

*J. H. ...*

National  
Science  
Foundation  
9<sup>th</sup> *Annual Report, 1959*



# National Science Foundation

*Ninth Annual Report for the  
Fiscal Year Ended June 30, 1959*





## LETTER OF TRANSMITTAL

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WASHINGTON, D.C.,  
*January 15, 1960.*

MY DEAR MR. PRESIDENT:

I have the honor to transmit herewith the Annual Report for Fiscal Year 1959 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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## CHAIRMAN'S FOREWORD

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During the Second World War, the Office of Scientific Research and Development supplied vast sums of money to universities for the salaries and facilities of their scientific faculties in order that they might more quickly and effectively carry forward research of potential value to our military efforts. The relations of the Federal Government to the private and public universities of our country were thus profoundly altered.

As the creation of the National Science Foundation and the development of the fund-granting activities of the National Institutes of Health and the Office of Naval Research were debated during the succeeding 5 years, three concerns were frequently voiced. Would universities be encouraged to expand their scientific activities with Federal funds that might suddenly be withdrawn and thus leave the universities in a precarious financial condition? Would large Federal grants discourage the grants from State governments and the gifts from private individuals and foundations which had kept our universities free and strong? Would the Federal Government gradually gain control of university policies and administration? Ten years after the enactment of the National Science Foundation Act, it is appropriate to consider those concerns in the light of what has happened during this new era of scientific activity in the United States.

Federal support of science in our universities is now generally recognized as a proper and necessary function of the National Government. Few would deny that more research, more well-trained scientists, more general understanding of science and its role in our culture are essential to our national life. Consequently, few would hold that these vital needs should be ignored by the Federal Government and left entirely to unplanned support by local agencies and generous individuals. Dramatic evidence of this widely recognized responsibility of the Government is found in the progressive increase, from \$3.5 million to \$155 million, in the National Science Foundation budget, approved by the Administration and appropriated by the Congress. It is unthinkable that the National Government will ever withdraw or even curtail its assistance to our universities for these activities of vital importance to our nation. If that were to happen, the continued life of our universities would be gravely threatened. We have taken steps that cannot be retraced.

A traditional custom of our country that is of inestimable value is the financial support by private individuals of universities and museums of

art, hospitals and research laboratories, musical organizations and libraries. This has been done to a degree unequalled in other countries; it gives the giver a desirable sense of responsible partnership in the great cultural institutions of our country. Those who feared that grants from the National Science Foundation for research and fellowships in our universities would suppress such private giving should have been reassured by the fact that some of our largest State universities have steadily received vast sums from countless donors. Governmental assistance has often stimulated private giving provided the burden of taxation has not been too heavy. In any event, it is heartening to observe that during the years in which our Foundation has been providing more and more funds for our universities, the universities have been receiving more assistance than ever before from individuals, private foundations, and industry. Annual alumni giving, endowment campaigns, new foundations, fund-raising organizations, such as the American Cancer Society, have provided a greatly increased flow of gifts for research and education which largely supplement the grants from our Foundation. It is not unreasonable to assume that the Foundation has catalyzed this increased and more widespread support of science.

Because universities render so many vital services to society and comprise so many young men and women, they are subject to countless and conflicting pressures. Students and students' parents, the general public and the public press, philanthropists and trustees make various demands which sometimes deflect the university from its unique and proper functions. Those primary functions are: training the mind and ennobling the spirit, the discovery and diffusion of knowledge. It is natural and proper that the faculties should recognize their responsibility and respect their ability to fulfill these high missions of the university without interference from misguided enthusiasts outside the academic world. In truth, we can say that the National Science Foundation has been sensitive to these appropriate desires of scholars; in modesty, we can say that the Foundation has strengthened our universities without encroaching on their prerogatives or impairing their self-determined policies.

We have been aided by scientists from the faculties of many universities in thus protecting the freedom of all universities against the dominating influence of needed money. All requests for financial assistance, all applications for fellowships are judged by committees of scientists who are versed in relevant fields of science. Such committees may sometimes be too conservative, unimaginative, or influenced by personal prejudices; generally, however, they represent the best judgments available among scientists who are selflessly devoted to the furtherance of sci-

ence and their universities. Beyond the judgments of these committees, the final responsibility rests with the National Science Board. We are now formulating plans for diffusing our responsibility more widely and vesting it in part in the universities in which research is done.

We recognize a primary responsibility to the universities which are among the most vital and enduring institutions of our nation and of all the civilized world.

DETLEV W. BRONK,  
*Chairman, National Science Board.*



## DIRECTOR'S STATEMENT

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The attention and interest that continue to focus on science and technology give rise to the hope that substantial gains are being made in those areas that have become the subject of national concern.

A review of the current status of research and development and of education in the sciences provides little reason for relaxation of effort, however, and certainly none at all for complacency. Progress is being made, yes, but not of an order commensurate with the problems. Despite the vast amount of newspaper space that has been devoted to research and development, and despite the oft-repeated recitals of deficiencies in our educational system, one is obliged to wonder just how fully the American public is aware of the deeper implications in both these areas.

The strength of our economy, the adequacy of our defenses, the health and future of ourselves and our children depend to an increasing extent on the effectiveness of our research and development effort and on the number and quality of scientists and engineers which our educational system is providing. Two factors of overriding importance—the rapidly growing population of the United States and competitive conditions in the modern world—make it imperative that we be strong in science and technology.

So far as the international political situation is concerned, the most drastic changes are unlikely to affect this need. If the cold war continues indefinitely, requirements for scientific and technical personnel to devise and operate modern weapons systems will continue to be high. If the cold war should subside to the point of partial or complete disarmament, we should still find ourselves in active competition with other nations on economic and ideological grounds.

By 1985 the population of the United States will reach an estimated quarter-billion. This rapidly expanding population will require corresponding acceleration in the growth of our economy to meet the needs and demands of millions of additional citizens.

The United States, as well as other nations that enjoy highly developed science and technology, has a responsibility to help the developing nations to apply today's knowledge to the problems of underproduction, hunger, and disease.

From a still broader point of view, science has an important role to play in furthering international understanding and cooperation.

The International Geophysical Year demonstrated in a magnificent way that men of all nations can work together harmoniously to extend our knowledge of nature. That such efforts can also carry over into the political area was demonstrated in the Antarctic Treaty when, as an aftermath of the IGY, 12 nations agreed to reserve a major portion of the earth's surface as a great scientific laboratory. The establishment of the International Atomic Energy Agency under the United Nations and the two successful International Conferences on the Peaceful Uses of Atomic Energy bear witness to mankind's basic desire to use the new forces that science has discovered for the common good. Already steps have been taken, both by the United Nations and the international scientific community, looking to collaboration in outer space.

It is apparent that science, in addition to its progress as an academic subject, is increasingly an instrument of both national and international policy.

Against this background, then, let us examine recent accomplishments and problems in both education and research.

In education, the Federal Government has established forward-looking programs dealing primarily with teaching and education in mathematics, science, and engineering. It has done so by enlarging the programs of the National Science Foundation in scope and depth, and through the National Defense Education Act, administered by the Office of Education. It is noteworthy that this Act is not limited to science alone, but extends into such important matters as improved counseling and guidance of young students, scholarship loans for students at colleges and universities, special fellowships to graduate schools with emphasis upon the study of languages and of teaching, and provision for teaching equipment and facilities.

If, however, these initial accomplishments have led us to believe that now that we have taken some active steps all will be well, we are lapsing into a very dangerous attitude. Let us look at the facts. There is still an alarming dearth of trained teachers, especially for secondary schools, and no prospect that the requisite number will be forthcoming. Although active attention is being given to the importance of improving competence in teaching, there has been, on the whole, little accomplished toward the prime requisite of providing salaries that will enable the teaching profession to compete successfully with other careers. True, some excellent results have been accomplished here and there by a few forward-looking local communities and organizations. But as a nation we have not come to grips with the major problem. The cultivation and staffing of a professional group can be adequately realized only if the career is a rewarding one from the standpoint of salary, future, and

prestige, as well as the deeper satisfactions that go with the opportunity to serve. On these points one must acknowledge that progress is meager indeed.

On the manpower side, the equivalent of about one-fourth of our scientists and engineers are engaged in research and development. This pool of talent is critical in two ways: Its size puts a certain limit to the research and development effort we attempt, and its competence determines the effectiveness of our undertakings. Significant increase in the size of this pool and improvement in its quality are a long-range operation. We must remember, too, that there is a definite limit on the extent to which we can forecast the special skills and the fields that will be important for the future. Who could have predicted even 10 years ago the current interest in and need for scientists and engineers for space exploration? At the rapid pace at which modern technology evolves, our problem is how to provide available manpower reserves competent to deal with any and all important technological developments and who have the knowledge and versatility to follow future changes and new undertakings.

These considerations clearly indicate what our manpower policy must be: We must endeavor to identify talented students and to provide those with aptitude for science and engineering the opportunity for training in these professions. Furthermore, this training should concentrate upon basic aspects of science and engineering, because only in this way can the individual hope to cope effectively with new developments. Both teaching and research must be taken into account—quite possibly the former may be the more important.

In terms of our educational system as a whole, an immediate problem—and a very troublesome one—is how we can place proper emphasis on the sciences and engineering and at the same time do justice to other disciplines. Engineers and scientists are a minority group; their expressions of concern and foreboding are sometimes interpreted as special pleading. However, we must bear in mind that they are in position to appraise our technological effort and to estimate our potentialities. Let us remind ourselves of the following: (a) elementary instruction in the sciences has suffered in comparison with other subjects; (b) science and technology depend critically upon the number and competence of the scientists and engineers we train; (c) if we are to improve our general education system, it is more feasible and expeditious to begin in a critical special area than to attempt to do the whole job at once.

With respect to scientific research—and especially development—considerable progress has been made; these are areas where we have been aware of specific needs. During the past year there have

been notable achievements in space exploration, in ballistic missiles and rocketry, and in radio astronomy—to cite but a few examples—and provision is being planned for needed facilities in such important areas as environmental biology and oceanography. The immediate practical limiting factor in our research and development activities turns out to be largely an economic one: How much can we afford to spend in terms of money as well as of manpower? How can we maximize our research and development effort? Since our security and economic strength are directly dependent upon its progress and vigor, these questions are crucial.

Certainly one answer is that we cannot afford to economize by reducing the level of support for research, particularly for basic research. The United States is currently spending more than \$10 billion annually for research and development: less than 8 percent of this goes for basic research. Yet our progress in *basic* research largely determines the possibilities for development.

The potentialities of science for useful application cannot be predetermined; they depend upon the efforts of individual investigators or coherent groups. In general their findings cannot be predicted. By curtailing basic research activities all we succeed in doing is to blindfold ourselves for the future. Furthermore, the more thorough the basic research the more effective is the engineering development of required items. A democracy has a unique advantage in the strength and variety of its basic research. But to realize this advantage it must provide full support. Moreover, we do not yet appreciate the fact that by allotting to a given project only 90 percent of the funds required we may limit the effort to only 50-percent effectiveness.

There are those who seem to feel that both money and manpower problems could be solved very simply by curtailing the support of science generally and of basic research in particular. If scientists were slowed down or prevented from coming up with so many intriguing ideas for new developments, then there would be manpower and money enough to go around. All that would be necessary would be to determine in advance what items were desirable and then to proceed with their development on the basis of exactly predetermined budgets. Nothing could be more fallacious. In the first place, the output of basic research provides the up-to-date information and data essential to modern development. This stockpile must not be reduced or the quality of our developments will suffer. Secondly, such a philosophy encourages premature development, that is, development without adequate basic research background and justification—a highly wasteful and extravagant practice. Finally, curtailing basic research means shutting the door on

possible major discoveries or breakthroughs on which one might have capitalized in really important ways.

Progress in basic research depends directly upon the number and effectiveness of scientists and engineers. Because research experience is an essential part of advanced training, their competence, in turn, is directly related to the quantity and quality of basic research conducted in the graduate schools of our universities. In other words, this is a continuous "feedback" process in which input and output are mutually dependent and equally important. It is absolutely necessary, therefore, that our universities have adequate funds for basic research.

In recent years, for example, the need has arisen for such capital facilities as nuclear accelerators and reactors, optical and radio telescopes, electronic computers, and oceanographic research equipment. The Federal Government must play a leading role in furnishing these, provided the need is urgent and clearly in the national interest, and provided, also, the necessary funds cannot be raised from other sources. Recipient institutions must expect to participate in the funding to the extent possible.

The inadequacy of college and university laboratories has prompted the initiation of Federal programs, on a matching funds basis—for the re-equipping, remodeling, and expansion of existing laboratory facilities.

And—most importantly, perhaps—the need is recognized for providing our academic institutions with flexible funds through some form of institutional grant to supplement current support of research projects. The purpose of such grants is to provide support for general scientific research and research training functions of the institution without reference to the specific activities to be undertaken with the grant funds.

Clearly, however, the national budget cannot support without limit all the research and development that may seem desirable. Since more than 90 percent of the overall effort goes into applied research and development, appreciable savings can be realized only through greater economy and efficiency in developmental work. This means careful examination and selection of the applications of science to be undertaken.

This priorities problem is by no means new, either to industry or government. The technical industries, especially, have developed considerable competence in dealing with it by such modern methods as systems analysis and operations research. Both techniques warrant further study and more intensive application.

In the selection process a new and serious consideration arises from the magnitude of the effort required, in money and in manpower, in special fields of technology, and indeed in certain areas of pure science, which limits the national effort to a relatively few installations. One need

only mention such developments as ballistic missiles, space craft, computing centers, and commercial power reactors; and in science, high-energy particle accelerators, powerful radio astronomy installations, and supersonic research facilities. The establishment of priorities among these pressing and costly needs is a fundamental question for the Government. It is typical of the type of problems under study and review by the Federal Council on Science and Technology, which was established last year.

If it is determined that a majority of such enterprises must be pursued, then the whole problem of selection extends beyond the areas of technology and becomes a matter of concern to the Nation as a whole. The Director of the Central Intelligence Agency reminds us that:

The major thrust of Soviet economic development and its high technological skills and resources are directed toward specialized industrial, military, and national power goals. A major thrust of our economy is directed into the production of the consumer type goods and services which add little to the sinews of our national strength. Hence, neither the size of our respective gross national products nor of our respective industrial productions is a true yardstick of our relative national power positions.

The uses to which economic resources are directed largely determine the measure of national power.

Thus, we are called upon to consider priorities in our national life in a way that has probably never before been so necessary except during war. It is incumbent upon the Federal Government and leaders throughout the country to make clear to the people that we shall have to pay careful attention to our national goals and then make optimum use of existing resources—manpower and material—in achieving them. Other Western nations early realized that they could not afford to support research in each of the big new fields opening up, and so they have made a choice, or pooled their resources of talent and manpower in a variety of international scientific organizations.

Actually, as a people, we are past masters of the art of winning public acceptance. Our high standards of living are the result of our ability to develop and produce consumer goods. American industry has abundant experience and competence in (a) ascertaining consumer demand; (b) meeting the demand; (c) creating the demand where it does not exist. As one looks around, one finds that some of the best talent in the country is occupied in developing and meeting artificially created consumer demands. Obviously, the methods of influencing the American public in its choice of priorities for spending are familiar ones. But who, then, can or should engage in a similar effort to bring the public into a realization of national needs? And how is this to be done? If

the importance of better education and training and the intelligent selection of national priorities were to become matters of serious concern to each citizen, there is no doubt that successful action would follow.

The steps that need to be taken are of such magnitude and involve so many different groups that we must have recourse to democracy's main strength—the will of the people, based on understanding. Such an undertaking requires the active assistance of many public-spirited groups and organizations, each doing its bit to bring out the facts, the significance of the issues involved, and the type of action required.

Backed by an informed body of public opinion and reinforced by a full measure of State and local effort, the Federal Government would then have a clear mandate to develop a national program. On the basis of what we have done in the past, such a goal does not seem impossible of attainment. One thing is certain, however; if we lag we shall have periodic reminders in the form of notable advances by other nations.

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



**NATIONAL SCIENCE FOUNDATION**

**Reappraisal**

**and**

**Reorganization**

**THE STATUS OF SCIENCE**

**IN THE UNITED STATES,**

**1958-59**

## **REAPPRAISAL AND REORGANIZATION— THE STATUS OF SCIENCE IN THE UNITED STATES, 1958–59**

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A sense of crisis gripped the United States following the launching by the U.S.S.R. of the first earth satellite in October 1957. During the ensuing year many people, at every level of Government and in private life, sought ways to meet the challenge which, they felt, had thus been so forcefully presented to the Nation.

The haste and urgency of late 1957 were far less apparent in 1958–59. Instead, the past year has been devoted largely to consolidation of some of the actions already taken. Though it was, for some, a year of inquiry into further steps that the Nation might take to secure a sound structure of education and science, it was for far too many others a year for slipping back into complacency. The feeling of crisis waned. Many Americans seemed to want to forget that we live in a competitive world in which our Nation, to remain strong and free, must understand the dangers it faces and be determined to surmount them.

Those who wished could, and did, take a deeper look into some of the relationships between science and government. In the scientific and political communities, the form and substance of proposed improvements in our educational system and our organization for science have been the subject of continuing scrutiny. Important issues have been raised. The fact is acknowledged that quick resolution of some of them is neither possible nor desirable. Thoughtful persons differ over the direction we should take.

### **The Federal Government and Science Policy**

Through the debates and the actions, some progress could be distinguished. Enactment of Public Law 85-568 of July 29, 1958, was the culmination of previous months of discussion about our position in research and engineering with respect to outer space. The law created the National Aeronautics and Space Administration, "to provide for research into problems of flight within and outside the earth's atmosphere," and for many other purposes. Its activities began officially in October 1958 and NASA announced early in 1959 a 10-year program of space exploration directed toward scientific study of the atmosphere; the ionosphere; energetic particles; astronomy; and magnetic, electric, and gravitational fields.

The same law also established the National Aeronautics and Space Council, to coordinate space activities and establish space policy at the highest level. This Council is composed of the President, the Secretaries of State and Defense, the Administrator of the NASA, the Chairman of the Atomic Energy Commission, and a maximum of one additional Government member (at present the Director of NSF) and three additional non-Government members. The Council advises the President on all significant aeronautical and space activities of the United States, on comprehensive programs for these activities as conducted by Federal agencies, and on differences that may need resolving among Government bodies with respect to aeronautical and space activities.

The National Defense Education Act became law September 2, 1958, capping extended debate on the character of the educational system in the United States and the responsibility of the Federal Government for improving education. Among the results of the first year's operation under the act have been—

1. Student loan funds, totaling \$30.5 million, distributed to 1,201 institutions of higher learning.
2. Fellowship awards made to 1,000 graduate students, with 18 percent of them in biological science and 28 percent in physical science and mathematics.
3. Twelve foreign language institutes conducted during the summer.
4. Establishment of 19 language and area centers at colleges and universities for operation during the academic year.
5. Contracts placed for 20 modern foreign language research projects.

#### **The President's Science Advisory Committee**

The President's Science Advisory Committee (PSAC) issued two highly significant reports during the year: *Strengthening American Science*, released Dec. 27, 1958, and *Education for the Age of Science*, released May 24, 1959.

1. *Strengthening American Science*.—This report dealt with the fundamental problems of relationships between government and science in the United States. "It is apparent . . .," the report said, "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."

It pointed out that throughout the history of science the various disciplines, seemingly unrelated, frequently stimulate each other. The interplay between fields, producing unexpected results, is at the heart of scientific and technological progress. One cannot predict the quarter from which the next scientific advance will come; the important thing is not to be overly concerned with how "practical" the research is, but rather to insure the research programs have great breadth and scope. "In the past, major advances in the Government's management of science have come about under the pressure of emergencies. Ways must now be found for recognizing the importance of stability and other long-term goals, while preserving the flexibility to respond to emergencies."

Together with this must come recognition of the need for fully integrated policies to give public and private laboratories an assurance of stable and sustained support. "Each year numbers of them must set aside valuable time to go back to the supporting agency, hat in hand, seeking another year's financing. Often a large laboratory must assemble funds from a number of Government agencies and then perform a complicated juggling act to adjust equipment costs, overhead, and salaries to match its income." The major problem, stated the report, was to meet the needs of these research institutions while continuing to meet the programmatic and policy needs of the agencies sponsoring research. "Without in any way encroaching upon the freedom and authority of each department or agency to manage its own programs, there is still an opportunity to pull together the policies developed in different agencies of the Government with a view of integrating and reconciling them as a whole."

To take advantage of this opportunity the report called for the establishment of a Federal Council for Science and Technology. The key to the recommendation was that top-level, policy-making representatives of the agencies concerned with research and development would be members of the new Federal Council. Each would then be in a position to speak with authority about his agency's position on a subject, to commit his agency to a plan of action, and to insure that his agency fulfilled its planned program. The Council was envisioned in this way as a truly effective planning and coordinating body, rather than merely a channel of communications. The Federal Council for Science and Technology, established as a result of this recommendation, is discussed in detail beginning on page 7.

*Strengthening American Science* also appraised many other aspects of the support and encouragement of science by the Government. It recommended careful study by Government officials of patterns prevalent in industry, where vice presidents for research take the lead in corporation planning for new scientific and technical activities. The Secretary of each Government department, the report suggested, should appoint an appropriate assistant to keep him in intimate touch with the department's scientific and technical activities and provide policy supervision over the activities. This would enable departments more clearly to state the missions of their laboratories, and thereby help the latter to plan and execute reasonable programs capable of meeting their needs.

The report made several recommendations concerning Government-sponsored research in non-Government institutions, a field of increasing importance as Government expenditures in private laboratories steadily grow. It named as a key problem that of providing university laboratories more opportunity for the planning of their research—something that is more difficult to achieve in the presence of extensive support of single research projects by Government and industry. Suggestions were offered for difficulties that arise under Federal policies and practices in the financing of research at non-Government organizations.

Extensive recommendations were also made concerning Government and private funding of research, including mention that policy activities of the National Science Foundation should be continued and strengthened in the general area of Government-university relationships in the conduct of Government-sponsored research.

2. *Education for the Age of Science.*—This report presented views as to ways in which our educational system can be strengthened so as more fully to meet the requirements of today's scientific era. It said:

A modern educational system should not only sharpen the intellectual capacities and curiosities of each new generation, should not only extract the essential core from ever-accumulating stores of knowledge, should not only find ways to produce new leaders equipped to add to these stores and to create all the new tools that the civilization requires; it must also produce the citizens and leaders who will know how to use the knowledge and tools to advance social and cultural life.

Of fundamental importance is the need for intellectual excellence in America. "In a frontier society, such as that of America of 100 years ago, it was natural that physical prowess and bravery, inherent in the pioneer, should have been held in high esteem," the report said. "Today the frontier is intellectual; the scholar, the research worker, the scientist, the engineer, the teacher are the pioneers." It went on to underline the

fact that "well-trained minds are among the most critical of our present national assets, among the scarcest and most valuable of our resources."

To create the intellectual resources we need, the report pointed out, we must first better the lot of our teachers. Five things can be done: Many nonteaching tasks should be assigned to others. Teachers' salaries should be increased. Time should be provided to permit teachers to keep up with their subject matter. Teacher training should be re-examined, and new training methods used, with particular emphasis on substantive knowledge. And finally, teachers must be supplied with far more adequate and up-to-date teaching aids of all types.

Another key in creating needed intellectual resources is the identification of especially able youngsters. "We strongly urge that measures be evolved to discover and to provide financial support for bright students whose needs cannot be met in their local community, and to make it possible for them to study in more adequate schools. Such financial support begun, where necessary, in the secondary school and continued through college and graduate school, should be regarded not as a charity but as a prize honestly won for achievement—and a wise investment in maintaining the national welfare . . . . It is scarcely possible to put the matter too strongly. The potentially great scientist or engineer, scholar, physician, or educator who ends up, through no fault of his own, as an underling at a task below his native endowment, represents an indefensible national loss."

### **Federal Council for Science and Technology**

The Federal Council for Science and Technology was established by Executive Order 10807, signed by President Eisenhower March 13, 1959. Named to the Council and serving as its first Chairman was the Special Assistant to the President for Science and Technology, Dr. James R. Killian, Jr. (succeeded by Dr. George B. Kistiakowsky at the close of the fiscal year). Serving as members of the Council are representatives from the Departments of Agriculture, of Commerce, of Defense, of Health, Education, and Welfare, and of the Interior, and from the National Aeronautics and Space Administration, National Science Foundation, and Atomic Energy Commission.

Functions of the Council, as enumerated in the Executive order, are to consider problems and developments in the fields of science and technology and related activities affecting more than one Federal agency, or concerning the Nation's overall advancement in science and technology. It recommends to the President measures designed: to provide more effective planning and administration of Federal scientific and technological programs, to identify research needs including areas of research

requiring additional emphasis, to achieve more effective utilization of the scientific and technological resources and facilities of Federal agencies, and to further international cooperation in science and technology. It is in a position to coordinate the interests and responsibilities of the various Federal agencies with research and development programs of mutual interest.

Close cooperation between NSF and the Federal Council was envisaged in the Order, with the Foundation continuing its substantive programs of support of basic research and education in the sciences and its basic science policy functions.

Executive Order 10807 also abolished the Interdepartmental Committee on Scientific Research and Development. Its former role, in modified form, is continued in the creation of a Standing Committee of the Federal Council for Science and Technology.

### **Increased NSF Responsibilities**

During the year several additional responsibilities were assigned or transferred to the National Science Foundation, or became active programs within NSF.

1. *Coordination of Federal Science Information Activities.*—The importance of the information programs that had been carried on by the Foundation were emphasized by Congress in the National Defense Education Act of 1958. The act created a Science Information Service within NSF to develop better ways to make scientific information readily available to working scientists. Executive Order 10807 further strengthened these responsibilities of the Foundation, stipulating that NSF shall “provide leadership in the effective coordination of the scientific information activities of the Federal Government with a view to improving the availability and dissemination of scientific information.” Other Federal agencies were directed to cooperate with and assist NSF in performing this function.

The Office of Science Information Service, established within the Foundation in January 1959, was assigned functions provided for in the Executive order. Since then it has continued to work closely with other Government agencies having interests or activities in the science information field, and has sought with them to improve the flow of scientific information within and outside the Federal Government.

2. *Research in Weather Modification.*—On December 31, 1957, the Advisory Committee on Weather Control presented its final report to the President and terminated its activities. The report recommended that its major functions be transferred to the National Science Foundation “to assist that agency in developing a long-range program of basic



and applied research in weather modification in cooperation with other agencies." At the beginning of the fiscal year, by Public Law 510, 85th Congress, the Foundation was given the responsibility to provide for a program of study, research, and evaluation in the field of weather modification. Other Government agencies, such as the Weather Bureau, will continue their work in this field.

On March 23, 1959, the Foundation announced grants amounting to \$1,130,000 to both Government and private institutions for weather modification research. In commenting upon the program, the Director of the Foundation stated:

We believe that these investigations are most necessary at the present stage of development of weather modification theory and practice. Until now, weather modification studies have been complicated by a large proportion of trial-and-error experiments of uncertain results, many without the controls necessary adequately to assess their meaning and significance. The work under the NSF program will increasingly move from scattered and unrelated investigations to efforts soundly based on scientific knowledge.

3. *The U.S. Antarctic Research Program.*—Also in March 1959 NSF announced the establishment of an Antarctic research program within the Foundation. Toward the conclusion of the International Geophysical Year a decision was made by the Government to maintain continuing scientific activity in the Antarctic based, in large part, upon certain of the IGY programs. NSF was selected as the Federal agency responsible for continuing such a U.S. Antarctic scientific program. For ideas and recommendations as to scientific programs that might be suitably carried on in the Antarctic, the Foundation receives advice from the National Academy of Sciences-National Research Council, as well as from Federal agencies with interests in the Antarctic.

The conduct of research in the Antarctic by U.S. scientists was made possible during the IGY by the logistic support of the U.S. Navy, which has had long experience in polar operations and which carried out its IGY duties with the traditional excellence that has come to be expected of the naval service. The Navy is continuing in this role in current and forthcoming scientific operations in the Antarctic.

4. *Information on Scientific and Technical Personnel.*—In April 1959, the Bureau of the Budget requested that NSF assume the responsibility for taking the leadership in developing, in cooperation with other Government agencies, a national program of information on scientific and technical personnel. NSF accepted the assignment, and has begun to organize its plans for the collection of information to provide as fully rounded a picture as possible of scientific and technological manpower

training, working conditions, and future trends. The Foundation continued to remain responsible for acting as a clearinghouse for scientific manpower information and for conducting studies in this area.

### **Other Changes in Government Organization for Science**

At the end of 1958 the President's Committee on Scientists and Engineers went out of existence. The final report, transmitted to the President on December 17, summarized the 2-year program of the committee, and the Office of Civil and Defense Mobilization agreed to assume the responsibility for continuing two of the activities, the local action programs and the utilization conferences.

The appointment of Dr. Wallace R. Brode as science adviser to the Secretary of State on January 13, 1958, provided recognition of the important interrelationships between science and foreign policy. By the end of fiscal 1959 eight men were assigned to duty in six countries as part of the science attaché program. Four additional posts are expected to be manned soon.

The principal function of the science adviser is to provide the Secretary of State with advice and recommendations concerning the interactions of science and foreign policy. His staff maintains necessary liaison with Government and non-Government organizations and with international organizations, such as the science groups in the United Nations and the North Atlantic Treaty Organization.

### **Proposals To Alter the Federal Science Structure**

Throughout the year, the question was frequently raised and debated as to whether the organizational changes discussed above were keeping pace with the scientific needs of the Nation. Was it possible, perhaps, that in attempting to assure freedom of investigation for scientists, the Nation was neglecting its own interests? Was more coordination, if not direction, from the Federal Government required? Furthermore, were not science and technology now recognized to be so important to our national existence that they should have a voice in Government equivalent to that of, say, labor or agriculture? And finally, is there not duplication and lack of direction among the many Federal agencies responsible for support of research and development, that call for centralized control?

#### **Establishment of a Department of Science**

In May 1959, the Subcommittee on Reorganization and International Organizations of the Committee on Government Operations, U.S. Senate, held hearings on three bills whose purposes were to try to solve such problems as those just raised. One would have provided a Department

of Science and Technology, another a Department of Science, and the third a Commission on a Department of Science and Technology.

It was pointed out that if a new department were established which controlled only a small portion of the research funds expended by the Government, the desired degree of centralization would not be present. One alternative, establishment of a department to control all, or most, Government research and development functions, was strongly opposed by many representatives of science within and outside Government. Primarily, it was pointed out, most Government-supported research is and should be related to the mission of the sponsoring agency. Each department or agency makes provision for scientific research and development in order better to accomplish its mission. Thus, with a typical agency, research and development per se is not the purpose; it is only a means to an end. If a new department were to take in the science functions required for the accomplishment of the missions of other agencies, the latter would be seriously hampered in carrying out their duties. Domination by a sort of superagency would have a demoralizing effect upon scientific activities of the Government.

Too, past experience has shown that often "applied research drives out basic," that is, that owing to the competition for funds within an agency which has both research interests and operating programs, applied research which contributes directly toward success of the operating programs tends to be emphasized at the expense of the more remote, less certain findings of basic research. At present, the National Science Foundation, with no direct responsibility for technological development, has the responsibility of maintaining a comprehensive program in support of basic research in many fields.

The Foundation has pointed out that the problem of unnecessary duplication in basic science does not exist as in other fields of human endeavor, provided effective communication exists between research workers. For each basic researcher is under compulsion—his own inner desires and the standards of his discipline—to uncover and publish significant new and original results in science. Except for purposes of verification, publication of work which duplicates that of others is absurd. The best way to insure that there is no undesirable duplication is therefore by insuring that scientists have ready access to all pertinent materials published in their fields. They know, themselves, whether or not to continue a proposed line of work. Centralized governmental control may have use in avoiding duplication of applied scientific or engineering work, but it is irrelevant and indeed harmful to the planning of new basic scientific research on a national scale.

In Foundation testimony before the Subcommittee on Reorganization and International Organizations of the Committee on Government Operations of the Senate, it was pointed out that the President's action in appointing a Special Assistant for Science and Technology and reassignment of the Science Advisory Committee to report to the President were impressive steps toward the solution of some of the most urgent problems having to do with science and technology. Furthermore, the establishment of the Federal Council for Science and Technology provides a valuable opportunity for promoting closer cooperation among Government agencies in planning their research and development programs and in strengthening the Nation's research efforts. By virtue of the nature of its membership and the authority granted it, the Council is an excellent means by which Federal departments can coordinate and collaborate effectively. The Council should be given full opportunity to carry on its work before judgments are made concerning a supposed need for a centralized agency with control over Federal scientific programs.

### **Calls From the Scientific Community for Increased Efforts in Critical Scientific Areas**

Not only was the Federal structure the subject of continuing critical and constructive examination, but the role that Government agencies should play in certain vital scientific areas was also reviewed. The scientific community, aware equally with the Federal Government of the need for improvement, undertook through various groups studies designed to investigate and report upon ways in which our national effort in certain scientific fields might be bettered.

In some cases, it was recognized that the Federal Government must indeed play an expanded part with respect to areas of science where success or failure has a direct, immediate, and significant bearing on the national interest. The establishment of the Atomic Energy Commission in 1946 was an early example of necessary supervision of a large scientific and technological activity by the Federal Government. The National Aeronautics and Space Administration, with its responsibilities in space technology and research, is another more recent example. In a different context, increased Federal support is also called for in many scientific areas where facilities and instrumentation have become so costly as to render impossible the exclusive use of private financing.

#### **Medical Research**

A group headed by Stanhope Bayne-Jones, formerly dean of the Yale University School of Medicine, made its report to Marion B. Folsom, then Secretary of Health, Education, and Welfare, early in the

fiscal year. The group had been appointed by Secretary Folsom to advise him on long-term needs in medical research and education, and its report called for systematic increases in Federal support for medical research from the \$330 million spent in 1957 to about \$900 million by 1970. It stated that the number of research personnel should be more than doubled in that time, and that support be made more general, less limited to research in specific diseases. It noted that, as at present, one-half the funds should necessarily come from the Federal Government "unless there is a marked change in social philosophy leading to private gifts or State appropriations on an unprecedented scale."

### **Oceanographic Research**

The Committee on Oceanography of the National Academy of Sciences-National Research Council, in a major report released February 15, 1959, warned that the United States must within the next 10 years double its present rate of deep-sea research or face serious economic, political, and military hazards. "Action on a scale appreciably less than that recommended," the Committee stated, "will jeopardize the position of oceanography in the United States relative to the position of the science in other major nations, thereby accentuating serious military and political dangers, and placing the nation at a disadvantage in the future use of the resources of the sea."

The three principal recommendations of the Committee were that—

1. The U.S. Government should expand its support of the marine sciences at a rate which will result in at least a doubling of basic research activity during the next 10 years. Cost of the 10-year program was estimated to be \$651,410,000 above the present level of support.

2. The increase in support of basic research should be accompanied by a new program of oceanwide surveys, requiring a doubling of present surveying efforts.

3. The United States should expand considerably its support of applied marine sciences, particularly in the areas of military defense, marine resources, and marine radioactivity.

The National Science Foundation and the Navy, the report recommended, should each support about 50 percent of the new basic research activity. New ship construction, it said, should be financed about 50 percent by the Navy, with four other agencies including the Foundation sharing the remainder. Specific recommendations for support of pertinent areas of research and education were made for the Coast and Geodetic Survey, the Bureau of Commercial Fisheries, the Atomic

Energy Commission, the Office of Education, the Department of State and International Cooperation Administration, the Public Health Service, the Geological Survey, and the Bureau of Mines.

The Oceanography Report was made in the form of a summary report, with recommendations, which was the first chapter in a projected 10-chapter work entitled "Oceanography 1960 to 1970." Additional chapters have subsequently been published by NAS-NRC, and in total represented a highly significant analysis of an important and neglected area of science in the United States. They discuss in detail such topics as "Basic Research in Oceanography During the Next 10 Years," "Ocean Resources," and "Marine Sciences in the United States—1958."

### **Atmospheric Research**

On March 18, the National Science Foundation announced receipt of the second progress report of the University Committee on Atmospheric Research, a group which with Foundation support had been looking into the state of the meteorological sciences in the United States.

The committee's report took the form of "Preliminary Plans for a National Institute for Atmospheric Research." Culminating 18 months of activity and studies, the report emphasized, among other points, the "need to mount an attack on the fundamental atmospheric problems on a scale commensurate with their global nature and importance," and "the fact that the extent of such an attack requires facilities and technological assistance beyond those that can properly be made available at individual universities."

The report envisioned an institute established and operated by a university committee, and funded by the National Science Foundation. Capital and operating costs over a 6-year period were estimated in the report at around \$70 million.

The Foundation reviewed thoroughly the recommendations of the University Committee and, as well, previous recommendations by the Committee on Meteorology of the National Academy of Sciences. As a result, the National Science Board adopted a resolution which recognized the growing importance of atmospheric research, its consequent need of increasing numbers of trained manpower, and such special facilities as computers, aircraft, balloons and rockets, and tie-ins with satellite exploration, and the need for participation in atmospheric research by other disciplines, such as physics, mathematics, chemistry, statistics, and engineering, as well as conventional meteorology. The Board resolution concluded with a recommendation that the Foundation take the lead in the following:

1. Encouraging and supporting research in atmospheric physics in existing departments of colleges and universities for the expansion and improvement of research and training in this field.

2. Encouraging other appropriate institutions to establish departments of atmospheric physics.

3. Taking prompt steps to arrange for aircraft and other observational and experimental aids suitably appropriate and available for field research together with suitably appropriate modern computing facilities. Consideration should be given to the manner in which such facilities should be managed and be made available to the atmospheric research community.

Subsequently the Board authorized the adoption of an agreement with the university committee to assemble a small scientific staff and director to initiate planning of research programs and facilities, to propose broad research programs involving so far as possible the collaborative efforts of existing university groups, and to establish limited specialized facilities where necessary for maximum usefulness and accessibility to active university groups. No concentration of major facilities, nor establishment of a central "research institute," was envisioned at that time. An immediate purpose of the enterprise, the Board stated, is to strengthen atmospheric research and training in all U.S. universities.

### **High Energy Physics**

A major policy statement concerning Federal support of science was made by President Eisenhower, setting forth a program recommended by a special panel appointed by his Science Advisory Committee and the General Advisory Committee to the Atomic Energy Commission. In his talk, "Science: Hand-Maiden of Freedom," delivered at the symposium on basic research sponsored by the National Academy of Sciences, the American Association for the Advancement of Science, and the Alfred P. Sloan Foundation, the President clearly outlined the reason for Federal involvement in this project, when he said:

I am recommending to the Congress that the Federal Government finance the construction as a national facility of a large new electron linear accelerator. Physicists consider the project, which has been sponsored by Stanford University, to be of vital importance. Moreover, they believe it promises to make valuable contributions to our understanding in the field in which the United States already is strong, and in which we must maintain our progress. Because of the cost, such a project must become a Federal responsibility. This proposed national facility, which will be by far the largest of its kind ever built—a machine 2 miles long—has



the endorsement of the interested Government agencies, including the Treasury. Construction of the accelerator will take 6 years, at an overall cost of approximately \$100 million.

Released with the President's talk was an explanatory statement on elementary particle physics and a program of Federal support for high energy accelerator physics, prepared by the special SAC-GAC panel. A number of federally sponsored groups, notably the Advisory Panel on High Energy Accelerators of the National Science Foundation, had studied the problem. The statement recommended that the Atomic Energy Commission, the National Science Foundation, and the Department of Defense each support research in high-energy physics because of their separate responsibilities for the support of basic research, because of the fundamental nature and significance of high-energy physics, and because of the need for each agency to stay in close contact with scientists in this field of research. Establishment of an interdepartmental council on high-energy accelerators was proposed, with technical assistance to be provided by all three agencies. Finally, the statement recommended an increasing level of support for construction and operation of high-energy accelerators to a level of approximately \$135 million by fiscal year 1963.

### **Changing Role of the National Science Foundation in Federal Science Organization**

As the discussions continued throughout Washington and the Nation on the reorganization of science, a look at the National Science Foundation showed that within NSF changes were taking place that affected, and were affected by, the national concern for better science. There was increasing evidence, as outlined above, that other agencies were looking to NSF for leadership in specific situations involved with Federal support of scientific research. Too, NSF is assuming increased leadership toward the objective that Federal support of basic research be reasonably balanced and consistent with the varying needs of the different scientific disciplines.

Historically, the Foundation has depended upon the thinking of scientists throughout the Nation concerning the directions in which research was needed, and has endeavored to base its programs generally upon this consensus. In addition, where other organizations have undertaken studies of the needs of particular areas of science and have recommended additional support, the Foundation has been in a position to step in with assistance. This has happened in the case of the U.S. Antarctic Research Program, the weather modification program, and

the exchange of scientific information; it is also in process in the field of scientific manpower information.

Of particular note, the Foundation has since 1953 initiated a variety of experimental programs in science education. For example, its Summer Institute Program for Secondary School Teachers of Science and Mathematics is now represented by 348 institutes in all States of the Union, each institute serving an average number of 50 teachers. In addition, the Foundation supports 32 Academic Year Institutes, and 182 Inservice Institutes, widely scattered across the Nation. Curriculum-improvement programs have been initiated for courses in high-school physics, mathematics, chemistry, and biology. The program in physics, first to be initiated, is rapidly approaching the time when it will be available to all schools and teachers who wish to use it. Curriculum-improvement studies are carried forward by outstanding scientists in each discipline, working in close cooperation with many of the Nation's foremost teachers of high-school science; NSF financial support involves no control of these studies by the Foundation. Finally, the Foundation is supporting a score or more of new education-in-the-sciences programs designed to update teacher knowledge in the sciences, to provide increasing opportunities for teachers and students to participate in scientific research, and, in other ways, to strengthen the ties between secondary schools and colleges and universities across the whole spectrum of science instruction.

To accomplish its mission, the Foundation maintains continuing relationships with the scientific community, both within and outside the Government. The Foundation follows the work of the investigators in their respective fields, and submits for scrutiny by scientific advisers the proposals for research support which are received. NSF program directors are also in close informal touch with their opposite numbers in other Federal agencies interested in research, such as the Office of Naval Research, the Atomic Energy Commission, and the National Institutes of Health. Each division within NSF has a statutory Divisional Committee of prominent scientists in the fields covered by the division, whose advice is sought on policy and program matters. The various scientific societies contribute their knowledge and opinions on scientific issues to the Foundation through their many contacts with NSF.

Important, too, is the fact that NSF support is not keyed to a specific agency mission. Insofar as basic research leads naturally into applications and potential developments of military or economic significance, it must continue to be supported by the agencies with missions in those fields. But other large areas of research, important to the Nation as a whole, must continue to be nourished, else they starve; nor can agencies

with operational missions and limited budgets with which to accomplish those missions be expected to carry this load. It is in this area above all that NSF seeks to support the most worthy investigations. It does this in partial fulfillment of its own mission to advance science, and "to develop and encourage the pursuit of a national policy for the promotion of basic research and education in the sciences."

A

Photographic

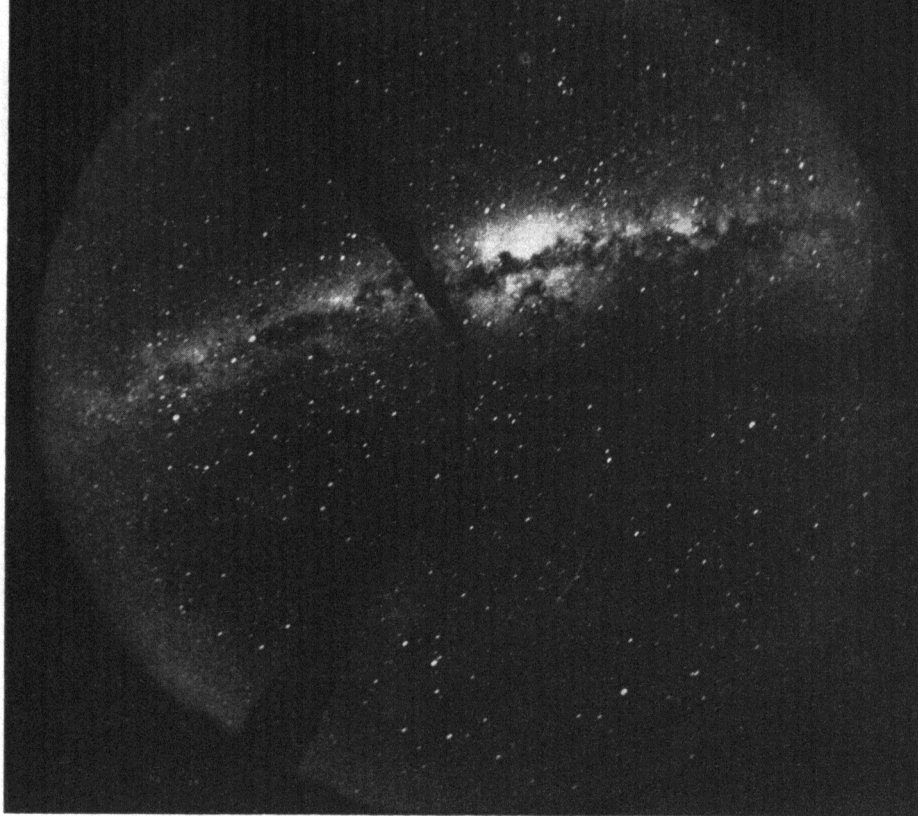
Sampling of

Foundation-Supported

Activities

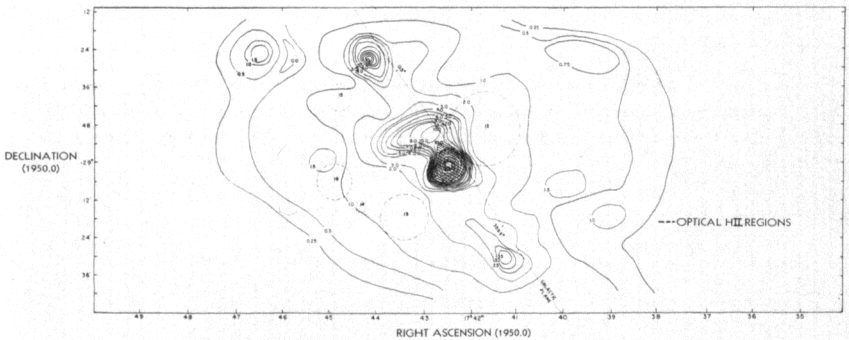
## PHOTO CREDITS

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**THE CENTER OF THE MILKY WAY AS SEEN IN INFRA-RED AND BY RADIO ASTRONOMY**

A vast galaxy in which our sun is only one of more than 100 million stars, the Milky Way is under study by many NSF-sponsored projects. In the above edge-on photograph it appears as a typical spiral nebula. The large bright spot is at the center of the galaxy. Below, a radio contour map of the same area, from significant work being done at the National Radio Astronomy Observatory (see p. 47). Note that the dark band of dust along the center of the galaxy partially obscures the infra-red photo, but causes almost no interference in the radio spectrum.



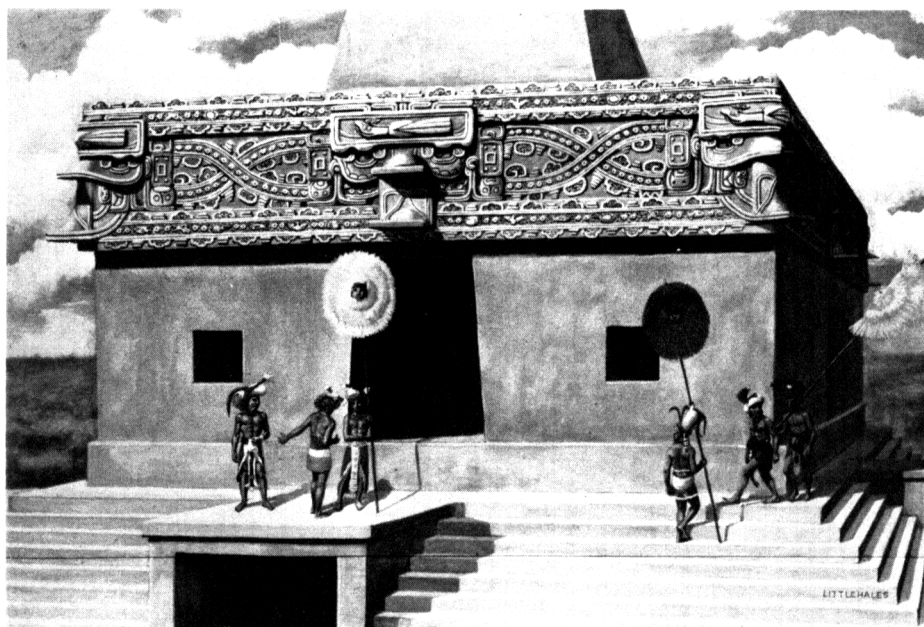
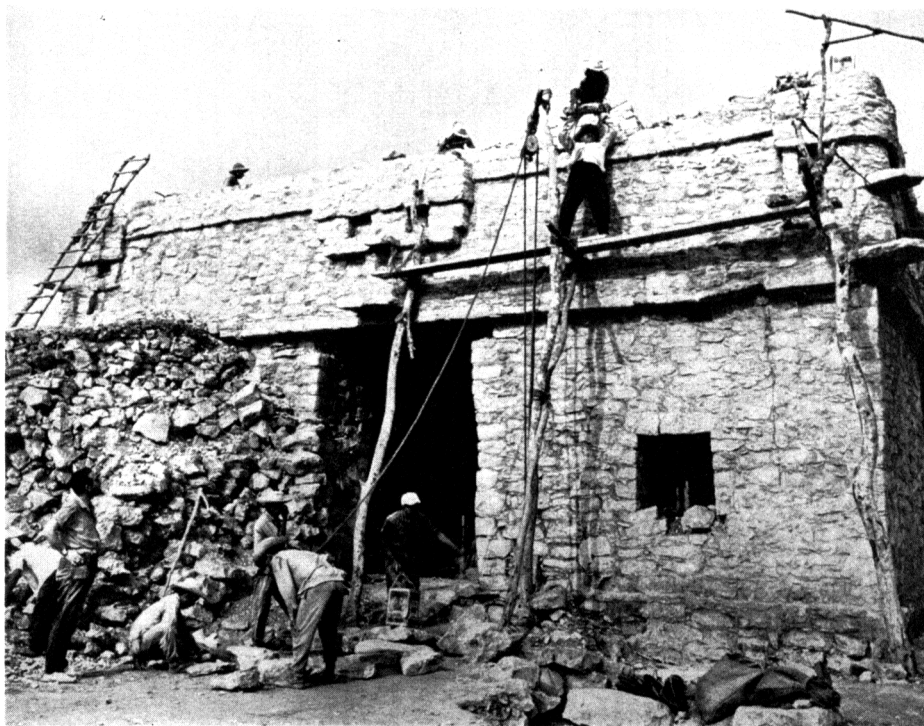
REGION OF GALACTIC CENTER—ISOPHOTES OF BRIGHTNESS TEMPERATURE IN °K AT 8000 MC.



**TEMPLE OF THE SEVEN DOLLS EXCAVATED FROM BURIED RUINS AT DZIBILCHALTUN—  
LOST CITY OF THE MAYAS**

The Temple of the Seven Dolls (named for seven small clay figurines found beneath the floor), believed to be the tomb of an important Maya, is shown at left during excavation. Earth and rubble still cover the underlying pyramid. Excavations were made by a Tulane University expedition jointly sponsored by the National Science Foundation and the National Geographic Society.

At top right is photo of modern Maya restoring the facade of the temple. Below is an artist's reproduction based on material already uncovered and on a knowledge of Mayan culture. The Maya offered sacrifices to their gods in many similar temples. (See p. 54.)







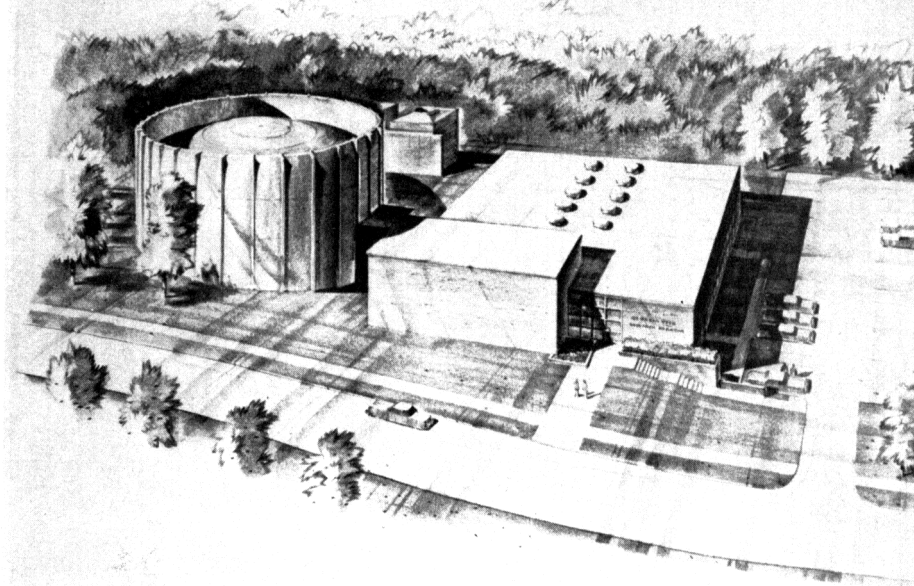
#### YOUNG STUDENTS BENEFIT FROM TRAVELING ELEMENTARY SCHOOL SCIENCE LIBRARIES

Students in 800 elementary schools are this year studying science books through an extension of the Traveling High School Science Library Program now in its sixth successful year. Books for the new program were selected and distributed by the American Association for the Advancement of Science under an NSF grant.

#### SIMULATED CLIFF USED TO TEST DEPTH PERCEPTION OF INFANTS

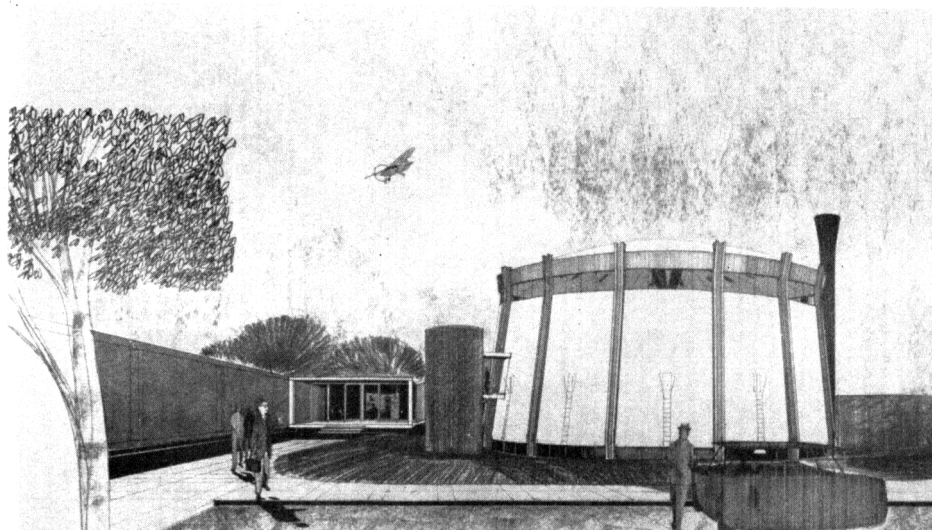
Infant's reaction to height is determined by placing a child on a wooden table which had a strong piece of plate glass on top and extending over the edge. Children and animals were placed on the table and coaxed to crawl over the glass. Both child and lamb balked and stayed on the "safe side," the baby in spite of his mother's coaxing. (See p. 51.)



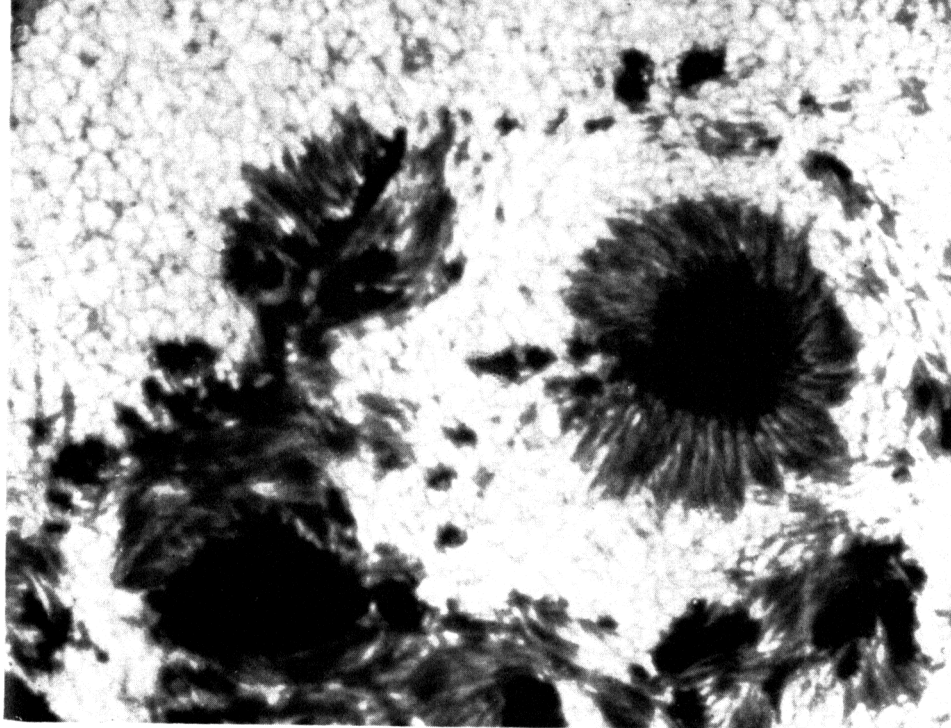


#### UNIVERSITY RESEARCH FACILITIES

Recognizing that adequate large-scale facilities are essential to the conduct of some kinds of basic research, the Foundation provides support for them in cases where the need is urgent, where it is clearly in the national interest, and where necessary funds cannot be obtained from other sources. Ordinarily, NSF funds are supplemented by grants from other sources, both public and private. Illustrative of the excellent new research facilities now being constructed are the nuclear reactor centers at Georgia Institute of Technology (above) and Texas Agricultural and Mechanical College (below).

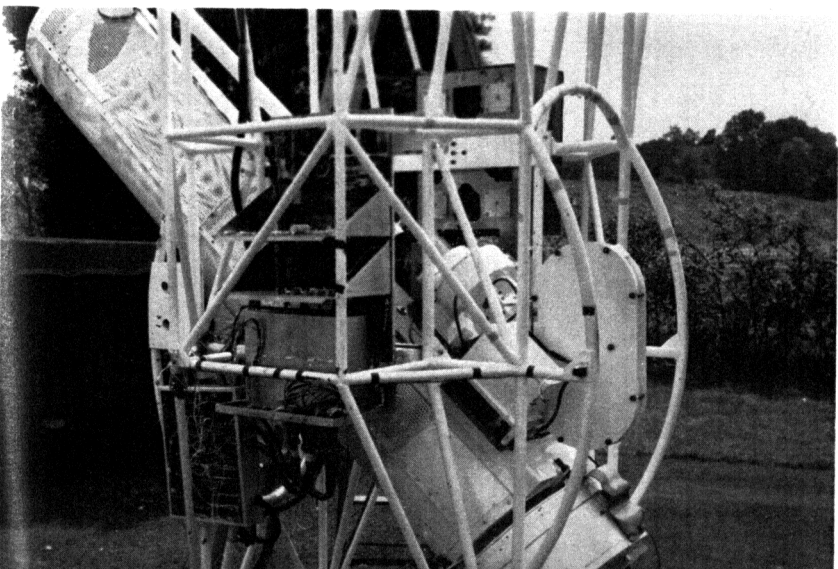






#### STRATOSCOPE FLIGHTS OBTAIN DETAILED SUN SPOT PHOTOGRAPHS

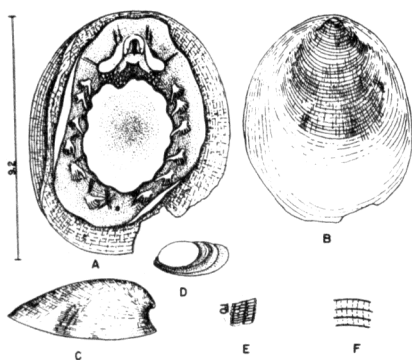
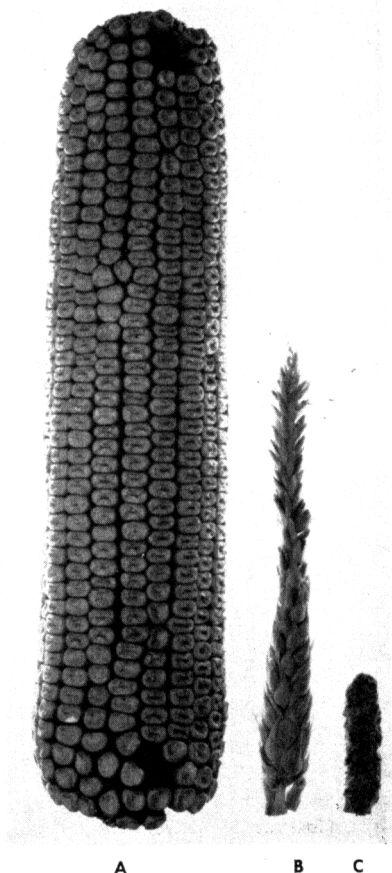
Photograph at left shows Stratoscope launch. (See p. 46.) Shown above is an active sun spot group that caused major disturbances in long-range radio communications. Spots consist of dark core of relatively cool gases within strong magnetic field, surrounded by wispy filaments of outward-moving warmer gases. Entire spot group is embedded in cellular heat convection pattern of hot gases on sun's surface. Below is a close-up of Stratoscope showing TV camera housing (small box on left rear of telescope) and electronics equipment.



## EVOLUTION IN REVERSE

Modern corn (A) bears slight resemblance to the ancient variety, cobs of which (C) have been recovered from prehistoric cave dwellings. In connection with a study of the ancestry of corn, corn ears (B) have been successfully produced quite similar to the unproductive, primitive, prehistoric type. This reversal of evolution was accomplished by crossing genetically different strains of pop corn and pod corn, which retain certain primitive characteristics, so that some of the progeny possessed a combination of many primitive traits.

Results such as these demonstrates that evolution is not an agonizingly slow process requiring millions of years for detectable change to occur, but rather can, and often does, result in drastic modifications in a remarkably short period of time.



## NEW MOLLUSK SPECIES DISCOVERED

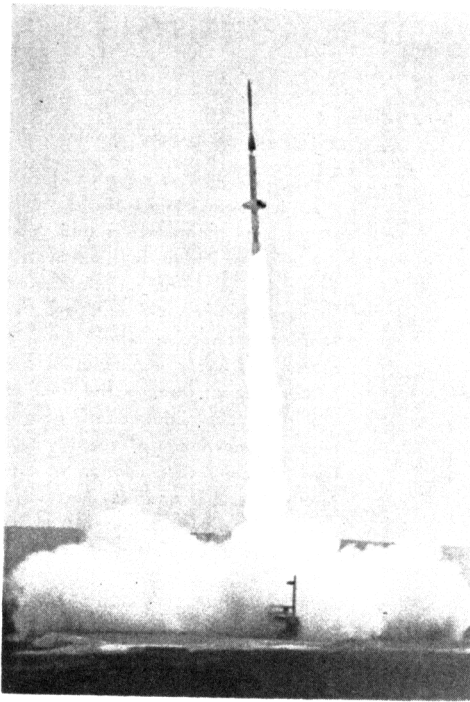
Several specimens of neopilinids, shell fish thought to have been extinct for 300 million years, were dredged up from the bottom of the Peru-Chile trench (See p. 55.) One, a new species, has been named after the principal investigator and the ship.

*Neopilina (Vema) ewingi*, new species. *A*, Ventral view of paratype; *B*, dorsal view of another paratype; *C*, lateral view of paratype (specimen *A*); *D*, apical portion of shell of paratype; *E*, *F*, striations on shell of paratype. Scale in millimeters. [R. J. Menzies]



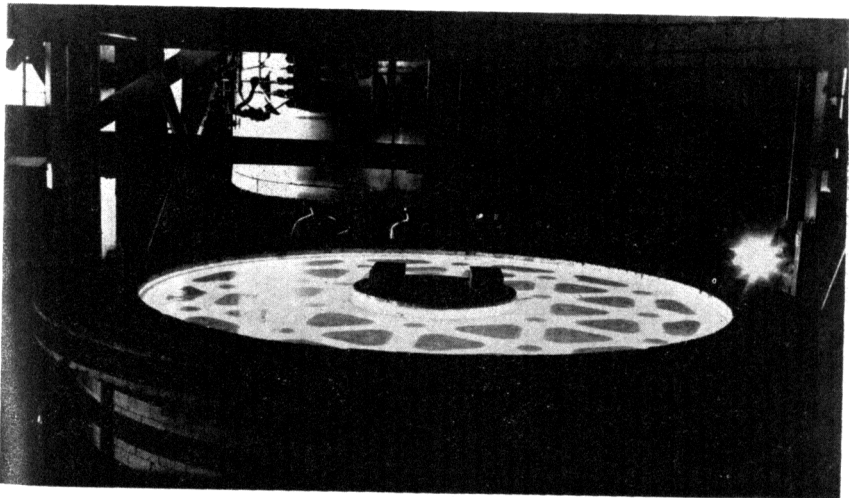
## NIKE-ASP ROCKET LAUNCHED IN PROJECT SUNFLARE II

Project Sunflare II results showed that X-rays with energies as high as 80,000 electron volts—vastly greater than had previously been estimated—are produced in the most active phases of sun flares. Findings also showed that temperatures in the solar atmosphere may be as high as one hundred million degrees Centigrade, about 10 times hotter than has so far been estimated. The estimates were based on rocket observations of the streams of X-rays from massive solar storms. The rockets carried payloads of about 55 pounds to heights of as much as 150 miles as part of the International Geophysical Cooperation—1959 program, a continuation of IGY administered by the National Science Foundation.



## TELESCOPE MIRROR CAST FOR KITT PEAK NATIONAL OBSERVATORY

The molten blank for the 84-inch telescope mirror to be located at Kitt Peak National Observatory in Arizona is here shown being moved from furnace to annealing kiln, where it slowly cooled for seven months prior to delivery. Patterns in the blank are ceramic cores placed to lessen total weight of the blank, which nevertheless weighs almost 4,000 pounds. Final grinding and polishing will be done at the observatory.



## SCIENTISTS AT WORK IN ANTARCTICA

At left, glaciologists in a snow pit use dial thermometers and density tubes, at various levels indicated by meter stick, to obtain information on snow temperature and density. Seasonal changes in surface temperatures and snow accumulation are reflected down through the wall of the pit. The information gained leads to knowledge of quantity and type of snow accumulation at different seasons and in successive years. Pit depth represents about two years accumulation of snow.

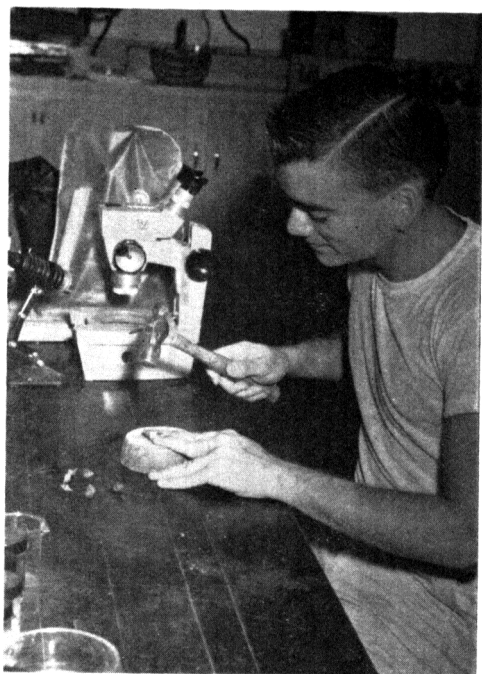
Below, an auroral observer protected against 30-knot winds in  $-40^{\circ}$  F. temperatures makes visual auroral observations in instrument tower raised above the snow drift zone. After becoming accustomed to the darkness, he notes the type of auroral activity (form and intensity), position in the sky, color, and direction of movement.

Information from these NSF-supported projects is forwarded to data centers established during the IGY.

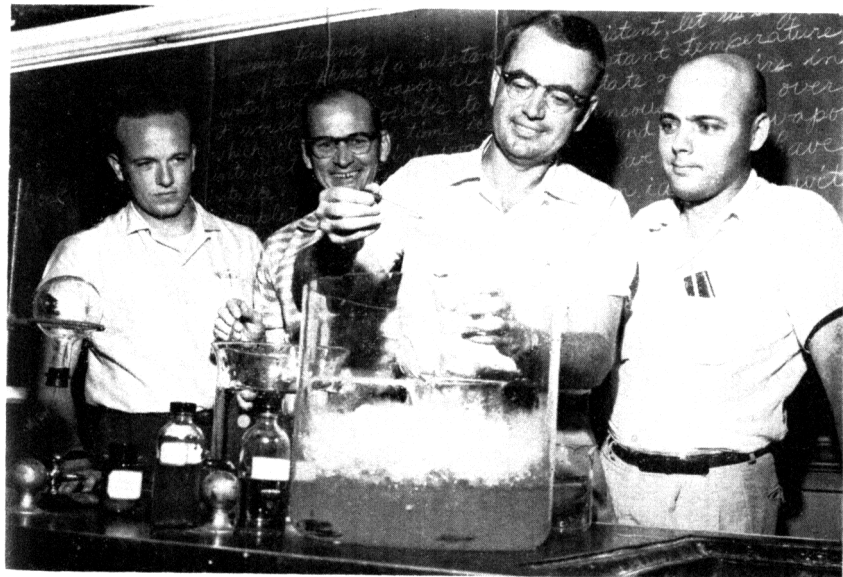


## SUMMER SCIENCE TRAINING FOR STUDENTS AND TEACHERS

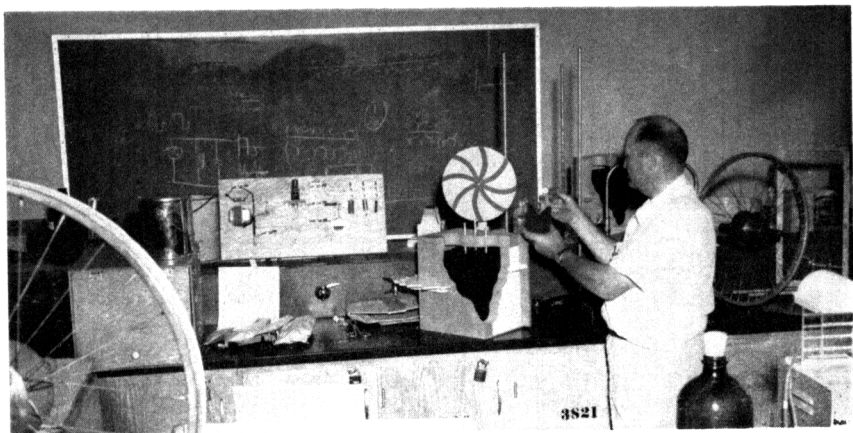
At right, an undergraduate research student pries open an oyster in a project that is part of concentrated summer biology studies in marine research. Students in this program each worked under the supervision of a scientist. NSF summer training programs for undergraduates enabled about 2,200 students at 213 institutions to get working experience in the methods and techniques of science.



Below, high school teachers participating in an NSF summer institute perform a thermodynamic demonstration. Conducted in a chemistry laboratory, their experiment illustrates that, below a given pressure called its triple point pressure, a solid can be converted directly into vapor without melting. During the summer 348 institutes were held for college and secondary school science teachers, with from 10 to 150 participants in each institute.







### CARRYING SCIENCE TO THE NATION'S HIGH SCHOOLS

Specially trained high school science teachers are provided with science equipment-packed station wagons. The traveling teacher visits high schools for about a week at a time giving lecture-demonstrations. Previous experience with this Foundation-supported program has shown that these visits motivate students toward scientific careers, inspire science teachers to improve their instruction, and stimulate community interest in science.

The car shown here is one of twenty used by teachers trained at Oklahoma State University who will visit 600 schools in the 8 surrounding States. Other regional centers are Michigan State University, University of Oregon, and the Oak Ridge Institute of Nuclear Studies, Inc.



**NATIONAL SCIENCE FOUNDATION**

Program Activities

of the

National Science Foundation

## SUPPORT OF BASIC RESEARCH IN THE SCIENCES

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### Research Programs

In fiscal year 1959, support for basic research programs increased two and a half times from approximately \$25 million in 1958 to almost \$65 million. Responsibility for these Foundation programs lies with the Division of Biological and Medical Sciences; the Division of Mathematical, Physical, and Engineering Sciences; the Office of Social Sciences; and, in the case of Antarctic research, with the Office of Special International Programs. Projects described here in brief are to be considered illustrative of the research being supported.

### DIVISION OF BIOLOGICAL AND MEDICAL SCIENCES

#### Current Research Support

The *Developmental Biology* program supported projects on the structure and physiology of reproductive organs; the physiology of reproductive cells and fertilization; the mechanism of cell division; descriptive embryology (plant and animal); plant morphogenesis (apical activity of roots and shoots, stem elongation, genesis and control of plant form); chemistry of development (molecular basis of differentiation, metabolic patterns during development, chemical induction of new structures, and growth-stimulating substances); regeneration of lost parts; development genetics (analysis of mutant gene effects in development); tissue and organ culture (plant and animal); histology; cytochemistry; fine structure of plant and animal tissues as revealed through electron microscopy; gross and microscopic plant and animal anatomy; and cell and tissue changes in old age.

The program in *Environmental Biology* provided grants for research in plant and animal ecology; ecological physiology; paleoecology; various projects in parasitology; biological oceanography; animal behavior and other areas in which the major immediate emphasis concerned the interrelationships between physical, biological, or sociological factors and one or more organisms. In addition, support was given for the purchase of specialized equipment, and for the design and development of research equipment. The distribution of grants changed somewhat in fiscal year 1959 with studies of the dynamics and structure of animal populations, biological oceanography, life history investigations, and

projects involving quantitative community ecology comprising nearly half of the grants made. The remainder were rather evenly distributed in number in the general areas of plant and animal physiological ecology, vegetation development, paleoecology, behavioral studies, productivity analyses, limnology, various aspects of mycology and parasitology, and microclimatology.

The *Genetic Biology* program continued to support research directed toward elucidating the nature—both structurally and chemically—of genetic material, the laws governing the transmission of hereditary traits from one generation to another, and the mechanisms by which genetic material controls and determines the expression of hereditary characters. Within this framework, grants made by the program supported studies on cytogenetics; genetic fine structure and gene action; investigations of evolutionary mechanisms; quantitative and population genetics; and the genetics of specific traits. Experimental approaches to the problems include cytogenetic and recombinational analyses; breeding and selection experiments; and biophysical, biochemical, and mathematical methods. Much of the genetic program research was directed, at the molecular and cellular level, toward the fundamental problems of defining the gene and elucidating the mechanisms by which it acts, reduplicates, and mutates.

Since the inception of the *Metabolic Biology* program 2 years ago, there has been considerable clarification of the content of the program; grants made during the past year have dealt almost exclusively with intermediary metabolism, and comprise an area concerned with metabolic pathways and the interrelationships between enzyme reactions and metabolic pools. The areas of investigation ranged from the mechanism of protein synthesis and growth to specific metabolic factors which inhibit growth. Within this wide area were problems dealing with nearly all metabolic processes of animal and plant tissues; mechanisms of cellular respiration; and effects of hormones and inorganic ions on the metabolism of plants and animals. A number of grants dealt with various phases of photosynthesis and the mechanism of action of antibiotics.

Grants made by the *Molecular Biology* program encompassed studies of the physical and chemical properties of substances of biological origin; studies of RNA- and DNA-type macromolecules and of individual enzymes—isolation, purification, synthesis, reactivity, kinetics, and mechanisms of action; and aspects of physical and quantitative biology, such as molecular genetics, molecular morphology, virus structure and organization, membrane and bioelectric phenomena, model systems, photobiology, and bioenergetics. The research supported showed a continuing and relatively large effort in investigating peptide and protein structure,

synthesis, and reactivity. There has been a relatively large increase in research dealing with virus structure and organization, primary light and energy processes, membrane phenomena, and the organization and replication of RNA and DNA. Fiscal year 1959 grants also showed a marked increase in research on immunochemistry, molecular genetics, molecular morphology, bioenergetics, and investigations into the active sites on enzyme molecules. Nuclear and electron spin resonance technology is becoming more prominent in biological research; several grants were made this year whereby instruments were purchased or adapted to biological problems.

Grants awarded in the *Psychobiology* program continued to stress physiological and experimental psychology, with some emphasis upon the support of quantitative techniques as these develop from the fields of mathematics and mathematical statistics. Support was provided for research dealing with sensory processes, learning, problem-solving behavior, and the relationship between brain mechanisms and behavior. During the past year an increasing number of grants were made for the field study of animal behavior, reflecting the growing attention to ethology. For example, research is being carried out dealing with the behavior of the African mountain gorilla, the exact territorial pattern of behavior of the kob (an African antelope), and the behavior of the howler monkey in Panama—the only isolated and protected primate population which has been studied systematically.

The *Regulatory Biology* program deals with interactions between organisms such as host-parasite interrelations, integrative responses to external stimuli, and with processes originating within plants and animals which involve regulatory functions of organs and cells. Grants during 1959 were awarded for studies on synthetic media, various biological rhythmic processes, hormone interrelationships, physiological adaptations and specializations leading to evolutionary change, orientation to polarized light and other external stimuli, interactions between the hypothalamus and pituitary, control of red blood cell formation, immune reactions, etc. About one-third of the grants support investigations on plants. The remainder is about evenly divided between three categories consisting of invertebrates, vertebrates other than mammals, and, finally, various aspects of mammalian physiology.

The majority of research grants in the *Systematic Biology* program were for the support of monographic or revisional studies on particular groups of organisms or for systematic studies on specified faunas or floras. Some were made in support of large-scale biological explorations in little-known areas, such as the Sixth Archbold Expedition for Biological Exploration in New Guinea and the Plant Survey of the Guiana Region

of South America. Other biologists were given support for collecting in all continents, but with more limited objectives. Grants made by this program are playing a vital role in the resurgence of systematic biology. Although funds have been limited, grant support has contributed, among other things, to the stability of going research programs and to the innovation of many new ones throughout the broad spectrum of organisms, both living and fossil; to the collection, preparation, and study of new collections, often from the outermost corners of the globe; to the preparation and publication of the results of research, which in this field often means monographic reports; and to the improvement of the large research collections that must be classed as part of our national scientific heritage.

Proposals of a *general* nature which cut across several program areas continued to be handled by the Division through a special category. This scheme has proven to be a useful one in that it insures that the division has the necessary flexibility to handle proposals which otherwise do not fit into individual relatively circumscribed program areas. The range of such proposals in fiscal year 1959 varied greatly and included, for example, the support of several projects in biometrics; grants for the support of stocks of important biological material; support of the Mobile Desert Laboratory at the California Institute of Technology; and a variety of research equipment grants for the use of groups of scientists working in "coherent areas" of biological research.

#### **Facilities for Research in the Biological and Medical Sciences**

During the past year, the scope of facilities support remained limited to specialized biological facilities. These are generally facilities which are unique either in program or in location, not found in the usual university or college departments covering the life sciences. Included are such facilities as marine and field stations, systematic biology museums which house collections of various life forms, and controlled-environment laboratories.

In fiscal year 1959, 17 grants totaling \$3,269,800 were made. A grant went to the University of Wisconsin for the construction of the first "biotron"—a laboratory for the study of both animal and plant growth and development under controlled-environment conditions. Climatic variables which will be controlled include temperature, humidity, light intensity, and air movement. The biotron should approach the status of a national or regional laboratory, with access being provided to competent investigators from other institutions. Support was also provided for renovation of the phytotron (similar to the biotron, but limited to plant studies) at the California Institute of Technology.

Among the grants was one to the Woods Hole Oceanographic Institute which will permit greater use of oceanographic vessels for the conduct of basic biological investigations; to the Jackson Memorial Laboratory for the construction and equipping of an addition to the main laboratory building; to Duke University and to the University of Florida for construction of laboratory buildings at their marine laboratories.

Support was provided for rehabilitation of systematic biology facilities at the Bishop Museum of Hawaii, which houses some of the leading collections of Pacific area life forms; also for major repairs and modernization of buildings at the Long Island Biological Laboratory, a major center of genetics research.

To round out the picture of the kind of facilities supported during 1959, it might be well to mention a grant to the University of California for support of basic research facilities at the White Mountain Research Station where high-altitude physiological research is conducted, another to the University of Chicago for the construction of a laboratory to permit study of the comparative behavior of animals, and finally the one to the University of Missouri for the construction of an animal calorimeter for determining heat losses.

## DIVISION OF MATHEMATICAL, PHYSICAL, AND ENGINEERING SCIENCES

### **Current Research Support**

An expansion in basic research potential in astronomy has occurred since World War II that promises to make possible a vast number of important discoveries within the next 10 years. This may be credited almost entirely to the development of radically new types of instrumentation, as well as to the greatly increased financial support currently available to the astronomical community for the purpose of developing and purchasing these instruments. Considerable support provided by the *Astronomy* program is being devoted to research leading to instrumentation developments in order to increase the range of spectral sensitivity of astronomical observing equipment, the overall sensitivity of the equipment to weak sources, and the resolving power (i.e., the ability of the equipment to record as separate sources two or more individual objects, such as markings on the surface of the moon and planets). Astronomy is also being revolutionized by the availability of new high-altitude platforms for telescopes. Balloons are already being successfully used, and space vehicles will soon permit observations from beyond the earth's atmosphere.

A new program for *Atmospheric Sciences* was established in July 1958 to meet growing interests in scientific studies of the atmospheric environment. The global observational programs of the IGY added much emphasis, as did the scientists' recent successes in sending aloft space satellites and increasing precipitation through modern weather modification. This new program deals with research in meteorology, upper atmosphere studies, cloud physics, and the energy transfer processes between earth, sea, and air. To meet the most critical need for orderly progress in atmospheric sciences, a threshold of long-term, stable support for basic research and the provision of adequate research tools and facility needs have been the major objectives during the first year.

