
Carlsberg Foundation, Denmark.....	-----	-----	2	-----
Centre Nationale de la Recherche Scientifique, France.....	-----	2	-----	-----
Centre Nationale de Transfusion Sanguine, France.....	-----	1	-----	-----
Cern, Switzerland.....	-----	1	3	-----
Chalmers Tekniska Hogskola, Sweden.....	-----	-----	-----	1
College de France, France.....	-----	1	-----	-----
Cologne, University of, Germany.....	-----	-----	2	1
Copenhagen, University of, Denmark.....	-----	6	-----	-----
Council of Scientific and Industrial Research, India.....	1	-----	-----	-----
Dublin Institute for Advanced Study, Ireland.....	-----	1	-----	-----
Durham, University of, England.....	-----	1	-----	-----
Ecole Polytechnique, France.....	-----	1	1	-----
Edinburgh, University of, Scotland.....	-----	1	-----	-----
Federal Research Institute for Virus Diseases of Animals, Germany.....	-----	1	-----	-----
Fourah Bay College, British West Africa.....	-----	1	-----	-----
Ghent, University of, Belgium.....	-----	1	-----	-----
Glasgow, University of, Scotland.....	-----	-----	-----	1
Gottingen, University of, Germany.....	-----	1	-----	1
Grenoble, University of, France.....	-----	1	-----	-----
Hebrew University, Israel.....	-----	-----	2	-----
Heidelberg, University of, Germany.....	-----	2	2	-----
Institut Fourier, France.....	-----	1	1	-----
Institut Henri Poincare, France.....	-----	1	-----	-----
Institut Pasteur, France.....	-----	2	-----	-----
Institute for Theoretical Physics, Denmark.....	-----	-----	2	-----
Institute for Theoretical Physics, Naples, Italy.....	-----	1	-----	-----
Instituto Superiore de Sanita, Italy.....	-----	1	-----	-----
International Training Centre for Aerial Survey, Netherlands.....	-----	-----	-----	1
Karolinska Institute, Sweden.....	-----	1	1	-----
Leeds, University of, England.....	-----	-----	1	-----
Leiden, University of, Netherlands.....	-----	2	1	-----
Lima, University of, Peru.....	1	-----	-----	-----
London, University of, England.....	4	5	3	1
Lund, University of, Sweden.....	-----	1	-----	1
Marburg, University of, Germany.....	-----	1	-----	-----
Maudsley Hospital, England.....	-----	1	-----	-----
Medical Biological Laboratory, National Defense Research Council, Netherlands.....	-----	-----	1	-----
Melbourne, University of, Australia.....	-----	1	-----	-----
Munich, University of, Germany.....	-----	2	-----	-----
Museum National d'Histoire Naturelle, France.....	-----	-----	1	-----
Nagoya University, Japan.....	-----	1	-----	-----
Nancy, University of, France.....	-----	1	-----	-----
National Institute for Medical Research, England.....	-----	1	-----	-----
New Zealand, University of, New Zealand.....	-----	1	-----	-----
Nigeria, University College of, Nigeria.....	1	-----	-----	-----
Nobel Medical Institute, Sweden.....	-----	-----	2	-----
Norges Tekniske Hogskole, Norway.....	-----	-----	-----	1
Observatoire de Paris, France.....	-----	2	-----	-----
Osaka University, Japan.....	-----	-----	1	1
Oslo, University of, Norway.....	-----	1	-----	1
Oxford, University of, England.....	7	6	3	3
Paris, University of, France.....	3	3	5	2
Pavia, University of, Italy.....	-----	-----	1	-----