The weather modification program is handled as part of the Atmospheric Sciences research support program. It was established under Public Law 85-510, which directs the Foundation to ". . . initiate and support a program of study, research, and evaluation in the field of weather modification." A full range of laboratory and field experimental work is already being supported, together with the study and improvement of the physical and statistical evaluation methods employed in determining the results of any seeding operation. The program has the objective of studying more intensively than has been attempted before the scientific basis of weather modification.

In the *Chemistry* program grants were made principally in the areas of organic and physical chemistry. Support for organic chemistry during 1959 provided for studies of solvolysis reactions, small ring compounds and polycyclic systems of theoretical interest, structure and total synthesis of natural products, transannular reactions, molecular rearrangements, and the chemistry of divalent carbon. In physical chemistry support was provided primarily for investigations of spectroscopic methods such as nuclear magnetic resonance, electron paramagnetic resonance, and infrared spectroscopy; kinetics and mechanisms of reactions; thermodynamic properties of molecules; and quantum mechanical calculations of molecular structure. Research was also supported in inorganic chemistry on boron compounds, the transition elements, and the properties of optically active complex inorganic compounds; in analytical chemistry, on polarography, gas chromatography, and on chelating agents.

A shift in emphasis in the *Earth Sciences* program has resulted in greater support for oceanography, so that a more significant fraction of the scientific programs of oceanographic institutions might be free of pressure for immediate practical results. As in the past, the program has also been concerned with geophysics, geochemistry, and geology. These areas commonly overlap both with the life and other physical



sciences—geochemistry with chemistry, geophysics with classical physics, paleoecology with environmental biology, geology with engineering sciences, paleontology with systematic biology. During the year interest has noticeably increased in seismology and crustal studies, based on the need for more information about the crust and mantle of the earth.

The *Engineering Sciences* program, recognizing the broad responsibilities of the engineering profession, recommends for support research which should provide either new knowledge concerning basic physical properties, or generalizations that reflect better understanding or more realistic predictions of the behavior of systems. If engineering sciences grants are identified by scientific fields, most of the research effort is in transfer and rate mechanisms, fluid mechanics, the properties of materials, and the mechanics of solids. During this year two grants were made in the increasingly significant field of plasma dynamics. They are somewhat unique in that they involve the interdisciplinary efforts of highly trained investigators in the sciences of aerodynamics, thermodynamics, electrodynamics, chemistry, atomic and molecular physics, and applied mathematics. Another grant which will coordinate activities of engineers, physicists, and chemists is in the field of magnetic resonance research.

The *Mathematical Sciences* program has continued its support of all areas of theoretical mathematics. Emphasis tends to mirror the patterns of interest of the mathematical community, which in turn usually correspond with the fields in which most significant progress is being made. Thus, algebraic topology is an area which is flourishing, and is attracting increasing efforts on the part of research mathematicians. Among other areas in which substantial results are being achieved, one might note a renewed activity in differential geometry and the theory of finite groups.

The *Physics* program has continued to place major emphasis on high-energy physics, particularly cosmic rays. More emphasis than in previous years has also centered on low-temperature research, such as that exploring the dynamics of liquid helium. A noticeable trend upward is also apparent in theoretical physics and in solid state research. There has been an increase in cooperative research in high-energy physics in which unique facilities, such as the cosmotron at Brookhaven and the bevatron at Berkeley, are used by research workers from other institutions. In this program the visiting scientist spends a few days or weeks taking extensive photographs of phenomena of interest to him, and then making the measurements and calculations in a more leisurely manner back at his own institution. This spreading of the usefulness of the high-energy machines among institutions otherwise cut off from active

fields of research tends to unify the field of experimental nuclear physics. Fundamental to the success of this type of research are means for reducing the records to a form suitable for input to the high-speed calculating machines now available.

### **The National Observatories**

1. *The National Radio Astronomy Observatory.*—After years of planning and construction, many of the facilities of the Observatory are approaching completion or are actually in operation. The smaller of the two principal instruments, an 85-foot radio telescope, went into part-time operation during March 1959 and into full operation a few months later. This instrument is named after a man who was a principal contributor to its design, the late Dr. Howard E. Tatel. Constructed by the Blaw-Knox Co., the precision of the parabolic surfaces is such as to permit its use at radio wavelengths as short as 3 cm. The feed of the instrument is of an unusually advanced design that provides three distinct elements capable of receiving information simultaneously on 3.75 cm., 21 cm., and 68 cm. This arrangement permits the telescope to operate with a productivity equivalent to that of three 85-foot telescopes equipped with more conventional feeds. Receivers of the greatest possible sensitivity are being provided or planned for. Several important research projects have already been carried out by the staff and visiting astronomers, and many more are planned. (See p. 46.)

The larger of the two steerable telescopes planned for the Observatory is a 140-foot dish. Construction of this instrument is well advanced, the concrete pier having been completed, as well as some of the moving parts. It seems reasonable to hope that this instrument will be in full operation during the calendar year 1961, despite the fact that the plans require that the 2,000-ton, 140-foot dish retain its shape in all operating positions to within a few millimeters.

Other facilities at the site of the Observatory at Green Bank, W. Va., include an office-laboratory building, a residence hall, and a maintenance building. All of these will be in operation by the end of October 1959. The facilities and staff, which now numbers 40 people, have been carefully selected to provide the finest in research opportunities for all qualified U.S. scientists desiring to do research in the area of radio astronomy.

2. *The Kitt Peak National Observatory.*—Construction of the Kitt Peak National Observatory was started in 1959. It will have two major telescopes for observing the stars: a 36-inch reflector scheduled for operation during the fiscal year 1960, and an 84-inch reflector to be completed in 1961 or 1962. Although not the world's largest, nor of

radically new design, these instruments will incorporate all of the advanced techniques of recent years in order that observations of extremely faint stars can be made.

The Observatory's solar telescope, however, is intended to be the largest in the world. It will have a parabolic mirror 60 inches in diameter with a focal length of 300 feet, which will form a solar image several times larger and more brightly illuminated (per square second of arc) than is attainable with any other ground-based instrument.

The conversion of an undeveloped mountain top on an Indian reservation into a modern astronomical observatory that will rank among the world's foremost is a formidable task. In addition to telescopes, buildings, onsite roads, and utilities on the mountain, a city laboratory building is being constructed in Tucson. This building, adjacent to the University of Arizona campus, with instrument shops and offices, will provide a base station for the resident staff and visiting astronomers. It is anticipated that most of these supporting facilities will be completed and occupied during the fiscal year 1960. A permanent paved access road is being constructed from the base of Kitt Peak to the Observatory, but will probably not be completed until a later date.

Long-range plans for the Kitt Peak National Observatory have envisioned the eventual installation on the mountain of a very large reflecting telescope with an aperture of perhaps several hundred inches. However, with the sudden dawning of the space age, these plans have been placed in abeyance in favor of a new and exciting project, namely, the design, construction, and operation of a large, orbital (satellite) optical telescope. It seems appropriate that this project should be undertaken at Kitt Peak under the management of the Association of Universities for Research in Astronomy, Inc., because the magnitude of the effort would tax the resources of a single university very heavily. This program looks beyond the specialized, smaller orbital telescopes now being planned at several other observatories. The Kitt Peak space telescope would be an accurately pointable instrument of high resolving power which can make observations on command from the ground and communicate them back to the earth. This is definitely a long-range project; it may be many years before such a sophisticated, fully operable telescope can be placed in orbit. At present an aperture of about 50 inches is being considered. It would be most desirable to place the instrument into a 24-hour orbit, i.e. at an altitude of about 22,000 miles above the surface of the earth, in order to keep it in view of the ground station at all times. It is hoped that this telescope may eventually form a part of the total instrumentation of the Observatory and be available,

as are the other telescopes, to all qualified U.S. astronomers. The ultimate cost will probably be very large, and close liaison with other U.S. Government agencies, particularly the National Aeronautics and Space Administration, will be maintained during all phases of the project.

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

Support provided for facilities in the mathematical, physical, and engineering sciences totaled \$12.3 million in fiscal year 1959, including the national observatories described above.

As in the last few years, the largest portion of facilities money went for support of the two national astronomical observatories. The National Radio Astronomy Observatory at Green Bank, W. Va., received \$4,350,000 in 1959 which makes a total since 1957 of \$9.5 million. The Kitt Peak National Observatory received \$4,405,000 during the year, bringing the amount spent for this observatory up to approximately \$7.5 million.

Grants for research reactors were four in number totaling \$2 million, and were made to Texas A. & M. College, Georgia Institute of Technology, University of Buffalo, and Cornell University. In 1959, assistance to the amount of \$1.5 million for the establishment of computing centers was given to the following institutions: North Carolina, Oklahoma, Yale, Iowa State, and Cornell.

### **OFFICE OF SOCIAL SCIENCES**

During fiscal year 1959, the Foundation established an Office of Social Sciences to support research and related activities in basic social science disciplines. This Office replaces the previous Social Science Research Program and represents a further step in the development of Foundation activities in the area. It is clear that the intellectual, economic, and social strength of our Nation requires a vigorous approach to social problems, with scientific techniques of study making their maximum contribution. The Foundation, in supporting basic scientific research in the social sciences, endeavors to assist social scientists to improve their research techniques, to accumulate fundamental knowledge about human behavior and society, and to develop sound theoretical bases for further inquiry. Support of basic social science research within the framework of the National Science Foundation stimulates interchange between natural and social scientists and will undergird any effort on the part of others to deal with social problems and public policy.

### Current Research Support

The *Anthropological Sciences* program includes basic research in archeology, physical and cultural anthropology, linguistics, and related fields. Grants made in fiscal year 1959 include support for the study of the ethnography of little understood cultures, such as the Seminole of Florida, the Nyaturu of Kenya, and the Ibo of Nigeria. Such field research adds to our knowledge of the varieties of human culture and the processes of sociocultural change. Some of the archeological projects are concerned with investigation of new and improved dating processes, such as beach-ridge dating and obsidian-hydration dating. An expedition to the Middle East will investigate the paleoecological aspects of the beginnings of food production. Projects in linguistics include the application of statistical methods to problems of historic linguistic reconstruction and a study of paralinguage among the Taos. A grant has been made to two cryptologists to enable them to apply modern techniques of cryptoanalysis and structural linguistics to the still unsolved puzzle of Mayan hieroglyphics.

The *Sociological Sciences* program has been active in support of laboratory studies of individual choice behavior which are directed to increasing our knowledge of how individuals make decisions in the face of incomplete information and uncertain outcomes. Techniques for the measurement of attitudes and investigation of the dynamics of attitude formation and change are other areas in which experimental research is being supported, including studies of how resistance to attitude change is built up, and of the nature and extent of changes in attitude which follow the receipt of items of information that disagree with previously held beliefs. The increased use of mathematical concepts and techniques in the sociological sciences is evidenced by grants for the construction and testing of probability models for conformity behavior and for experimental simulation of social processes on electronic computers.

The core of the *Economic Sciences* program has been mathematical economics, and grants have been made for econometric studies of parameter estimates, resource allocation, and time-series analysis. In addition, grants of interest and importance to basic economic theory, which are not econometric in technique, have been made in 1959. Among these are studies of international economic transactions, investigations of economic behavior at the level of the individual consuming household, and research into the economic aspects of technological inventions.

The *History and Philosophy of Science* program provided support for research in the history of metallurgy, studies of early American naturalists, and investigations of the development of mathematical proportionality. Research in the philosophy of science covered grants for

studies on inductive probability, the philosophy of fundamental physical theory, and the foundations of measurement.

## OFFICE OF SPECIAL INTERNATIONAL PROGRAMS ANTARCTIC RESEARCH PROGRAM

### Current Research Support

Unlike the programs previously discussed which are organized by scientific discipline, the *Antarctic Research* program is supported on a geographical basis and covers many disciplines.

Investigations underway include the following: observations and measurements of aurora and airglow at each of the Antarctic stations; studies in the biological and medical sciences, including bacteriology, marine fishes, bird migration, psychology, and transmission of disease in isolated communities; geomagnetic observations made at each of the stations; glaciological studies, including snow accumulation, movement of glaciers, thickness of the icecap, and chronological banding in the ice; studies in ionospheric physics at many of the stations by probing the ionosphere with radio transmitters and recording of special radio signals; the collection of meteorological data at all stations and on the traverses, with additional data from balloon-carried radiosondes; oceanographic research carried out at each of the shoreline stations and from the Navy supply ships in the Antarctic; seismology investigations, including station studies with permanent seismographs to record and measure earthquake waves, and traverse seismology in which artificial vibrations are used to study ice thickness and subsurface geology.

An expanded program of research in the same disciplines as the above, with the additions of studies in geodesy and cartography, cosmic rays, gravity, and geology, will be conducted by the next team of scientists going to the Antarctic in the fall of 1959.

(A description of the organization of the Antarctic Research Program can be found under "Special International Programs.")

### Significant Research Developments

STRATOSCOPE INSTRUMENTATION MAKES POSSIBLE HISTORIC SUNSPOT PHOTOS.—The Stratoscope I 12-inch balloon-borne solar telescope project supported by NSF made three successful flights from Lake Elmo, Minn., during the summer of 1959, obtaining a great many of the clearest photographs ever obtained of the sun's surface, in time sequence. The photos show details of the umbra and penumbra (center and surrounding magnetic areas) of sunspots, including a large group that seriously interrupted radio communications in August, as well as of the polygonal convection cells elsewhere on the sun's surface. (See p. 27.)

These flights marked the first successful control from the ground of an astronomical instrument in space, for the aiming and focusing of the telescope was accomplished by remote control from a trailer van stationed beneath a point in the estimated trajectory of the balloon. The field of view of the telescope was continuously monitored on the ground by a closed-circuit television system. It is expected that many of the techniques developed in connection with this project will find application in other models of space instruments, both balloon borne and satellite borne.

During the flights the telescope remained at an altitude of over 15 miles for the period its camera operated, then was parachuted to earth. Purpose of sending the telescope up in a balloon was to get it above the earth's atmosphere, which prevents clear visibility of celestial objects. At its height of 80,000 feet, Stratoscope I was above about 98 percent of the earth's atmosphere.

\* \* \*

**RESOLUTION OF FINE STRUCTURE OF GALACTIC NUCLEUS.**—The source of radio emission known as Sagittarius A is one of the most intense in the whole sky. Lying very nearly in the center of our galaxy (200 million billion miles from the earth), many radio astronomers have believed it to be the nucleus of the Milky Way. It is used as the zero from which galactic longitude is measured in the newly adopted system of galactic coordinates.

An investigator working at NSF's National Radio Astronomy Observatory at Green Bank, W. Va., successfully used the new 85-foot Tatel radio telescope to resolve Sagittarius A into at least four component parts. One of the first results obtained with this telescope, this finding indicates that parts of the source may not be located at the center of the galaxy; as a result, a considerable revision in ideas of the physical structure of the galactic center might be necessary. Whether one of the observed components is the nucleus and the components are subordinate to it, or whether all the components taken together make up the galactic nucleus, must now be answered.

\* \* \*

**THE NEWLY DISCOVERED ENERGY GAP AND SUPERCONDUCTIVITY.**—The explanation of superconductivity, the vanishing of electrical resistance in certain materials near absolute zero, has been a major unsolved problem in theoretical physics for the past half century. Recently, however, a new theory of superconductivity has been proposed which in explaining this phenomenon suggests the existence of an "energy gap"

of a definite magnitude in the electronic excitation spectrum of the superconductor. Measurements of the transmission of submillimeter radiation through thin superconducting films and measurements of the reflection of this radiation from bulk superconductors have helped verify the predictions of this theory. Indeed, by very ingenious experiments using this latter technique in the far infrared, NSF grantees have provided the most direct demonstration to date of the existence of this energy gap.

During the same period another NSF grantee has measured very accurately the specific heat of certain metals in the superconducting state to test experimentally still another aspect of this new theory which predicts the behavior of the electronic specific heat contribution. This work has provided additional verification of the existence of this energy gap.

These two experiments taken together comprise a major advance in our understanding of the phenomenon of nonresistant flow of electrical current.

\* \* \*

**GENE STRUCTURE CORRELATED WITH PROTEIN SYNTHESIS.**—Much research in genetics today is oriented toward solving the important problem of how genes act to control the metabolic (chemical) activities of cells. Specific chemical reactions in the cell are controlled by specific protein molecules known as enzymes, the synthesis of which is controlled in turn by genes that are thought to determine the exact sequence of the many subunits (amino acids) in the protein molecules.

A genetic system is being investigated which may lead us closer to an ultimate understanding of the relationship between the fine structure of genes and the chemistry of the cell. A map has been constructed for a series of changes (mutations) within the particular gene that controls the production of the specific enzyme responsible for the synthesis of the amino acid, tryptophan, in the bacterium *Escherichia coli*. Mutations at any point within this gene may cause loss of some or all of the enzyme activity. In some cases, even though much of the specific enzyme activity is lost, an altered protein can be detected by immunological techniques; in other cases, no related protein of any kind is formed. In either case, it is possible to produce reverse mutations in the gene, so that the enzyme activity and other characteristics of the normal protein are fully or partially restored. Thus, the investigators now have a series of proteins, including the original active protein, more-or-less enzymatically inactive altered proteins produced by mutated genes, and altered proteins whose activity has been partially or fully restored by



reverse mutation. They are now determining the amino acid sequence in each of these kinds of proteins, and they hope to correlate differences in amino-acid sequence both with changes in the enzymatic activity of the protein and with the position of the mutation sites in the gene.

With such a knowledge of the fine structure of the gene, the enzyme whose production it controls, and the chemistry of the cell, it should eventually be possible to repair hereditary defects in cellular metabolism by deliberately changing the gene itself or by externally controlling the synthesis of its products.

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**BIOLOGICAL CLOCKS.**—An apparently universal characteristic of living organisms is the ability to orient themselves in space and time by mechanisms best described as “biological clocks,” in much the same manner as manmade systems.

Amphipods (sand fleas), for example, possess biological clocks which respond to the elevation of the sun, from which they get the cues initiating their vertical migrations. There is other evidence indicating that certain animal forms have multiple rhythms interacting with each other simultaneously in different frequencies so that rhythm mixing results in new cycles. Some of these clocks are triggered by temperature stimuli, while others may be linked to different environmental cues, such as light stimulation or moisture stimulation. It is obvious then that highly timed stimuli apparently can be stored in organisms at primitive levels, although we are relatively ignorant of the evolution of such systems within organisms from lower to higher level and from general modalities to highly discriminating sensory organs within any one organism.

A hypothesis developed by a Foundation-supported investigator assumes that all organisms are capable of time measurement in that their “clocks” have a common and ancient basic mechanism. This basic element is an oscillatory system with a natural period evolved to match, approximately, the earth’s rotation, its annual circling of the sun, and interacting with the revolution of our moon around the earth. As an example, one of the best known biological rhythms is that of the daily period periodicity of the onset of running activity in small rodents. An analysis of this periodic system has shown that the hamster “clock” has an error that does not exceed 2 minutes in 24 hours in its activity pattern. Within limits such patterns of activity may be modified within various organisms by appropriate techniques, but it has also been demonstrated that there are limits within which these systems may be violated without causing great stress and eventual death to the organisms involved.

Potentially important contributions to the development of man-machine systems may be derived from investigations of orientation components and systems in organisms. Various flying, terrestrial, and aquatic animals exhibit unique abilities of sensing, direction finding, time discrimination, and integration of information over time, directly relevant to the attainment of analogous objectives in the field of bioastronautics. These organisms possess the abilities to filter information, detect and identify targets, discriminate faint signals from noise, navigate considerable distances on coordinates not yet identified, and intercept moving targets by methods which demand continued investigations.

One example of a compact and efficient navigational system is the vocal and auditory apparatus of a bat. Although it weighs less than 1 gram, this system orients flight maneuvers in darkness, discriminates faint echoes from minute moving targets from louder noise in the same frequency band, and guides the interception of individual flying insects at rates up to one every second. Still more compact sensory and integrating mechanisms for detecting and filtering chemical, optical, and mechanical signals are to be found in insects. Complex patterns of sensory input are analyzed within a fraction of a second, and the output of a few milligrams of nervous tissue results in a definitive decision and appropriate action. Even the smallest and simplest of these mechanisms is capable of recognizing patterns of sensory input rather than merely responding when some threshold intensity is reached.

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**MECHANISM OF ACTION OF THYROID GLAND CONTROL OF METAMORPHOSIS OF TADPOLE TO ADULT AMPHIBIAN.**—The iodine-containing hormone (thyroxine) produced by the thyroid gland has long been known to exercise a vital role in the regulation of developmental processes. For example, a deficiency of thyroxine results in cretinism—a form of idiocy in humans.

In amphibians, the complex metamorphic changes which transform the fishlike tadpole into the adult land form are subject to thyroid regulation. Among the changes involved are resorption of gills and tail, development of limbs, and numerous other transformations involving jaws, teeth, skin, brain, and behavior. Tadpoles, in which the thyroid is rendered inactive by the removal of the pituitary gland, do not undergo metamorphosis. By rearing such tadpoles in solutions of thyroxine of graded concentrations, an investigator has discovered that specific metamorphic changes are triggered by particular concentrations of the hormone. Another experimental series, involving substances identical to the basic portion of the molecular structure but differing in the

chemical composition of the reacting groups (analogs), indicated that various compounds had different levels of activity and sites of action in addition to the effects of quantities of thyroxine. It seems that the qualitative nature of the chemical molecule of the thyroid hormone can selectively regulate specific developmental events.

The transforming tadpole may be viewed as a complex mosaic of parts, many of which are responsive to thyroid hormones. The nature of the response depends not only upon the part in question, but also upon the hormone concentration, and perhaps upon the relative proportion of the different molecular forms of the hormone. Alteration of one or more of the normal factors can produce an abnormal sequence of developmental events.

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**DEPTH PERCEPTION OF HUMAN INFANTS WELL DEVELOPED BY TIME LOCOMOTION IS POSSIBLE.**—A new technique of testing for visual depth perception is being used to shed some light upon an age-old controversy about native and learned factors in the perception of distance. Does a baby learn through experience to avoid falling over a vertical edge, or is this ability to discriminate distance an inborn one? A “visual cliff” apparatus has been developed to study this problem. (See photo on p. 24.) The child is placed on a board which spans a large fenced-in sheet of glass. On one side of the center board a textured linoleum surface is laid directly under the glass (the “near” side); on the other side, a matching linoleum surface is laid 3½ feet below the glass (the “far” side). The cues to safe descent are exclusively visual; tactual, olfactory, or auditory cues are the same on both sides of the center board. The investigators find that by the time locomotion is possible, the crawling child shows a very strong preference for the “near” side, avoiding what appears to be a sharp dropoff. The same avoidance of an apparent dropoff has also been observed in very young rats, goats, and chickens. It appears even in rats that have been dark reared until 20 minutes prior to testing. Depth appears to be discriminated on the basis of visual stimulation, even when chances for previous learning are minimal.

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**TEST TUBE PRODUCTION OF HEMOGLOBIN IDENTIFIES CELL PARTICULATE WHICH SYNTHESIZES PROTEINS.**—Cell particulates called microsomes are known to play a major role in protein synthesis. Only now with the successful synthesis of a specific protein—hemoglobin, the oxygen-carrying protein in the red blood cells—outside the living cell is their role being more fully understood.

Microsomes were extracted from the red blood cells of the rabbit and mixed with two enzymes from the same type cell, energy-yielding phosphate compounds, and a complete mixture of amino acids. Three of the amino acids were labeled with radioactive carbon atoms. After incubation, it was found that hemoglobin was produced containing the labeled amino acids in the same ratio as that occurring in the natural rabbit hemoglobin.

The red blood cell microsomal protein contains two of the three amino acids which were labeled before being added to the mixture, but in a different ratio than that in rabbit hemoglobin. The ratio in the synthesis product was that of hemoglobin, thus showing that the microsomes were making hemoglobin and not microsomal protein.

The microsomes are essential to the experiment. Without them no labeled amino acids were taken up. The microsome must therefore perform the role of a jig or template for the manufacture of specific protein molecules.

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**HORMONE SYNTHESIS RESULTS IN LARGEST MANMADE PROTEIN MOLECULE.**—A pituitary hormone that is the largest polypeptide (protein) molecule yet produced in the laboratory has been successfully synthesized. The molecule consists of 13 amino acids linked in a specific sequence fairly similar to ACTH in structure. This hormone stimulates the melanocyte cells, which produce a skin coloring pigment. The hormone may prove useful in treating albinism.

The particular significance of this synthesis is that it can be used to study the relationship of chemical structure to biological activity. It has been determined that relatively small fragments of the hormone, containing key amino acid sequences, may possess the ability to perform the functions of the complete hormone when large enough levels are used. Whether or not these fragments are capable of sustaining all of the biological functions of the intact hormone remains to be established.

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**CATALYST BLOOD FACTOR IDENTIFIED THAT TRANSFORMS SOLUBLE FIBRIN INTO THE INSOLUBLE FORM (BLOOD CLOT).**—A catalytic factor has been obtained from blood which apparently occurs as a complex with fibrinogen and has the ability to transform 1,000 to 10,000 times its own weight of soluble fibrin into the insoluble form. For the first time it is now possible to study blood clotting at the molecular level and perhaps minimize the trauma of surgery and accelerate wound healing.

The blood-clotting process is believed to occur in the following manner. Fibrinogen, a complex polypeptide, is split by thrombin; a peptide bond-breaking catalyst, to small units called fibrin monomers. These

monomers polymerize into chains. After a high degree of polymerization has been achieved, the chains are cross-linked forming a blood clot. If the cross-linkages occur in the presence of calcium ions and the previously mentioned catalytic factor, the linkage is very strong and the clot is quite resistant to dissolution.

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**METHOD DEVELOPED FOR GROWING WINTER GRAINS IN TROPICS IN A THIRD OF USUAL TIME.**—Winter rye has been grown which produces grain without cold temperatures and in one-third of usual time. Grain is normally produced by winter rye in eight months, including a cold spell of 6 to 8 weeks. With the use of a newly developed technique, it now becomes feasible to raise winter rye and probably most other winter grains in the tropics in  $2\frac{1}{2}$  months.

The rye plants were grown in a phytotron (a building in which it is possible to control the various environmental factors). In this case the temperature was kept at a constant  $62^{\circ}$  F. When the plants were a month old and had about 10 leaves each, they were sprayed with a plant-growth hormone, gibberelin.

Gibberelin spray eliminated the need for the prolonged cold period required by nature for the production of winter grains. It is believed that during the cold period the plants normally secrete and accumulate the hormones necessary for growth and flowering.

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**ENZYMATIC SYNTHESIS OF DNA (BASIC HEREDITARY MATERIAL) LEADS TO UNDERSTANDING OF CHEMISTRY OF DNA FORMATION.**—As previously reported, the addition of a bacterial enzyme to a mixture of nucleic acid building blocks (nucleoside triphosphates) has resulted in the production of DNA (deoxyribonucleic acid) provided a small quantity of DNA is used as a primer.

The synthetic material is composed of macromolecules possessing a high degree of intramolecular organization involving purine and pyrimidine rings. The molecular structure is two stranded (double spiral), apparently linked by hydrogen bonds similar to natural DNA.

The process of synthesis is autocatalytic (the more DNA produced, the faster the reaction). As long as only the secondary structure of the DNA primer is disrupted, the double-stranded DNA macromolecules are still produced.

However, the use of an unusual DNA primer (AT-Polymer), not obtained naturally and containing only two of the four naturally occurring nucleic acid components resulted in the production of large

amounts of AT-Polymer. This occurred even though all four were present.

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EXCAVATION OF THE OLDEST CONTINUOUSLY INHABITED CITY IN THE NEW WORLD—DZIBILCHALTUN.—Northern Yucatan, in Mexico, is the site of the ruins of a Mayan city inhabited for more than 3,000 years, from 2,000 B.C. in pre-Mayan times till after the Spanish conquest by Cortez.

Partial excavation of the ruined pyramids and temples of Dzibilchaltun has revealed a city of 20 square miles with a central 10-square-mile area. This "downtown" section had pyramidal temples, palaces, and buildings of vaulted stone with thatched houses on stone foundations crowded between the larger buildings. Surrounding this area were the "suburbs" with fewer pyramids, but equally crowded with stone-vaulted temples and residential platforms. A 1½-mile-long, 60-foot-wide limestone causeway spanned the center of Dzibilchaltun—8 feet high in some places.

The significance of the excavation of the oldest continuously inhabited city in the New World is that it will provide an unexcelled yardstick for studying the historic development of Mayan culture over a continuum of more than three millennia.

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EFFECT OF TEMPTATION ON CHANGES IN ATTITUDE.—The theory of cognitive dissonance holds that when a person is forced to do or say something in disagreement with his privately held opinion, there will be a tendency for opinion to change in such a way as to bring it into correspondence with the act performed. Secondly the greater the pressure used to induce the discordant act, the less will be the tendency to change opinion. In an experimental test of this theory, changes in moral attitudes following either cheating on a test or refraining from cheating were investigated. A sample of students were offered a prize for good performance on a test and were given an opportunity to cheat. Those who did not take advantage of the opportunity and did not cheat became more severe in their attitudes toward cheating, while those who did cheat became more lenient. The greater the motivation to cheat (tested by varying the value of the prize), the greater each of these effects was. This study is one of the first to explore the consequences when an individual is faced with the decision to comply with, or violate, a standard and, if verified by further research, will increase our ability to predict human behavior.

EVIDENCE FOUND OF LARGE VOLCANIC ERUPTION.—During a Foundation-supported cruise of the oceanographic research vessel R/V *Vema*, the precision depth recorder picked up a subbottom echo from an apparently continuous layer that extends from about 12° N. to 12° S. latitude, and is about 5° longitude wide. It ranges from within a few inches of the surface to as much as 120 feet below the sea floor. In the 11 cores that were obtained, the layer consisted of a clean, pure, nearly white volcanic ash with an average thickness of 4 inches. The purity of the ash suggests that it was deposited over a very short period of time. Also the sediments above and below the ash are quite similar, indicating that no permanent major environmental change resulted from the ash fall.

It is possible that this represents the volcanic debris from one major eruption. If so, it is larger than any single explosive eruption known in historic times. It is also possible that the ash is the product of multiple eruptions over a short period of time and from several volcanic centers. Although the limits of the ash are by no means known, in the area thus far covered its volume exceeds 30 cubic miles, more than a thousand times the volume of the famous Krakatao volcanic eruption in 1883, which resulted in concussion heard 2,500 miles away.

Thus far an isotopic date for the ash layer has not been obtained. Further work on dating is planned.

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OCEANOGRAPHIC CRUISE RESULTS IN DISCOVERY OF MOLLUSK THOUGHT TO BE EXTINCT FOR 300 MILLION YEARS.—The same cruise through the Caribbean and down the west coast of South America into the South Atlantic made possible many samplings of sediments and living animals and plants from the deep ocean. Several specimens of neopilinids in good condition were dredged up from the bottom of the Peru-Chile trench, one of which proved to be a brandnew species which has been named "Neopilina (*Vema*) ewingi." These small organisms were thought to have lived only during the Paleozoic era of geologic time and were believed to have died out at least 300 million years ago. Their existence today is therefore as important biologically as was the discovery of the coelecanth fish off the African coast several years ago. All fossil forms of neopilinids so far discovered have come from sediments deposited in relatively shallow water. The newly discovered form came from a depth of about 18,000 feet. Thus, either the neopilinids were adapted to living in both deep and shallow water from the beginning of their existence, or they gradually moved into deeper water as the competition for life increased in the shallow waters off the

continental shelves, and as they moved became progressively adapted to life without light and under extreme pressure.

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**SEQUOIA MIGRATIONS ESTABLISHED.**—An NSF grantee has been able to trace the history of the giant redwood or "Big Tree" from tropical swamps 60 million years ago through adaptation to drier and cooler climates. This involved migration from California to western Nevada and back to California again. The modern trees are found in discontinuous patches from the northern to southern Sierra Nevada range. Fossil sequoia have been found in sediments up to 70 million years old in California and Nevada.

The ancient species occurred in humid subtropical to warm temperate climates and was associated with other warmth- and moisture-loving forms. During the 10 or 20 million years of the early Tertiary period, the climate became drier and cooler. In response the sequoia adapted itself to the less tropical conditions, so that by about 25 million years ago a tree much like the modern Big Tree had evolved, able to stand cooler winters but still requiring a great deal of summer moisture. The Sierra Nevada had not yet developed to their present great heights, enabling the trees to spread to what is now western Nevada, benefiting from what was then a mild, humid climate providing an ideal natural nursery.

As the Sierra Nevada was uplifted, rainfall on the eastern side of the range was drastically reduced and many of the leafy trees, such as birch, sycamore, elm, and certain maples, found today only in the eastern United States, were effectively eliminated from the area. The sequoia and a few others managed to survive by migration across the top of the rising mountains.

Later, faced with the much lower winter temperatures of the Pleistocene glacial epoch, Big Tree again migrated down into warmer climates, remaining only in areas where there was enough summer moisture for its shallow root system. The glacial ice, cutting through many valleys, isolated patches of the sequoia one from another, in the areas where they are generally found today.

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**A FRESH LOOK AT THE PHYSICAL WORLD AS A MANY-BODY PROBLEM.**—Investigations carried out under one NSF grant may be expected to lead to a unification of approach to problems in many branches of physics, and to a significant advance in our knowledge of the physical world. Less sophisticated theories have in the past failed to explain many common physical phenomena, especially those encountered in



the study of nuclear structure. This is so because of the extreme complexity of so many nuclei. An exact solution may be found for problems involving the simplest of all nuclei, that of hydrogen. But as the number of particles in a nucleus increases, the number of interactions among the particles shortly becomes so numerous that, while equations can be written, they are too complex to be solved.

The brilliant new theoretical approach which is enabling physicists to overcome these obstacles is known as the "many-body" solution, and provides a method of dealing with highly complicated physical phenomena by approximations. With solutions sufficiently exact to be extremely valuable, the new technique has proven very successful and has opened up an entire new field for dealing with particles too numerous to be treated individually, but too few to be treated statistically.



**EQUIPMENT DEVELOPED WHICH PRODUCES ULTRA-HIGH PRESSURES AND HIGH TEMPERATURES.**—An apparatus has been developed which can produce ultra-high pressures and high temperatures similar to those produced by the device which successfully synthesized diamonds, but using different principles.

The equipment called a tetrahedral anvil can generate pressures up to 100,000 atmospheres (1.5 million pounds per square inch) at 3,000° C.; and for very short periods, at temperatures as high as 50,000° C. It consists of four anvils with triangular faces. Hydraulic rams drive the anvils together, compressing the sample and developing pressure in three dimensions. Heat is supplied to the sample from electrical resistance heaters beneath the anvil faces.

Investigations are now being conducted on the chemical and physical properties of matter at high pressures and high temperatures with the apparatus. It should be particularly valuable in geochemical research by increasing the understanding of the nature of the earth's interior and the manner in which minerals develop. In metallurgy, its use may lead to the development of metals with all sorts of properties hitherto impossible to produce.

## **Research-Related Activities**

### **Scientific Conferences and Symposia**

During the past fiscal year, the Foundation sponsored and provided partial support for 41 scientific conferences and symposia. In most instances, sponsorship was shared with one or more private or public agencies, including universities and scientific societies.

1958 INTERNATIONAL CONFERENCE ON SEMICONDUCTORS—Rochester, N.Y., August 18–22, 1958; Chairman: John Bardeen, Urbana, Ill.; Cosponsor: The University of Rochester.

PROPERTIES OF METALS AT LOW TEMPERATURES—Geneva, N.Y., August 25–29, 1958; Chairman: Milan D. Fiske, General Electric Co., Research Laboratory, Schenectady, N.Y.; Cosponsor: General Electric Co., Research Laboratory.

FRACTURE COLLOQUIUM—Dedham, Mass., September 8–11, 1958; Chairman: B. L. Auerbach, Department of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.; Cosponsor: Committee on Ship Steel and Materials Advisory Board of the National Academy of Sciences-National Research Council.

CONFERENCE ON FUNDAMENTAL RESEARCH IN PLAIN CONCRETE—Allerton Park, Ill., September 8–12, 1958; Chairman: Clyde E. Kesler, University of Illinois, Urbana, Ill.; Cosponsors: American Concrete Institute, American Society of Civil Engineers, Portland Cement Association, Reinforced Concrete Research Council.

CONFERENCE ON BASIC RESEARCH IN CIVIL ENGINEERING—Washington, D.C., September 10–11, 1958; Chairman: Martin Mason, dean of engineering, George Washington University, Washington, D.C.; Cosponsors: American Society of Civil Engineers, George Washington University.

STOPPING POWER CONFERENCE—Gatlinburg, Tenn., September 15–18, 1958; Chairman: Edwin A. Uehling, Department of Physics, University of Washington, Seattle, Wash.; Cosponsor: National Academy of Sciences-National Research Council Subcommittee on Penetration of Charge Particles in Matter.

1958 INTERNATIONAL CONFERENCE ON SMALL ANGLE X-RAY SCATTERING FROM METALS—Kansas City, Mo., September 23–25, 1958; Chairman: J. C. Grosskreutz, Department of Physics, Midwest Research Institute, Kansas City, Mo.; Cosponsor: Midwest Research Institute.

INTERNATIONAL SYMPOSIUM ON THE PHYSICAL CHEMISTRY OF PROCESS METALLURGY—Pittsburgh, Pa., April 27–30, 1959; Chairman: Augustus B. Kinzel, American Institute of Mining, Metallurgical & Petroleum Engineers, Inc., New York, N.Y.; Cosponsor: Metallurgical Society of the American Institute of Mining, Metallurgical & Petroleum Engineers, Inc.

SYMPOSIUM ON PARTIALLY ORDERED SETS IN LATTICE THEORY—Monterey, Calif., April 1959; Chairman: J. H. Curtiss, American Mathematical Society, Providence, R.I.; Cosponsor: American Mathematical Society.

CONFERENCE ON THE DESIGN AND CONDUCT OF RESEARCH PROGRAMS IN WEATHER MODIFICATION—Shenandoah National Park, Va., May 1–3, 1959; Chairman: John W. Tukey, Department of Mathematics, Princeton University, Princeton, N.J.; Cosponsor: Division of Mathematics, National Academy of Sciences-National Research Council.

SYMPOSIUM ON LIQUID DIELECTRICS—Philadelphia, Pa., May 3–7, 1959; Chairman: Louis J. Frisco, Dielectric Laboratory, Johns Hopkins University, Baltimore, Md.; Cosponsor: The Electromechanical Society, Inc.

INTERNATIONAL SYMPOSIUM ON DISTANCE MEASURING EQUIPMENT AND TECHNIQUES—Washington, D.C., May 5–12, 1959; Chairman: Waldo E. Smith, American Geophysical Union, Washington, D.C.; Cosponsors: American Geophysical Union, International Association of Geodesy.

SYMPOSIUM ON QUANTITATIVE BIOLOGY—Cold Spring Harbor, N.Y., June 3–10, 1959; Chairman: M. Demerec, Biological Laboratory, Long Island Biological Association, Cold Spring Harbor, N.Y.; Cosponsor: Long Island Biological Association.

GENERAL PETROLEUM GEOCHEMISTRY SYMPOSIUM—New York, N.Y., June 4, 1959; Chairman: Bartholomew S. Nagy, Department of Chemistry, Fordham University, New York, N.Y.; Cosponsor: Fordham University.

**18TH GROWTH SYMPOSIUM**—University of Wisconsin, Madison, Wis., June 11–13, 1959; Chairman: Ralph O. Erickson, Department of Botany, University of Pennsylvania, Philadelphia, Pa.; Cosponsor: Society for the Study of Development and Growth.

**CONFERENCE ON OPTICAL PUMPING**—Ann Arbor, Mich., June 15–19, 1959; Chairman: Peter Franken, Department of Physics, University of Michigan, Ann Arbor, Mich.; Cosponsor: University of Michigan.

**MEETING OF THE AMERICAN SOCIETY OF HEATING & AIR-CONDITIONING ENGINEERS**—Philadelphia, Pa., January, 1959; Chairman: John Everetts, Jr., American Society of Heating & Air-Conditioning Engineers, Philadelphia, Pa.; Cosponsor: The Technical Advisory Committee on Physiological Research and Human Comfort.

**PILOT CROSS-DISCIPLINARY CLINIC ON THE INSTRUMENTATION REQUIREMENTS FOR CLOUD AND WEATHER MODIFICATION**—Cambridge, Mass., February 11–13, 1959; Chairman: Lloyd E. Slater, Foundation for Instrumentation Education and Research, New York, N.Y.; Cosponsors: American Meteorological Society, Foundation for Instrumentation Education and Research, Meteorology Department, Massachusetts Institute of Technology.

**TWO REGIONAL DEVELOPMENTAL BIOLOGY CONFERENCES**—Alligator Point, Fla., March 13–14, 1959, and Colby College, Waterville, Maine, March 23–24, 1959; Chairman: Victor Twitty, Department of Zoology, Stanford University, Stanford, Calif.; Cosponsor: American Society of Zoologists.

**MIDWEST CONFERENCE ON THEORETICAL PHYSICS**—Evanston, Ill., March 13–14, 1959; Chairman: Max Dresden, Department of Physics, Northwestern University, Evanston, Ill.; Cosponsor: Northwestern University.

**SECOND CONFERENCE ON THE NUCLEAR OPTICAL MODEL**—Tallahassee, Fla., March 16–17, 1959; Chairman: Alex E. S. Green, Department of Physics, Florida State University, Tallahassee, Fla.; Sponsor: Florida State University.

**SYMPOSIUM ON ASTRONOMICAL ASPECTS OF COSMIC RAYS**—University of Rochester, Rochester, N.Y., March 30–April 2, 1959; Chairman: Malcolm P. Savedoff, Department of Physics, University of Rochester, Rochester, N.Y.; Cosponsors: University of Rochester, American Astronomical Society.

**TECHNICAL CONFERENCE ON PHYSICAL METALLURGY OF STRESS-CORROSION FRACTURE**—Pittsburgh, Pa., April 2–3, 1959; Chairman: R. W. Shearman, The Metallurgical Society of the American Institute of Metallurgical Engineers, New York, N.Y.; Cosponsor: The Metallurgical Society of the American Institute of Metallurgical Engineers.

**THIRD SYMPOSIUM ON ROCK MECHANICS**—Golden, Colo., April 20–22, 1959; Chairman: Lute J. Parkinson, Department of Mining Engineering, Colorado School of Mines, Golden, Colo.; Cosponsor: Colorado School of Mines.

**SECOND ASTROMETRIC CONFERENCE**—Cincinnati, Ohio, April 20–23, 1959; Chairman: Paul Herget, Director, Cincinnati Observatory, Cincinnati, Ohio; Cosponsor: Cincinnati Observatory, University of Cincinnati.

**CONFERENCE ON THE ECOLOGY AND BEHAVIOR OF THE MOUNTAIN GORILLA**—Washington, D.C., September 30, 1958; Chairman: Fairfield Osborn, New York Zoological Society, New York, N.Y.; Cosponsor: New York Zoological Society.

**SPECIAL CONFERENCE ON CLOUD PHYSICS**—Woods Hole, Mass., September 1958; Chairman: Helmut Weickmann, Section of Meteorology, American Geophysical Union, National Academy of Sciences, Washington, D.C.; Cosponsor: American Geophysical Union Committee on Cloud Physics.

**SYMPOSIUM ON IMAGE INTENSIFICATION**—Fort Belvoir, Va., October 6–7, 1958; Chairman: Robert S. Wiseman, Warfare Vision Branch, U.S. Army Engineer Re-

search and Development Laboratories, Fort Belvoir, Va.; Cosponsor: U.S. Army Engineer Research and Development Laboratories.

CONFERENCE ON SYSTEMATIC MUSEUMS AS RESOURCES FOR BASIC RESEARCH—University of the State of New York, Albany, N.Y., October 13–14, 1958; Chairman: William N. Fenton, New York State Museum and Science Service, Albany, N.Y.; Cosponsor: The University of the State of New York.

CONFERENCE ON VERTEBRATE SPECIATION—University of Texas, Austin, Tex., October 26–November 1, 1958; Chairman: W. Frank Blair, Department of Zoology, University of Texas, Austin, Tex.; Cosponsor: University of Texas.

JOINT MEETING OF INTERNATIONAL ASSOCIATION FOR BRIDGE AND STRUCTURAL ENGINEERING AND THE STRUCTURAL DIVISION OF AMERICAN SOCIETY OF CIVIL ENGINEERS—New York, N.Y., October 1958; Chairman: Frank Baron, Department of Civil Engineering, University of California, Berkeley, Calif.; Cosponsor: American Society of Civil Engineers.

SYMPOSIUM ON PLANETARY RADIO ASTRONOMY—Gainesville, Fla., December 28, 1958; Chairman: Alex G. Smith, Department of Physics, University of Florida, Gainesville, Fla.; Cosponsors: University of Florida, American Astronomical Society.

SPECIAL CONFERENCE ON TEMPORARY GEODESY—Harvard University, December 1958; Chairman: Milton O. Schmidt, University of Illinois, Urbana, Ill.; Cosponsors: Section of Geodesy of the American Geophysical Union, Astrophysical Observatory of the Smithsonian Institution.

SECOND CARIBBEAN GEOLOGICAL CONFERENCE—Mayaguez, P.R., January 5–9, 1959; Chairman: John D. Weaver, professor of geology, University of Puerto Rico, Mayaguez, P.R.; Cosponsors: University of Puerto Rico, Economic Development Administration of the Commonwealth of Puerto Rico.

SYMPOSIUM ON ELECTROMAGNETIC THEORY—Toronto, Canada, June 15–20, 1959; Chairman: George Sinclair, University of Toronto, Toronto, Canada; Cosponsor: Commission VI of the International Scientific Radio Union.

INTERNATIONAL SYMPOSIUM ON CIRCUIT AND INFORMATION THEORY—Los Angeles, Calif., June 16–18, 1959; Chairman: R. A. Epstein, Jet Propulsion Laboratory, Institute of Radio Engineers, Pasadena, Calif.; Cosponsors: Institute of Radio Engineers, International Scientific Radio Union.

INTERNATIONAL CONFERENCE ON MOLECULAR QUANTUM MECHANICS—Boulder, Colo., June 17–21, 1959; Chairman: Robert G. Parr, Department of Chemistry, Carnegie Institute of Technology, Schenley Park, Pittsburgh, Pa.; Cosponsor: University of Colorado.

FOURTH BIENNIAL SYMPOSIUM ON ANIMAL REPRODUCTION—Urbana, Ill., June 18–20, 1959; Chairman: N. L. VanDemark, University of Illinois, Urbana, Ill.; Cosponsor: University of Illinois.

CONFERENCE ON THE PREPARATION AND DISTRIBUTION OF CHEMICAL COMPOUNDS OF CERTIFIED HIGH PURITY—Washington, D.C., June 22–23, 1959; Chairman: Clem O. Miller, Division of Chemistry and Chemical Technology, National Academy of Sciences-National Research Council, Washington, D.C.; Cosponsor: National Academy of Sciences-National Research Council.

THE INTERDISCIPLINARY CONFERENCE ON ATMOSPHERIC POLLUTION—Santa Barbara, Calif., June 29–30, 1959; Chairman: Kenneth C. Spengler, American Meteorological Society, Boston, Mass.; Cosponsor: The Committee on Air Pollution, American Meteorological Society.

WORKSHOP ON BIOLOGICAL PHENOMENA IN SUBMOLECULAR LEVELS—Marine Biological Laboratory, Woods Hole, Mass., June, July, and August, 1959; Chairman: Albert Szent-Gorgyi, Institute for Muscle Research, Marine Biological Laboratory, Woods Hole, Mass.; Cosponsor: Marine Biological Laboratory.

## **Support of Travel to International Meetings**

Personal contact between highly competent scientists from all over the world, conducting similar types of research, is one of the most important means by which ideas are exchanged. This sort of cross-fertilization is vital to the advancement of scientific knowledge. The Foundation, therefore, partially defrays travel costs for a limited number of American scientists to attend selected international meetings and congresses abroad. The grant to the scientist generally provides for a round-trip, air-tourist fare between his home institution and the location of the meeting. In the 1959 fiscal year, 419 scientists received such awards at a cost of approximately \$330,000.

## **Training Aspects of Research Grants**

The research grants program continued to contribute significantly to the training of both predoctoral and postdoctoral research assistants and associates. During 1959, approximately 2,000 of these people received the highest caliber of training through their participation in research projects under the supervision of many of this country's most competent scientists.

Combining this number with the approximately 4,000 awards offered through the Foundation's formal fellowship programs gives a total of 6,000 who have been provided with the opportunity to further their scientific education and laboratory training under the most favorable and productive conditions.

## **Fiscal Analysis of Research Programs**

During the 1959 fiscal year, 1,809 grants were made in support of basic research to 333 institutions in all 50 States, the District of Columbia, Puerto Rico, Argentina, Bermuda, Canada, France, Israel, and Turkey. Expenditures for research in the sciences totaled \$64.5 million—\$49 million for research grants and \$15.5 million for facilities.

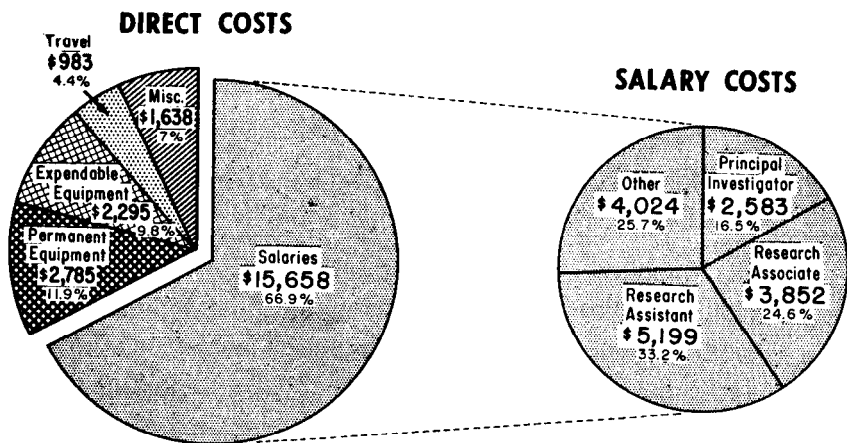
The average 1959 research grant amounts to \$27,153 for a period of 2.26 years, or \$12,015 a year. (See fig. 1.) While the duration of the average grant has increased only slightly in the past year, the amount has increased by 40 percent. This is a reflection of the ability to provide more nearly adequate support for requests for research funds.

Facilities grants were discussed in detail previously in the sections dealing with the programs of research divisions and offices.

Table 1 summarizes the research grant program by subject categories. A detailed list of grants showing institutions, principal grantee, title of project, and amount is given in appendix C.

**Table 1.—National Science Foundation grants, by fields of science, 1958–59**

Field	Fiscal year, 1958		Fiscal year, 1959	
	Number	Amount	Number	Amount
<b>Biological and medical sciences:</b>				
Developmental . . . . .	48	604, 300	87	1, 591, 700
Environmental . . . . .	78	953, 600	119	2, 333, 700
Genetic . . . . .	57	711, 150	78	1, 780, 650
Metabolic . . . . .	74	1, 482, 350	116	3, 141, 600
Molecular . . . . .	78	1, 609, 100	148	4, 059, 400
Psychobiology . . . . .	62	968, 800	77	1, 518, 800
Regulatory . . . . .	70	1, 075, 280	103	2, 575, 245
Systematic . . . . .	103	1, 036, 350	182	2, 568, 600
General . . . . .	35	440, 100	57	891, 910
	605	8, 881, 130	967	20, 461, 605
<b>Mathematical, physical, and engineering sciences:</b>				
Astronomy . . . . .	33	1, 017, 830	51	1, 955, 175
Atmospheric sciences . . . . .			46	2, 920, 769
Chemistry . . . . .	134	2, 323, 900	199	4, 406, 445
Earth sciences . . . . .	70	1, 246, 395	85	2, 063, 860
Engineering sciences . . . . .	88	1, 538, 400	129	4, 311, 900
Mathematical sciences . . . . .	72	1, 242, 100	94	2, 556, 175
Physics . . . . .	69	2, 139, 200	142	5, 509, 100
	466	9, 507, 825	746	23, 723, 424
<b>Social sciences:</b>				
Anthropological . . . . .	22	384, 100	23	353, 700
Sociological . . . . .	14	182, 100	14	279, 000
Economic . . . . .	5	93, 300	5	137, 900
History and philosophy of science . . . . .	8	66, 450	11	118, 700
	49	725, 950	53	889, 300
<b>Antarctic research (life and physical sciences) . . . . .</b>	13	922, 800	43	4, 057, 200
<b>Total . . . . .</b>	<b>1, 133</b>	<b>20, 037, 705</b>	<b>1, 809</b>	<b>49, 121, 529</b>



Indirect Costs = 13.8% of  
 Total Direct Costs = \$ 3,747

Figure 1.—Distribution of research grant funds, by type of expenditure, based on average grant for fiscal year 1959 of \$27,153.

## **TRAINING AND EDUCATION IN THE SCIENCES**

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The availability of increased funds in fiscal year 1959, \$62.5 compared to \$20.5 millions in 1958, made possible a more vigorous and varied attack on the problems of science education by the Division of Scientific Personnel and Education. Old programs were expanded and new programs were established.

As in the past, the program activities of the Division were directed toward the attainment of excellence in science education and were focused on specific problems within the following general areas:

- (1) Motivation and support of high-caliber students and advanced scholars in science, mathematics, and engineering.
- (2) Supplemental training in subject matter for teachers of science, mathematics, and engineering at all levels in the educational system.
- (3) Development of new and more realistic course-content materials and teaching and learning aids.
- (4) Improvement of information about the training, utilization, and need for scientific and technological manpower.

The Foundation's general approach to problems of science education is based fundamentally on the principle that the improvement of education in the sciences must come from within the scientific and educational communities themselves. Such improvement requires close cooperation between those whose work is primarily research and those who teach.

For the most part, support has gone directly to educational institutions, professional societies, and other organizations of scientists and science teachers for the implementation of activities which they themselves have developed and which our advisers have agreed show promise of success. These advisers—scientists and science teachers—come from the high schools, the colleges and universities, industry, and governmental agencies.



## **Motivation and Support of High-Caliber Students and Advanced Scholars**

Since the most important element in science education is the learner, primary attention must be given to him. His interests must be developed and his motivations strengthened. If he is to become an advanced scholar, it must be possible for him to remain in school. A major share of NSF funds has gone to the support of programs in this area. Programs reach students at every level in the educational structure, from the junior high school (science clubs and student science projects) through the highest levels of graduate training (senior post-doctoral fellowships).

One of the most interesting—potentially one of the most promising—of the new programs this year was the Summer Science Training Program for Secondary School Students. Through the support provided, about 6,000 highly selected high school students were able to spend time on the campuses of colleges and universities and at research activities of other kinds and to participate in scientific activities in a variety of ways.

A number of other programs are directed toward the motivation and training of precollege students who are interested in science and mathematics. Many of the projects to be conducted under the new State Academies of Science Program will reach these youth. A considerable amount of support will be provided by the State academies for activities in the junior academies of science and for enrichment of the science club and science fair programs.

Additional support was given to each of the "old" programs which have been directed primarily toward secondary school students: Visiting Scientists, Traveling Science Libraries, Traveling Science Demonstration Lectures, Science Clubs and Student Science Projects, and Career Information.

The first substantial effort to improve the training of undergraduate students of science, mathematics, and engineering was launched during the past year under the program title "Undergraduate Research Participation." Essentially, the program makes possible participation by undergraduate students in actual research being conducted in colleges, universities, and other nonprofit research institutions. Under the 213 grants which were made, approximately 2,200 students were able to participate in scientific activity of a relatively high order. Not only should this program help to motivate many of the more able undergraduate students to continue into graduate work, but it should contribute much to their actual training in the methods and techniques of science.

Two new programs were initiated for the support of graduate students and advanced scholars—the Cooperative Graduate Fellowship Program and Summer Fellowships for Graduate Teaching Assistants. The Cooperative Graduate Fellowship Program is similar in many respects to the established program of Graduate Fellowships. The essential differences are that the cooperating institutions participate in the evaluation of applicants and that they receive specific amounts to apply toward the cost of education of the fellows. The program of Summer Fellowships for Graduate Teaching Assistants is an innovation aimed at making it possible for the graduate teaching assistant to pursue his own studies and research during the summers, and thus hasten the completion of his graduate work. The need for the program is reflected in the fact that more than 1,200 teaching assistants in 105 institutions applied for these fellowships in the first year of operation.

### **Supplemental Training for Teachers**

While many factors combine in the “effective” science teacher, the fundamental one is knowledge of his field. For a number of years, an increasing amount of support has been provided for programs which supplement the subject-matter knowledge of teachers—particularly at the secondary school level. This support, in the past, has been concentrated largely in the now well-known summer institutes. Growing programs of Academic Year and In-Service Institutes have extended the opportunities of secondary school teachers to obtain supplemental subject-matter training. That the same problem exists at the college and university levels has been recognized and is being dealt with through Summer Institutes and Summer Conferences for College Teachers and Science Faculty Fellowships.

A number of new programs in the area of supplemental teacher training inaugurated in 1959 have been designed to bolster weak spots in the area of teacher qualifications; these programs now span the entire spectrum from the elementary and junior high schools through the graduate levels.

Secondary school teachers of science and mathematics differ widely in the extent and quality of their subject-matter training. Many are trying to provide adequate instruction to their students when they themselves have had little or no formal training in the subjects which they are teaching. Others are bona fide graduate students who need the opportunity to progress in their fields of specialization. In the past, efforts have been made to reach both groups—and those between the extremes—through the institutes programs. Many summer institutes

have been designed to reach teachers at particular levels within this range.

These institutes have not been adequate, however, to serve the needs of the best qualified of the secondary school teachers of science and mathematics—those whose primary need is to pursue graduate study toward advanced degrees in their fields of specialization. For this reason, the new program of Summer Fellowships for Secondary School Teachers was designed and introduced during fiscal year 1959. The mechanism of this program is very similar to that used in the Graduate Fellowship programs, and in the summer of 1959 the first awardees—selected by the Foundation through a national competition and studying in their individually designed programs of study at the institutions of their choice—began receiving stipends for durations of one to three summers.

The Research Participation for Teacher Training Program provided another method of improving the professional competence of the best qualified science and mathematics teachers in secondary schools and colleges. This program made it possible for teachers with an adequate subject-matter background to participate in ongoing research programs at institutions with established research traditions. This experience provided the participating teacher an insight into science not gained by course work.

Three important new activities designed for groups of science teachers not previously included or to meet other special needs were launched within the institutes framework. These programs were directed toward groups of teachers of science, mathematics, and engineering whose needs had not been met through other programs.

Growing recognition of the importance of science education as a part of the general education program at the elementary school level led to the first tentative and experimental approach by the Foundation in this area—to help determine the responsibilities of the Foundation and ways in which it might best meet these responsibilities. A small program of 12 Summer Institutes for Elementary School Teachers and Supervisors was supported.

There was a special need for programs designed for science and mathematics instructors in technical institutes, who teach generally at the college level and whose academic backgrounds are widely varied. For this reason, two exploratory special Summer Institutes for Technical Institute Personnel were supported.

For a number of reasons, it appeared that the Summer Institutes for College Teachers were not completely filling the need for summer sup-

plemental training. Two of the most important factors to be considered were that the institutes were too long in duration for many teachers and that many teachers had need for more specialized training than the institutes could offer. Accordingly, the new program of Summer Conferences for College Teachers was introduced on an experimental basis in 1959. Approximately 20 summer conferences—all of less than 4 weeks in duration, and covering a variety of specialized subject matter areas—were supported. About 530 college and university teachers attended.

The programs for the supplemental training described above are more or less formalized and “programmatically” in nature. A concentrated effort is being made to discover ways to meet still other needs in the training of teachers at all levels. A number of projects of this nature were supported in 1959, ranging from highly specialized field institutes to short conferences on college teaching and workshops for teachers at the lower academic levels.

### **Course-Content Materials and Teaching Aids**

It is necessary, of course, that we have well-motivated students and scholars working under the direction of well-qualified teachers if we are to meet our national need both for scientific literacy in the whole population and for adequate numbers of highly competent scientists and science teachers at all levels. But this is not sufficient; another factor which cannot be overlooked is the provision of improved instructional materials—the tools which enable the teacher to best do his job.

The ever-increasing acceleration in the acquisition of scientific and technological knowledge, together with its manifold impact on every area of human thought and activity, has produced a serious lag between advances in science and technology and their presentation in the classroom.

The complexity and implications of this problem led to an initially experimental approach by the Foundation through grants both for relatively small, exploratory projects in several fields and for a pioneering major effort to bring scholarship of the highest order to the development of a new physics course for the high schools. The success of these ventures, particularly of the Physical Sciences Study Committee in devising the new physics course, led to support for comparable projects in other disciplines and for a variety of efforts to improve course content and develop new supplementary teaching aids.

### **Improvement of Scientific Manpower Information**

Basic to the understanding of the problems of science education and to the development of programs to meet these problems is manpower information. We must know, in a substantive way, not only our present and future needs for scientists, technologists, and teachers at all levels

and in all fields, but we must be able to assess the status of training and education with respect to meeting these needs. For this reason, the activities of the Scientific Manpower Program have been expanded in ways designed to provide better and more current information of many kinds.

### **Other Activities**

Because our international relationships are vital and science education cannot be contained within national boundaries, an effort was made during fiscal year 1959 to explore ways in which we could profit by the experience of our international neighbors in coping with our own problems. These exploratory activities touched upon each of the major problem areas in which we have program interests—students and advanced scholars, the training of teachers at the secondary-school and college levels, course content and teaching aids, and the collection and dissemination of scientific manpower information.

### **Fellowship Programs**

Traditionally, fellowships are considered by the academic community as a form of grant to selected individuals to enable those individuals to further their own education. Fellowships are clearly distinct in concept from grants designed to underwrite a specific project—research or development—and do not normally require that the recipient render any services to the donor.

The National Science Foundation fellowship programs provide support for scientific study or work in mathematics, the sciences, and engineering. Fellows are selected in national competition solely on the basis of ability. They have freedom of choice in selecting the educational institutions which they desire to attend.

Seven fellowship programs were in operation during fiscal year 1959—Graduate (Predoctoral), Postdoctoral (Regular), Senior Postdoctoral, Science Faculty, Cooperative Graduate, Summer Fellowships for Graduate Teaching Assistants, and Summer Fellowships for Secondary School Teachers.

A total of 3,937 fellowships were awarded in 1959; their value was approximately \$13.1 million. (Appendix F shows the distribution of fellowship awards by type, field, and State.)

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

The *Graduate Fellowships* program offers support to unusually able students working for master's or more advanced degrees to enable them to complete their studies as quickly as possible. In 1959, a total of 1,100 awardees were selected from 4,506 applicants; program support

amounted to approximately \$3.2 million. Honorable mention was accorded 1,979 applicants.

Stipends for these 1959 awards were set at \$1,800, \$2,000, and \$2,200 per year depending on the level of the fellowship—first year, intermediate, or terminal. In addition to stipends, financial support is provided for tuition, dependents, and other allowances.

### **Postdoctoral Fellowships**

*Postdoctoral Fellowships* are intended especially for those individuals who have received a doctor's degree within the past 5 years. The program's objective is to improve the capabilities and stature of such persons as investigators in their chosen fields of research.

In fiscal year 1959, there were 778 applications and a total of 194 awards for tenure ranging from 6 to 24 months, depending on the program planned by the individual. The cost of the program for those accepting awards was approximately \$1.1 million.

Postdoctoral fellows are provided with stipends at the rate of \$4,500 per year (\$5,000 per year for portions of tenure beyond 12 months), plus allowances for dependents, travel, and special expenses.

### **Senior Postdoctoral Fellowships**

The *Senior Postdoctoral Fellowships* program is designed to enable recognized senior scientists, engineers, and mathematicians to be relieved of their normal professional responsibilities so that they may pursue a full-time program of study designed to broaden their knowledge and to improve their capabilities as investigators.

During 1959, 241 scientists applied for these fellowships; 83 individuals were offered awards. The estimated cost was \$767,000.

Tenures are from 3 to 24 months, with stipends of the salary-matching type not exceeding \$12,000 per year. Allowances for travel and special expenses are available.

### **Science Faculty Fellowships**

The aim of the *Science Faculty Fellowships* program is the direct improvement of science education by providing college and university faculty members with the opportunity to improve and update their knowledge of the fields in which they have specialized (or of closely related fields), and hence their competency as college teachers. This program permits faculty members to be relieved of teaching responsibilities in order to pursue a full-time study program.

Of the 1,069 individuals who applied, awards were offered to 302. The cost of this program during 1959 was about \$2.3 million.

Science Faculty Fellows may elect tenures ranging from 3 to 15 months and receive stipends on a salary-matching basis (not to exceed \$12,000 per year) as of the time of application. In addition, they are provided with allowances for travel, special expenses, and tuition, if required.

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

New in fiscal year 1959, the program of *Summer Fellowships for Secondary School Teachers of Science and Mathematics* permits secondary school teachers of high ability to undertake individually planned programs of summer study to improve their subject matter competence, and thus enhance their effectiveness as teachers.

Tenures from one summer of 6 weeks to three full summers are available. Stipends total \$75 for each week of tenure. In addition, the Foundation awards cover the cost of tuition, plus limited travel and dependency allowances. The selection of 628 awardees was made from 1,578 applicants during 1959, the first year of the program, at a cost of approximately \$1.5 million.

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

A second new program introduced in 1959, the *Summer Fellowships for Graduate Teaching Assistants*, enables graduate teaching assistants of participating institutions to devote full time, during the summer, to their own study and research.

A total of 1,260 teaching assistants submitted applications for fellowships for the summer of 1959 and 580 were offered awards. Program support amounted to about \$500,000 for those accepting awards.

A summer fellow may select a tenure ranging from 8 to 12 weeks, at a weekly stipend of between \$50 and \$75 (determined by the institution). Tuition and required fees are paid by the Foundation.

### **Cooperative Graduate Fellowships**

The *Cooperative Graduate Fellowships* program established during the past year has, like the older program of Graduate Fellowships, the function of offering support for predoctoral studies. It differs, however, in that the institutions themselves play a larger part in the evaluation of applicants and in the administration of the program. A greater distribution of fellows among the Nation's schools of graduate study has been achieved through this program.

A Cooperative Graduate Fellow receives a stipend of \$2,200 for a 12-month tenure. The amount may be augmented by the institution at a rate not exceeding \$800 per year. In lieu of tuition and fees, a cost-

of-education allowance of \$1,800 is provided to the institution for each fellow. Fellows may undertake limited teaching duties as a justifiable part of their academic training.

A total of 2,872 individuals applied through 111 colleges and universities in 1959. The Foundation offered awards to 1,050 individuals, representing 105 institutions. The cost of the program was about \$3.7 million.

### **NATO Science Fellowships**

The North Atlantic Council of the North Atlantic Treaty Organization established the *NATO Science Fellowships* program in the fall of 1958. The program is designed to stimulate the exchange of scientists among the NATO countries by the fellowships mechanism; each member nation is charged with selecting fellows from among its own population. The Foundation, at the request of the Department of State, administered the program under the title "NATO Postdoctoral Fellowships in Science" for the United States.

Of the 91 Americans who applied, 20 were selected and will study in various NATO countries and Sweden.

### **Institutes Programs**

The primary objective of the institutes programs is to improve science instruction through making it possible for teachers in secondary schools and colleges to obtain additional knowledge of subject matter and to become acquainted with new developments in science and mathematics. The institutes are characterized as "group" activities—as contrasted with the individual activities of fellows—and employ course materials specially prepared to meet the subject matter needs of the teachers.

Four major institute programs are supported by the Foundation: (1) Summer Institutes for High School Teachers of Science and Mathematics, (2) Summer Conferences for College Teachers, (3) Academic Year Institutes for High School and College Teachers, and (4) In-Service Institutes for High School Teachers. Limited experimental programs also being supported include Summer Institutes for Elementary School Teachers and Supervisors, Summer Institutes for Faculty of Technical Institutes and Technical Curricula in Junior Colleges, and In-Service Institutes for Elementary Science Teachers.

Fiscal year 1959 costs totaled \$33.6 million for 348 summer institutes for high school and college teachers, 12 summer institutes for elementary school teachers and supervisors, 32 academic year institutes, 182 in-service institutes, 20 summer conferences, 12 elementary summer institutes, 11 elementary inservice institutes, and 2 summer programs for



technical institute personnel. The 1959 program was about two and a half times as large as that of 1958.

Proposals for institutes originate with the colleges and universities and the institutes are conducted by them. The Foundation does not participate in the selection of participants or the operation of the institutes.

### Summer Institutes

From a program that started out in 1953 with approximately 100 participants, 42 of whom received NSF stipends, the summer institutes program had grown by 1959 to one with 21,000 participants, 20,000 of whom received NSF stipends.

The content offered by these institutes has grown also. From a modest beginning of two different programs, the offerings have become more varied until institutes in the summer of 1959 represented 12 different fields in science and mathematics. There are NSF summer programs in each of the 50 States and Puerto Rico.

Two additional summer training activities were established in fiscal year 1959—Summer Conferences for College Teachers and Summer Programs for Technical Institute Personnel. An experimental program to provide summer institute experience for elementary-school supervisors and teachers in the area of science and mathematics also was initiated in the summer of 1959.

1. *Summer Institutes for Secondary School and College Teachers.*—The summer institutes for high school and college teachers have increased from 2 in 1953 to 348 during the summer of 1959. They are designed to improve the competence of the participating teachers by providing courses that are specially aimed at overcoming deficiencies in their knowledge of the subject matter of science and mathematics. Most of the participants have completed their formal coursework a number of years ago, and others must teach courses in science and mathematics for which they have not had adequate academic preparation.

The institutes vary in length from 4 to 12 weeks. The average in 1959 was 7 weeks. The number of participants in each institute in 1959 varied from 10 to 150.

Of the 348 summer institutes in 1959, 30 were for college teachers only; 19 were for both secondary school and college teachers; and the remaining 299 were for secondary school teachers only.

Adequate balance in geographic distribution was maintained; for example, 57 percent of the institutes were held east of the Mississippi and 43 percent were held west of the Mississippi. There were 51 summer institutes in New England and New York, 86 in the other Eastern States and the District of Columbia, 53 in the Southeastern States, 52 in

the Midwest, 61 in the Southwest and Hawaii, 41 in the Rocky Mountain and Northwest region (including Alaska), and 4 in the Commonwealth of Puerto Rico.

The National Science Foundation grants provided funds for participant support. The maximum amount awarded a participant was set by the Foundation at \$75 per week for stipend, plus allowance for dependents and travel. While most institutes followed this schedule and granted the maximum allowable amounts to each awardee, a few distributed their available funds in smaller amounts to more participants. Many of the institutes accepted a few registrants beyond those who received stipends.

The National Science Foundation in addition awarded each host institution sufficient funds to pay necessary tuition and fees for the stipend holders. The Foundation grant also covered direct costs occasioned by the institute to the extent that they exceeded the amount already allowed for tuition and fees.

One of the essential features of this program is that the institutes are managed so that the participants are treated as a special group and their identity maintained. They are usually housed together, and often spend scheduled out-of-class time together in company with their instructors.

2. *Summer Institutes for Elementary School Teachers and Supervisors.*—This program was developed on an experimental basis in 1959. These experimental institutes are specifically designed to give key teachers and supervisory personnel in elementary schools an opportunity to increase their knowledge of the sciences and mathematics, in order that science and mathematics can be taught more effectively to students in the elementary schools.

This experimental program of 12 institutes provided training for 515 teachers and elementary school science supervisors.

3. *Summer Programs for Technical Institute Personnel.*—Also experimental in nature, these programs are specifically designed to meet the subject matter needs, primarily in science and mathematics, of the teacher in technical institutions not conferring the baccalaureate degree. The first two programs in this category were supported in fiscal year 1959.

4. *Summer Conferences for College Teachers.*—Summer conferences were supported for the first time as a formal program activity in 1959. The conferences are specifically designed to consider specialized subject matter areas of science and mathematics. Through the use of short courses or series of lectures of less than 4 weeks' duration, these conferences facilitate an exchange of ideas among the participants and

provide them an opportunity to learn of recent subject material advances.

There were 546 college teachers of science and mathematics supported in this program of 20 conferences during 1959.

### **Academic Year Institutes**

Academic year institutes are full-time, year-long programs of study in science and mathematics designed especially for secondary school teachers in these fields. Financial support for the teacher and for the host institution is provided by a grant from the Foundation. The courses of study are planned by the colleges and universities which sponsor them; each institution supplies the facilities and administers its own program.

For the 1959-60 Academic Year Institute program, 32 colleges and universities received awards. The 32 institutes represent 32 different institutions in 29 States. Seven of these institutes are in the field of mathematics only, while the other 25 give training in the principal sciences, as well as in mathematics. Twenty-two of the institutes will continue through the summer of 1960; 10 are for the academic year only. Supplementary experimental grants were made to three institutes for support of eight college teachers—"teachers of science"—in each institute. It is estimated that the 1959-60 program will give support to over 1,500 teachers from all 50 States.

During this year, supplementary grants were also made to 19 of the 1958-59 institutes to enable them to extend their programs through the summer of 1959 for about 450 teachers.

Foundation grants to sponsoring institutions provide a maximum stipend of \$3,000 per academic year, plus additional allowances for dependents, travel, and books. Institutions receive support for the operational costs, so that teachers do not have to pay tuition or fees.

### **In-Service Institutes**

In-service institutes provide support in the form of grants to institutions of higher learning for programs offering opportunities to teachers from secondary schools for further study in the subject matter of the sciences and mathematics during out-of-school hours in the academic year.

Participating teachers receive no stipends but are given a travel allowance at the maximum rate of 7 cents per mile for each trip from home to institute and return. The sponsoring institutions receive support for direct costs of operation. In 1959, 182 grants for in-service institutes were made to 162 different institutions in 40 States, the District of Columbia, and Puerto Rico.

It is estimated that about 9,000 secondary school teachers will have an opportunity for further study under this program during the 1959-60 school year.

A very limited program of in-service institutes for elementary school teachers and supervisors of mathematics and science will be supported on an experimental basis during the 1959-60 school year. Eleven grants were made to 11 different institutions in 10 States and Puerto Rico. About 350 elementary school teachers and supervisors will have an opportunity for further study under this program.

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

The Special Projects in Science Education Programs are concerned principally with the experimental testing and development of promising new ideas for the improvement of science instruction and with new and more effective methods for increasing interest in and understanding of science. From experiments carried out in this manner have evolved such operational programs as the institutes program and the course content improvement program.

A total of \$8.9 million was obligated in fiscal year 1959 to carry out these special projects, which fall into three general categories: secondary school programs, college programs and teacher improvement programs, and international science education programs.

#### **Secondary School Programs**

These projects are planned by universities, colleges, scientific societies, research organizations, and other groups to enlist interest in and promote understanding of science, mathematics, and engineering by students in the secondary schools.

1. *Visiting Scientists (Secondary Schools)*.—Under this project, grants are made to professional societies for the administration of programs of visiting scientists to secondary schools to acquaint students and faculty with the sciences as vital activities and to provide counsel concerning careers and education.

Participating scientists receive travel expenses, and may receive a modest honorarium not exceeding \$50 per day of school visitation.

Grants for 1959 were made to the American Chemical Society, American Institute of Biological Sciences, American Institute of Physics, and the Mathematical Association of America.

2. *Traveling High School Science Library Program*.—The primary objective of this program is to stimulate the interests of high school students in science and mathematics through making available to schools, on a loan basis, a carefully selected library of general-interest books covering a broad spectrum of science fields. Since 1955 this program has

been conducted, with support from the Foundation, by the American Association for the Advancement of Science. During 1958-59, 375 sets of 200 books each were circulated to 1,309 high schools and preparatory schools, including 26 Armed Forces dependents' schools in foreign countries.

Eight sets were loaned to State and county library systems for demonstration and bookmobile circulation; 153 sets were loaned to NSF-sponsored institutes and to summer programs for academically talented high school students for use during the summer of 1959.

An auxiliary service of this program has been the publication from time to time by AAAS of various kinds of booklists: (1) *The Traveling High School Science Library*, an annotated bibliography of the 200 titles currently in use in this library; (2) *An Inexpensive Science Library*, a list of paperbound science and mathematics books; and (3) *The AAAS Science Book List*, containing over 1,000 annotated titles.

3. *Traveling Science Demonstration Lecture Program*.—Support is provided by NSF for the training and subsequent expenses of selected teachers in demonstrating scientific principles in the classroom. These teachers travel over designated areas of the country, visiting secondary schools upon request.

Participating teachers receive salaries equal to their normal monthly salary for a 12-month period. In addition, all travel expenses are paid. The institutions which provide summer training are completely reimbursed for this expense and also perform the administrative arrangements for the academic-year visits.

Support for this program for fiscal years 1956 through 1958 has been granted to the Oak Ridge Institute of Nuclear Studies; this activity was expanded in 1959 to several other centers. Five grants were made to four institutions: ORINS (two grants), Michigan State University, Oklahoma State University, and the University of Oregon.

In general, the program provides for 3 months of summer training for 20 teachers at each of the centers, and full support for these teachers during the academic year. However, ORINS has trained an additional 20 teachers who were recommended by State education departments or local schools systems. These teachers are supported during the summer by the National Science Foundation grant, and during the rest of the year by their own school systems. ORINS, in addition, is running 2 institutes during the academic year, spring and fall, for 20 teachers each, with the same curriculum as the summer course.

During the 1958-59 academic year, teachers trained at Oak Ridge made visits to 194 areas and made contacts with 409 high schools, 3,000 teachers, and more than 100,000 students.

Visits by traveling lecturers have resulted in many significant changes in the teaching of science, according to a large number of letters received from schools visited. These letters recount in detail the improvements which the schools have been able to make in science demonstrations, laboratory equipment, assignments for students, and project work after contact with one of the demonstration-lecturers.

4. *Science Clubs and Student Projects.*—The primary objective of this program is to stimulate an interest in science and in scientific and engineering careers, particularly among precollege-age students by providing grants for the support of extracurricular science projects under the guidance of national youth organizations.

Since 1952, the National Science Foundation has provided partial support to Science Service, a nonprofit organization which administers the program of Science Clubs of America. Science projects carried out by the members of these clubs are displayed at science fairs, culminating in the annual National Science Fair.

A grant was also awarded to 4-H Clubs of America to defray the costs of a joint conference of 4-H Club leaders, college scientists, and U.S. Department of Agriculture scientists to explore methods of expanding interest and understanding of science through 4-H Club activities.

5. *Summer Training for Secondary School Students.*—This series of projects provides grants to colleges, universities, and other nonprofit research institutions to enable them to offer opportunities to unusually able secondary school students to study and work during the summer with experienced scientists and mathematicians at the sponsoring institutions.

Two general types of training programs were presented. Most common were institute-type training courses, varying in duration from 2 to 11 weeks, and featuring classroom work, laboratory exercises, and field trips centered around a specified area of science. In some cases, however, the training was based upon student participation in actual research projects of appropriate scope under the guidance of scientists.

A total of 116 grants were made to 109 different institutions in 36 States, the District of Columbia, and Puerto Rico. About 6,000 students participated in this program during the summer of 1959.

6. *State Academies of Science.*—State Academies of Science and similar organizations receive support through this program for projects to strengthen interest in science, especially among young people. Academies of Science are uniquely qualified for implementing many such types of projects because of their active involvement with Junior Acad-

emics of Science and science fairs, and because of the broad diversification of professional talent represented in their memberships.

In 1959, 30 grants were made to 23 different academies in 22 States and the District of Columbia.

7. *Science Career Information*.—Preparation and distribution of career guidance materials by scientific organizations—material designed to give authoritative information to students considering professional careers in various fields of science—are supported by this program.

During fiscal year 1959, grants of this nature were made to the American Institute of Physics, the American Geological Institute, the American Physiological Society, and the Florida State University.

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

These programs are planned by universities, colleges, scientific societies, research organizations, and other groups to stimulate student interest in and understanding of science, mathematics, and engineering and to increase the knowledge and broaden the professional outlook of science teachers.

1. *Visiting Scientists (Colleges)*.—The Foundation provides support to national professional societies for visits by distinguished scientific lecturers to colleges and universities throughout the country. Visiting scientists lecture, conduct seminars, and meet with students, faculty, and administrative officers for the purpose of stimulating interest in science and providing counsel concerning scientific education and careers in science.

2. *Undergraduate Research Participation Program*.—This is a newly developed program which provides support in the form of grants to colleges, universities, and other nonprofit research institutions to foster undergraduate participation in research. The purposes of the program are to interest undergraduates in research by actually sharing in an ongoing program, and to provide training in the techniques of research. Participating undergraduates in some cases receive stipends to enable them to spend time on research training, and the sponsoring institutions receive support for a share of operating expenses.

A total of 213 grants were made under this program in 1959, with 2,205 undergraduates participating during the summer of 1959.

3. *Research Participation for Teacher Training*.—This program provides support to colleges, universities, and other nonprofit research institutions for programs offering opportunities to teachers from secondary schools and small colleges to participate in scientific research during the summer months.

Participating teachers receive stipends comparable to those in summer institutes, and the sponsoring institutions receive support for a share of operating expenses.

Fifty-six grants were made to 54 institutions in 29 States and the District of Columbia; these projects provided research training for approximately 400 high school teachers and 145 college teachers during the summer of 1959.

4. *Supplementary Training for Science Teachers.*—Support in the form of grants is given colleges, universities, scientific societies, and non-profit scientific institutions for various activities aimed at improving the quality of science and mathematics teaching at all educational levels. Examples are short conferences on the improvement of science teaching; longer conferences involving specialized instruction in science; and other special summer training programs for science teachers.

Altogether, 37 grants were made to 25 institutions and 9 societies for conferences and other teacher training activities located in 24 States; approximately 3,000 teachers participated in these activities.

5. *Special Field Institutes.*—During 1959, eight special field institute grants were made in support of outstanding special programs providing advanced training in highly specialized subjects for college faculty members, research workers, and advanced graduate students.

The principal objective of this program is to provide support for instructional and operating expenses so that educational institutions can offer important special programs for the advancement of scientific knowledge.

Six of these institutes provided intensive summer instruction and seminars lasting from 2 to 12 weeks; the other program involved part-time participation during the academic year. It is estimated that 127 college professors and 80 graduate students will participate in these programs, together with over 50 research scientists.

Specialized subjects in which instructional and research programs were offered include: dynamical astronomy, geophysical fluid dynamics, marine science, archeology, phytoneumatology, physiological optics, theoretical physics, and computer programming for research scientists and engineers.

#### **International Science Education Programs**

The activities in International Science Education, begun in fiscal year 1959, have developed under three general program groupings: Curricula development programs, teacher-training programs, and science student programs. Limited support was provided in 1959 for a variety of special pilot projects which may lead to fruitful operational programs.



1. *Curricula Development Program.*—In an effort to improve the science curricula available in this country, studies of science subject matter taught in foreign educational systems are being supported. Such studies are conducted by appropriate professional groups in cooperation with foreign scientists and educators. Major attention is being given to preuniversity and undergraduate curricula. Assistance is also available to interested and qualified American groups to undertake survey projects under the sponsorship of international regional organizations and also under the exchange program currently underway with the U.S.S.R. under the Lacy-Zaroubin agreement.

2. *Teacher-Training Program.*—Projects supported under this heading are aimed at improving the quality of our Nation's teacher-training programs through cooperative projects with other countries and by making use of the experience and wisdom accumulated by other educational systems. Grants can be made to international teacher-training institutes where the close personal contact that would be brought about between American secondary and college teachers with their counterparts in other nations can lead to greatly enhanced backgrounds and an invaluable appreciation of mutual problems. The Foundation assures appropriate American participation at such institutes by providing travel and living expenses for scientists and science teachers selected from our Nation's schools and colleges. Visiting foreign staff projects are also supported whereby distinguished foreign scholars contribute to Foundation-sponsored summer and academic year institutes programs.

3. *Science Student Program.*—Foundation support is offered through these projects for a number of special science education activities aimed at enabling science students and scientists to engage in international educational programs with the primary objective of making it possible for these individuals to keep abreast of the current state of knowledge and scientific advancement throughout the world. For example, assistance is given to the professional societies and institutions of higher learning to administer a program of visiting foreign scientists whereby eminent foreign scientists are invited to spend periods of a few days to a few weeks in science departments of our colleges and universities with the objective of augmenting the quality of the research and educational activities of these institutions. Increasing attention is being given to the development and support of international field institutes whereby scholars and students from many nations can gather together for a few days or weeks to exchange ideas and developments in a special field of scientific interest.

## Course Content Improvement Program

The purpose of the NSF Course Content Improvement Program is to encourage and assist first-rank research scientists and teachers in attempts to incorporate modern scientific knowledge and theory into school curricula. As a result of experience and promising results obtained in previous years, 1959 funds for these programs were substantially increased to \$6.1 million. This permitted expansion into a wide range of disciplines and inauguration of additional major efforts.

### Course Content Studies and Development

Activities under this heading provide support for first-rate mathematicians, scientists, engineers, teachers at appropriate levels, and associated experts in education and the communications arts to develop subject matter content and model instructional materials for courses in mathematics and science in elementary and secondary schools and for courses in mathematics, the sciences, and engineering in colleges and universities. Projects ranging from small-scale experiments to comprehensive programs are national in scope and significance.

1. *Science and Mathematics in Elementary Schools.*—Throughout the country, elementary schools may soon teach science in every grade, along with mathematics. The problem is to identify significant content; to determine at what levels particular concepts can be grasped (taking variations in student backgrounds and abilities into account); and to develop written materials, apparatus, and other aids for pupils and teachers. Teachers' manuals and similar materials are particularly important, for many elementary school teachers have had little preparation in science. In this field, projects are still exploratory and experimental. Among them are work by mathematicians and teachers at Stanford University on adding geometry and other topics in grades 1–6, investigation by a group at the University of California at Berkeley on science for these grades, and development of teaching materials in geology under the sponsorship of the American Geological Institute and the University of Minnesota.

2. *Mathematics.*—The school Mathematics Study Group was organized in mid-1958 to carry out an extensive program to improve mathematics teaching in elementary and secondary schools. Many eminent mathematicians and accomplished teachers are engaged in this project, which is sponsored by Yale University and directed by Prof. E. G. Begle. One goal is to provide a sound basis for a solid college course in calculus and analytical geometry by the end of the 12th grade. Sample texts and teacher guides for grades 7 and 9–12 will be tried experimentally during 1959–60. Special manuals are being written for in-service teachers and

soft-cover books on special topics will be prepared for students. A related University of Minnesota project will test the use of the new courses in correspondence study by talented students in small schools lacking advanced work in mathematics.

3. *Physics*.—High school physics is the subject of the pioneering comprehensive study. By September 1960, revised instructional materials will be available through commercial channels for all schools wishing to adopt the course. The result of 4 years of effort by several score of the Nation's top physicists, as well as several hundred teachers who participated in developing the material and testing preliminary versions, the course focuses upon the great ideas of physics and provides insights into the way these ideas have developed. A textbook, laboratory guide, a special kit of apparatus, films presenting major experiments not readily conducted in the classroom, examinations, a teachers' guide, and supplementary books on special topics have been fashioned into a carefully articulated learning experience. This course represents a new approach to high school physics and, for the first time in many years, brings the indispensable range and depth of knowledge of a number of eminent scientists into the development of a secondary school curriculum. The Physical Science Study Committee, of which Prof. J. R. Zacharias is chairman, under the sponsorship of the Massachusetts Institute of Technology and Educational Services, Inc., has made educational history with the aid of grants from NSF and from other groups.

4. *Chemistry*.—Several approaches may prove desirable in high school chemistry. Conferences in 1957 and 1958 led to a summer writing conference at Reed College in 1959, where research leaders and college and secondary school teachers prepared a preliminary textbook and demonstration and laboratory experiments for a course using chemical bonds as the central theme. Meanwhile an interim committee of distinguished chemists, sponsored by Ohio State University, is preparing plans for a chemistry project comparable to that in physics.

5. *Life Sciences*.—In the life sciences a large group of eminent biologists and teachers have initiated the Biological Sciences Curriculum Study (BSCS) under the chairmanship of Dr. H. Bentley Glass of Johns Hopkins University and the sponsorship of the American Institute of Biological Sciences. It is the intention of the BSCS, first, to develop a new high school course in biology, and later to contribute to the improvement of biological instruction at other levels.

Support has also been granted to the National Academy of Sciences for completing the revision of a sourcebook of laboratory and field studies for high school biology, the preliminary edition of which has received widespread commendation.

6. *College Studies.*—The Foundation is supporting a variety of course content and curriculum studies for colleges and universities, including development of teaching resources in anthropology, review of curricula in psychology, sourcebooks of experiments for general physiology and general plant pathology, development of a new freshman chemistry course at Johns Hopkins University, a research-oriented course at Purdue University for senior aeronautical engineering students, and a conference on the subject of materials in electrical engineering curricula.

### **Supplementary Teaching Aids**

Under this program grants are awarded to colleges, universities, and professional organizations to enable highly competent mathematicians, scientists, and engineers, aided by teachers, media experts, and technicians, to develop audiovisual aids and new laboratory equipment for extending the range and to enhance the quality of their instruction. Support is not provided under this program for projects of merely local significance, nor for the purchase of equipment to improve facilities in a single educational institution.

1. *Films.*—To fulfill a long-time need of science teachers, the Foundation has awarded a grant for the collection of reliable information on content and presentation in existing science films and for study of means for encouraging the production of needed films and their more effective use.

One use of films is to stimulate interest in science through brief reports by active scientists on their work. This is the object of "Horizons of Science," a project started with the aid of grants to the Educational Testing Service. Each month through the school year subscribers will receive a 20-minute film, usually confined to a single report but sometimes giving short treatments of several topics. Film can also give everyone in a large lecture theater a close view of experiments and demonstrations. This is a feature of Foundation-supported lectures to be presented by scientists of the Rockefeller Institute to New York high school students during short vacations. Films can assist teachers by presenting key experiments difficult or impossible to conduct in school, plus the stimulation of a "visit" from a distinguished scientist. For its high school physics course the Physical Science Study Committee is preparing about 60 such films, each about 20 minutes in length. A project in microbiology at the University of California at Davis illustrates another approach, the preparation of a series of very short films to be used like lantern slides, but capable of showing movement, growth, and other events which are difficult or impossible to depict in single photographs.

2. *Television.*—More than 700 school systems and institutions of

higher education now can use television as an aid in classroom teaching, but its potentialities require much further exploration. Partial support was provided for one venture sponsored by the Greater Washington Educational Television Association, in which 16 school systems, a number of university and Government laboratories, and many scientists pooled their talents to produce a science course for 30,000 5th- and 6th-graders in nearly 300 schools. In a weekly presentation, scientists from different laboratories discussed major current investigations in fields studied in the regular lessons; televised in color, these programs were kinescoped so that they can be used in other areas.

3. *Laboratory equipment.*—Under an experimental program for stimulating the development of new, inexpensive laboratory equipment, NSF grants were awarded for 16 projects, including an integrated set of instrument “building blocks” for instruments used in analytical chemistry, a supersonic wind tunnel, and transparent plastic models of vertebrate embryos. Descriptions of apparatus developed under these grants will be published and commercial supply houses are likely to consider production of many items. A grant was also awarded to the American Institute of Physics to publish drawings of new apparatus for college physics.

### **Scientific Manpower Program**

The *Scientific Manpower* program has as its principal function obtaining and disseminating information concerning the Nation’s scientific manpower resources. Its functions are carried out through two major activities: (1) The National Register of Scientific and Technical Personnel, and (2) Scientific Manpower Studies. The cost of the program in 1959 was \$780,000.

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

The National Register of Scientific and Technical Personnel is maintained to insure that information on the resources of scientific manpower is available, and that individual scientists and engineers with specialized skills can be identified and located as required in the national interest.

During 1959, the principal activities of the Register have been directed toward (1) bringing up to date as promptly as possible the processing of Register data in order to maximize its usefulness, (2) continuing the coverage of scientists through the cooperative efforts of the scientific societies, and (3) servicing miscellaneous requests for Register information.

To expedite the processing of present and future Register data, a machine processing laboratory was established during 1959 at the Reg-

ister Records Center operated by North Carolina State College. A preliminary listing contained data collected on some 170,000 scientists during the period from January 1957 to December 1958.

Preliminary analyses of these data for 1957-58 were started. The data deal with a wide variety of factors, such as salary, age, level of education, field of study, professional specialties, function, type of employer, and foreign-language facility.

Agreement has been reached with the cooperating scientific societies, and planning is underway to determine the procedures and schedules to be used in a 1960 circularization of the scientific community to secure current information. It is planned that the questionnaire will provide for updating information on present registrants and complete information on new registrants.

### **Scientific Manpower Studies**

The responsibilities of this activity are to develop data regarding the supply, demand, training, and characteristics of scientific and technical personnel, and to provide a central clearinghouse for scientific and technical manpower information. The Scientific Manpower Studies activity is the central program in the Federal Government for the provision of such information.

During fiscal year 1959, the program, by means of funds provided to other Government agencies and to research organizations, has initiated a series of projects designed to fill some of the more important gaps in information. The program has concentrated on four principal areas: (1) improvement of basic data on scientific and technical personnel; (2) studies of demand for scientists and engineers; (3) studies in the selection of scientific and technical vocations; and (4) scientific and technical manpower in foreign countries.

Among the more important specific projects begun this year were: a survey of scientific and technical employment in private industry and State governments; a survey of scientific and technical personnel in colleges and universities; a survey of scientists and engineers in Federal Government employment engaged in research (in cooperation with the Civil Service Commission); programs of study of graduate students, by level and by field; a survey of nonacademic mathematical employment; a procedural study of the identification of scientific and technical occupations; pilot studies of the demand for scientists and engineers in several industries; a study of Communist China's scientific and technical manpower; and a followup study of college graduates to determine beginning career patterns.

These projects are in accord with the series of studies recommended in the Foundation's report "A Program for National Information on

Scientific and Technical Personnel.” This report was prepared in answer to a Bureau of the Budget request for such a coordinated program. One of the recommendations of this report was the following:

To insure prompt, efficient, and thorough implementation of this program, an appropriate Federal agency should be given specific responsibility for coordinating the several projects for analyzing the data produced, and for assuring that the findings will be made public.

The National Science Foundation, upon request of the Bureau of the Budget, has agreed to act as the “focal agency” for this responsibility.

During this fiscal year the following reports were completed:

*Foreign Language Knowledge of American Scientists, 1954-55.*—Three out of every four scientists included in the National Register of Scientific and Technical Personnel reported knowledge of at least one foreign language. The total who reported some competence in a foreign language was about 97,000 scientists. About 2 percent of these have some knowledge of Russian, 1 percent of Chinese or Japanese. Such knowledge for the most part stems largely from nativity and family background.

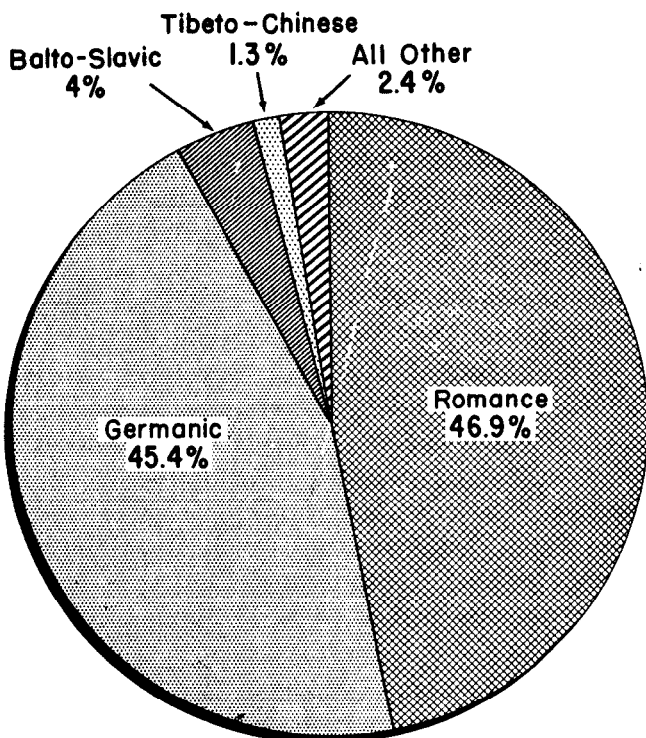
German was the language reported most often and French next, obviously a reflection of educational requirements for scientific training, particularly at the graduate level. Figure 2 shows the distribution of the major groups of languages reported by the scientists.

Chemists, chemical engineers, physicists, and astronomers showed a greater concentration in the Germanic languages; psychologists and earth scientists, in French and other Romance languages.

*Scientists and Engineers in American Industry, January 1957—A Preliminary Report.*—American industry employed 738,000 scientists and engineers as of January 1957 (approximately two-thirds of the national total)—528,000 engineers, 152,000 scientists, and 58,000 administrators of scientific and engineering activities. About one-third of these scientists and engineers were engaged in research and development activities.

The largest occupational group by far were the engineers, numbering 528,000. Among the scientists, chemists were the most numerous group—72,000. Employment in other scientific fields was as follows: Life scientists (medical, agricultural, and biological), 16,600; earth scientists (geologists and geophysicists primarily), 14,200; physicists and mathematicians, 12,100 and 12,400, respectively; and metallurgists, 10,800. (See fig. 3)

Engineers and chemists contributed the largest occupational groups among the 228,000 industrial scientists and engineers engaged in research



Language	No. of scientists with some degree of proficiency	With major proficiency
Germanic .....	44,168	31,202
Romance .....	45,628	30,080
Balto-Slavic .....	3,843	2,929
Tibeto-Chinese ..	1,240	816
All Other	2,395	1,928

Figure 2.—Foreign language knowledge of American scientists, by major language group, 1954-55.

and development. However, employment in research and development is of greater relative importance in certain fields, as will be noted from figure 4. Three-fifths of the physicists were in research and development, the largest proportion among all the occupational groups.

By major industry group, the aircraft industry employed the greatest number of research and development scientists, and electrical equipment the next greatest. The chart below shows the number of scientists in all activities and those in research and development for the major industry groups.



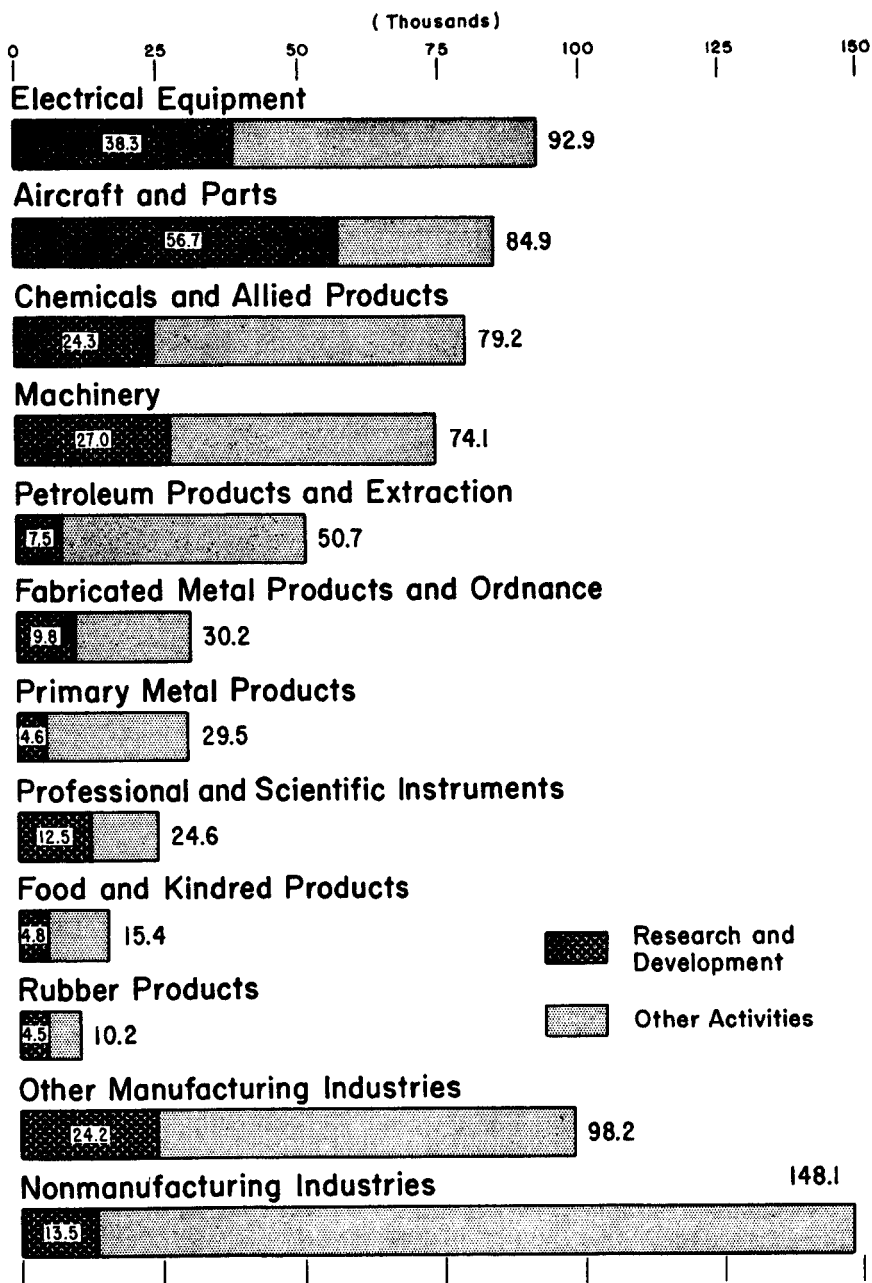
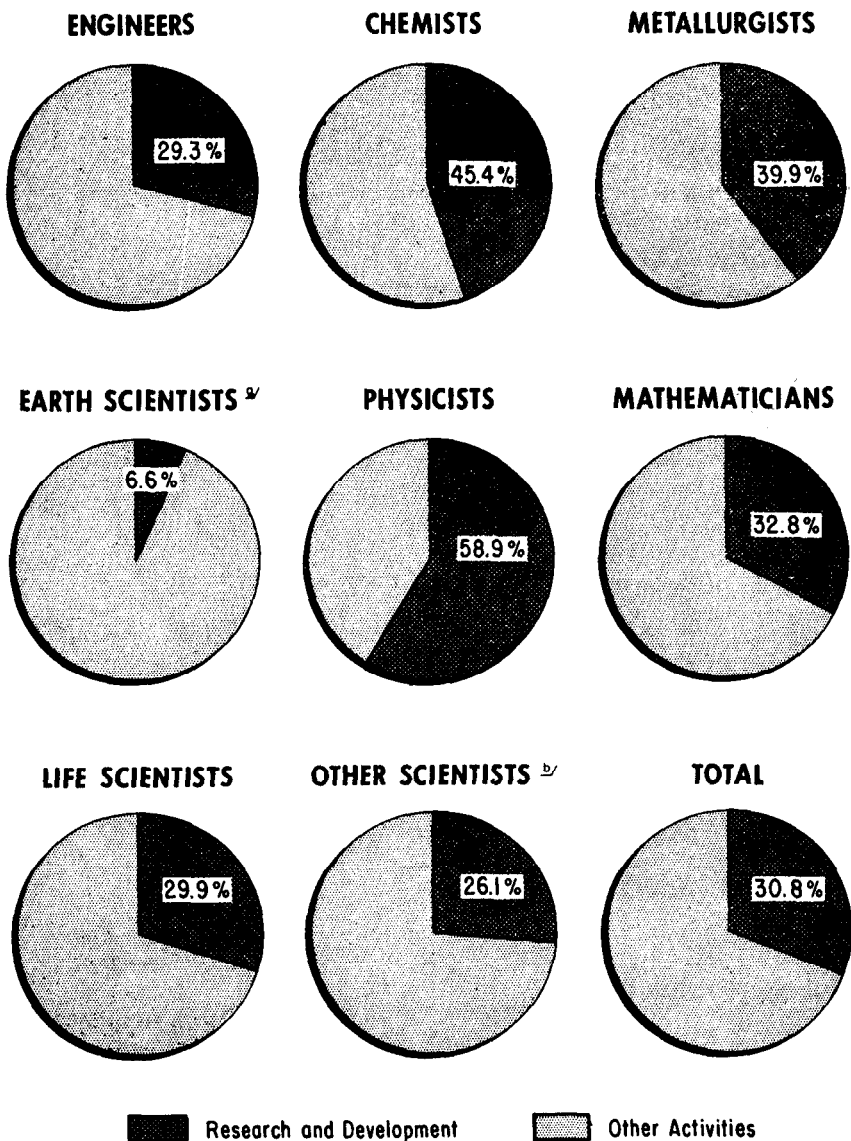


Figure 3.—Scientists and engineers in research and development activities and in all activities, by industry, January 1957.



<sup>a/</sup> The small proportion of earth scientists employed in research and development work reflects the exclusion of field exploration from research and development under the survey definition.

<sup>b/</sup> Includes scientists and engineers employed as administrators.

**Figure 4.**—Percentages of scientists and engineers in industry performing research and development, by occupational group, January 1957.

*American Science Manpower—Employment and Other Characteristics, 1954–55.*—Of the 116,000 employed scientists listed in the National Register in 1954–55, the largest group (some 41,000 persons) were employed in the fields of chemistry and chemical engineering. (See table 2.)

Almost half of the 116,000 scientists were employed in private industry, and nearly one-third by educational institutions. About 44 percent were engaged in research, development, or field exploration; slightly less than one-fifth were in management or administration and about the same proportion in teaching. Almost 8,000 (7 percent) were women.

Table 2.—Distribution of all employed scientists, by field, 1954–55

Employment field	All scientists	
	Number	Percent
Total—all fields . . . . .	115, 775	100. 0
Life sciences . . . . .	24, 629	21. 3
Agricultural sciences . . . . .	8, 126	7. 0
Biological sciences . . . . .	15, 612	13. 5
Medical sciences . . . . .	891	. 8
Earth sciences . . . . .	13, 829	12. 0
Geology and geophysics . . . . .	11, 991	10. 4
Meteorology . . . . .	1, 838	1. 6
Physics and astronomy . . . . .	11, 452	9. 9
Chemistry and chemical engineering . . . . .	40, 655	35. 0
Chemistry . . . . .	32, 452	28. 0
Chemical engineering . . . . .	8, 203	7. 0
Mathematics . . . . .	8, 670	7. 5
Engineering, except chemical . . . . .	4, 611	4. 0
Psychology . . . . .	10, 163	8. 8
Geography . . . . .	522	. 4
All other fields * . . . . .	1, 244	1. 1

\* Includes all other scientific and nonscientific specialties.

Source: National Register of Scientific and Technical Personnel, 1954–55.

*Scientific Manpower—1958.*—Papers presented at the Seventh Conference on Scientific Manpower, held in conjunction with the AAAS meeting in Washington, D.C., in December 1958, are included in papers presented at the symposium on “Demographic and Sociological Aspects of Scientific Manpower.”

In addition, this program provided much information on scientists and engineers to the Foundation for planning and operating its programs and to other Government agencies, many private organizations, and the general public.

## EXCHANGE OF SCIENTIFIC INFORMATION

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The scientist's problems regarding information are: How can the present volume of research results be published promptly? What is being published of interest to me, where is it, and how can I get it? The Office of Science Information Service seeks ways and means to answer these questions by fostering cooperation and coordination of scientific information activities of Federal agencies and non-Government organizations.

Scientific information has become a major problem, particularly since World War II, as a result of rapid scientific progress multiplying the volume of new scientific information beyond the point where it can be effectively published or handled through existing methods. Accompanying this problem there has been an increased consumption of fundamental science by technology. The scientist needs his information faster. Formerly the timelag between development of a fundamental idea and its utilization by technology was measured in tens of years; now it may be measured in months and weeks.

During the 1959 fiscal year increased interest in this problem by the President and Congress culminated in the assignment to the Foundation of greatly expanded responsibilities for leadership in a national effort to improve the availability of research information to scientists.

The National Defense Education Act of 1958 defined NSF objectives for providing or arranging for the provision of a wide range of information services leading to a more effective dissemination of scientific information and the development of new or improved methods, including mechanized systems, for making scientific information available.

Under the terms of title IX of the act, the Office of Science Information Service (OSIS) was established by the Foundation, replacing the former Office of Scientific Information. The act also provided for the establishment of a Science Information Council made up of representatives of private industry, education, professional societies, Government, and others concerned with information problems. The group advises and makes recommendations to OSIS.

OSIS has also established the Federal Advisory Committee on Scientific Information, composed of senior members of 17 Federal agencies with significant scientific information programs, to coordinate Federal activities in the field.

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

The Office of Science Information Service has proceeded on the assumption that much is to be gained by close cooperation with, and support of, existing information services, both public and private, where they are functioning effectively. This policy is inherent in applicable language of the National Defense Education Act and was emphasized strongly in recommendations to the President by his Science Advisory Committee. Many of the information services rendered by scientific societies and professional institutions are world famous for their quality. It is essential that the Federal Government continue to cooperate with and assist such private groups in maintaining and improving their specialized services.

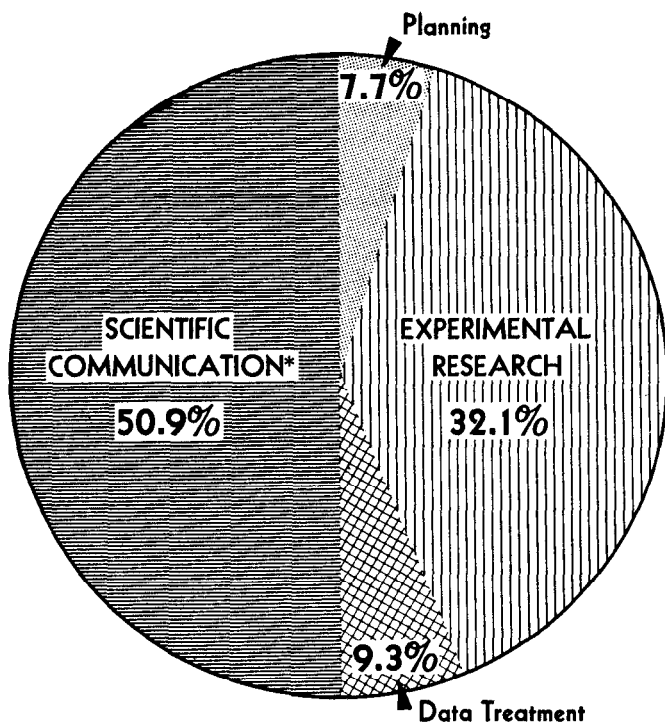
Other objectives of OSIS programs are to identify and analyze strengths and weaknesses of existing information practices; to foster cooperation and coordination among public and private agencies for the solution of problems in the field; and to encourage and support research for developing new and improved techniques of information handling.

The four major programs within the Office of Science Information Service are *Documentation Research*, *Foreign Science Information*, *Publications and Information Services*, and *Unpublished Research Information*.

In the 1959 fiscal year, 146 grants totaling about \$3.8 million were made; comparable figures for the 1958 fiscal year were 89 grants and \$1.9 million.

### **Documentation Research**

Scientists need new techniques to help them find and digest the material they want without time-consuming searches through the literature. To develop these techniques it is necessary to have a clear understanding of the actual information requirements of scientists, as well as a precise knowledge of the ways in which scientists communicate. The Foundation supports research of a fundamental nature that will produce new knowledge, insights, or techniques for the development of systems to meet scientists' information needs.



\*Oral or written

Data from Case Institute of Technology for N.S.F.—1957-1958

Figure 5.—How industrial chemists spend their working time.

Support of research by the Documentation Research program falls into three principal areas: studies of present patterns of scientific communication; the organization and searching of scientific information, including the development of mechanized systems; and mechanical translation from one natural language to another.

#### Studies of Scientists' Information Requirements

Two studies of the pattern of scientific communication were completed during fiscal year 1959: *The Flow of Information Among Scientists—Problems, Opportunities, and Research Questions*, prepared by the Bureau of Applied Social Research, Columbia University, and *An Operations Research Study of the Scientific Activity of Chemists*, from the Operations Research Group, Case Institute of Technology. (See fig. 5.)

A subsequent grant has been made to the Bureau of Applied Social Research at Columbia University for the preparation of a critical review of all studies to date of scientists' use of information. The review will serve to summarize what has been learned so far and to outline questions and problems needing further study.

## **Research on Information Storage and Retrieval**

Several long-range projects in this area are being supported by NSF grants.

One such grant has been given to the University of Pennsylvania for an investigation of linguistic transformation for information retrieval, a continuation of work performed under previous NSF grants. The promising results of the earlier work have justified the expansion of support. Among the results thus far achieved is a computable method for recognizing the syntactic structure of English sentences. This has resulted in an actual program, now working on a Univac computer, for the constituent, or phrase-structure analysis of English sentences.

Short-range storage and retrieval research projects include studies of the relative efficiency of different systems of classification and indexing, and a test program to evaluate certain characteristics of the two most widely used chemical notation systems for structural formulas.

### **Mechanical Translation**

OSIS is currently supporting research on five mechanical translation projects, three of which are directed toward procedures for Russian-to-English translations.

The Harvard Computation Laboratory has in operation a comprehensive Russian-to-English automatic dictionary of electronics and mathematics. The laboratory is now producing word-for-word translations; as word order, multiple meaning, and other problems are solved, the quality of translating will improve. The dictionary is used as a research tool in a continuing program to achieve fully automatic translation.

At Georgetown University research continues on the mechanical translation of Russian chemical and French physics texts. Several different techniques have been developed, including provision for selecting proper meanings of words and for their rearrangement into English word order. These techniques are now being tested on general-purpose computers.

A group at the University of California, through linguistic analyses of an extensive body of Russian text in the field of biochemistry, is developing a dictionary and translation rules.

Detailed studies of the way in which the German and English languages function are being made at the Massachusetts Institute of Technology. Such knowledge is believed to be necessary to the achievement of high-quality mechanical translation.

The Cambridge Language Research Unit in England is studying the semantic organization of languages to develop procedures for the mechanical handling of variations of meaning as well as form. These procedures are being tested first on punched cards.

## **Research Information Center and Advisory Service on Information Processing**

Research and development in scientific documentation is growing at a rapid pace. Projects supported by Foundation grants represent only a portion of the active work in the field. In order to foster communication among research workers, the Documentation Research Program collects and publishes information about these activities. Brief descriptive accounts of work in progress appear in the semiannual NSF report, *Current Research and Development in Scientific Information*.

To extend this clearinghouse service for information in the field, a Research Information Center and Advisory Service on Information Processing is being supported at the National Bureau of Standards, with a portion of the financial support for the center contributed by the Council on Library Resources. The center staff has undertaken a continuing study of available reports and publications about information processing and will prepare reviews of progress in particular research areas. The center will provide Federal agencies and cooperating private organizations with technical advice on problems encountered in research projects on information processing.

### **Research Conferences**

Support and staff assistance was given to the International Conference on Scientific Information, held in Washington, D.C., in November 1958. At the conference, progress in research on scientific information problems and the need for additional work were discussed. The conference proceedings will be published by the National Academy of Sciences.

### **Foreign Science Information**

The Foreign Science Information program is concerned with the broadest aspects of the international exchange of scientific information. This involves attention to U.S. collections of original foreign research publications; support of translation and domestic dissemination of foreign scientific information; studies of the scientific information systems and the information resources of other countries; and interchange of scientific information between the United States and other countries.

Although during 1959 procurement and translation of scientific information of Soviet origin continued to be of primary importance, greater attention was given to increasing our knowledge of scientific achievement in other countries, including Japan, mainland China, Poland, and Yugoslavia.



## **Translation of Russian Scientific Documents**

OSIS, in cooperation with the Office of Naval Research and the National Bureau of Standards, supported the efforts of 28 professional societies and academic institutions in cover-to-cover translations of 35 Russian scientific and technical journals and 18 books and monographs, as well as special articles and collections of scientific papers. This support permitted the translation of approximately 70,000 pages of foreign scientific information, a significant increase over the 1958 support program when the 29 journals, 10 books and monographs, and other materials translated totaled 37,000 pages.

### **Translation Centers**

Within the Federal Government, interagency cooperation stimulated by the Foundation led to the establishment of a Foreign Technical Information Center in the Office of Technical Services of the Department of Commerce. This center collects scientific and technical translations prepared by Government agencies, announces their availability, and provides copies to the public on request.

In the interest of further reinforcing a cooperative national attack on the translation problem, the Foreign Science Information program continued its support of the Special Libraries Association Translation Center at the John Crerar Library in Chicago. SLA collects translations from non-Government sources and forwards them to the Department of Commerce for announcement simultaneously with Government-prepared translations.

In January 1959 the Office of Technical Services began issuance of a semimonthly publication entitled *Technical Translations*, which provides a central source of information in the United States on translated technical literature available to science and industry. It lists and abstracts translations available from the Office of Technical Services, The Special Libraries Association Translation Center, cooperating foreign governments, educational institutions, and private sources.

### **Special Information Resources**

Support was also given to the Midwest Interlibrary Center (MILC) for continuation of its program of building a comprehensive collection of foreign chemical and biological serial publications to serve as a national as well as a regional resource.

### **Studies and Surveys**

Information studies on the organization and characteristics of scientific information and information systems in all nations which conduct research are underway. These include studies of Poland by the New

York Public Library and of Japan and Indonesia by the Pacific Science Board of the National Academy of Sciences. Similar studies are being developed for the U.S.S.R., mainland China, Czechoslovakia, Yugoslavia, Hungary, Korea, and other countries.

### **Overseas Activities**

OSIS has played an important role in improving coordination with international scientific information activities. Help is being given to the European Productivity Agency in a study of the feasibility of establishing a Pan-European Translation Center to collect and organize translations of Eastern European and Oriental scientific literature from Western Europe.

The Foundation, as directed by the Bureau of the Budget and the President, is responsible for the coordination and administration of budget estimates and programs for scientific information activities undertaken overseas by Federal agencies using foreign currencies accruing under Public Law 480, 83d Congress. A total of \$1.2 million was appropriated by Congress for this purpose. Although certain administrative difficulties exist, the Public Law 480 program offers an opportunity for a notable increase in the quantity of foreign publications and translations available in the United States. A contract for such a program in Israel became effective April 24, 1959, and about 10,000 pages of foreign scientific and technical materials are currently in process of translation there.

In May 1959, OSIS representatives visited Poland to negotiate a contract which provides for the translation and publication of an average of 500 copies of 19,000 pages of Polish scientific and technical information. It is expected that a contract will be negotiated with Yugoslavia. Feasibility surveys will be conducted in India.

### **Publications and Information Services**

The Publications and Information Services program supports a variety of scientific publications; data and reference centers; and experiments, studies, surveys, and conferences. This support is to aid the dissemination of scientific information by helping to maintain, improve, and expand present means of publication, and by helping to establish and maintain information centers that provide scientists with specialized reference service.

#### **Support of Scientific Publications**

During 1959, grants were made in support of primary research journals to launch new publications and to aid existing periodicals. The former included two experimental publications: *Wildlife Disease*, the

first research journal to be issued solely in microform (Microcard in this case); and *Physical Review Letters*, an experiment in rapid low-cost publication of short, up-to-the-minute articles on physics research. Typical of other new periodicals supported is the *Journal of Geophysical Research*; here the NSF grant assures publication for 2 years during which time it is believed the journal can become self-supporting. Representative of the existing primary journals receiving support in 1959 is *Genetics*; in this case the grant is for the publication of an accumulated backlog of papers as a separate volume. Other journals have received temporary support to enable them to publish cumulative indexes or to insure publication while regular income is being adjusted to meet sudden increases in costs or the need for immediate expansion of coverage.

Grants also were made in support of abstracting and indexing services. Typical is the grant made to *Biological Abstracts* to enable it to improve the adequacy of its coverage. Other reasons for such grants include supporting a new service until it can build up its regular income, permitting reorganization of a service to improve its effectiveness, and covering a financial crisis caused by a sudden rise in costs or the need to offer a temporary specialized service. Consultation with the National Federation of Science Abstracting and Indexing Services (formed in January 1958 with NSF support) aids in achieving coordination and consistency of overall pattern. The policy of temporary support only is applied here also; however, the periods of subsidy are somewhat longer than in the case of primary journals because costs are higher and possible sources of income are fewer.

Recognizing that good critical reviews constitute one of the most important—and most neglected—forms of scientific publications, the Publications and Information Services program made its first extensive grant in this area in December 1958. Under this grant four series of review papers are being prepared in physics, varying from comprehensive technical reviews of major area of the field to short, semitechnical synopses of limited subject scope.

#### **Support of Information Services**

Two significant grants in this area were made during 1959. The first was for continued support to the Office of Critical Tables of the National Academy of Sciences. This office is an information and coordinating center for projects engaged in developing critical physical data of all kinds. The second grant of this kind was to the Bio-Sciences Information Exchange administered by the Smithsonian Institution and jointly supported by a number of Government agencies. The exchange functions as a repository of knowledge on "who is working on what" in the bi-

ological sciences and offers reference service on its holdings to all participating groups.

### **Studies and Surveys**

Studies are being made to provide yardstick information for use in evaluation of proposals and to direct the way to improved publication and other dissemination methods. One is developing a breakdown of scientific reading habits of chemists and physicists in terms of the kinds of material covered and specific journals read. Other investigations underway concern the membership, dues, and publication structure of professional scientific societies; the editorial subscription and production practices of scientific journals; publication climate in industries engaged in basic research; an analysis by the American Institute of Physics of the overall publication picture in physics; and a somewhat preliminary study in the biological field being conducted by the American Institute of Biological Sciences.

### **Unpublished Research Information**

The principal concern of the other programs of OSIS is with the dissemination of domestic and foreign scientific information generated through conventional publications channels. The Unpublished Research Information (URI) program seeks to increase the accessibility of unclassified, unpublished research information. The major sources of such information are research reports and memoranda of Government and private institutions, theses, dissertations and papers resulting from scientific conferences. This material frequently contains significant scientific information not otherwise found in published sources.

The development of the program and its accomplishments to date have been governed by two general precepts: attain systematic dissemination of unclassified research information not generated through conventional publications channels; and encourage the flow of such information to these channels.

Clearinghouse activities involving direct literature search service by OSIS were transferred to the Office of Technical Services, Department of Commerce, and to the Science and Technology Division of the Library of Congress.

Preliminary investigation was made of the feasibility of establishing a center, similar to the federally supported Bio-Sciences Information Exchange, for handling mathematical, physical, and engineering information generated by Government or federally sponsored projects. A similar study was made of the problem of handling materials information and data. Increasing attention will be given to these kinds of studies as the program develops.

## **Inventory of Government Scientific Reporting**

In 1959 the Foundation, through the URI Program, accelerated its efforts to survey information activities of Federal agencies operating major scientific information programs. Bulletin No. 1 of the series, *Scientific Information Activities of Federal Agencies*, covering the information activities of the Department of Agriculture, was published in November 1958. Bulletin No. 2, released in June 1959, reported such activities for the Office of Naval Research.

### **Unpublished Research Reports**

In 1959 continued support was given by a grant to the Office of Technical Services (OTS) of the Department of Commerce to increase the availability of unclassified Government research reports to the Nation's scientists and engineers.

A grant was made to the Library of Congress for continued support to enable it to expand further its reference collection of Government research reports and to provide reference and bibliographic services to insure accessibility of this information to the scientific community.

### **Other Activities**

The OSIS responsibility for conducting the U.S. scientific exhibits program at the Brussels World's Fair was concluded in 1959. During the year a number of these exhibits were installed at the Chicago Museum of Science and Industry.

Other exhibits were prepared for use at meetings of scientific organizations where the problems of scientific information dissemination and programs for improvement in the field were topics of discussion.

To provide an effective means for the exchange of information among groups working in the scientific information field, the Office of Science Information Service began publication of a bimonthly news bulletin, *Science Information News*, in February 1959. The bulletin reports national and international developments and, it is hoped, will promote cooperation and coordination among scientific information services. Initial reaction indicates this bulletin fills a widespread need.

*Providing U.S. Scientists With Soviet Scientific Information*, published during the fiscal year, describes the overall U.S. effort to make available Russian scientific publications, translations, abstracts, indexes, and bibliographies. It also contains a reference list of 76 Russian journals currently being translated into English.

*Current Research and Development in Scientific Documentation, No. 4*, describes projects here and abroad in information requirements and uses, research on information storage and retrieval, mechanical translation, and in equipment development.

## **SURVEYS OF THE NATIONAL RESEARCH AND DEVELOPMENT EFFORT**

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A major Foundation responsibility is the measurement and appraisal of the total research and development effort. Each sector of the economy, pursuing its own interests, contributes its part to the whole effort. As a Federal agency, the Foundation is in a position to view the condition of the Nation with regard to its entire research and development activity. This view aids in the formulation of national science policy and the establishment of internal policies for the Foundation's programs in research and education.

The NSF Act of 1950 provided for such a mission in directing it to develop recommendations regarding national science policies. The President's Executive Order of March 1954 specifically directed it "to make comprehensive studies and recommendations regarding the Nation's scientific research and its resources for scientific activities" and to appraise "the impact of research upon industrial development and upon the general welfare."

### **Importance of Research and Development in the Economy**

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 more forcefully realized with the Foundation's estimate for 1957 of \$10 billion for research and development in the country as a whole with the employment of more than 300,000 scientists and engineers.

Referred to as the "industry of discovery," research and development activity in the United States has in recent years expanded more rapidly than many other industries. Expenditures for this purpose rose from more than \$2 billion<sup>1</sup> in 1947 to \$5.2 billion<sup>2</sup> in 1953 and to the previously mentioned \$10 billion in 1957.

That this upward trend will persist is indicated by the fact that the 1957-58 recession failed to halt its growth. Perhaps contributing to the continued increase is a new public awareness, created by the Soviet

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<sup>1</sup> Department of Defense. Office of the Secretary of Defense (R&D), *The Growth of Scientific Research and Development*. Washington 25, D.C., 1953, p. 10.

<sup>2</sup> National Science Foundation. *Reviews of Data on Research & Development*, No. 1, "Expenditures for Research and Development in the United States, 1953." Washington 25, D.C., 1956.

satellite launchings, of the need for continuing research and development.

Many have realized that research and development contributes significantly to our domestic policy of maintaining a healthy economy. But until the past few years the intrinsic effects of research and development on the growth of the economy and on maintaining its level had only been vaguely explored. The theory that research and development acts in this way on the economy has been expounded by the late Prof. Sumner Slichter of Harvard University. He has stated that technological research leads to increased demand for goods, which in turn raises production and thereby acts as a source of greater income. Thus, research has a dynamic as well as a stabilizing effect. Research and development acts in this manner primarily because we have a free enterprise system. The competition by industry to bring about the innovations and new products as a result of research is responsible for these overall effects on the economy.

Thus, research and development also influences the competition among nations, extending to all levels, the military and civilian, i.e., competition with regard to weapons systems as well as to standards of living. Dr. Waterman, at the hearings before the Joint Economic Committee of the Congress in February 1959, testified: "The real point is that we are competing with the Soviet Union for the future . . . the economic implications of research and development are of a long-range nature. What we do now in planning our research and development effort, in giving it adequate support, may determine not only our own future but the future of the world as well."

The importance of research and development requires that ways be found to measure this effort. To do this it is necessary to obtain detailed data, which in turn will permit closer analysis of the effects of research and development.

#### **Survey Program and Related Analytical Studies of the Foundation**

Two measurements of the research and development effort are (1) dollars expended and (2) manpower employed. In the late 1930's and during the 1940's, statistics were primarily broad estimates of total volume of expenditures and manpower. Some of these estimates were prepared by the National Research Project of the Work Projects Administration, the National Resources Planning Board, the Office of Scientific Research and Development, the President's Scientific Research Board, and the Research and Development Board of the Department of Defense.

The Foundation's Office of Special Studies, benefiting from this earlier work, approached the problem of measurement on a systematic

and comprehensive basis. The economy was divided into four "sectors"—Federal Government, industry, colleges and universities, and other nonprofit institutions.

Data are compiled in terms of both sources of funds and performers of research and development for all four sectors. This permits analysis of intersectoral relations and the construction of a transfer table showing the flow of funds for support of work by the sectors to others for the conduct of research, as well as for the basic research performed and/or supported by each sector.<sup>3</sup>

Surveys are conducted in each sector, largely by means of questionnaires either directly by the Foundation's staff or by contractual agreement with another Federal agency or outside institution. For the Federal sector and for most groups in the nonprofit sector, the surveys aimed for complete coverage; sampling was used for industrial firms and smaller philanthropic foundations.

The first comprehensive round of surveys covering the year 1953-54 was completed, with full reports issued covering the individual surveys in each sector. The data have been combined into an overall estimate for the country. This necessarily experimental series indicated deficiencies to be met, or at least acknowledged, for some of these are inherent in the subject matter, and laid the foundation for a permanent survey program.

The purposes served by the current program of statistical surveys are twofold, one being to supply a sufficient amount of information for analysis, and the other to formulate a statistical time series summarizing annual fluctuations in research and development activity. The demands on the Foundation to supply data on research and development activities have been great, and as a result continual updating of information is planned. A detailed survey of each sector will be conducted once every 4 or 5 years. In the intervening years only summary data will be collected, largely for the purpose of developing the time series. However, owing to the current interest in research and development data, this plan for the present has been modified to make the summary surveys somewhat more detailed in nature, but eventually it is hoped to confine them to total figures. In this way, adequate data on research and development will be available for each sector as well as for the country as a whole.

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<sup>3</sup> National Science Foundation. *Reviews of Data on Research & Development*, No. 1. "Expenditures for Research and Development in the United States, 1953." Washington 25, D.C., 1956; *Reviews of Data on Research & Development*, No. 5. "Funds for Basic Research in the United States, 1953." Washington 25, D.C., 1957.



Emerging from the data collection have come the tools for shaping analytical studies. Like the factfinding studies, they are the means for achieving the objectives and they continue to build the basis for guidance in policy matters and "appraising the impact of research on the general welfare."

### **Total National Activity**

Based on its sectoral surveys, the Foundation estimates that research and development activity in 1956 totaled about \$8.5 billion. In terms of "sources of funds" and "performers" of research and development, industry performed 76 percent of the total dollar volume and supplied 38 percent of this national total from its own funds. The Federal Government was the major source of funds, supplying 59 percent in addition to the 38 percent from industry, and the remainder came from colleges and universities and other nonprofit organizations. In interpreting these data, it should be borne in mind that the bulk of this amount represents development customarily performed by industry and largely financed by the Federal Government to meet its military objectives.

Knowledge regarding basic research, a foremost concern of the Foundation, is also gained from these surveys. Such information is useful to the internal formulation of policy. Here again the overall figures for 1956 show the Federal Government to be the major source of funds; the colleges and universities maintain their traditional position as primary performers of basic research.

From these surveys ensued some of the studies and actions dealing with the impact on the economy of research and development activity as outlined below.

(a) As a start in the direction of exploring this activity, a conference was held dealing with "Research and Development and Its Impact on the Economy" in the spring of 1958 which resulted in publication of the *Proceedings*.<sup>4</sup>

(b) On the same subject was the Director's presentation, quoted previously, before the Joint Economic Committee. An abridged version of his remarks was published in the NSF series, *Reviews of Data on Research & Development*, No. 13, "Research and Development and Economic Growth," in which Dr. Waterman stated:

More and more emphasis is being given to research and development in the analysis of long-term growth as compared to the somewhat more traditional factors, particularly capital expenditures and

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<sup>4</sup>National Science Foundation, *Proceedings of a Conference on Research and Development and Its Impact on the Economy*. Washington 25, D.C.: Supt. of Documents, U.S. Government Printing Office, 1958.

population. The 1959 *Economic Report of the President* has called attention to the extremely important role that research and development contributes to the growth of the economy.

(c) *Current Projects on Economic and Other Impacts of Scientific Research and Development, 1959*.—The survey of projects pertaining to analysis of the impact of research and development to date has been limited to colleges and universities. Over 100 projects were reported by 54 of the 140 responding institutions. Under the title shown above, publication of an inventory of these projects is planned for the fall of 1959. This survey may be extended to research institutes and privately endowed foundations.

(d) *Bibliography on the Economic and Social Implications of Scientific Research and Development*.—A selected annotated bibliography has been prepared. It is intended to provide references representative of typical approaches to the study of research and development, and to serve as a guide for further investigation.

(e) *Conference on Economic Analysis of Research and Development*.—In the spring of 1959 a 2-day symposium was held, convoking analysts from industrial firms and universities to present informal papers on their inquiries into the research process. The symposium was mutually fruitful to participants in providing a channel for communications and constructive critical discussion of the work in their fields.

## **Federal Government**

During the fiscal year 1959 the Foundation published *Federal Funds for Science, VII—The Federal Research and Development Budget, Fiscal Years 1957, 1958, and 1959* based on data reported to the Foundation in the spring of 1958 by the Federal agencies participating in the Government's research and development programs. The President subsequently submitted supplemental requests for additional appropriations which had not been included in the budget for both fiscal years 1958 and 1959. Congress, recognizing the needs of science, in several cases increased funds for scientific research and development by a substantial amount over the original budget estimates.

*Reviews of Data on Research & Development*, No. 12, "Recent Legislative and Executive Actions on the Federal Budget for Scientific Research and Development, Fiscal Years 1958 and 1959," presented preliminary information on the extent of the major changes in the estimated obligations which were published in the seventh issue of *Federal Funds for Science*.

During the year, a survey was conducted of obligations and expenditures for scientific research and development for fiscal years 1958,

1959, and 1960. Among the changes introduced in reporting the survey, the most important in terms of the overall totals, relates to the expanded definition of development which now corresponds to the definition used in current surveys of the other sectors. Table 3 summarizes estimated obligations for fiscal year 1959.

With respect to the manpower studies of the Federal sector, the data on research and development personnel were collected as a part of a larger survey by the U.S. Civil Service Commission.

**Table 3.—Estimated Federal Obligations for Conduct of Research and Development, Fiscal Year 1959**

[Millions of dollars]

Agency	Estimated obligations, fiscal year 1959 <sup>a</sup>
Total, all agencies . . . . .	\$7, 233
Department of Agriculture . . . . .	119
Department of Commerce . . . . .	28
Department of Defense <sup>b</sup> . . . . .	5, 581
Department of the Army . . . . .	(992)
Department of the Navy . . . . .	(1, 249)
Department of the Air Force . . . . .	(2, 738)
Advanced Research Projects Agency . . . . .	(427)
Departmentwide funds . . . . .	(175)
Department of Health, Education, and Welfare . . . . .	244
National Institutes of Health . . . . .	(212)
Department of the Interior . . . . .	62
Atomic Energy Commission . . . . .	773
National Aeronautics and Space Administration . . . . .	303
National Science Foundation . . . . .	57
All other agencies . . . . .	65

<sup>a</sup> These estimates were published in *Federal Funds for Science, VIII—The Federal Research and Development Budget, Fiscal Years 1958, 1959, and 1960*.

<sup>b</sup> Data reflect revised appropriation structure for research and development. Totals include pay and allowances of military personnel in research and development, separately identified procurement funds in support of R, D, T, & E, as well as the Research, Development, Test, and Evaluation appropriations.

NOTE: Detail will not necessarily add to totals because of rounding.

## Industry

Two previous surveys of research and development performance by private firms were sponsored by the National Science Foundation and were conducted by the Bureau of Labor Statistics, U.S. Department of

Labor. The first survey covered the years 1953-54<sup>5</sup> and the second 1956.<sup>6</sup> Preliminary figures on costs and manpower were released on the 1956 survey. A detailed report containing final revised figures is in the process of publication.

The 1957 survey was conducted by the Bureau of the Census in order that research and development data could be related to other economic statistics collected by that agency. A detailed survey covering the year 1958 is currently underway, being conducted also by the Bureau of the Census.

Preliminary returns from the 1957 survey were released in the fall of 1959 in *Reviews of Data on Research & Development*, No. 14, "Funds for Research and Development Performance in American Industry, 1957." For overall comparisons the Foundation has estimated the funds for total industrial research and development performance for the 5 years 1953-57 as presented in figure 6.

## Colleges and Universities

The final report of a Foundation survey of colleges and universities was issued in December 1958, *Scientific Research and Development in Colleges and Universities—Expenditures and Manpower, 1953-54*. A survey for the year 1957-58 is now underway, this one being conducted for the Foundation by the U.S. Office of Education. The rapid growth of Federal financial support of scientific research and development at institutions of higher education during the postwar period has raised a number of issues of national education and science policy. Among these issues are:

(a) Relative responsibilities of Federal and non-Federal sources for financing academic research.

(b) Relationship of federally sponsored research to the issue of Federal aid to higher education.

(c) The compatibility of institutional objectives to those of sponsoring Federal agencies.

(d) The effects of Federal sponsorship of research upon the balance of institutional activities as between research and instruction. (For example, is Federal support of research tending to drive

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<sup>5</sup> *Science and Engineering in American Industry. Final Report on a 1953-54 Survey*. Prepared for the National Science Foundation by the U.S. Department of Labor, Bureau of Labor Statistics. Washington 25, D.C.: Supt. of Documents, U.S. Government Printing Office, 1956.

<sup>6</sup> National Science Foundation. *Reviews of Data on Research & Development*, No. 10, "Research and Development Costs in American Industry, 1956." Washington 25, D.C., 1958.

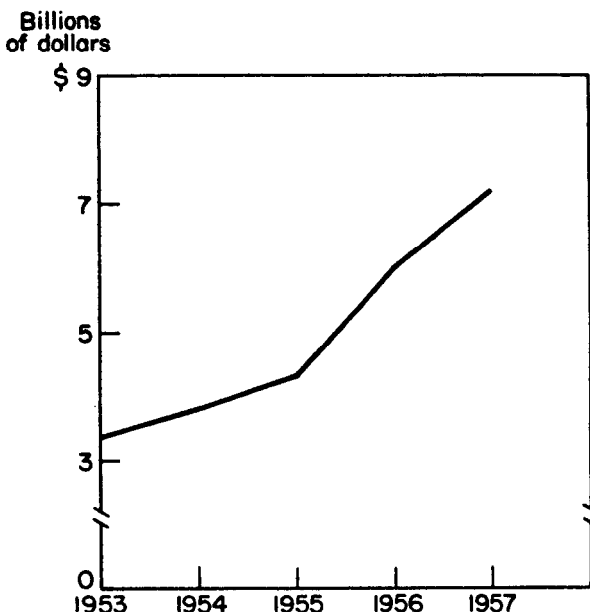


Figure 6.—Funds for research and development performed by private industrial firms, 1953–57

NOTE: Data for each year are expressed in terms of current dollars.

(a) Funds shown here are for private industrial firms, i.e., principally manufacturing and other industrial firms which account for more than 90 percent of the total amount for the "industry sector" as a whole. Also included in the sector as defined by NSF (but not represented in the chart) are independent commercial laboratories, trade associations, and research centers operated by private industrial organizations under contract with the Federal Government.

faculty out of teaching and into research because of better opportunities for promotion?)

(e) The effects of Federal sponsorship upon the balance among the institutional research activities, e.g., as between natural and social sciences and between the sciences and the humanities.

(f) The effects of Federal contracts for applied research and development upon basic research.

(g) Use of the research center as an institutional device for attaining research objectives of Federal agencies.

(h) Responsibilities of Federal agencies for paying indirect costs of sponsored research.

An assessment of these problems requires facts on the total research and development effort carried on at institutions of higher education, the proportion federally financed, the trends in Federal support by agencies, field of science, character of work, etc. (See figures 7 and 8.)

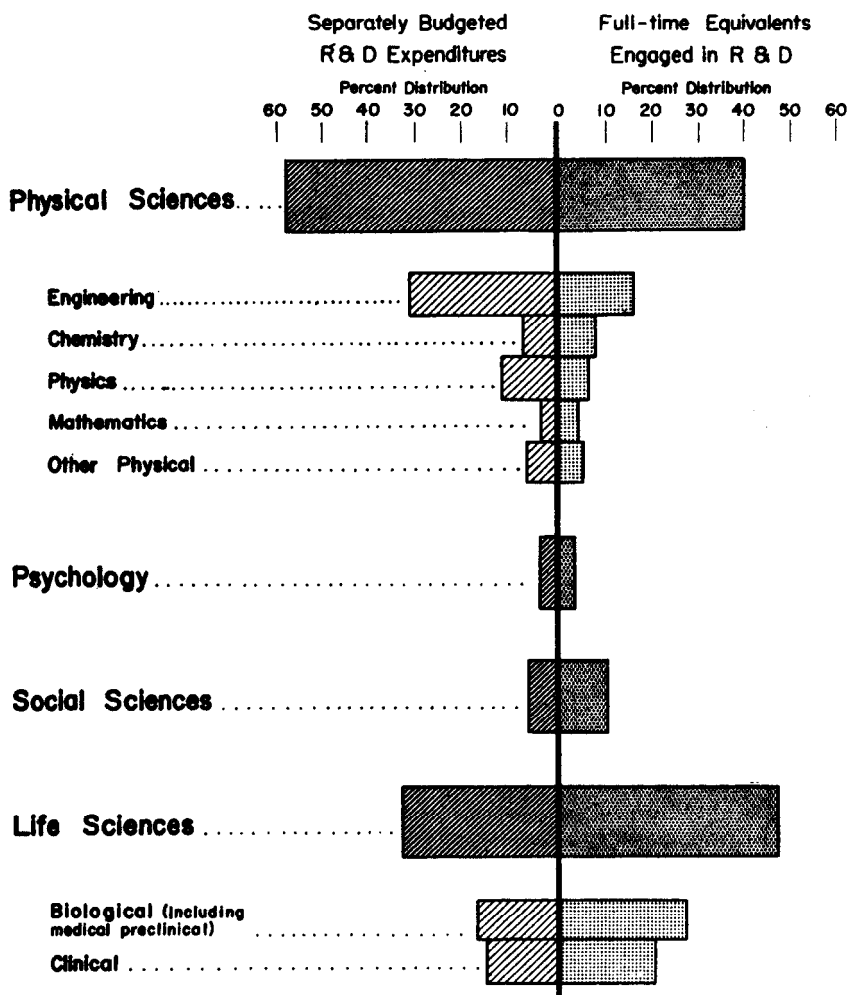


Figure 7.—Separately budgeted research and development in colleges and universities proper, 1953–54. Comparison of expenditures and faculty, by field of science.

NOTE: Excludes data on agricultural sciences.

(a) Separately budgeted research and development includes both research and development sponsored by outside agencies and that supported by "earmarked" university funds.

(b) Due to varying response factors, the institutional coverage of expenditure and manpower data is not completely comparable. Within the scope of the 190 large colleges and universities surveyed, 173 schools reported on expenditures and 180 reported on manpower. The chart is based on the schools reporting on both items.

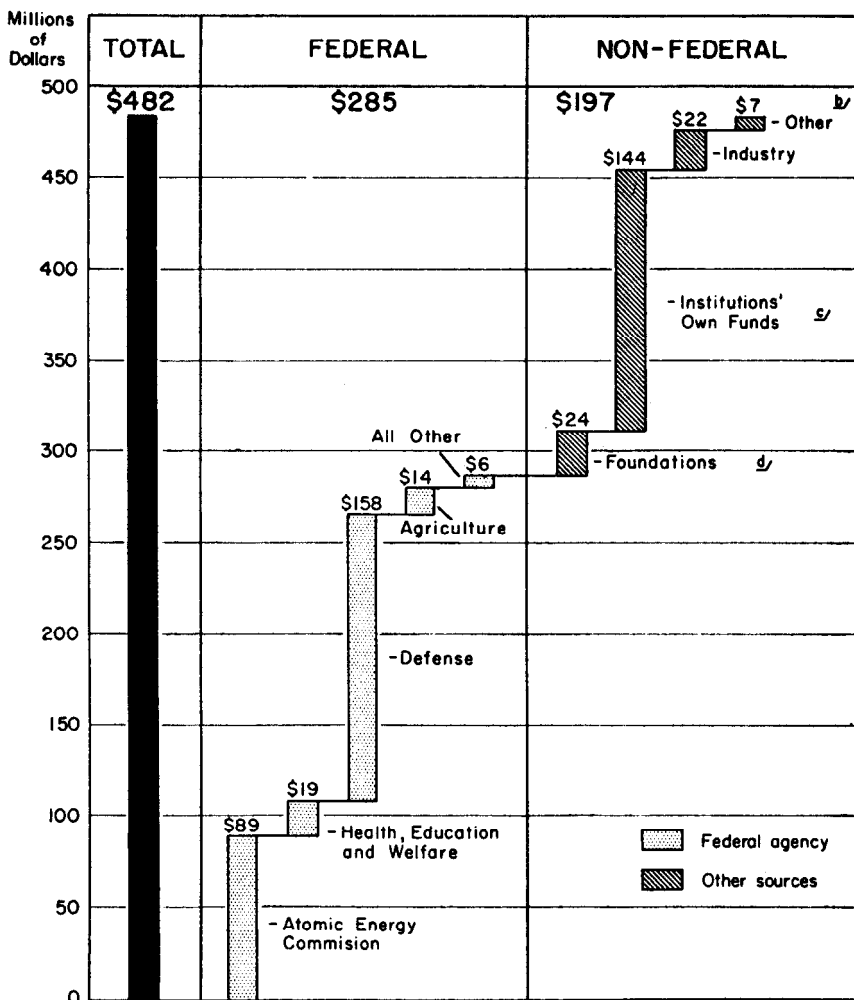


Figure 8.—Total cost of research and development at colleges and universities, by source of support, fiscal year 1954.<sup>a</sup>

<sup>a</sup> Includes colleges and universities proper, agricultural experiment stations, and Federal research centers.

<sup>b</sup> Includes gifts and grants, and other private sources.

<sup>c</sup> Includes State and local government funds.

<sup>d</sup> Includes health agencies.

Data obtained from the Foundation's 1953-54 survey of research and development at colleges and universities have contributed significantly to policy recommendations developed by the Foundation with respect to a number of the above problems.<sup>7</sup>

### **Other Nonprofit Institutions**

Repeating the 1953-54 surveys of private foundations, research institutes, health agencies, and other nonprofit organizations, the Foundation has utilized the services of the U.S. Department of Labor, Bureau of Labor Statistics, to collect data on expenditures and personnel for the year 1957. Privately endowed foundations reported \$71.5 million for support of research and development in that year, 67 percent of which was characterized as basic research. Health agencies reported \$23 million, 47 percent of which was basic research, mostly in the life sciences.

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<sup>7</sup> See the following reports: National Science Foundation. *Government-University Relationships in Federally Sponsored Scientific Research and Development*. Washington 25, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1958; and *Federal Financial Support of Physical Facilities and Major Equipment for the Conduct of Scientific Research*. Washington 25, D.C.: National Science Foundation, 1957.



## **SPECIAL INTERNATIONAL PROGRAMS**

### **International Geophysical Year**

#### **General**

The International Geophysical Year (IGY) 1957-58, the worldwide cooperative program in geophysical research conducted by 66 nations, came to a close on December 31, 1958. By this date there had successfully been completed 18 months of scientific observations begun on July 1, 1957.

The planning and execution of the U.S. portion of the IGY program were conducted by the U.S. National Committee for the IGY, National Academy of Sciences. Funding and coordination of Government interests were provided by the National Science Foundation.

#### **Summary of Preliminary Results of the IGY**

The data for the IGY are so extensive that it will take years to extract all the valuable material contained therein. Nevertheless, a large number of significant preliminary results have already been recorded.

A comprehensive report on these results for the entire 18-month period of the IGY was presented to the Subcommittee on Independent Offices of the Committee on Appropriations, House of Representatives, in February 1959, by members of the U.S. National Committee for the IGY and its technical panels, and is available in published form. The preliminary results covered in detail in the report can only briefly be mentioned here.

As a part of the IGY, the sun was subjected to the most comprehensive and detailed examination ever given by man to any extraterrestrial object. Solar manifestations were looked at both to discover more about the processes that occur in the sun, and to try to correlate these manifestations with the complex phenomena that occur in the earth's atmosphere.

Every variety of geophysical instrument, including rockets and satellites, was used in the total IGY examinations. It is probably safe to say that every available vehicle was used by the farflung parties of scientists in the accomplishment of their missions.

Of the many measurements and accomplishments of the series of IGY satellites, two outstanding ones may be mentioned. With respect to instrumentation carried aloft by satellites, the identification of the Van Allen Radiation Belt is probably the most significant. Man has now established the fact that the earth is surrounded by two great doughnut-shaped zones of trapped charged particles at distances in the plane of the geomagnetic equator of about 600–4,000 and 8,000–12,000 miles altitude. Further, it has been established that for a given altitude this radiation is most intense in low geomagnetic latitudes and is much reduced at polar latitudes, and that it has a distribution relationship to the earth's magnetic field. A second significant preliminary finding resulted from careful ground-based observations of the Vanguard I satellite orbit and complicated calculations based upon the orbital data. An important contribution to geodesy was made by these calculations, as they permitted a refinement of our knowledge of the distribution of mass of the earth, indicating a slight excess in mass in the Southern Hemisphere over that in the Northern Hemisphere.

By means of rockets and balloons, important deviations between the latitude energy distribution of cosmic rays impinging upon the earth and the structure of the earth's magnetic field have been detected. Similarly, terrestrial magnetic field measurements tend to verify the existence of a strong electrical current in the high atmosphere above the earth's magnetic equator. Still further, the earth's magnetic field has been demonstrated to maintain a detectable influence far into space. This came as a consequence of studies of ionospheric phenomena called whistlers, which originate from atmospheric electrical disturbances that propagate along paths guided by the force of the earth's magnetic field.

The diurnal and seasonal variations of the ionosphere also demonstrate the close relations among solar variations and terrestrial responses. Careful and prolonged measurements of the aurora enable still closer identification of solar radiation and solar particle output and the resultant upper atmospheric consequences. An additional significant finding derived from the examination of these solar-terrestrial phenomena

is that the sun's corona appears to be of great extent and that the earth itself may be immersed in this extremely tenuous material.

The sun's effects are not, however, confined to the earth's atmosphere. The liquid and solid portions of the earth respond to the energy in which they are bathed, and react between themselves and with the atmosphere as a gigantic heat engine with two fluids. And even the solid earth responds to the sun in the measurable form of the earth tides. The earth's intake and output of energy, primarily from the sun, are remarkably stable. The energy exchanges between the atmosphere and the oceans are on a vast scale. The circulation of winds and waters effects the exchanges necessary for this stability.

The understanding of meteorological phenomena will have been advanced immeasurably when the IGY data have been completely analyzed. In the oceans—our last terrestrial frontier—new currents and deep countercurrents have been identified and measured. The exchanges of gases, such as carbon dioxide, between the waters and the atmosphere have been measured all over the world, and as a result it has been established that the distribution of carbon dioxide gas is remarkably constant throughout the world. All the world's important glaciers and ice deposits have been measured and probed to complete the data that man must have in order to promote climatological research on its necessary long-time scale, and future similar measurements from time to time will yield epochal knowledge.

The first serious large-scale scientific examinations of the Antarctic form a noteworthy part of the IGY program. Tremendous depths of ice, up to 14,000 feet, were probed by seismic means and give for the first time an indication of the actual size of the Antarctic ice deposit. First mappings of the structure under the icecap were made. Many upper atmospheric measurements were completed and preliminarily substantiate the belief that cosmic rays are distributed in the Southern Hemisphere in the same fashion as they have been measured in the Northern Hemisphere. The simultaneity and general frequency of auroral occurrences in both hemispheres were established.

Meteorology particularly benefited from the investigations in the Antarctic where, until the IGY, meteorological knowledge was scant and upper air observations almost nonexistent. The Antarctic is the only place on earth where the ocean waters perform earth circuits without continental or other interruptions and where a high, frigid continent underlies a very large-scale circulation system.

The earth's crust and interior were also subjected to careful scrutiny. Seismic stethoscopes measured natural and manmade disturbances of vibrations in the earth, both on land and at sea, and measured strains and deformations in the earth's crust. Mountain roots were in some cases found to penetrate through the earth's crust deeply into the mantle. Measurements of the value of gravity are tying in hitherto incomplete gravity networks and revealing mass distribution and mass anomalies.

The data now gathering in IGY World Data Centers will spur man's imagination concerning his entire world as never before. The continuing use of this data, and its vast research value, far outweighs the cost of the IGY effort and should greatly accelerate the pace of research in relevant areas.

### **World Data Centers**

In accordance with agreements reached by the nations participating in the IGY, the data resulting from observations are being collected in three World Data Centers: World Data Center A, located in the United States; World Data Center B, established in the U.S.S.R.; and World Data Center C, maintained by eight nations of Western Europe, Japan, and Australia. If received by only one of the World Data Centers, data are immediately copied and sent to the other two centers so that three complete sets of IGY data will be in existence for the use of interested scientists in all parts of the world. Any individual or institution may obtain copies of the data from a center at a nominal sum to cover reproduction costs.

A third 6-monthly catalog of data was prepared by all IGY World Data Centers in January 1959. A fourth catalog will be prepared by September 1959. For each discipline, one of the Data Centers (A, B, or C) has the responsibility of preparing a final catalog of IGY data held by the IGY World Data Centers. The schedule for production of these catalogs varies considerably from discipline to discipline; it is expected that catalogs for most disciplines will be prepared by the end of 1960.

World Data Center A has been organized into 11 archives for different IGY disciplines located in various parts of the United States, with a Central Coordination Office in Washington, D.C., directed by the National Academy of Sciences. The locations of the 11 archives follow:

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

Communications regarding data interchange matters in general and World Data Center A as a whole should be addressed to: Director, World Data Center A, National Academy of Sciences, 2101 Constitution Avenue NW., Washington 25, D.C. Inquiries and communications concerning data in specific disciplines should be addressed to the appropriate archive listed above.

Publications based on IGY observational data are being issued under a disciplinary report series by the appropriate archives and a general report series by the Coordination Office.

#### **Moscow Meeting of the CSAGI**

The fifth reunion of the Comité Spécial de l'Année Géophysique Internationale (CSAGI), the international planning body for the IGY, was held in Moscow in July and August 1958. The four principal matters taken up by the CSAGI Moscow Assembly were (1) a review of the accomplishments of the first two-thirds of the IGY; (2) the question of the future of international cooperation in geophysics after the end of the IGY; (3) the problem of the collection, storage, and cataloging of data at the World Data Centers; and (4) the question of publication of IGY data and results.

A review of the accomplishments of the IGY was achieved largely through symposia in the various disciplines. Results reported by the

United States and the U.S.S.R. on their work in rockets and satellites were of particular interest.

### **International Geophysical Cooperation—1959**

The question of the future of international cooperation in geophysics after the end of the IGY was given emphasis at the Moscow Assembly, where a proposal was introduced by the Soviet delegation to extend the entire IGY program for an additional year. The final decision on this proposal reached by the assembly was to recommend the continuation of geophysical research only in certain fields under a program to be known as "International Geophysical Cooperation, 1959" (IGC-1959). Included among the recommendations for continued cooperative work were a world magnetic survey, a limited solar activities program, Antarctic research, oceanographic studies, and rocket and satellite observations. The CSAGI recommendation for International Geophysical Cooperation—1959 was subsequently adopted by the International Council of Scientific Unions, the parent body of the CSAGI. Participation in the program is on a voluntary basis at national levels.

The National Science Foundation has accepted in principle the proposed program for continuation of international participation in geophysical sciences in 1959. Research proposals supported by the Foundation's Division of Mathematical, Physical, and Engineering Sciences represent U.S. contributions to the continuation of international participation in geophysical sciences in 1959.

### **Annals of the IGY**

At the Moscow Assembly of the CSAGI it was agreed that the *Annals of the International Geophysical Year*, published for the CSAGI by the Pergamon Press, Ltd., London, should serve as a complete record of the IGY. All important IGY results and data will be published in the *Annals*. Such publication will not, however, preclude publication elsewhere.

The following volumes of the *Annals* are in published form:

Volume I, The First and Second International Polar Years, the Inception and Development of the IGY.

Volume IIA, The International Geophysical Year Meetings (first four CSAGI Assemblies), 1959.

Volume III, The Ionosphere, 1957.

Volume IV, IGY Instruction Manuals (nuclear radiation, aurora and airglow, longitudes and latitudes, geomagnetism, seismology, cosmic radiation), 1957.

Volume V, IGY Instruction Manual (ozone, aurora and airglow, Antarctic radio communications), 1957.

Volume VI, Manual on Rockets and Satellites, 1958.

Volume VII, IGY Instructional Manual (world days and communications, CSAGI Guide to World Data Centers, Arctic communications, geographical distribution of IGY stations), 1959.

Additional volumes of the *Annals* are in process of publication.

## **U.S. Antarctic Research Program**

### **General**

The scientific research conducted in the Antarctic during the IGY developed results that indicated the need for a continuing program. To plan for continuing Antarctic research at the international level, the Special Committee for Antarctic Research (SCAR) was established by the International Council of Scientific Unions. This Committee, initially composed of representatives of the 12 nations who conducted programs in the Antarctic as part of the IGY, makes broad international program recommendations on the scientific work needed in the region. All of the 12 nations represented have agreed to continue scientific programs in Antarctica.

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

A subsequent policy decision reduced the six-station network in the Antarctic maintained by the United States during the IGY to a four-station network: the Pole Station, the Byrd Station, the Naval Air Facility at McMurdo, and the Hallett Station. In addition to operating these four stations, the United States agreed to supply scientific personnel and equipment under cooperative arrangements with other countries at the following stations: the Scott Base (operated by New Zealand during the IGY and continued in the post-IGY period); the Wilkes Station (formerly maintained by the United States, now by Australia); and the Ellsworth Station (during the IGY operated by the United States, now maintained by Argentina). The U.S. IGY Little America Station was shut down at the close of the IGY.

### **Operation of the U.S. Antarctic Research Program**

To undertake the detailed problems of coordinating a program of Antarctic research, the National Science Foundation established during 1958 the Antarctic Research Program under the Office of Special International Programs. Research proposals for Antarctic research are re-

ceived from governmental agencies, universities, and other institutions; are evaluated through suitable review; selected to assure a balanced program; and supported to the extent of available funds and logistic support. Logistic planning and requirements are handled in cooperation with the U.S. Navy. (A description of research currently conducted as part of this program can be found under "Support of Basic Research in the Sciences," p. 46.)

The Antarctic Research Program must in one sense be a "package" program, because it crosses the lines of many scientific disciplines and because it involves a geographic area. However, at the same time the determination of program grants must be made on the basis of scientific competence as for any Foundation grant. The area is exceedingly remote and those who receive grants for research must have access to Antarctica through the facilities of the Naval Support Force. Thus, before processing a grant for research in the Antarctic, the National Science Foundation must make available more than funds; it must also assure the grantee that the travel accommodations to and from Antarctica, the living space for the research worker, and the scientific facilities necessary for this work have been developed and are on hand. All of these items contribute to the total cost of the research; the funds involved in an individual grant itself do not therefore indicate the full cost of the particular research project.

Considerable liaison work with the Naval Support Force and with the Department of State are necessary to arrange for the logistic support that each grantee must have. In addition to this, many grantees must work in cooperation with the scientists of other nations, and the necessary liaison work to arrange for such cooperative operations must also be supplied where necessary through arrangements by the Foundation's staff.

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

To assure full cooperation and coordination of the intragovernment operations, the Interdepartmental Committee on Antarctic Research, composed of representatives of Government agencies with interests in the Antarctic, has been set up by the Foundation to examine proposals



and programs of the represented agencies and the broad program suggested by the Committee on Polar Research. The first U.S. team of scientists to carry out research in the Antarctic following the IGY left the United States in the fall of 1958 and will return January-February 1960 (Team I).

A second group of scientists (Team II) will leave the United States in the fall of 1959; the summer contingent will return January-February 1960 and the winter contingent in January-February 1961.

The following table shows the number of U.S. scientists in Team I and the number planned for Team II at each station and aboard ships in Antarctic waters:

Station	Team I		Team II	
	Summer	Winter	Summer	Winter
McMurdo (U.S.) . . . . .	6	3	16	6
Byrd (U.S.) . . . . .	0	13	4	12
Pole (U.S.) . . . . .	0	8	0	9
Hallett (U.S. joint with New Zealand) . . . . .	0	1	0	5
Wilkes (Australia) . . . . .	0	3	0	4
Ellsworth (Argentina) . . . . .	0	1	0	5
Scott (New Zealand) . . . . .	0	3	3	3
Shipboard . . . . .	2	0	6	0
	8	32	29	44

## Cooperation With International Science Activities of Other Government Agencies

### International Cooperation Administration

Under the terms of an interagency service agreement between the Foundation and the International Cooperation Administration, certain scientific and technical services have been supplied to that agency for activities in different countries. These services have included during the past year representation by more than a dozen qualified scientists at committee meetings and symposia of the Organization for European Economic Cooperation and the furnishing of a science adviser to the Government of the Philippines in Manila.

### Department of State

The Foundation has cooperated with the Department of State in establishing liaison for the exchange of information between the staff of the Foundation and the science officers of the Department of State who have assumed their overseas posts.

Appendices

## APPENDIX A

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

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EARL L. GREEN, R. B. Jackson Memorial Laboratory, Bar Harbor, Maine.

PHILIP HANDLER, Department of Physiological Chemistry, Duke University School of Medicine, Durham, N.C.

ARTHUR HASLER, Department of Zoology, University of Wisconsin, Madison, Wis.

STERLING B. HENDRICKS, Bureau of Plant Industry, U.S. Department of Agriculture, Beltsville, Md.

HUDSON HOAGLAND, Worcester Foundation for Experimental Biology, Shrewsbury, Mass.

CARL L. HUBBS, Scripps Institution of Oceanography, University of California, La Jolla, Calif.

WILLIAM D. McELROY, Department of Biology, Johns Hopkins University, Baltimore, Md.

ERNST MAYR, Museum of Comparative Zoology, Harvard University, Cambridge, Mass.

HOWARD M. PHILLIPS, Alabama College, Montevallo, Ala.

C. LADD PROSSER, Department of Physiology, University of Illinois, Urbana, Ill.

ALBERT C. SMITH, Museum of Natural History, U.S. National Museum, Smithsonian Institution, Washington, D.C.

### *Advisory Panel for Chemistry*

ANTON B. BURG, Department of Chemistry, University of Southern California, Los Angeles, Calif.

BYRCE L. CRAWFORD, Jr., Department of Chemistry, University of Minnesota, Minneapolis, Minn.

STANLEY J. CRISTOL, Department of Chemistry, University of Colorado, Boulder, Colo.

FREDERICK R. DUKE, Department of Chemistry, Iowa State College, Ames, Iowa.

FRANK T. GUCKER, Department of Chemistry, Indiana University, Bloomington, Ind.

DONALD F. HORNIG, Department of Chemistry, Princeton University, Princeton, N.J.

DAVID N. HUME, Department of Chemistry, Massachusetts Institute of Technology, Cambridge, Mass.

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

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

JOHN D. ROBERTS, Department of Chemistry, California Institute of Technology, Pasadena, Calif.

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

PHILIP W. WEST, Department of Chemistry, Louisiana State University, Baton Rouge, La.

### *Advisory Panel for College Programs and Teacher Improvement Training*

JULIAN W. HILL, Educational Aid Committee, E. I. du Pont de Nemours & Co., Wilmington, Del.

MARCUS E. HOBBS, Graduate School of Arts and Sciences, Duke University, Durham, N.C.

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

WALTER F. LOEWING, Graduate School, Iowa State University, Iowa City, Iowa.

BERNARD S. MEYER, Department of Botany, Ohio State University, Columbus, Ohio.

EUGENE P. NORTHPROP, Department of Mathematics, University of Chicago, Chicago, Ill.

*Advisory Panel for Developmental Biology*

FREDERIK B. BANG, Department of Pathology, Johns Hopkins University, Baltimore, Md.

DIETRICH H. F. A. BODENSTEIN, U.S. Public Health Service, National Heart Institute, Gerontology Branch, Baltimore City Hospital, Baltimore, Md.

ARMIN C. BRAUN, The Rockefeller Institute for Medical Research, New York, N.Y.

RALPH O. ERICKSON, Department of Botany, University of Pennsylvania, Philadelphia, Pa.

NELSON T. SPRATT, Jr., Department of Zoology, University of Minnesota, Minneapolis, Minn.

ALBERT TYLER, Department of Embryology, California Institute of Technology, Pasadena, Calif.

EDGAR ZWILLING, Department of Animal Genetics, University of Connecticut, Storrs, Conn.

*Advisory Panel for Earth Sciences*

J. R. BALSLEY, Jr., U.S. Geological Survey, Washington, D.C.

JULIAN R. GOLDSMITH, Department of Geology, University of Chicago, Chicago, Ill.

W. B. HEROY, Sr., Geotechnical Corporation, Dallas, Tex.

HARRY H. HESS, Department of Geology, Princeton University, Princeton, N.J.

HELMUT E. LANDSBERG, Division of Climatology, U.S. Weather Bureau, Washington, D.C.