*Foreign Institutions—Continued*

Foreign institutions	Graduate	Post doctoral	Senior post-doctoral	Science faculty
Pisa, University of, Italy.....		1		
Queensland, University of, Australia.....			1	
Rome, University of, Italy.....		1	2	1
Royal Botanical Gardens, England.....		1		
Royal Institute of Technology, Sweden.....		1		
Royal Veterinary College, Sweden.....		1		
Saar, University of, Germany.....	1			
Sao Paulo, University of, Brazil.....			1	
St. Thomas' Hospital, England.....		2		
Stockholm, University of, Sweden.....		1		
Swiss Federal Institute of Technology, Switzerland.....		1		1
Sydney, University of, Australia.....			1	
Technische Hochschule, Aachen, Germany.....		1		
Technische Hochschule, Darmstadt, Germany.....		1		
Technische Hochschule, Munich, Germany.....				2
Technische Hochschule, Stuttgart, Germany.....		2		
Technische Hochschule, Vienna, Austria.....				
Technische Hogeschool, Delft, Netherlands.....		1	1	2
Tokyo, University of, Japan.....		1	1	
Uppsala, University of, Sweden.....		1	2	
Vienna, University of, Austria.....	1		1	
Weizmann Institute of Science, Israel.....		1	1	

*Present or Most Recent Institutional Affiliation of Individuals Offered Science Faculty, Senior Postdoctoral, and Postdoctoral Fellowships*

	Science faculty	Senior post-doctoral	Post-doctoral
Adelaide, University of, Adelaide, Australia.....			1
Air Force Research Center, Cambridge, Mass.....		1	
Alabama Polytechnic Institute, Auburn, Ala.....			1
Alaska, University of, College, Alaska.....	2		
Alcorn Agricultural and Mechanical College, Alcorn, Miss.....	1		
Amherst College, Amherst, Mass.....	1		
Antelope Valley Junior College, Lancaster, Calif.....	1		
Arizona, University of, Tucson, Ariz.....	2		
Arkansas, University of, Fayetteville, Ark.....	2		
Austin Peay State College, Clarksville, Tenn.....	1		
Bail State Teachers College, Muncie, Ind.....	2		
Beloit College, Beloit, Wis.....	1		
Berea College, Berea, Ky.....	1		
Boston College, Chestnut Hill, Mass.....	1		
Bowdoin College, Brunswick, Maine.....	1		
Brandeis University, Waltham, Mass.....	1	2	
Brigham Young University, Provo, Utah.....		1	
Brookhaven National Laboratory, New York, N.Y.....		1	
Brooklyn College, Brooklyn, N.Y.....	1		
Brown University, Providence, R.I.....		1	1
Bucknell University, Lewisburg, Pa.....	2		
California Institute of Technology, Pasadena, Calif.....	2		5
California State Polytechnic College, San Luis Obispo, Calif.....	2		
California, University of, Berkeley, Calif.....	1	3	16
California, University of, Davis, Calif.....	1		
California, University of, La Jolla, Calif.....			1
California, University of, Los Angeles, Calif.....	1	2	6
Calvin College, Grand Rapids, Mich.....	1		
Carleton College, Northfield, Minn.....	2		
Case Institute of Technology, Cleveland, Ohio.....	3		1
Catholic University of Puerto Rico, Ponce, P.R.....	1		
Central Washington College of Education Ellensburg, Wash.....	1		
Chattanooga, University of, Chattanooga, Tenn.....	1		
Chicago, University of, Chicago, Ill.....	1	3	14
Chico State College, Chico, Calif.....	2		
Christian Brothers College, Memphis, Tenn.....	2		
Church College of Hawaii, The, Hale, Oahu, Hawaii.....	1		
Cincinnati, University of, Cincinnati, Ohio.....	1		
Clarkson College of Technology, Potsdam, N.Y.....	2		
Clemson Agricultural College, Clemson, S.C.....	3		
College of Medical Evangelists, Los Angeles, Calif.....			1
Colorado College, Colorado Springs, Colo.....	1		
Colorado State University, Fort Collins, Colo.....	1		
Colorado, University of, Boulder, Colo.....			1
Columbia University, New York City, N.Y.....	1	1	11
Concordia College, Moorhead, Minn.....	1		

Present or Most Recent Institutional Affiliation of Individuals Offered  
Science Faculty, Senior Postdoctoral, and Postdoctoral Fellowships—Con.