BRYAN PATTERSON, Division of Geological Sciences, Harvard University, Cambridge, Mass.

R. P. SHARP, Department of Geology and Geophysics, California Institute of Technology, Pasadena, Calif.

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

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

*Advisory Panel for Engineering Sciences*

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.

ARTHUR B. BROWNELL, Worcester Polytechnic Institute, Worcester, Mass.

PAUL F. CHENEVA, Department of Electrical Engineering, Massachusetts Institute of Technology, Cambridge, Mass.

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

HARMER E. DAVIS, Institute of Transportation and Traffic Engineering, University of California, Berkeley, Calif.

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

OSCAR T. MARZKE, U.S. Steel Corp., Pittsburgh, Pa.

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

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

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.

W. THOMAS EDMONDSON, Department of Zoology, University of Washington, Seattle, Wash.

EUGENE P. ODUM, Department of Biology, University of Georgia, Athens, Ga.

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.

VERNON BRYSON, Institute of Microbiology, Rutgers University, New Brunswick, N.J.

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

EVERETT DEMPSTER, Department of Genetics, University of California, Berkeley, Calif.

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.

*Advisory Panel on High Energy Accelerators*

HERBERT L. ANDERSON, The Enrico Fermi Institute for Nuclear Studies, University of Chicago, Chicago, Ill.

RICHARD CRANE, Department of Physics, University of Michigan, Ann Arbor, Mich.

BERNARD T. FELD, Laboratory for Nuclear Science, Massachusetts Institute of Technology, Cambridge, Mass.

LELAND J. HAWORTH, Brookhaven National Laboratory, Upton, Long Island, N.Y.

E. J. LOFGREN, Radiation Laboratory, University of California, Berkeley, Calif.

LEONARD L. SCHIFF, Department of Physics, Stanford University, Stanford, Calif.

FREDERICK SEITZ, Department of Physics, University of Illinois, Urbana, Ill.

ROBERT SERBER, Department of Physics, Columbia University, New York, N.Y.

MILTON WHITE, Department of Physics, Princeton University, Princeton, N.J.

ROBERT R. WILSON, Laboratory of Nuclear Studies, Cornell University, Ithaca, N.Y.

*Advisory Panel for Mathematical Sciences*

LIPMAN BERS, Department of Mathematics, New York University, New York, N.Y.

J. L. DOOB, Department of Mathematics, University of Illinois, Urbana, Ill.

DOROTHY MORROW GILFORD, Office of Naval Research, Washington, D.C.

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

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

DEANE MONTGOMERY, Department of Mathematics, Institute for Advanced Study, Princeton, N.J.

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

JOHN V. WEHAUSEN, Department of Engineering, University of California, Berkeley, Calif.

RAYMOND L. WILDER, Department of Mathematics, University of Michigan, Ann Arbor, Mich.

*Advisory Panel for Medical Student Research*

SAM L. CLARK, Sr., Department of Anatomy, Vanderbilt University School of Medicine, Nashville, Tenn.

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

RUSSELL L. HOLMAN, Department of Pathology, Louisiana State University School of Medicine, New Orleans, La.

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

WALTER J. NUNGESTER, Department of Bacteriology, University of Michigan School of Medicine, Ann Arbor, Mich.

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.

EDWIN S. LENNOX, Department of Chemistry and Chemical Engineering, University of Illinois, Urbana, Ill.

FRITZ LIPMANN, The Rockefeller Institute for Medical Research, New York, N.Y.

MERTON F. UTTER, Department of Biochemistry, Western Reserve University, Cleveland, Ohio.

C. B. VAN NIEL, Department of Biology, Hopkins Marine Station, Pacific Grove, Calif.

*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, McCollum-Pratt Institute, Johns Hopkins University, Baltimore, Md.

VINCENT G. DETHIER, Division of Biology, University of Pennsylvania, Philadelphia, Pa.

IRVING M. KLOTZ, Department of Chemistry, Northwestern University, Evanston, Ill.

CYRUS LEVINTHAL, Department of Biology, Massachusetts Institute of Technology, Cambridge, Mass.

MANUEL F. MORALES, Department of Biochemistry, Dartmouth College, Hanover, N.H.

AARON NOVICK, Institute for Molecular Biology, University of Oregon, Eugene, Oreg.

JEROME GROSS, Massachusetts General Hospital, Boston, Mass.

*Advisory Panel for Physics*

ROBERT H. DICKE, Department of Physics, Princeton University, Princeton, N.J.

JOHN R. PELLAM, Department of Physics, California Institute of Technology, Pasadena, Calif.

JAMES RAINWATER, Department of Physics, Columbia University, New York, N.Y.

ROBERT G. SACHS, Department of Physics, University of Wisconsin, Madison, Wis.

EMILIO G. SEGRE, Department of Physics, University of California, Berkeley, Calif.

LLOYD P. SMITH, Avco Research and Advanced Development Division, Wilmington, Mass.

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.

CLARENCE ZENER, Research Laboratories, Westinghouse Electric Corp., Pittsburgh, Pa.

*Advisory Panel for Psychobiology*

WENDELL R. GARNER, Department of Psychology, Johns Hopkins University, Baltimore, Md.

LLOYD G. HUMPHREYS, Department of Psychology, University of Illinois, Urbana, Ill.

DOUGLAS H. LAWRENCE, Department of Psychology, Stanford University, Stanford, Calif.

CONRAD G. MUELLER, Department of Psychology, Columbia University, New York, N.Y.

H. E. ROSVOLD, Laboratory of Psychology, National Institute of Mental Health, Bethesda, Md.

DELOS D. WICKENS, Department of Psychology, Ohio State University, Columbus, Ohio.

*Advisory Panel for Secondary School Programs*

ALFRED BORG, Bacteriology Department, Kansas State College, Manhattan, Kans.

FRANCIS E. CISLAK, Reilly Tar and Chemical Corp., Indianapolis, Ind.

JOHN A. HOLDEN, Jr., Department of Education, Montpelier, Vt.

JOSEPH PLATT, Harvey Mudd College, Claremont, Calif.

JOHN W. SHIRLEY, North Carolina State College, Raleigh, N.C.

PELHAM WILDER, Jr., Department of Chemistry, Duke University, Durham, N.C.

SAMUEL S. WILKS, Department of Mathematics, Princeton University, Princeton, N.J.

*Advisory Panel for Regulatory Biology*

WILLIAM BOYD, Department of Biochemistry, Boston University, Boston, Mass.

JOHN R. BROBECK, University of Pennsylvania, Department of Physiology, Philadelphia, Pa.

ROY FORSTER, Department of Zoology, Dartmouth College, Hanover, N.H.

ROBERT E. HUNGATE, Department of Bacteriology, University of California, Davis, Calif.

CHARLTON HUNT, Department of Physiology, University of Utah, Salt Lake City, Utah.

RACHMIEL LEVINE, Department of Metabolic Research, Michael Reese Hospital, Chicago, Ill.

FOLKE SKOOG, University of Wisconsin, Department of Botany, Madison, Wis.

CARROLL M. WILLIAMS, Department of Zoology, Harvard University, Cambridge, Mass.

*Advisory Panel for Scientific Manpower Information*

- PHILIP N. POWERS, Internuclear Company, Clayton, Mo.  
JAMES W. COLE, JR., School of Chemistry, University of Virginia, Charlottesville, Va.  
HAROLD GOLDSTEIN, Division of Manpower and Employment Statistics, Bureau of Labor 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, Career Executive Board, Civil Service Commission, Washington, D.C.  
M. H. TRYTTEN, Office of Scientific Personnel, National Research Council-National Academy of Sciences, Washington, D.C.  
J. FLETCHER WELLEMAYER, Washington, D.C.  
DAEL WOLFLE, American Association for the Advancement of Science, Washington, D.C.

*Advisory Panel for Social Science Research*

- HARRY ALPERT, University of Oregon, Eugene, Oreg.  
I. BERNARD COHEN, Committee on Higher Degrees in History of Science, Harvard University, Cambridge, Mass.  
\*LEONARD S. COTTRELL, JR., Russell Sage Foundation, New York, N.Y.  
LOREN C. EISELEY, Department of Anthropology, University of Pennsylvania, Philadelphia, Pa.

EMIL W. HAURY, Department of Anthropology, University of Arizona, Tucson, Ariz.

E. ADAMSON HOEBEL, Department of Anthropology, University of Minnesota, Minneapolis, Minn.

ERNEST NAGEL, Department of Philosophy, Columbia University, New York, N.Y.

FREDERICK F. STEPHAN, Department of Economics and Social Institutions, Princeton University, Princeton, N.J.

JOHN W. THIBAUT, Department of Psychology, University of North Carolina, Chapel Hill, N.C.

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

*Advisory Panel for Systematic Biology*

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

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

ROGERS McVAUGH, University Museums Building, University of Michigan, Ann Arbor, Mich.

DONALD P. ROGERS, Department of Botany, University of Illinois, Urbana, Ill.

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

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

ALBERT C. SMITH, Museum of Natural History, Smithsonian Institution, Washington, D.C.

WILLIAM C. STEERE, New York Botanical Garden, Bronx Park, New York, N.Y.

HORACE W. STUNKARD, American Museum of Natural History, New York, N.Y.

\*Part of the year only.

## APPENDIX B

### Financial Report for Fiscal Year 1959

#### SALARIES AND EXPENSES APPROPRIATION

##### *Receipts*

Appropriation for fiscal year 1959-----	\$136,000,000.00	
Unobligated balance from fiscal year 1958----	1,329,145.00	
Total -----		\$137,329,145

##### *Obligations*

Support of science:		
Basic research:		
Biological and medical sciences-----	\$19,805,483.00	
Mathematical, physical, and engineering sciences-----	22,985,407.00	
Social sciences -----	853,366.00	
Antarctic research -----	2,305,903.00	
Subtotal-----	45,950,159.00	
Research facilities:		
Biological and medical sciences-----	3,269,800.00	
Mathematical, physical, and engineering sciences-----	12,310,650.00	
Subtotal-----	15,580,450.00	
Surveys and reports-----	230,254.00	
Dissemination of scientific information-----	3,847,527.00	
Subtotal, grants and contracts-----	65,608,390.00	
Program development, operation, and evaluation -----	1,700,120.00	
Total obligations—support of science--		\$67,308,510.00
Support of scientific manpower:		
Graduate fellowships-----	13,070,838.00	
Institutes program-----	33,247,999.00	
Special projects in science education-----	8,940,905.00	
Course-content improvement program-----	6,030,325.00	
Clearinghouse for scientific manpower infor- mation -----	780,285.00	
Subtotal, grants and contracts-----	62,070,352.00	

Program development, operation, and evaluation -----	\$2, 285, 432. 00
Total obligations—support of scientific manpower -----	\$64, 355, 784. 00
Executive direction and management-----	1, 275, 849. 00
Total obligations fiscal year 1959-----	132, 940, 143. 00
Unobligated balance carried forward to fiscal year 1960-----	<sup>1</sup> 4, 389, 002. 00
Total -----	137, 329, 145. 00

#### INTERNATIONAL GEOPHYSICAL YEAR APPROPRIATIONS

##### *Receipts*

Appropriation for fiscal year 1959-----	\$2, 500, 000. 00
Unobligated balance from fiscal year 1958-----	5, 139, 593. 00
Total -----	\$7, 639, 593. 00

##### *Obligations*

Technical programs-----	\$5, 620, 801. 00
Administrative expenses, National Academy of Sciences-National Research Council-----	275, 708. 00
Administrative expenses, National Science Foundation -----	35, 495. 00
Total obligations, fiscal year 1959-----	5, 932, 004. 00
Unobligated balance carried forward to fiscal year 1960-----	<sup>1</sup> 1, 707, 589. 00
Total -----	7, 639, 593. 00

#### TRUST FUND

##### *Receipts*

Unobligated balance from fiscal year 1958-----	\$7, 218. 00
Donations from private sources-----	2, 140. 00
Total -----	9, 358. 00

##### *Obligations*

Total obligations fiscal year 1959-----	2, 745. 00
Unobligated balance carried forward to fiscal year 1960-----	6, 613. 00
Total -----	9, 358. 00

<sup>1</sup> A substantial portion of the unobligated balance represents outstanding payments under grants and contracts with other Federal agencies.

## APPENDIX C

### Grants for Basic Research

#### ANTHROPOLOGICAL SCIENCES

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Harry L. Shapiro, Department of Anthropology; *Archaeological Reconnaissance on Okinawa*; 1 year; \$2,800

UNIVERSITY OF ARIZONA, Tucson, Ariz. Frederick S. Huise, Department of Anthropology; *Biological Characteristics of Migrants*; 1 year; \$4,000

Edward H. Spicer, Department of Anthropology; *Processes of Cultural Assimilation*; 2 years; \$15,200

BROWN UNIVERSITY, Providence, R.I.; J. L. Giddings, Department of Anthropology; *Beach-Ridge Dating*; 2 years; \$37,800

UNIVERSITY OF BUFFALO, Buffalo, N.Y.

George L. Trager, Department of Anthropology; *Paralanguage in the Native Speech of Taos Pueblo*; 1 year; \$8,100

Marian E. White, Department of Anthropology; *Iroquois Migration Route*; 1 year; \$4,300

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.

George M. Foster, Department of Anthropology; *Comparative Study of Socio-Cultural Change*; 4 years; \$39,000

Robert F. Helzer, Department of Anthropology, Berkeley; *Culture History of the Western Great Basin*; 1 year; \$5,500

UNIVERSITY OF CHICAGO, Chicago, Ill.

Robert J. Braidwood, The Oriental Institute; *Paleo-Ecological Study of the Appearance of Food Production*; 3 years; \$47,700

COLUMBIA UNIVERSITY, New York, N.Y.

Uriel Weinreich, Department of Linguistics; *Linguistic and Cultural Differentiation of Coterritorial Societies*; 2 years; \$7,800

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.

Demitri B. Shlimkin, The Graduate Council; *Siberian Linguistic Analysis*; 1 year; \$1,100

HARVARD UNIVERSITY, Cambridge, Mass.

Gordon R. Willey, Peabody Museum; *Archaeological Excavation of a Maya Site*; 2 years; \$2,700

UNIVERSITY OF IDAHO, Moscow, Idaho

A. W. Bowers, Department of Anthropology; *Archaeological Study of Twin Falls*; 1 year; \$2,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.

Oscar Lewis, Department of Anthropology; *Process of Urbanization in Mexico*; 1 year; \$15,700

INSTITUTE OF ANDEAN RESEARCH, New York, N.Y.

Gordon F. Ekholm; *Interrelationships of New World Cultures*; 2 years; \$40,700

LAWRENCE COLLEGE, Appleton, Wis.

Harold K. Schneider, Department of Anthropology; *The Role of Livestock in Nyaturu Society*; 1 year; \$13,400

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; *Archaeological Study of Glacial Lake Agassiz Basin*; 1 year; \$9,800

NATIONAL BUREAU OF ECONOMIC RESEARCH, INC.; New York, N.Y.

Solomon Fabricant, Director of Research; *International Economic Transactions*; 2 years; \$51,000

UNIVERSITY OF ROCHESTER, Rochester, N.Y.

Richard N. Rosett, Department of Economics; *Investigations of Household Economic Behavior*; 1 year; \$9,400

SMITHSONIAN INSTITUTION, Washington, D.C.

Ralph S. Solecki, Department of Anthropology; *Prehistoric Man in Shanidar Valley*; 1 year; \$23,500

William C. Sturtevant, Bureau of American Ethnology; *Seminole Culture*; 1 year; \$3,000

STANFORD UNIVERSITY, Stanford, Calif.

B. A. Gerow, Department of Anthropology; *Obsidian-Hydration Dating Method*; 1 year; \$8,800

TULANE UNIVERSITY, New Orleans, La.

William F. Friedman, Middle American Research Institute; *Hieroglyphic Writings of the Ancient Maya*; 2 years; \$4,000

UNIVERSITY OF WASHINGTON, Seattle, Wash.

B. Ottenberg, Department of Anthropology; *Anthropological Study of Urban Nigeria*; 13 months; \$15,000

#### ASTRONOMY

ASSOCIATION OF UNIVERSITIES FOR RESEARCH IN ASTRONOMY, INC., Tucson, Ariz.; Aden B. Meinel, Kitt Peak National Observatory; *Preliminary Conceptual Design and Experimental Studies for Large Aperture Orbital Telescopes*; 1 year; \$160,000

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena 4, Calif.

F. Zwicky, Department of Astrophysics; *A Cooperative Supernova Search*; 1 year; \$7,400

F. Zwicky, Department of Astronomy; *Radial Velocities of a Special Class of Blue Stars*; 1 year; \$3,900

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.

Merle F. Walker, Department of Astronomy, Lick Observatory, Berkeley; *Application of the Lallemand-type Image Converter*; 1 year; \$8,600

O. Struve, Department of Astronomy; *Computation of Orbits in the Restricted Three Body Problem*; 2 years; \$20,900

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio

Victor M. Blanco, Department of Astronomy; *Infrared Studies of Faint Red Stars*; 2 years; \$18,900

J. J. Nassau, Department of Astronomy; *New Ultraviolet Transmitting Objective Prism*; 1 year; \$10,500



**UNIVERSITY OF CHICAGO, Chicago, Ill.**

G. van Biesbroeck, Department of Astronomy; *Astrometric Investigations*; 1 year; \$6,200

W. A. Hiltner, Yerkes Observatory, Williams Bay, Wis.; *Image Converters for Astrometrical Photography*; 1 year; \$15,000

W. A. Hiltner, Yerkes Observatory; *Program for Research on Galactic Clusters*; 2 years; \$12,800

G. P. Kuiper, Yerkes Observatory; *Physical and Statistical Studies of Asteroids*; 1 year; \$29,500

K. H. Prendergast, Yerkes Observatory, Williams Bay, Wis.; *Problems of Theoretical Astrophysics*; 2 years; \$11,700

UNIVERSITY OF CINCINNATI, Cincinnati, Ohio; Paul Herget, Cincinnati Observatory; *The Calculation of Minor Planet Orbits*; 1 year; \$10,000

COLUMBIA UNIVERSITY, New York 27, N.Y.; J. Schlit, Department of Astronomy; *Studies Related to the Establishment of a Large Astrometric Telescope in the Southern Hemisphere*; 1 year; \$25,300

DARTMOUTH COLLEGE, Hanover, N.H.; G. Z. Dimitroff, Department of Mathematics and Astronomy; *Solar Activity Related to Ionospheric Phenomena*; 1 year; \$1,500

UNIVERSITY OF FLORIDA, Gainesville, Fla.; T. D. Carr and A. G. Smith; Department of Physics; *Radio Observations of Jupiter and Saturn from Chile*; 2 years; \$41,000

FORDHAM UNIVERSITY, New York, N.Y.; W. J. Miller, Astronomical Laboratory; *Photometric and Measuring Equipment for the Variable Star Program*; 2 years; \$5,000

GEORGETOWN UNIVERSITY, Washington 7, D.C.; C. C. Kless and W. P. Meggers, Department of Astronomy; *Investigations of the Sun's Spectrum*; 2 years; \$28,800

HARVARD UNIVERSITY, Cambridge, Mass. Thomas Gold, Harvard College Observatory; *Twenty-one Centimeter Radio Astronomy*; 2 years; \$97,000

David Layzer, Department of Astronomy; *Theoretical Energy Levels and Transition Probabilities*; 1 year, \$12,300

Donald H. Menzel, Department of Astronomy; *Henry Draper Spectral Types for the Southern Polar Cap*; 1½ years; \$6,900

G. de Vaucouleurs, Harvard College Observatory; *Photometric Studies of Bright Galaxies*; 2 years; \$15,000

HIGH ALTITUDE OBSERVATORY OF THE UNIVERSITY OF COLORADO, Boulder, Colo.; Dr. Walter Orr Roberts, Director; *High Resolutions Spectrograph*; 2 years; \$80,000

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; Frank K. Edmondson, Director, Goethe Link Observatory; *Observations of Asteroids*; 3 years; \$22,500

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; John D. Strong, Laboratory of Astrophysics and Physical Astronomy; *High Altitude Astronomy*; 6 months; \$30,000

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Lawrence H. Aller, Department of Astronomy; *The Abundance of Certain Elements in the Solar Atmosphere*; 2 years; \$13,800

O. C. Mohler, McMath-Hulbert Observatory; *Hydrogen in the Solar Spectrum*; 2 years; \$19,600

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; William J. Luyton, Department of Astronomy; *General Proper Motion Survey*; 3 years; \$25,800

OHIO STATE UNIVERSITY, Columbus, Ohio; John D. Kraus, Department of Electrical Engineering; *Completion of 360-foot Standing Parabola Radio Telescope*; 2 years; \$166,000

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; William Blitzstein and Frank Bradshaw Wood, Department of Astronomy; *Astronomical Research in the Infrared*; 2 years; \$13,600

UNIVERSITY OF PITTSBURGH, Pittsburgh Pa.; N. E. Wagman, Allegheny Observatory; *Determination of the Parallaxes of Dwarf Stars*; 4 years; \$6,000

PRINCETON UNIVERSITY, Princeton, N.J.; Martin Schwarzschild, Department of Astronomy; *High Altitude Astronomy*; 3 years; \$165,000

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; Robert Fleischer, Department of Physics; *Radio Astronomy*; 18 months; \$20,000

UNIVERSITY OF TEXAS, Austin, Tex. Frank N. Edmonds, Jr., Department of Mathematics and Astronomy; *An Analysis of Solar Granulation*; 1 year; \$3,000

Gerald P. Kuiper, McDonald Observatory; *Design of Infrared Microwave Telescope*; 1 year; \$40,000

UNIVERSITY OF TOLEDO, Toledo, Ohio; Robert A. Chipman, Department of Astronomy; *Search for Spectrum Lines in Radio Astronomy*; 2 years; \$22,800

VANDERBILT UNIVERSITY, Nashville, Tenn.; John H. DeWitt, Department of Astronomy; *The Application of Television Techniques to Astronomy*; 1 year; \$27,900

UNIVERSITY OF WISCONSIN, Madison, Wis. C. M. Huffer, Department of Astronomy; *Three-Color Studies of Eclipsing Binaries*; 1 year; \$5,600

Julian E. Mack, Department of Physics; *Interferometric Study of Coronal Emission*; 1 year; \$3,000

YALE UNIVERSITY, New Haven, Conn. Dirk Brouwer, Department of Astronomy; *Modernization of a Long Screw Measuring Engine and Its Application to Astrometric Research*; 3 years; \$27,500

Harlan J. Smith, Department of Astronomy; *Investigation of Planetary Radio Emission*; 16 months; \$21,000

**ATMOSPHERIC SCIENCES**

UNIVERSITY OF ARIZONA, Tucson, Ariz.; A. Richard Kassander, Jr., Louis J. Battan, and James E. McDonald, Institute of Atmospheric Physics; *Physics of Clouds and of Cloud Modification*; 3 years; \$161,800

ATMOSPHERIC RESEARCH GROUP, Pasadena, Calif.; Paul B. MacCready, Jr., *Field Studies in Cloud Physics*; 1 year; \$57,100

UNIVERSITY OF CALIFORNIA, Berkeley, Calif. J. Neyman, Department of Statistics; *Randomized Cloud Seeding*; 2 years; \$64,900

Norris W. Rakestraw, Scripps Institution of Oceanography, La Jolla; *Carbon Dioxide in the Atmosphere*; 3 years; \$84,000

Zdenek Sekera, Department of Meteorology, Los Angeles; *Planetary Earth Albedo*; 2 years; \$58,700

UNIVERSITY OF CHICAGO, Chicago, Ill. Horace R. Byers, Department of Meteorology; *Research in Cloud Physics*; 3 years; \$383,700

Horace R. Byers and Roscoe R. Braham, Department of Meteorology; *Physical Effects of Silver Iodide Seeding in the Great Plains*; 3 years; \$114,300

Chester W. Newton, Department of Meteorology; *Aerological Analysis of Extratropical Current Systems*; 2 years; \$20,000

Sverre Pettersen, Department of Meteorology; *Heat and Water Vapor Exchange Processes*; 30 months; \$37,500

CHIEF OF NAVAL RESEARCH, Washington, D.C.; Bernard Vonnegut, Arthur D. Little, Inc., Cambridge, Mass.; *Cloud Electrification Studies*; 1 year; \$50,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.; R. G. Semonin, Department of Meteorology; *Atmospheric Particulates in Precipitation Physics*; 2 years; \$43,000

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.

Henry G. Houghton, Department of Meteorology; *Study of Means for the Augmentation of the National Effort in Atmospheric Research*; 6 months; \$50,000

H. C. Willett, Department of Meteorology; *Effect of Variable Solar Activity on Atmospheric Circulation*; 2 years; \$26,000

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; George D. Frier, Department of Physics; *Electrical Properties of the Atmosphere*; 2 years; \$63,100

NEBRASKA STATE TEACHERS COLLEGE, Chadron, Nebr.; Lyle V. Andrews, Division of Science and Mathematics; *Physical Study of a Hail Suppression Program*; 18 months; \$11,000

NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY, Socorro, N. Mex.

Marx Brook, Department of Physics; *Thunderstorm Electrification*; 3 years; \$194,600

W. D. Crozier, Department of Atmospheric Physics; *Study of Atmospheric Space Charge*; 3 years; \$45,000

NEW YORK UNIVERSITY, New York 3, N.Y.;

Max A. Woodbury, Department of Mathematics; *A Study of Statistical Evaluation of Weather Modification*; 2 years; \$58,800

OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Stillwater, Okla.; Herbert L. Jones, School of Electrical Engineering; *Investigation of the Electrical Field Intensity Near a Severe Storm*; 3 years; \$23,100

OREGON STATE COLLEGE, Corvallis, Oreg.;

Fred W. Decker, Department of Physics; *Precipitation Radar Study*; 2 years; \$5,000

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.

Alfred K. Blackadar, Department of Meteorology; *Graphical Integration of Circulation Models*; 2 years; \$13,300

Charles L. Hosler, Department of Meteorology; *The Role of Orographic Barriers of Less Than 3000 Feet in the Generation and Propagation of Showers*; 3 years; \$98,600

TEXAS A. & M. RESEARCH FOUNDATION, College Station, Tex.

Yoshikazu Sasaki, Department of Oceanography and Meteorology; *A Study of Mesoscale Disturbances in the Atmosphere by Numerical Methods*; 2 years; \$35,000

Walter J. Saucier, Department of Oceanography and Meteorology; *Stratospheric Patterns*; 2 years; \$74,100

TUFTS UNIVERSITY, Medford, Mass.; Irving I. Schell, Department of Geology; *Nature of Climatic Change*; 2 years; \$17,000

WOODS HOLE OCEANOGRAPHIC INSTITUTION, Woods Hole, Mass.

Joanne S. Malkus; *Atmospheric Convection, and Its Role in Tropical Meteorology*; 3 years; \$156,100

Henry M. Stommel; *Collaborative Study of Deep Ocean Current Systems*; 2 years; \$290,000

A. H. Woodcock; *Sea-Salt Nuclei—Their Origin, Physical-Chemical Nature and Role in Atmospheric Processes*; 3 years; \$83,100

## CHEMISTRY

UNIVERSITY OF AKRON, Akron, Ohio; Maurice Morton, Institute of Rubber Research; *Anionic Addition Polymerization*; 3 years; \$56,000

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Douglas S. Chapin, Department of Chemistry; *Preferential Adsorption of Orthohydrogen and of Paradeuterium*; 3 years; \$36,500

AUGSBURG COLLEGE AND THEOLOGICAL SEMINARY, Minneapolis, Minn.; John R. Holm, Department of Chemistry; *Oxidation of Alcohols by the Chromium (VI) Oxide-Pyridine Complex*; 2 years; \$5,100

BOSTON UNIVERSITY, Boston, Mass.; Lowell V. Coulter, Department of Chemistry; *Low Temperature Heat Capacities and Entropies of the Beta Quinol Clathrates of Nitrogen, Carbon Monoxide and Hydrogen Chloride*; 2 years; \$21,100

BRANDEIS UNIVERSITY, Waltham, Mass.;

Myron Rosenblum, Department of Chemistry; *Thermal Decomposition of Oxadiazinones—A New Pyrolysis Reaction*; 2 years; \$16,700

BRIGHAM YOUNG UNIVERSITY, Provo, Utah

J. Rex Goates, Department of Chemistry; *Thermodynamic Properties of Solutions of Nonelectrolytes*; 3 years; \$21,200

H. Tracy Hall, Department of Chemistry; *High Pressure-High Temperature Studies*; 3 years; \$85,000

BROWN UNIVERSITY, Providence, R.I.; Harold R. Nace, Department of Chemistry; *Ring Contractions of Cyclic Ketones*; 3 years; \$24,000

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.

Norman Davidson, Department of Chemistry; *Production and Properties of Free Radicals in Rigid Media*; 2 years; \$18,000

George S. Hammond, Department of Chemistry; *Diffusion Kinetics in Thermal Decomposition*; 3 years; \$33,700

John H. Richards, Department of Chemistry; *Organic Chemistry of Sandwich Compounds*; 30 months; \$11,100

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.

William G. Dauben, Department of Chemistry; *Determination of Structures of Natural Products*; 2 years; \$37,500

William C. Drinkard, Jr., Department of Chemistry; *Reactivity of Organic Ligands in Complex Inorganic Compounds*; 2 years; \$8,000

Harold S. Johnston, Department of Chemistry; *Fast Gas-Phase Reactions*; 3 years; \$54,300

Daniel Kivelson, Department of Chemistry; *Electron Paramagnetic Resonance Studies of Free Radicals*; 3 years; \$27,400

James D. McCullough, Department of Chemistry, Los Angeles; *Structural and Equilibrium Studies on Group VIb Compounds*; 2 years; \$21,400

Glen H. Miller, Department of Chemistry, Santa Barbara College, Santa Barbara, Calif.; *Mechanisms of Photolysis of Some Fluorinated Compounds*; 2 years; \$14,000

Donald S. Noyce, Department of Chemistry; *Behaviour of Cyclic Systems; New Types of Transannular Interaction*; 2 years; \$27,700

Chester T. O'Konski, Department of Chemistry; *Molecular Polarization and Interaction*; 2 years; \$37,800

James N. Pitts, Jr., Department of Chemistry, Riverside; *Structure and Photochemical Reactivity of Ketones*; 2 years; \$12,800

Hosmer W. Stone, Department of Chemistry, Los Angeles; *Orthosemidine Oxidation Products as Redox Indicators*; 2 years; \$12,300

Saul Winstein, Department of Chemistry, Los Angeles; *Nature and Behavior of Ion Pairs in Solvolysis*; 3 years; \$44,300

CARLETON COLLEGE, Northfield, Minn.; Richard W. Ramette, Department of Chemistry; *Thermodynamic Studies of Solubility in Deuterium Oxide*; 3 years; \$10,000

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.

Allan K. Colter, Department of Chemistry; *Charge-Transfer Complexes in Solvolytic Reactions*; 2 years; \$11,000

Robert R. Holmes, Department of Chemistry; *Pentacoordinated Molecules*; 1 year; \$5,500

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; Samuel H. Maron, Department of Chemistry; *Thermodynamics of Non-Electrolyte Solutions*; 1 year; \$20,000

UNIVERSITY OF CINCINNATI, Cincinnati, Ohio; Raymond E. Dessy, Department of Chemistry; *Conductivities of Some Group II Organometals*; 3 years; \$12,500

CLARKSON COLLEGE OF TECHNOLOGY, Potsdam, N.Y.; Charles A. Howe, Department of Chemistry; *Orientation in the Electrophilic Substitution of Polysubstituted Aromatic Nuclei*; 2 years; \$12,600

COLUMBIA UNIVERSITY, New York, N.Y.

Ronald Breslow, Department of Chemistry; *Unsaturated Small-Ring Compounds*; 3 years; \$37,600

Victor K. LaMer, Department of Chemistry; *Properties of Mixed Monolayers With Special Reference to Molecular Architecture*; 2 years; \$19,000

COLGATE UNIVERSITY, Hamilton, N.Y.; Elmer R. Trumbull, Jr., Department of Chemistry; *Rearrangement of Epoxides and Related Compounds*; 3 years; \$8,700

UNIVERSITY OF CONNECTICUT, Storrs, Conn.

Roy J. Gritter, Department of Chemistry; *Free Radical Chemistry of Epoxides in Solution*; 2 years; \$9,500

Lewis Katz, Chemistry Department; *Polymerphism*; 3 years; \$18,200

CORNELL COLLEGE, Mount Vernon, Iowa; Philip R. Marshall, Department of Chemistry; *Kinetics of Gas-Solid Reactions*; 3 years; \$9,000

CORNELL UNIVERSITY, Ithaca, N.Y.

Andreas C. Albrecht, Department of Chemistry; *Theoretical and Experimental Study of Vibronic States*; 3 years; \$31,500

Alfred T. Blomquist, Department of Chemistry; *Four-Membered Ring Compounds; Substituted Cyclobutadienes*; 3 years; \$28,500

Peter Debye, Department of Chemistry; *Polymers in Strong Electrical Fields and Porous Media Flow*; 1 year; \$25,800

James L. Hoard, Department of Chemistry; *Structural Analysis of Rhombohedral Boron and of Multidentate Chelate Complexes of Iron Group Elements*; 2 years; \$33,300

Jerrold Meinwald, Department of Chemistry; *Highly Strained Bicyclic Systems*; 3 years; \$42,200

William T. Miller, Jr., Department of Chemistry; *Reactions of Fluoroolefins With Nucleophiles; Chemistry of Fluorocarbanions*; 3 years; \$46,800

UNIVERSITY OF DELAWARE, Newark, Del.; Harold Kwart, Department of Chemistry; *Effects of Replacement of Oxygen by Sulfur in Organic Compounds*; 3 years; \$21,700

DENISON UNIVERSITY, Granville, Ohio; Dwight R. Spessard, Department of Chemistry; *Reactivity of Haloalkylphosphonic Acids and Esters*; 2 years; \$6,900

DUKE UNIVERSITY, Durham, N.C.; Charles K. Bradsher, Department of Chemistry; *Benzoquinolinizinium Salts*; 3 years; \$28,900

DUQUESNE UNIVERSITY, Pittsburgh, Pa. Bernard T. Gillis, Department of Chemistry; *Chemistry of Azo Dienophiles*; 2 years; \$12,000

Kurt C. Schrelber, Department of Chemistry; *Conjugation in the Naphthalene System*; 3 years; \$14,200

EMORY UNIVERSITY, Atlanta, Ga.; H. Lawrence Clever, Department of Chemistry; *Solubility of Gases in Solutions of Electrolytes*; 3 years; \$18,000

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Ernest Grunwald, Department of Chemistry; *Ion Solvation and Ion Association; Studies of PI Complexes*; 3 years; \$32,400

UNIVERSITY OF FLORIDA, Gainesville, Fla.; E. E. Muschultz, Jr.; Department of Chemistry; *Collisions of Metastable Atoms in Gases*; 2 years; \$8,900

FORDHAM UNIVERSITY, New York, N.Y.; I. Moyer Hunsberger, Department of Chemistry; *Hydrogen Bonding and Double Bond Character in Heterocyclic and Aromatic Systems*; 3 years; \$23,300

GEORGETOWN UNIVERSITY, Washington, D.C.; William W. Zorbach and James W. Pratt, Department of Chemistry; *Structure of Digitoxigenin Monodigitoxoside*; 2 years; \$18,800

GEORGIA INSTITUTE OF TECHNOLOGY, Atlanta, Ga.

Donald G. Davis, Jr.; Department of Chemistry; *Chronopotentiometry With Solid Electrodes*; 2 years; \$8,000

John R. Dyer, Department of Chemistry; *Stereochemistry of Streptomycin*; 3 years; \$15,000

GOSHEN COLLEGE, Goshen, Ind.; Henry D. Weaver, Jr., Department of Chemistry; *Low Temperature Kinetic Study of Ferric Thiocyanate and Other Fast Reactions*; 3 years; \$11,600

HAMILTON COLLEGE, Clinton, N. Y.; Donald J. Denney and James W. Ring, Departments of Chemistry and Physics; *Dielectric Relaxation in Polar Liquids and Their Solutions*; 2 years; \$10,600

**HARVARD UNIVERSITY, Cambridge, Mass.**

Paul D. Bartlett, Department of Chemistry; *Mechanisms of Organic Reactions*; 3 years; \$64,500

Louis F. Fieser, Department of Chemistry; *Steroids and Quinones*; 3 years; \$39,000

David H. Geske, Department of Chemistry; *Electrochemistry of Some Organoboron Ions*; 18 months; \$6,700

William Klemperer, Department of Chemistry; *High Temperature Molecular Spectroscopy*; 3 years; \$40,000

August H. Maki, Department of Chemistry; *Electron Paramagnetic Resonance Research*; 1 year; \$14,700

**HOWARD UNIVERSITY, Washington, D.C.;**  
Moddie D. Taylor, Department of Chemistry; *Rare Earth Hydrides and Benzoates*; 3 years; \$23,000

**UNIVERSITY OF IDAHO, Moscow, Idaho;**  
James H. Cooley, Department of Chemistry; *Preparation and Properties of Aliphatic Hydroamic Esters*; 1 year; \$2,500

**ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.**

Myron L. Bender, Department of Chemistry; *Mechanisms of the Hydrolytic Reactions of Carboxylic Acid Derivatives*; 3 years; \$33,000

Paul E. Fanta, Chemistry Department; *Preparation and Properties of Ethylenimine Derivatives*; 3 years; \$20,700

Peter G. Lykos, Department of Chemistry; *Quantum Chemistry of Aromatic Molecules*; 3 years; \$20,000

**UNIVERSITY OF ILLINOIS, Urbana, Ill.**

Douglas E. Applequist, Department of Chemistry; *Sigma-Pi Interference Strain*; 3 years; \$29,900

Nelson J. Leonard, Department of Chemistry; *Transannular Interactions in Medium-Ring Compound*; 2 years; \$22,500

Carl S. Marvel, Department of Chemistry; *Synthesis of High Polymers and Relations Between Structure and Properties*; 3 years; \$59,300

Theron S. Piper, Department of Chemistry; *Crystal Field Theory Applied to the Transition Elements*; 3 years; \$15,500

Harold R. Snyder, Department of Chemistry; *Synthesis and Reactions of Heterocyclic Compounds*; 3 years; \$51,000

Frederick T. Wall, Department of Chemistry; *Calculation of Reaction Probabilities for Simple Chemical Reactions*; 3 years; \$22,800

Frederick T. Wall, Department of Chemistry; *Configurations of Macromolecules and Polymeric Electrolytes*; 2 years; \$38,200

**INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.;**  
Riley Schaeffer, Department of Chemistry, Indiana University; *Boranes and Related Compounds*; 2 years; \$17,100

**IOWA STATE COLLEGE, Ames, Iowa;**  
Orville L. Chapman, Department of Chemistry; *Photochemistry of Metal-Organic Complexes*; 2 years; \$14,000

**IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Ames, Iowa;**  
Charles H. DePuy, Department of Chemistry; *Chemistry of Cyclopentene-3,5-Dione*; 2 years; \$13,800

**IOWA STATE COLLEGE, Ames, Iowa;**  
Glen A. Russell, Department of Chemistry; *Electrophilic Substitution on Saturated Carbon Atoms*; 3 years; \$16,800

**IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Ames, Iowa;**  
Ernest Wenkert, Department of Chemistry; *Structure and Syntheses of Diterpenoid Natural Products*; 3 years; \$23,800

**JOHNS HOPKINS UNIVERSITY, Baltimore, Md.**  
J. D. H. Donnay, Department of Chemistry; *Crystal Structure of a Synthetic Mica*; 2 years; \$15,800

G. Wilse Robinson, Department of Chemistry; *Low Temperature Chemistry*; 3 years; \$48,000

**UNIVERSITY OF KANSAS, Lawrence, Kans.**

Richard J. Bearman, Department of Chemistry; *Thermo-Osmosis of Gases Through Membranes*; 3 years; \$20,000

A. W. Burgstahler, Department of Chemistry; *Stereochemistry and Synthetic Applications of Hexahydrogallic Acid*; 18 months; \$7,200

William E. McEwen, Department of Chemistry; *Timing of Covalency Changes in Competitive Rearrangement Reactions*; 3 years; \$24,100

**KENTUCKY RESEARCH FOUNDATION, University Station, Lexington, Ky.;**  
Lyle R. Dawson, Department of Chemistry; *Properties of Some Less Common Non-Aqueous Solvents*; 2 years; \$11,600

**LAFAYETTE COLLEGE, Easton, Pa.;**  
Thomas G. Miller, Department of Chemistry; *Rearrangements of 4,4-Disubstituted-2,5 Cyclohexadienes*; 2 years; \$4,500

**LINCOLN UNIVERSITY, Jefferson City, Mo.;**  
Willis E. Byrd, Department of Chemistry; *Amine-Sulfur Dioxide Complexes*; 3 years; \$8,600

**LOUISIANA POLYTECHNIC INSTITUTE, Ruston, La.;**  
Charles Nelson Robinson, Department of Chemistry; *Total Synthesis of Heliotrine*; 2 years; \$8,800

**LOUISIANA STATE UNIVERSITY, Baton Rouge, La.;**  
Sean P. McGlynn, Department of Chemistry; *Singlet-Triplet Intercombinations in Molecules*; 3 years; \$26,000

**LUTHER COLLEGE, Decorah, Iowa;**  
Adrian Docken, Department of Chemistry; *Synthesis of Cyclopentanopentalene Derivatives*; 1 year; \$3,200

**UNIVERSITY OF MARYLAND, College Park, Md.**

William G. Malsch and Homer W. Schamp, Jr., Department of Chemistry; *Effect of Pressure on Optical Absorption*; 2 years; \$22,900

Charles E. White, Department of Chemistry; *Spectral Characteristics of Fluorescent Metal Chelates*; 2 years; \$11,000

**MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.**

George H. Büchi, Department of Chemistry; *Photochemical Reactions*; 3 years; \$48,600

F. Albert Cotton, Department of Chemistry; *Spectral and Magnetic Studies of Complex Ions*; 2 years; \$24,000

Richard C. Lord, Department of Chemistry; *Rotational and Vibrational Spectra of Polyatomic Molecules*; 3 years; \$32,800

Dietmar Seyferth, Department of Chemistry; *Inorganic Chemistry on Comparative Organometallic Chemistry*; 3 years; \$24,400

John S. Waugh, Department of Chemistry; *Nuclear Resonance Spectra of Molecules*; 2 years; \$16,100

**UNIVERSITY OF MASSACHUSETTS, Amherst, Mass.;**  
John L. Ragle, Department of Chemistry; *Electronic Structure in Relation to*

*Substituent Groups in Organic Complexes*; 2 years; \$9,500

MELLON INSTITUTE OF INDUSTRIAL RESEARCH, Pittsburgh, Pa.; P. J. Flory, Executive Director of Research; *Properties of Polymers and Their Solutions*; 2 years; \$57,500  
MELLON INSTITUTE, Pittsburgh, Pa.; Foll A. Miller, Department of Research in Chemical Physics; *Infrared Studies at Long Wavelengths*; 2 years; \$33,700  
MICHIGAN STATE UNIVERSITY, East Lansing, Mich.

Carl H. Brubaker and James L. Dye, Department of Chemistry; *Thermodynamic and Conductance Behavior of High-charge Type Electrolytes in Aqueous Solution*; 2 years; \$27,000

James L. Hall, Department of Chemistry; *Acetonitrile as a Solvent for Inorganic Reactions*; 3 years; \$17,900

Max T. Rogers, Department of Chemistry; *Conformational Isomerism by Electric Dipole Moment Measurements and Nuclear Magnetic Resonance Spectroscopy*; 2 years; \$23,900  
UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Robert E. Ireland, Department of Chemistry; *Approach to the Total Synthesis of Atisine*; 2 years; \$13,600  
UNIVERSITY OF MINNESOTA, Minneapolis, Minn.

I. M. Kolthoff, Department of Chemistry; *Polarography at the Rotated Dropping Electrode*; 2 years; \$20,000

I. M. Kolthoff and E. J. Meehan, Department of Chemistry; *Reactions Induced by Free Radicals in Solution*; 3 years; \$63,700

William E. Parham, Department of Chemistry; *Chemistry of Divalent Carbon*; 2 years; \$13,300

UNIVERSITY OF MISSOURI, Columbia, Mo.; Lloyd B. Thomas, Department of Chemistry, *Chemical and Physical Absorption of Filament Surfaces*; 3 years; \$26,800

MONTANA STATE COLLEGE, Bozeman, Mont.; Charles N. Caughlan, Department of Chemistry; *Organic Compounds of Titanium*; 2 years; \$15,000

NEW MEXICO HIGHLANDS UNIVERSITY, Las Vegas, N. Mex.; Randolph C. Wilhoit, Department of Chemistry; *Alkoxides of the Group III Metals*; 2 years; \$10,400  
NEW YORK UNIVERSITY, New York, N.Y.

S. Carlton Dickerman, Department of Chemistry; *Aryl Radical Affinities of Olefins*; 2 years; \$10,400

Alvin I. Kosak, Department of Chemistry; *Orientation of Substituents in Monosubstituted Thiophenes*; 3 years; \$24,400

Kurt M. Mislow, Department of Chemistry; *Stereochemistry of Arsenic and Antimony*; 3 years; \$27,400

NORTHEAST LOUISIANA STATE COLLEGE, Monroe, La.; Raymond Annino, Department of Chemistry; *Polarographic Investigation of Mucochloric and Dichloromaleic Acids*; 1 year; \$4,000

NORTHWESTERN UNIVERSITY, Evanston, Ill. Frederick G. Bordwell, Department of Chemistry; *Effect of Activating Groups on the Course and Rates of Elimination Reactions*; 3 years; \$31,400

Donald D. DeFord and Richard C. Bowers, Department of Chemistry; *Voltammetry with Membrane Electrodes*; 3 years; \$23,100

Arthur A. Frost, Department of Chemistry; *Quantum Mechanical Electronic Energy Calculations of Simple Molecules*; 3 years; \$32,800

Robert L. Letsinger, Department of Chemistry; *Synthesis and Study of Enzyme-like Catalysts*; 3 years; \$37,300

R. K. Summerbell, Department of Chemistry; *Synthesis and Stereochemistry of Some Heterocyclic Compounds*; 2 years; \$18,400  
UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.

Ernest L. Ellef, Department of Chemistry; *Properties and Reactivity of Simple Cyclohexane Derivatives*; 31 months; \$21,500

Louls Pierce, Department of Chemistry; *Molecular Microwave Spectroscopy*; 3 years; \$44,600

OHIO STATE UNIVERSITY, Columbus, Ohio.

Daryle H. Busch, Department of Chemistry; *Thermodynamics and Electron Transfer Processes Related to Optically Active Complex Inorganic Compounds*; 2 years; \$16,400

Earl W. Malmberg, Department of Chemistry; *Oxidation of Hydrocarbons and Related Temperature Reactions*; 2 years; \$18,600

William N. White, Department of Chemistry; *Mechanism of Certain Aromatic Rearrangements*; 3 years; \$20,000

Quentin Van Winkle, Department of Chemistry; *Electronic Properties of Chlorophyll Films; Mechanism by Which Chlorophyll Converts Light Energy Into Chemical Potential Energy*; 1 year; \$11,200  
OHIO UNIVERSITY, Athens, Ohio

Jesse H. Day, Department of Chemistry; *Effects of Temperature on the Ultra-Violet and Visible Spectra or Thermo-chromic Compounds*; 2 years; \$8,700

William D. Huntsman, Department of Chemistry; *Thermal Cyclization of Diolefins and Related Compounds*; 2 years; \$14,000  
UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.

Harold E. Afsprung, Department of Chemistry, University of Oklahoma; *Use of Onium Type Cations as Analytical Reagents*; 2 years; \$10,800

Sherril D. Christian, Department of Chemistry, The University of Oklahoma; *Composition and Molecular Orientation of the Liquid-Air Interfacial Region for Organic Binary Mixtures*; 2 years; \$11,000  
OREGON STATE COLLEGE, Corvallis, Oreg.

Elliott N. Marvell, Department of Chemistry; *Influence of Geometric Isomerism on the Claisen and Cope Rearrangements*; 3 years; \$21,000

Allen B. Scott, Department of Chemistry; *Impurities in Ionic Solids*; 2 years; \$16,400  
UNIVERSITY OF OREGON, Eugene, Oreg.

Wendell M. Graven, Department of Chemistry; *Photolytic Studies of the Higher Dialkyl Organic Peroxides*; 3 years; \$21,400

Richard M. Noyes, Department of Chemistry; *Mechanisms of Fast Ion and Ion-Pair Reactions*; 2 years; \$23,900

D. F. Swinehart, Department of Chemistry; *Activity Coefficients of Electrolytes With Doubly Charged Anions*; 2 years; \$7,000

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.

Lionel Goodman, Department of Chemistry; *Steric Effects on the Electronic Energy Levels of Substituted Benzenes*; 2 years; \$13,500

H. B. Palmer, Department of Fuel Technology and P. S. Skell, Department of Chemistry; *Reactions of Radicals Generated by*

*the Sodium Flame Method*; 3 years; \$39,100  
UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Charles C. Price, Department of Chemistry; *Influence of Structure on Reactivity*; 3 years; \$25,000

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa. Edward McC. Arnett, Department of Chemistry; *Acid-Base Equilibria Involving Organic Compounds*; 2 years; \$6,900

Edward M. Arnett, Department of Chemistry; *Deuterium Analysis Utilizing Gas Chromatography*; 1 year; \$8,000

William B. Kehl, Computation and Data Processing Center and G. A. Jeffrey, Department of Chemistry; *Computer Programming for Crystal Structure Analysis*; 2 years; \$27,400

Jerome L. Rosenberg, Department of Chemistry; *Chemistry of Electronically Excited States of Conjugated Molecules*; 3 years; \$14,700

POMONA COLLEGE, Claremont, Calif.; C. Freeman Allen, Department of Chemistry; *Synthesis of  $C_{22}$  Pthalenoic Acid*; 1 year; \$6,000

UNIVERSITY OF PUERTO RICO, Rio Piedras, P.R.; Owen H. Wheeler, Department of Chemistry; *Effect of Alkyl Groups on the Reactivity and Formation of Carbon Rings*; 2 years; \$7,700

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.

Herbert C. Brown, Department of Chemistry; *Qualitative Studies of Chemical Reactivity*; 3 years; \$47,800

A. F. Clifford, Department of Chemistry; *Chemistry of the Hypofluorites*; 2 years; \$15,700

Nathan Kornblum, Department of Chemistry; *New and Selective Method of Oxidation*; 2 years; \$29,100

RENSELAEER POLYTECHNIC INSTITUTE, Troy, N.Y.

Harry F. Herbrandson, Department of Chemistry; *Carbanion Oxidations by Ketones*; 2 years; \$11,200

Robert L. Stroud, Department of Chemistry; *Mercury-Photosensitized Decomposition and Oxidation of Diborane*; 2 years; \$13,200

RESEARCH FOUNDATION, Oklahoma State University, Stillwater, Okla.; George Gorin, Department of Chemistry, Oklahoma State University; *Complexes of Thiol Compounds*; 2 years; \$11,200

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.

J. J. Hermans, Department of Chemistry, College of Forestry, Syracuse; *Chemical Substitution in Glucosides and Their Derivatives*; 2 years; \$17,500

Conrad Schuerch, Department of Chemistry, College of Forestry, Syracuse; *Stereoisomerism of Vinyl Polymers*; 2 years; \$11,800

Michael Szwarc, Department of Chemistry, College of Forestry, Syracuse; *Chemistry of Living Polymers*; 2 years; \$39,000

RESEARCH INSTITUTE OF TEMPLE UNIVERSITY, Philadelphia, Pa.; Dr. Aristid V. Grosse, President; *High Temperatures Inorganic Chemistry*; 2 years; \$54,300

RICE INSTITUTE, Houston, Tex.; Thomas E. Brackett, Department of Chemistry; *Specific Heat of Small Particles of Sodium Chloride from  $1^{\circ} K$  to  $20^{\circ} K$* ; 1 year; \$4,100

UNIVERSITY OF ROCHESTER, Rochester, N.Y. William H. Sanders, Jr., Department of Chemistry; *Mechanisms of Elimination Reactions*; 3 years; \$35,900

Winston D. Walters, Department of Chemistry; *Kinetics and Mechanisms of the Thermal Reactions of Cyclic Compounds*; 4 years; \$28,000

ROCKEFELLER INSTITUTE, New York, N.Y.; Armin C. Braun; *Chemical Nature and Mode of Action of a Specific Inducer of the Male Sex Organ in Certain Plant Species*; 2 years; \$30,000

SACRAMENTO STATE COLLEGE, Sacramento, Calif.; C. Robert Hurley, Department of Chemistry; *Ionization Constant of Ferruthenic Acid; Lower Oxidation States of Ruthenium*; 3 years; \$7,500

SAINT MARY OF THE PLAINS COLLEGE, Dodge City, Kans.; Louis W. Clark, Department of Chemistry; *Kinetics of Decomposition of Unstable Organic Acids in Non-Aqueous Solvents*; 2 years; \$7,100

UNIVERSITY OF SAN FRANCISCO, San Francisco, Calif.; G. E. McCasland, Department of Chemistry; *Stereochemistry of the Cyclohexanes*; 2 years; \$15,000

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.

Ronald F. Brown, Department of Chemistry; *Effects of Gem-Substituents on the Rates and Equilibria of Ring Closure Reactions*; 2 years; \$18,700

Jerry Donohue, Department of Chemistry; *Crystal and Molecular Structures of Inorganic Compounds of Unknown Chemical Structure*; 3 years; \$57,200

STANFORD UNIVERSITY, Stanford, Calif.

Eugene R. Hardwick, Department of Chemistry; *Scintillation Study on Radiation Damage in Crystalline Solids*; 3 years; \$18,000

Harry S. Mosher, Department of Chemistry; *Rate Studies on the Addition, Reduction and Enolization Reactions of the Grignard Reagent*; 2 years; \$18,300

Carl R. Noller, Department of Chemistry; *Synthesis and Resolution of Dendroasymmetric Compounds*; 3 years; \$12,000

D. A. Skoog, Department of Chemistry and Chemical Engineering; *Reactions of Iodine with Thiocyanate Ion*; 3 years; \$18,000

STATE COLLEGE OF WASHINGTON, Pullman, Wash.; Grant Gill Smith, Department of Chemistry; *Rearrangement of Alpha-Diketones and Hydrolysis of Lactones and Amides*; 3 years; \$17,400

STATE UNIVERSITY OF IOWA, Iowa City, Iowa

Norman C. Baenziger, Department of Chemistry; *Application of Machine Calculations to Chemical Problems*; 1 year; \$29,700

Norman C. Baenziger, Department of Chemistry; *Structures of Intermetallic Compounds*; 2 years; \$15,800

Robert E. Buckles, Department of Chemistry; *Addition Reactions of Halogens in the Presence of Polyhalide Salts*; 3 years; \$25,900

SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.; Harry Brumberger, Department of Chemistry; *Critical Phenomena in Binary Liquid Mixtures*; 3 years; \$21,500

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; William H. Fletcher, Department of Chemistry; *Vibrational Spectra and Molec-*

ular *Structure of Diazoalkanes and Ketenes*; 2 years; \$12,000

TEXAS LUTHERAN COLLEGE, Seguin, Tex.; Oscar E. Weigang, Jr., Department of Chemistry; *Solvent Effects on the Near U.V. and Visible Spectra of Hydrocarbons*; 2 years; \$6,600

UNIVERSITY OF TEXAS, Austin, Tex. Philip S. Bailey, Department of Chemistry; *Abnormal Ozonolyses and Rearrangements of Peroxidic Ozonolysis Products*; 2 years; \$18,500

Royston M. Roberts, Department of Chemistry; *Reactions of Alkylbenzenes in the Presence of Lewis Acids*; 2 years; \$16,800

UNIVERSITY OF UTAH, Salt Lake City, Utah

Randall E. Hamm, Department of Chemistry; *Square-Wave Polarography*; 2 years; \$10,800

W. J. Horton, Department of Chemistry; *Ether Cleavage and Enol Lactone Rearrangement*; 2 years; \$18,500

James M. Sughara, Department of Chemistry; *Synthesis of 5-Ketoses*; 2 years; \$10,700

VANDERBILT UNIVERSITY, Nashville, Tenn.; Donald E. Pearson, Department of Chemistry; *Electrophilic Reactions*; 3 years; \$15,500

UNIVERSITY OF VERMONT, Burlington, Vt.; Clinton D. Cook, Department of Chemistry; *Free Radical Halogenations of the N-Bromosuccinimide Type*; 3 years; \$19,300

UNIVERSITY OF VIRGINIA, Charlottesville, Va.

Loren G. Hepler, Department of Chemistry; *Thermochemical Investigations of Inorganic Substances*; 3 years; \$19,400

Oscar R. Rodig, Department of Chemistry; *Mechanism of Biosynthesis of Antibiotics*; 3 years; \$9,600

WASHINGTON UNIVERSITY, St. Louis, Mo. C. David Gutsche, Department of Chemistry; *Synthesis of Polycyclic Compounds*; 3 years; \$26,200

Lindsay Helmholz, Department of Chemistry; *Structure of Inorganic Complex Ions*; 2 years; \$13,300

UNIVERSITY OF WASHINGTON, Seattle, Wash. Arthur G. Anderson, Jr., Department of Chemistry; *Nonclassical Aromatic Compounds*; 3 years; \$27,200

Norman W. Gregory, Department of Chemistry; *Vaporization Reactions*; 3 years; \$24,800

WAYNE STATE UNIVERSITY, Detroit, Mich. Carl Djerassi, Department of Chemistry; *Systematization and Correlation of Optical Rotatory Dispersion Data*; 2 years; \$50,000

Stanley Kirschner, Department of Chemistry; *Rotatory Dispersion of Asymmetric Complex Inorganic Compounds*; 2 years; \$20,500

A. Edward Remick, Department of Chemistry; *Mechanism of Oxidation-Reduction Reactions*; 2 years; \$11,800

WELLESLEY COLLEGE, Wellesley, Mass.; Margaret K. Selkel, Department of Chemistry; *Flavanoid Plant Pigments*; 3 years; \$10,800

WESLEYAN UNIVERSITY, Middletown, Conn.; William A. Hoffman, Jr., Department of Chemistry; *Oximes of Alloxan and Cyanuric Acid Derivatives as Chelating Agents*; 2 years; \$6,200

WHEATON COLLEGE, Wheaton, Ill.; Stanley M. Parmerter, Department of Chemistry; *Preparation and Reaction of Hydrazones*; 2 years; \$5,300

UNIVERSITY OF WISCONSIN, Madison, Wis. Harlan L. Goering, Department of Chemistry; *Radical Addition, Rearrangement and Solvolytic Reactions*; 3 years; \$29,500

John L. Margrave, Department of Chemistry; *Gas-Solid Interactions at High Temperatures*; 3 years; \$44,500

Charles F. Curtiss, Department of Chemistry; *Theoretical Extensions of the Kinetic Theory of Gases*; 2 years; \$23,300

Louis J. Gosting, Department of Chemistry; *Diffusion Studies on Electrolytes and Proteins*; 3 years; \$32,500

Edwin M. Larsen, Department of Chemistry; *Reduced States of the Transition Elements*; 2 years; \$12,400

Daniel L. Leussing, Jr., Department of Chemistry; *Reactions of Sulfhydryl Compounds with Metal Ions*; 2 years; \$12,200

WORCESTER POLYTECHNIC INSTITUTE, Worcester, Mass.; David Todd, Department of Chemistry; *N-Substituted Hydrazones*; 2 years; \$12,700

UNIVERSITY OF WYOMING, Laramie, Wyo.; Sara Jane Rhoads, Department of Chemistry; *Effect of Ring Size on the Direction and Rate of Alkylation of 2-Carboalkoxy-cyclanones*; 3 years; \$18,900

YALE UNIVERSITY, New Haven, Conn. Harold Conroy, Department of Chemistry; *Structure and Theoretical Biogenesis of Alkaloids*; 3 years; \$38,800

Lars Onsager, Department of Chemistry; *Theory of Cooperative Phenomena*; 3 years; \$45,200

Andrew Patterson, Jr., Department of Chemistry; *High-Field Conductance of Solutions of Alkali Metals in Amine-Type Solvents*; 3 years; \$30,000

DEVELOPMENTAL BIOLOGY

ALBION COLLEGE, Albion, Mich.; Pearl Liu Chen, Department of Biology; *Cytology of Streptomyces*; 2 years; \$5,700

BRANDEIS UNIVERSITY, Waltham, Mass. Lionel Jaffe, Department of Biology; *Orientation of Cell Growth by Polarized Radiant Energy*; 4 years; \$33,300

Lawrence Levine and Maurice Sussman, Departments of Biochemistry and Biology; *An Immunological Study of Slime Mold Developments*; 3 years; \$27,600

Edgar Zwilling, Department of Biology; *Clone Cultures From Early Chick Embryo Cells*; 4 years; \$19,200

UNIVERSITY OF CALIFORNIA, Berkeley, Calif. Max Alfert, Department of Zoology, *Cytochemical Studies of Cell Nuclei*; 2 years; \$29,500

S. F. Cook, Department of Physiology; *Ultrastructure of the Organic Matrix of Bone*; 2 years; \$6,000

Herbert B. Currier, Department of Botany, Davis; *Relation of Callose Formation to Plasmodermal Function in Plant Cells*; 1 year; \$6,600

Ernest M. Gifford, Jr., Department of Botany, Davis; *Studies of Shoot Apices*; 3 years; \$10,100

William A. Jensen, Department of Botany, and Leroy G. Kavaljian, Department of Life Sciences, Sacramento State College, Sacramento; *Cell Differentiation During Early*

- Development of Higher Plants*; 3 years; \$45,000
- Anton Lang and Roy M. Sachs, Department of Botany and Floriculture, Los Angeles; *The Role of Gibberellin in Plant Morphogenesis*; 1 year; \$14,600
- Lucille S. Hurley, Department of Home Economics, Davis; *The Role of Pantothenic Acid in Development*; 2 years; \$6,200
- A. M. Schechtman, Department of Zoology, Los Angeles; *Macromolecular Background of Embryonic Development*; 3 years; \$36,200
- CARLETON COLLEGE, Northfield, Minn.; Thurlo B. Thomas, Department of Biology; *Cell Changes in the Lacrimal Gland During Development*; 2 years; \$10,700
- UNIVERSITY OF CONNECTICUT, Storrs, Conn.; Walter Landauer, Department of Animal Genetics; *Vitamin and Amino Acid Content of Chicken Embryos Homozygous for Lethal Mutations*; 5 years; \$30,000
- UNIVERSITY OF CHICAGO, Chicago, Ill.; Jane H. Overton, Division of Natural Sciences; *Growth Patterns*; 2 years; \$8,500
- UNIVERSITY OF CONNECTICUT, Storrs, Conn.; Edgar Zwilling, Department of Animal Genetics; *Clone Cultures From Early Chick Embryo Cells*; 5 years; \$20,200
- COLUMBIA UNIVERSITY, New York, N.Y.
- L. C. Dunn and Dorothea Bennett, Department of Zoology; *Developmental Effects of Genetic Factors at the T Locus in the House Mouse*; 2 years; \$20,100
- Victor Paschke, Department of Mechanical Engineering; *Thermal Fundamentals of Quenching*; 3 years; \$54,100
- CONNECTICUT COLLEGE, New London, Conn.; Betty F. Thomson, Department of Botany; *Role of Light in Histogenesis and Differentiation in Angiosperms*; 2 years; \$15,100
- CORNELL COLLEGE, Mount Vernon, Iowa; Francis A. Pray, Department of Biology; *Development of Certain Selected Rotifers*; 2 years; \$7,300
- CORNELL UNIVERSITY, Ithaca, N.Y.
- John M. Anderson, Department of Zoology; *Comparative Studies of the Digestive Tract in Various Starfishes*; 3 years; \$12,800
- Bettison E. Shapiro, Department of Anatomy, Medical College, N.Y.; *Analysis of Factors Involved in the Initiation of Amphibian Gastrulation*; 2 years; \$4,800
- F. C. Steward, Department of Botany, New York State College of Agriculture, Ithaca; *Cytological Study of Rapidly Proliferating Plant Tissue Cultures*; 1 year; \$5,500
- DUKE UNIVERSITY, Durham, N.C.; Kenneth L. Duke, Department of Anatomy; *Comparative Histological Study of Mammalian Ovaries*; 3 years; \$8,100
- EMORY UNIVERSITY, Emory University, Ga.; Geoffrey H. Bourne, Department of Anatomy; *Enzyme Activity in the Cells of Young and Old Animals*; 2 years; \$27,600
- FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Charles B. Metz, Oceanographic Institute; *Physiology of Fertilization in Marine Invertebrates*; 3 years; \$47,900
- FORDHAM UNIVERSITY, New York, N.Y.; Charles A. Berger, Department of Biology; *Cytological Aspects of Development*; 3 years; \$9,000
- HARVARD UNIVERSITY, Cambridge 38, Mass.
- Cornelius F. Strittmatter, Department of Biological Chemistry; *Development of Meta-*
- bolic Patterns in the Chick Embryo*; 2 years; \$10,000
- Ralph H. Wetmore, Biological Laboratories; *Comparative Genesis of Form in Ferns and Mosses*; 1 year; \$13,300
- Ralph H. Wetmore, Biological Laboratories; *Comparative Morphogenesis of Developing Prothallia and Embryos of Ferns and Mosses*; 1 year; \$16,500
- UNIVERSITY OF ILLINOIS, Urbana, Ill.; S. Meryl Rose, Department of Zoology; *Specific Inhibition During Development*; 2 years; \$28,600
- INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.
- Martin Dworkin, Department of Microbiology, Indiana University; *Nutritional Requirements of Some Fruiting Mycobacteria*; 1 year; \$3,800
- Charles W. Hagen, Jr., Department of Botany, Indiana University; *Chemical Differentiation in Flower Parts*; 3 years; \$23,700
- LUBBOCK CHRISTIAN COLLEGE, Lubbock, Tex.; Norman Hughes, Department of Biology; *Nuclear-Cytoplasmic Relationships in Amphibian Development*; 2 years; \$4,600
- MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Eugene Bell, Department of Biology; *Development of the Vertebrate Limb*; 3 years; \$33,800
- MIAMI UNIVERSITY, Oxford, Ohio; Charles Helmsch, Department of Botany; *Developmental Root Anatomy*; 1 year; \$8,400
- UNIVERSITY OF MINNESOTA, Minneapolis, Minn.
- Ernst C. Abbe, Department of Botany; *Factors Influencing Organogenesis in Matze*; 3 years; \$30,200
- William J. L. Felts, Department of Anatomy; *Study of the Skeleton of Cetaeae*; 2 years; \$13,000
- Norman S. Kerr, Department of Zoology; *Morphogenesis in the True Slime Mold, Didymium Nigripes*; 2 years; \$18,100
- Nelson T. Spratt, Department of Zoology; *Mechanisms of Morphogenetic Movements and Cellular Interactions in Somite Formation and Differentiation*; 3 years; \$26,800
- UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.
- Robert L. Hunter, Department of Anatomy; *Esterases in Biological Materials*; 2 years; \$11,200
- P. B. Kaufman, Department of Botany; *Mechanism of Stem Elongation in Grasses*; 2 years; \$15,900
- Norman E. Kemp, Department of Zoology; *Differentiation of Submicroscopic Structure During Development*; 2 years; \$21,300
- UNIVERSITY OF MINNESOTA, Minneapolis, Minn.
- John R. Rowley, Department of Botany; *Submicroscopic Structure of the Pollen Grain Wall*; 1 year; \$3,800
- Shirley C. Tucker, Department of Botany; *Flora Ontogeny of Michelia Fuscata*; 2 years; \$10,400
- MISSOURI BOTANICAL GARDEN, St. Louis, Mo.; Norton H. Nickerson; *Growth Pattern Changes Induced by Treatment With Gibberellin Acid*; 2 years; \$6,400
- MONTANA STATE COLLEGE, Bozeman, Mont.; Ray F. Evert, Department of Botany and Bacteriology; *Seasonal Changes in Phloem Structure in Pyrus Malus*; 2 years; \$11,200
- NEW YORK BOTANICAL GARDEN, New York, N.Y.; Richard M. Klein; *Characterization of*



*Causal Agents in Crown Gall of Plants*; 1 year; \$6,000

NEW YORK UNIVERSITY, New York, N.Y.

William J. Crotty, Department of Biology; *Control by Visible Radiation of Differentiation in Ferns*; 2 years; \$10,000

Henry I. Hirschfeld, Department of Biology; *Nuclear-Cytoplasmic Relationships in Blepharisma undulans*; 2 years; \$12,600

UNIVERSITY OF NORTH DAKOTA, Grand Forks, N. Dak.; E. W. Pfeiffer, Department of Anatomy, School of Medicine; *Origin of the Ovarian Interstitial Cells of Dipodomys*; 1 year; \$1,800

OGLETHORPE UNIVERSITY, Atlanta, Ga.; Arthur L. Cohen, Department of Biology; *Morphogenesis in the Myxomycetes*; 2 years; \$20,700

UNIVERSITY OF OREGON, Eugene, Oreg.

Jacob Straus, Department of Biology; *Experimental Morphogenesis and Physiology of Mature Plant Embryos*; 3 years; \$22,000

R. L. Bacon, Department of Anatomy; *Development of Organ Antigens in the Sea Urchin*; 2 years; \$25,100

Sanford S. Tepper, Department of Biology; *Developmental Changes in the Shoot Apices of Flowering Plants*; 2 years; \$11,000

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.

Paul B. Green, Department of Botany; *Structure and Development of the Plant Cell Wall*; 2 years; \$20,000

L. V. Hellbrunn, Department of Zoology; *Changes in Marine Invertebrate Eggs During Early Development*; 3 years; \$24,400

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.

Peter Gray, Department of Biological Sciences; *Embedding Media and Section Cutting Mechanics in Ultra-thin Sectioning*; 3 years; \$13,400

Paul G. Mahlberg, Department of Biological Sciences; *Growth of the Non-articulated Laticifer*; 2 years; \$7,500

PRINCETON UNIVERSITY, Princeton, N.J.;

William P. Jacobs, Department of Biology; *Control of Differentiation and Growth in Higher Plants*; 3 years; \$55,900

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.

William Battin, Department of Biology; *Cytoplasmic DNA in Amphibian Oogenesis*; 3 years; \$10,000

Arlene R. Seaman, Department of Anatomy, College of Medicine, N.Y.; *Histochemical and Fine Ultrastructural Study of the Prostate Gland*; 1 year; \$3,200

RICE INSTITUTE, Houston, Tex.; Allen C. Enders, Department of Biology; *Phenomena Related to Implantation of the Blastocyst in the Armadillo*; 3 years; \$39,100

STANFORD UNIVERSITY, Stanford, Calif.;

Donald L. Stitwell, Jr., Department of Anatomy; *Blood Supply of the Vertebral Column*; 3 years; \$17,400

STATE UNIVERSITY OF IOWA, Iowa City, Iowa;

Reed A. Flickinger, Department of Zoology; *Carbon Dioxide Utilization in Flatworm Regeneration*; 3 years; \$19,200

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.;

Ronald C. Fraser, Department of Zoology and Entomology; *Metabolic Events in Growth Stimulation*; 1 year; \$6,500

UNIVERSITY OF TEXAS, Austin, Tex.

Charles Helmsch, Department of Botany; *Developmental Root Anatomy*; 2 years; \$9,700

Addison E. Lee, Department of Botany; *Growth and Development of Ectopic Roots Carrying Various Gene Mutations*; 3 years; \$16,700

W. Gordon Whaley, Department of Botany; *Physiological Basis of Heterosty; 1 year; \$4,400*

TULANE UNIVERSITY, New Orleans, La.; Jerome O. Krivanek, Department of Zoology; *Chemical Analyses of the Developing *Stime* Mold, Dictyostellum Discoideum*; 3 years; \$24,600

UNIVERSITY OF VERMONT AND STATE AGRICULTURAL COLLEGE, Burlington, Vt.; F. W. Dunlue, Department of Anatomy, College of Medicine; *Existence, Origin and Nature of Mesangial Cells*; 3 years; \$13,100

UNIVERSITY OF VERMONT, Burlington, Vt.; Walter L. Wilson, Department of Physiology and Biophysics, School of Medicine; *The Cell Cortex in Cleavage and Development*; 2 years; \$3,700

UNIVERSITY OF VIRGINIA, Charlottesville, Va.

B. E. Frye, Department of Biology; *Morphological and Functional Development of the Islets of Langerhans*; 1 year; \$3,400

J. David Deck, Department of Anatomy; *A Study of Limb Regeneration in Larval and Adult Amphibians*; 3 years; \$17,500

WASHINGTON UNIVERSITY, St. Louis, Mo.;

Viktor Hamburger and Rita Levi-Montalcini, Department of Zoology; *Nerve Growth-Promoting Agents*; 2 years; \$53,100

WESTERN CAROLINA COLLEGE, Cullowhee, N.C.; Francis W. Yow, Department of Science; *Morphogenesis in *Euplotes Burytomus**; 3 years; \$6,000

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; Thomas D. Brock, Biological Laboratory; *Cell Growth and Reproduction in Yeasts*; 2 years; \$11,100

WHITMAN COLLEGE, Walla Walla, Wash.;

Arthur G. Rempel, Department of Biology; *Normal Development of the Digestive, Respiratory and Circulatory Systems in the Salamander*; 2 years; \$4,800

WILKES COLLEGE, Wilkes-Barre, Pa.; Francis J. Michelini, Department of Biology;

*Developmental Processes in *Xanthium Italicum*, Moretti*; 2 years; \$8,500

WILSON COLLEGE, Chambersburg, Pa.;

M. Jean Allen, Department of Biology; *Histochemistry of Developmental Stages of *Polychaetes**; 2 years; \$18,500

YALE UNIVERSITY, New Haven, Conn.

Edgar J. Boell, Department of Zoology; *Mitochondrial Differentiation During Embryonic Development*; 2 years; \$24,700

Earl D. Hanson, Department of Zoology; *Role of Ribonucleic Acid in Nucleocytoplasmic Interaction*; 3 years; \$26,100

Donald F. Poulson, Department of Zoology; *Physiological and Developmental Genetic Studies on *Drosophila**; 2 years; \$27,000

Dorothea Rudnick, Department of Zoology; *Localization of Glutamyltransferase in Chick Embryo During Development*; 3 years; \$14,300

#### EARTH SCIENCES

UNIVERSITY OF ALASKA, College, Alaska; J. C. Cain, Geophysical Institute; *Analysis of IGY Magnetic Data*; 1 year; \$26,000

AMERICAN MUSEUM OF NATURAL HISTORY, Central Park West, New York, N.Y.; James Reid McDonald; *Wounded Knee Fauna of South Dakota*; 18 months; \$16,100

- UNIVERSITY OF ARIZONA, Tucson, Ariz.; P. E. Damon, Department of Geology; *Geochemical Data in Southwestern United States*; 2 years; \$30,000
- BUCKNELL UNIVERSITY, Lewisburg, Pa.; George Theokritoff, Department of Geology; *Geology of Granville-Hampton Area, New York*; 1 year; \$2,800
- CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.  
H. A. Lowenstam, Division of Geological Sciences; *Trace Elements in Marine Invertebrates*; 2 years; \$28,000
- C. F. Richter, Seismological Laboratory; *Seismicity of Southern California*; 2 years; \$17,000
- G. J. Wasserburg, Department of Geology; *Rare Gases in Rock and Natural Gases*; 3 years; \$40,000
- UNIVERSITY OF CALIFORNIA, Berkeley, Calif.  
M. N. Bramlette, Scripps Institution of Oceanography, La Jolla; *Diatom Distribution in Oceans*; 3 years; \$25,200
- Harmon Craig, Scripps Institution of Oceanography, La Jolla; *Geochemistry Volcanic Gases and Waters*; 3 years; \$45,000
- Frank W. Dickson, Institute of Geophysics, Los Angeles; *Ore Forming Processes*; 2 years; \$29,750
- Jack F. Evernden, Garniss H. Curtis, Department of Geological Sciences, Berkeley; *Absolute Dating by Potassium-Argon Method*; 2 years; \$55,800
- David T. Griggs, Institute of Geophysics, Los Angeles; *Plasticity at High Pressures and Temperatures*; 2 years; \$38,000
- Victor Vacquier, Scripps Institution of Oceanography, La Jolla, Calif.; *Deep Anomalies in Electrical Conductivity*; 3 years; \$68,000
- CASPER COLLEGE, Casper, Wyo.; Paul W. Netterstrom, Department of Geology; *Tectonic History of Bighorn Mountains*; 2 years; \$3,000
- UNIVERSITY OF CHICAGO, Chicago, Ill.  
Robert N. Clayton, Department of Chemistry; *Oxygen Isotope Fractionation*; 3 years; \$58,700
- Mark A. Melton, Department of Geology; *Geomorphic-Ecologic Study of Non-Mature Drainage Systems*; 3 years; \$11,200
- UNIVERSITY OF CINCINNATI, Cincinnati, Ohio  
Kenneth E. Caster, Department of Geology; *Upper Ordovician Fauna*; 2 years; \$23,250
- William F. Jenks, Department of Geology, and Geography; *Volcanic Rocks of Arizona*; 2 years; \$17,700
- COLUMBIA UNIVERSITY, New York, N.Y.  
Maurice Ewing, Lamont Geological Observatory; *Marine and Bottom Research in High Southern Latitudes (Vema Cruise 15)*; 1 year; \$140,000
- David B. Ericson, Lamont Geological Observatory; *Ocean Sediment Cores*; 2 years; \$26,000
- Paul F. Kerr, Department of Mineralogy; *Differential Thermal Analysis of Sulfides and Arsenides*; 2 years; \$28,000
- J. Oliver, Lamont Geological Observatory; *Earth Strain Meter*; 2 years; \$30,000
- John E. Nafe, Lamont Geological Observatory; *Geophysical Survey of North Rim Puerto Rico Trench*; 6 months; \$30,000
- Arie Poldervaart, Department of Geology; *Geology of Independence Area, Montana*; 2 years; \$15,000
- Arie Poldervaart, Department of Geology; *Katazonal Metamorphism in Africa and Europe*; 16 months; \$5,650
- CORNELL UNIVERSITY, Ithaca, N.Y.; E. P. Wheeler, Department of Geology; *Anorthosite and Adamellite Bodies of Northern Labrador*; 4 years; \$10,000
- DARTMOUTH COLLEGE, Hanover, N.H.; John B. Lyons, Department of Geology; *Systematic Compositional Variation in Metamorphic Minerals*; 1 year; \$1,150
- FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; William F. Tanner, Geology Department; *Near-Shore Investigations*; 1 year; \$13,800
- FORDHAM UNIVERSITY, New York, N.Y.; Bartholomew Nagy, Department of Chemistry; *Clay Minerals and Carbohydrates in Sedimentary Diagenetic Environments*; 2 years; \$16,100
- UNIVERSITY OF HAWAII, Honolulu, Hawaii  
J. J. Naughton, Department of Chemistry and Institute of Geophysics; *Oxidation-Reduction Systems of Silicates and Igneous Rocks*; 2 years; \$20,000
- G. Donald Sherman, Department of Agronomy and Soil Science; *Secondary Minerals in Highly Weathered Rocks*; 3 years; \$49,500
- UNIVERSITY OF HOUSTON, Houston, Texas; Jules R. DuBar, Department of Geology; *Waccamaw and Croatan Deposits of North and South Carolina*; 2 years; \$11,400
- UNIVERSITY OF ILLINOIS, Urbana, Ill.; Ralph E. Grim, Department of Geology; *Phase Changes in Silicates*; 2 years; \$46,500
- JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; M. Gordon Wolman, Department of Geography; *Comparison of Present and Pleistocene Susquehanna River*; 2 years; \$8,800
- LONG ISLAND UNIVERSITY, Brooklyn, N.Y.; Jean Hough, Department of Biology; *Oligocene and Miocene Faunas*; 2 years; \$10,000
- MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.  
M. J. Buerger, Department of Geology and Geophysics; *Structures and Properties of Crystals*; 3 years; \$63,500
- Theodore R. Madden, Department of Geology and Geophysics; *Crustal Electrical Investigation*; 3 years; \$20,000
- John W. Winchester, Department of Geology and Geophysics; *Analysis of Metamorphic Minerals by Neutron Activation and Related Methods*; 3 years; \$23,000
- UNIVERSITY OF MIAMI, Coral Gables, Fla.; Cesare Emiliani, The Marine Laboratory; *Paleotemperature Research*; 6 months; \$9,000
- UNIVERSITY OF MIAMI, Miami, Fla.; Fritz F. Koczy, The Marine Laboratory; *Radium Distribution at Water-Sediment Interface*; 1 year; \$12,000
- UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Harold M. Mooney, School of Mines and Metallurgy; *Seismic Pulse Propagation*; 6 months; \$1,000
- UNIVERSITY OF MISSOURI, Columbia, Mo.; Walter D. Keller, Department of Geology; *Accelerated Rock Weathering by Hydrolysis*; 3 years; \$19,250
- MONTANA STATE COLLEGE, Bozeman, Mont.; William J. McMannis, Department of Geography and Geology; *Shoreline of Beltian Deposition, Southwestern Montana*; 2 years; \$11,700

NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.; William R. Thurston, Division of Earth Sciences; *A Study of the Feasibility and Destroyability of Drilling a Hole to the Mohorovicic Discontinuity*; 1 year; \$15,000

UNIVERSITY OF NEVADA, Reno, Nev.; Aleksis von Volborth, Nevada Mining Analytical Laboratory of the Mackay School of Mines; *Mineralogy of Allanite*; 2 years; \$15,000

NEW YORK UNIVERSITY, New York, N.Y.; Brooks F. Ellis, Department of Geology; *Lithofacies and Ostracod Studies in Long Island Sound*; 2 years; \$20,000

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; Ralph J. McCracken, Department of Soils; *Weathering and Soil Genesis in Piedmont and Coastal Plain Regions*; 3 years; \$27,700

OSBERLINE COLLEGE, Oberlin, Ohio  
Kathryn H. Clisby, Department of Geology and Geography; *Pollen Studies and Pleistocene Chronology of San Augustine Plains*; 2 years; \$22,400

Fred Foreman, Department of Geology and Geography; *Sedimentary Petrology of San Augustine Plains*; 1 year; \$10,200

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; Leonard R. Wilson, Department of Geology; *Stratigraphic Palynology*; 3 years; \$37,000

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.  
Charles D. Jeffries, Department of Agronomy; *Intermediate Weathering Products of Clay Minerals*; 3 years; \$27,500

MacKenzie L. Keith, Department of Geophysics and Geochemistry; *Fractionation of Stable Isotopes*; 6 months; \$560

Gerhard O. W. Kramp, Department of Geology; *Microflora of Modern Sediments and Coal Lithotypes*; 3 years; \$29,600

Leonard F. Herzog, Department of Geophysics and Geochemistry; *Dating With Beryllium<sup>10</sup>*; 2 years; \$20,250

PRINCETON UNIVERSITY, Princeton, N.J.; H. D. Holland, Department of Geology; *Carbonate Solubility at High Temperatures and Pressures*; 3 years; \$30,000

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; J. L. White, Department of Agronomy, Purdue University; *The Weathering Sequence of Micaceous Clay Minerals*; 3 years; \$16,200

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; H. G. Wilm, College of Forestry; *Present Status of Knowledge of Forest Influences and Forest Hydrology in Europe and the United Kingdom*; 1 year; \$1,675

Royal R. Marshall, Pasadena, Calif.; *Lead Isotopes in Basalts and Eclogites*; 1 year; \$9,600

ST. LAWRENCE UNIVERSITY, Canton, N.Y.; R. O. Bloomer, Department of Geology and Geography; *Grenville Complex*; 3 years; \$13,600

SOUTH DAKOTA STATE GEOLOGICAL SURVEY, Vermillion, S. Dak.; Daniel Lum; *Gravity Studies in Western South Dakota*; 2 years; \$5,400

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; K. O. Emery, Department of Geology; *Varved Sediments in Santa Barbara Basin*; 1 year; \$8,100

STANFORD UNIVERSITY, Stanford, Calif.; John W. Harbaugh, Department of Geology;

*Quantitative Study of Paleozoic Carbonate Rocks, Caballo Mountain, New Mexico*; 3 years; \$16,000

STATE COLLEGE OF WASHINGTON, Pullman, Wash.; J. A. Kittrick, Department of Agronomy; *Solubility Product and the Soil Phosphate System*; 3 years; \$12,500

STATE UNIVERSITY OF IOWA, Iowa City, Iowa; Lucien M. Brush, Jr., Iowa Institute of Hydraulic Research; *Sediment Sorting Experiments*; 2 years; \$16,100

TEXAS A. & M. RESEARCH FOUNDATION, College Station, Tex.; R. G. Bader, Department of Oceanography, Agricultural and Mechanical College of Texas; *West Mississippi Delta*; 2 years; \$16,400

UNIVERSITY OF UTAH, Salt Lake City, Utah; Joseph W. Berg, Jr., Department of Geophysics; *Crustal Structure in Utah and Nevada*; 1 year; \$17,300

WASHINGTON UNIVERSITY, St. Louis, Mo.; H. Lekoy Scharon, Department of Geology; *Paleomagnetic Investigation of the St. Francois Mountains Igneous Rocks*; 2 years; \$14,300

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Maurice Rattray, Jr.; Department of Oceanography; *Oceanographic Model Studies of Puget Sound*; 2 years; \$31,900

WAYNE STATE UNIVERSITY, Detroit, Mich.; Willard H. Parsons, Department of Geology; *Volcanic Rocks in the Northern Abasco Region*; 2 years; \$18,000

UNIVERSITY OF WICHITA, Wichita, Kans.; Paul Tasch, Department of Geology; *Permian Conchostracans of Kansas and Oklahoma*; 2 years; \$9,750

WILLIAMS COLLEGE, Williamstown, Mass.; J. A. MacFadyen, Jr., Department of Geology; *Properties of Clay as a Model Material*; 3 years; \$5,500

UNIVERSITY OF WISCONSIN, Madison, Wis.  
R. C. Emmons, Department of Geology; *Chemical Analysis of Granitic Rock*; 1 year; \$575

John C. Rose, Department of Geology; *Portable Apparatus for Determination of Absolute Gravity*; 2 years; \$24,000

George P. Woollard, Department of Geology; *Gravity Data in the United States*; 1 year; \$23,000

WOODS HOLE OCEANOGRAPHIC INSTITUTION, Woods Hole, Mass.  
J. B. Hersey and Richard G. Leahy; *Geophysical Survey of North Rim, Puerto Rico Trench*; 1 year; \$53,700

Francis Minot, Department of Engineering; *Design Concepts for Research Vessels*; 1 year, \$18,400

YALE UNIVERSITY, New Haven, Conn.  
E. S. Deevey, Geochronometric Laboratory; *Studies of Isotopic Carbon*; 2 years; \$39,400.

P. B. Sears, Conservation Program; *Correlation of Pleistocene Deposits by Micro-paleontology*; 3 years; \$22,300

ECONOMIC SCIENCES

UNIVERSITY OF ILLINOIS, Urbana, Ill.; William A. Neiswanger, Department of Economics; *Parameter Estimates in Economic Models*; 2 years; \$20,500

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; F. Machup, Department of Political Economy; *Economic Aspects of Inventions*; 3 years; \$39,000

YALE UNIVERSITY, New Haven, Conn.; T. C. Koopmans, Cowles Foundation for Research in Economics; *Allocation of Resources Over Time*; 1 year; \$18,000

#### ENGINEERING SCIENCES

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Raymond W. Bliss, Jr., Institute of Atmospheric Physics; *Energy Transfer from Solar Collectors*; 3 years; \$40,000

BROWN UNIVERSITY, Providence, R.I.; Daniel C. Drucker, Division of Engineering; *Mechanical Behavior of Metals in the Plastic Range*; 2 years; \$61,200

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Anthony T. Ballnt, Department of Electrical Engineering; *Non-Linear Ferromagnetic Circuit*; 2 years; \$9,200

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.

Donald Coles, Department of Aeronautics; *Stability and Transition in Fluid Flow*; 3 years; \$57,000

Thad Vreeland, Jr., Division of Engineering; *The Atomic Mechanism of Yielding in Silicon-Iron Crystals*; 2 years; \$20,700

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.

Andreas Acrivos, Department of Chemical Engineering; *Determination of Local Mass Transfer Coefficients*; 2 years; \$12,500

Boris Bresler, Department of Engineering; *Mechanism of Deformation and Failure in Plain Concrete*; 2 years; \$25,100

R. W. Clough, Department of Civil Engineering; *Matrix Analysis of Structures*; 2 years; \$22,700

J. T. Gler, R. V. Dunkle, and A. K. Oppenheim, Institute of Engineering Research; *Gaseous Radiation*; 1 year; \$11,700

Eugene E. Petersen, Department of Chemical Engineering; *Effect of Ultrasonic Vibrations on Liquid Heat and Mass Transfer*; 2 years; \$12,700

M. Polivka and J. W. Dorn, Institute of Engineering Research; *Effect of Temperature on Creep Characteristics of Portland Cement Compounds*; 2 years; \$19,300

Egor P. Popov, Department of Civil Engineering; *Plastic Strength of Structures Under Repeated Loads*; 2 years; \$21,800

John M. Prausnitz, Department of Chemical Engineering; *Jet Reactor Concentration and Temperature Fluctuations*; 2 years; \$11,800

H. A. Schade, Institute of Engineering Research; *Towing Tank Reproduction of Non-Uniform Seas*; 1 year; \$10,000

Erich G. Thomsen, Metal Processing Department; *Plastic Deformation of Metals*; 3 years; \$40,000

Jack Washburn, Department of Metallurgy; *Relation of Dislocation Substructure to Properties*; 2 years; \$34,000

Lotfi A. Zadeh, Electronics Research Laboratory; *Input-Output and Representation of Nonlinear Systems*; 3 years; \$35,100

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.

Charles L. McCabe, College of Engineering and Science; *Equilibrium Measurements in Reactive Metal Systems at High Temperatures*; 3 years; \$47,400

James B. Woodford, Jr., Department of Electrical Engineering; *Research in Solid State Devices*; 2 years; \$29,500

Carl F. Zorowski, Department of Mechanical Engineering; *Problems Associated With*

*Cold Rolling of Mechanical Engineering*; 1 year; \$9,200

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; Donald P. Echman and Irving Lefkowitz, Department of Mechanical Engineering; *Automatic Control Systems*; 3 years; \$49,400

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; I. S. Dunn, Department of Civil Engineering, Colorado State University; *Primary and Secondary Consolidation of Soils*; 2 years; \$15,200

UNIVERSITY OF COLORADO, Boulder, Colo. Warren DeLapp, Department of Civil Engineering; *An Experimental Investigation of the Mechanics of Air Entrainment*; 3 years; \$28,000

Frank Kreith, Department of Mechanical Engineering; *Heat, Mass and Momentum Transfer in Rotating Systems*; 3 years; \$52,400

COLUMBIA UNIVERSITY, New York, N.Y. Morton B. Friedman, Department of Civil Engineering and Engineering Mechanics; *Analysis of Dissipative Media*; 2 years; \$18,000

Wan H. Kim, Department of Electrical Engineering; *Network Topology and Network Synthesis*; 2 years; \$22,400

Richard Skalak, Department of Civil Engineering; *Surface Waves on Rotating Fluids*; 3 years; \$29,700

L. A. Zadeh and T. E. Stern, Department of Electrical Engineering; *Input-Output Analysis of Nonlinear System*; 4 years; \$40,600

CORNELL UNIVERSITY, Ithaca, N.Y.; M. H. Cohen, Department of Electrical Engineering; *Solar Bursts at Meter Wave Lengths*; 19 months; \$29,500

UNIVERSITY OF DAYTON, Dayton, Ohio; James P. Hsu, Department of Chemical Engineering; *Frequency Response Analysis of a Multipass Heat Exchanger*; 2 years; \$4,800

UNIVERSITY OF DELAWARE, Newark, Del.; J. A. Gerster, Department of Chemical Engineering; *Transient Response Characteristics of Distillation Column*; 3 years; \$45,200

A. B. Metzner, Department of Chemical Engineering; *Catalytic Uses of Ion Exchange Resins*; 3 years; \$28,700

UNIVERSITY OF FLORIDA, Gainesville, Fla. Per Bruun, Department of Engineering Mechanics; *Wind-Water Relations in Coastal Waters*; 2 years; \$43,000

Charles E. Huckaba, Department of Chemical Engineering; *Fundamental Analysis of Transient Conditions in Distillation Operations*; 3 years; \$24,600

GEORGIA INSTITUTE OF TECHNOLOGY, Atlanta, Ga.

M. R. Carstens, Department of Civil Engineering; *Transition From Laminar to Turbulent Flow*; 2 years; \$29,500

Werner N. Grune, Department of Civil Engineering; *Anaerobic Digestion in the Presence of Radioactive Wastes*; 2 years; \$26,800

Clyde Orr, Jr., Engineering Experiment Station; *Thermal Forces in Materials of High Thermal Conductivity*; 2 years; \$19,000

HARVARD UNIVERSITY, Cambridge, Mass.; H. W. Emmons, Department of Engineering and Applied Physics; *High Temperature, High Speed Gas Dynamics*; 1 year; \$28,300

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.

F. Essenburg, Department of Mechanics; *Thermal Stresses in Plates and Shells*; 2 years; \$15,700

Roy M. Gundersen, Department of Mathematics; *Compressible Flow With Weak Entropy Changes*; 2 years; \$7,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.

William J. Fry and Frederic S. Brunschwig, Department of Electrical Engineering; *Production of Uniform High Intensity Ultrasonic Fields*; 2 years; \$44,800

P. D. Coleman, Department of Electrical Engineering; *Phase Energy Spectra Optimization in Linear Electron Accelerators*; 2 years; \$43,900

C. P. Sless, Department of Civil Engineering; *Analytical Studies of Continuous Plates*; 3 years; \$43,000

IOWA STATE COLLEGE, Ames, Iowa; Ladis H. Csanyi, Bituminous Research Laboratory; *Determination of the Constituents of Asphalts*; 2 years; \$49,100

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.

Stanley Corrsin, Department of Mechanical Engineering; *Isotropic Turbulence*; 5 years; \$166,000

H. E. Hoelscher, Department of Chemical Engineering; *Chemical and Physical Reactions in Flowing Liquid Systems*; 3 years; \$31,500

UNIVERSITY OF KANSAS, Lawrence, Kans.

Donald L. Dean, Department of Civil Engineering; *Stress and Stability Problems of Structural Lattices*; 3 years; \$26,500

Fred Kurata, Department of Chemical Engineering; *A Study of Phase and Volumetric Behavior at Extremely Low Temperatures*; 2 years; \$54,000

LINFIELD RESEARCH INSTITUTE, McMinnville, Oreg.; W. P. Dyke, Director; *Energy Distribution in Field Emitted Electrons*; 3 years; \$101,700

LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; Dale R. Carver, Department of Engineering Mechanics; *A Study of the Dynamic Behavior of Sandwich Construction*; 3 years; \$23,200

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.

William P. Allis, Research Laboratory of Electronics; *Interdepartmental Research Program on Ionized Plasmas*; 2 years; \$500,000

Stephen H. Crandall, Department of Mechanical Engineering; *Variational Methods for Viscous Fluid Flow*; 1 year; \$5,700

John F. Elliott, Department of Metallurgy; *Solution Calorimetry With Metals*; 5 years; \$31,600

Peter Griffith, Department of Mechanical Engineering; *Transition Boiling Heat Transfer*; 2 years; \$15,000

Morris Halle; *Linguistic Structure*; 3 years; \$92,600

Joseph H. Keenan, Department of Mechanical Engineering; *Knudsen Flow of Gases Through Porous Plugs*; 2 years; \$24,700

T. William Lambe, Department of Civil and Sanitary Engineering; *Research on Fundamental Factors Affecting the Strength of Clay*; 2 years; \$19,000

Alan S. Michaels; Department of Chemical Engineering; *Tailored Polymers for Use as Perm-Selective Membranes*; 2 years; \$17,400

R. C. Reid, Department of Chemical Engineering; *Cryogenic Chemistry*; 2 years; \$19,300

Charles N. Satterfield and Robert C. Reid, Department of Chemical Engineering; *Oxidation Kinetics in Porous-walled Tubes*; 2 years; \$11,400

Milton C. Shaw; Department of Mechanical Engineering; *Evaluation of the Radioactive Tracer Technique for use in Tool Wear Studies*; 1 year; \$11,600

Tau-Yi Toong, Department of Mechanical Engineering; *Study of Basic Mechanism of Flame Stabilization in a Boundary Layer*; 2 years; \$29,800

C. F. Taylor and A. R. Rogowski, Department of Mechanical Engineering; *Ignition and Combustion of Fuel Sprays*; 2 years; \$37,500

John G. Trump, Department of Electrical Engineering; *The Production of Intense High-energy Particle Beams*; 2 years; \$90,000

MICHIGAN STATE UNIVERSITY, East Lansing, Mich.; Emmett M. Laursen; Department of Civil Engineering; *The Distribution of Pressure and Shear on Dune-shaped Rough Boundaries*; 2 years; \$39,000

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.

G. V. Berg, Department of Civil Engineering; *A Study of the Energy Functions for Structures Subjected to Earthquakes*; 2 years; \$12,600

Samuel K. Clark; Department of Engineering Mechanics; *Analog for Transient Thermal Stresses*; 1 year; \$10,700

G. Parravano, Department of Chemical and Metallurgical Engineering; *Fractional Crystallization of Inorganic, Organic, and Biological Materials*; 2 years; \$19,000

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.

Paul Anderson, Department of Civil Engineering; *Behavior of Beams Curved in a Plane Perpendicular to Load Distribution*; 1 year; \$16,600

Norman H. Ceaglske, Department of Chemical Engineering; *Analytical Studies of Automatic Process Control Systems*; 2 years; \$14,700

Chieh C. Chang, Department of Aeronautical Engineering; *Theoretical Investigation of Ram Jet Buzz*; 2 years; \$27,800

Richard C. Jordan and James L. Threlkeld, Department of Mechanical Engineering; *Incidence and Collection of Solar Radiation*; 2 years; \$32,000

UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; Nicolas M. Bashara, Department of Electrical Engineering; *Discharges in Dielectric Voids*; 2 years; \$9,400

NEW YORK UNIVERSITY, New York, N.Y.

Max Kronstein, Department of Chemical Engineering; *Formation of Coherent Films from Fluid Polymers*; 1 year; \$10,700

M. C. Li, Department of Civil Engineering; *Effect of Heat on Physicochemical Properties of Soils*; 2 years; \$22,200

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.

Bernard D. Cullity, Department of Metallurgy; *Control of Preferred Orientation in Metals*; 3 years; \$44,800

Lawrence H. N. Lee, Department of Engineering Sciences, *Plastic Buckling Strength of Initially Imperfect Cylinders*; 2 years; \$20,500

OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE; Truet B. Thompson, School of Electrical Engineering; *Time Series Approximation Synthesis of Delay-Type Devices*; 2 years; \$17,900

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; John E. Powers, Department of Chemical Engineering; *Barrier Systems in Thermogravitational Diffusion*; 3 years; \$25,300

OREGON STATE COLLEGE, Corvallis, Oreg.  
J. G. Knudsen, Department of Chemical Engineering; *Local Shell-Slide Heat Transfer Coefficients in Baffled Tubular Heat Exchangers*; 3 years; \$12,500

J. S. Walton, Department of Chemical Engineering; *Solid-Vapor Equilibria of Binary Metal Salt Mixtures*; 2 years; \$17,500

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.  
Philip L. Walker, Jr., Department of Fuel Technology; *Carbon-Oxygen Reactions*; 3 years; \$22,500

A. H. Waynick, Department of Electrical Engineering; *Dynamical Processes in the Lower Ionosphere*; 2 years; \$36,500

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; J. F. Calvert and T. W. Sze, Department of Electrical Engineering; *Loss Minimization in Nonlinear Electrical Networks*; 2 years; \$22,800

POLYTECHNIC INSTITUTE OF BROOKLYN, Brooklyn, N.Y.; Nathan Marcovitz, Microwave Research Institute; *Magnetic Resonance Research*; 3 years; \$149,000

PRATT INSTITUTE, Brooklyn, N.Y.; Abraham B. Finkelstein, Department of Engineering Science; *Unsteady Water Waves Influenced by the Motion of Solid Bodies or Distributions of Singularities, and Solutions of Periodic Flows Derivative Therefrom*; 2 years; \$10,200

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.  
Carroll O. Bennett, School of Chemical and Metallurgical Engineering; *Diffusion Coefficients of Gases at High Pressure*; 2 years; \$20,000

E. W. Comings, Department of Chemical and Metallurgical Engineering; *Measurement of Thermal Conductivity of Gases at High Pressure*; 3 years; \$28,300

Alden H. Emery, Jr., School of Chemical Engineering, Purdue University; *Degree of Cure, Network Formation, and Heat Generation in Synthetic Elastomers*; 2 years; \$10,800

A. G. Guy, Department of Metallurgical Engineering; *Research in Physical Metallurgy in the Soviet Union*; 1 year; \$8,800

Hsu L. and R. J. H. Bollard, Department of Aeronautical Engineering; *Characteristics of Structural Elements at Elevated Temperatures*; 3 years; \$50,000

J. E. Myers, School of Chemical and Metallurgical Engineering; *Influence of Surface Roughness on Heat, Mass, and Momentum Transfers*; 3 years; \$17,800

J. Henry Rushton, Department of Chemical Engineering; *Rates of Mass Transfer at the Surface of Drops*; 3 years; \$35,300

RICE INSTITUTE, Houston, Tex.  
R. Kobayashi and Thomas Leland, Department of Chemical Engineering; *Thermodynamic Properties of Hydrocarbon and Hydrogen Mixtures*; 3 years; \$13,100

Riki Kobayashi, Department of Chemical Engineering; *Viscosities of Hydrocarbon Mixtures at High Pressures*; 3 years; \$17,800

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.  
R. K. Bernhard, Department of General Engineering; *Soil Wave Characteristics in the Vicinity of a Disturbing Source*; 2 years; \$27,100

A. R. Jumikis, Department of Civil Engineering; *Upward Migration of Water From the Ground-Water Temperature in Freezing Soil*; 3 years; \$61,400

Sigmund Weisemann, Materials Research Laboratory; *Submicroscopic Investigation of Lattice Inhomogeneities of Metals*; 2 years; \$25,800

STANFORD UNIVERSITY, Stanford, Calif.  
Robert H. Eustis, Department of Mechanical Engineering; *Heat Transfer to Bubbles in Liquids*; 1 year; \$16,400

George Leppert, Department of Mechanical Engineering; *Heat Transfer From A Single Sphere*; 2 years; \$9,500

George Leppert, Department of Mechanical Engineering; *Local Boiling Pressure Drop With Forced Convection*; 2 years; \$17,900

David M. Mason, Department of Chemical Engineering; *Effect of Kinetics on Forced-Convection Heat Transfer to Reacting Gases*; 3 years; \$25,600

Richard H. Pantell, Microwave Laboratory; *Non-Periodic Circuit R-F Interaction With Slow-Moving Electrons*; 2 years; \$65,000

Cornelius J. Pings, Department of Chemical Engineering; *Structure of Liquids*; 2 years; \$16,200

STATE COLLEGE OF WASHINGTON, Pullman, Wash.  
A. L. Betts and R. D. Harbour, Department of Electrical Engineering; *Pressure Gradient Potentials in Liquids*; 3 years; \$23,300

E. R. Tinney, Division of Industrial Research; *The Advance of A Shallow Liquid Front Down A Dry Channel*; 2 years; \$13,000

STATE UNIVERSITY OF IOWA, Iowa City, Iowa; Karl Kammermeyer, Department of Chemical Engineering; *Adsorption of Gases and Vapors at Elevated Temperatures and Pressures*; 2 years; \$27,700

SWARTHMORE COLLEGE, Swarthmore, Pa.; Carl Barus, Department of Electrical Engineering; *Study of Learning Machines*; 3 years; \$18,500

SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.  
S. Eskinazi and D. Dosanjh, Department of Mechanical Engineering; *Viscous Decay of a Vortex*; 2 years; \$23,800

Gordon Kent, Department of Electrical Engineering; *High Current Density Electron Flow*; 2 years; \$29,700

SYRACUSE UNIVERSITY, Syracuse, N.Y.; William Gill and Robert V. Jelinek, Department of Chemical Engineering; *The Kinetics of Reactions Between A Single-Component Gas and A Single Component Liquid*; 2 years; \$20,200

UNIVERSITY OF TEXAS, Austin, Tex.; David M. Himmelblau, Department of Chemical Engineering; *Kinetics of Reactions of Sulfur Dioxide With Water*; 3 years; \$18,000

UTAH STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Logan, Utah; Clayton Clark, Department of Electrical Engineering; *Motion of Sporadic E. Patches*; 3 years; \$20,700

UNIVERSITY OF UTAH, Salt Lake City, Utah  
E. B. Christiansen, Chemical Engineering Department and Ivan B. Cutler, Ceramic Engineering Department; *Strength and Failure of Glass*; 2 years; \$12,700

E. B. Christiansen and Ivan B. Cutler; College of Engineering; *Study of Silica Glasses Containing Vanadium Oxide*; 2 years; \$9,300

Andrew W. Jenike, Utah Engineering Experiment Station; *Flow of Plastic-Rigid Solids in Convergent Channels Under the Action of Body Forces*; 3 years; \$57,100

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Albert L. Babb, Department of Chemical Engineering; *Fundamental Studies of Chemical Absorption*; 2 years; \$14,300

UNIVERSITY OF WISCONSIN, Madison, Wis.; P. S. Myers, Department of Mechanical Engineering; *A Study of Combustible Mixture Formation With Liquid Fuels*; 3 years; \$57,600

WOODS HOLE OCEANOGRAPHIC INSTITUTION, Woods Hole, Mass.; Richard G. Barakat and Charles E. Carver, Jr.; *Directional Spectrum of Water Waves*; 1 year; \$24,000

UNIVERSITY OF WYOMING, Laramie, Wyo.; Eric J. Lindahl, Department of Mechanical Engineering; *Determination of The Characteristics of Pulsative Flow*; 2 years; \$13,800

YALE UNIVERSITY, New Haven, Conn.  
Barnett F. Dodge, Department of Chemical Engineering; *High Pressure of Materials*; 3 years; \$41,400

Newman A. Hall and Aris Phillips, Department of Engineering; *Thermodynamics of Plasticity*; 2 years; \$26,100

## ENVIRONMENTAL BIOLOGY

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Charles M. Breder, Jr., Department of Fishes and Aquatic Biology; *Ecological Adjustments of Mollusca*; 2 years; \$6,000

BROOKLYN BOTANIC GARDEN, Brooklyn, N.Y.; Paul R. Burkholder, Director of Research; *Growth Substances in Marine Organisms and in Their Habitats*; 3 years; \$31,300

BROOKLYN COLLEGE, Brooklyn, N.Y.; R. H. Whittaker, Department of Biology and Rudolph W. Becking, Department of Forestry, Alabama Polytechnic Institute; *Productivities of Plant Communities in the Great Smoky Mountains*; 1 year; \$12,100

BUTLER UNIVERSITY, Indianapolis, Ind.; Marion T. Hall, Department of Botany; *Variability in Southwestern Species of Juniperus*; 1 year; \$6,000

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; F. W. Went, Professor of Plant Physiology, and Sterling Emerson, Professor of Genetics; *Effects of Parental Environment on Progeny Phenotype*; 3 years; \$56,500

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.  
Ralph W. Chaney, Department of Paleontology; *Relationships of Cenozoic Floras of Japan and Western North America*; 5 years; \$37,800

Edward W. Fager, Scripps Institute of Oceanography, La Jolla; *Sand Bottom Communities*; 3 years; \$30,700

Charles R. Goldman, Department of Biology, Davis; *Basic Productivity in California Lakes*; 3 years; \$23,300

J. W. MacSwain, Department of Entomology and Parasitology, Berkeley; *Ethology and Floral Constancy Among Bees*; 3 years; \$19,000

CABLETON COLLEGE, Northfield, Minn.; Paul Jensen, Department of Biology; *Aggregation of Invertebrates in a Prairie Community*; 3 years; \$9,700

CHICAGO NATURAL HISTORY MUSEUM, Chicago, Ill.; Rainer Zangerl, Curator of Fossil Reptiles and Eugene S. Richardson, Jr.; Curator of Fossil Invertebrates; *Paleoecology of Pennsylvanian Black Shale*; 3 years; \$33,200

UNIVERSITY OF CHICAGO, Chicago, Ill.  
Thomas Park, Department of Zoology; *Experimental Studies of Competition*; 3 years; \$22,600

Thomas Park, Department of Zoology; *Thesis Research in Population Ecology*; 3 years; \$32,000

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.

R. M. Hansen, Department of Range Management, Colorado State University; *Changes in Rodent Population in Response to Habitat*; 3 years; \$34,100

R. M. Hansen and T. A. Vaughan, Assistant Biologists, Agricultural Experiment Station; *Interspecific Competition in Closely Related Thomomys*; 3 years; \$15,800

John R. Olive, Department of Zoology; *Vertical Migratory Rhythmicity of Microcrustaceans*; 1 year; \$5,750

COLUMBIA UNIVERSITY, New York, N.Y.; Harold C. Conklin; *Ethnecological Investigations in the Philippines*; 2 years; \$24,000

CONNECTICUT AGRICULTURAL EXPERIMENT STATION, New Haven, Conn.; Raimon L. Beard; *Long Range Effects of Insecticides on Insect Populations*; 2 years; \$8,100

CORNELL UNIVERSITY, Ithaca, N.Y.  
John P. Barlow, Department of Conservation; *Respiration of Zooplankton Populations*; 3 years; \$25,800

Clifford O. Berg, Department of Entomology; *Biology of European Sciomyzidae*; 2 years; \$6,400

LaMont C. Cole, Department of Zoology; *Effects of Movements on Rodent Population Structure*; 1 year; \$5,900

William J. Hamilton, Jr., Department of Conservation; *Biology of *Sorex Cinereus**; 3 years; \$9,700

David Pimentel, Department of Entomology and Limnology; *Regeneration Mechanism in the Regulation of Certain Populations*; 4 years; \$26,600

Edward C. Raney, Department of Conservation; *Life History and Ecology of Some Clupeiform Fishes*; 3 years; \$13,700

DARTMOUTH COLLEGE, Hanover, N.H.  
F. H. Bormann, Department of Botany; *Physiological Significance of Root Grafting in Pine*; 3 years; \$14,500

Charles J. Lyon, Department of Botany; *Radiocarbon Dating of Drowned Forests*; 1 year; \$3,000

UNIVERSITY OF DELAWARE, Newark, Del.  
Carl N. Shuster, Department of Biological Sciences; *Effect of Environment on Shell Structure in Mollusks*; 2 years; \$13,000

Donald P. de Sylva, Department of Biological Sciences; *Systematics and Ecology*

- of Eggs and Larvae of Delaware Bay Fishes; 2 years; \$20,000  
**DUKE UNIVERSITY, Durham, N.C.**  
 I. E. Gray, Department of Zoology; *Distribution and Abundance of Fauna in Transitional Marine Habitats*; 2 years; \$24,900  
 I. E. Gray, Department of Zoology; *Fauna of Transitional Marine Habitats*; 1 year; \$5,000  
 Terry W. Johnson, Jr., Department of Botany; *Marine Mycology*; 3 years; \$16,800  
 Paul J. Kramer, Department of Botany; *Plant Water Relations*; 5 years; \$50,000  
 Daniel A. Livingstone, Department of Zoology; *Pleistocene Environmental Changes in the Tropics*; 3 years; \$74,400  
 F. John Vernberg, Duke University Marine Laboratory; *Comparative Ecology of Tropical and Temperate Zone Crustaceans*; 2 years; \$10,900  
**EMORY UNIVERSITY, Atlanta, Ga.**; W. D. Burbanck, Department of Biology; *Ecology and Distribution of Cyathura*; 3 years; \$23,600  
**UNIVERSITY OF GEORGIA, Athens, Ga.**  
 Eugene P. Odum, Department of Zoology; *Tropic Structure and Productivity of a Salt Marsh Ecosystem*; 3 years; \$17,500  
 John M. Teal, Marine Institute; *Energy Flow of a Salt Marsh Ecosystem*; 3 years; \$15,600  
**GOUCHER COLLEGE, Baltimore, Md.**; Cornelius Lems, Department of Biological Sciences; *Trends in Growth Forms of Flowering Plants*; 1 year; \$3,800  
**UNIVERSITY OF ILLINOIS, Urbana, Ill.**  
 Richard R. Graber, Illinois Natural History Survey; *Visual and Audio Studies of Nocturnal Migration*; 2 years; \$16,200  
 S. Charles Kendeligh, Department of Zoology; *Physiological Ecology of Tropical Birds*; 1 year; \$9,400  
**INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.**; David G. Frey, Department of Zoology, Indiana University; *Cladocerans and Their Use in Interpreting Lake Ontogeny*; 2 years; \$11,800  
**KANSAS STATE COLLEGE OF AGRICULTURE AND APPLIED SCIENCE, Manhattan, Kans.**; Reginald H. Painter, Department of Entomology; *Interrelations of Insect Biotypes and Host Plants*; 3 years; \$31,600  
**KANSAS STATE TEACHERS COLLEGE, Emporia, Kans.**; Earl Segal, Department of Biology; *Effects of Rapid Temperature Change on Mollusks*; 3 years; \$21,500  
**UNIVERSITY OF KANSAS, Lawrence, Kans.**  
 Richard H. Benson, Department of Geology; *Paleoecology of Ostracoda in Pamlico Sound*; 2 years; \$9,900  
 Henry S. Fitch, Department of Zoology; *Ecology of the Central Plains Herpetofauna*; 2 years; \$7,600  
 Charles D. Michener and Robert E. Beer, Department of Entomology; *Arthropod Associates of Army Ants*; 2 years; \$5,800  
 Robert R. Sokal, Department of Entomology; *Natural Selection During Growth in Tribolium Populations*; 3 years; \$18,000  
**LINFIELD RESEARCH INSTITUTE, McMinnville, Oreg.**; Jane C. Dirks-Edmunds; Department of Biology; *Biotic Succession in a Douglas Fir Forest*; 2 years; \$15,200  
**LONG BEACH STATE COLLEGE, Long Beach, Calif.**; Donald J. Reish, Department of Biological Sciences; *Animal Succession in Newly Developed Marine Harbors*; 3 years; \$20,700  
**LOUISIANA STATE UNIVERSITY, Baton Rouge, La.**; Phillip S. Callahan, Department of Entomology; *Nocturnal Behavior and Reproduction of Certain Lepidoptera*; 2 years; \$12,900  
**LOYOLA UNIVERSITY, New Orleans, La.**; Walter G. Moore, Department of Biology; *Inter-specific Relationships in Anostraca Populations*; 2 years; \$6,500  
**MANCHESTER COLLEGE, North Manchester, Ind.**; William R. Eberly, Department of Biology; *Factors in Development of Metalimnetic Oxygen Maxima in Lakes*; 2 years; \$5,800  
**UNIVERSITY OF MIAMI, Coral Gables, Fla.**  
 Samuel P. Meyers, The Marine Laboratory; *Marine Yeasts of Biscayne Bay*; 2 years; \$16,000  
 Hilary B. Moore, The Marine Laboratory; *Tropical Level Sea Bottom Communities*; 2 years; \$41,800  
 John E. Randall, The Marine Laboratory; *Ecology of Coral Reef Fishes*; 2 years; \$28,000  
 Earl R. Rich, Department of Zoology; *Factors Affecting Fecundity in Tribolium*; 3 years; \$14,100  
**MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing, Mich.**; John L. Lockwood, Department of Botany and Plant Pathology; *Fungitoxicity in Natural Soils*; 2 years; \$11,700  
**UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.**  
 William R. Dawson, Department of Zoology; *Temperature Compensation in Reptiles*; 3 years; \$28,300  
 Samuel A. Graham, Department of Forestry; *Dynamics in Michigan Forest Ecology*; 2 years; \$9,200  
 L. R. Slobodkin, Department of Zoology; *Efficiency and Predation in Experimental Populations*; 4 years; \$61,500  
 Frederick E. Smith, Department of Zoology; *Population Density in Relation to Growth and Competition*; 3 years; \$32,900  
**UNIVERSITY OF MINNESOTA, Minneapolis, Minn.**  
 Hual C. Chiang, Department of Biology, Duluth Branch; *Ecological Studies of Insect Flight*; 3 years; \$12,300  
 William H. Marshall, Department of Entomology and Economic Zoology; *Electronic Methods for Tracing Animal Movements*; 1 year; \$18,300  
 Arthur N. Wilcox, Cedar Creek Natural History Area; *Mapping and Obtaining Biometeorological Data in a Permanent Natural History Research Area*; 3 years; \$55,800  
**UNIVERSITY OF NEW HAMPSHIRE, Durham, N.H.**; Phillip J. Sawyer, Department of Zoology; *Ecology of *Pholis Gunnelus**; 2 years; \$6,100  
**UNIVERSITY OF NEW MEXICO, Albuquerque, N. Mex.**; Howard J. Dittmer, Department of Biology; *Root Systems of Desert and Semi-arid Plants*; 2 years; \$9,500  
**UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.**  
 Earl E. Deubler, Institute of Fisheries Research; *Biology and Ecology of Paratichthys Lethostigma*; 3 years; \$21,400  
 William L. Engels, Department of Zoology; *Daylength and Zugunruhe in Trans-equatorial Migrants*; 3 years; \$16,600



- OHIO STATE UNIVERSITY, Columbus, Ohio; Jacob Verduin, Natural Resources Institute; *Photosynthesis and Respiration in an Aquatic Environment*; 1 year; \$3,100
- OHIO WESLEYAN UNIVERSITY, Delaware, Ohio; Elwood B. Shirling, Department of Botany; *Actinophages and Their Host Interactions*; 3 years; \$20,400
- UNIVERSITY OF OREGON, Eugene, Oreg.; Richard W. Castenholz, Department of Biology; *Growth of Marine Littoral Diatoms*; 2 years; \$11,700
- PACIFIC LUTHERAN COLLEGE, Parkland, Wash.; Jens W. Knudsen, Department of Biology; *Ecology and Life History of Puget Sound Brachyura and Anomura*; 2 years; \$6,900
- PAN AMERICAN COLLEGE, Edinburg, Tex.; Pauline James, Science Division; *Ecology and Behavior of Podiceps Dominicus*; 2 years; \$9,100
- PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; Richard G. Schein, Department of Plant Pathology; *Ecology of Plant Parasitism*; 4 years; \$24,300
- UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; H. T. Hammel, Department of Physiology; *Thermal and Metabolic Responses to Cold*; 1 year; \$6,100
- PORTLAND STATE COLLEGE, Portland, Oreg.; Quentin D. Clarkson, Division of Science; *Environmental Factors in Iris Hybridization*; 2 years; \$4,900
- PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Clarence J. Goodnight, Department of Biological Sciences; *Ecology of Soil Arachnids*; 3 years; \$11,100
- UNIVERSITY OF RHODE ISLAND, Kingston, R.I.; Richard D. Wood, Department of Botany; *Aquatic Plant Biology*; 1 year; \$4,400
- RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.
- Murray F. Buell, Department of Botany; *Continuum Concept in Vegetation Studies*; 4 years; \$26,400
- Paul G. Pearson, Department of Zoology; *Small Mammal Populations in Relation to Burning of Ground Cover*; 1 year; \$1,600
- David Frammer, Department of Agricultural Microbiology; *Ecology of Predacious Fungi*; 4 years; \$15,700
- UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.
- Robert M. Chew, Department of Biology; *Energy Metabolism and Water Balance of a Desert Community*; 1 month; \$600
- Olga Hartman and J. Laurens Barnard, Allan Hancock Foundation; *Benthic Fauna of Offshore Basins*; 1 year; \$10,700
- Olga Hartman and K. O. Emery, Allan Hancock Foundation; *Faunas of Submarine Canyons*; 2 years; \$33,500
- Norman T. Mattox, Department of Biology; *Life History of the Round Stingray*; 2 years; \$5,200
- Jay Savage and Andrew Starrett, Department of Biology; *Ecogeographic Analysis of Costa Rican Herpetofauna*; 1 year; \$5,200
- UNIVERSITY OF ST. THOMAS, Houston, Tex.; J. P. Kennedy, Biology Department; *Reproductive Success in Sceloporus*; 1 year; \$5,800
- SAN JOSE STATE COLLEGE, San Jose, Calif.; L. Richard Mewaldt, Department of Biology; *Migratory Restlessness in Birds*; 3 years; \$20,600
- SOUTHEASTERN STATE COLLEGE, Durant, Okla.; W. H. McCarley, Department of Botany; *Isolating Mechanisms in Peromyces Sp.*; 4 years; \$16,400
- SOUTHWEST MISSOURI STATE COLLEGE, Springfield, Mo.; Paul L. Redfearn, Science Department; *Ecological Study of Bryophytes*; 2 years; \$7,300
- STATE COLLEGE OF WASHINGTON, Pullman, Wash.
- Rexford Daubenmire, Department of Botany; *Patterns of Variation in Pristine Forest*; 5 years; \$11,600
- Richard A. Parker, Department of Zoology; *Copepod-Cladoceran Competition*; 2 years; \$20,300
- TEXAS TECHNOLOGICAL COLLEGE, Lubbock, Tex.; Donald W. Tinkle, Department of Biology; *Reproduction and Variation in Lizard Populations*; 2 years; \$4,600
- UNIVERSITY OF TEXAS, Austin, Tex.
- Louis S. Kornicker, Institute of Marine Science, Port Aransas; *Carbonate Sedimentation on a Living Coral Reef*; 3 years; \$36,800
- Calvin McMillan, Department of Botany; *Nature of the Grassland Type of Community*; 3 years; \$27,000
- Calvin McMillan, Department of Botany; *Phytogeographical Studies in Mexico and Texas*; 2 years; \$28,200
- ERNEST R. TINKHAM, Indio, Calif.; *Environmental Relationships of Desert Sand Dune Biota*; 3 months; \$350
- TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; Willis A. Egler, Department of Botany, Newcomb College; *Plant Succession in Volcanic Areas*; 2 years; \$5,000
- UNIVERSITY OF TULSA, Tulsa, Okla.; Harriet G. Barclay, Department of Botany; *Paramos of South America as Biotic Communities*; 1 year; \$12,600
- UNIVERSITY OF UTAH, Salt Lake City, Utah; Arden R. Gauflin, Department of Biology; *Ecology of Plecoptera*; 3 years; \$9,700
- VASSAR COLLEGE, Poughkeepsie, N.Y.; Gladys E. Baker and Louise F. Potter, Plant Science Department; *Physiological Studies of Microbial Populations*; 3 years; \$17,700
- WABASH COLLEGE, Crawfordsville, Ind.; Eliot C. Williams, Jr., Department of Zoology; *Loss of Pigmentation in Cave Planarians*; 2 years; \$6,500
- UNIVERSITY OF WASHINGTON, Seattle, Wash.
- W. T. Edmondson, Department of Zoology; *Nutrient Supply and Productivity of Lake Washington*; 3 years; \$42,300
- Richard H. Fleming, Department of Oceanography; *Zoogeography of Bathypelagic Species of the North Pacific*; 2 years; \$16,100
- WEST VIRGINIA UNIVERSITY, Morgantown, W. Va.; H. L. Barnett and V. G. Lilly, Department of Plant Pathology; *Parasitism of Biotrophic Fungi on Other Fungi*; 3 years; \$18,600
- WISCONSIN STATE COLLEGE, La Crosse, Wis.; Howard F. Young, Department of Biology; *Avian Reproductive Success*; 2 years; \$5,200
- UNIVERSITY OF WISCONSIN, Madison, Wis.; Myron P. Backus and William F. Whittingham, Department of Botany; *Ecology of Soils Microfungi*; 3 years; \$47,400
- J. T. Curtis, Department of Botany; *Behavioral Basis for the Description of Plant Communities*; 3 years; \$19,800

WOODS HOLE OCEANOGRAPHIC INSTITUTION, Woods Hole, Mass.

Richard H. Backus, Research Associate in Marine Biology; *Composition of Oceanic Deep Scattering Layers*; 1 year; \$58,100

George L. Clarke, Marine Biologist; *Feeding Metabolism and Growth of Zooplankton*; 3 years; \$41,600

Gordon Riley, *Productivity of the Benthos of Coastal Waters*; 2 years; \$14,500

William E. Schevill, Associate in Oceanography; *Environmental Cetology*; 3 years; \$56,700

William C. Schroeder; *Biology of the Larger Pelagic Fishes of the Western Atlantic*; 3 years; \$65,000

Harry J. Turner, Marine Biologist; *Environmental Influences of Reproductive Cycles of Benthic Marine Invertebrates*; 2 years; \$34,100

YALE UNIVERSITY, New Haven, Conn.

John L. Brooks, Department of Zoology; *Influence on Relative Growth in Cyclomorphic Daphnia*; 2 years; \$18,500

G. Evelyn Hutchinson, Department of Zoology; *Palaeolimnological Studies in Italian Lakes*; 3 years; \$25,000

Talbot H. Waterman, Department of Zoology; *Diurnal Vertical Migrations by Aphotic Zone Zooplankton*; 2 years; \$15,600

#### GENETIC BIOLOGY

ALABAMA POLYTECHNIC INSTITUTE, Auburn, Ala.

John S. Mecham, Department of Zoology-Entomology; *Genetical Relationships and Isolating Mechanisms*; 2 years; \$7,400

S. A. Edgar and L. W. Johnson, Department of Poultry Husbandry; *Cellular Antigens in Reproduction and Livability of Chickens*; 2 years; \$12,900

UNIVERSITY OF ARIZONA, Tucson, Ariz.; William B. Heed, Department of Zoology; *Evolutionary Studies in the Genus Drosophila*; 1 year; \$10,000

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.

Sterling H. Emerson, Department of Biology; *Protoplasts of Neurospora Crassa*; 2 years; \$16,000

E. B. Lewis, Department of Biology; *Collection of Mutant Types of Drosophila Melanogaster*; 3 years; \$28,200

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.

V. S. Asmundson, C. Stormont, W. J. Miller and F. X. Ogasawara, Department of Poultry Husbandry, Davis; *Serological Study of Turkeys and Related Gallinaceous Birds*; 3 years; \$30,300

M. M. Green, Department of Genetics, Davis; *Wild-type Isocitric Acid in the White Locus of Drosophila Melanogaster*; 1 year; \$1,000

Harlan Lewis, Department of Botany, Los Angeles; *Race and Species Formation in Clarkia*; 5 years; \$77,600

Curt Stern, Department of Zoology, Berkeley; *Developmental Genetics of Drosophila Melanogaster*; 1 year; \$8,700

CITY OF HOPE MEDICAL CENTER, Duarte, Calif.; William D. Kaplan, Department of Genetics; *Sterility Component of X-ray and Chemically Induced Dominant Lethals in D. Melanogaster*; 1 year; \$7,400

COLUMBIA UNIVERSITY, New York, N.Y.

Th. Dobzhansky, Department of Zoology; *Genetic Heterozygosity and Developmental Variation*; 1 year; \$8,700

Th. Dobzhansky, Department of Zoology; *Heterozygosity and Developmental Variation*; 2 years; \$36,800

Jerry Hirsch, Department of Psychology; *Experimental Behavior Genetics*; 4 years; \$31,700

John A. Moore, Department of Zoology; *Genetics and Evolution of Frogs*; 3 years; \$35,200

Ruth Sager, Department of Zoology; *Non-Chromosomal Heredity*; 2 years; \$21,500

CORNELL UNIVERSITY, Ithaca, N.Y.; Charles R. Henderson, Department of Animal Husbandry, New York State College of Agriculture, Ithaca; *Estimation of Genetic Parameters*; 2 years; \$35,000

UNIVERSITY OF COLORADO, Denver, Colo.; Melvin L. Morse, Department of Biophysics, Medical School, Denver, Colo.; *Genetic Study of Bacteria*; 2 years; \$11,000

DARTMOUTH COLLEGE, Hanover, N.H.; Raymond W. Barratt, Department of Botany; *Gene Control of Glutamic Acid Dehydrogenase Production*; 3 years; \$36,900

DICKINSON COLLEGE, Carlisle, Pa.; Daniel J. McDonald, Department of Biology, *Adaptive Values in Populations of Tribolium*; 3 years; \$10,500

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; A. Gib DeBusk, Department of Biological Sciences; *Genic Transformation in Neurospora Crassa*; 1 year; \$5,500

UNIVERSITY OF FLORIDA, Gainesville, Fla.; John D. Kilby, Department of Biology; *Genetic and Environmental Factors Governing Melanism in Poeciliid Fish*; 2 years; \$11,600

GENETICS SOCIETY OF AMERICA BIOLOGICAL LABORATORIES, Harvard University, Cambridge, Mass.; Robert P. Wagner; *Committee on Maintenance of Genetic Stocks*; 3 years; \$12,000

GOUCHER COLLEGE, Baltimore, Md.; Helen V. Crouse, Department of Biology; *Genetic and Cytological Studies on the Genus Sciara*; 2 years; \$20,700

HARVARD UNIVERSITY, Cambridge, Mass.

R. P. Levine, The Biological Laboratories; *Genetics of Chlamydomonas Reinhardtii*; 2 years; \$18,500

R. P. Levine and J. D. Watson, The Biological Laboratories; *The Replication of Dna of Chlamydomonas Reinhardtii*; 2 years; \$22,900

John R. Raper, Department of Biology; *Genetics and Physiology of Tetrapolarity in the Higher Fungi*; 2 years; \$17,500

Haverford College, Haverford, Pa.; Irving Finger, Department of Biology; *Immunogenetic Studies of Cytoplasmic Particles*; 2 years; \$11,800

UNIVERSITY OF ILLINOIS, Champaign, Ill.

Arthur L. Hooker, Department of Plant Pathology; *Genetics and Physiology of Host-Parasite Interactions*; 1 year; \$9,700

David L. Nanney, Department of Zoology; *Protozoan Genetics*; 15 months; \$16,000

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; Stanley Zimmering, Department of Zoology; *Factors Influencing Crossing Over in Segregation of Chromosomes*; 1 year; \$4,400

IOWA STATE COLLEGE, Ames, Iowa; A. W. Nordskog, Department of Poultry and Animal Husbandry; *Blood Group Studies in the Fowl*; 3 years; \$28,400

KANSAS STATE COLLEGE OF AGRICULTURE AND APPLIED SCIENCE, Manhattan, Kans.

A. M. Guhl and J. V. Craig, Departments of Zoology and Poultry Husbandry; *Genetic Influence on Behavior*; 3 years; \$12,800

Thad H. Pittenger, Department of Agronomy; *Cellular Heredity and Somatic Variation in Neurospora*; 2 years; \$19,200

LONG ISLAND BIOLOGICAL ASSOCIATION, Cold Spring Harbor, N.Y.; A. Chovnick, Biological Laboratory; *Structural and Functional Studies of a Complex Locus in Drosophila Melanogaster*; 3 years; \$26,000

MANHATTAN COLLEGE, New York, N.Y.; Robert E. Beardsley, Department of Biology; *Genetics of Agrobacterium Tumefaciens*; 2 years; \$16,100

UNIVERSITY OF MASSACHUSETTS, Amherst, Mass.; Manley Mandel, Department of Bacteriology and Public Health; *Biology of Serratia Marcescens*; 2 years; \$15,200

MINNEAPOLIS WAR MEMORIAL BLOOD BANK, Minneapolis, Minn.; G. Albin Matson, Director; *Hereditary Blood Factors Among Indians in Central and South America*; 2 years; \$40,000

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Ralph E. Comstock, Department of Animal Husbandry; *Responses to Selection in Mice*; 5 years; \$23,300.

UNIVERSITY OF MISSOURI, Columbia, Mo. M. G. Nuffer, Department of Field Crops; *Mutational Behavior of Selected Loci in Matze*; 3 years; \$31,800

G. Redei, Department of Field Crops; *Physiology of Gene Action in Arabidopsis*; 2 years; \$9,800

Franklin W. Stahl, Department of Zoology; *Growth, Mutation, and Recombination in Bacteriophage*; 2 years; \$21,200

NORTH CAROLINA STATE COLLEGE, Raleigh, N.C.

B. R. Farthing and J. E. Legates, Department of Animal Industry; *Quantitative Genetic Research With Mice*; 3 years; \$33,800

Frank L. Haynes, Jr., Department of Horticulture; *Cytogenetic Studies in the Genus Solanum, Section Tuberosum*; 3 years; \$21,000

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; S. G. Stephens, Division of Biological Sciences; *Field Studies on the Origin and Differentiation of Caribbean Cottons*; 2 years; \$9,600

NORTHERN ILLINOIS UNIVERSITY, DeKalb, Ill.; Cecil Jackson Bennett, Department of Biological Sciences; *Adaptation of Drosophila to Insecticides*; 2 years; \$9,600

UNIVERSITY OF OREGON, Eugene, Ore.; E. Novitski, Department of Biology; *Studies on Chromosome Behavior in Drosophila*; 2 years; \$26,700

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; Paul Grun, Department of Botany and Plant Pathology; *Cytogenetic Studies in the Genus Solanum*; 3 years; \$17,000

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Seymour Benzer, Department of Biological Sciences, Purdue University; *Genetic Fine Structure and Its Relation to the Dna Molecule*; 3 years; \$44,100

QUEEN'S UNIVERSITY, Kingston, Ontario, Canada; Eloy Axel Carlson, Department of

Biology; *Experimental Analysis of Models Interpreting Complex Loci*; 2 years; \$10,100

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; Frederick A. Valentine, Department of Forest Botany; *Mutation of Variegated to Orange Variegated Pericarp in Matze*; 3 years; \$2,900

ROSCOE B. JACKSON MEMORIAL LABORATORY, Bar Harbor, Maine

Margaret C. Green; *Development of Short-Ear Mutant Mice*; 2 years; \$10,000

Margaret C. Green; Staff Scientist; *Formal Genetics of the Mouse and Maintenance of Mutant Stocks*; 3 years; \$51,000

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J. Seymour Abrahamson, Department of Biology; *Induction of Structural Changes in Drosophila Melanogaster*; 2 years; \$14,000

Waclaw Szybalski, Institute of Microbiology; *Genetically Essential Fractions of Normal and Modified Dna in Bacteriophage and Bacteria*; 2 years; \$27,600

SAN DIEGO STATE COLLEGE FOUNDATION, San Diego, Calif.; Frank J. Ratty, Department of Zoology, San Diego State College; *Effects of Proximal Heterochromatin on Mutation and Germinal Selection*; 3 years; \$10,800

SOUTHERN ILLINOIS UNIVERSITY, Carbondale, Ill.; Carl C. Lindgren, Biological Research Laboratory; *Mathematical Analysis of Yeast Tetrad Data*; 1 year; \$8,800

STANFORD UNIVERSITY, Stanford, Calif.

Joshua Lederberg, Department of Genetics; *Genetic Recombination in Bacteria*; 5 years; \$109,500

Walter N. Strickland, Department of Biological Sciences; *Genetic Recombination in Neurospora*; 1 year; \$18,500

Charles Yanofsky, Department of Biological Sciences; *Mutational Alterations of the A-Protein of Tryptophan Synthetase*; 3 years; \$61,200

STATE UNIVERSITY OF IOWA, Iowa City, Iowa.

H. F. Hsu, Department of Hygiene and Preventive Medicine; *Biological Species of Schistosoma Japonicum and Their Formation*; 3 years; \$32,200

Emil Witschi, Department of Zoology; *Genetics and Physiology of Sex Differentiation*; 2 years; \$28,100

SYRACUSE UNIVERSITY, Syracuse, N.Y.; B. S. Strauss, Department of Zoology; *Mechanisms of Gene Action and Interaction*; 2 years; \$23,000

UNIVERSITY OF TEXAS, Austin, Tex.; Wilson S. Stone, Department of Zoology; *Cytogenetics of Zea-Tripsacum Hybrids*; 3 years; \$13,900

TRINITY COLLEGE, Hartford, Conn.; Stanley Zimmering, Department of Biology; *Interchromosomal Factors Influencing Crossing Over and Segregation*; 2 years; \$11,900

TULANE UNIVERSITY, New Orleans, La.; Peter E. Volpe, Department of Zoology; *Genetics and Systematics of Anurans*; 2 years; \$12,100

UNIVERSITY OF UTAH, Salt Lake City, Utah; Robert K. Vickery, Jr.; Department of Genetics; *Cytogenetic Studies of the Patterns of Evolution in Mimulus*; 1 year; \$8,000

WASHINGTON UNIVERSITY, St. Louis, Mo.; Harrison D. Stalker and Hampton L. Carson, Department of Zoology; *Population Genetics of Drosophila*; 3 years; \$46,600

UNIVERSITY OF WASHINGTON, Seattle, Wash.; Stanley M. Gartler, Division of Medical Genetics; *Human Biochemical Genetics*; 2 years; \$18,500

David R. Stadler, Department of Botany; *Genetic Recombination in Neurospora*; 3 years; \$24,000

WESLEYAN UNIVERSITY, Middletown, Conn.; Ernest Caspari, Department of Biology; *Genetic Control of Changes in Permeability for Riboflavin in the Moth Ephestia*; 2 years; \$11,800

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; Jan H. Bruell, Department of Psychology; *Genetics of Behavior in Mice*; 2 years; \$24,000

UNIVERSITY OF WISCONSIN, Madison, Wis. James F. Crow, Department of Genetics; *Cytogenetic and Population Genetic Studies in Drosophila*; 2 years; \$35,100

R. W. Hougas, Department of Genetics; *Haploid Induction in Solanum*; 3 years; \$22,600

Newton E. Morton, Department of Medical Genetics; *Genetics of Interracial Crosses in Hawaii*; 1 year; \$30,500

YALE UNIVERSITY, New Haven, Conn. Walter R. Guild and Harry P. Rappaport, Biophysics Department; *Pneumococcus and the Transformation Process*; 2 years; \$31,200

Francois Merger, Department of Forest Genetics; *Basic Research in Forest Genetics*; 5 years; \$53,200

#### HISTORY AND PHILOSOPHY OF SCIENCE

UNIVERSITY OF CALIFORNIA, Berkeley, Calif. Ernest W. Adams, Department of Philosophy, Berkeley; *Foundations of Measurement*; 1 year; \$3,300

Rudolf Carnap, Department of Philosophy; *Theory of Inductive Probability*; 2 years; \$28,000

UNIVERSITY OF CHICAGO, Chicago, Ill.; Cyril Stanley Smith, Institute for the Study of Metals; *Sources for the History of Metallurgy*; 3 years; \$15,000

CITY COLLEGE, New York, N.Y.; A. Edel; *Social Science Variables in Philosophy*; 1 year; \$7,500

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; E. Grant; *Mathematical Proportionality*; 2 years; \$4,700

LEHIGH UNIVERSITY, Bethlehem, Pa.; Adolf Grunbaum, Department of Philosophy; *Philosophy of Fundamental Physical Theory*; 1 year; \$3,200

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Richard M. Martin, Department of Philosophy; *Applications of Symbolic Logic*; 1 year; \$5,900

TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; Joseph Ewan, Department of Botany; *Studies on American Naturalists*; 2 years; \$10,000

YALE UNIVERSITY, New Haven, Conn.; T. R. Forbes, Department of Anatomy; *Science and Medicine*; 1 year; \$1,100

#### MATHEMATICAL SCIENCES

AMERICAN MATHEMATICAL SOCIETY, Providence, R.I.; J. H. Curtiss, Executive Director; *Summer Research Institute in the Theory of Numbers*; 6 weeks; \$41,000

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Harvey Cohn, Department of Mathematics;

*Study of Biquadratic Fields*; 3 years; \$37,800

BRANDEIS UNIVERSITY, Waltham, Mass.

E. H. Brown and J. J. Kohn, Department of Mathematics; *Fiber Spaces*; 3 years; \$30,400

Oscar Goldham, Leon Ehrenpreis, Maurice Auslander and Arnold Shapiro, Department of Mathematics; *Differentiable and Analytic Manifolds*; 3 years; \$52,900

BROWN UNIVERSITY, Providence, R.I.; John Wermer, Department of Mathematics; *Poly-nominal Approximation in Several Complex Variables*; 2 years; \$14,000

UNIVERSITY OF CALIFORNIA, Berkeley, Calif. Chen-Chung Chang, Department of Mathematics, Los Angeles; *Foundations of Mathematics*; 2 years; \$11,600

R. C. Gilbert, C. J. A. Halberg, and V. A. Kramer; Department of Mathematics; *Generalizations of the Trace*; 1 year; \$5,600

Louis Henyey, Computer Center; *Expansion of Computing Facility*; 1 year; \$130,000

John L. Kelley, Department of Mathematics; *Functional Analysis*; 2 years; \$51,600

John Myhill, Department of Philosophy; *Recursion Theory*; 1 year; \$5,600

Ralph S. Phillips, Department of Mathematics, Los Angeles; *Functional Analysis and Partial Differential Equations*; 2 years; \$21,800

Henry Scheffé, Department of Statistics; *Design and Analysis of Experiments*; 1 year; \$8,400

Alfred Tarski, Department of Mathematics; *Foundation of Mathematics*; 3 years; \$57,300

R. L. Vaught, Department of Mathematics; *The Theory of Models in Metamathematics*; 2 years; \$12,100

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; Joseph Auslander, Department of Mathematics; *Pointwise Almost Periodic Transformation Groups*; 2 years; \$10,100

CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.

Eugene Lukacs, Department of Mathematics; *Probability Theory and Mathematical Statistics*; 1 year; \$4,000

Katsumi Nomizu, Department of Mathematics; *Isometries and Singularities of Submanifolds*; 3 years; \$10,000

UNIVERSITY OF CHICAGO, Chicago, Ill.

Alberto P. Calderon, Department of Mathematics; *Research in Analysis*; 3 years; \$69,900

Shing-Shem Chern, Department of Mathematics; *Kählerian Homogeneous Spaces*; 1 year; \$6,200

Eldon Dyer, Department of Mathematics; *Geometry and Topology*; 3 years; \$14,600

Paul R. Halmos, Department of Mathematics; *Algebraic Logic and Set Theory*; 2 years; \$18,200

UNIVERSITY OF CINCINNATI, Cincinnati, Ohio; Paul Herget, Director of Computing Center; *Support of Computing Center*; 2 years; \$30,000

UNIVERSITY OF COLORADO, Boulder, Colo.; Sarvadaman Chowla, Department of Mathematics; *Dirichlet L Series and Allied Problems*; 2 years; \$31,900

COLUMBIA UNIVERSITY, New York, N.Y.; Samuel Ellenberg, Department of Mathe-

matics; *Partial Differential Equations*; 2 years; \$6,800

CORNELL UNIVERSITY, Ithaca, N.Y.; Justin J. Price and Constantine Kassimatis, Department of Mathematics; *Orthogonal Expansions and Trigonometric Integrals*; 1 year; \$3,900

DARTMOUTH COLLEGE, Hanover, N.H.

Richard H. Crowell, Department of Mathematics; *Homological Algebra and Knot Theory*; 2 years; \$6,900

J. Laurie Snell, Department of Mathematics; *Stochastic Processes and Their Applications*; 1 year; \$15,800

GEORGIA INSTITUTE OF TECHNOLOGY, Atlanta, Ga.; John A. Nohel, Department of Mathematics; *Differential Equations*; 2 years; \$25,600

GOUCHER COLLEGE, Baltimore, Md.; Mary-Elizabeth Hamstrom, Department of Mathematics; *Nappings Whose Inverses Are 3-Manifolds*; 3 years; \$6,200

HARVARD UNIVERSITY, Cambridge, Mass.

W. W. Leontief, Harvard Economic Research Project; *Numerical Analysis in Economic Research*; 2 years; \$6,300

Lars V. Ahlfors, Department of Mathematics; *Riemann Surfaces and Complex Manifolds*; 1 year; \$12,000

R. Brauer, J. Tate and O. Zariski, Department of Mathematics; *Algebra Number Theory and Algebraic Geometry*; 2 years; \$35,400

W. W. Leontief, Harvard Economic Research Project; *Numerical Analysis in Economic Research*; 2 years; \$6,300

UNIVERSITY OF ILLINOIS, Urbana, Ill.

Robert G. Bartle, Department of Mathematics; *Linear Operators*; 1 year; \$7,000

Collin R. Blyth, Department of Mathematics; *Mathematical Statistics*; 1 year; \$13,500

Stewart S. Cairns; Department of Mathematics; *Topology of Manifolds*; 1 year; \$15,100

Lee Albert Rubel, Department of Mathematics; *Small Functions With Prescribed Zeros*; 15 months; \$4,200

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; Ernst Snapper, Department of Mathematics, Indiana University; *Multiples of Divisors on Algebraic Varieties*; 2 years; \$5,800

INSTITUTE FOR ADVANCED STUDY, Princeton, N.J.; Atle Selberg, School of Mathematics; *Studies in Mathematics*; 2 years; \$48,000

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.

Wei-Liang Chow, Department of Mathematics; *Algebraic Geometry and Its Applications to Number Theory*; 5 years; \$84,300

Frederick I. Mautner, Department of Mathematics; *Functional Analysis and Group Representations*; 1 year; \$6,500

UNIVERSITY OF KANSAS, Lawrence, Kans.; Nachman Aronszajn, Department of Mathematics; *Differential Eigenvalue Problems*; 1 year; \$21,200

UNIVERSITY OF MARYLAND, College Park, Md.

Avron Douglis, Department of Mathematics; *Partial Differential Equations*; 2 years; \$18,000

R. E. Fullerton, Department of Mathematics; *Analysis on Frechet Surfaces*; 1 year; \$1,400

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Kenkichi Iwasawa, Department of Mathematics; *Galois Extensions of Algebraic Number Fields*; 2 years; \$16,700

MICHIGAN STATE UNIVERSITY, East Lansing, Mich.; Howard E. Campbell, Robert E. Oehmke and Marvin L. Tomber, Department of Mathematics; *Derivation Algebras of Nonassociative Algebras*; 2 years; \$44,100

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; G. S. Young, Department of Mathematics; *Applications of Topology in Analysis*; 6 months; \$3,750

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.

Bjarni Jonsson, Department of Mathematics; *Foundations of Algebra*; 2 years; \$7,000

Marguerite Frank, Department of Mathematics; *Lie Algebras*; 2 years; \$12,500

Gerhard K. Kalisch, Department of Mathematics; *Group Algebra and  $L_p$  Spaces*; 2 years; \$10,800

UNIVERSITY OF MISSOURI, Columbia, Mo.

Henry E. Bent; *Establishment of Computing Center*; 1 year; \$46,400

Joseph L. Zemmer, Department of Mathematics; *Infinite Independent Aba Groups*; 1 year; \$2,500

UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; Hugo Ribelro, Department of Mathematics; *Relative Completeness of Sets of Sentences*; 2 years; \$10,700

NEW YORK UNIVERSITY, New York, N.Y.; Richard Courant, Institute of Mathematical Sciences; *Research in Mathematical Sciences*; 2 years; \$100,000

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; D. W. Wall, Department of Mathematics; *Rings and Algebras With Radical*; 1 year; \$9,900

NORTHWESTERN UNIVERSITY, Evanston, Ill.

Ralph P. Boas, Jr., Department of Mathematics; *External Problems for Polynomials Trigonometric Polynomials, and Entire Functions*; 2 years; \$19,500

William M. Boothby, Department of Mathematics; *Differential Geometry and Lie Groups*; 1 year; \$6,200

Bruno Harris, Department of Mathematics; *Cohomology Theory of Jordan Algebra*; 2 years; \$3,100

H. C. Wang, Department of Mathematics; *Linear Groups*; 1 year; \$6,700

Daniel Zelinsky, Department of Mathematics; *Homological Algebra*; 1 year; \$14,400

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; Arnold E. Ross; Department of Mathematics; *A Summer Number Theory Research Seminar*; 2 years; \$41,600

OHIO STATE UNIVERSITY, Columbus, Ohio; Clifford Spector, Department of Mathematics; *Constructive Ordinals and Recursive Functions*; 1 year; \$10,700

OREGON STATE COLLEGE, Corvallis, Oreg.; Arvid T. Lonseth, Department of Mathematics; *Computer Research*; 3 years; \$24,600

UNIVERSITY OF OREGON, Eugene, Oreg.

Frank W. Anderson and Robert L. Blair, Department of Mathematics; *Extensions of Algebraic Systems of Continuous Functions*; 2 years; \$8,800

Bertram Yood and Paul Civin, Department of Mathematics; *Involutions on Normed Algebras*; 2 years; \$17,000

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.

William Craig, Department of Mathematics; *Mathematical Logic*; 2 years; \$6,900

Haskell Curry, Department of Mathematics; *Combinatory Logic*; 2 years; \$21,200

PURDUE RESEARCH FOUNDATIONS, Lafayette, Ind.

Leonard Gillman and Meyer Jerison, Department of Mathematics; *Theory of Continuous Functions*; 3 years; \$63,300

Casper Goffman, Department of Mathematics, Purdue University; *Area of Discontinuous Parametric Surfaces*; 2 years; \$10,700

Merrill E. Shanks, Department of Mathematics and Statistics; *Algebraic Structures Over Manifolds*; 2 years; \$21,200

PRINCETON UNIVERSITY, Princeton, N. J.; S. Lefschetz, Department of Mathematics; *Birational Invariance of Picard Varieties*; 2 years; \$5,750

STANFORD UNIVERSITY, Stanford, Calif.

Newton S. Hawley and Theodore T. Frankel, Applied Mathematics and Statistical Laboratory; *Study of Manifolds*; 3 years; \$22,100

James L. McGregor, Department of Mathematics; *Diffusion Processes*; 2 years; \$4,200

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; A. L. Whiteman, Department of Mathematics; *Cyclotomy and Transcendence Problems*; 1 year; \$8,100

STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N. J.; Lawrence Goldman, Department of Mathematics; *The Zeros of Homogeneous Linear Differential Equations*; 1 year; \$5,500

SYRACUSE UNIVERSITY RESEARCH FOUNDATION, Syracuse, N. Y.; P. T. Church, Department of Mathematics; *Applications of Topology to Analysis*; 2 years; \$7,300

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; O. G. Harrold, Jr., Department of Mathematics; *Characterization of Locally Euclidean Spaces*; 2 years; \$12,500

UNIVERSITY OF TEXAS, Austin, Tex.; H. S. Vandiver, Department of Mathematics; *Theory of Numbers*; 2 years; \$35,500

TRINITY COLLEGE, Hartford, Conn.; Walter J. Kilmczak, Department of Mathematics; *Convergence of Series of Eigenfunctions*; 2 years; \$5,650

TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; A. D. Wallace, Department of Mathematics; *Research in Semigroups*; 3 years; \$39,600

UNIVERSITY OF UTAH, Salt Lake City, Utah; C. E. Bruggess, Department of Mathematics; *Continua in Euclidean Space*; 2 years; \$10,700

WASHINGTON UNIVERSITY, St. Louis, Mo.; J. K. Goldhaber, Department of Mathematics; *Finite Projective Planes*; 2 years; \$7,900

WAYNE STATE UNIVERSITY, Detroit, Mich.

Samuel Kaplan, Department of Mathematics; *The Second Dual of the Space of Continuous Functions*; 1 year; \$3,300

Owen G. Owens, Department of Mathematics; *The Ultrahyperbolic Equation*; 1 year; \$5,000

UNIVERSITY OF WISCONSIN, Madison, Wis. Richard H. Bruck, Department of Mathematics; *Topics in Algebra and Geometry*; 1 year; \$9,500

Stephen C. Kleene, Department of Mathematics; *Recursive Functions*; 18 months; \$13,600

YALE UNIVERSITY, New Haven, Conn.

Felix E. Browder, Department of Mathematics; *Partial Differential Equations*; 28 months; \$22,500

Oystein Ore, Department of Mathematics; *Theory of Graphs*; 2 years; \$10,400

YESHIVA UNIVERSITY, New York, N. Y.; Leo Zippin and Harry E. Rauch, Department of Mathematics; *Transformation Groups-Topological and Differentiable*; 3 years; \$49,400

## METABOLIC BIOLOGY

BERMUDA BIOLOGICAL STATION FOR RESEARCH INCORPORATED, St. George's West, Bermuda; Saul Roseman, The Rackham Arthritis Research Unit, University of Michigan; *Mucopolysaccharide Metabolism in Marine Organisms*; 2 years; \$6,150

BOSTON UNIVERSITY, Boston, Mass.; F. J. Lionetti, Department of Biochemistry of Medicine; *Triose Metabolism in Human Erythrocytes*; 2 years; \$16,800

BRANDEIS UNIVERSITY, Waltham, Mass.

John M. Lowenstein, Department of Biochemistry; *Factors Involved in the Generation of High Energy Phosphate*; 2 years; \$16,000

Jerome A. Schiff, Department of Biology; *Reduction of Sulfate by Chlorella Pyrenoidosa*; 2 years; \$10,000

BRIGHAM YOUNG UNIVERSITY, Provo, Utah, Richard D. Sagers, Department of Bacteriology; *Formation of Acetate by Anaerobic Microorganisms*; 3 years; \$25,100

BYRN MAWR COLLEGE, Bryn Mawr, Pa.; Robert L. Conner, Department of Biology; *Mode of Action of Steroids in the Metabolism of Protozoa*; 1 year; \$3,000

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; James Bonner, Department of Biology; *Chemical Studies of Plant Growth Processes*; 3 years; \$74,000

UNIVERSITY OF CALIFORNIA, Berkeley, Calif. Edward A. Adelberg, Department of Bacteriology; *Enzymatic Changes in Genetic Adaptation of Microorganisms*; 3 years; \$30,650

Frank W. Allen, Department of Biochemistry; *5-Ribosyl Uracil As A Component of Ribonucleic Acids*; 3 years; \$30,000

Arthur L. Black, Department of Biochemistry; *Pyruvate Metabolism in the Cow*; 1 year; \$2,800

O. H. Scherbaum, Department of Zoology, Los Angeles; *Role of Nucleic Acids in the Mechanism of Synchronous Cell Division*; 2 years; \$31,600

Horace A. Barker, Department of Agricultural Chemistry, College of Agriculture; *Structure and Function of a Vitamin B-Containing Coenzyme*; 3 years; \$40,000

David P. Hackett, Department of Biochemistry; *Respiratory Hydrogen Transport Chain in Plants*; 3 years; \$46,100

David M. Prescott, Department of Anatomy, School of Medicine, Los Angeles; *Function of the Nucleus in the Life Cycle of the Cell*; 2 years; \$12,000

UNIVERSITY OF CHICAGO, Chicago, Ill.; Lawrence Bogorad, Department of Botany; *Metabolism of Pyrrole and Porphyrin*; 4 years; \$38,250

COLUMBIA UNIVERSITY, New York, N.Y.; Stuart W. Tanenbaum, Department of Microbiology, College of Physicians and Surgeons; *Biosynthesis of Patulin and Related Aromatic Compounds*; 2 years; \$19,200

UNIVERSITY OF CONNECTICUT, Storrs, Conn.; Emil O. Berstein, Department of Zoology; *Acetate Metabolism and the Nature of Obligate Photoautotrophy*; 2 years; \$16,200

CORNELL UNIVERSITY, Ithaca, N.Y. Martin Alexander and Jeffery E. Dawson, Department of Agronomy; *Metabolism of the Chemoautotrophic and Heterotrophic Nitrogen-fixing Bacteria*; 2 years; \$12,200

Martin Gibbs, Department of Biochemistry and Nutrition; *Pathways of Carbohydrate Dissimilation in the Autotrophic Cell*; 3 years; \$49,200

UNIVERSITY OF DELAWARE, Newark, Del. Bruce M. Pollock, Department of Biological Sciences; *Physiological and Biochemical Mechanisms of the Rest Period in Seeds*; 3 years; \$30,000

John C. Wriston, Jr., Department of Chemistry; *Metabolism of One-Carbon Compounds*; 2 years; \$18,000

DICKINSON COLLEGE, Carlisle, Pa.; Barbara B. McDonald, Biology Department; *Deoxyribose Nucleic Acid Metabolism in Tetrahymena Pyriformis*; 3 years; \$17,800

FORDHAM UNIVERSITY, New York, N.Y. F. F. Nord, Department of Organic Chemistry and Enzymology; *Biochemical and Physico-Chemical Studies on Enzymes*; 2 years; \$28,700

F. F. Nord, Department of Organic Chemistry and Enzymology; *Structural, Biochemical and Physico-Chemical Studies on Lignins*; 3 years; \$41,000

UNIVERSITY OF GEORGIA, Athens, Ga. Milton J. Cormier, Department of Chemistry; *Mechanisms of Bioluminescent Reactions*; 2 years; \$15,750

Robert A. McKorie, Department of Chemistry; *Equipment for Research in Microbiology and Biochemistry*; 1 year; \$12,000

William J. Payne and Robert A. McKorie, Department of Bacteriology; *Bacterial Metabolism of Uronic Acids*; 2 years; \$16,000

GOUCHER COLLEGE, Baltimore, Md.; Helen M. Habermann, Department of Biological Sciences; *Physiology of Pigment-Deficient Mutants of Helianthus Annus L.*; 3 years; \$37,100

HARVARD UNIVERSITY, Cambridge Mass. Bernard D. Davis, Department of Bacteriology and Immunology; *Bacterial Physiology and Metabolism*; 4 years; \$159,400

Edmund Chi Chien Lin, Department of Biological Chemistry; *Properties of Certain Enzymes in Bacterial Cells*; 3 years; \$21,500

Frederick C. Neldhardt, Department of Bacteriology and Immunology, The Medical School; *Role of Pentose Nucleic Acid in the Growth of Bacteria*; 2 years; \$14,400

K. V. Thimann, Department of Biology; *Growth and the Action of Aurin*; 3 years; \$45,600

HAHNEMANN MEDICAL COLLEGE AND HOSPITAL, Philadelphia, Pa.; Albert G. Moat, Department of Microbiology; *Site and Mode of Action of Biotin*; 3 years; \$28,750

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.; William F. Danforth, Department of Biology; *Cellular Permeability and*

*Metabolic Regulation in Unicellular Organisms*; 1 year; \$1,000

UNIVERSITY OF ILLINOIS, Urbana, Ill. H. H. Draper, Department of Animal Science; *Function and Metabolism of Alpha-Tocopherol in Animals*; 2 years; \$18,000

B. Connor Johnson, Department of Animal Science; *Role of Vitamin B12 in Intermediary Metabolism*; 2 years; \$27,000

B. L. Larson, Department of Dairy Science; *Secretory Activity and Protein Synthesis in Mammary Gland Tissue Cultivated in Vitro*; 3 years; \$40,000

James F. Nance, Department of Botany; *Lipide Metabolism and Growth in Plants*; 2 years; \$7,500

Max E. Rafelson, Department of Biological Chemistry, College of Medicine, Chicago; *Growth and Two Carbon Metabolism in Microorganisms*; 3 years; \$24,600

R. S. Wolfe, Department of Bacteriology; *Metabolic Reactions in Bacteria*; 3 years; \$23,200

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; Henry R. Mahler, Department of Chemistry; *Studies of the Biosynthesis and Mode of Action of Respiratory Enzymes*; 5 years; \$100,000

INSTITUTE FOR CANCER RESEARCH AND THE LANKENAU HOSPITAL RESEARCH INSTITUTE, Philadelphia, Pa.; Murray Strassman Division of Biochemistry; *Biosynthesis of Valine and Isoleucine*; 3 years; \$22,000

INSTITUT PASTEUR, Paris, France; Jacques Monod, Head, Department of Cellular Biochemistry; *Specific Factors in Enzyme and Protein Biosynthesis*; 3 years; \$40,250

IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Ames, Iowa; I. C. Anderson, Department of Agronomy; *Biochemical Studies on Some Inherited Differences in Plants*; 3 years; \$16,000

IOWA STATE COLLEGE, Ames, Iowa; Sam Aronoff, Department of Botany and Plant Pathology; *Biogenesis of Chlorophyll*; 3 years; \$28,750

JOHNS HOPKINS UNIVERSITY, Baltimore, Md. Herman M. Kalckar, Department of Biology, McCollum-Pratt Institute; *Enzymology of Glactose Metabolism*; 2 years; \$15,000

Manfred M. Mayer, Department of Microbiology, School of Hygiene and Public Health; *Cytotoxic Reactions Mediated by Antibody and Complement*; 4 years; \$72,000

Alvin Nason, McCollum-Pratt Institute; *Biochemistry of Nitrogen Fixation*; 1 year; \$10,100

Alvin Nason, Department of Biology; *Attempted Characterization of Cellfree N2 Fixation*; 3 years; \$45,000

MARQUETTE UNIVERSITY, Milwaukee, Wis.; Walter G. Rosen, Department of Biology; *Influence of Streptomycin on Chlorophyll and Chloroplast Synthesis*; 1 year; \$4,000

UNIVERSITY OF MARYLAND, College Park, Md.; Samuel P. Bessman, Department of Pediatrics, School of Medicine, Baltimore; *Differential Formation of Fat or Cholesterol as a Function of Glycolysis*; 3 years; \$28,900

MCGILL UNIVERSITY, Montreal, Canada; J. H. Quastel, Director, McGill-Montreal General Hospital Research Institute; *Factors Controlling Uptake and Transport of Amino Acids*; 3 years; \$35,700

MICHIGAN STATE UNIVERSITY, East Lansing, Mich.

Robert S. Bandurski, Department of Botany and Plant Pathology; *Metabolism of Microorganisms and Higher Plants With Special Reference to Sulfate Reduction*; 3 years; \$52,900

Edward C. Cantino, Department of Botany and Plant Pathology; *Biochemical Mechanisms of Stimulatory Effects of Light on Growth and Morphogenesis in Blastocladiella*; 3 years; \$20,000

N. E. Tolbert, Department of Agricultural Chemistry; *Metabolism of Glycolic and Glyoxylic Acids in Plants*; 3 years; \$48,000  
UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.

Morris Foster, Department of Zoology; *Physiological Studies of Melanogenesis*; 18 months; \$8,000

William E. Lands, Department of Biological Chemistry; *Chemistry and Metabolism of Plasmalogen*; 3 years; \$23,700

Peter M. Ray, Department of Botany; *Relation Between Cell Wall Metabolism and Growth of Plant Cells*; 3 years; \$30,000

Alfred S. Sussman, Department of Botany; *Dormancy in Ascospores of Neurospora*; 2 years; \$17,700  
UNIVERSITY OF MINNESOTA, Minneapolis, Minn.

Samuel Kirkwood, Department of Agricultural Biochemistry; *Enzyme Systems Concerned With Iodine Metabolism*; 3 years; \$20,500

John F. van Pilsun, Department of Physiological Chemistry; *Guadinium Compound Metabolism*; 2 years; \$11,100

MONTANA STATE COLLEGE, Bozeman, Mont.; Richard H. McBee, Department of Botany and Bacteriology; *Cellulose Decomposition by Bacteria*; 3 years; \$14,500

MOUNT SINAI MEDICAL RESEARCH FOUNDATION, Chicago, Ill.; S. G. A. Alivisatos, Department of Biochemical Research; *Metabolism of Histamine and Related Compounds*; 3 years; \$39,700

NEW YORK BOTANICAL GARDEN, New York, N.Y.; Marjorie Anchel, Research Associate; *Metabolism of Fungal Polyacetylenes*; 3 years; \$29,300

NEWARK STATE COLLEGE, Union, N.J.; Carl S. Hammen, Department of Science; *Carbon Dioxide Fixation in Invertebrates*; 3 years; \$13,000

NORTH DAKOTA AGRICULTURAL COLLEGE, Fargo, N. Dak.; D. Stuart Frear, Department of Agricultural Chemistry; *Intermediary Metabolism of Flax Rust*; 3 years; \$20,000

NORTHWESTERN UNIVERSITY, Evanston, Ill.; Ralph A. Slepceky, Department of Biological Sciences; *Relationships Between Dipicolinic Acid and Cell Metabolites in Bacterial Spores*; 3 years; \$24,000

OHIO UNIVERSITY, Athens, Ohio; John T. McQuate, Department of Zoology; *Oxidative and Phosphorilative Activities of Subcellular Particles of Yeast*; 3 years; \$36,800

OHIO STATE UNIVERSITY, Columbus, Ohio.

John E. Gander, Department of Agricultural Biochemistry; *Biosynthesis of Cyanogenic Glycosides in Plants*; 3 years; \$19,600

J. E. Varner, Department of Agricultural Biochemistry; *Mass Spectrometer for Biochemical Research*; 2 years; \$19,550  
OKLAHOMA STATE UNIVERSITY, Stillwater, Okla.