	Science faculty	Senior post- doctoral	Post- doctoral
Connecticut, University of, Storrs, Conn.	2		
Cornell University, Ithaca, N. Y.		5	5
Cornell University, New York State Veterinary College, Ithaca, N. Y.	1		
Dana College, Blair, Nebr.	1		
Dartmouth College, Hanover, N. H.	2		
David Taylor Model Basin, Washington, D. C.		1	
Delaware, University of, Newark, Del.		1	
Detroit, University of, Detroit, Mich.	2		
Drew University, Madison, N. J.	1		
Drury College, Springfield, Mo.	1		
Duke University, Durham, N. C.			1
D'Youville College, Buffalo, N. Y.	1		
Earlham College, Richmond, Ind.	1		
Eastern Michigan University, Ypsilanti, Mich.	2		
Eastern Pennsylvania Psychiatric Institute, Philadelphia, Pa.			1
El Camino College, El Camino College, Calif.	2		
Emory University, Atlanta, Ga.	1		
Fairmont State College, Fairmont, W. Va.	1		
Florence State College, Florence, Ala.	1		
Florida, University of, Gainesville, Fla.	1		1
Franklin and Marshall College, Lancaster, Pa.	1		
General Motors Institute, Flint, Mich.	1		
Geneva College, Beaver Falls, Pa.	1		
Geological Survey, U. S., Washington, D. C.		1	
George Washington University, Washington, D. C.	1	1	
Georgia Institute of Technology, Atlanta, Ga.	3		
Georgia, University of, Athens, Ga.	1		
Georgetown University, Washington, D. C.	1		
Glendale College, Glendale, Calif.	1		
Grambling College, Grambling, La.	1		
Hampton Institute, Hampton, Va.	2		
Harvard University, Cambridge, Mass.		3	10
Haverford College, Haverford, Pa.	3		
Holy Cross, College of the, Worcester, Mass.	1		
Hollins College, Hollins College, Va.	1		
Houghton College, Houghton, N. Y.	1		
Humboldt State College, Arcata, Calif.	1		
Hunter College, New York City, N. Y.	1		
Idaho, University of, Moscow, Idaho.	2		
Illinois Institute of Technology, Chicago, Ill.			1
Illinois, University of, Urbana, Ill.	3	1	10
Illinois, University of, Chicago, Ill.	3		
Indiana Technical College, Fort Wayne, Ind.	1		
Indiana University, Bloomington, Ind.	1	2	4
Institute for Advanced Study, Princeton, N. J.			1
Iowa State University of Science and Technology, Ames, Iowa.	1	1	1
Iowa, State University of, Iowa City, Iowa.	1	1	
Jamestown Community College, Jamestown, N. Y.	1		
Jefferson Medical College, Philadelphia, Pa.			1
Johns Hopkins University, Baltimore, Md.		2	7
Kansas State Teachers College, Emporia, Kans.	2		
Kansas State University of Agriculture and Applied Science, Manhattan Kans.	1		
Kentucky, University of, Lexington, Ky.	1		
Kenyon College, Gambler, Ohio.	1		
Keuka College, Keuka, N. Y.	1		
King's College, Wilkes-Barre, Pa.	1		
Lake Forest College, Lake Forest, Ill.	1		
Lamar State College of Technology, Beaumont, Tex.	1		
Lawrence College, Appleton, Wis.	1		
Lehigh University, Bethlehem, Pa.	1		
Lenoir Rhyne College, Hickory, N. C.	1		
Livingstone College, Salisbury, N. C.	1		
Los Alamos Scientific Laboratory, Los Alamos, N. Mex.		1	
Louisiana, Northwestern State College of, Natchitoches, La.	1		
Louisiana Polytechnic Institute, Ruston, La.	2		
Louisville, University of, Louisville, Ky.	1		
Maine, University of, Orono, Maine.	1		
Marillac Junior College, St. Louis, Mo.	1		
Marquette University, Milwaukee, Wis.	1		
Marshall College, Huntington, W. Va.	1		
Mary Washington College of the University of Virginia, Fredericksburg, Va.	1		
Marygrove College, Detroit, Mich.	1		
Massachusetts Institute of Technology, Cambridge, Mass.	1	2	5
Massachusetts, University of, Amherst, Mass.	1		
Medical Nobel Institute, Stockholm, Sweden.			1
Memphis State University, Memphis, Tenn.	1		
Michigan College of Mining and Technology, Houghton, Mich.	1		