Norman N. Durham, Department of Bacteriology; *The Biosynthesis of Induced Enzymes*; 1 year; \$6,900

Arthur R. Schulz, Department of Biochemistry; *Function of Vitamin K<sub>1</sub> in Phosphorylation*; 2 years; \$14,600

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, The University of Oklahoma, Norman, Okla.; H. H. Ramsey and T. E. Wilson, Department of Microbiology, School of Medicine, Oklahoma City; *Priority of Enzyme Synthesis in Microorganisms*; 2 years; \$9,500

OREGON STATE COLLEGE, Corvallis, Oreg.

Vernon H. Cheldelin, Department of Chemistry, Science Research Institute; *Nutrition and Metabolism of Insects*; 3 years; \$31,000

Leo W. Parks, Department of Bacteriology; *Ergosterol Metabolism in Saccharomyces Cerevisiae*; 2 years; \$15,000

A. W. Pritchard, Department of Zoology; *Intermediary Carbohydrate Metabolism in the Crayfish*; 3 years; \$11,300

Tsoo E. King, Science Research Institute; *Reconstitution of the Mitochondrial Respiratory Chain*; 2 years; \$30,000

C. H. Wang, Department of Chemistry; *Radiorepirometric Studies of Glucose Metabolism*; 1 year; \$12,500

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Alex Shrift, Department of Botany; *The Uncoupling of Cell Division from Growth*; 2 years; \$12,800

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; Ronald Bentley, Department of Biochemistry and Nutrition; *Carbohydrate Metabolism in Molds*; 3 years; \$30,100

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Bruce J. Rogers, Department of Botany and Plant Pathology, Purdue University; *Selective Action of 3-Amino-1, 2, 4-Triazole in Plants*; 2 years; \$11,700

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.

Dan A. Richert, Department of Biochemistry, College of Medicine, Syracuse; *Influence of Nutritional Deficiencies on Red Cell Production and Heme Synthesis*; 3 years; \$24,800

Ernest Sondheimer, Department of Forest Chemistry, State University College of Forestry at Syracuse University; *The Effects of Rubbery Wood Virus on Lignin Biosynthesis*; 2 years; \$7,000

Arthur M. Zimmerman, Department of Pharmacology, Downstate Medical Center, Brooklyn; *Effect on Adenosinetriphosphate on Living Cells*; 2 years; \$12,100

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.

Werner Braun, Institute of Microbiology; *The Effect of Metabolic Factors Upon Bacterial Cell Populations*; 3 years; \$42,000

Frank F. Davis, Department of Agricultural Biochemistry; *Low Molecular Weight Ribonucleic Acids from Yeast*; 2 years; \$6,000

Gerald Litwack, Department of Agricultural Biochemistry; *Formation of Lysozyme Substrate in Microbial Cell Walls*; 3 years; \$12,000

Wayne W. Unbreit, Department of Bacteriology; *A Study of Autotrophy*; 3 years; \$31,500

SCRIPPS CLINIC AND RESEARCH FOUNDATION, La Jolla, Calif.; Henry I. Nakada, Division of Laboratories; *Glyoxylic Acid Metabolism*; 4 years; \$23,000

SMITHSONIAN INSTITUTION, Washington, D.C.; Herbert Friedmann, United States



National Museum; *Metabolic Aspects of the Digestion of Waas*; 2 years; \$22,600  
UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.

Walter Marx, Department of Biochemistry and Nutrition; *Thyroxine and Yeast Metabolism*; 3 years; \$27,800

Jack B. Wolfe, Department of Medical Microbiology, Medical School; *Glutarate Metabolism of Microorganisms*; 2 years; \$11,900

STANFORD UNIVERSITY, Stanford, Calif.; C. B. Van Neil, Department of Biology; *Studies on Autotrophic Bacteria*; 3 years; \$28,300  
SYRACUSE UNIVERSITY, Syracuse, N.Y.

Donald G. Lundgren, Department of Bacteriology and Botany; *Biosynthesis in an Obligate Chemosynthetic Autotroph*; 2 years; \$8,000

Trevor Robinson, Department of Bacteriology and Botany; *Enzymatic Pathways of Alkaloid Biosynthesis*; 2 years; \$8,000  
UNIVERSITY OF TENNESSEE, Knoxville, Tenn.

D. Frank Holtman, Department of Bacteriology; *Role of Amino Acids and Certain Enzyme Inhibitors in the Host-Parasite Relationship*; 2 years; \$11,700

Samuel R. Tipton, Department of Zoology and Entomology; *Chemical Properties of Mitochondria*; 3 years; \$15,000  
TUFTS UNIVERSITY, Medford, Mass.

Morris E. Friedkin, Department of Pharmacology; *Enzymatic Conversion of Deoxyuridylic Acid to Thymidylic Acid*; 4 years; \$70,600

Alton Meister, Department of Biochemistry, School of Medicine; *Analytical Ultracentrifuge for Biochemical Research*; 1 year; \$26,000

Alton Meister, Department of Biochemistry, School of Medicine; *Mechanisms of Protein Synthesis*; 4 years; \$80,000

Louis Shuster, Department of Pharmacology, School of Medicine; *Nucleotide Metabolism in Germinating Seeds*; 3 years; \$33,500

UTAH STATE UNIVERSITY, Logan, Utah; Gene W. Miller, Department of Botany; *Lime-induced Chlorosis in Plants*; 2 years; \$12,000

VANDERBILT UNIVERSITY, Nashville, Tenn. Jane H. Park, Department of Physiology, School of Medicine; *Mechanisms of Oxidative Phosphorylation*; 3 years; \$21,000

Oscar Touster, Department of Biochemistry, School of Medicine; *Metabolism of Polyols and Pentoses*; 4 years; \$75,000

WAYNE STATE UNIVERSITY, Detroit, Mich. Charles D. Jeffries, Department of Bacteriology; *Metabolic Requirements for the Production of Nuclease by *Serratia Marcescens**; 3 years; \$11,200

T. T. Tchen, Department of Chemistry; *Conversion of Inorganic Sulfur to Organic Sulfur*; 1 year; \$6,500

WESLEYAN UNIVERSITY, Middletown, Conn. Vincent W. Cochran, Department of Biology; *Physiology of Spore Germination in Fungi*; 2 years; \$15,000

William Firshein, Department of Biology; *Nucleic Acid Synthesis and Bacterial Pathogenicity*; 3 years; \$10,000

UNIVERSITY OF WISCONSIN, Madison, Wis. W. H. Peterson, Department of Biochemistry and G. J. Hajny, Forest Products Laboratory, Forest Service, U.S. Department of

Agriculture; *Biosynthesis of Polysydric Alcohols by Osmophilic Yeasts*; 2 years; \$11,500

J. B. Wilson, Department of Bacteriology; *Physiological Basis of Virulence in the *Brucellae**; 3 years; \$22,000

Folke Skoog, Department of Botany; *Chemical Regulation of Growth and Morphogenesis in Plants*; 4 years; \$80,000

WISTAR INSTITUTE OF ANATOMY AND BIOLOGY, Philadelphia, Pa.; A. F. Graham; *The Physiology of Mammalian Cells Cultivated in Vitro*; 4 years; \$80,000

WORCESTER FOUNDATION FOR EXPERIMENTAL BIOLOGY, Shrewsbury, Mass.; Erwin Schwenk; *Biosynthesis of Cholesterol*; 2 years; \$25,000

YALE UNIVERSITY, New Haven, Conn.

Sofia Simmonds, Department of Biochemistry and Microbiology, School of Medicine; *Inducible Peptidases in *Escherichia Coli**; 3 years; \$13,000

Melvin V. Simpson, Department of Biochemistry; *Biosynthesis of Chymotrypsinogen in a Cell-free System*; 3 years; \$60,000

Wolf Vishniac, Department of Microbiology; *Enzymatic Reactions in Microbial Metabolism*; 3 years; \$27,300

#### MOLECULAR BIOLOGY

ALTON OCHSNER MEDICAL FOUNDATION, New Orleans, La.; Dr. Otto Schales, Director; *The Chemical Structure of Urochrome*; 2 years; \$20,000

BOYCE THOMPSON INSTITUTE FOR PLANT RESEARCH, INC., Yonkers, N.Y.; Beatrice S. Magdoff; *Structure of Southern Bean Mosaic Virus*; 3 years; \$37,000

BRANDEIS UNIVERSITY, Waltham, Mass.

Martin D. Kamen, Graduate Department of Biochemistry; *Photochemistry of Electron Transport Systems*; 3 years; \$58,000

Robert E. Kane, Department of Biochemistry; *Cytoplasmic Structural Proteins*; 2 years; \$12,000

Harold P. Klein, Department of Biology; *Formation of A-Amylase by *Pseudomonas Saccharophila**; 3 years; \$26,000

Henry Linschitz and Nathan O. Kaplan, Department of Chemistry; *Particulates and Whole Cell Studies*; 2 years; \$36,000

Helen Van Vunakis, Department of Biochemistry; *Functional Groups in Biologically Active Proteins*; 3 years; \$40,000

BRIGHAM YOUNG UNIVERSITY, Provo, Utah; Leo P. Vernon, Department of Chemistry; *Photochemical Oxidizing Systems*; 3 years; \$23,000

BROWN UNIVERSITY, Providence, R.I.; Seymour Lederberg, Department of Biology; *Subcellular Particles of Microorganisms*; 2 years; \$30,000

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; Carl G. Niemann, Division of Chemistry and Chemical Engineering; *Substrate Control of Enzymatic Processes*; 2 years; \$20,000

UNIVERSITY OF CALIFORNIA, Berkeley, Calif. Charles A. Dekker, Department of Biochemistry; *Structural Studies on Nucleic Acids*; 3 years; \$42,000

William G. Clark and William J. Hartmen, University of California Medical Center, Los Angeles; *Biosynthesis of Pharmacologically Active Amines in Cephalopods*; 2 years; \$20,000

- James B. Hendrickson, Department of Chemistry; *The Stimulated Biosynthesis of Strychnine*; 2 years; \$10,000
- Wilfried F. H. M. Mommaerts, School of Medicine, Los Angeles; *Electromicroscopy of the Contraction Process in Living Muscle*; 1 year; \$7,000
- Nello Pace, Department of Physiology, School of Medicine; *Ion Binding by Liver Microsome Subfractions*; 2 years; \$24,000
- T. A. Geissman, Department of Chemistry, Los Angeles; *Synthesis and Biogenesis of the Necic Acids*; 3 years; \$45,000
- D. H. Reynolds, College of Letters and Science; *Studies on Chitinase, With Especial Emphasis on Its Use as an Analytical Tool in Biochemical and Biological Research*; 2 years; \$20,000
- UNIVERSITY OF CHICAGO, Chicago, Ill.; John Westley, Department of Biochemistry; *Influence of Biochemical Environment on Protein Structure*; 2 years; \$20,000
- CHILDREN'S HOSPITAL OF PHILADELPHIA, Philadelphia, Pa.; Fred Karush, Department of Pediatrics, University of Pennsylvania; *Exchangeable Hydrogen of Proteins*; 3 years; \$34,000
- CITY OF HOPE MEDICAL CENTER, MEDICAL RESEARCH INSTITUTE, Duarte, Calif.; Richard S. Schweet, Department of Biochemistry; *The Incorporation of Amino Acids Into Ribonucleic Acid*; 3 years; \$45,000
- COLLEGE OF MEDICAL EVANGELISTS, Loma Luda, Calif.; Robert L. Nutter, Department of Microbiology; *Multiplicity Reactivation in the T Even Bacteriophages*; 2 years; \$12,000
- COLUMBIA UNIVERSITY, New York, N.Y. Teru Hayashi, Department of Zoology; *Interactions of Actin and Myosin in Contraction*; 3 years; \$22,500
- Karl Meyer, Department of Medicine; *Structure of Mucoids*; 3 years; \$23,000
- William L. Nastuk, Department of Physiology; *Physicochemical Factors in Membrane Receptor Activation*; 4 years; \$47,000
- CORNELL UNIVERSITY, Ithaca, N.Y.; Harold A. Scheraga, Department of Chemistry; *Thermodynamic Properties of Proteins*; 3 years; \$26,000
- DUQUESNE UNIVERSITY, Pittsburgh, Pa. Oscar Gowron, Department of Chemistry; *Reaction of Cyanide With Cystin. II. Kinetics of the Reaction*; 1 year; \$6,500
- Norman C. Li, Department of Chemistry; *Metal Complexation With Compounds of Biochemical Interest*; 3 years; \$23,000
- EASTERN PENNSYLVANIA PSYCHIATRIC INSTITUTE, Philadelphia, Pa.; George Karreman, Department of Basic Research; *Studies in the Field of Molecular Biology With Particular Reference to Quantum Biology*; 2 years; \$30,000
- FLORIDA STATE UNIVERSITY, Tallahassee, Fla. Sidney W. Fox, Director of The Oceanographic Institute; *Thermal Synthesis of Biochemical Substances*; 3 years; \$30,000
- Earl Frieden, Department of Chemistry; *Copper Enzymes and Copper Ion Catalyses*; 2 years; \$29,000
- UNIVERSITY OF FLORIDA, Gainesville, Fla.; Arthur L. Koch, Department of Biochemistry; *Detection and Estimation of the Activity of Single Enzyme Molecules*; 3 years; \$45,000
- GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; Erich Heinz, Department of Physiology; *Chemical and Physico-Chemical Basis of Transport*; 2 years; \$30,000
- UNIVERSITY OF GEORGIA, Athens, Ga.; Carroll T. Clark, Department of Chemistry; *Ascorbic Acid in Aromatic Hydroxylation*; 2 years; \$10,000
- HARVARD UNIVERSITY, Cambridge, Mass. Paul Doty, Department of Chemistry; *Research on Polypeptides and Proteins*; 3 years; \$60,000
- John T. Edsall, Department of Biology; *Physical Chemistry of Amino Acids, Peptides, and Proteins*; 4 years; \$80,000
- Lowell P. Hager, Department of Chemistry; *Biological Halogenation Mechanisms*; 3 years; \$34,000
- Oleg Jardetzky, Department of Pharmacology, Harvard Medical School; *Nuclear Magnetic Resonance Studies of Biologically Important Molecules*; 3 years; \$23,000
- Bert L. Vallee, Medical School, Boston; *Structural Studies of Zinc Metalloenzyme Hydrogenases*; 1 year; \$14,000
- UNIVERSITY OF HAWAII, Honolulu, Hawaii; Kerry T. Yasunobu, Department of Chemistry; *Functions and Physicochemical Properties of Plant Enzymes*; 2 years; \$20,000
- UNIVERSITY OF HOUSTON, Houston, Tex.; Allen H. Bartel, Department of Biology; *Immunochemical and Biophysical Study of Dissociable Macromolecules*; 2 years; \$32,000
- HOWARD UNIVERSITY, Washington, D.C.; Herman Branson, Department of Physics; *The Properties of Large Molecules: Ferritin and Apoferritin*; 2 years; \$10,000
- UNIVERSITY OF ILLINOIS, Urbana, Ill. L. M. Black, Department of Botany; *Fundamental Research on Plant Viruses*; 3 years; \$36,000
- J. A. Hayashi, Department of Biological Chemistry; *Isolation of the Blood Group J Substance from Bovine Plasma*; 2 years; \$15,000
- Eugene Rabinowitch, Department of Botany; *Primary Light Processes in Photosynthesis and Related Processes*; 3 years; \$54,000
- G. L. Webster, Department of Chemistry, College of Pharmacy, Chicago; *Infrared Spectrophotometer for Biochemical Research*; 1 year; \$5,000
- INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind. Walter L. Meyer, Department of Chemistry; *Synthetic Approaches to C-18 Functional Steroids*; 2 years; \$24,000
- Roy Repaske, Department of Bacteriology; *Terminal Oxidative Systems and Oxidation Phosphorylation in Bacteria*; 2 years; \$25,000
- INSTITUTE FOR CANCER RESEARCH, Philadelphia, Pa.; Thomas F. Anderson, Division of Biology; *Morphology and Growth of Bacteriophages*; 3 years; \$35,000
- IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Ames, Iowa; David E. Metzler, Department of Chemistry; *Mechanism of the Catalytic Action of Riboflavin*; 2 years; \$10,000
- JOHNS HOPKINS UNIVERSITY, Baltimore, Md. Michael Beer, Department of Biophysics; *Chemistry of Electron Microscopy Stains and Histochemistry of Phloem Tissue*; 3 years; \$30,000
- Thomas C. Bruce, Department of Physiological Chemistry; *Intra VS Intermolecu-*

lar Nucleophilic Attack at the Ester Level; 2 years; \$10,000

David R. Evans, Mergenthaler Laboratory for Biology; *Structural Basis of Stimulation by Carbohydrates*; 2 years; \$16,000

Albert L. Lehninger, Department of Physiological Chemistry; *Secretory Functions of Mitochondria*; 3 years; \$51,000

W. D. McElroy, McCollum-Pratt Institute; *Conversion of Chemical Energy Into Light Energy by Biological Systems*; 3 years; \$45,000

Gifford B. Pinchot, McCollum-Pratt Institute; *Phosphorylation Coupled Electron Transport*; 3 years; \$56,000

UNIVERSITY OF KANSAS, Lawrence, Kans.

Phillip Newmark, Department of Biochemistry; *Nucleic Acid and Virus Biosynthesis in Plants*; 2 years; \$23,000

Russell C. Mills, Department of Biochemistry; *Succinic Dehydrogenase Complex of Pasteurella Tularcensis*; 2 years; \$10,000

UNIVERSITY OF LOUISVILLE, Louisville, Ky.

R. D. Dullam and J. F. Taylor, Department of Biochemistry, School of Medicine; *Role of Quinones in Mitochondrial Enzyme Systems*; 3 years; \$40,000

Robert S. Levy, Department of Biochemistry; *Human Serum Lipoproteins*; 1 year; \$10,500

MARINE BIOLOGICAL LABORATORY, Woods Hole, Mass.

Frank H. Johnson and Yata Haneda; *Biochemical Nature of Luminescent Systems*; 1 year; \$9,000

Rita Guttman; *Response of Muscle to Rapid Cooling*; 2 years; \$7,000

Albert Szent-Gyorgyi, Institute for Muscle Research; *Bioenergetics*; 3 years; \$75,000

MARQUETTE UNIVERSITY, Milwaukee, Wis.; M. Laskowski, Department of Biochemistry; *Protolytic Inhibitors*; 3 years; \$50,000

MARYCREST COLLEGE, Davenport, Iowa; Helen Ven Horst, Department of Chemistry; *Decomposition of Amino Acids in Blood Serum*; 1 year; \$2,500

UNIVERSITY OF MARYLAND, College Park, Md.

Arthur J. Emery, Department of Biological Chemistry; *Fundamentals of the Mechanism of Protein Synthesis*; 2 years; \$10,000

R. G. Grenell and Leopold May, The Psychiatric Institute, The School of Medicine; *Effect of Excitant and Depressant Molecules on the Structure of Brain Lipide-Protein Complexes*; 1 year; \$5,000

Edward J. Herbst, Department of Biochemistry; *Molecular Form and Function of Spermine in Animal Tissues*; 2 years; \$17,000

L. J. Mullins, School of Medicine; *Models of the Cell Membrane*; 3 years; \$30,000

MASSACHUSETTS GENERAL HOSPITAL, Boston, Mass.; Roger W. Jeanloz; *Study of Uridine-diphosphate-aminosugar Derivatives*; 2 years; \$21,000

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.

Cyrus Levinthal and A. Garen, Department of Biology; *Alterations in the Alkaline Phosphates Molecule caused by Mutation*; 4 years; \$120,000

S. E. Luria, Department of Chemistry; *Molecular Aspects of Viral Function and Organization*; 4 years; \$220,000

Francis O. Schmitt, Department of Biology; *Characterization of Macromolecules and Their Aggregation States*; 1 year; \$24,000

MAY INSTITUTE FOR MEDICAL RESEARCH, Cincinnati, Ohio; Ernest C. Foulkes; *The Carrier Systems in Renal Transport Mechanisms*; 2 years; \$21,000

MEDICAL COLLEGE OF VIRGINIA, Richmond, Va.; Alfred Richard, School of Pharmacy; *Macromolecular Degradation Products of Protein Hydrolysis*; 2 years; \$24,000

MELLON INSTITUTE, Pittsburgh, Pa.; Edward Casassa; *Physical Chemistry of Seed Proteins*; 2 years; \$20,000

MICHAEL REESE HOSPITAL, Chicago, Ill.; Herbert M. Rubinstein, Department of Medicine; *Mechanism of Antigen Binding by Tissues*; 2 years; \$20,000

MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing, Mich.; Willis A. Wood; Department of Agricultural Chemistry; *Microbial Carbohydrate Metabolism*; 3 years; \$27,000

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Armand J. Guarino, Department of Biological Chemistry; *Acid-soluble Nucleotides of Phage Infected E. Coli*; 2 years; \$14,000

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.

Allan H. Brown, Department of Botany; *Photosynthetic Research*; 3 years; \$18,000

Irvin E. Lliener, Department of Agricultural Biochemistry; *The Structural Basis of Enzyme Action*; 2 years; \$13,000

John E. Wertz, Department of Chemistry; *Nuclear and Electron Spin Resonance*; 1 year; \$26,000

Helmut Mangold, The Hormel Institute, Austin; *Vapor Phase Chromatography for Phospholip Research*; 1 year; \$2,000

UNIVERSITY OF MISSOURI, Columbia, Mo.; Charles W. Gehrke, Agricultural Experiment Station; *Quantitative Determination of Omino Acid by Gas Chromatography*; 2 years; \$10,000

MONTANA STATE COLLEGE, Bozeman, Mont.; K. J. Goering, Department of Chemistry; *Isolation and Purification of Myrosin*; 2 years; \$8,000

MOUNT SINAI HOSPITAL, New York, N.Y.; Harry Sobotka, Department of Chemistry; *Factor Converting Mesophilic into Thermophilic Microorganisms*; 2 years; \$18,000

NATIONAL ACADEMY OF SCIENCE-NATIONAL RESEARCH COUNCIL, Washington, D.C.; Frank L. Campbell, Division of Biology and Agriculture; *Support of NAS-NRC Ad Hoc Committee on International Relations in Biophysics*; 3 years; \$17,250

NAZARETH COLLEGE, Louisville, Ky.; Sister Virginia Helmes, Department of Chemistry; *Activity of Peroxidase in Horse Radish Root*; 2 years; \$3,000

NEW YORK UNIVERSITY, New York, N.Y.; Bernard L. Horecker, Department of Microbiology, College of Medicine; *Carbohydrate Cleavage and Group Transfer Reactions*; 3 years; \$45,000

NORTH CAROLINA STATE COLLEGE, Raleigh, N.C.

Harold J. Evans, Department of Botany; *Nodule-Nitrate Reductase in Nitrogen Fixation by Leguminous Plants*; 3 years; \$31,000

Marvin L. Speck, Department of Animal Industry; *Identity and Configuration of Amino Acids*; 2 years; \$16,000

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; Ralph Penniall, Department of Biochemistry; *Adenosinetriphosphatases of Heart Tissue*; 2 years; \$15,000

NORTHWESTERN UNIVERSITY, Evanston, Ill.  
Irving M. Klotz, Department of Chemistry; *Protein Interactions*; 4 years; \$60,000  
John H. Law, Department of Chemistry; *Biochemistry of the Glycolipides*; 2 years; \$16,000  
OKLAHOMA MEDICAL RESEARCH FOUNDATION, Oklahoma City, Okla.; Ranwel Caputto, Department of Biochemistry; *Chemical Studies on an Adenosine-Dinucleotide in Muscle Extracts*; 3 years; \$31,000  
UNIVERSITY OF OREGON, Eugene, Oreg.  
H. S. Mason, Department of Biochemistry, School of Medicine, Portland; *Biochemistry of Natural Melanins*; 3 years; \$27,000  
F. J. Reithel and R. G. Wolfe, Department of Chemistry; *Homogeneous Beta-Galactosidase From E. Coli*; 2 years; \$25,000  
Bradley T. Scheer, Graduate School; *Thermodynamics and Kinetics of the Active Transport of Ions*; 1 year; \$8,000  
PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; Andrew A. Benson, Department of Agricultural and Biological Chemistry; *Radiochemical Studies in Lipid Biochemistry*; 3 years; \$53,000  
UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.  
Donald C. Dittmer, Department of Chemistry; *Reactions of Pyridinium Compounds*; 3 years; \$19,000  
Phillip George, Department of Chemistry; *Phytochemical Studies on Hemoproteins and Related Compounds*; 3 years; \$42,000  
UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; Klaus Hofmann, Department of Biochemistry, School of Medicine; *Synthesis of Peptides Possessing Corticotropic and Melanocyte-expanding Activity*; 3 years; \$45,000  
POLYTECHNIC INSTITUTE OF BROOKLYN, Brooklyn, N.Y.  
Murray Goodman, Department of Chemistry; *Synthesis, Properties and Reactions of Peptides and their Derivatives*; 3 years; \$40,000  
David Harker; *Crystal Structure of Ribonuclease*; 1 year; \$25,000  
Herbert Morawetz, Department of Chemistry; *Reactions Involving Interactions of Several Functional Groups*; 2 years; \$24,000  
PRINCETON UNIVERSITY, Princeton, N.J.; Walter Kauzmann, Department of Chemistry; *Denaturation of Proteins*; 3 years; \$54,000  
PURDUE RESEARCH FOUNDATION, Lafayette, Ind.  
Henry Koffler and J. F. Foster, Departments of Biological Sciences and Chemistry, Purdue University; *Biosynthesis and Properties of Proteins Containing Amino Acid Analogues*; 3 years; \$40,000  
L. J. Mullins, Department of Biophysics, Purdue University; *Kinetic Measurement of Active Transport in the Frog Skin*; 1 year; \$11,000  
Roy L. Whistler, Department of Biochemistry, Purdue University; *Synthesis of a New Polysaccharide Structure*; 2 years; \$15,000  
REED COLLEGE, Portland, Oreg.; Michael Litt, Department of Chemistry; *Kinetic Study of Ribonuclease*; 2 years; \$6,500  
RESEARCH FOUNDATION OF CHILDREN'S HOSPITAL, Washington, D.C.; John C. Houck, Biochemistry Section; *Kinetics and Thermodynamics of Ribonuclease Action*; 2 years; \$14,000

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; Sol Kramer, Department of Biology; *Shortening and Stretch of Insect Muscle Models with Large Sarcomeres*; 18 months; \$9,000  
UNIVERSITY OF ROCHESTER, Rochester, N.Y.; Thomas T. Bannister, Department of Biology; *Investigation of the Primary Process in Photosynthesis*, 2 years; \$30,000  
ROCKEFELLER INSTITUTE, New York, N.Y.  
Lyman C. Craig, Department of Biochemistry; *Isolation and Chemical Composition of Cypridina Luciferin*; 1 year; \$9,000  
S. William Pelletier; *Chemistry of the Sapogenins of Polygala Senega*; 2 years; \$15,000  
Gertrude E. Perlmann; *Studies on Protein Structure*; 1 year; \$1,900  
ROCKEFELLER INSTITUTE FOR MEDICAL RESEARCH, New York, N.Y.; Keith R. Porter; *Membrane-Limited Systems in the Cells of the Vertebrate Eye*; 2 years; \$22,000  
RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.  
Michael Heidelberger, Institute of Microbiology; *Chemical Constitution and Biological Specificity*; 3 years; \$44,000  
Walter W. Wainio, Department of Physiology and Biochemistry; *Purification and Characterization of the Cytochromes Oxidase, B and C<sub>1</sub> of Mammalian Heart Muscle*; 3 years; \$60,000  
SAINT LOUIS UNIVERSITY, St. Louis, Mo.; A. H. Weber, Department of Physics; *Structure Determination of Individual Virus Particles*; 2 years; \$14,000  
THE WIEZMANN INSTITUTE OF SCIENCE, Rehovoth, Israel; Sidney A. Bernhard; *Poly-Functional Catalysis by Heterogeneous Synthetic Polypeptides*; 6 months; \$4,000  
SMITH COLLEGE, Northampton, Mass.  
Glady A. Anslow, Department of Physics; *Structure of Small Peptides*; 2 years; \$27,000  
Dorothy Wrinch, Department of Physics; *Investigations of the Structure of Relatively Small Peptides*; 3 years; \$28,000  
UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; Milo Don Appelman, Department of Bacteriology; *Degradation of Ergothioneine by Bacteria*; 2 years; \$20,000  
STATE UNIVERSITY OF IOWA, Iowa City, Iowa; Charles Tanford, Department of Chemistry; *Configuration of Proteins in Solution*; 3 years; \$31,000  
STANFORD UNIVERSITY, Stanford, Calif.  
Robert L. Baldwin, School of Medicine; *Ultracentrifugal Studies of Proteins*; 3 years; \$23,000  
Arthur Kornberg, Department of Biochemistry; *Enzymatic Synthesis of Desoxyribonucleic Acid and Studies of Virus*; 2 years; \$28,000  
UNIVERSITY OF TEXAS, Austin, Tex.  
R. L. Airth, Department of Botany; *Mechanism of Bioluminescence in Fungi*; 2 years; \$16,500  
Austen F. Riggs, Department of Zoology; *Biochemistry of Hemoglobin and of Nitrogen Fixation*; 2 years; \$15,000  
TULANE UNIVERSITY, New Orleans, La.; Elliott Shaw, Department of Biochemistry; *Chemistry of Enzyme Active Centers*; 3 years; \$32,000  
VANDERBILT UNIVERSITY, Nashville, Tenn.  
William J. Darby, Department of Biochemistry; *Radio-Chemical and Molecular Kinetic*

*Analyses of Biological Systems*; 1 year; \$13,500

Jan van Eys, Department of Biochemistry, School of Medicine; *Control of and Mechanisms in Glycolysis*; 2 years; \$15,000

WASHINGTON UNIVERSITY, St. Louis, Mo.

Robert K. Crane, Department of Biological Chemistry; *Utilization of Hexoses by Animal Cells*; 3 years; \$36,000

Luis Glasser, Department of Biological Chemistry; *Biosynthesis of N-Acetyl-Galactosamine-Containing Polysaccharides*; 3 years; \$21,000

Paul Horowitz, Department of Physiology; *Ion Transport Across Membranes in Muscle*; 3 years; \$25,000

Jack L. Strominger, School of Medicine; *Structure and Biosynthesis of the Bacterial Cell Wall*; 3 years; \$39,000

UNIVERSITY OF WASHINGTON, Seattle, Wash.

Donald J. Hanahan, Department of Biochemistry; *Chemistry and Biochemistry of Inositol-Containing Lipids*; 3 years; \$40,000

Robert F. Labbe, Department of Pediatrics, School of Medicine; *Enzymatic Conversion of Protoporphyrin and Iron to Heme*; 3 years; \$34,000

Howard V. Rickenberg, Department of Microbiology; *Induced Enzyme Formation in Mammalian Tissues*; 2 years; \$18,000

WAYNE STATE UNIVERSITY, Detroit, Mich.;

Laurence Levine, Department of Biology; *Contractile Function in Vorticellae*; 2 years; \$12,000

WEST VIRGINIA UNIVERSITY, Morgantown, W. Va.; William J. Canady, School of Medicine; *Thermodynamics of Solution Processes*; 2 years; \$7,000

WORCESTER FOUNDATION FOR EXPERIMENTAL BIOLOGY, Shrewsbury, Mass.

Ralph I. Dorfman; *Use of Nuclear Magnetic Resonance for Isotopic Analysis*; 2 years; \$60,000

Eugene L. Hess; *Interaction of Glucocorticoids With Macromolecular Constituents of the Lymphocyte*; 2 years; \$20,000

YALE UNIVERSITY, New Haven, Conn. Joseph Fruton, Department of Biochemistry; *Hydrolysis and Synthesis of Peptide Bonds by Intracellular Enzymes*; 4 years; \$55,000

Daniel L. Kline, Department of Physiology, School of Medicine; *Activation and Purification of Fibronolytic Enzymes*; 2 years; \$18,000

YESHIVA UNIVERSITY, New York, N.Y.

Maurice M. Rapport, Department of Biochemistry, Albert Einstein College of Medicine; *Chemical Structure and Immunochemical Properties of Lipid Haptens*; 3 years; \$22,000

Jonathan Wittenberg, Department of Physiology, Albert Einstein College of Medicine; *Oxygen Transport in Mammalian Systems*; 3 years; \$30,000

## PSYCHOBIOLOGY

ADELPHI COLLEGE, Garden City, N.Y.; David Ehrenfreund, Department of Psychology; *Studies of Learning and Performance*; 2 years; \$13,300

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Helmut E. Adler, Department of Animal Behavior; *Sensory Factors in Bird Navigation*; 3 years; \$49,900

AMHERST COLLEGE, Amherst, Mass.; Lincoln P. Brower, Department of Biology; *Analysis*

*of Factors Controlling Mimicry*; 3 years; \$23,100

UNIVERSITY OF ARIZONA, Tucson, Ariz.

Nell R. Bartlett, Department of Psychology; *Study of Skilled Sensory-Motor Reactions*; 4 years; \$42,000

Joe T. Marshall, Jr., Department of Zoology; *Research on Speciation*; 1 year; \$7,200

BOSTON UNIVERSITY, Boston, Mass.; J. M. Harrison, Department of Psychology; *Behavioral Analysis of the Auditory Pathways*; 4 years; \$43,100

BROOKLYN COLLEGE, Brooklyn, N.Y.; Elizabeth Fehrer and David H. Raab, Department of Psychology; *Studies in Perception*; 2 years; \$21,200

BROWN UNIVERSITY, Providence, R.I.;

Trygg Engen, Department of Psychology; *Thresholds for Olfactory Stimuli*; 30 months; \$15,900

UNIVERSITY OF CALIFORNIA, Berkeley, Calif. Peter R. Marler, Department of Zoology, Berkeley; *Studies of Instinctive Behavior*; 2 years; \$23,200

Allen Parducci, Department of Psychology, Los Angeles; *Stimulus Determinants in Judgment*; 3 years; \$13,400

Leo J. Postman, Department of Psychology; *Retention of Verbal Materials*; 3 years; \$46,500

CLARK UNIVERSITY, Worcester, Mass.;

Joachim F. Wohlwill, Department of Psychology; *Development of Number Concepts*; 1 year; \$4,200

COLUMBIA UNIVERSITY, New York, N.Y.

John Lotz, Language and Communication Research Center; *Physiological Foundations for Speech Typology*; 2 years; \$36,900

William N. Schoenfeld and William W.

Cumming, Department of Psychology; *Research on Schedules of Reinforcement*; 2 years; \$42,100

COLUMBUS PSYCHIATRIC INSTITUTE AND

HOSPITAL, Columbus, Ohio; Norma F. Besch; Research Division; *Studies in Associative Interference*; 2 years; \$8,600

DARTMOUTH COLLEGE, Hanover, N.H.;

William M. Smith, Department of Psychology; *Visual Contour Processes*; 2 years; \$16,800

DUKE UNIVERSITY, Durham, N.C.

Irving T. Diamond, Department of Psychology; *Behavioral Analysis of the Somatic Cortex*; 2 years; \$23,500

Gregory A. Kimble, Department of Psychology; *Inhibitory Processes in Eyelid Conditioning*; 3 years; \$20,400

FLORIDA STATE UNIVERSITY, Tallahassee,

Fla.; Howard D. Baker and James C. Smith, Department of Psychology; *Behavioral Measurement of Visual Functions*; 1 year; \$7,300

HARVARD UNIVERSITY, Cambridge, Mass.

Richard J. Herrnstein, Department of Psychology; *Stimulus Factors in Learning*; 2 years; \$20,700

B. F. Skinner, Department of Psychology; *Research on Reinforcement Schedules*; 2 years; \$78,600

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.

Russell L. Devalois, Department of Psychology; *Research on Visual Mechanisms*; 2 years; \$21,100

James A. Dinsmoor, Department of Psychology, Indiana University; *Studies on Instrumental Conditioning*; 2 years; \$14,500

- Charles B. Ferster, Indiana University Medical Center, Indianapolis; *Studies of Reinforcement Phenomena*; 3 years; \$37,500
- JOHNS HOPKINS UNIVERSITY, Baltimore, Md.  
Stewart H. Hulse, Department of Psychology; *Study of Resistance to Extinction*; 2 years; \$11,900
- Edward F. MacNichol, Jr., Department of Biophysics; *Visual Research*; 3 years; \$46,200
- LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; Brendan A. Maher, Department of Psychology; *Frontal Area Function in Lower Mammals*; 2 years; \$12,300
- UNIVERSITY OF MAINE, Orono, Maine; Gerald W. Barnes; Department of Psychology; *Reinforcing Properties of Auditory Stimuli*; 1 year; \$4,700
- UNIVERSITY OF MARYLAND, College Park, Md.; Henricus G. Kuypers, Department of Anatomy, School of Medicine; *Brain Reticular Formation*; 2 years; \$12,600
- MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing, Mich.  
Paul Bakan, Department of Psychology; *Studies of Figural After-Effects*; 2 years; \$11,000
- S. Howard Bartley, Department of Psychology; *Studies of Brightness Vision*; 3 years; \$50,900
- Donald M. Johnson, Department of Psychology; *Analysis of Thinking*; 2 years; \$13,000
- MICHIGAN STATE UNIVERSITY, East Lansing, Mich.; Hans Toch, Department of Psychology; *Studies of Apparent Movement*; 1 year; \$6,900
- UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Clyde H. Coombs, Department of Psychology; *Psychological Measurement*; 3 years; \$35,400
- UNIVERSITY OF MINNESOTA, Minneapolis, Minn.  
Kenneth MacCorquodale and Paul E. Meehl, Department of Psychology; *Studies of Reinforcement*; 2 years; \$13,800
- David L. LaBerge, Department of Psychology; *Studies in Stimulus Generalization*; 15 months; \$7,100
- MOUNT HOLYOKE COLLEGE, South Hadley, Mass.  
Horace H. Corbin, Department of Psychology; *Discrimination of Relative Numerousness*; 1 year; \$7,200
- John Volkmann, Department of Psychology; *Analysis of Visual Acuity*; 1 year; \$8,700
- NEW MEXICO COLLEGE, State College, N.M.; Merrell E. Thompson, Department of Psychology; *Stimulus Generalization and Inhibition*; 3 years; \$21,600
- NEW YORK UNIVERSITY, New York, N.Y.; Howard H. Kendler; *Research on Problem-Solving Behavior*; 3 years; \$30,100
- NEW YORK ZOOLOGICAL SOCIETY, New York, N.Y.; John T. Emlen, Jr., Department of Zoology, University of Wisconsin; *Ecology and Behavior of the Mountain Gorilla*; 30 months; \$34,900
- UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; Lyle V. Jones, The Psychometric Laboratory; *Multivariate Analysis in Psychological Research*; 5 years; \$62,700
- NORTHWESTERN UNIVERSITY, Evanston, Ill.  
J. W. Cotton and W. F. Hill, Department of Psychology; *Experimental Studies of Extinction*; 3 years; \$31,300
- Winfred F. Hill, Department of Psychology; *Relationships Between Exploratory and Activity Drive*; 1 year; \$5,700
- OHIO STATE UNIVERSITY, Columbus, Ohio  
Donald R. Meyer, Department of Psychology; *Studies in Primate Learning*; 1 year; \$3,500
- Delos D. Wickens, Department of Psychology; *Discriminability Within Complex Stimuli*; 3 years; \$36,800
- UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.  
Charles C. Carpenter, Department of Zoology; *Ethological Studies of Reptiles*; 2 years; \$17,800
- Irene Hullecka, Department of Psychology, University of Oklahoma; *Drive and Incentive as Determinants of Performance*; 1 year; \$2,100
- UNIVERSITY OF OREGON, Eugene, Oreg.  
Fred Atneave, Department of Psychology; *Perception of Sequential Stimulation*; 3 years; \$20,100
- Robert F. Fagot, Department of Psychology; *Psychophysical Measurement*; 18 months; \$7,000
- PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.  
C. R. Carpenter, Department of Psychology; *A Field Study of Primate Population*; 1 year; \$13,200
- William F. Prokasy, Jr., Department of Psychology; *Studies in Conditioning*; 2 years; \$11,500
- UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Robert C. Bolles, Department of Psychology; *Stimulus Properties of Drives*; 2 years; \$12,300
- UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; Lloyd E. Homme, Department of Psychology; *Analysis of Response Differentiation and Generalization*; 2 years; \$13,900
- QUEENS COLLEGE, Flushing, N.Y.; Eugene S. Gollin, Department of Psychology; *Development of Cognitive Behavior*; 2 years; \$23,500
- REED COLLEGE, Portland, Oreg.; Fredrick A. Courts, Department of Psychology; *Studies of Variability of Response*; 1 year; \$9,400
- RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; Jack Richardson, Department of Psychology, Harpur College, Endicott; *Role of Similarity in Concept Formation*; 2 years; \$2,700
- UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.  
Everett J. Wyers, Department of Psychology; *Effects of Stimulation of Reticular Formation on Discriminative Behavior*; 2 years; \$20,200
- William W. Grings, Department of Psychology; *Studies of Reinforcement of Perception*; 1 year; \$5,000
- SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.; Alvin J. North, Department of Psychology; *Studies of Discriminative Learning*; 1 year; \$6,400
- STATE COLLEGE OF WASHINGTON, Pullman, Wash.; Helmuth K. Buechner, Department of Zoology; *Territorial Behavior in Uganda Kob*; 1 year; \$6,200
- SWARTHMORE COLLEGE, Swarthmore, Pa.; Solomon E. Asch, Department of Psychology; *Studies in Cognition*; 3 years; \$28,000

TEACHERS COLLEGE, COLUMBIA UNIVERSITY, New York, N.Y.; Rosedith Sitgreaves, Department of Psychological Foundation and Services; *Psychometric Research*; 1 year; \$12,100

TEXAS TECHNOLOGICAL COLLEGE, Lubbock, Tex.; A. C. Pereboom, Department of Psychology; *Analysis of Incentive Learning*; 1 year; \$3,200

TRAINING SCHOOL AT VINELAND, Vineland, N.J.; Johs. Clausen; *Studies of Electrically Induced Visual Sensations*; 2 years; \$14,400

TUFTS UNIVERSITY, Medford, Mass.; Paul D. Coleman, Department of Psychology; *Study of Auditory Localization*; 6 months; \$4,900

UNIVERSITY OF VERMONT AND STATE AGRICULTURAL COLLEGE, Burlington, Vt.; Norman J. Slamecka, Department of Psychology; *Research on Retention*; 2 years; \$7,800

UNIVERSITY OF WASHINGTON, Seattle, Wash.

Irwin G. Sarason, Department of Psychology; *Variables in Verbal Conditioning*; 1 year; \$4,700

Moncrieff H. Smith, Jr., Department of Psychology; *Aspects of Biological Motivation*; 3 years; \$30,300

WAYNE STATE UNIVERSITY, Detroit, Mich.; Eli Saltz, Department of Psychology; *Studies in Verbal Learning*; 3 years; \$21,000

WESLEYAN UNIVERSITY, Middletown, Conn.; William R. Thompson, Department of Psychology; *Influence of Stress on Behavior*; 2 years; \$24,200

WILLIAMS COLLEGE, Williamstown, Mass.; Thomas E. McGill, Department of Psychology; *Hearing in Submammalian Vertebrates*; 1 year; \$2,000

UNIVERSITY OF WISCONSIN, Madison, Wis. William A. Mason, Department of Psychology; *Behavior of Infrahuman Primates*; 2 years; \$15,300

Karl U. Smith, Department of Psychology; *The Role of Perception in Patterned Motion*; 3 years; \$27,000

YALE UNIVERSITY, New Haven, Conn. Frank A. Logan, Department of Psychology; *Conditions of Reinforcement*; 3 years; \$36,300

Neal E. Miller, Department of Psychology; *Physiological Analysis of Motivation*; 2 years; \$16,000

PHYSICS

AMHERST COLLEGE, Amherst, Mass.; Theodore Soller, Colby W. Dempsey, Joel E. Gordon, Department of Physics; *Research on Solids Below One-tenth Degree Absolute*; 2 years; \$19,900

ARIZONA STATE COLLEGE, Tempe, Ariz.; Arnold G. Meister, Department of Physics; *Infrared Spectra of Simple Molecules*; 2 years; \$28,600

UNIVERSITY OF ARIZONA, Tucson, Ariz.; Robert M. Kalbach, Department of Physics; *High Energy Particle Interactions*; 2 years; \$22,700

BOSTON COLLEGE, Chestnut Hill, Mass.; Joseph H. Chen, Department of Physics; *Dielectric Relaxation Phenomena in Alkali Halides*; 7 months; \$16,300

BOSTON UNIVERSITY, Boston, Mass.; Edward C. Booth, Department of Physics; *Resonant Scattering of Bremsstrahlung*; 1 year; \$8,700

BRANDEIS UNIVERSITY, Waltham, Mass. Stanley Deser, Department of Physics; *Elementary Particle Theory*; 2 years; \$12,900

David L. Falkoff and Kenneth W. Ford, Department of Physics; *Theoretical Nuclear and Elementary Particle Physics*; 2 years; \$39,000

BRIGHAM YOUNG UNIVERSITY, Provo, Utah; Harvey J. Fletcher, Mathematics Department; *Dynamics of the Cochlea*; 2 years; \$9,100

BROWN UNIVERSITY, Providence, R.I. J. J. Bray, Department of Physics; *Quadrupole Coupling in Nuclear Magnetic Resonance*; 2 years; \$17,700

J. F. Bunnett, Department of Chemistry; *Mechanism and Reactivity in Substitution at Unsaturated Centers*; 3 years; \$30,900

Robn Truell, Division of Applied Mathematics; *Ultrasonic Study of Defects in Solids*; 2 years; \$30,900

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; Jesse W. M. DuMond, Department of Physics; *An Inhomogeneous Field Magnetic Spectrometer*; 3 years; \$57,500

UNIVERSITY OF CALIFORNIA, Berkeley, Calif. Francis A. Jenkins, Department of Physics and John G. Phillips, Department of Astronomy, Berkeley; *Analyses of Molecular Spectra*; 3 years; \$123,600

Charles Kittel, Department of Physics; *Solid State Physics and Magnetism*; 3 years; \$164,300

Malvin A. Ruderman and Eyvind H. Wichmann, Department of Physics; *Theory of Elementary Particles and High Energy Interactions*; 2 years; \$36,400

David S. Saxon, Department of Physics, Los Angeles; *Research in Theoretical Nuclear and Solid State Physics*; 3 years; \$115,400

CARLETON COLLEGE, Northfield, Minn.; William Butler and Robert Reitz, Department of Physics; *Carrier Mobilities in Alkali Halide Crystals*; 3 years; \$19,700

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; Sergio DeBenedetti, Department of Physics; *Positronium Studies of Solids and Liquids*; 3 years; \$66,300

CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C. James G. Brennan, Department of Physics; *Theory of Nuclear Spectroscopy*; 2 years; \$11,500

Theodore A. Litovitz, Department of Physics, Robert Melster and George E. McDuffie, Jr., Department of Electrical Engineering; *Dielectric Relaxations in Liquids Under Pressure*; 2 years; \$15,600

UNIVERSITY OF CHICAGO, Chicago, Ill. Mark G. Inghram, Department of Physics; *Properties of High Temperature Gases and Condensed Vapors*; 3 years; \$115,300

William Lichten, Department of Physics; *Molecular Beam Studies*; 3 years; \$22,400

Marcel Schein, Department of Physics; *Cooperative Emulsion Flight For High Energy Events*; 3 years; \$625,000

CLEMSON AGRICULTURAL COLLEGE, Clemson, S.C.; John E. Miller and Charles A. Reed, Department of Physics; *X-ray Diffraction Studies of the Debye Constant*; 2 years; \$11,500

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; John J. Faris and William D. Derbyshire, Department of Physics, Colorado State University; *Magnetic Properties of Ferrimagnetic Materials*; 2 years; \$34,400

UNIVERSITY OF COLORADO, Boulder, Colo.

Albert A. Bartlett, Department of Physics; *Beta-Ray Spectroscopy*; 2 years; \$49,700

W. H. Tantilla, Department of Physics; *Lattice Vibrations and Defects*; 3 years; \$39,800

CORNELL UNIVERSITY, Ithaca, N.Y.; Kenneth Greisen, Laboratory of Nuclear Science; *Cosmic Ray Shower and Particle Study*; 1 year; \$31,800

DARTMOUTH COLLEGE, Hanover, N.H.

Robert W. Christy, Department of Physics; *Bleaching of X-irradiated Centers in Alkali Halides*; 2 years; \$28,500

William P. Davis, Jr., Department of Physics; *Oscillations in Direct Current Glow Discharges*; 2 years; \$14,100

DUKE UNIVERSITY, Durham, N.C.

William M. Fairbank and Michael J. Buckingham, Department of Physics; *Higher Order Transitions at Low Temperatures*; 1 year; \$26,400

Hertha Sponer, Department of Physics; *Electronic Structure of Molecules in Condensed Systems*; 2 years; \$31,200

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; Joseph E. Lannutti, Department of Physics; *High Energy Nuclear Physics*; 2 years; \$52,800

FORDHAM UNIVERSITY, New York, N.Y.

Joseph F. Mulligan, Department of Physics; *Electron Correlation in Atoms and Molecules*; 2 years; \$14,800

Alfons Weber, Department of Physics; *Raman Spectroscopy of Gases*; 2 years; \$32,200

FRANKLIN AND MARSHALL COLLEGE, Lancaster, Pa.; William T. Allen, Department of Physics; *Trapping Levels in Phosphors*; 2 years; \$11,400

GEORGIA INSTITUTE OF TECHNOLOGY, Atlanta, Ga.

Harold R. Brewer, Department of Physics; *M-Shell Internal Conversion Coefficients*; 15 months; \$25,000

T. L. Weatherly and J. Q. Williams, School of Physics; *Determination of Molecular Constants by Microwave Spectroscopy*; 2 years; \$21,600

L. D. Wyly and C. H. Braden, Department of Physics; *Studies of Nuclear Decay Schemes*; 3 years; \$23,400

GREENVILLE COLLEGE, Greenville, Ill.; Ralph J. Miller, Department of Physics; *Cadmium Sulfide Activation, Preparation and Properties*; 2 years; \$17,000

GRINNELL COLLEGE, Grinnell, Iowa; Roger J. Hanson, Department of Physics; *Soft Gamma Ray Background Radiation*; 2 years; \$14,800

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.

William E. Bennett, Department of Physics; *Nuclear Structure*; 3 years; \$41,500

Forrest F. Cleveland, Department of Physics; *Structure of Polyatomic Molecules*; 3 years; \$36,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.

James S. Koehler, Department of Physics; *Research on Dislocation in Crystals*; 2 years; \$37,100

Robert Novick, Department of Physics; *Study of Atomic and Ion Structure Using Beam Methods*; 3 years; \$59,300

Clark S. Robinson, Department of Physics; *Nuclear Phenomena at High Energy*; 3 years; \$46,800

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; E. J. Konopinski, Department of Physics; *The Theory and Interpretation of Elementary Particle Interactions*; 2 years; \$64,200

INSTITUTE FOR ADVANCED STUDY, Princeton, N.J.; J. Robert Oppenheimer, Director; *Fundamental Theory of Particles and Fields*; 2 years; \$90,000

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.

Theodore H. Berlin, Department of Physics; *Theories of High Energy Physics, Fields, and Statistical Mechanics*; 2 years; \$50,200

Alhud Pevsner, Department of Physics; *Mechanized Analysis of Bubble Chamber Photographs*; 2 years; \$61,900

UNIVERSITY OF KANSAS, Lawrence, Kans.

J. W. Culvahouse, Department of Physics; *Nuclear Orientation at Low Temperatures*; 2 years; \$48,400

L. W. Seagondollar, Department of Physics; *Excitation Levels in Medium Mass Nuclei*; 2 years; \$37,000

KENT STATE UNIVERSITY, Kent, Ohio;

Anthony A. Silvidi, Department of Physics; *Improvement of the Diffusion Cloud Chamber as a Basic Research Tool*; 1 year; \$2,400

KENTUCKY RESEARCH FOUNDATION, Lexington, Ky.; Vincent P. Kenney and John G. Dardis, Department of Physics; *High Energy Particle Studies*; 2 years; \$72,700

LEHIGH UNIVERSITY, Bethlehem, Pa.

Raymond J. Emrich, Department of Physics; *Flow Studies in a Shock Tube*; 2 years; \$59,300

Peter Havas, Department of Physics; *The Relativistic Theory of Interacting Particles*; 2 years; \$24,500

MANHATTAN COLLEGE, New York, N.Y.;

Brother Gabriel Kane, Department of Physics; *Primary Cosmic Ray Flux and Fragments Produced in Cosmic Ray Stars*; 2 years; \$10,000

MARQUETTE UNIVERSITY, Milwaukee, Wis.;

Kluek Lee, Department of Physics; *Pear-Shaped Nuclear Deformation*; 2 years; \$16,600

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Norman C. Rasmussen, Laboratory for Nuclear Science and Hans Mark, Department of Nuclear Engineering;

*High Precision Measurement of Nuclear Gamma Rays*; 2 years; \$87,300

UNIVERSITY OF MIAMI, Coral Gables, Fla.;

Joseph Ford, Department of Physics; *Approach of One-Dimensional Systems to Equilibrium*; 1 year; \$2,800

MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing, Mich.

Joseph Ballam, Department of Physics; *Heavy Mesons and Hyperons*; 2 years; \$101,000

Jerry A. Cowen, Department of Physics; *Effects of the Lattice on Paramagnetic Resonance Adsorption*; 2 years; \$22,900

Thomas H. Edwards, and Clarence D. Hause, Department of Physics; *Near Infrared Molecular Spectroscopy*; 2 years; \$26,000

Egon A. Hiedemann, Department of Physics; *Diffraction of Light by Ultrasonic Waves in Transparent Solids*; 2 years; \$14,600

MICHIGAN STATE UNIVERSITY, East Lansing, Mich.;

Julius S. Kovacs and Don B. Lichten-



berg, Department of Physics; *Theory of the Interactions of Mesons and Hyperons*; 2 years; \$20,200

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Irving J. Lowe, Department of Physics; *Nuclear Magnetic Resonance Line Shapes and Relaxation*; 2 years; \$28,200

UNIVERSITY OF MISSOURI, Columbia, Mo.; Newell S. Gingrich, Department of Physics; *X-Ray Diffraction by Liquids and Vapors*; 2 years; \$23,500

MONTANA STATE UNIVERSITY, Missoula, Mont.; Mark J. Jakobson, Department of Physics; *Photo-Neutron Cross Sections*; 2 years; \$23,700

NEBRASKA WESLEYAN UNIVERSITY, Lincoln, Nebr.; Walter R. French, Jr., Department of Physics; *Variations in Cosmic Ray Intensities*; 2 years; \$7,300

UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; Paul Goldhammer, Department of Physics; *Nuclear Forces and the Properties of Nuclei*; 2 years; \$14,700

UNIVERSITY OF NEVADA, Reno, Nev.; George Barnes, Department of Physics; *A New Kind of Vacuum Gage*; 2 years; \$21,300

UNIVERSITY OF NEW MEXICO, Albuquerque, N. Mex.  
Jack Katzenstein, Department of Physics; *Discharge Through Small Conductors*; 2 years; \$25,000

Victor H. Regener, Department of Physics; *Time Variations of Cosmic Radiation at High Altitudes*; 3 years; \$33,900

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; Paul S. Hubbard, Department of Physics; *Nuclear Magnetic Resonance*; 2 years; \$38,800

UNIVERSITY OF NORTH DAKOTA, Grand Forks, N. Dak.; Earl N. Mitchell, Department of Physics; *Properties of Thin Ferromagnetic Films*; 2 years; \$29,200

NORTHWEST NAZARENE COLLEGE, Nampa, Idaho; Gilbert C. Ford, Department of Physical Science; *Mass Spectrometer Studies*; 2 years; \$31,500

NORTHWESTERN UNIVERSITY, Evanston, Ill.  
Martin Bailyn, Department of Physics; *Transport Theory in Metals*; 2 years; \$13,800

Sybrand Broersma, Department of Physics; *Magnetic Resonance Studies of Liquids and Solids*; 2 years; \$12,900

Max Dresden, Department of Physics; *Problems in Superconductivity and Field Theory*; 2 years; \$23,000

Jules A. Marcus, Department of Physics; *Magnetic Properties of Metal Crystals at Low Temperatures*; 2 years; \$40,900

Edson R. Peck, Department of Physics; *Precision Measurements in Spectroscopy*; 2 years; \$33,200

James H. Roberts, Department of Physics; *Hyperfragments in Nuclear Emulsions*; 3 years; \$67,900

Stephen M. Shafroth, Department of Physics; *Nuclear Spin-Orbit Forces and Excited States*; 2 years; \$70,000

Arnold J. F. Slegert, Department of Physics; *Theoretical Studies in Statistical Mechanics*; 2 years; \$39,100

OBERLIN COLLEGE, Oberlin, Ohio; Thurston E. Manning, Department of Physics; *Machine Analysis of Complex Atomic Spectra*; 2 years; \$15,400

OHIO UNIVERSITY, Athens, Ohio; Lawrence J. Callaher and A. I. Johnson, Department of Physics; *Binding Energies of Simple Nucleon Systems*; 1 year; \$8,300

OHIO STATE UNIVERSITY, Columbus, Ohio  
Clifford V. Herr, Department of Physics and Astronomy; *Atomic Oscillators at Low Temperatures*; 2 years; \$27,600

Robert L. Mills and Andrew M. Sessler, Department of Physics; *Theoretical Nuclear Physics*; 2 years; \$35,900

Robert A. Oetjen and Ely E. Bell, Department of Physics; *Far Infrared Spectroscopic Research*; 2 years; \$56,000

Charles H. Shaw, Department of Physics; *Structure of Liquids and Solids at Low Temperatures*; 3 years; \$40,700

UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; Chun C. Lin, Department of Physics, The University of Oklahoma; *Internal Rotation of Molecules*; 2 years; \$19,600

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.  
John A. Sauer, Department of Physics and Arthur E. Woodward, Department of Chemistry; *Dynamic Mechanical Behavior of High Polymers Over a Wide Temperature Range*; 2 years; \$25,000

Rolf G. Winter, Department of Physics; *High Energy Particle Interactions*; 2 years; \$15,200

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.  
Kenneth R. Atkins, Department of Physics; *Investigation of Liquid Helium*; 2 years; \$37,600

Britton Chance, Johnson Foundation for Medical Physics; *The Application of New Methods of Measurement to Biological Phenomena*; 5 years; \$73,900

Keith A. Brueckner, Department of Physics; *Theory of Many-Body Systems*; 3 years; \$46,100

Barnett C. Cook and Norman Goldberg, Department of Physics; *Electron-Neutrino Relation in Decay of Helium*; 1 year; \$6,800

Sherman Frankel, Department of Physics; *Low Energy Nuclear Spectroscopy*; 2 years; \$49,200

William E. Stephens, Department of Physics; *Photonuclear Processes*; 3 years; \$45,000

Roger H. Walmsley, Department of Physics; *Angular Momentum of Liquid Helium*; 2 years; \$10,800

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.  
Bernard L. Cohen, Radiation Laboratory; *Nuclear Structure and Nuclear Reactions*; 1 year; \$48,700

Myron P. Garfunkel, Department of Physics; *Microwave Adsorption Studies in Superconductors*; 2 years; \$54,700

Sydney Meshkov, Department of Physics; *Two Body Interactions Between Nucleons and Nuclear Moments*; 2 years; \$12,000

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.  
K. W. Melssner, Department of Physics, Purdue University; *High Precision Spectroscopy*; 3 years; \$30,300

D. C. Peaslee and Masao Sugawara, Department of Physics, Purdue University; *Theory of Interactions of Elementary Particles*; 2 years; \$18,300

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.  
H. B. Huntington, Department of Physics; *Ultrasonic Studies of Solids*; 1 year; \$12,300

- Heinrich A. Medicus and Paul F. Yergin, Department of Physics; *Photonuclear Research*; 2 years; \$61,300  
 UNIVERSITY OF RHODE ISLAND, Kingston, R.I.; Leo Diesendruck, Department of Physics; *Theory of Electromagnetic Fields in Moving Anisotropic Media*; 14 months; \$4,900  
 RICE INSTITUTE, Houston, Tex.  
 Harold E. Rorschach, Jr., Department of Physics; *Low Temperature Physics*; 2 years; \$34,300  
 William Tobocman, Department of Physics; *Numerical Evaluation of the Direct Nucleon Interaction Theory*; 2 years; \$22,500  
 RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Peter Lindenfeld, Ernest Lynton, and Bernard Serin, Department of Physics; *Properties of Dilute Metallic Binary Alloys*; 2 years; \$44,900  
 SAINT LOUIS UNIVERSITY, St. Louis, Mo.; James F. McGee, Department of Physics; *X-Ray Microscope*; 1 year; \$9,100  
 ST. OLAF COLLEGE, Northfield, Minn.; Thomas D. Rossing, Department of Physics; *Ferromagnetic Resonance in Thin Magnetic Films*; 2 years; \$27,600  
 UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.  
 John Backus, Department of Physics; *The Properties of Orchestral Reed Instruments*; 2 years; \$19,400  
 Harriet H. Forster, Department of Physics; *Coupling Constants in Beta Interactions*; 1 year; \$10,200  
 STANFORD UNIVERSITY, Stanford, Calif.; Walter E. Meyerhof, Department of Physics; *Nuclear Structure Research with 3 Mev Particles*; 2 years; \$180,000  
 STATE COLLEGE OF WASHINGTON, Pullman, Wash.; William Band, Department of Physics; *Theory of Shock Propagation in Solids*; 3 years; \$16,000  
 STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N.J.; Kenneth C. Rogers, Department of Physics; *Gyromagnetic Ratio of the Free Mu Meson*; 2 years; \$44,000  
 SYRACUSE UNIVERSITY, Syracuse, N.Y.  
 Richard L. Arnowitz, Department of Physics; *Theory of Elementary Particles*; 30 months; \$25,000  
 Erich M. Harth, Department of Physics; *A High Repetition Rate Bubble Chamber for Gamma Ray Studies*; 1 year; \$22,200  
 SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.; Arnold Hong, Department of Physics; *Electron Paramagnetic Investigations at Low Temperatures*; 2 years; \$27,600  
 TEXAS COLLEGE OF ARTS AND INDUSTRIES, Kingsville, Tex.; James M. Robinson, Jr., Department of Physics; *Analysis of the Lithium Molecules*; 2 years; \$15,900  
 UNIVERSITY OF VERMONT AND STATE AGRICULTURAL COLLEGE, Burlington, Vt.; Albert D. Crowell, Department of Physics; *Surface Adsorption Using Radioactive Tracers*; 2 years; \$22,800  
 WASHINGTON UNIVERSITY, St. Louis, Mo.  
 Michael W. Friedlander, Department of Physics; *The Nature and Properties of Cosmic Ray Particles*; 2 years; \$33,700  
 J. P. Hurley, Department of Physics; *Photon Splitting by the Coulomb Field*; 1 year; \$10,100  
 T. A. Pond, Department of Physics; *Investigation of Beta Decay Interactions*; 2 years; \$86,800  
 UNIVERSITY OF WASHINGTON, Seattle, Wash.  
 H. G. Dehmelt, Department of Physics; *Spin Resonance of Free Electrons*; 2 years; \$23,100  
 Jere J. Lord, Department of Physics; *High Energy Particle Interactions in Emulsions*; 2 years; \$13,500  
 WAYNE STATE UNIVERSITY, Detroit, Mich.; Suraj N. Gupta, Department of Physics; *Quantum Theory of Fields*; 2 years; \$20,000  
 WEST VIRGINIA UNIVERSITY, Morgantown, W. Va.; Harvey N. Rexroad, Jack D. Graybeal, David F. Guinn, Gerald C. Michael, Department of Physics and Chemistry; *Microwave and EMR Studies of Molecules*; 1 year; \$15,900  
 WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; Berol L. Robinson, Department of Physics; *Low Energy Nuclear Physics*; 2 years; \$44,100  
 UNIVERSITY OF WISCONSIN, Madison, Wis.; R. G. Herb, Department of Physics; *High Voltage Electrostatic Generators*; 3 years; \$240,000  
 YALE UNIVERSITY, New Haven, Conn.; Vernon W. Hughes, Department of Physics; *Hyperfine Structure of Positronium*; 1 year; \$23,000  
 REGULATORY BIOLOGY  
 AMERICAN UNIVERSITY, Washington, D.C.; Alfred B. Chaet, Department of Biology; *Toxic Factors in Heat Death*; 2 years; \$9,600  
 UNIVERSITY OF ARIZONA, Tucson, Ariz.  
 Joseph T. Bagnara, Department of Zoology; *Interrelationships of the Chromatotropic Hormones, Pterins and Skin Pigments*; 3 years; \$16,500  
 L. K. Sowls, Cooperative Wildlife Research Unit; *Reproduction in the Collared Peccary (Pecari Tajacu)*; 3 years; \$7,900  
 BERMUDA BIOLOGICAL STATION, St. George's West, Bermuda; Talbot H. Waterman, Department of Zoology, Yale University; *Polarized Light and Homing in Crustacea*; 1 year; \$4,600  
 BOSTON UNIVERSITY, Boston, Mass.; Robert L. Hazelwood, Department of Physiology; *Hormonal and Metabolic Studies on the Glycogen Body of the Chick*; 3 years; \$11,400  
 BOYCE THOMPSON INSTITUTE FOR PLANT RESEARCH, INC., Yonkers, N.Y.; Lela V. Barton; *Dormancy and After-Ripening of Seeds*; 3 years; \$33,700  
 UNIVERSITY OF BRITISH COLUMBIA, Vancouver, Canada; William S. Hoar, Department of Zoology; *Osmoregulatory Function of Thyroid Gland in Flatfishes*; 3 years; \$7,200  
 BROWN UNIVERSITY, Providence, R.I.; Paul F. Fenton, Department of Biology; *Inherited Metabolic and Endocrine Patterns*; 1 year; \$3,900  
 UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Herman Rahn, Department of Physiology; *Physiological Adaptations to Deep Submersion*; 3 years; \$19,200  
 CALIFORNIA ARBORETUM FOUNDATION, INC., Arcadia, Calif.; William S. Steward, Director; *Mechanism of the Food Plant Preferences of Certain Insects*; 3 years; \$29,900

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; A. Van Harrevel, Division of Biology; *Effects of Cerebral Asphyxiation on Conditioned Reflexes*; 2 years; \$28,600

UNIVERSITY OF CALIFORNIA, Berkeley, Calif. Howard A. Bern, Department of Zoology; *Properties of Neurosecretory Cells in Vertebrates and Invertebrates*; 5 years; \$90,000  
Richard M. Eakin and Robert C. Stebbins, Department of Zoology and Museum of Vertebrate Zoology; *Structure and Function of the Parietal Eye in the Reptiles*; 3 years; \$30,700

Malcolm S. Gordon, Department of Zoology, Los Angeles; *Osmotic Regulation in Eurhaline Fishes*; 3 years; \$18,600

Morton I. Grossman, Medical Center; *Studies on Pancreatic Physiology*; 3 years; \$29,900

Karl M. Knigge, Department of Anatomy, School of Medicine, Los Angeles; *Neural Control of Corticotropin and Thyrotropin Secretion*; 3 years; \$19,800

Leonard Machlis, Department of Botany; *Sexual Hormones in Algae and Fungi*; 5 years; \$109,100

Elwin Marg, School of Optometry; *Neurophysiology of the Visual System*; 2 years; \$27,000

P. F. Scholander, Scripps Institution of Oceanography, La Jolla; *Comparative Studies in Prolonged and Deep Diving*; 3 years; \$13,500

Yoshinori Tanada, Department of Biological Control; *Virus Epizootiology of Insects*; 3 years; \$33,900

UNIVERSITY OF CINCINNATI, Cincinnati, Ohio; Frank J. Etges, Department of Biological Sciences; *Chemotaxis and Chemotactic Agents*; 3 years; \$22,700

CITY OF HOPE MEDICAL CENTER, Duarte, Calif.; Howard R. Bierman, Department of Internal Medicine; *Life Span of the Blood Elements*; 2 years; \$15,200

COLUMBIA UNIVERSITY, New York, N.Y. Herbert Eiftman, Department of Anatomy, College of Physicians and Surgeons; *Cytochemistry of the Female Reproductive System*; 2 years; \$11,600

Werner R. Lowenstein, Department of Physiology; *Nature and Localization of Generator Processes in Mechanoreceptors*; 3 years; \$45,800

CORNELL UNIVERSITY, Ithaca, N.Y.

Richard H. Barnes, School of Nutrition, *Contributions of Intestinal Microflora to the Nutrition of the Host Animal*; 4 years; \$55,400

Perry W. Gilbert, Department of Zoology; *Morphology and Physiology of the Middle and Inner Ear of Dipodomys*; 2 years; \$8,500

William A. Wimsatt, Department of Zoology; *Studies of Hibernation and Digestion in Chiroptera*; 3 years; \$38,300

DARTMOUTH COLLEGE, Hanover, N.H.; David S. Dennison, Department of Zoology; *Geotropism and Its Relation to Phototropism*; 2 years; \$11,100

DARTMOUTH MEDICAL SCHOOL, Hanover, N.H.; S. M. Tenney, Department of Physiology; *Responses to Carbon Dioxide During Acclimatization to High Altitude*; 1 year; \$1,500

DEPAUL UNIVERSITY, Chicago, Ill.; Mary A. McWhinnie, Department of Biological Sci-

ences; *Hormonal Control in Crustacean Metabolism*; 2 years; \$11,200

UNIVERSITY OF FLORIDA, Gainesville, Fla.

Darrell B. Pratt, Department of Bacteriology; *Osmotic Properties of Marine Bacteria*; 3 years; \$28,400

Ernest B. Wright, Department of Physiology; *Excitation and Conduction in Nerve*; 2 years; \$23,500

GEORGETOWN UNIVERSITY, Washington, D.C.; Estelle R. Ramey, Department of Physiology; *Relationship of the Sympathetic Nervous System to the Adrenal Cortex in the Response to Stress*; 3 years; \$27,800

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; C. Adrian Hogben, Department of Physiology; *Excretory Function of Swim-bladder and Gastric Mucosa*; 3 years; \$11,200

UNIVERSITY OF GEORGIA, Athens, Ga.; Burlyn E. Michel, Department of Botany; *Growth Inhibitors Found in Cabbage and Other Crucifers*; 2 years; \$9,600

HARVARD UNIVERSITY, Cambridge, Mass.; I. Mackenzie Lamb, Farlow Herbarium and Library; *Growth Regulation in Sporophores of Higher Fungi*; 2 years; \$21,800

UNIVERSITY OF ILLINOIS, Urbana, Ill.

J. Woodland Hastings, Department of Chemistry; *Biochemical Mechanisms Involved in Clock-Like Daily Rhythms*; 4 years; \$71,700

C. Ladd Prosser, Department of Physiology; *Comparative Physiology of Non-Striated Muscle and of Physiological Adaptation*; 5 years; \$102,600

C. Ladd Prosser, Department of Physiology; *Conduction in Non-Striated Muscle*; 1 year; \$6,500

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.

C. O. Miller, Department of Botany; *Chemical Basis of Plant Photomorphogenesis*; 3 years; \$31,700

Sidney Ochs, Department of Physiology, Medical Center, Indianapolis; *Surface Responses From the Cerebral Cortex Elicited by Stimulation*; 3 years; \$9,600

Sid Robinson, Department of Physiology, Indiana University; *Respiratory Adjustments of Mammals in Exercise*; 3 years; \$45,700

IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Ames, Iowa; Walter E. Loomis, Department of Botany and Plant Pathology; *Translocation of Plants*; 3 years; \$34,500

ISAAC ALBERT RESEARCH INSTITUTE OF THE JEWISH CHRONIC DISEASE HOSPITAL, Brooklyn, N.Y.; Sydney S. Lazarus, Endocrinology Laboratory; *Pancreatic B. Cell Destruction in Metadiabetes*; 3 years; \$29,300

JEWISH HOSPITAL AND MEDICAL CENTER, Cincinnati, Ohio; Benjamin F. Miller and Paul Nathan, The May Institute for Medical Research and Department of Physiology; *Antibody Responsible for Destruction of Tissue and Organ Transplants*; 3 years; \$22,600

JOHNS HOPKINS UNIVERSITY, Baltimore, Md. Abraham G. Osler, School of Hygiene and Public Health; *Mechanism of Hypersensitivity Phenomena*; 5 years; \$81,100

Robert R. Wagner, Department of Medicine; *Interferon B: Its Properties and Role in the Viral Interference Phenomenon*; 5 years; \$77,100

- KAISER FOUNDATION, Oakland, Calif.; Ellisworth C. Dougherty, Laboratory of Comparative Physiology and Morphology; *Cultivation of Brachionid Rotifers*; 2 years; \$8,500
- KANSAS STATE COLLEGE OF AGRICULTURE AND APPLIED SCIENCE, Manhattan, Kans.; Francis C. Lanning, Department of Chemistry; *The Nature and Distribution of Silica in Plants*; 3 years; \$13,600
- UNIVERSITY OF KANSAS, Lawrence, Kans.; Cora M. Downs, Department of Bacteriology; *Study of Tissue Culture Cells Infected With Various Agents*; 3 years; \$35,500
- LEHIGH UNIVERSITY, Bethlehem, Pa.; John A. Freeberg, Department of Biology; *Lycopodium Porthalli and Their Endophytic Fungi*; 3 years; \$22,000
- LONG BEACH STATE COLLEGE, Long Beach, Calif.; Richard G. Lincoln, Department of Biological Sciences; *Photoperiodic Inhibition of Flowering*; 15 months; \$10,800
- LONGWOOD COLLEGE, Farmville, Va.; Robert T. Brumfield, Department of Biology; *Control of Cell Division and Growth in Plant Root Meristems*; 39 months; \$38,600
- LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; John S. Roussel; Department of Entomology; *Evolution of Diapause in The Boll Weevil*; 3 years; \$26,100
- MAYO ASSOCIATION, Rochester, Minn.; Charles F. Code, Physiology Section, Mayo Clinic; *Factors Controlling Gastric Secretion*; 5 years; \$60,100
- UNIVERSITY OF MIAMI, Miami, Fla.; Charles E. Lane, Department of Marine Science; *The General Biology of the Land Crab*; 3 years; \$37,900
- MICHIGAN STATE UNIVERSITY, East Lansing, Mich.; Mravis Richardson, Department of Microbiology; *Parasitization by Brucella Abortus of Cells From Bovine Tissues*; 3 years; \$36,500
- MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing, Mich.; Emanuel Hackel, Department of Natural Science; *The Nature of Human Blood Group Antigens*; 3 years; \$13,200
- UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; Dwain W. Warner, Museum of Natural History; *Effects of Prolactin on the Reproductive Behavior of the Brown-Headed Cowbird*; 1 year; \$7,800
- UNIVERSITY OF MISSOURI, Columbia, Mo. Jacob Levitt; *Physiological Basis of Resistance of Plants to Frost and Drought*; 3 years; \$34,700
- Boyd L. O'Dell, Agricultural Chemistry; *Unidentified Nutrients Required by the Guinea Pig*; 3 years; \$28,000
- John E. Peterson, Department of Botany; *Culture and Physiology of the Myzobacteria*; 2 years; \$13,800
- MOUNT SINAI HOSPITAL, New York, N.Y.; M. L. Littman, Department of Microbiology; *Vitamin, Amino Acid, Carbohydrate and Mineral Requirements of Pathogenic Fungi*; 3 years; \$24,000
- NEW YORK UNIVERSITY, New York, N.Y.; Silvio Baez, Department of Anesthesiology; *Structure and Behavior of the Microcirculation*; 2 years; \$17,300
- NEW YORK ZOOLOGICAL SOCIETY, New York, N.Y.; Thomas Goreau, Zoological Park, *Physiology of Reef Building Corals*; 1 year; \$10,500
- NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; N. N. Winstead and C. L. McCombs, Departments of Plant Pathology and Horticulture, North Carolina Agriculture Experimental Station; *Pathogeniocity, Disease Development, and Resistance in Cucurbitaceae*; 3 years; \$32,500
- NORTHWESTERN UNIVERSITY, Evanston, Ill. Ronald R. Novales, Department of Biology; *Responses of Melanophores to Intermedin and Drugs*; 3 years; \$30,800
- Albert Wolfson, Department of Biological Sciences; *Regulation of Migratory Behavior and Reproductive Cycles in Birds*; 3 years; \$49,300
- UNIVERSITY OF NOTRE DAME, Notre Dame, Ind. Gerd T. A. Benda, Department of Biology; *Reaction of Plant Cells to Wounding*; 2 years; \$9,500
- Bernard S. J. Wostmann, Lobund Institute; *Electrophoretic Analysis of the Serum of Germfree Animals*; 1 year; \$18,800
- OHIO STATE UNIVERSITY, Columbus, Ohio; Frank A. Hartman and Katherine A. Brownell, Department of Physiology; *Hormone Controlling Fat Deposition in the Mammal*; 2 years; \$21,300
- UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Vincent G. Dethier, Division of Biology; *Chemoreception (Mechanism of Action)*; 5 years; \$76,800
- UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; Leonard A. Cohen, School of Medicine; *Coordination Between Hindlimb Reflexes*; 2 years; \$14,300
- PRINCETON UNIVERSITY, Princeton, N.J.; W. W. Swingle, Department of Biology; *Study of Adrenal Cortical Hormones in Salt and Water Metabolism*; 3 years; \$34,600
- PURDUE RESEARCH FOUNDATION, Lafayette, Ind. Frederick N. Andrews, Department of Animal Sciences, Purdue University; *Growth Patterns Under Varying Temperature and Light Condition*; 3 years; \$42,500
- Charles M. Kirkpatrick, Department of Forestry and Conservation, Purdue University; *Thyroid Gland Morphology of the Gray Squirrel*; 1 year; \$1,800
- Marwin Moskowitz, Department of Biological Sciences; *Isolation and Physiology of Clone Cultures of Mammalian Cells*; 1 year; \$6,100
- REED COLLEGE, Portland, Ore.; Gilbert F. Gwilliam, Department of Biology; *Morphological and Physiological Basis of Certain Aspects of Behavior*; 3 years; \$9,400
- UNIVERSITY OF ROCHESTER, Rochester, N.Y.; E. S. Nasset, Department of Physiology; *Influence of Thyroid Gland on the Secretion of Gastric Juice*; 1 year; \$11,900
- ROCKEFELLER INSTITUTE, New York, N.Y. Alexander Mauro, Department of Biophysics; *Electrophysiological Study of Knife Fishes*; 2 years; \$9,000
- George E. Palade, Department of Cytology; *Anatomical Pathway of Various Substances Across the Wall of Glomerular Capillaries*; 2 years; \$15,000
- RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J. James H. Leatham, Bureau of Biological Research; *Water and Salt Electrolyte Metabolism of the Desert Rat*; 1 year; \$2,200
- M. Wight Taylor, Department of Agricul-

tural Biochemistry; *Purchase of a Pellet Mill*; 1 year; \$3,050

SMITHSONIAN INSTITUTION, Washington, D.C.; Herbert Friedmann, Museum of Natural History; *Endocrine Basis of Parasitic Breeding in Birds*; 3 years; \$21,900

STATE UNIVERSITY OF IOWA, Iowa City, Iowa; Ruben H. Flocks, Department of Urology, University Hospital; *Antigenic Properties of Urogenital Organs*; 2 years; \$46,400

STANFORD UNIVERSITY, Stanford Calif. Winslow R. Briggs, Department of Biological Sciences; *Dosage-Response Relationships of Phototropic Induction*; 3 years; \$32,700

Alan K. Done, Department of Pediatrics; *Role of Ascorbic Acid in Adrenal-Cortical Function*; 1 year; \$4,400

Philip E. Smith, Department of Anatomy; *Gonadotrophic Hormone Content of the Anterior Hypophysis*; 2 years; \$5,200

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; Howard F. L. Rock, Department of Botany; *Revision of the Genus *Helenium*, Section *Tetradus* (Compositae)*; 3 years; \$9,900

UNIVERSITY OF TEXAS, Austin, Tex. Walter V. Brown, Department of Botany; *Arid Land Grasses: Their Stomatal Activity*; 2 years; \$10,200

Leroy J. Olson, Department of Microbiology; *Origin and Evolution of Host Parasite Relationship*; 3 years; \$20,700

UNIVERSITY OF TEXAS, Dallas, Tex.; Robert M. Pike, Department of Microbiology; *Erythrocyte Sensitization and Rheumatoid Factor*; 2 years; \$13,100

VALPARAISO UNIVERSITY, Valparaiso, Ind.; W. C. Gunther, Department of Biology; *Seasonal Variation of Reproductive Organs and Endocrine Glands*; 1 year; \$1,600

UNIVERSITY OF VERMONT, Burlington, Vt.; Thomas Sporston, Department of Botany; *Influence of Photoperiods on the Development of Sexual Stage of the *Trifolium Erik**; 2 years; \$9,700

UNIVERSITY OF VERMONT AND STATE AGRICULTURAL COLLEGE, Burlington, Vt.

Calvin Hanna, Department of Pharmacology, School of Medicine; *Intracellular Distribution of Amines*; 3 years; \$26,400

Martin W. Williams, Department of Pharmacology; *Differences Between the Longitudinal and Circular Muscles of the Vertebrate Gastro-Intestinal Tract*; 2 years; \$13,100

WABASH COLLEGE, Crawfordsville, Ind.; Willis H. Johnson, Department of Biology; *Nutritive Requirements of *Paramecium Multimicronucleatum**; 2 years; \$5,500

WALLA WALLA COLLEGE, College Place, Wash.; Harold G. Coffin, Department of Biological Science; *Laboratory Culture of Marine Decapod Larvae*; 2 years; \$8,000

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio

M. Nell MacIntyre, Department of Anatomy; *Physiological Induction of Sex Differentiation in Mammals*; 3 years; \$39,300

Stanley F. Patten, Jr., Department of Anatomy, School of Medicine; *Fate and Function of Transfused Tritium Labeled Lymphocytes*; 2 years; \$14,100

WILLIAMS COLLEGE, Williamstown, Mass.; Allyn J. Waterman, Department of Biology; *Fetal and Adult Thyroid-Pituitary System*; 3 years; \$19,800

UNIVERSITY OF WISCONSIN, Madison, Wis.; Peter R. Morrison, Department of Zoology; *Body Temperature and Its Regulation in Mammals*; 3 years; \$49,200

YALE UNIVERSITY, New Haven, Conn.; Grace E. Pickford, Bingham Oceanographic Laboratory; *Collection of Large Quantities of Freshly Frozen Pituitary Glands*; 1 year; \$8,100

#### SOCIOLOGICAL SCIENCES

UNIVERSITY OF CHICAGO, Chicago, Ill.; Donald J. Bogue, Population Research and Training Center; *Basic Research in Demographic Methodology*; 2 years; \$13,500

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; Harold E. Jones, and Susan M. Ervin, Institute of Human Development; *Verbal Behavior in Bilinguals*; 1 year; \$15,200

CORNELL UNIVERSITY, Ithaca, N.Y.; Urie Bronfenbrenner, Department of Child Development and Family Relations; *Family Structure and Personality Development*; 3 years; \$40,500

DUKE UNIVERSITY, Durham, N.C. E. E. Jones, *Effects of Interaction Context on Persons Perception*; 3 years; \$37,700

Jack W. Brehm, Department of Psychology; *Cognitive Dissonance and Attitude Change*; 3 years; \$18,000

UNIVERSITY OF ILLINOIS, Urbana, Ill.; William McGuire, Department of Psychology; *Immunitization to Persuasion*; 2 years; \$13,900

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Ithiel de Sola Pool, Center for International Studies; *Acquaintance-ship Networks*; 2 years; \$27,000

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; Leslie Kish, Survey Research Center; *Analytical Statistics for Complex Samples*; 2 years; \$18,000

NEW YORK UNIVERSITY, New York, N.Y. Stuart W. Cook, Department of Psychology; *Measurement of Attitude*; 14 months; \$18,200

Edith D. Nelmark, Department of Psychology; *The Effect of "Social" Stimuli upon Discrimination and Choice Behavior*; 2 years; \$10,200

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; Sidney Slegel, Department of Psychology; *Theoretical Models of Choice and Strategy Behavior*; 3 years; \$21,700

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; R. D. Luce, *Individual Choice Behavior*; 2 years; \$16,700

STANFORD UNIVERSITY, Stanford, Calif.; Bernard P. Cohen, Behavioral Sciences Division; *Probability Models for Conformity Behavior*; 2 years; \$24,200

WESLEYAN UNIVERSITY, Middletown, Conn.; David C. Beardslee and Donald D. O'Dowd, Department of Psychology; *Relation Between Structure and Content of Attitudes*; 2 years; \$4,200

#### SYSTEMATIC BIOLOGY

ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, Philadelphia, Pa.

Ruth Patrick, Department of Limnology; *Fresh-Water Diatoms of the United States*; 3 years; \$22,200

- James A. G. Rehn, Department of Insects; *Orthoptera of North America*; 2 years; \$31,000
- ALBION COLLEGE, Albion, Mich.; William J. Gilbert, Department of Biology; *Systematic Studies of Hawaiian Marine Algae*; 3 years; \$7,100
- AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.
- Leonard J. Brass, Department of Mammals; *Biological Exploration of New Guinea*; 1 year; \$13,500
- William K. Emerson, Department of Fishes and Aquatic Biology; *Systematic Studies of Recent Mollusks*; 3 years; \$22,000
- Willis J. Gertsch; Department of Insects and Spiders; *Systematics and Biology of the California Spider Fauna*; 3 years; \$11,700
- Frederico Lane, Department of Insects and Spiders; *Systematic Studies of Neotropical Cerambycidae (Coleoptera)*; 3 years; \$17,300
- Wesley E. Lanyon, Department of Birds; *Systematics and Evolution of Tyrant Flycatchers of the Genus Myiarchus*; 1 year; \$4,000
- Joseph C. Moore, Department of Mammals; *Revision of Indomalayan Sciuridae*; 2 years; \$7,400
- Norman D. Newell, Department of Geology and Paleontology; *The Living and Fossil Genera of Bivalve Mollusks*; 3 years; \$11,600
- Frederick H. Rindge, Department of Insects and Spiders; *Revisionary Studies of the Genera of North American Geometridae*; 3 years; \$10,300
- Albert Schwartz, Department of Amphibians and Reptiles; *Herpetological Survey of Cuba*; 3 years; \$9,500
- ANTIOCH COLLEGE, Yellow Springs, Ohio; John W. Crenshaw, Department of Biology; *Species Variation in Blood Protein Patterns*; 2 years; \$12,700
- ARCTIC INSTITUTE OF NORTH AMERICA, New York, N.Y.; Francis Harper; *Biological Investigations in Keewatin and the Ungava Peninsula*; 1 year; \$9,700
- UNIVERSITY OF ARIZONA, Tucson, Ariz.; Howard K. Gloyd, Department of Zoology; *The Genus Agkistrodon and Related Groups of Crotalid Snakes*; 2 years; \$15,600
- BEAUDETTE FOUNDATION FOR BIOLOGICAL RESEARCH, Solvan, Calif.; E. Yale Dawson; *The Marine Red Algae of Pacific Mexico*; 2 years; \$8,800
- BOSTON UNIVERSITY, Boston, Mass.
- Arthur G. Humes, Department of Biology; *Parasitic Copepoda of Fishes and Invertebrates*; 2 years; \$9,200
- Arthur G. Humes, Department of Biology; *Systematics of Copepods From the West Indies*; 1 year; \$1,800
- BOTANICAL MUSEUM OF HARVARD UNIVERSITY, Cambridge, Mass.; Charles Schweinfurth; *Phytogeographical Study of the Orchidaceae of the Guyana Massif in Northern South America*; 3 years; \$5,100
- BROWN UNIVERSITY, Providence, R.I.
- George L. Church, Department of Botany; *Origin of Species Complexes in Eastern Elymus*; 3 years; \$19,600
- Walter H. Snell and Esther Dick, Department of Botany; *Boleti of Northeastern North America*; 4 years; \$12,800
- UNIVERSITY OF BRITISH COLUMBIA, Vancouver, B.C., Canada; Shirley R. Sparling, Department of Biology and Botany; *Life Cycles of Red Algae*; 2 years; \$4,000
- UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Carl Gans, Department of Biology; *Functional Morphology of Squamate Reptilia*; 3 years; \$19,900
- CALIFORNIA ACADEMY OF SCIENCES, San Francisco, Calif.; Edward S. Ross, Department of Entomology; *Monographic Studies of the Insect Order Embioptera*; 3 years; \$18,000
- UNIVERSITY OF CALIFORNIA, Berkeley, Calif. Lincoln Constance, Department of Botany; *Taxonomic and Distributional Studies of South America Umbelliferae*; 3 years; \$20,800
- Frank E. Peabody, Department of Zoology, Los Angeles; *The Phylogeny and Paleocology of Carboniferous Reptiles*; 1 year; \$3,000
- Willis P. Popenoe, Department of Geology; *Upper Cretaceous Molluscan Faunas of California*; 3 years; \$14,500
- Johannes Proskauer, Department of Botany; *Biosystematic Studies on Anthrocero-tales*; 2 years; \$9,100
- S. A. Sher, Department of Plant Nematology; *The Nematode Subfamily Hoplolaiminae*; 2 years; \$5,000
- Ray F. Smith, Department of Entomology and Parasitology; *Biosystematics of Diabrotica and Related Genera of Beetles*; 3 years; \$16,500
- R. A. Stirton and S. P. Welles, Museum of Paleontology; *Vertebrate Fauna of the Moenkopi Formation*; 3 years; \$25,000
- John M. Tucker, Department of Botany; *Evolution of the Quercus Undulata Complex*; 2 years; \$7,300
- CAPE HAZE MARINE LABORATORY, Placida, Fla.; Dr. Eugenie Clark, Director; *Syngnathid Fishes of the Red Sea*; 1 year; \$1,800
- CARNEGIE MUSEUM, Pittsburgh, Pa.; Kenneth C. Parkes; *Investigation of the Natal and Juvenal Plumages of Non-Passerin Birds*; 3 years; \$7,500
- CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; Ross H. Arnett, Jr., Department of Biology; *Ecological Factors Affecting Speciation of Oedemerid Beetles in the Sonoran Desert*; 1 year; \$2,000
- CHICAGO NATURAL HISTORY MUSEUM, Chicago, Ill.
- Robert F. Inger, Department of Zoology; *The Amphibians and Reptiles of Borneo*; 3 years; \$7,000
- Robert F. Inger, Division of Amphibians and Reptiles; *Systematics and Zoogeography of the Fresh-Water Fishes of North Borneo*; 1 year; \$6,800
- UNIVERSITY OF CHICAGO, Chicago, Ill.; Everett C. Olson, Department of Geology; *Middle Permian Vertebrate Faunas*; 2 years; \$10,000
- UNIVERSITY OF CINCINNATI, Cincinnati, Ohio.
- Maxine L. Abbott, Department of Biological Sciences; *Study of the Compression Flora of the Upper Freeport (No.7) Coal in Ohio*; 3 years; \$20,900
- Margaret Fulford, Department of Biological Sciences; *Leafy Hepaticae of Tropical America*; 3 years; \$15,000

COLUMBIA UNIVERSITY, New York, N.Y.

J. Laurens Barnard, Department of Geology; *Taxonomy, etc., of Abyssal Marine Amphipods*; 3 years; \$9,500

Robert J. Menzies, Lamont Geological Observatory; *Abyssal Isopods of the Atlantic Ocean*; 4 years; \$30,000

UNIVERSITY OF CONNECTICUT, Storrs, Conn.; Francis R. Trainor, Marine Research Laboratory; *The Morphology of the Marine Alga Enteromorpha*; 2 years; \$3,200

CORNELL UNIVERSITY, Ithaca, N.Y.

Richard P. Korf, Department of Plant Pathology; *Discomycete Flora of Asia*; 5 years; \$29,200

Edward C. Raney, Department of Zoology; *Research in North American Ichthyology*; 3 years; \$13,700

Charles G. Sibley, Department of Conservation; *A Taxonomic Study of Avian Proteins*; 3 years; \$20,000

DUKE UNIVERSITY, Durham, N.C.

Lewis E. Anderson, Department of Botany; *Mosses of the United States and Canada*; 4 years; \$41,000

Lewis E. Anderson, Department of Botany; *Renovation of the Grout Reference Slide Collection of Mosses*; 1 year; \$3,200

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.

Ruth S. Breen, Department of Botany; *An Illustrated Manual of the Mosses of Florida*; 2 years; \$7,100

Alan J. Kohn, Department of Biological Sciences; *Systematics of Indo-West Pacific Marine Mollusks of the Family Conidae*; 3 years; \$14,800

Robert B. Short, Department of Biological Sciences; *Taxonomic and Life History Studies on the Dicyemid Mesozoa*; 2 years; \$10,400

Norman E. Weisbord, Department of Geology; *Late Cenozoic Invertebrates from Northern Venezuela*; 2 years; \$7,000

Ralph W. Yerger, Department of Biological Sciences; *Freshwater Fishes of Florida*; 2 years; \$5,000

UNIVERSITY OF FLORIDA, Gainesville, Fla.; Coleman J. Goin, Department of Biological Sciences; *Systematics and Evolution of the Amphibia*; 1 year; \$2,000

UNIVERSITY OF GEORGIA, Athens, Ga.; Elon E. Byrd, Department of Zoology; *Life History Studies of the Trematode Family Ochetsomatidae*; 3 years; \$15,000

HANOVER COLLEGE, Hanover, Ind.; J. Dan Webster, Department of Zoology; *Taxonomic Study of the Grace Warbler and the Olive Warbler in Mexico*; 2 years; \$1,500

HARVARD UNIVERSITY HERBARIUM, Cambridge, Mass.; Dr. Irving W. Bailey; *Phylogenetic Trends in the Cactaceae*; 3 years; \$23,400

HARVARD UNIVERSITY, Cambridge, Mass. Leslie A. Garay, Botanical Museum; *Orchid Flora of Colombia and Ecuador*; 4 years; \$10,200

Richard A. Howard, Arnold Arboretum; *Vascular Patterns in Petioles of Woody Flowering Plants*; 2 years; \$10,800

Reed C. Rollins, Gray Herbarium; *Differentiation and Evolution in Leavenworthia (Cruciferae)*; 3 years; \$15,000

Richard E. Schultes, Botanical Museum; *Floristic Studies of the Northwest Amazon*; 4 years; \$9,500

UNIVERSITY OF ILLINOIS, Urbana, Ill.

Robert S. Bader, Department of Zoology; *Osteometric Variability of Fossil and Re-*

*cent Mammalian Populations*; 3 years; \$16,500

G. Neville Jones, Department of Botany; *The American Species of Tilia*; 1 year; \$5,000

Richard B. Selander, Department of Entomology; *Study of the Blister Beetle Genus Purota*; 2 years; \$15,400

Lewis J. Stannard, Jr.; *Thysanoptera of Oceanic Islands*; 3 years; \$18,600

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.

James E. Canright, Department of Botany; *Comparative Morphology and Relationships of the Annonaceae*; 3 years; \$20,000

Charles B. Helsler, Jr., Department of Botany, University of Indiana; *Taxonomic and Cytogenetic Studies of Helianthus*; 3 years; \$13,900

Frank N. Young, Department of Zoology; *Taxonomic and Ecological Studies on Aquatic Beetles*; 3 years; \$14,000

IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Ames, Iowa; Wallace E. LaBerge, Department of Zoology and Entomology; *Bees of the Genus Andrena in North America*; 3 years; \$15,000

IOWA STATE COLLEGE, Ames, Iowa; Martin J. Ulmer, Department of Zoology and Entomology; *Trematode and Cestode Parasites of Vertebrates*; 3 years; \$15,000

KANSAS STATE TEACHERS COLLEGE, Emporia, Kans.; Gilbert A. Lelsman, Department of Biology; *The Pennsylvanian Fossil Flora of Southeastern Kansas*; 2 years; \$7,000

UNIVERSITY OF KANSAS, Lawrence, Kans. Robert E. Beer, Department of Entomology; *Comparative Internal Anatomy of the Acarina*; 3 years; \$15,800

George W. Byers, Department of Entomology; *The Genus Nephrotoma in North America*; 3 years; \$7,000

Theodore H. Eaton, Jr., Museum of Natural History; *Phylogeny of Paleozoic Reptiles*; 1 year; \$10,000

H. B. Hungerford, Department of Entomology; *Comparative Morphology and Taxonomy of the Aquatic and Semi-Aquatic Hemiptera of the World*; 3 years; \$35,600

H. B. Hungerford, Department of Entomology; *A Monographic Study of the Microneuridae of the World*; 3 years; \$10,100

Raymond C. Jackson, Department of Botany; *Biosystematic Investigation in Haplo-pappus*; 3 years; \$7,800

Robert W. Lichtwardt, Department of Botany; *The Fungal Order Ecrrinales*; 2 years; \$10,000

Rufus H. Thompson, Department of Botany; *Life History and Cytogenetics of Representative Species Families of Green Algae*; 2 years; \$12,600

Robert W. Wilson, Department of Zoology; *Systematics of Paleocene Mammals of the San Juan Basin, New Mexico*; 1 year; \$7,400

KENTUCKY RESEARCH FOUNDATION, University Station, Lexington, Ky.; Dale M. Smith, Department of Botany; *Studies of the Polyploid Species of Helianthus*; 3 years; \$12,000

LINFIELD RESEARCH INSTITUTE, McMinnville, Oreg.; Kenneth M. Fender; *Revisional Studies in the Lampyroid Beetles*; 2 years; \$5,000

LOS ANGELES COUNTY MUSEUM, Los Angeles, Calif.; E. Yale Dawson; *The Marine Red*

- Algae of Pacific Mexico*; 2 years; \$10,000  
MARINE LABORATORY, UNIVERSITY OF MIAMI, Miami, Fla.; Gilbert L. Voss, The Marine Laboratory, Miami; *Cephalopods of the North Atlantic*; 3 years; \$20,000  
MARQUETTE UNIVERSITY, Milwaukee, Wis.; Peter Abramoff, Department of Biology; *Toad Populations of the Islands of Lake Michigan*; 1 year; \$4,200  
UNIVERSITY OF MARYLAND, College Park, Md.; Richard Highton, Department of Zoology; *Systematics of Plethodontid Salamanders*; 2 years; \$7,900  
UNIVERSITY OF MASSACHUSETTS, Amherst, Mass.; Rudolf M. Schuster, Department of Botany; *Evolution in the Suborder Ptilidinae*; 4 years; \$18,600  
MERCER UNIVERSITY, Macon, Ga.; David W. Johnston, Department of Biology; *Bio-systematics of American Crows*; 1 year; \$2,600  
MIAMI UNIVERSITY, Oxford, Ohio; Harvey A. Miller, Department of Botany; *Bryophytes of Pacific Islands*; 3 years; \$19,800  
UNIVERSITY OF MIAMI, Coral Gables, Fla. Samuel P. Meyers, The Marine Laboratory; *Systematic Studies of Marine Fungi*; 2 years; \$10,000  
C. Richard Robins, The Marine Laboratory; *Monograph of the Fish Family Ophiidiidae*; 2 years; \$9,000  
Henry Fredrick Strohecker, Department of Zoology; *Revisory Synopsis of the Endomychidae*; 5 years; \$17,600  
MICHIGAN STATE UNIVERSITY, East Lansing, Mich.; John H. Beaman, Department of Botany and Plant Pathology; *Alpine Flora of Mexico and Guatemala*; 3 years; \$23,000  
UNIVERSITY OF MICHIGAN, Ann Arbor, Mich. Reeve M. Bailey, Museum of Zoology; *Phylogeny of Spiny-Rayed Fishes (Percocidea)*; 2 years; \$18,000  
Emmet T. Hooper, Museum of Zoology; *Systematic Studies of the Rodent Family Cricetidae*; 3 years; \$14,700  
William R. Murchie, Flint College, Flint; *The Oligochaete Genus Diplocardia*; 3 years; \$7,900  
Alexander H. Smith, Department of Botany; *A Manual of the Fleishy Basidiomycetes*; 3 years; \$20,000  
Frederick K. Sparrow, Department of Botany; *The Fungus Genus Physoderma (Phycomycetes)*; 3 years; \$18,000  
Erwin C. Stumm, Museum of Paleontology; *Studies of Paleozoic Invertebrates*; 1 year; \$5,000  
Henry K. Townes, Jr.; Museum of Zoology; *The Ichneumon Flies of the Old World*; 2 years; \$5,000  
UNIVERSITY OF MINNESOTA, Minneapolis, Minn.  
Ernst C. Abbe, Department of Botany; *Relationships of Plant Families Composing the Amentifera*; 2 years; \$12,000  
Edwin F. Cook, Department of Entomology and Economic Zoology; *A Systematic Study of the Genus Malacosoma*; 3 years; \$29,900  
Alexander A. Granovsky, Department of Entomology and Economic Zoology; *Research on Aphid Fauna*; 2 years; \$10,000  
John W. Hall, Department of Botany; *Pollen and Spore Analysis of the Dakota Oretaceous Formation*; 2 years; \$9,900  
Thomas Morley, Department of Botany; *Systematic Studies of the Melastomataceae*; 1 year; \$5,900  
Richard E. Norris, Department of Botany; *Morphological and Cytological Studies of Red Algae*; 3 years; \$15,000  
Gerald B. Ownbey, Department of Botany; *Taxonomic Cytotaxonomic and Evolutionary Studies in the Genus *Cirsium**; 3 years; \$20,000  
UNIVERSITY OF MISSISSIPPI, University, Miss.; Frank M. Hull, Department of Biology; *Taxonomic and Phylogenetic Studies of Diptera*; 2 years; \$15,400  
MISSOURI BOTANICAL GARDEN, St. Louis, Mo. Julian A. Steyermark, Research Department; *Flora of Missouri*; 1 year; \$7,300  
Robert E. Woodson, Jr.; *Flora of Panama*; 3 years; \$36,800  
MONTANA STATE COLLEGE, Bozeman, Mont.; Richard C. Froeschner, Department of Zoology and Entomology; *Taxonomic Revision of the Cydnidae for the World*; 3 years; \$13,200  
UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; Harold W. Manter, Department of Zoology; *Digenetic Trematodes of Fishes of Hawaii*; 1 year; \$8,000  
NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY, Campus Station, Socorro, N. Mex.; Christina Lochman-Balk, Department of Geology; *The Faunas of the Deadwood Formation (Upper Cambrian) of the Black Hills*; 2 years; \$8,800  
UNIVERSITY OF NEW HAMPSHIRE, Durham, N.H.; Wilbur L. Bullock, Department of Zoology; *Acanthocephalan Parasites of Northern New England*; 4 years; \$15,000  
COLLEGE OF NEW ROCHELLE, New Rochelle, N.Y.; Mary D. Rogick, Department of Biology; *Bryozoa of the Antarctic*; 3 years; \$4,400  
NEW YORK BOTANICAL GARDEN, New York, N.Y.  
Herman F. Becker; *The Oligocene Flora of the Ruby Basin of Montana*; 2 years; \$19,800  
Arthur Cronquist; *Vascular Plants of the Intermountain West*; 3 years; \$19,000  
Otto Degener, Collaborator in Hawaiian Botany; *Botanical Exploration of the Hawaiian Islands*; 3 years; \$15,700  
B. Maguire and J. J. Wurdack; *A Plant Survey of the Guiana Region of South America*; 5 years; \$145,400  
Clark T. Rogerson; *Monographic Studies in the Hypocreales (Ascomycetes)*; 3 years; \$20,100  
Dr. William C. Steere, Director; *Arctic American Mosses*; 5 years; \$29,900  
NEW YORK ZOOLOGICAL SOCIETY, New York, N.Y.; Jocelyn Crane, Department of Tropical Research; *The Ethology of Heliconiid Butterflies*; 3 years; \$12,000  
NORTH CAROLINA STATE COLLEGE, Raleigh, N.C.; Clyde F. Smith, Department of Entomology; *Eriosomatini (Aphidae: Homoptera)*; 3 years; \$25,000  
UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; C. Ritchie Bell, Department of Botany; *Cytological Studies of North American Umbelliferae*; 1 year; \$3,500  
OHIO ACADEMY OF SCIENCE, Ohio State University, Columbus, Ohio; E. Lucy Braun, Department of Botany; *Vascular Flora of Ohio*; 4 years; \$23,900  
UNIVERSITY OF OKLAHOMA RESEARCH INSTITUTE, Norman, Okla.; J. Teague Self, Department of Zoology, The University of Oklahoma; *Biochemical Studies of Oestodes*; 1 year; \$3,200



- POMONA COLLEGE, Claremont, Calif.; Lyman Benson, Department of Botany; *Taxonomy and Distribution of the Cacti of the United States and Canada*; 3 years; \$14,800
- UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; Hui-Lin Li, Morris Arboretum; *Trees and Shrubs of Formosa*; 3 years; \$13,800
- PFEIFFER COLLEGE, Misenheimer, N.C.; Charles W. Foreman, Department of Biology; *Comparative Study of the Electromigration Properties of the Hemoglobins of Rodents and Certain Other Mammals*; 1 year; \$2,000
- PURDUE RESEARCH FOUNDATION, Lafayette, Ind.  
Raymond M. Cable, Department of Biological Sciences; *Marine Digenetic Trematodes of Puerto Rico*; 1 year; \$6,200
- George B. Cummins, Department of Botany and Plant Pathology; *The Spermogonial Morphology of the Rust Fungi*; 3 years; \$8,600
- Grady L. Webster, Department of Biological Sciences; *Biosystematic Study of the West Indian Species of Phyllanthus*; 3 years; \$13,000
- QUEENS COLLEGE, Flushing, N.Y.; Max K. Hecht, Department of Biology; *Review of Cretaceous and Early Tertiary Frogs, Salamanders, Lizards and Snakes*; 3 years; \$11,800
- RANCHO SANTA ANA BOTANIC GARDEN, Claremont, Calif.; Lee W. Lenz; *Cytological and Taxonomic Investigation of Certain Apogon Irises*; 3 years; \$7,100
- ROBERT COLLEGE, Istanbul, Turkey; Dale J. Osborn, Biology Department; *Taxonomy and Distribution of Turkish Mammals*; 3 years; \$5,200
- UNIVERSITY OF ROCHESTER, Rochester, N.Y.; David H. Kistner, Department of Biology; *Systematic Studies of Stenacethetini (Coleoptera)*; 1 year; \$3,200
- RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; Josiah L. Lowe, College of Forestry, Syracuse, N.Y.; *Polyporaceae of North America*; 2 years; \$12,000
- RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; Alan A. Boyden, Serological Museum; *Serological Studies of the Classification of Vertebrata*; 1 year; \$9,700
- SMITHSONIAN INSTITUTION, Washington, D.C.  
J. F. Gates Clarke, Department of Zoology; *Systematic Studies of South American Microlepidoptera*; 3 years; \$22,900
- Jose Cuatrecasas, Department of Botany, U.S. National Museum; *Taxonomic Study of the Phanerogams of Colombia*; 3 years; \$35,000
- UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; Jay M. Savage, Department of Biology; *Variation and Evolution in the Genus Bufo*; 2 years; \$10,000
- SOUTHERN ILLINOIS UNIVERSITY, Carbondale, Ill.; John Charles Downey, Department of Zoology; *Plebejus Icaroides*; 3 years; \$18,300
- SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.; David L. Clark, Department of Geology; *Cretaceous Cephalopods of Texas*; 2 years; \$12,000
- STANFORD UNIVERSITY, Stanford, Calif.  
Albert W. C. T. Herre, Curator of Ichthyology; *Monograph of the Genus Usnea in North America*; 1 year; \$5,000
- Victor C. Twitty, Department of Biological Sciences; *Biology and Genetic Relationships of the Californian Species of Taricha*; 5 years; \$58,000
- Ira L. Wiggins, Natural History Museum; *Research in Systematic Botany*; 3 years; \$43,000
- STATE COLLEGE OF WASHINGTON, Pullman, Wash.  
George E. Hudson, Department of Zoology; *The Phylogeny of Gallinaceous Birds*; 2 years; \$4,300
- Marlon Ownbey, Department of Botany; *Nature of Species with Special Reference to Tragopogon*; 3 years; \$19,500
- STATE UNIVERSITY OF IOWA, Iowa City, Iowa  
Constantine J. Alexopoulos, Department of Botany; *Systematic Studies of the Myzomycetes*; 3 years; \$13,100
- Robert F. Thorne, Department of Botany; *Phylogeny of the Angiosperms*; 1 year; \$2,900
- TEXAS AGRICULTURAL EXPERIMENT STATION, College Station, Tex.; Frank W. Gould, Department of Range and Forestry; *Cytotaxonomic Studies of the Grass Bouteloua Curtipendula*; 3 years; \$15,000
- TEXAS A. & M. RESEARCH FOUNDATION, College Station, Tex.; Harry D. Thiers, Department of Biology, Agricultural and Mechanical College of Texas; *The Boletaceae of the Gulf Coastal Plain*; 3 years; \$10,000
- UNIVERSITY OF TEXAS, Austin, Tex.  
Harold C. Bold, Department of Botany; *Algae of Texas Soils*; 3 years; \$20,000
- B. L. Turner, Department of Botany; *Cytotaxonomic Studies in the Tribe Helentaeae*; 3 years; \$22,200
- TULANE UNIVERSITY, New Orleans, La.; Royal D. Suttks, Department of Zoology; *Revision of the Garfishes*; 3 years; \$20,000
- UNIVERSITY OF TEXAS, Austin, Tex.; Robert K. Selander, Department of Zoology; *Comparative Study of Behavior in the Quisqualine Ioterids*; 3 years; \$10,000
- URSINUS COLLEGE, Collegeville, Pa.; Robert C. Stein, Department of Biology; *A Behavioral and Morphological Study of Empidonax*; 1 year; \$2,000
- VANDERBILT UNIVERSITY, Nashville, Tenn.; Robert B. Channell, Department of Biology; *Taxonomic Revision of the "Eu-Rhynchospora" Portion of the Genus Rhynchospora*; 3 years; \$18,000
- WASHINGTON UNIVERSITY, St. Louis, Mo.; Robert E. Woodson, Jr.; Henry Shaw School of Botany; *Analysis of Peripheral Populations of Asclepias Tuberosa Terminalis*; 1 year; \$2,300
- UNIVERSITY OF WASHINGTON, Seattle, Wash.; C. Leo Hitchcock, Department of Botany; *Vascular Plants of the Pacific Northwest*; 3 years; \$6,900
- WAYNE STATE UNIVERSITY, Detroit, Mich.  
David R. Cook, Department of Biology; *Taxonomy Distribution and Ecology of the Microarthropoda*; 3 years; \$15,000
- William E. Duellman, Department of Biology; *The Hyliid Frogs of Middle America*; 3 years; \$10,800
- COLLEGE OF WILLIAM AND MARY, Williamsburg, Va.; *Summer Institutes for High School Teachers of Science and Mathematics*; 6 weeks; \$53,000
- UNIVERSITY OF WISCONSIN, Milwaukee, Wis.  
John W. Baxter, Department of Botany; *Rust Fungi of the Southwestern United States and Northern Mexico*; 3 years; \$4,800

Kenneth B. Raper, Departments of Bacteriology and Botany; *A Comparative Study of the Aspergillus*; 3 years; \$25,000

John W. Thomson, Department of Botany; *Manual of American Arctic Lichens*; 2 years; \$14,000

YALE UNIVERSITY, New Haven, Conn.

Henry B. Bigelow, Professor of Zoology and Giles W. Mead, U.S. Fish and Wildlife Service; *Soft-Rayed Bony Fishes of the Western North Atlantic*; 3 years; \$29,900  
Gerd Heinrich, Peabody Museum, *Zoogeographic and Speciation Study of the Ichneumoninae of Angola*; 2 years; \$11,500

Phillip S. Humphrey, Peabody Museum of Natural History; *A Monographic Study of the Trachea and Syrinx of Ducks*; 2 years; \$5,000

John R. Reeder, Department of Botany; *Phylogeny and Classification of the Gramineae*; 3 years; \$14,900

S. Dillon Ripley, Peabody Museum of Natural History; *Studies in Systematic Ornithology*; 1 year; \$19,900

William L. Stern, School of Forestry; *Anatomy and Taxonomy of Tropical Woody Plants*; 3 years; \$20,000

ZOOLOGICAL SOCIETY OF PHILADELPHIA, Philadelphia, Pa.; Roger Conant; *Distribution and Speciation in the Water Snakes*; 3 years; \$10,300

#### FACILITIES

ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, Philadelphia, Pa.; H. Radclyffe Roberts; *Rehabilitation of Facilities for Systematic Biology*; 1 year; \$60,000

BERNICE P. BISHOP MUSEUM, Honolulu, Hawaii; Alexander Spoehr; *Rehabilitation of Facilities for Systematic Biology at Bishop Museum*; 3 years; \$171,600

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; Dr. Clifford C. Furnas, Chancellor; *Research Reactor Facility*; 2 years; \$425,000

CALIFORNIA ACADEMY OF SCIENCES, San Francisco, Calif.; Robert C. Miller; *Rehabilitation of Entomological Collections*; 3 years; \$90,000

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.

Robert L. Sinchelman, Division of Biology; *Nucleic Acid Studies*; 1 year; \$27,000

James Bonner, Earhart Plant Research Laboratory; *Renovation and General Support of the Earhart Plant Research Laboratory*; 3 years; \$155,000

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.

Sherburne F. Cook, Department of Physiology, University of California Advisory Committee on High Altitude Research and Nello Pace, White Mountain Research Station; *Basic Research Facilities at the White Mountain Research Station*; 28 months; \$52,000

Stanislavs Vasilevskis, Lick Observatory, Mount Hamilton; *Equipment Surveying and Automatic Measurement of Astrogaphic Plates*; 3 years; \$100,000

UNIVERSITY OF CHICAGO, Chicago, Ill.

Howard F. Hunt, Department of Psychology, and H. B. Steinbach, Department of Zoology; *Construction of a Laboratory for Study of Animal Behavior*; 2 years; \$80,000

Charles E. Olmsted, Department of Botany; *Controlled Environment Facilities for Plant Research*; 2 years; \$150,000

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; Frank B.

Sallsbury, Department of Botany and Plant Pathology, The Colorado State University; *Controlled Environment Unit for Study of Photoperiodism and Related Problems*; 2 years; \$17,200

CORNELL UNIVERSITY, Ithaca, N.Y.

Trevor R. Cuykendall and David D. Clark, Department of Engineering Physics; *Establishment of a Center for Nuclear Technology*; 2 years; \$475,000

J. Barkley Rosser, Computing Center; *Purchase of Computing Machine*; 1 year; \$250,000

DUKE UNIVERSITY, Durham, N.C.

C. G. Bookhout, The Marine Laboratory, Beaufort; *Expansion of Facilities for Research in Marine Biology*; 2 years; \$78,500

Knut Schmidt-Nielsen, Department of Zoology; *Installation of Controlled Climate Facilities for Basic Physiological Research*; 2 years; \$35,300

IOWA STATE COLLEGE, Ames, Iowa; Robert M. Stewart, Jr., Department of Physics; *Construction of Digital Computer*; 2 years; \$100,000

LONG ISLAND BIOLOGICAL ASSOCIATION, Cold Spring Harbor, N.Y.; Miloslav Demerec, *Rehabilitation, Renovation and Enlargement of the Facilities of the Long Island Biological Laboratory*; 4 years; \$135,000

MARINE BIOLOGICAL LABORATORY, Woods Hole, Mass.; Phillip B. Armstrong; *General Support for the Marine Biological Laboratory*; 3 years; \$105,000

UNIVERSITY OF MIAMI, Coral Gables, Fla.; F. G. Walton Smith, The Marine Laboratory, Miami; *Construction of Laboratory Buildings for the Marine Biological Laboratory*; 1 year; \$162,500

UNIVERSITY OF MISSOURI, Columbia, Mo.; Robert E. Steward, Department of Agricultural Engineering; *Construction of an Animal Calorimeter for Determination of Heat Losses by Radiation, Conduction, Convection, and Evaporation*; 2 years; \$27,700

UNIVERSITY OF OKLAHOMA, Norman, Okla.; Gerald Tuma, Department of Electrical Engineering; *Construction of Digital Computer*; 18 months; \$150,000

ROSCOE B. JACKSON MEMORIAL LABORATORY, Bar Harbor, Maine; Earl L. Green, Director of the Laboratory; *Construct and Equip an Addition to the Main Laboratory Building*; 1 year; \$200,000

TEXAS AGRICULTURAL AND MECHANICAL COLLEGE SYSTEM, College Station, Tex.; Aaron Rose, Texas Engineering Experiment Station; *Nuclear Science Center of the Texas Agricultural and Mechanical College System*; 2 years; \$350,000

UNIVERSITY OF WISCONSIN, Madison, Wis.; Folke Skoog, Blotron Committee; *Construction of a Controlled Environment Laboratory for Animal and Plant Research*; 3 years; \$1,500,000

YALE UNIVERSITY, New Haven, Conn.; Norman S. Buck; *Establishment of a Computing Center*; 2 years; \$500,000

#### GENERAL

UNIVERSITY OF ALABAMA, University, Ala.; B. V. Branscomb, Assistant Dean, School of Medicine, Medical Center; *Short Term Research by Medical Students*; 3 years; \$4,140

AMERICAN PHYSIOLOGICAL SOCIETY, Washington, D.C.; Louis N. Kantz; *Program of Summer Research for Teachers of College Physiology*; 2 years; \$74,500

BOSTON UNIVERSITY, Boston, Mass.; F. M. Siney, School of Medicine; *Short Term Research by Medical Students*; 3 years; \$8,280  
CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.

E. B. Lewis, Division of Biology; *X-Ray Studies in Genetics, Immunology, Biophysics, Virology*; 1 year; \$18,000

F. W. Went, Division of Biology; *A Mobile Research Laboratory for Desert Ecology*; 1 year; \$24,000

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.

John Field, School of Medicine, Los Angeles; *Short Term Research by Medical Students*; 3 years; \$12,420

J. B. deC. M. Saunders, School of Medicine, San Francisco; *Short Term Research by Medical Students*; 3 years; \$12,420

Paul K. Stumpf, Department of Agricultural Biochemistry, Davis; *Equipment for Investigations in Intermediary Metabolism and the Mechanisms of Enzyme Actions*; 2 years; \$21,500

UNIVERSITY OF CINCINNATI, Cincinnati, Ohio; S. A. Trufant, College of Medicine; *Short Term Research by Medical Students*; 3 years; \$16,560

UNIVERSITY OF COLORADO, Boulder, Colo.

R. H. Fitz, School of Medicine, Denver; *Short Term Research by Medical Students*; 3 years; \$16,560

R. Thompson, Department of Microbiology; *Summer Course in the Principles and Techniques of Tissue Culture*; 3 years; \$29,400

COLUMBIA UNIVERSITY, New York, N.Y.; W. J. Eckert, Director, Watson Scientific Computing Laboratory; *Research Requiring Computers*; 3 years; \$145,000

CORNELL UNIVERSITY, Ithaca, N.Y.; Douglas S. Robson, Department of Plant Breeding, New York State College of Agriculture and Agricultural Experiment Station; *Cumulative Component Analysis*; 3 years; \$22,500

UNIVERSITY OF DELAWARE, Newark, Del.; Robert F. Jackson, Computing Center; *Computing Research*; 3 years; \$30,000

DUKE UNIVERSITY, Durham, N.C.; Thomas M. Gallie, Jr., John J. Gergen, Computer Laboratory; *Research Requiring Computers*; 2 years; \$50,000

GEORGETOWN UNIVERSITY, Washington, D.C.; W. C. Hess, School of Medicine; *Short Term Research by Medical Students*; 3 years; \$4,140

GEORGIA INSTITUTE OF TECHNOLOGY, Atlanta, Ga.

William F. Atchison, Rich Electronic Computer Center; *Support of the Rich Electronic Computer Center and Basic Research Requiring Digital Computation*; 3 years; \$150,000

P. Weber; *Support of a Nuclear Research Reactor Facility*; 2 years; \$750,000

HARVARD UNIVERSITY, Cambridge, Mass.; F. M. Carpenter, Department of Biology; *Supplemental Funds for Operation of Electron Microscope Facility*; 1 year; \$2,900

IOWA STATE COLLEGE, Ames, Iowa; Richard S. Bear; *A Recording Spectrophotometer*; 1 year; \$17,000

JEFFERSON MEDICAL COLLEGE OF PHILADELPHIA, Philadelphia, Pa.; W. A. Sodeman, Dean of the Medical College; *Short Term Research by Medical Students*; 3 years; \$8,280

KANSAS STATE COLLEGE OF AGRICULTURE AND APPLIED SCIENCE, Manhattan, Kans.;

S. Thomas Parker, Computing Center; *Establishment of a Computing Center*; 2 years; \$24,000

UNIVERSITY OF LOUISVILLE, Louisville, Ky.; E. K. Hall, Chairman, Research Committee, School of Medicine; *Short Term Research by Medical Students*; 3 years; \$8,280

MARQUETTE UNIVERSITY, Milwaukee, Wis.; J. S. Hirschboeck, Dean, School of Medicine; *Short Term Research by Medical Students*; 3 years; \$4,140

UNIVERSITY OF MARYLAND, College Park, Md.; W. S. Stone, Dean, School of Medicine, Baltimore; *Short Term Research by Medical Students*; 3 years; \$10,350

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; P. M. Morse, Computation Center; *Methods for Use of High-Speed Digital Computers*; 3 years; \$167,325

MAYO ASSOCIATION, Rochester, Minn.; J. B. Berkson, Statistics Section; *Estimation Problems Bearing on Biological Problems*; 3 years; \$35,900

UNIVERSITY OF MIAMI, Coral Gables, Fla.; J. C. Finerty, School of Medicine; *Short Term Research by Medical Students*; 3 years; \$8,280

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; W. H. Marshall, Lake Itasca Forestry and Biological Station; *Summer Research at the Lake Itasca Forestry and Biological Station*; 2 years; \$23,700

UNIVERSITY OF MISSISSIPPI, University, Miss.; D. S. Pankratz, Dean, School of Medicine, Jackson; *Short Term Research by Medical Students*; 3 years; \$10,350

NEW YORK UNIVERSITY, New York, N.Y.; Alan W. Bernheimer, Department of Microbiology, Bellevue Medical Center; *Research in Biochemical Genetics, Metabolism, Immunity and Hypersensitivity*; 1 year; \$22,000

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.

W. R. Berryhill, School of Medicine; *Short Term Research by Medical Students*; 3 years; \$16,560

William M. Whyburn, Vice President for Graduate Studies and Research; *Numerical Analysis Center*; 1 year; \$500,000

UNIVERSITY OF NORTH DAKOTA, Grand Forks, N. Dak.; T. H. Harwood, Dean, School of Medicine; *Short Term Research by Medical Students*; 3 years; \$6,210

UNIVERSITY OF OKLAHOMA, Norman, Okla.; Carl D. Riggs, University of Oklahoma Biological Station; *Summer Research at the University of Oklahoma Biological Station*; 3 years; \$15,000

UNIVERSITY OF OREGON, Eugene, Oreg.; D. W. E. Baird, University of Oregon Medical School, Portland; *Short Term Research by Medical Students*; 3 years; \$16,560

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; David R. Goddard, Director, Division of Biology; *Equipment for Research in Plant Physiology*; 1 year; \$21,000

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; F. S. Cheever, Dean, School of Medicine; *Short Term Research by Medical Students*; 3 years; \$12,420

UNIVERSITY OF PUERTO RICO, Rio Piedras, P.R.; E. Harold Hinman, Dean, School of Medicine, San Juan; *Short Term Research by Medical Students*; 3 years; \$10,350

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; R. A. Moore, College of Medicine; Downstate

Medical Center, Brooklyn; *Short Term Research by Medical Students*; 3 years; \$16,560

RICE INSTITUTE, Houston, Tex.; Zevi W. Salsburg and Jim Douglas, Jr., Departments of Chemistry and of Mathematics; *Development of Standard Programs for the Rice Institute Digital Computer*; 2 years; \$28,200

SAINT LOUIS UNIVERSITY, St. Louis, Mo. R. Walter Schlesinger, Department of Microbiology; *Research Equipment for Investigations on Biochemical Mechanisms of Growth and Multiplication of Viruses and Bacteria*; 1 year; \$28,850

D. Smith, Assistant Dean, School of Medicine; *Short Term Research by Medical Students*; 3 years; \$8,280

SETON HALL UNIVERSITY, South Orange, N.J.; C. L. Brown, Seton Hall College of Medicine and Dentistry, Jersey City; *Short Term Research by Medical Students*; 3 years; \$10,350

STANFORD UNIVERSITY, Stanford, Calif.; L. M. Stowe, Associate Dean, School of Medicine, San Francisco; *Short Term Research by Medical Students*; 3 years; \$12,420

TEMPLE UNIVERSITY, Philadelphia, Pa.; R. M. Buckner, Associate Dean, School of Medicine; *Short Term Research by Medical Students*; 3 years; \$12,420

UNIVERSITY OF TEXAS, Austin, Tex.; Robert W. Lacky, Southwestern Medical School, Dallas; *Short Term Research by Medical Students*; 3 years; \$12,420

TUFTS UNIVERSITY, Medford, Mass.; J. M. Hayman, School of Medicine; *Short Term Research by Medical Students*; 3 years; \$12,420

TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; James W. Sweeney, Computing Laboratory; *Support of a Computing Laboratory*; 3 years; \$120,000

UNION COLLEGE AND UNIVERSITY, Schenectady, N.Y.; H. C. Wiggers, Albany Medical College; *Short Term Research by Medical Students*; 3 years; \$8,280

UNIVERSITY OF VERMONT AND STATE AGRICULTURAL COLLEGE, Burlington, Vt.; G. A. Wolf, Jr., College of Medicine; *Short Term Research by Medical Students*; 3 years; \$8,280

UNIVERSITY OF VIRGINIA, Charlottesville, Va. T. H. Hunter, Dean, School of Medicine; *Short Term Research by Medical Students*; 3 years; \$12,420

Horton H. Hobbs, Director, Mountain Lake Biological Station; *Support of Research at the Mountain Lake Biological Station*; 3 years; \$18,000

WASHINGTON UNIVERSITY, St. Louis, Mo.; Edward S. Dempsey, Medical School; *Short Term Research by Medical Students*; 3 years; \$20,700

UNIVERSITY OF WASHINGTON, Seattle, Wash. R. C. Snyder and W. T. Edmondson, Department of Zoology; *Graduate Student Research at the Friday Harbor Laboratories*; 3 years; \$41,400

R. J. Blandau, Assistant Dean, School of Medicine; *Short Term Research by Medical Students*; 3 years; \$24,840

WAYNE STATE UNIVERSITY, Detroit, Mich.; M. Levitt, Assistant Dean, College of Medicine; *Short Term Research by Medical Students*; 3 years; \$8,280

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; J. L. Caughey, Jr., School of Medi-

cine; *Short Term Research by Medical Students*; 3 years; \$16,560

WOMAN'S MEDICAL COLLEGE OF PENNSYLVANIA, Philadelphia, Pa.; Marion Fay, Dean; *Short Term Research by Medical Students*; 3 years; \$8,280

UNIVERSITY OF WYOMING, Laramie, Wyo.; Edward C. Bryant, Department of Statistics; *Purchase of Electronic Digital Computer and a Flexowriter*; 1 year; \$33,200

#### CONTINUING ANTARCTIC RESEARCH

##### *Aurora and Airglow*

U. S. WEATHER BUREAU, Washington, D.C.; F. W. Reichelderfer; *Conduct of Antarctic Field Operations of the Continuing U.S. Antarctic Research Program*; 2 years; \$62,100

##### *Aurora and Airglow*

ARCTIC INSTITUTE OF NORTH AMERICA, New York, N.Y.

Walter A. Wood; *Conduct of the Aurora and Airglow Program of the Continuing U.S. Antarctic Research Program*; 2 years; \$85,500

Walter A. Wood; *Conduct of the Aurora and Airglow Program of the Continuing U.S. Antarctic Research Program*; 18 months; \$25,037

Walter A. Wood; *Conduct of an Aurora and Airglow Research Program at Ellsworth Station—1960*; 2 years; \$34,500

Walter A. Wood; *Program in Antarctica in Aurora and Airglow Research—1960*; 2 years; \$141,680

L. G. HANSCOMB AIR FORCE BASE, Bedford, Mass.; *Conduct of a Program in Antarctic Aurora and Airglow Research—1960*; 1 year; \$18,320

##### *Biology and Medicine*

ARCTIC INSTITUTE OF NORTH AMERICA, New York, N.Y.; Elmer G. Worthley, Sr.; *Conduct of Program of Microflora Studies—1959 Program in the Continuing U.S. Antarctic Research Program*; 2 months; \$9,000

DUKE UNIVERSITY, Durham, N.C.; Knut Schmidt-Nielsen; *The Salt and Water Metabolism of Adelle Penguins During the Nesting and Breeding Season*; 1 year; \$8,826

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; Thelma Hunt, Department of Psychology; *Analysis of Selection and Performance Data Obtained From IGY Antarctic Scientific Personnel in the Continuing U.S. Antarctic Research Program*; 1 year; \$12,075

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; W. J. L. Sladen and C. Eklund; *Antarctic Bird-Banding and Seal-Marking Program in the Continuing U.S. Antarctic Research Program*; 1 year; \$4,600

STANFORD UNIVERSITY, Stanford, Calif.

D. E. Wohlschlag; *Continuation of Present Mc Murdo Sound Marine Ecological Studies in 1959-60*; 1 year; \$24,143

D. E. Wohlschlag; *Program of Antarctic Marine Biology in 1959 in the Continuing U.S. Antarctic Research Program*; 1 year; \$31,000

UNIVERSITY OF TENNESSEE, Knoxville, Tenn. Madison E. Pryor; *A Survey of Land Invertebrates of the Antarctic in the Continuing U.S. Antarctic Research Program*; 1 year; \$12,525

Madison E. Pryor; *Support for the Analysis of Data Collected on the Survey of Land Invertebrates of the Antarctic*; 1 year; \$3,105

UNIVERSITY OF WISCONSIN, Madison, Wis.; Richard L. Penney; *Study of the Sexual and Parental Behavior of the Adelle Penguin and Orientation Mechanism in the Continuing U.S. Antarctic Research Program*; 1 year; \$13,743

#### Cosmic Rays

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; W. B. Fretter and R. R. Brown; *Continued Support of Cosmic Ray Investigations in the Antarctic*; 3 years; \$17,574

FRANKLIN INSTITUTE, Philadelphia, Pa.; M. A. Pomerantz; *Investigations of Time Variations of the Primary Cosmic Radiation at a Geomagnetic Pole*; 1 year; \$36,600

#### Executive Direction

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; \$23,590

#### Glaciology

AMERICAN GEOGRAPHICAL SOCIETY, New York, N.Y.; Dr. Charles B. Hitchcock, Director; *Revision of Antarctic Map and Preparation of Prospectus for an Antarctic Atlas*; 1 year; \$9,000

ARCTIC INSTITUTE OF NORTH AMERICA, New York, N.Y.

Walter A. Wood; *Conduct of Program in Traverse Seismology of the Continuing U.S. Antarctic Research Program*; 2 years; \$51,000

Walter A. Wood; *Conduct of Station and Traverse Glaciology of the Continuing U.S. Antarctic Research Program*; 2 years; \$33,400

U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR, Washington, D.C.

John Reed; *Collection, Indexing and Evaluation of Cartographic and Gravity-Traverse Data Relative to Antarctica in the Continuing U.S. Antarctic Research Program*; 2 years; \$25,000

John Reed; *Determination of Astronomic Positions During 1959 in the Continuing U.S. Antarctic Program*; 2 years; \$23,000

John Reed; *Geological Investigations in Antarctica in the Continuing U.S. Antarctic Research Program*; 2 years; \$60,000

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; R. P. Goldthwait; *Reduction and Analysis of Glaciology Data From Antarctic, 1959-60*; 18 months; \$41,872

TUFTS UNIVERSITY, Medford, Mass.; Robert L. Nichols; *Projects in Geomorphology, Glacial Geology, Glaciology, and Bedrock Geology in Selected Portions of the McMurdo Sound Area*; 1 year; \$29,350

U.S. ARMY, SNOW, ICE AND PERMAFROST RESEARCH ESTABLISHMENT, Wilmette, Ill.

*Conduct of Thermal Deep Coring Development Program—1959 Program*; 1 year; \$80,000

*Calendar Year 1960 Phase of the Deep Thermal Core Drilling in Ice Project*; 1 year; \$120,000

UNIVERSITY OF WISCONSIN, Madison, Wis.; *Reconnaissance Trail and Airborne Measure-*

*ments in Glaciology and Related Studies in Antarctica—1960*; 2 years; \$566,985

#### Geodesy and Cartography

AMERICAN GEOGRAPHICAL SOCIETY, New York, N.Y.

W. A. Briesemeister; *Revision of Antarctic Map*; 1 year; \$5,434

O. M. Miller; *Planning for an Antarctic Atlas*; 1 year; \$11,159

U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR, Washington, D.C.; *Topographic Mapping of Antarctica*; 1 year; \$200,000

#### Geology

U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR, Washington, D.C.; *Geological Mapping and Investigation in Antarctica*; 1 year; \$100,000

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; J. C. Craddock; *Bedrock Geology and Geomorphology of Some Nunataks in the Trans-Antarctic Trough*; 1 year; \$18,791

#### Geomagnetism

U.S. COAST AND GEODETIC SURVEY, Washington, D.C.

H. Arnold Karo; *Conduct of Geomagnetism Program of the Continuing U.S. Antarctic Research Program*; 2 years; \$38,000

*1960 Antarctic Magnetic Observatories*; 1 year; \$69,000

#### Ionospheric Physics

NATIONAL BUREAU OF STANDARDS, Washington, D.C.

A. V. Astin; *Conduct of Ionospheric Physics Program of the Continuing U.S. Antarctic Research Program*; 2 years; \$52,163

F. W. Brown; *Conduct of a Program in Ionospheric Physics—1960*; 1 year; \$198,000

#### Meteorology

U.S. COAST AND GEODETIC SURVEY, Washington, D.C.; H. Arnold Karo; *Seismology Observations at Byrd and South Pole Stations in the Continuing U.S. Antarctic Research Program*; 2 years; \$5,000

U.S. WEATHER BUREAU, Washington, D.C.

F. W. Relchelderfer; *Conduct of Meteorology Program of the Continuing U.S. Antarctic Research Program*; 2 years; \$218,500

*Antarctic Meteorological Research Program—1960*; 1 year; \$1,047,863

*U.S. Participation in International Southern Hemisphere Analysis Center—1959*; 2 years; \$36,985

UNIVERSITY OF WISCONSIN, Madison, Wis.; G. T. Trewartha; *A Climatology of the Antarctic*; 2 years; \$20,023

#### Related Scientific Support

ARCTIC INSTITUTE OF NORTH AMERICA, New York, N.Y.; Robert C. Faylor; *Related Scientific Support of U.S. Antarctic Research Program*; 1 year; \$129,375

L. G. HANSCOMB AIR FORCE BASE, Bedford, Mass.; A. P. Cray; *For Travel and Per Diem*; 1 year; \$3,000

U.S. WEATHER BUREAU, Washington, D.C.; *Conduct of Antarctic Field Operations of the Continuing U.S. Antarctic Research Program*; 1 year; \$81,693

### Station Seismology

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.

Hugo Benloff; *Conduct of Strain Stations in South America During the 1959 Antarctic Research Program*; 1 year; \$7,000

Hugo Benloff; *Operation, Upkeep, Replacement, Transportation and Additional Equipment for the South American Earth's Strain Stations at Nana, Peru, and Santiago, Chile for the Year 1960*; 1 year; \$26,097

Frank Press; *Exchange Scientists with U.S.S.R. Antarctic Expedition*; 1 year; \$20,000

Frank Press; *Operation of Wilkes Seismograph Station and Interpretation of Records for Year 1960*; 1 year; \$8,625

Frank Press; *Seismology Observations at Wilkes Station in the Continuing U.S. Antarctic Research Program*; 2 years; \$2,500  
COLUMBIA UNIVERSITY, New York, N.Y.

Maurice Ewing; *Seismology Observations at Hallett Station in the Continuing U.S. Antarctic Research Program*; 2 years; \$2,500

J. Oliver; *Antarctic Station Seismology (Hallett Station) Program—1960*; 1 year; \$6,037

U.S. COAST AND GEODETIC SURVEY, Washington, D.C.; 1960 *Antarctic Seismological Observations*; 1 year; \$10,000

UNIVERSITY OF WISCONSIN, Madison, Wis.; G. P. Woollard; *Continuation of Data Reduction Center for Elevation, Seismic, Gravity, and Magnetic Observations Obtained on Traverse Operations in Antarctica*; 2 years; \$135,930

### INTERNATIONAL GEOPHYSICAL CO-OPERATION—1959

#### Astronomy

AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS, Cambridge, Mass.; Harry L. Bondy; *Indirect Flare Detection*; 1 year; \$575

UNIVERSITY OF HAWAII, Honolulu, Hawaii; Walter Steiger; *Solar Activity Flare Patrol*; 1 year; \$8,000

HIGH ALTITUDE OBSERVATORY, Boulder, Colo.; Walter O. Roberts; *Optical Solar Flare Patrol and Solar Activity Summaries*; 1 year; \$10,600

NATIONAL BUREAU OF STANDARDS, Washington, D.C.; F. W. Brown; *Solar Activity Data*; 1 year; \$14,900

UNIVERSITY OF NEW MEXICO, Albuquerque, N. Mex.; Victor H. Regener; *Zodiacal Light in the Tropics*; 1 year; \$22,900

OFFICE OF NAVAL RESEARCH, Washington, D.C.; *Rocket Observations of Solar Flare Emissions in Ultraviolet and X-rays*; 1 year; \$250,000

KENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; Robert Fleischer; *Indirect Flare Patrol*; 1 year; \$8,000

#### Atmospheric Sciences

UNIVERSITY OF ALASKA, College, Alaska; M. H. Rees; *Role of Height in Auroral Spectroscopy*; 2 years; \$138,000

UNIVERSITY OF CALIFORNIA, La Jolla, Calif.

C. D. Keeling; *Meteorological Aspects of Carbon Dioxide and Its Exchange With the Ocean*; 1 year; \$24,700

N. W. Rakestraw; *Carbon Dioxide and Its Exchange with the Ocean*; 1 year; \$26,900

John Knauss; *Direct Current Measurements*; 1 year; \$50,000

Walter H. Munk; *Wave Station on San Clemente Island*; 1 year; \$15,000

CARNEGIE INSTITUTION OF WASHINGTON, Washington, D.C.; Merle A. Tuve; *South American Ionospheric Studies*; 1 year; \$9,569  
COLUMBIA UNIVERSITY, New York, N.Y.; William L. Donn; *Observatories at Island Stations, of Sea Level and Long Period Ocean Waves*; 1 year; \$25,600  
CORNELL UNIVERSITY, Ithaca, N.Y.

C. W. Gartlein; *All-Sky Camera Operation*; 6 months; \$11,500

C. W. Gartlein; *Visual Auroral Observations in the Antarctic*; 1 year; \$5,500

C. W. Gartlein; *Visual Auroral Observations in the United States*; 1 year; \$8,000  
NATIONAL BUREAU OF STANDARDS, Washington, D.C.; F. W. Brown; *Airglow Photometer*; 1 year; \$5,000

U.S. WEATHER BUREAU, Washington, D.C. H. E. Landsberg; *Atmospheric Profiles*; 1 year; \$40,000

F. W. Reichelderfer; *Arctic Basin Meteorology*; 1 year; \$34,500

F. W. Reichelderfer; *Arctic Ice Floe Meteorology*; 1 year; \$13,300

#### Earth Sciences

AMERICAN GEOGRAPHICAL SOCIETY, New York, N.Y.; William O. Field; *Glacier Observation in Southern Alaska*; 1 year; \$28,100

ARCTIC INSTITUTE OF NORTH AMERICA, Washington, D.C.; John E. Sater; *Surface Ice Motion Studies on McCall Glacier, Alaska*; 6 months; \$550

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; Robert P. Sharp; *Lower Blue Glacier Project*; 2 years; \$10,000  
COLUMBIA UNIVERSITY, New York, N.Y.

Maurice Ewing; *Standardization and Calibration of Long-Period and "Lg" Seismograph Network*; 1 year; \$21,500

J. Lamar Worzel; *Gravity Observations at Sea Using a Surface Vessel*; 1 year; \$63,000

OHIO STATE UNIVERSITY RESEARCH FOUNDATION, Columbus, Ohio; James B. Case; *Glaciers of Western United States*; 1 year; \$14,500

U.S. COAST AND GEODETIC SURVEY, Washington, D.C.; D. A. Rice; *Hawaiian Observations on Latitude and Longitude*; 6 months; \$6,000

UNIVERSITY OF WISCONSIN, Madison, Wis.; G. P. Woollard and R. B. Meyer; *Crustal Studies in Selected Areas*; 2 years; \$103,000

#### Engineering Sciences

DARTMOUTH COLLEGE, Hanover, N.H.; Millet G. Morgan; *IGC—1959, Whistlers—East Project*; 1 year; \$39,800

NATIONAL BUREAU OF STANDARDS, Washington, D.C.

Ralph J. Slutz; *IGC—1959, Ionospheric Data Processing and Publication*; 1 year; \$58,700

Ralph J. Slutz; *IGC—1959, South American Cooperative Ionospheric Stations*; 1 year; \$24,000

Ralph J. Slutz; *IGC—1959, Support of World Warning Agency*; 1 year; \$20,000  
STANFORD UNIVERSITY, Stanford, Calif.

Robert A. Hellwell, *IGC—1959, Whistlers—West Project*; 1 year; \$74,600

Allen M. Peterson; *IGC—1959, Rotometer Observations*; 1 year; \$9,900

Allen M. Peterson; *IGC—1959, Three-Frequency Backscatter Observation*; 1 year; \$36,400

UNIVERSITY OF VIRGINIA, Charlottesville, Va.; E. C. Stevenson; *IGC—1959, Radio Star Scintillation and Atmospheric Winds*; 1 year; \$20,000

#### Physics

UNIVERSITY OF CALIFORNIA, Santa Barbara, Calif.; P. H. Barrett; *Large Air Shower Detector*; 1 year; \$6,900

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; W. B. Fretter; *Time Variations of Neutron, Hard and Soft Cosmic Ray Components*; 1 year; \$5,000

UNIVERSITY OF CHICAGO, Chicago, Ill.; Peter Meyer; *Primary Cosmic Radiation*; 1 year; \$20,100

FRANKLIN INSTITUTE, Philadelphia, Pa.; M. A. Pomerantz; *Low Energy Primary Cosmic Rays at Thule*; 1 year; \$10,600

UNIVERSITY OF MARYLAND, College Park, Md.; William Webber; *Cosmic Ray Telescope at Thule*; 1 year; \$6,400

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; E. P. Ney, and J. R. Winckler; *Continuous Balloon Monitoring of Cosmic Rays and Solar Phenomena*; 1 year; \$350,000

UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; R. L. Chasson; *Cosmic Ray Monitoring*; 1 year; \$17,200

UNIVERSITY OF NEW HAMPSHIRE, Durham, N.H.; J. A. Lockwood; *Forbush-Type Decreased in Cosmic Rays*; 16 months; \$3,200

NEW YORK UNIVERSITY, New York, N.Y.; S. A. Korff; *Cosmic Ray Neutron Monitor in Alaska*; 2 years; \$34,600

STATE UNIVERSITY OF IOWA, Iowa City, Iowa; *Cosmic Ray Studies at High Altitudes*; 1 year; \$40,400

## APPENDIX D

### Grants Other Than Basic Research

#### Conferences in Support of Science

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH, Washington, D.C.; *Conference on High Temperature Problems in Aeronautics*; 6 days; \$2,600

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Washington, D.C.; Dr. Dael Wolfe, Executive Office; *First International Oceanographic Congress*; 1 year; \$15,000

AMERICAN GEOPHYSICAL UNION, Washington, D.C.

Waldo E. Smith, Executive Secretary; *International Symposium of Distance Measuring*; 7 days; \$4,500

Helmut Welckmann, Chairman; *Mechanisms of Precipitation Formation*; \$25,000

*Problems of Modern Geodesy*; 2 days; \$6,800

AMERICAN INSTITUTE OF MINING, METALLURGICAL, AND PETROLEUM ENGINEERS, New York, N.Y.

Augustus B. Kinzel; *International Symposium on the Physical Chemistry of Process Metallurgy*; 4 days; \$3,500

R. W. Shearman; *Symposium on "Observations on Dislocations"*; 5 days; \$500

*Technical Conference on the Physical Metallurgy of Stress-Corrosion Fracture*; 2 days; \$2,500

AMERICAN INSTITUTE OF NUTRITION, Washington, D.C.; Milton O. Lee, General Secretary; *Fifth International Congress on Nutrition*; 6 days; \$25,000

AMERICAN MATHEMATICAL SOCIETY, Providence, Rhode Island; Dr. J. H. Curtiss, Executive Director; *Symposium of Partially Ordered Sets in Lattice Theory*; 3 months; \$5,000

AMERICAN METEOROLOGICAL SOCIETY, Boston, Mass.; *Interdisciplinary Conference on Atmospheric Pollution*; 2 days; \$1,000

AMERICAN SOCIETY OF HEATING AND AIR-CONDITIONING ENGINEERS; *Annual Meeting of the American Society of Heating and Air-Conditioning Engineers*; 2 months; \$750

AMERICAN SOCIETY OF ZOOLOGISTS, DEPARTMENT OF ZOOLOGY, Stanford University, Stanford, Calif.; Dr. Victor Twitty, President; *Two Regional Developmental Biology Conferences*; 1 week; \$1,800

BOYCE THOMPSON INSTITUTE FOR PLANT RESEARCH, INC., Yonkers, N.Y.; *International Conference on Plant Growth Regulation*; 4 days; \$7,500

CALIFORNIA INSTITUTE OF TECHNOLOGY, Los Angeles, Calif.; *International Symposium on Circuit and Information Theory*; 3 days; \$1,700

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.; *Fourth Berkeley Symposium on Mathematical Statistics and Probability*; 6 weeks; \$25,000

CANADIAN MATHEMATICAL CONGRESS, Queen's University, Kingston, Ontario, Canada; *Seminar in Mathematics*; 4 weeks; \$1,000

UNIVERSITY OF CINCINNATI, Cincinnati, Ohio; *Second Astrometric Conference*; 4 days; \$22,200

COLORADO SCHOOL OF MINES, Golden, Colo.; Lute J. Parkinson, Department of Mining Engineering; *Third Symposium on Rock Mechanics*; 3 days; \$2,500

UNIVERSITY OF COLORADO, Boulder, Colo.; *International Conference on Molecular Quantum Mechanics*; 1 week; \$11,900

CORNELL UNIVERSITY, Ithaca, N.Y.; Henry G. Booker; *Fluid Mechanics in the Ionosphere*; 7 days; \$12,000

ECOLOGICAL SOCIETY OF AMERICA, Chicago, Ill.; Thomas Park, Department of Zoology; *Study Committee on Ecology*; 3 years; \$24,000

ELECTROCHEMICAL SOCIETY, UNIVERSITY OF TEXAS, Austin, Tex.; *Symposium on Liquid Dielectrics*; 5 days; \$3,300

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; *Second Conference on the Nuclear Optical Model*; 2 days; \$5,600

UNIVERSITY OF FLORIDA, Gainesville, Fla.; *Symposium on Planetary Radio Astronomy*; 1 day; \$750

FORDHAM UNIVERSITY, New York, N.Y.; *Symposium on Petroleum Geochemistry*; 1 day; \$1,500

FOUNDATION FOR INSTRUMENTATION EDUCATION AND RESEARCH, New York, N.Y.; *Pilot Cross-Disciplinary Clinic on the Instrumentation Requirements for Cloud and Weather Modification*; 3 days; \$5,100

UNIVERSITY OF ILLINOIS, Urbana, Ill.; *Fourth Biennial Symposium on Animal Reproduction*; 3 days; \$2,000

KAISER FOUNDATION RESEARCH INSTITUTE, Oakland, Calif.; *Symposium on Comparative Biochemistry of Photoreceptive Pigments*; 4 days; \$3,500

LONG ISLAND BIOLOGICAL ASSOCIATION, Cold Spring Harbor, N.Y.; Dr. M. Demerec, Director; *Symposium on Quantitative Biology*; 7 days; \$6,500

MARINE BIOLOGICAL LABORATORY, Woods Hole, Mass.; *Workshop on Biological Phenomena at Submolecular Levels*; 1 year; \$10,000

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; *Conference on Optical Pumping*; 5 days; \$4,600

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.

*Symposium on Radioisotopes in the Biosphere*; 4 days; \$14,050

MISSOURI BOTANICAL GARDEN, St. Louis, Mo.; *Symposium on Systematics: Biogeography*; 2 days; \$1,500



NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.

Committee on Nuclear Science; 2 years; \$27,600

John S. Coleman; *Conference in Molecular Radiobiology*; 3 days; \$8,700

S. S. Wilks, Division of Mathematics; *The Design and Conduct of Research Programs in Weather Modification*; 3 days; \$10,000

NATIONAL ACADEMY OF SCIENCES, Washington, D.C.; *Preparation and Distribution of Chemical Compounds of Certified High Purity*; 2 days; \$3,900

NEW YORK ZOOLOGICAL SOCIETY, New York, N.Y.; Fairfield Osborn, President; *Ecology and Behavior of the Mountain Gorilla*; 2 days; \$1,000

NORTHWESTERN UNIVERSITY, Evanston, Ill.; *Midwest Conference on Theoretical Physics*; 2 days; \$1,500

OREGON STATE COLLEGE, Corvallis, Oreg.; *Symposium on Color Centers in Alkali Halides*; 3 days; \$1,000

UNIVERSITY OF PUERTO RICO, Mayaguez, P.R.; *Second Caribbean Geological Conference*; 5 days; \$8,625

UNIVERSITY OF ROCHESTER, Rochester, N.Y. *Conference on High Energy Physics*; 11 days; \$32,000

Malcolm P. Savedoff, Department of Physics; *Symposium on the Astronomical Aspects of Cosmic Rays*; 1 day; \$2,000

SOCIAL SCIENCE RESEARCH COUNCIL, New York, N.Y.; *Conference on the History of the Use of Quantitative Methods in the Sciences*; 2 days; \$10,000

SOCIETY FOR THE STUDY OF DEVELOPMENT AND GROWTH, UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; *Eighteenth Growth Symposium*; 1 week; \$5,000

STANFORD UNIVERSITY, Stanford, Calif. *Colloquium on Creep in Structures*; 5 days; \$9,000

Patrick Suppes; *International Congress in Logic, Methodology, and Philosophy of Science*; 9 days; \$30,000

UNIVERSITY OF THE STATE OF NEW YORK, Albany, N.Y.; William N. Fenton, New York State Museum and Science Service, Albany, N.Y.; *Systematic Museums as Resources for Basic Research*; 2 days; \$4,500

UNIVERSITY OF TEXAS, Austin, Tex.; W. Frank Blair, Department of Zoology; *Vertebrate Speciation*; 1 week; \$1,500

UNIVERSITY OF TORONTO, Toronto, Ontario, Canada

*A Symposium on the Differences Among Globular Clusters*; 1 day; \$3,200

George Sinclair; *Symposium on Electromagnetic Theory*; 6 days; \$10,000

U.S. ARMY ENGINEERS RESEARCH AND DEVELOPMENT LABORATORIES, Fort Belvoir, Va.; *Symposium on Image Intensification*; 2 days; \$2,200

UNIVERSITY OF WASHINGTON, Seattle, Wash.; *Conference on Plasma Physics*; 6 days; \$5,000

## EDUCATION IN THE SCIENCES

### Academic Year Institutes

ARIZONA STATE COLLEGE, Tempe, Ariz.; *Academic Year Institute for High School Teachers of Science and Mathematics*; 12 months; \$300,900

ATLANTA UNIVERSITY, Atlanta, Ga.; *Academic Year Institute for High School Teach-*

*ers of Science and Mathematics*; 10 months; \$239,500

BOSTON COLLEGE, Chestnut Hill, Mass.; *Academic Year Institute for High School Teachers of Mathematics*; 11 months; \$193,100

BROWN UNIVERSITY, Providence, R.I.; *Academic Year Institute for High School Teachers of Science and Mathematics*; 12 months; \$321,700

UNIVERSITY OF CHICAGO, Chicago, Ill.; *Summer Program in Connection with the 1958-59 Academic Year Institute*; 10 weeks; \$34,500

UNIVERSITY OF COLORADO, Boulder, Colo. *Academic Year Institute for High School Teachers of Science and Mathematics*; 12 months; \$330,000

UNIVERSITY OF GEORGIA, Athens, Ga.; *Academic Year Institute for High School Teachers of Science and Mathematics*; 12 months; \$265,900

HARVARD UNIVERSITY, Cambridge, Mass. *Academic Year Institute for High School Teachers of Science and Mathematics*; 10 months; \$280,400

*Summer Program in Connection with the 1958-59 Academic Year Institute*; 8 weeks; \$2,800

UNIVERSITY OF HAWAII, Honolulu, Hawaii; *Academic Year Institute for High School Teachers of Science and Mathematics*; 10 months; \$125,200

UNIVERSITY OF ILLINOIS, Urbana, Ill. *Academic Year Institute for High School and College Teachers of Mathematics*; 12 months; \$359,500

*Academic Year Institute for High School Teachers of Mathematics*; 8 weeks; \$274,800

IOWA STATE TEACHERS COLLEGE, Cedar Falls, Iowa *Academic Year Institute for High School Teachers of Science and Mathematics*; 12 months; \$327,600

*Summer Program in Connection with 1958-59 Academic Year Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$12,550

UNIVERSITY OF KANSAS, Lawrence, Kans.; *Academic Year Institute for High School Teachers of Mathematics*; 10 months; \$245,800

LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; *Academic Year Institute for High School Teachers of Mathematics*; 12 months; \$258,500

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich. *Academic Year Institute for High School Teachers of Science and Mathematics*; 12 months; \$259,200

*Summer Program in Connection with 1958-59 Academic Year Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$16,800

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; *Academic Year Institute for High School Teachers of Mathematics*; 12 months; \$330,200

UNIVERSITY OF NEW MEXICO, Albuquerque, N. Mex.; *Academic Year Institute for High School Teachers of Science and Mathematics*; 10 months; \$217,400

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; *Academic Year Institute for High School Teachers of Science and Mathematics*; 12 months; \$284,100

UNIVERSITY OF NORTH DAKOTA, Grand Forks, N. Dak.; *Academic Year Institute for High*

*School Teachers of Science and Mathematics*; 10 months; \$250,880  
 UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; *Academic Year Institute for High School Teachers of Mathematics*; 12 months; \$209,900  
 OHIO STATE UNIVERSITY, Columbus, Ohio  
*Academic Year Institute for High School Teachers of Science and Mathematics*; 1 year; \$329,200  
*Summer Program in Connection with 1958-59 Academic Year Institute for High School Teachers of Science and Mathematics*; 10 weeks; \$22,750  
 OKLAHOMA STATE UNIVERSITY, Stillwater, Okla.; *Summer Program in Connection with the 1958-59 Academic Year Institute*; 9 weeks; \$8,700  
 OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Stillwater, Okla.; *Academic Year Institute for High School Teachers of Science and Mathematics*; 12 months; \$269,100  
 OREGON STATE COLLEGE, Corvallis, Oreg.  
*Academic Year Institute for High School Teachers of Science and Mathematics*; 12 months; \$273,500  
*Summer Program in Connection with 1958-59 Academic Year Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$22,850  
 PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.  
*Academic Year Institute for High School Teachers of Science and Mathematics*; 10 months; \$276,300  
*Summer Program in Connection with 1958-59 Academic Year Institute for High School Teachers of the Sciences*; 6 weeks; \$11,000  
 UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; *Academic Year Institute for High School Teachers of Science and Mathematics*; 10 months; \$271,500  
 SAN DIEGO STATE COLLEGE, San Diego, Calif.; *Academic Year Institute for High School Teachers of Mathematics*; 12 months; \$276,200  
 STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion, S. Dak.; *Academic Year Institute for High School Teachers of Science and Mathematics*; 12 months; \$315,000  
 SYRACUSE UNIVERSITY, Syracuse, N.Y.; *Academic Year Institute for High School Teachers of Science and Mathematics*; 10 months; \$268,000  
 UNIVERSITY OF TEXAS, Austin, Tex.; *Academic Year Institute for High School Teachers of Science and Mathematics*; 12 months; \$281,500  
 TUSKEGEE INSTITUTE, Tuskegee, Ala.; *Academic Year Institute for High School Teachers of Science and Mathematics*; 10 months; \$230,800  
 UNIVERSITY OF UTAH, Salt Lake City, Utah  
*Academic Year Institute for High School Teachers of Science and Mathematics*; 12 months; \$300,000  
*Summer Program in Connection with 1958-59 Academic Year Institute for High School Teachers of Science and Mathematics*; 10 weeks; \$26,100  
 UNIVERSITY OF VIRGINIA, CHARLOTTESVILLE, Va.; *Academic Year Institute for High School Teachers of Science and Mathematics*; 12 months; \$278,100  
 WASHINGTON UNIVERSITY, St. Louis, Mo.; *Academic Year Institute for High School*

*Teachers of Science and Mathematics*; 10 months; \$328,100  
 UNIVERSITY OF WISCONSIN, Madison, Wis.  
*Academic Year Institute for High School Teachers of Science and Mathematics*; 12 months; \$289,700  
*Summer Program in Connection with 1958-59 Academic Year Institute for High School Teachers of Science and Mathematics*; 10 weeks; \$15,450  
*Course Content Improvement*  
 AMERICAN PHYSIOLOGICAL SOCIETY, Washington, D.C.; *Final Preparation of Laboratory Experiments in General Physiology*; 1 year; \$2,300  
 AMERICAN PHYTOPATHOLOGICAL SOCIETY, THE UNIVERSITY OF WISCONSIN, Madison, Wis.; *Preparation of a Sourcebook of Laboratory and Field Exercises in Plant Pathology*; 18 months; \$8,500  
 AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Washington, D.C.; *Bentley Glass; Biological Sciences Curriculum Study Group*; 27 months; \$738,200  
 UNIVERSITY OF ARIZONA, TUSCON, Ariz.; Edward N. Wise; *Design of an Integrated Set of Instrument Building Blocks*; 4 years; \$38,550  
 ASSOCIATION OF LABORATORY TEACHERS; New York, N.Y.; Herbert Horky; *Development of Apparatus for Secondary School Science Courses*; 1 year; \$1,000  
 UNIVERSITY OF CALIFORNIA, Berkeley, Calif.  
*Resource Book and Other Aids for Teaching Undergraduate Courses in Anthropology*; 2 years; \$76,820  
 L. Brewer and R. Karplus; *Study of Course Content Improvement in Elementary School Sciences*; 1 year; \$43,000  
 CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; *Workshop on Materials in Electrical Engineering Education*; 5 days; \$22,550  
 CATHOLIC UNIVERSITY OF AMERICA, Washington, D.C.; Gabriel D. Boehler; *Design and Construction of an Inexpensive Supersonic Wind Tunnel Using Surplus Materials*; 1 year; \$14,260  
 CLARKE COLLEGE, Dubuque, Iowa; Sister Mary John Catherine; *Construction of Inexpensive Equipment for Undergraduate Courses in Experimental Psychology*; 1 year; \$300  
 EARLHAM COLLEGE, Richmond, Ind.; Laurence E. Strong; *Study of a Central Theme for High School Chemistry*; 13 months; \$90,000  
 GREATER WASHINGTON EDUCATIONAL TELEVISION ASSOCIATION, INC., Washington, D.C.; *Elementary-School Science Pilot Project*; 6 months; \$15,900  
 JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; John Strong; *Program to Improve and Modernize Subject-Matter Content and Instructional Materials in Optics at the College Level*; 2 years; \$27,530  
 KANSAS STATE COLLEGE OF AGRICULTURE AND APPLIED SCIENCE, Manhattan, Kans.; Henry M. Neeley, Jr.; *Design and Development of Transparent Over-layer Aids for Teaching Basic Principles of Engineering Graphics*; 1 year; \$3,840  
 UNIVERSITY OF MICHIGAN RESEARCH INSTITUTE, Ann Arbor, Mich.; Wilbert J. McKeachie and John E. Milholland; *Study of the Undergraduate Curriculum in Psychology*; 1 year; \$24,090

MIDWEST RESEARCH INSTITUTE, Kansas City, Mo.

Thomas I. Marx; *Development of Circulatory System Model*; 10 months; \$10,350

Thomas I. Marx; *Design and Development of Student Ophthalmoscope*; 4 months; \$1,720

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; *Teaching Resources Development Workshop Conference in Geology*; 1 year; \$43,700

NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.

*Interdisciplinary Program on Films and Television in Science Education*; 1 year; \$37,900

*Sourcebook of Laboratory and Field Studies for Secondary-School Biology*; 1 year; \$4,025

R. M. Whaley; *Summer Study on Fundamental Processes in Education*; 4 months; \$15,000

*Teaching Resources Development Program in Geology*; 2 years; \$31,280

NATIONAL SCIENCE TEACHERS ASSOCIATION, Washington, D.C.; *A Conference and Report on Science in Secondary Schools, Grades 7-12*; 6 months; \$14,000

UNIVERSITY OF NEW MEXICO, Albuquerque, N. Mex.; R. K. Moore; *Development of Kit-Style Digital Computers for Construction and Use by High School Students*; 1 year; \$20,000

NEW YORK UNIVERSITY, New York, N.Y.; *Improved Types of Christiansen Filters and a Spectrophotometer Based Upon Them*; 1 year; \$7,000

OHIO STATE UNIVERSITY, Columbus, Ohio; *Interim Planning Committee for Chemistry*; 6 months; \$11,500

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; Harold M. DeGroof; *Senior Laboratory in Aeronautical Engineering*; 6 months; \$9,310

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.

Walter Eppenstein; *Development of New Visual Aids for Demonstration Lectures in Physics*; 1 year; \$5,750

Harry F. Meiners; *Development of an Electronic Planctarium and Motion Pictures on Satellite Motion and Celestial Mechanics*; 18 months; \$15,870

STANFORD UNIVERSITY, Stanford, Calif.; *Experimental Teaching of Mathematics in the Elementary School*; 2 years; \$64,680

STATE UNIVERSITY OF IOWA, Iowa City, Iowa.