**Present or Most Recent Institutional Affiliation of Individuals Offered Science Faculty, Senior Postdoctoral, and Postdoctoral Fellowships—Con.**

	Science faculty	Senior post-doctoral	Post-doctoral
Michigan State University of Agriculture and Applied Science, East Lansing, Mich.	3	1	1
Michigan, University of, Ann Arbor, Mich.	1	3	7
Milwaukee School of Engineering, Milwaukee, Wis.	1		
Minnesota, University of, Minneapolis, Minn.	1	2	2
Mississippi State College for Women, Columbus, Miss.	1		
Mississippi State University, State College, Miss.	1		
Mississippi, University of, University, Miss.	1		
Missouri, University of, Columbia, Mo.	1	1	
Monsanto Chemical Company, Dayton, Ohio.		1	
Montana State College, Bozeman, Mont.	2		
Montgomery Junior College, Takoma Park, Md.	1		
Morehead State College, Morehead, Ky.	1		
Morgan State College, Baltimore, Md.	1		
Morton Junior College, Cicero, Ill.	1		
Mount San Antonio College, Pomona, Calif.	1		
Mundelein College, Chicago, Ill.	1		
Murray State College, Murray, Ky.	1		
Muskingum College, New Concord, Ohio.	1		
National Institutes of Health, Bethesda, Md.		1	
Nebraska, University of, Lincoln, Nebr.	1		
New Hampshire, University of, Durham, N.H.	1		
New York, College of the City of, New York City, N.Y.	1		
New York University, New York, N.Y.		1	3
North Carolina Agricultural and Technical College, Greensboro, N.C.	2		
North Carolina State College of Agriculture and Engineering, Raleigh, N.C.	1		
North Carolina, University of, Chapel Hill, N.C.	1	2	1
North Dakota Agricultural College, Fargo, N. Dak.	1		
North Dakota, University of, Grand Forks, N. Dak.	1		
North Texas State College, Denton, Tex.	1		
Northern Illinois University, DeKalb, Ill.	2		
Northwest Missouri State College, Maryville, Mo.	1		
Northwestern University, Evanston, Ill.	1		2
Norwich University, Northfield, Vt.	1		
Notre Dame, College of, Belmont, Calif.	1		
Notre Dame, University of, Notre Dame, Ind.	1		1
Oak Ridge National Laboratories, Oak Ridge, Tenn.		4	
Oberlin College, Oberlin, Ohio.	3		
Oklahoma State University of Agriculture and Applied Science, Stillwater, Okla.	2		
Oklahoma, University of, Norman, Okla.	3		1
Olympic Junior College, Bremerton, Wash.	1		
Oregon State College, Corvallis, Oreg.	3		
Oregon, University of, Eugene, Oreg.	1	1	1
Paducah Junior College, Paducah, Ky.	1		
Pennsylvania State University, The, University Park, Pa.	5	1	2
Pennsylvania, University of, Philadelphia, Pa.	1		2
Phillips University, Enid, Okla.	1		
Pittsburgh, University of, Pittsburgh, Pa.	1		
Polytechnic Institute of Brooklyn, Brooklyn, N.Y.	3	2	
Pomona College, Claremont, Calif.	1	1	2
Princeton University, Princeton, N.J.	1	1	2
Purdue University, Lafayette, Ind.	1	1	1
Radcliffe College, Cambridge, Mass.			1
Reedley College, Reedley, Calif.	1		
Rensselaer Polytechnic Institute, Troy, N.Y.	2		
Rice Institute, Houston, Tex.		1	
Rhode Island, University of, Kingston, R.I.	2		
Rochester, University of, Rochester, N.Y.			2
Rockefeller Institute, New York, N.Y.		1	1
Rockhurst College, Kansas City, Mo.	1		
Roosevelt University, Chicago, Ill.	1		
St. Francis College, Fort Wayne, Ind.	1		
St. John's University, Jamaica, N.Y.	1		
St. Louis University, St. Louis, Mo.	2		
St. Procopius College, Lisle, Ill.	1		
San Fernando Valley State College, Northridge, Calif.	1		
San Jose State College, San Jose, Calif.	2		
San Mateo, College of, San Mateo, Calif.	1		
Seattle University, Seattle, Wash.	1		
Shasta College, Redding, Calif.	1		
Simmons College, Boston, Mass.	1		
Skagit Valley College, Mount Vernon, Wash.	1		
Smith College, Northampton, Mass.	1		
Snow College, Ephraim, Utah.	1		
South Carolina, University of, Columbia, S.C.	1		
South Dakota State College of Agriculture and Mechanic Arts, Brookings, S. Dak.	2		

*Present or Most Recent Institutional Affiliation of Individuals Offered  
Science Faculty, Senior Postdoctoral, and Postdoctoral Fellowships—Con.*

	Science faculty	Senior post- doctoral	Post- doctoral
Southeast Missouri State College, Cape Gerardeau, Mo.....	1		
Southern California, University of, Los Angeles, Calif.....			1
Southern Illinois University, Carbondale, Ill.....	2		
Southern Methodist University, Dallas, Tex.....	1		
Southern Oregon College, Ashland, Oreg.....	1		
Southern University and Agricultural and Mechanical College, Baton Rouge, La.....	2		
Southwestern Louisiana Institute, Lafayette, La.....	2		
Stanford University, Stanford, Calif.....	1	1	10
State Teachers College, Frostburg, Md.....	1		
State Teachers College, Lock Haven, Pa.....	1		
State Teachers College at Towson, Baltimore, Md.....	1		
State University of New York, Albany, N.Y.....	1		
State University of New York (Agricultural and Technical Institute), Alfred, N.Y.....	1		
Stevens Institute of Technology, Hoboken, N.J.....	1		
Susquehanna University, Selinsgrove, Pa.....	1		
Swarthmore College, Swarthmore, Pa.....	2		
Syracuse University, Syracuse, N.Y.....	1	1	
Temple University, Philadelphia, Pa.....	1		1
Tennessee, University of, Knoxville, Tenn.....	1		
Texas Southern University, Houston, Tex.....	1		
Texas Agricultural and Mechanical College, College Station, Tex.....	2		
Texas Technological College, Lubbock, Tex.....	3		
Texas, University of, Austin, Tex.....	2	1	1
Tri-State College, Angola, Ind.....	1		
Tulane University, New Orleans, La.....			1
Union College and University, Schenectady, N.Y.....	1		
United States Naval Postgraduate School, Monterey, Calif.....	1		
Upland College, Upland, Calif.....	1		
Upsala College, East Orange, N.J.....	1		
Utah, University of, Salt Lake City, Utah.....			2
Valparaiso University, Valparaiso, Ind.....	1		
Virginia Polytechnic Institute, Blacksburg, Va.....	1		
Wabash College, Crawfordsville, Ind.....	1		
Washington State University, Pullman, Wash.....	2	1	
Washington University, St. Louis, Mo.....	1	2	3
Washington, University of, Seattle, Wash.....	2	3	5
Wayne State University, Detroit, Mich.....	1	1	
Wellesley College, Wellesley, Mass.....	1		
Wessington Springs College, Wessington Springs, S. Dak.....	1		
West Virginia University, Morgantown, W. Va.....	3		
Western Carolina College, Cullowhee, N.C.....	1		
Western Illinois University, Macomb, Ill.....	1		
Western Maryland College, Westminster, Md.....	1		
Western Reserve University, Cleveland, Ohio.....	2	1	1
Whitman College, Walla Walla, Wash.....	1		
Whittier College, Whittier, Calif.....	1		
Wichita, University of, Wichita, Kans.....	1		
William and Mary, College of, Norfolk, Va.....	1		
Winston-Salem Teachers College, Winston-Salem, N.C.....	1		
Wisconsin State College, Whitewater, Wis.....	1		
Wisconsin, University of, Madison, Wis.....	1	1	7
Wittenberg University, Springfield, Ohio.....	1		
Wright-Patterson Air Force Base, Dayton, Ohio.....		1	
Wyoming, University of, Laramie, Wyo.....	3		
Yale University, New Haven, Conn.....			10
Youngstown University, Youngstown, Ohio.....	2		

## APPENDIX F

### Publications of the National Science Foundation

This listing includes publications issued by the National Science Foundation during fiscal year 1960. A complete listing of available Foundation publications may be obtained upon request to the Foundation.

The publications marked with a price may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D.C. Other publications are available from the Foundation.

#### ANNUAL REPORTS

Ninth Annual Report, for fiscal year ending June 30, 1959 : NSF 60-1, \$1.

First Annual Weather Modification Report 1959 (A yearly report on activities in the field of weather modification) : NSF 60-24, \$0.35.

#### MANPOWER AND EDUCATION REPORTS

1. Scientific Manpower—1959 (The latest in a general series which contains the papers of the Conference on Scientific Manpower held in conjunction with the meetings of the AAAS in December of each year) : NSF 60-34, \$0.30.

2. Scientific Manpower Bulletins  
No. 11. Salary Profile of Scientists in the National Register of Scientific and Technical Personnel, 1956-58 : NSF 60-22.

3. Information on Science Scholarships and Student Loans : NSF 60-33.

4. Statistical Handbook on Science Education : NSF 60-13, \$0.55.

5. Fellowship, Institute, and Other Education Program Announcements (with instructions for applying).

#### RESEARCH AND DEVELOPMENT ECONOMIC REPORTS

1. Federal Funds for Science VIII. The Federal Research and Development Budget, Fiscal Years 1958, 1959, and 1960 : NSF 59-40, \$0.45.

2. Reviews of Data on Research and Development (A series of leaflets devoted to specific aspects of research and development economics) :

No. 20. Funds for Research and Development Performance in American Industry : NSF 60-35, \$0.10.

No. 19. Funds for Research and Development in Colleges and Universities, Fiscal 1959 : NSF 60-21, \$0.10.

No. 18. Research and Development Expenditures of Selected Groups of Nonprofit Institutions : NSF 60-7, \$0.05.

No. 17. Funds for Research in Medical Schools, 1957-58 : NSF 60-10, \$0.10.

No. 16. Funds for Research and Development in the United States, 1953-59 : NSF 59-65, \$0.10.

No. 15. Research and Development Expenditures of Foundations and Health Agencies, 1957 : NSF 59-55.  
No. 14. Funds for Research and Development Performance in American Industry, 1957 : NSF 59-46.

3. Bibliography on the Economic and Social Implications of Scientific Research and Development : NSF 59-41, \$0.25.

4. Methodology of Statistics on Research and Development : NSF 59-36, \$0.65.

5. Current Projects on Economic and Other Impacts of Scientific Research and Development, 1959 : NSF 59-51, \$0.25.

6. Science and Engineering in American Industry, Report on a 1956 Survey : NSF 59-50, \$0.70.

#### SCIENTIFIC INFORMATION EXCHANGE REPORTS

1. Scientific Information Notes (Bimonthly periodical reporting national and international developments in scientific and technical information dissemination) : Single copy \$0.25, subscription \$1.25 per year.

Vol. 1, No. 4, August-September 1959 ; NSF 49-48.

Vol. 1, No. 5, October-November 1959 ; NSF 59-61.

Vol. 2, No. 1, February-March 1960 ; NSF 60-8.

Vol. 2, No. 2, April-May 1960 ; NSF 60-23.

Vol. 2, No. 3, June-July 1960 ; NSF 60-38.

2. Scientific Information Activities of Federal Agencies (A series of pamphlets describing the policies and procedures of Federal Agencies relative to their scientific activities) :

No. 4. U.S. Government Printing Office : NSF 60-9, \$0.05.

No. 3. Department of Commerce : NSF 59-58, \$0.15.

#### SCIENCE ADMINISTRATION REPORTS

1. NSF Grants for Scientific Research : NSF 60-2.

2. Program Activities of the National Science Foundation : NSF 59-32.