R. T. Sanderson; *Development of Chemistry Teaching Aids*; 3 years; \$10,350

*Production of a Filmed Lecture-Demonstration on New Models Designed as Chemistry Teaching Aids*; 4 months; \$2,500

*Development of Teaching Aids for Analog Computer Instruction*; 1 year; \$3,690

UNIVERSITY OF VERMONT, Burlington, Vt.; Nelson L. Walbridge; *Design and Construction of Demonstration Ripple Tanks*; 1 year; \$8,720

WABASH COLLEGE, Crawfordsville, Ind.; Louis E. DeLaney; *Teaching Aids for Courses in Embryology and Comparative Anatomy*; 2 years; \$6,200

WALDEMAR MEDICAL RESEARCH FOUNDATION, INC., Port Washington, Long Island, N.Y.; Norman Molomot; *Design and Construction of Individual Laboratory Kits for High School Biology Courses*; 1 year; \$5,160

WESTERN MICHIGAN UNIVERSITY, Kalamazoo, Mich.; Haym Kruglak; *Preparation and Publication of Laboratory Test Items for College Courses in General Physics*; 1 year; \$7,130

WEST VIRGINIA UNIVERSITY, Morgantown, W. Va.; *Development of Stereomicrophotography and Other Methods for the Study of Submacroscopic Anatomy*; 1 year; \$9,000

YALE UNIVERSITY, New Haven, Conn.; E. G. Bogle; *School Mathematics Study Group*; 1 year; \$1,250,000

*In-Service Institutes*

UNIVERSITY OF AKRON, Akron, Ohio; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$8,830

ALABAMA COLLEGE, Montevallo, Ala.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$12,370

UNIVERSITY OF ALABAMA, University, Ala.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$28,420

ALBRIGHT COLLEGE, Reading, Pa.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$6,720

AMERICAN UNIVERSITY, Washington, D.C.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 10 months; \$19,840

ANTIOCH COLLEGE, Yellow Springs, Ohio; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 10 months; \$20,500

ARIZONA STATE UNIVERSITY, Tempe, Ariz.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$12,030

UNIVERSITY OF ARIZONA, Tucson, Ariz.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$5,900

BALL STATE TEACHERS COLLEGE, Muncie, Ind.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$10,650

BAYLOR UNIVERSITY, Waco, Tex.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$7,300

BETHANY COLLEGE, Bethany, W. Va.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$6,080

BISHOP COLLEGE, Marshall, Tex.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$14,540

BOSTON COLLEGE, Chestnut Hill, Mass. *In-Service Institutes for High School Teachers of Science and Mathematics*; 10 months; \$2,400

*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$13,700

BOWDOIN COLLEGE, Brunswick, Maine; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$9,450

BOWLING GREEN STATE UNIVERSITY, Bowling Green, Ohio; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$12,450

BRIDGEWATER COLLEGE, Bridgewater, Va.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$14,710

BRIGHAM YOUNG UNIVERSITY, Provo, Utah; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$4,550

BROWN UNIVERSITY, Providence R.I.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$4,800

BRYN MAWR COLLEGE, Bryn Mawr, Pa.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$10,160

BUCKNELL UNIVERSITY, Lewisburg, Pa.  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$3,770  
*In-Service Institute in Biology for Elementary School Teachers*; 8 months; \$4,300

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$5,930

BUTLER UNIVERSITY, Indianapolis, Ind.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$16,080

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$8,190  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$7,920  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$6,030  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$4,880

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$9,750  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$13,510

CENTRAL MICHIGAN COLLEGE, Mount Pleasant, Mich.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$8,600

CENTRAL STATE COLLEGE, Edmond, Okla.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$3,680

UNIVERSITY OF CHATTANOOGA, Chattanooga, Tenn.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$15,420

COLORADO STATE COLLEGE, Greeley, Colo.  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$8,100  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$7,430  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$6,740

COLORADO STATE UNIVERSITY, Fort Collins, Colo.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$3,080

UNIVERSITY OF COLORADO, Boulder, Colo.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$3,830

CONCORD COLLEGE, Athens, W. Va.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$9,310

CONCORDIA COLLEGE, Moorhead, Minn.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$17,230

UNIVERSITY OF CONNECTICUT, Storrs, Conn.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 10 months; \$20,750

DARTMOUTH COLLEGE, Hanover, N.H.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 7 months; \$11,200

UNIVERSITY OF DELAWARE, Newark, Del.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$5,400

UNIVERSITY OF DETROIT, Detroit, Mich.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 10 months; \$10,450

DRAKE UNIVERSITY, Des Moines, Iowa; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$14,830

EASTERN MICHIGAN COLLEGE, Ypsilanti, Mich.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$6,400

EMORY UNIVERSITY, Atlanta, Ga.  
*In-Service Institute in Mathematics for Elementary School Teachers*; 8 months; \$7,500  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$15,680

EVANSVILLE COLLEGE, Evansville, Ind.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$4,530

FENN COLLEGE, Cleveland, Ohio; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$6,700

FISK UNIVERSITY, Nashville, Tenn.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$6,240

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 10 months; \$37,970  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$8,150

FORDHAM UNIVERSITY, New York, N.Y.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$10,150

GENEVA COLLEGE, Beaver Falls, Pa.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$10,570

GEORGE WASHINGTON UNIVERSITY, Washington, D.C.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$3,400

HAMPTON INSTITUTE, Hampton, Va.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$15,000

UNIVERSITY OF HAWAII, Honolulu, Hawaii; *In-Service Institute for Secondary School*

*Teachers of Science and Mathematics*; 8 months; \$15,900  
**HIRAM COLLEGE**, Hiram, Ohio; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$6,100  
**COLLEGE OF THE HOLY CROSS**, Worcester, Mass.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$5,050  
**UNIVERSITY OF HOUSTON**, Houston, Tex.; T. N. Hatfield, Chairman, Department of Physics; *In-Service Institute for High School Teachers of Science and Mathematics*; 37 weeks; \$11,960  
**ILLINOIS COLLEGE**, Jacksonville, Ill.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$4,330  
**ILLINOIS INSTITUTE OF TECHNOLOGY**, Chicago, Ill.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$30,500  
**IMMACULATA COLLEGE**, Immaculata, Pa.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$10,000  
**IMMACULATE HEART COLLEGE**, Los Angeles, Calif.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$8,520  
**INDIANA CENTRAL COLLEGE**, Indianapolis, Ind.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$7,020  
**INDIANA STATE TEACHERS COLLEGE**, Terre Haute, Ind.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$6,400  
**INDIANA UNIVERSITY FOUNDATION**, Bloomington, Ind.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$6,680  
**INCARNATE WORD COLLEGE**, San Antonio, Tex.; *In-Service for Secondary School Teachers of Science and Mathematics*; 9 months; \$8,950  
**INTER AMERICAN UNIVERSITY OF PUERTO RICO**, San German, P.R.; *In-Service Institute in Sciences for Elementary School Teachers and Supervisors*; 9 months; \$20,200  
**JOHNS HOPKINS UNIVERSITY**, Baltimore, Md.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$10,200  
**KANSAS STATE COLLEGE OF AGRICULTURE AND APPLIED SCIENCE**, Manhattan, Kans.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$7,110  
**KANSAS STATE TEACHERS COLLEGE**, Emporia, Kans.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$17,200  
**KANSAS STATE TEACHERS COLLEGE**, Pittsburg, Kans.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$9,600  
**KNOX COLLEGE**, Galesburg, Ill.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$6,850  
**KNOXVILLE COLLEGE**, Knoxville, Tenn.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$16,040  
**LAKE FOREST COLLEGE**, Lake Forest, Ill.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$6,800  
**LINCOLN UNIVERSITY**, Lincoln University, Pa.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$9,430  
**LONG BEACH STATE COLLEGE**, Long Beach, Calif.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$8,540  
**UNIVERSITY OF LOUISVILLE**, Louisville, Ky.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$3,500  
**LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE**, Baton Rouge, La.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$5,850  
**MANHATTAN COLLEGE**, New York, N.Y.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$6,330  
**MARIAN COLLEGE**, Indianapolis, Ind.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$3,820  
**MARQUETTE UNIVERSITY**, Milwaukee, Wis.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$4,850  
**MARYGROVE COLLEGE**, Detroit, Mich.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$5,250  
**UNIVERSITY OF MARYLAND**, College Park, Md.; *In-Service Institute for Secondary Teachers of Science and Mathematics*; 9 months; \$15,660  
**MARYLHURST COLLEGE**, Marylhurst, Oreg.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$5,180  
**UNIVERSITY OF MASSACHUSETTS**, Amherst, Mass.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 10 months; \$28,475  
**MIAMI UNIVERSITY**, Oxford, Ohio; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$6,130  
**UNIVERSITY OF MIAMI**, Coral Gables, Fla.; *In-Service Institute for High School Teachers of Science and Mathematics*; 10 months; \$650  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 10 month; \$13,420  
**MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE**, Lansing, Mich.; *In-Service Institute for High School Teachers of Science and Mathematics*; 10 months; \$1,500  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$11,900  
**MILWAUKEE SCHOOL OF ENGINEERING**, Milwaukee, Wis.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$4,050  
**MISSISSIPPI COLLEGE**, Clinton, Miss.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$28,440  
**MISSOURI BOTANICAL GARDEN**, St. Louis, Mo.; *In-Service Institute for Secondary*

*School Teachers of Science and Mathematics*; 5 months; \$3,030

UNIVERSITY OF MISSOURI, Columbia, Mo.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$7,960

UNIVERSITY OF MISSISSIPPI, University, Miss.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$30,250

MONTANA STATE UNIVERSITY, Missoula, Mont.; *In-Service Institute in Mathematics for Elementary School Teachers and Supervisors*; 5 months; \$6,900

MONTCLAIR STATE COLLEGE, Upper Montclair, N.J.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 10 months; \$11,630

MOUNT MERCY COLLEGE, Pittsburgh, Pa.  
William A. Uricchio, Chairman, Biology Department; *In-Service Institute for High School Teachers of Biology*; 10 months; \$4,950

*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$6,950

*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$5,000

MURRAY STATE COLLEGE, Murray, Ky.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$7,100

NEW YORK UNIVERSITY, New York, N.Y.

*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$15,750

*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$5,670

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$5,200

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$6,850

NORTHERN ILLINOIS UNIVERSITY, De Kalb, Ill.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$7,090

NORTHLAND COLLEGE, Ashland, Wis.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$8,630

NORTHWESTERN UNIVERSITY, Evanston, Ill.  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$8,760

*In-Service Institute in Mathematics for Elementary School Principals and Supervisors*; 4 months; \$4,400

OHIO UNIVERSITY, Athens, Ohio; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$4,330

OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Stillwater, Okla.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$8,630

UNIVERSITY OF OKLAHOMA, Norman, Okla.  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$16,280

*In-Service Institute in Biology for Elementary School Teachers and Supervisors*; 9 months; \$7,700

UNIVERSITY OF OREGON, Eugene, Oreg.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$2,920

PACE COLLEGE, New York, N.Y.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$5,630

COLLEGE OF THE PACIFIC, Stockton, Calif.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$10,040

PAN AMERICAN COLLEGE, Edinburg, Tex.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$10,830

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$40,750

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$12,120

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$27,500

PRAIRIE VIEW AGRICULTURAL AND MECHANICAL COLLEGE, Prairie View, Tex.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$13,500

UNIVERSITY OF PUERTO RICO, Rio Piedras, P.R.

*Coordinated In-Service and Summer Institute for High School Teachers of Science and Mathematics*; \$33,700

*In-Service Institute for High School Teachers of Science and Mathematics*; 9 months; \$7,100

*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$10,420

COLLEGE OF PUGET SOUND, Tacoma, Wash.; Gordon D. Alcorn, Department of Biology; *In-Service Institute for Secondary School Science Teachers*; 10 months; \$3,500

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*, 9 months; \$26,660

UNIVERSITY OF REDLANDS, Redlands, Calif.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$5,080

REED COLLEGE, Portland, Oreg.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$14,350

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$13,580

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.

*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$11,490

*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 10 months; \$6,750

*In-Service Institute in Earth Sciences for Elementary School Teachers and Supervisors*; 9 months; \$6,300

SACRAMENTO STATE COLLEGE FOUNDATION, Sacramento, Calif.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$5,870

SAINT AUGUSTINE'S COLLEGE, Raleigh, N.C.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$6,640

COLLEGE OF ST. BENEDICT, St. Joseph, Minn.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$9,480

COLLEGE OF SAINT CATHERINE, St. Paul, Minn.; *In-Service Institute in Mathematics for Elementary School Teachers and Supervisors*; 8 months; \$4,100

SAINT LOUIS UNIVERSITY, St. Louis, Mo.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$7,250

SAINT NOBERT COLLEGE, West DePere, Wis.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 10 months; \$2,980

COLLEGE OF ST. THOMAS, St. Paul, Minn.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$11,820

ST. XAVIER COLLEGE, Chicago, Ill.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$5,400

SAN JOSE STATE COLLEGE, San Jose, Calif. *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$10,390

*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$3,400

UNIVERSITY OF SANTA CLARA, Santa Clara, Calif.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$25,000

SARAH LAWRENCE COLLEGE, Bronxville, N.Y.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$8,600

UNIVERSITY OF SCRANTON, Scranton, Pa. *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$4,640

*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$3,350

SHAW UNIVERSITY, Raleigh, N.C.; *In-Service Institute for Elementary School Teachers and Supervisors of Science and Mathematics*; 9 months; \$6,100

SHORTER COLLEGE, Rome, Ga.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$11,500

SOUTH DAKOTA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Brookings, S. Dak.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$11,480

SOUTHERN STATE COLLEGE, Durant, Okla.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$13,150

SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$4,900

SOUTHERN UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$7,950

SOUTHWESTERN LOUISIANA INSTITUTE, Lafayette, La.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$21,930

SOUTHWESTERN AT MEMPHIS, Memphis, Tenn.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$5,430

STATE TEACHERS COLLEGE, Salem, Mass. *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$10,090

*In-Service Institute in Mathematics for Elementary School Teachers, Supervisors, and principals*; 9 months; \$3,900

STATE TEACHERS COLLEGE, Lyndon Center, Vt.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 10 months; \$7,880

STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion, S. Dak.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$6,870

STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N.J.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$12,930

SYRACUSE UNIVERSITY, Syracuse, N.Y.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$16,950

TEACHERS COLLEGE, COLUMBIA UNIVERSITY, New York, N.Y.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$8,820

TEMPLE UNIVERSITY, Philadelphia, Pa.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$10,990

TENNESSEE AGRICULTURAL AND INDUSTRIAL STATE UNIVERSITY, Nashville, Tenn.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$10,080

TENNESSEE POLYTECHNIC INSTITUTE, Cookeville, Tenn.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$15,230

MIDDLE TENNESSEE STATE COLLEGE, Murfreesboro, Tenn.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$12,750

TEXAS WOMEN'S UNIVERSITY, Denton, Tex.; *In-Service Institute for Elementary School Teachers and Supervisors of Science and Mathematics*; 4 months; \$9,200

EAST TEXAS STATE COLLEGE, Commerce, Tex. *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$8,130

*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$5,330

*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$4,740

*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$8,060

NORTH TEXAS STATE COLLEGE, Denton, Tex.; *In-Service Institute for Secondary School*

*Teachers of Science and Mathematics*; 8 months; \$5,940  
**UNIVERSITY OF TOLEDO**, Toledo, Ohio; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$8,580  
**TOUGALOO SOUTHERN CHRISTIAN COLLEGE**, Tougaloo, Miss.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$13,200  
**UNION COLLEGE AND UNIVERSITY**, Schenectady, N.Y.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$12,000  
**UNIVERSITY OF UTAH**, Salt Lake City, Utah; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$7,650  
**UTAH STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE**, Logan, Utah; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$8,330  
**VILLANOVA UNIVERSITY**, Villanova, Pa.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$23,500  
**VIRGINIA POLYTECHNIC INSTITUTE**, Blacksburg, Va.; *In-Service Institute for Secondary School Teachers of Mathematics*; 9 months; \$17,970  
**UNIVERSITY OF VIRGINIA**, Charlottesville, Va.  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$6,150  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$6,000  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$5,850  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$5,250  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$5,150  
**WASHINGTON UNIVERSITY**, St. Louis, Mo.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$8,050  
**WAYNE STATE UNIVERSITY**, Detroit, Mich.  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$8,550  
*In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$8,460  
**WESTERN KENTUCKY STATE COLLEGE**, Bowling Green, Ky.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$8,630  
**WESTERN MICHIGAN UNIVERSITY**, Kalamazoo, Mich.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$10,750  
**WHITMAN COLLEGE**, Walla Walla, Wash.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$5,120  
**WILKES COLLEGE**, Wilkes-Barre, Pa.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$2,920  
**WILLIAM JEWELL COLLEGE**, Liberty, Mo.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$8,100  
**WILLIAMS COLLEGE**, Williamstown, Mass.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$7,180  
**WOMAN'S COLLEGE OF THE UNIVERSITY OF NORTH CAROLINA**, Greensboro, N. C.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$27,100  
**WORCESTER POLYTECHNIC INSTITUTE**, Worcester, Mass.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$9,500  
**YALE UNIVERSITY**, New Haven, Conn.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 8 months; \$11,650  
**YESHIVA UNIVERSITY**, New York N.Y.; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$17,680  
**XAVIER UNIVERSITY**, Cincinnati, Ohio; *In-Service Institute for Secondary School Teachers of Science and Mathematics*; 9 months; \$7,120

**Summer Institutes**  
**ADELPHI COLLEGE**, Garden City, N.Y.; *Summer Institute in Radiation Biology, Chemistry and Mathematics, for High School Teachers of Science*; 6 weeks; \$96,400  
**AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS**, College Station, Tex.  
 James G. Potter, Physics Department; *Summer Institute for High School Teachers of Science and Mathematics*; 12 weeks; \$67,800  
*Summer Institute for High School Teachers of Science and Mathematics*; 12 weeks; \$80,800  
**AGRICULTURAL, MECHANICAL AND NORMAL COLLEGE**, Pine Bluff, Ark.; *Summer Institute for High School Teachers of Science and Mathematics*; 5 weeks; \$26,600  
**AGRICULTURAL AND TECHNICAL COLLEGE OF NORTH CAROLINA**, Greensboro, N.C.; *Summer Institute for High School Teachers of Science*; 6 weeks; \$50,900  
**UNIVERSITY OF ARKANSAS**, Fayetteville, Ark.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$77,000  
**ALABAMA COLLEGE**, Montevallo, Ala.; *Summer Institute for High School Teachers of Science*; 6 weeks; \$59,100  
**ALABAMA POLYTECHNIC INSTITUTE**, Auburn, Ala.; *Summer Institute for High School Teachers of Science and Mathematics*; 11 weeks; \$146,200  
**UNIVERSITY OF ALABAMA**, University, Ala.; *Summer Institute for High School Teachers of Science and Mathematics*; 11 weeks; \$91,500  
**UNIVERSITY OF ALASKA**, College, Alaska; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$72,100  
**ALFRED UNIVERSITY**, Alfred, N.Y.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$43,700  
**ALLEGHENY COLLEGE**, Meadville, Pa.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$77,300  
**AMERICAN MATHEMATICAL SOCIETY**, Providence, R. I.; *Summer Institute in Mathe-*



*atics and Physics for College Teachers of Mathematics*; 4 weeks; \$20,000  
**AMERICAN MUSEUM OF NATURAL HISTORY**, New York, N.Y.; *Summer Institute for High School Teachers of Biology*; 5 weeks; \$12,300  
**AMERICAN UNIVERSITY**, Washington, D.C.  
*Summer Institute for High School Teachers of Chemistry and Physics*; 8 weeks; \$65,900  
*Summer Institute for College Teachers of Science and Mathematics*; 6 weeks; \$41,100  
**ANTIOCH COLLEGE**, Yellow Springs, Ohio; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$86,100  
**ARIZONA STATE COLLEGE**, Flagstaff, Ariz.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$60,000  
**ARIZONA STATE UNIVERSITY**, Tempe, Ariz.  
*Summer Institute for College Teachers of Biology*; 6 weeks; \$41,100  
*Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$53,300  
**UNIVERSITY OF ARIZONA**, Tucson, Ariz.  
*Summer Institute for Junior High School Teachers of Mathematics*; 6 weeks; \$30,100  
*Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$59,700  
**ATLANTA UNIVERSITY**, Atlanta, Ga.; *Summer Institute for High School Teachers of Science and Mathematics*; 9 weeks; \$64,300  
**BALDWIN-WALLACE COLLEGE**, Berea, Ohio; *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$57,400  
**BALL STATE TEACHERS COLLEGE**, Muncie, Ind.; *Summer Institute for High School and College Teachers of Mathematics*; 5 weeks; \$52,100  
**BAYLOR UNIVERSITY**, Waco, Tex.; *Summer Institute in Radiation Biology and in Science and Mathematics for High School Teachers of Science and Mathematics*; 8 weeks; \$89,300  
**BENEDICT COLLEGE**, Columbia, S.C.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$50,900  
**BIRMINGHAM-SOUTHERN COLLEGE**, Birmingham, Ala.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$55,500  
**BOSTON COLLEGE**, Chestnut Hill, Mass.  
Stanley J. Bezuska, S.J., Department of Mathematics; *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$39,050  
*Summer Institute for High School Teachers of Science*; 6 weeks; \$47,900  
**BOWDOIN COLLEGE**, Brunswick, Maine  
*Summer Institute for High School Teachers of Biology*; 6 weeks; \$35,900  
*Summer Institute for High School Teachers of Chemistry*; 6 weeks; \$30,200  
*Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$58,500  
*Summer Institute for High School Teachers of Physics*; 6 weeks; \$54,100  
**BRADLEY UNIVERSITY**, Peoria, Ill.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$43,000  
**BRIGHAM YOUNG UNIVERSITY**, Provo, Utah  
*Summer Institute for High School Teachers of Physics*; 6 weeks; \$50,000  
*Summer Institute for Junior High School Teachers of General Science*; 8 weeks; \$36,400  
*Summer Institute in Radiation Biology for High School Teachers of Science*; 8 weeks; \$20,200  
**BROOKLYN COLLEGE**, Brooklyn, N.Y.  
Samuel Borofsky, Department of Mathematics; *Summer Institute for High School Teachers of Biology*; 5 weeks; \$28,100  
Samuel Borofsky, Department of Mathematics; *Summer Institute for High School Teachers of Chemistry*; 5 weeks; \$26,400  
Samuel Borofsky, Department of Mathematics; *Summer Institute for High School Teachers of Mathematics*; 5 weeks; \$27,700  
Samuel Borofsky, Department of Mathematics; *Summer Institute for High School Teachers of Physics*; 5 weeks; \$23,800  
**BROWN UNIVERSITY**, Providence, R.I.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$72,700  
**BUCKNELL UNIVERSITY**, Lewisburg, Pa.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$64,900  
**UNIVERSITY OF BUFFALO**, Buffalo, N.Y.  
*Summer Institute for High School Teachers of Mathematics*; 4 weeks; \$38,900  
*Summer Institute in Physics for High School Teachers of Science*; 6 weeks; \$38,800  
**UNIVERSITY OF CALIFORNIA**, Berkeley, Calif.  
*Summer Institute for College Teachers of Science and Mathematics*; 7 weeks; \$117,600  
*Summer Institute for High School and College Teachers of Biology*; 6 weeks; \$37,100  
*Summer Institute for High School and Junior College Teachers of Mathematics*; 6 weeks; \$106,900  
*Summer Institute for High School Teachers of Science*; 7 weeks; \$117,700  
*Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$98,000  
*Summer Institute for Junior College and College Teachers of Mathematics*; 8 weeks; \$64,200  
*Summer Institute for Junior College Teachers of Engineering*; 8 weeks; \$108,100  
*Summer Institute in Radioactivity and Biology for High School Science Teachers*; 6 weeks; \$15,400  
**CARLETON COLLEGE**, Northfield, Minn.; *Summer Conference on Recent Advances in Analytical Chemistry for College Teachers of Chemistry*; 14 days; \$12,200  
*Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$142,700  
**CASE INSTITUTE OF TECHNOLOGY**, Cleveland, Ohio  
James R. Hooper, Jr., Special Programs; *Summer Conference in Process Control Theory for College Teachers in Chemical Engineering*; 19 days; \$21,300  
*Summer Institute for High School Teachers of Chemistry*; 6 weeks; \$54,500  
*Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$50,500  
**CATHOLIC UNIVERSITY OF AMERICA**, Washington, D.C.  
Raymond W. Moller; *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$51,900  
*Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$24,900  
**CATHOLIC UNIVERSITY OF PUERTO RICO**, Ponce, P.R.; *Summer Institute for High*

*School Teachers of Mathematics*; 6 weeks; \$25,100  
CENTRAL MICHIGAN COLLEGE, Mount Pleasant, Mich.; *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$49,200  
UNIVERSITY OF CHATTANOOGA, Chattanooga, Tenn.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$58,200  
CHICO STATE COLLEGE, Chico, Calif.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$56,600  
UNIVERSITY OF CINCINNATI, Cincinnati, Ohio; *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$51,500  
CLAREMONT COLLEGE, Claremont, Calif.; *Summer Institute in Biology for High School and Junior College Teachers of Biological Sciences*; 6 weeks; \$48,400  
CLARK UNIVERSITY, Worcester, Mass.; *Summer Institute for High School and Junior College Teachers of Mathematics*; 7 weeks; \$65,900  
CLARKSON COLLEGE OF TECHNOLOGY, Potsdam, N.Y.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$76,500  
CLEMSON AGRICULTURAL COLLEGE, Clemson S.C.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$50,600  
COLBY COLLEGE, Waterville, Maine; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$78,700  
COLGATE UNIVERSITY, Hamilton, N.Y.; *Summer Institute for Junior High School Teachers of Science*; 6 weeks; \$48,200  
COLLEGE OF THE HOLY CROSS, Worcester, Mass.; *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$60,200  
COLLEGE OF SAINT THOMAS, St. Paul, Minn.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$46,100  
COLORADO COLLEGE, Colorado Springs, Colo. Richard G. Beidleman, Department of Zoology; *Summer Institute for High School and Junior College Teachers of Science and Mathematics*; 8 weeks; \$78,150  
*Summer Institute for High School and Junior College Teachers of Science and Mathematics*; 8 weeks; \$77,400  
COLORADO STATE UNIVERSITY, Fort Collins, Colo.; John J. Faris, Department of Physics; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$93,800  
UNIVERSITY OF COLORADO, Boulder, Colo. *Summer Institute for High School Teachers of Biology*; 6 weeks; \$44,500  
*Summer Institute for High School Teachers of Physics*; 8 weeks; \$54,300  
*Summer Institute in Science for Elementary School Teachers and Supervisors*; 4 weeks; \$34,800  
COLUMBIA COLLEGE, Columbia, S.C.; *Summer Institute for High School Teachers of Science*; 6 weeks; \$49,200  
UNIVERSITY OF CONNECTICUT, Storrs, Conn.; *Summer Institute for High School Teachers of Science*; 6 weeks; \$104,100  
CONVERSE COLLEGE, Spartanburg, S.C.; *Summer Institute for High School Teachers of Science*; 8 weeks; \$77,500  
CORNELL COLLEGE, Mount Vernon, Iowa; Cecil F. Dam, Department of Physics; *Summer Conference in Radioisotopes and Their Uses for College Teachers of Science and Mathematics*; 13 days; \$15,900  
CORNELL UNIVERSITY, Ithaca, N.Y.; *Summer Institute for High School Teachers of Earth Sciences*; 6 weeks; \$53,800  
UNIVERSITY OF DELAWARE, Newark, Del.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$40,800  
UNIVERSITY OF DENVER, Denver, Colo. *Summer Institute for High School Teachers of Science and Mathematics*; 9 weeks; \$86,100  
*Summer Institute for High School Teachers of Chemistry*; 9 weeks; \$69,100  
*Summer Institute in Earth Science for High School Teachers of Science*; 9 weeks; \$44,000  
DEPAUW UNIVERSITY, Greencastle, Ind. *Summer Institute for Junior High School Teachers of Science*; 6 weeks; \$56,500  
*Summer Institute in Science and Mathematics for Elementary School Teachers*, 6 weeks; \$14,600  
UNIVERSITY OF DETROIT, Detroit, Mich. *Summer Conference in Engineering Graphics for College Teachers*; 12 days; \$7,000  
*Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$49,600  
DILLARD UNIVERSITY, New Orleans, La.; *Summer Institute for High School Teachers of Science*; 6 weeks; \$38,500  
DRAKE UNIVERSITY, Des Moines, Iowa *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$46,600  
*Summer Institute for High School Teachers of Science*; 6 weeks; \$48,400  
DUKE UNIVERSITY, Durham, N.C. *Summer Institute for High School Teachers of Science and Mathematics*; 9 weeks; \$104,200  
*Summer Institute in Radiation Biology for High School Teachers of Biology*; 8 weeks; \$20,200  
*Summer Institute for College Teachers of Mathematics*; 6 weeks; \$22,300  
EAST CAROLINA COLLEGE, Greenville, N.C.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$59,200  
EASTERN ILLINOIS UNIVERSITY, Charleston, Ill.; *Summer Institute for High School Teachers of Mathematics*; 8 weeks; \$29,700  
EASTERN MICHIGAN COLLEGE, Ypsilanti, Mich. Robert S. Pate, Department of Mathematics; *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$41,100  
*Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$40,900  
*Summer Institute for High School Teachers of Mathematics and Physics*; 6 weeks; \$32,400  
EAST TENNESSEE STATE COLLEGE, Johnson City, Tenn.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$57,200  
EAST TEXAS STATE COLLEGE, Commerce, Tex.; *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$19,500  
EMORY UNIVERSITY, Emory University, Ga.; *Summer Institute for College Teachers of Chemistry*; 9 weeks; \$36,900

FISK UNIVERSITY, Nashville, Tenn.

*Summer Institute for High School Teachers of Science*; 8 weeks; \$64,300

Samuel P. Massie; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$67,500

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.

*Summer Institute for College Teachers of Geology*; 8 weeks; \$55,400

*Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$118,500

*Summer Institute for Junior College Teachers of Science and Mathematics*; 8 weeks; \$77,100

UNIVERSITY OF FLORIDA, Gainesville, Fla.; N. Eldred Gingham, College of Arts and Sciences; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$112,400

FORDHAM UNIVERSITY, New York, N.Y.; *Summer Institute in Mathematics and Physics for High School Teachers*; 6 weeks; \$95,000

FORT HAYS KANSAS STATE COLLEGE, Hays, Kans.

*Summer Institute for High School Teachers of Mathematics*; 8½ weeks; \$41,200

*Summer Institute for High School Teachers of Science*; 8 weeks; \$71,800

FORT LEWIS AGRICULTURAL AND MECHANICAL COLLEGE, Durango, Colo.

*Summer Institute for College Teachers of Chemistry*; 4 weeks; \$33,700

Herbert D. Hart, Department of Chemistry; *Summer Institute for High School Teachers of Chemistry*; 6 weeks; \$49,580

*Summer Institute for High School Teachers of Chemistry*; 6 weeks; \$49,200

FRANKLIN AND MARSHALL COLLEGE, Lancaster, Pa.

*Summer Institute for High School Teachers of Biology and General Science*; 6 weeks; \$34,700

*Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$50,300

FRESNO STATE COLLEGE, Fresno, Calif.; *Summer Institute for High School Teachers of Science*; 6 weeks; \$108,400

GEORGE PEABODY COLLEGE FOR TEACHERS, Nashville, Tenn.; *Summer Institute for High School Teachers of Science and Mathematics*; 10 weeks; \$136,900

GEORGETOWN UNIVERSITY, Washington, D.C.

Ralph S. Henderson, Department of Physics; *Summer Conference for College Teachers of Physical Science*; 21 days; \$14,500

*Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$27,600

UNIVERSITY OF GEORGIA, Athens, Ga.

*Summer Institute for High School Teachers of Biology*; 4 weeks; \$30,300

*Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$51,400

GONZAGA UNIVERSITY, Spokane, Wash.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$87,200

HAMILTON COLLEGE, Clinton, N.Y.; *Summer Institute for High School Teachers of Mathematics*; 8 weeks; \$64,500

HAMPTON INSTITUTE, Hampton, Va.; *Summer Institute for High School Teachers of Science and Mathematics*; 9 weeks; \$97,000

UNIVERSITY OF HAWAII, Honolulu, Hawaii; *Summer Institute for High School Teachers*

*of Science and Mathematics*; 6 weeks; \$90,900

UNIVERSITY OF HOUSTON, Houston, Tex.; *Summer Institute in Engineering Science and Mathematics for Technical Institute Personnel and Junior College Teachers in Technical Curricula*; 8 weeks; \$54,100

HOWARD PAYNE COLLEGE, Brownwood, Tex.; *Summer Institute for High School Teachers of Science*; 6 weeks; \$49,400

HOWARD UNIVERSITY, Washington, D.C.; *Summer Institute in Radiation Biology and Modern Biological Perspectives for High School Teachers of Science*; 8 weeks; \$52,000

HUMBOLDT STATE COLLEGE, Arcata, Calif.; *Summer Institute for High School and College Teachers of Science and Mathematics*; 6 weeks; \$48,700

HUNTER COLLEGE OF THE CITY OF NEW YORK, New York, N.Y.

Jennie L. S. Simpson, Department of Biological Sciences; *Summer Institute for High School Teachers of Biology*; 6 weeks; \$48,700

*Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$47,200

UNIVERSITY OF IDAHO, Moscow, Idaho; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$64,400

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$99,500

ILLINOIS WESLEYAN UNIVERSITY, Bloomington, Ill.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$71,500

UNIVERSITY OF ILLINOIS, Urbana, Ill.

*Summer Institute for High School Teachers of Chemistry*; 8 weeks; \$35,400

*Summer Institute in Science for Elementary School Supervisors*; 18 months; \$65,400

IMMACULATE HEART COLLEGE, Los Angeles, Calif.; *Summer Institute for High School Teachers of Physics*; 6 weeks; \$49,100

INDIANA STATE TEACHERS COLLEGE, Terre Haute, Ind.; *Summer Institute for Junior High School Teachers of Science*; 10 weeks; \$87,200

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.

*Summer Institute for High School Teachers of Biology*; 6 weeks; \$36,600

*Summer Institute for College Teachers of Botany*; 6 weeks; \$53,800

*Summer Institute for College Teachers of Chemistry*; 4 weeks; \$35,600

*Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$49,000

INSTITUTE OF PAPER CHEMISTRY, Appleton, Wis.; Elwood O. Dillingham, Department of Chemistry; *Summer Conference for College Teachers of Chemistry and Biology*; 12 days; \$8,000

IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Ames, Iowa

*Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$78,100

*Summer Institute for Junior College and College Teachers of Mathematics*; 6 weeks; \$31,900

*Summer Institute for Junior College and College Teachers of Engineering*; 6 weeks; \$50,800

IOWA STATE TEACHERS COLLEGE, Cedar Falls, Iowa; Dorothy C. Matala, Science Department; *Summer Institute for Junior High School Teachers of General Science and Mathematics*; 8 weeks; \$96,400

KANSAS STATE COLLEGE OF AGRICULTURE AND APPLIED SCIENCE, Manhattan, Kans.; *Summer Institute for High School Teachers of Mathematics*; 8 weeks; \$56,500

KANSAS STATE TEACHERS COLLEGE, Emporia, Kans.; *Summer Institute for High School Teachers of Science and Mathematics*; 12 weeks; \$216,500

UNIVERSITY OF KANSAS, Lawrence, Kans.  
*Summer Institute for High School and College Teachers of Mathematics*; 8 weeks; \$135,500

*Summer Institute in Radiation Biology for High School Teachers*; 8 weeks; \$20,200

*Summer Institute in Science for Elementary School Teachers and Supervisors*; 8 weeks; \$60,800

KENT STATE UNIVERSITY, Kent, Ohio  
*Summer Institute for High School Teachers of Biology*; 8 weeks; \$64,600

*Summer Institute for High School Teachers of Mathematics*; 8 weeks; \$69,100

KNOX COLLEGE, Galesburg, Ill.; *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$51,300

LAFAYETTE COLLEGE, Easton, Pa.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$52,500

LEHIGH UNIVERSITY, Bethlehem, Pa.; *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$39,900

LONG ISLAND BIOLOGICAL ASSOCIATION, Cold Spring Harbor, N.Y.; Arthur Chovnick; *Summer Conference on Recent Developments in Genetics for College Teachers of Genetics*; 20 days; \$12,700

LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; *Summer Institute for High School Teachers of Science and Mathematics*; 9 weeks; \$71,700

LOYOLA UNIVERSITY OF LOS ANGELES, Los Angeles, Calif.; *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$36,100

MACALESTER COLLEGE, St. Paul, Minn.; *Summer Institute in Physics and Mathematics for High School Teachers*; 8 weeks; \$43,500

UNIVERSITY OF MAINE, Orono, Maine; *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$48,600

MANKATO STATE COLLEGE, Mankato, Minn.; *Summer Institute for High School Teachers of Science and Mathematics*; 5½ weeks; \$43,700

UNIVERSITY OF MARYLAND, College Park, Md.  
*Summer Conference on Radioisotopes and Tracer Methodology for College Teachers of Physical and Biological Sciences*; 12 days; \$13,000

*Summer Institute for High School Teachers of Science*; 7 weeks; \$83,400

*Summer Institute for Junior High School Teachers of Mathematics*; 6 weeks; \$37,400

MARSHALL COLLEGE, Huntington, W. Va.; *Summer Institute for High School Teachers of Science and Mathematics*; 11 weeks; \$63,800

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; Jerrold R. Zacharias, Chairman of the Physical Science Study

Committee; *Special Conference for College Physics Teachers*; 10 days; \$6,910

UNIVERSITY OF MASSACHUSETTS, Amherst, Mass.  
*Summer Institute for High School Teachers of Biology*; 7 weeks; \$51,500

*Summer Institute for High School Teachers of Mathematics*; 7 weeks; \$54,000

MEMPHIS STATE UNIVERSITY, Memphis, Tenn.; *Summer Institute for High School Teachers of Mathematics*; 5 weeks; \$38,500

MIAMI UNIVERSITY, Oxford, Ohio; *Summer Institute for High School Teachers of Science*; 8 weeks; \$62,900

MICHIGAN COLLEGE OF MINING AND TECHNOLOGY, Houghton, Mich.  
 Kenneth M. McMillan, Mathematics Department; *Summer Conference for College Teachers of Science Mathematics and Engineering*; 19 days; \$7,100

*Summer Conference in Analog Computation for College Teachers*; 19 days; \$4,000

MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing, Mich.; *Summer Institute for High School and Junior College Teachers of Science and Mathematics*; 11 weeks; \$180,900

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.  
 Wilbert J. McKeachie, Department of Psychology; *Summer Conference for College Teachers of Psychology*; 19 days; \$8,500

*Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$36,700

*Summer Institute in Mathematics for Elementary School Teachers and Supervisors*; 4 weeks; \$30,600

*Summer Institute in Radiation Biology for College Teachers*; 8 weeks; \$20,800

MIDDLE TENNESSEE STATE COLLEGE, Murfreesboro, Tenn.; *Summer Institute for High School Teachers of Science*; 11 weeks; \$64,700

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.  
*Summer Institute for High School Teachers of Science and Mathematics*; 10 weeks; \$117,600

*Summer Institute for High School Teachers of Biology*; 5 weeks; \$19,700

Frank Verbruge; *Summer Institute for High School Teachers of Physics*; 8 weeks; \$79,200

*Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$45,300

MISSISSIPPI STATE UNIVERSITY, State College, Miss.; *Summer Institute for High School and Junior College Teachers of Science and Mathematics*; 11 weeks; \$151,800

MISSISSIPPI SOUTHERN COLLEGE, Hattiesburg, Miss.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$80,800

UNIVERSITY OF MISSISSIPPI, University, Miss.; *Summer Institute for High School Teachers of Science and Mathematics*; 10½ weeks; \$136,800

UNIVERSITY OF MISSOURI, Columbia, Mo.  
*Summer Institute for High School Teachers of Biology*; 8 weeks; \$62,700

*Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$76,700

*Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$91,700

MONTANA STATE COLLEGE, Bozeman, Mont. *Summer Institute for High School and College Teachers of Chemistry*; 5 weeks; \$42,400

*Summer Institute for High School Teachers of Mathematics*; 5 weeks; \$41,500

MONTANA STATE UNIVERSITY, Missoula, Mont.

*Summer Institute for High School Teachers of Biology*; 8 weeks; \$23,400

*Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$79,200

*Summer Institute for Junior College and College Teachers of Mathematics*; 6 weeks; \$50,900

*Summer Institute in Radiation Biology for High School Teachers of Science*; 8 weeks; \$15,200

MONTCLAIR STATE COLLEGE, Upper Montclair, N.J.; *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$72,100

MOREHEAD STATE COLLEGE, Morehead, Ky.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$60,050

MORGAN STATE COLLEGE, Baltimore, Md.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$73,700

MUHLENBERG COLLEGE, Allentown, Pa.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$33,500

MURRAY STATE COLLEGE, Murray, Ky.; *Summer Institute for High School Teachers of Science*; 8 weeks; \$84,500

UNIVERSITY OF NEBRASKA, Lincoln, Nebr.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$64,400

UNIVERSITY OF NEVADA, Reno, Nev.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$57,400

UNIVERSITY OF NEW HAMPSHIRE, Durham, N.H.; *Summer Institute in Chemistry and Physics for High School Teachers*; 8 weeks; \$80,600

NEW MEXICO COLLEGE OF AGRICULTURE AND MECHANIC ARTS, State College, N. Mex.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$133,000

NEW MEXICO HIGHLANDS UNIVERSITY, Las Vegas, N. Mex.; *Summer Institute for High School Teachers of Physics*; 8 weeks; \$62,700

UNIVERSITY OF NEW MEXICO, Albuquerque, N. Mex.

*Summer Institute for High School Teachers of Mathematics*; 8 weeks; \$62,400

Harold O. Ried, Director of Summer Session; *Summer Institute in Radiation Biology for High School Teachers of Science*; 8 weeks; \$22,600

NEW YORK UNIVERSITY, New York, N.Y.; *Summer Conference on Chemical Instrumentation for College Teachers of Chemistry*; 19 days; \$18,800

NORTH CAROLINA COLLEGE AT DURHAM, Durham, N.C.

William H. Robinson; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$62,900

*Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$60,500

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; *Summer Institute for College Teachers of Statistics*; 6 weeks; \$31,100

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.

*Summer Conference for College Teachers of General Biology*; 19 days; \$10,600

*Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$94,000

*Summer Institute for Junior College and College Teachers of Chemistry*; 6 weeks; \$52,800

NORTH DAKOTA STATE COLLEGE, Fargo, N. Dak.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$95,000

UNIVERSITY OF NORTH DAKOTA, Grand Forks, N. Dak.; *Summer Institute for High School Teachers of Science*; 8 weeks; \$66,100

NORTH TEXAS STATE COLLEGE, Denton, Tex.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$48,600

NORTHEAST MISSOURI STATE TEACHERS COLLEGE, Kirksville, Mo.; *Summer Institute in Science and Mathematics for High School Teachers of General Science*; 10 weeks; \$87,100

NORTHERN MICHIGAN COLLEGE, Marquette, Mich.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$54,500

NORTHERN STATE TEACHERS COLLEGE, Aberdeen, S. Dak.; *Summer Institute in General Science for High School Teachers of Science*; 5 weeks; \$25,000

NORTHERN ILLINOIS UNIVERSITY, DeKalb, Ill.; *Summer Institute for High School Teachers of Chemistry*; 8 weeks; \$67,000

NORTHWESTERN STATE COLLEGE OF LOUISIANA, Natchitoches, La.

*Summer Institute for High School Teachers of Biology and Chemistry*; 9 weeks; \$80,200

*Summer Institute for High School Teachers of Science and Mathematics*; 9 weeks; \$66,600

NORTHWESTERN UNIVERSITY, Evanston, Ill.; *Summer Institute for High School Teachers of Mathematics*; 8 weeks; \$66,800

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.

*Summer Institute for High School Teachers of Chemistry*; 7 weeks; \$48,100

*Summer Institute for High School Teachers of Mathematics*; 7 weeks; \$142,800

OAK RIDGE INSTITUTE OF NUCLEAR STUDIES, INC., Oak Ridge, Tenn.; *Summer Institute for High School Teachers of Science*; 4 weeks; \$33,200

OBERLIN COLLEGE, Oberlin, Ohio; *Summer Institute for High School Teachers of Mathematics*; 8 weeks; \$126,400

OHIO STATE UNIVERSITY, Columbus, Ohio; *Summer Institute in Radiation Biology and in Science and Mathematics for High School Teachers of Science and Mathematics*; 8 weeks; \$125,100

OHIO UNIVERSITY, Athens, Ohio.

*Summer Institute for College Teachers of Chemistry*; 6 weeks; \$46,600

*Summer Institute for High School Teachers of Science*; 6 weeks; \$54,200

OHIO WESLEYAN UNIVERSITY, Delaware, Ohio; *Summer Institute for High School Teachers of Physics*; 8 weeks; \$46,900

OKLAHOMA BAPTIST UNIVERSITY, Shawnee, Okla.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$54,300

OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Stillwater, Okla. *Summer Institute for College Teachers of Statistics*; 8 weeks; \$42,400

*Summer Institute for High School and College Teachers of Mathematics*; 6 weeks; \$58,200

*Summer Institute for High School Teachers of Biology*; 9 weeks; \$65,900

UNIVERSITY OF OKLAHOMA, Norman, Okla. *Summer Conference in Digital Computers and the Related Mathematics for College Teachers of Science, Mathematics and Engineering*; 21 days; \$26,800

*Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$118,400

*Summer Institute in Earth Sciences for Junior High School Teachers*; 4 weeks; \$10,100

OREGON STATE COLLEGE, Corvallis, Oreg. *Summer Institute for College Teachers of Biology*; 8 weeks; \$64,500

*Summer Conference for College Teachers of Undergraduate Geology*; 13 days; \$12,100

Stanley E. Williamson; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$64,600

*Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$63,900

*Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$47,600

*Summer Institute for Junior College and College Teachers of Chemistry*; 6 weeks; \$49,000

UNIVERSITY OF OREGON, Eugene, Oreg. *Summer Institute for College Teachers of Biology*; 8 weeks; \$34,800

*Summer Institute for High School Teachers of Mathematics*; 8 weeks; \$64,900

OUR LADY OF THE LAKE COLLEGE, San Antonio, Tex.; *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$33,600

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa. *Summer Conference for Technical Institute and Junior College Teachers in Instrumentation and Control and Related Subjects*; 19 days; \$13,500

*Summer Institute in Science for Elementary School Teachers and Supervisors*; 6 weeks; \$45,700

*Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$100,900

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$101,500

PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE, Philadelphia, Pa.; *Summer Institute for High School and College Teachers of Biology, Chemistry and Physics*; 6 weeks; \$27,400

UNIVERSITY OF PITTSBURGH, Pittsburgh, Pa. *Summer Conference on Recent Advances in the Ecology of Freshwater Organisms*

*for College Teachers of Biology*; 12 days; \$8,500

*Summer Institute for High School Teachers of Mathematics*; 8 weeks; \$37,700

PORTLAND STATE COLLEGE, Portland, Oreg.; *Summer Institute for High School Teachers of Mathematics*; 7 weeks; \$67,400

PRAIRIE VIEW AGRICULTURAL AND MECHANICAL COLLEGE, Prairie View, Tex.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$42,800

PRATT INSTITUTE, Brooklyn, N.Y.; *Summer Institute for High School Teachers of Chemistry*; 6 weeks; \$36,300

PRINCETON UNIVERSITY, Princeton, N.J. *Summer Institute for High School and College Teachers of Chemistry*; 6 weeks; \$40,500

*Summer Institute for High School and College Teachers of Mathematics*; 6 weeks; \$41,680

UNIVERSITY OF PUERTO RICO, Mayaguez, P.R. *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$47,500

*Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$46,600

*Summer Institute in Radiation Biology for High School Teachers of Biology and Physics*; 6 weeks; \$14,800

PURDUE RESEARCH FOUNDATION, Lafayette, Ind. *Summer Institute for High School Teachers of Mathematics*; 8 weeks; \$64,500

*Summer Institute for High School Teachers of Mathematics*; 8 weeks; \$66,900

*Summer Institute in Chemistry and Physics for High School Teachers of Physical Sciences*; 6 weeks; \$50,400

*Summer Institute in Radiation Biology for High School Teachers of Science and Mathematics*; 8 weeks; \$75,700

RANDOLPH-MACON WOMAN'S COLLEGE, Lynchburg, Va.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$61,300

UNIVERSITY OF REDLANDS, Redlands, Calif.; *Summer Institute for High School Teachers of Science and Mathematics*; 10 weeks; \$42,800

REED COLLEGE, Portland, Oreg. *Summer Institute for High School and Junior College Teachers of Mathematics*; 8 weeks; \$51,000

*Summer Institute for High School Teachers of Physics*; 8 weeks; \$58,000

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y. *Summer Institute for High School Teachers of Science*; 8 weeks; \$166,900

Edwin B. Allen; *Summer Institute in Natural Sciences for High School Teachers of Science*; 8 weeks; \$205,800

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y. *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$46,500

*Summer Institute for High School Teachers of Science*; 6 weeks; \$47,900

*Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$58,250

*Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$50,400

*Summer Institute in Science and Mathematics for Elementary School Teachers and Supervisors*; 6 weeks; \$42,100

UNIVERSITY OF RHODE ISLAND, Kingston, R.I.; *Summer Institute in Science for Elementary School Teachers*; 6 weeks; \$30,200

RIPON COLLEGE, Ripon, Wis.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$65,300

RIVIERA COLLEGE, Nashua, N.H.; *Summer Institute for High School Teachers of Biology*; 6 weeks; \$24,600

UNIVERSITY OF ROCHESTER, Rochester, N.Y.  
*Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$47,500  
*Summer Institute in Science for Elementary School Teachers*; 18 months; \$45,900

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.  
*Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$82,600  
*Summer Institute for High School Teachers of Physics*; 6 weeks; \$50,300  
*Summer Institute in Mathematics for Elementary School Teachers and Supervisors*; 6 weeks; \$45,400

SACRAMENTO STATE COLLEGE FOUNDATION, Sacramento, Calif.; *Summer Institute for High School Teachers of Science*; 6 weeks; \$60,400

SAINT AUGUSTINE'S COLLEGE, Raleigh, N.C.; *Summer Institute for High School Teachers of Science*; 6 weeks; \$51,000

SAINT LOUIS UNIVERSITY, St. Louis, Mo.  
*Summer Institute for High School Teachers of Chemistry*; 6 weeks; \$26,800  
*Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$46,500  
*Summer Institute for High School Teachers of Physics*; 6 weeks; \$19,000

SAN JOSE STATE COLLEGE, San Jose, Calif.  
*Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$46,400  
*Summer Institute for High School Teachers of Science*; 6 weeks; \$50,900  
*Summer Institute in Science for Elementary School Teachers*; 6 weeks; \$41,600

UNIVERSITY OF SANTA CLARA, Santa Clara, Calif.; *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$25,500

SARAH LAWRENCE COLLEGE, Bronxville, N.Y.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$41,100

SEATTLE UNIVERSITY, Seattle, Wash.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$68,800

SETON HILL COLLEGE, Greensburg, Pa.; *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$38,600

SHIPPENSBURG STATE TEACHERS COLLEGE, Shippensburg, Pa.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$30,100

SIMMONS COLLEGE, Boston, Mass.; *Summer Institute for High School Teachers of Chemistry*; 6 weeks; \$24,400

UNIVERSITY OF SOUTH CAROLINA, Columbia, S.C.  
*Summer Institute in General Science for Elementary School Teachers and Supervisors*; 6 weeks; \$25,700  
*Summer Institute for High School and College Teachers of Mathematics*; 8 weeks; \$85,550

SOUTH DAKOTA SCHOOL OF MINES AND TECHNOLOGY, Rapid City, S. Dak.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$167,700

SOUTH DAKOTA STATE COLLEGE, Brookings, S. Dak.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$62,300

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.  
*Summer Institute for High School Teachers of Chemistry and Physics*; 6 weeks; \$40,600  
*Summer Institute for High School Teachers of Biology*; 6 weeks; \$44,200  
*Summer Institute for College Teachers of Mathematics*; 6 weeks; \$39,500

SOUTHERN ILLINOIS UNIVERSITY, Carbondale, Ill.; *Summer Institute for High School Teachers of Science*; 8 weeks; \$64,500

SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.  
*Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$27,500  
*Summer Institute for High School Teachers of Physics*; 6 weeks; \$28,500

SOUTHERN UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; *Summer Institute for High School Teachers of Chemistry and Physics*; 8 weeks; \$32,500

SOUTHWESTERN LOUISIANA INSTITUTE, Lafayette, La.; *Summer Institute for High School Teachers of Science and Mathematics*; 9 weeks; \$70,400

SOUTHWEST MISSOURI STATE COLLEGE, Springfield, Mo.; *Summer Institute for Junior High School Teachers of Mathematics*; 6 weeks; \$26,800

SPRING HILL COLLEGE, Spring Hill, Ala.; *Summer Institute for High School Teachers of Physics*; 6 weeks; \$23,400

STANFORD UNIVERSITY, Stanford, Calif.; *Summer Institute for High School and College Teachers of Biology*; 10 weeks; \$18,600

STATE COLLEGE OF WASHINGTON, Pullman, Wash.  
*Summer Institute for High School Teachers of Mathematics*; 8 weeks; \$56,900  
*Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$89,700

STATE UNIVERSITY OF IOWA, Iowa City, Iowa  
*Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$60,300  
*Summer Institute for High School Teachers of Science*; 8 weeks; \$68,300

STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion, S. Dak.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$64,700

STEPHEN F. AUSTIN STATE COLLEGE, Nacogdoches, Tex.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$51,800

STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N.J.; *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$60,000

SYRACUSE UNIVERSITY, Syracuse, N.Y.  
*Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$59,700  
*Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$54,300  
*Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$76,800  
*Summer Institute in Radiation Biology for High School Teachers*; 6 weeks; \$15,400

TEACHERS COLLEGE, COLUMBIA UNIVERSITY, New York, N.Y.; *Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$40,500

TEACHERS COLLEGE OF CONNECTICUT, New Britain, Conn.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$48,700

TEMPLE UNIVERSITY, Philadelphia, Pa.

*Summer Institute for High School Teachers of Physics*; 8 weeks; \$53,700

*Summer Institute in General Science for Junior High School Teachers*; 6 weeks; \$53,900

*Summer Institute in General Science for Junior High School Teachers*; 6 weeks; \$31,900

TENNESSEE POLYTECHNIC INSTITUTE, Cookeville, Tenn.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$92,200

TEXAS CHRISTIAN UNIVERSITY, Fort Worth, Tex.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$92,400

TEXAS SOUTHERN UNIVERSITY, Houston, Tex.; *Summer Institute for High School Teachers of Science and Mathematics*; 12 weeks; \$88,000

TEXAS TECHNOLOGICAL COLLEGE, Lubbock, Tex.

*Summer Institute for High School Teachers of Biology*; 8 weeks; \$76,200

*Summer Institute for High School Teachers of Chemistry*; 6 weeks; \$72,500

UNIVERSITY OF TEXAS, Austin, Tex.

*Summer Institute for College Teachers of Physics*; 9 weeks; \$36,600

*Summer Institute for High School Teachers of Science and Mathematics*; 9 weeks; \$72,100

THIEL COLLEGE, Greenville, Pa.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$28,500

UNIVERSITY OF TOLEDO, Toledo, Ohio; *Summer Institute for High School Teachers of Science*; 8 weeks; \$59,900

TUFTS UNIVERSITY, Medford, Mass.

*Summer Conference for College Teachers of Chemistry*; 12 days; \$15,100

*Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$52,200

TUSKEGEE INSTITUTE, Tuskegee Institute, Ala.

*Summer Institute for High School Teachers of Chemistry*; 8 weeks; \$54,700

*Summer Institute in Radiation Biology for High School Teachers of Biology*; 8 weeks; \$20,200

UNION COLLEGE, Schenectady, N.Y.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$153,200

UTAH STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Logan, Utah; *Summer Institute for Junior High School Teachers of Science and Mathematics*; 10 weeks; \$75,800

VANDERBILT UNIVERSITY, Nashville, Tenn.

*Summer Institute for High School Teachers of Mathematics*; 8 weeks; \$52,700

*Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$82,300

UNIVERSITY OF VERMONT AND STATE AGRICULTURAL COLLEGE, Burlington, Vt.

*Summer Institute for High School Teachers of Mathematics*; 7 weeks; \$71,400

*Summer Institute for High School Teachers of Physics*; 8 weeks; \$93,800

VILLANOVA UNIVERSITY, Villanova, Pa.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$96,700

VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg, Va.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$63,800

VIRGINIA STATE COLLEGE, Petersburg, Va.; *Summer Institute for High School Teachers of General Science*; 8 weeks; \$86,550

UNIVERSITY OF VIRGINIA, Charlottesville, Va.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$93,300

WAKE FOREST COLLEGE, Winston-Salem, N.C.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$58,800

WASHBURN UNIVERSITY OF TOPEKA, Topeka, Kans.; *Summer Institute for Junior High School Teachers of Mathematics*; 8 weeks; \$63,800

UNIVERSITY OF WASHINGTON, Seattle, Wash.; *Summer Institute for High School Teachers of Physics*; 7 weeks; \$54,900

*Summer Institute in Radiation Biology for College Teachers of Science*; 7 weeks; \$18,400

*Summer Institute in Radiation Biology for High School Teachers of Science*; 7 weeks; \$17,800

WAYNE STATE UNIVERSITY, Detroit, Mich. *Summer Institute for High School Teachers of Mathematics*; 8 weeks; \$61,600

*Summer Institute in Radiation Biology for High School Teachers*; 8 weeks; \$20,200

WESLEYAN UNIVERSITY, Middletown, Conn.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$100,100

WEST TEXAS STATE COLLEGE, Canyon, Tex.; *Summer Institute for High School Teachers of Science and Mathematics*; 12 weeks; \$84,500

WEST VIRGINIA UNIVERSITY, Morgantown, W. Va.; *Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$89,300

WEST VIRGINIA WESLEYAN COLLEGE, Buckhannon, W. Va.; *Summer Institute for Junior High School Teachers of Sciences*; 6 weeks; \$49,000

WESTERN KENTUCKY STATE COLLEGE, Bowling Green, Ky.; *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$79,600

WESTERN MICHIGAN UNIVERSITY, Kalamazoo, Mich.

*Summer Conference in Geobotany for College Teachers of Biology, Geology, Geography, or Conservation Education*; 14 days; \$17,900

*Summer Institute for High School Teachers of Mathematics*; 6 weeks; \$50,300

*Summer Institute for Junior High School Teachers of General Science*; 8 weeks; \$51,500

WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; *Summer Institute for High School Teachers of Science and Mathematics*; 11 weeks; \$128,600

WESTERN STATE COLLEGE OF COLORADO, Gunnison, Colo.; *Summer Institute for High School Teachers of Biology*; 8 weeks; \$27,100

WESTERN WASHINGTON COLLEGE OF EDUCATION, Bellingham, Wash.; *Summer Institute*



for *High School Teachers of Mathematics*; 9 weeks; \$67,600

WILLIAM JEWELL COLLEGE, Liberty, Mo.; *Summer Institute for High School Teachers of Science*; 8 weeks; \$79,400

WISCONSIN STATE COLLEGE, Eau Claire, Wis.; *Summer Institute for High School Teachers of Science*; 6 weeks; \$47,700

UNIVERSITY OF WISCONSIN, Madison, Wis. *Summer Conference in Inorganic Chemistry for College Teachers of Undergraduate Chemistry*; 12 days; \$12,400

*Summer Institute for College Teachers of Biology*; 6 weeks; \$45,600

*Summer Institute for High School Teachers of Biology*; 8 weeks; \$63,300

WITTENBERG COLLEGE, Springfield, Ohio.; *Summer Institute in Earth Science for High School Teachers of Science and Mathematics*; 8 weeks; \$44,600

WOMAN'S COLLEGE OF THE UNIVERSITY OF NORTH CAROLINA, Greensboro, N.C.; *Summer Institute in Science and Mathematics for High School Teachers of General Science*; 6 weeks; \$42,500

WORCESTER POLYTECHNIC INSTITUTE, Worcester, Mass. *Summer Institute for High School Teachers of Science and Mathematics*; 8 weeks; \$76,800

John C. Johnson; *Summer Institute in Science and Mathematics for High School Teachers of Science*; 8 weeks; \$79,200

UNIVERSITY OF WYOMING, Laramie, Wyo. *Summer Institute for College Teachers of Biology*; 5 weeks; \$33,200

*Summer Institute for College Teachers of Mathematics*; 8 weeks; \$68,000

*Summer Institute for College Teachers of Statistics*; 8 weeks; \$81,200

*Summer Institute for High School Teachers of Chemistry and Physics*; 10 weeks; \$96,400

R. J. Bessey; *Summer Institutes for High School Teachers of Chemistry and Physics*; 10 weeks; \$100,000

*Summer Institute for High School Teachers of General Science*; 8 weeks; \$69,600

*Summer Institute in Radiation Biology for High School Teachers*; 8 weeks; \$20,200

XAVIER UNIVERSITY, Cincinnati, Ohio.; *Summer Institute for High School Teachers of Chemistry*; 6 weeks; \$39,300

YALE UNIVERSITY, New Haven, Conn. *Summer Conference on Biophysics Research for College Teachers of Science*; 5 days; \$7,100

*Summer Institute for High School Teachers of Science and Mathematics*; 6 weeks; \$80,300

*Undergraduate Research Participation Program*

ADELPHI COLLEGE, Garden City, N.Y.; *Undergraduate Research Participation Program*; 1 year; \$5,900

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station, Tex.; *Undergraduate Research Participation Program*; 1 year; \$9,400

AGRICULTURAL AND TECHNICAL COLLEGE OF NORTH CAROLINA, Greensboro, N. C.; *Undergraduate Research Participation Program*; 1 year; \$8,300

ALBRIGHT COLLEGE, Reading, Pa.; *Undergraduate Research Participation Program*; 1 year; \$1,780

ALLEGHENY COLLEGE, Meadville, Pa.; *Undergraduate Research Participation Program*; 1 year; \$6,060

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; *Undergraduate Research Participation Program*; 1 year; \$17,000

AMERICAN UNIVERSITY, Washington, D.C.; *Undergraduate Research Participation Program*; 3 months; \$2,540

AMHERST COLLEGE, Amherst, Mass.; *Undergraduate Research Participation Program*; 1 year; \$18,870

UNIVERSITY OF ARKANSAS, Fayetteville, Ark.; *Undergraduate Research Participation Program*; 1 year; \$14,290

BARNARD COLLEGE, New York, N.Y.; *Undergraduate Research Participation Program*; 1 year; \$9,040

BOSTON UNIVERSITY, Boston, Mass.; *Undergraduate Research Participation Program*; 1 year; \$32,840

BOWDOIN COLLEGE, Brunswick, Maine; *Undergraduate Research Participation Program*; 1 year; \$8,650

BOWLING GREEN STATE UNIVERSITY, Bowling Green, Ohio; *Undergraduate Participation Program*; 1 year; \$3,300

BRANDeis UNIVERSITY, Waltham, Mass.; *Undergraduate Research Participation Program*; 1 year; \$7,490

BRIDGEWATER COLLEGE, Bridgewater, Va.; *Undergraduate Research Participation Program*; 3 months; \$4,200

BRIGHAM YOUNG UNIVERSITY, Provo, Utah, *Undergraduate Research Participation Program*; 1 year; \$10,880

BROWN UNIVERSITY, Providence, R.I.; *Undergraduate Research Participation Program*; 1 year; \$17,130

BRYN MAWR COLLEGE, Bryn Mawr, Pa.; *Undergraduate Research Participation Program*; 1 year; \$8,250

BUCKNELL UNIVERSITY, Lewisburg, Pa. *Undergraduate Research Participation Program*; 3 months; \$3,600

BUTLER UNIVERSITY, Indianapolis, Ind.; *Undergraduate Research Participation Program*; 1 year; \$3,880

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; *Undergraduate Research Participation Program*; 1 year; \$19,280

UNIVERSITY OF CALIFORNIA, Berkeley, Calif. *Undergraduate Research Participation Program*; 3 months; \$7,520

*Undergraduate Research Participation Program*; 1 year; \$3,520

*Undergraduate Research Participation Program*; 3 months; \$3,500

*Undergraduate Research Participation Program*; 3 months; \$3,220

*Undergraduate Research Participation Program*; 3 months; \$2,720

UNIVERSITY OF CALIFORNIA, Los Angeles, Calif.; *Undergraduate Research Participation Program*; 1 year; \$5,780

CANISUS COLLEGE, Buffalo, N.Y.; *Undergraduate Research Participation Program*; 3 months; \$5,330

CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.; *Undergraduate Research Participation Program*; 1 year; \$25,940

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio; *Undergraduate Research Participation Program*; 3 months; \$4,030

UNIVERSITY OF CHICAGO, Chicago, Ill.; *Undergraduate Research Participation Program*; 1 year; \$19,250

UNIVERSITY OF CINCINNATI, Cincinnati, Ohio; *Undergraduate Research Participation Program*; 1 year; \$3,210

CITY COLLEGE, New York, N.Y.; *Undergraduate Research Participation Program*; 1 year; \$10,100

COLGATE UNIVERSITY, Hamilton, N.Y.; *Undergraduate Research Participation Program*; 1 year; \$14,270

COLORADO COLLEGE, Colorado Springs, Colo.; *Undergraduate Research Participation Program*; 1 year; \$860

COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; *Undergraduate Research Participation Program*; 8 months; \$18,950

*Undergraduate Research Participation Program*; 8 months; \$910

UNIVERSITY OF COLORADO, Boulder, Colo.; *Undergraduate Research Participation Program*; 3 months; \$15,190

UNIVERSITY OF CONNECTICUT, Storrs, Conn.; *Undergraduate Research Participation Program*; 1 year; \$8,870

*Undergraduate Research Participation Program*; 3 months; \$8,690

CORNELL COLLEGE, Mount Vernon, Iowa; *Undergraduate Research Participation Program*; 1 year; \$4,280

CORNELL UNIVERSITY, Ithaca, N.Y.; *Undergraduate Research Participation Program*; 1 year; \$40,720

CREEDMORE INSTITUTE FOR PSYCHOBIOLOGIC STUDIES BRANCH, RESEARCH FOUNDATION FOR MENTAL HYGIENE, INC., Middletown, N.Y.; *Undergraduate Research Participation Program*; 3 months; \$1,790

DARTMOUTH COLLEGE, Hanover, N.H.; *Undergraduate Research Participation Program*; 1 year; \$17,300

UNIVERSITY OF DENVER, Denver, Colo.; *Undergraduate Research Participation Program*; 1 year; \$10,740

UNIVERSITY OF DETROIT, Detroit, Mich.; *Undergraduate Research Participation Program*; 1 year; \$7,060

DREXEL INSTITUTE OF TECHNOLOGY, Philadelphia, Pa.; *Undergraduate Research Participation Program*; 1 year; \$9,460

DUQUESNE UNIVERSITY, Pittsburgh, Pa.; *Undergraduate Research Participation Program*; 1 year; \$2,200

EARLHAM COLLEGE, Richmond, Ind.; *Undergraduate Research Participation Program*; 3 months; \$7,320

EASTERN NAZARENE COLLEGE, Wollaston, Mass.; *Undergraduate Research Participation Program*; 1 year; \$2,670

EMMANUEL COLLEGE, Boston, Mass.; *Undergraduate Research Participation Program*; 1 year; \$4,400

FISK UNIVERSITY, Nashville, Tenn.; *Undergraduate Research Participation Program*; 1 year; \$1,360

FLORIDA AGRICULTURAL AND MECHANICAL UNIVERSITY, Tallahassee, Fla.; *Undergraduate Research Participation Program*; 1 year; \$4,250

UNIVERSITY OF FLORIDA, Gainesville, Fla.; *Undergraduate Research Participation Program*; 1 year; \$15,810

FORDHAM UNIVERSITY, New York, N.Y.; *Undergraduate Research Participation Program*; 1 year; \$9,390

FRANKLIN AND MARSHALL COLLEGE, Lancaster, Pa.; *Undergraduate Research Participation Program*; 3 months; \$5,590

GENEVA COLLEGE, Beaver Falls, Pa.; *Undergraduate Research Participation Program*; 1 year; \$3,480

GOUCHER COLLEGE, Baltimore, Md.; *Undergraduate Research Participation Program*; 1 year; \$1,340

GRINNELL COLLEGE, Grinnell, Iowa; *Undergraduate Research Participation Program*; 1 year; \$14,280

GROVE CITY COLLEGE, Grove City, Pa.; *Undergraduate Research Participation Program*; 1 year; \$780

GUSTAVUS ADOLPHUS COLLEGE, St. Peter, Minn.; *Undergraduate Research Participation Program*; 1 year; \$910

HAMPDEN-SYDNEY COLLEGE, Hampden-Sydney, Va.; *Undergraduate Research Participation Program*; 1 year; \$1,200

HARVARD UNIVERSITY, Cambridge, Mass.; *Undergraduate Research Participation Program*; 3 months; \$12,830

HAVERFORD COLLEGE, Haverford, Pa.; *Undergraduate Research Participation Program*; 1 year; \$8,140

UNIVERSITY OF HAWAII, Honolulu, Hawaii; *Undergraduate Research Participation Program*; 3 months; \$6,810

HOWARD UNIVERSITY, Washington, D.C.; *Undergraduate Research Participation Program*; 1 year; \$17,140

HOLLINS COLLEGE, Hollins College, Va.; *Undergraduate Research Participation Program*; 1 year; \$5,700

IDAHO STATE COLLEGE, Pocatello, Idaho; *Undergraduate Research Participation Program*; 1 year; \$1,670

*Undergraduate Research Participation Program*; 1 year; \$880

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.; *Undergraduate Research Participation Program*; 1 year; \$17,640

UNIVERSITY OF ILLINOIS, Urbana, Ill.; *Undergraduate Research Participation Program*; 1 year; \$7,730

*Undergraduate Research Participation Program*; 1 year; \$4,570

IMMACULATE HEART COLLEGE, Los Angeles, Calif.; *Undergraduate Research Participation Program*; 1 year; \$6,400

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; *Undergraduate Research Participation Program*; 1 year; \$17,400

IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Ames, Iowa; *Undergraduate Research Participation Program*; 1 year; \$7,690

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; *Undergraduate Research Participation Program*; 1 year; \$5,270

JUNIATA COLLEGE, Huntingdon, Pa.; *Undergraduate Research Participation Program*; 1 year; \$8,160

KANSAS STATE COLLEGE OF AGRICULTURE AND APPLIED SCIENCES, Manhattan, Kans.; *Undergraduate Research Participation Program*; 1 year; \$18,350

UNIVERSITY OF KANSAS, Lawrence, Kans.; *Undergraduate Research Participation Program*; 1 year; \$14,900

KENTUCKY RESEARCH FOUNDATION, UNIVERSITY STATION, Lexington, Ky.; *Undergraduate Research Participation Program*; 1 year; \$28,230

KING'S COLLEGE, Wilkes-Barre, Pa.; *Undergraduate Research Participation Program*; 1 year; \$3,750

KNOX COLLEGE, Galesburg, Ill.; *Undergraduate Research Participation Program*; 1 year; \$2,010

LAFAYETTE COLLEGE, Easton, Pa.; *Undergraduate Research Participation Program*; 1 year; \$11,360

LAMAR STATE COLLEGE OF TECHNOLOGY, Beaumont, Tex.; *Undergraduate Research Participation Program*; 1 year; \$6,400

LA VERNE COLLEGE, La Verne, Calif.; *Undergraduate Research Participation Program*; 1 year; \$4,810

LEHIGH UNIVERSITY, Bethlehem, Pa.  
*Undergraduate Research Participation Program*; 1 year \$3,720  
*Undergraduate Research Participation Program*; 1 year; \$3,380

LONG ISLAND BIOLOGICAL ASSOCIATION, Cold Spring Harbor, N.Y.; *Undergraduate Research Participation Program*; 3 months; \$7,400

LORAS COLLEGE, Dubuque, Iowa; *Undergraduate Research Participation Program*; 1 year; \$3,440

LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; *Undergraduate Research Participation Program*; 1 year; \$14,500

MACALESTER COLLEGE, St. Paul, Minn.; *Undergraduate Research Participation Program*; 1 year; \$960

MANHATTAN COLLEGE, New York, N.Y.; *Undergraduate Research Participation Program*; 1 year; \$10,300

MARQUETTE UNIVERSITY, Milwaukee, Wis.; *Undergraduate Research Participation Program*; 1 year; \$2,650

UNIVERSITY OF MARYLAND, College Park, Md.; *Undergraduate Research Participation Program*; 1 year; \$9,630

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.; *Undergraduate Research Participation Program*; 8 months; \$5,780

UNIVERSITY OF MASSACHUSETTS, Amherst, Mass.; *Undergraduate Research Participation Program*; 1 year; \$16,060

MIAMI UNIVERSITY, Oxford, Ohio; *Undergraduate Research Participation Program*; 1 year; \$9,130

UNIVERSITY OF MIAMI, Coral Gables, Fla.; *Undergraduate Research Participation Program*; 1 year; \$1,080

MICHIGAN COLLEGE OF MINING AND TECHNOLOGY, Houghton, Mich.; *Undergraduate Research Participation Program*; 1 year; \$3,390

MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing, Mich.  
*Undergraduate Research Participation Program*; 1 year; \$47,720  
*Undergraduate Research Participation Program*; 1 year; \$6,290  
*Undergraduate Research Participation Program*; 1 year; \$1,810

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.  
*Undergraduate Research Participation Program*; 3 months; \$3,350  
*Undergraduate Research Participation Program*; 3 months; \$1,870

MILLIKIN UNIVERSITY, Decatur, Ill.; *Undergraduate Research Participation Program*; 1 year; \$1,560

MILLSAPS COLLEGE, Jackson, Miss.; *Undergraduate Research Participation Program*; 1 year; \$3,070

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.  
*Undergraduate Research Participation Program*; 1 year; \$7,300  
*Undergraduate Research Participation Program*; 1 year; \$5,020

MISSISSIPPI STATE UNIVERSITY, State College, Miss.; *Undergraduate Research Participation Program*; 9 months; \$6,810

MONTANA STATE UNIVERSITY, Missoula, Mont.  
*Undergraduate Research Participation Program*; 1 year; \$1,170  
*Undergraduate Research Participation Program*; 1 year; \$820  
*Undergraduate Research Participation Program*; 1 year; \$690

MOUNT MERCY COLLEGE, Pittsburgh, Pa.; *Undergraduate Research Participation Program*; 3 months; \$4,060

NATIONAL RADIO ASTRONOMY OBSERVATORY, Green Bank, W.Va.; *Undergraduate Research Participation Program*; 3 months; \$6,180

NEW ENGLAND INSTITUTE FOR MEDICAL RESEARCH, Ridgefield, Conn.; *Undergraduate Research Participation Program*; 3 months; \$2,500

UNIVERSITY OF NEW HAMPSHIRE, Durham, N.H.; *Undergraduate Research Participation Program*; 1 year; \$7,780

NEW MEXICO COLLEGE OF AGRICULTURE AND MECHANIC ARTS, State College, N. Mex.; *Undergraduate Research Participation Program*; 1 year; \$18,360

NEW MEXICO HIGHLANDS UNIVERSITY, Las Vegas, N. Mex.; *Undergraduate Research Participation Program*; 1 year; \$7,150

NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY, Socorro, N. Mex.; *Undergraduate Research Participation Program*; 1 year; \$9,480

NEW YORK UNIVERSITY, New York, N.Y.  
*Undergraduate Research Participation Program*; 1 year; \$8,990  
*Undergraduate Research Participation Program*; 3 months; \$1,950

UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; *Undergraduate Research Participation Program*; 1 year; \$23,710

NORTH DAKOTA STATE COLLEGE, Fargo, N. Dak.; *Undergraduate Research Participation Program*; 1 year; \$14,140

UNIVERSITY OF NORTH DAKOTA, Grand Forks, N. Dak.  
*Undergraduate Research Participation Program*; 1 year; \$8,540  
*Undergraduate Research Participation Program*; 3 months; \$2,300

NORTHEASTERN UNIVERSITY, Boston, Mass.; *Undergraduate Research Participation Program*; 1 year; \$8,600

NORTHWESTERN STATE COLLEGE OF LOUISIANA, Natchitoches, La.  
*Undergraduate Research Participation Program*; 1 year; \$3,270  
*Undergraduate Research Participation Program*; 1 year; \$1,500

NORTHWESTERN UNIVERSITY, Evanston, Ill.; *Undergraduate Research Participation Program*; 3 months; \$9,500

COLLEGE OF NOTRE DAME OF MARYLAND, Baltimore, Md.; *Undergraduate Research Participation Program*; 1 year; \$3,700

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; *Undergraduate Research Participation Program*; 1 year; \$1,120

OHIO STATE UNIVERSITY, Columbus, Ohio; *Undergraduate Research Participation Program*; 1 year; \$1,530

OHIO UNIVERSITY, Athens, Ohio; *Undergraduate Research Participation Program*; 3 months; \$4,770

OHIO WESLEYAN UNIVERSITY, Delaware, Ohio  
*Undergraduate Research Participation Program*; 3 months; \$4,830  
*Undergraduate Research Participation Program*; 1 year; \$760

OKLAHOMA STATE UNIVERSITY RESEARCH FOUNDATION, Stillwater, Okla.; *Undergraduate Research Participation Program*; 1 year; \$13,070

OREGON STATE COLLEGE, Corvallis, Oreg.  
*Undergraduate Research Participation Program*; 3 months; \$5,580  
*Undergraduate Research Participation Program*; 1 year; \$4,080  
*Undergraduate Research Participation Program*; 1 year; \$3,510  
*Undergraduate Research Participation Program*; 1 year; \$2,060  
*Undergraduate Research Participation Program*; 1 year; \$2,000  
*Undergraduate Research Participation Program*; 1 year; \$830  
*Undergraduate Research Participation Program*; 1 year; \$810

UNIVERSITY OF OREGON, Eugene, Oreg.; *Undergraduate Research Participation Program*; 1 year; \$45,870

COLLEGE OF THE PACIFIC, Stockton, Calif.; *Undergraduate Research Participation Program*; 1 year; \$5,620

UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.  
*Undergraduate Research Participation Program*; 1 year; \$650  
*Undergraduate Research Participation Program*; 3 months; \$7,380  
*Undergraduate Research Participation Program*; 1 year; \$4,750

POLYTECHNIC INSTITUTE OF BROOKLYN, Brooklyn, N.Y.; *Undergraduate Research Participation Program*; 1 year; \$9,190

POMONA COLLEGE, Claremont, Calif.; *Undergraduate Research Participation Program*; 1 year; \$17,570

PRINCETON UNIVERSITY, Princeton, N.J.; *Undergraduate Research Participation Program*; 1 year; \$14,430

UNIVERSITY OF PUERTO RICO, Rio Piedras, P.R.; *Undergraduate Research Participation Program*; 1 year; \$4,600

UNIVERSITY OF REDLANDS, Redlands, Calif.; *Undergraduate Research Participation Program*; 3 months; \$6,260

REED COLLEGE, Portland, Oreg.; *Undergraduate Research Participation Program*; 1 year; \$13,700

KENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; *Undergraduate Research Participation Program*; 1 year; \$14,470

RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK, Albany, N.Y.; *Undergraduate Research Participation Program*; 3 months; \$8,500

ROSCOE B. JACKSON MEMORIAL LABORATORY, Bar Harbor, Maine; *Undergraduate Research Participation Program*; 3 months; \$12,140

ROSEMONT COLLEGE, Rosemont, Pa.; *Undergraduate Research Participation Program*; 1 year; \$2,085

COLLEGE OF SAINT CATHERINE, St. Paul, Minn.; *Undergraduate Research Participation Program*; 1 year; \$2,970

COLLEGE OF SAINT ELIZABETH, Convent Station, N.J.; *Undergraduate Research Participation Program*; 1 year; \$4,630

SAINTE JOSEPH COLLEGE, West Hartford, Conn.; *Undergraduate Research Participation Program*; 1 year; \$3,050

SAINTE JOSEPH'S COLLEGE, Collegeville, Ind.; *Undergraduate Research Participation Program*; 1 year; \$3,760

SAINTE LOUIS UNIVERSITY, St. Louis, Mo.  
*Undergraduate Research Participation Program*; 1 year; \$3,020  
*Undergraduate Research Participation Program*; 1 year; \$2,490

SAINTE MARTIN'S COLLEGE, Olympia, Wash.; *Undergraduate Research Participation Program*; 1 year; \$1,160

ST. MARY'S COLLEGE, Winona, Minn.; *Undergraduate Research Participation Program*; 1 year; \$6,560

SAINTE MARY'S UNIVERSITY OF SAN ANTONIO, San Antonio, Tex.; *Undergraduate Research Participation Program*; 1 year; \$7,040

UNIVERSITY OF SAN FRANCISCO, San Francisco, Calif.; *Undergraduate Research Participation Program*; 1 year; \$1,830

SEATTLE PACIFIC COLLEGE, Seattle, Wash.; *Undergraduate Research Participation Program*; 1 year; \$6,410

SEATTLE UNIVERSITY, Seattle, Wash.; *Undergraduate Research Participation Program*; 1 year; \$10,990

UNIVERSITY OF SOUTH CAROLINA, Columbia, S.C.; *Undergraduate Research Participation Program*; 1 year; \$9,650

SOUTHERN ILLINOIS UNIVERSITY, Carbondale, Ill.; *Undergraduate Research Participation Program*; 1 year; \$11,740

SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.; *Undergraduate Research Participation Program*; 1 year; \$7,990

SOUTHERN UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; *Undergraduate Research Participation Program*; 1 year; \$1,620

SOUTHEASTERN STATE COLLEGE, Durant, Okla.; *Undergraduate Research Participation Program*; 1 year; \$3,710

SOUTHWESTERN AT MEMPHIS, Memphis, Tenn.; *Undergraduate Research Participation Program*; 3 months; \$6,250

STANFORD UNIVERSITY, Stanford, Calif.; *Undergraduate Research Participation Program*; 1 year; \$17,580

STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; *Undergraduate Research Participation Program*; 1 year; \$13,510

STATE UNIVERSITY OF IOWA, Iowa City, Iowa  
*Undergraduate Research Participation Program*; 1 year; \$9,170  
*Undergraduate Research Participation Program*; 1 year; \$3,580

SYRACUSE UNIVERSITY RESEARCH FOUNDATION, Syracuse, N.Y.; *Undergraduate Research Participation Program*; 11 months; \$7,820

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.  
*Undergraduate Research Participation Program*; 1 year; \$4,850  
*Undergraduate Research Participation Program*; 1 year; \$7,410

TEXAS WOMAN'S UNIVERSITY, Denton, Tex.; Undergraduate Research Participation Program; 1 year; \$9,390  
 Undergraduate Research Participation Program; 1 year; \$2,190  
 Undergraduate Research Participation Program; 3 months; \$1,720  
 Undergraduate Research Participation Program; 1 year; \$1,510  
 UNIVERSITY OF TEXAS, Austin, Tex.; Undergraduate Research Participation Program; 3 months; \$7,260  
 TUFTS UNIVERSITY, Medford, Mass.; Undergraduate Research Participation Program; 1 year; \$9,230  
 TULANE UNIVERSITY OF LOUISIANA, New Orleans, La.; Undergraduate Research Participation Program; 1 year; \$18,100  
 TUSKEGEE INSTITUTE, Tuskegee Institute, Ala.; Undergraduate Research Participation Program; 1 year; \$15,000  
 UNION COLLEGE AND UNIVERSITY, Schenectady, N.Y.; Undergraduate Research Participation Program; 1 year; \$5,690  
 UNIVERSITY OF UTAH, Salt Lake City, Utah  
 Undergraduate Research Participation Program; 3 months; \$10,720  
 Undergraduate Research Participation Program; 1 year; \$8,160  
 VILLANOVA UNIVERSITY, Villanova, Pa.; Undergraduate Research Participation Program; 1 year; \$4,070  
 VIRGINIA FISHERIES LABORATORY, Gloucester Point, Va.; Undergraduate Research Participation Program; 3 months; \$7,700  
 VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg, Va.; Undergraduate Research Participation Program; 1 year; \$8,990  
 VIRGINIA STATE COLLEGE, Petersburg, Va.; Undergraduate Research Participation Program; 1 year; \$6,650  
 WABASH COLLEGE, Crawfordsville, Ind.; Undergraduate Research Participation Program; 3 months; \$5,320  
 WAYNE STATE UNIVERSITY, Detroit, Mich.; Undergraduate Research Participation Program; 3 months; \$4,810  
 WEST VIRGINIA WESLEYAN COLLEGE, Buckhannon, W. Va.; Undergraduate Research Participation Program; 1 year; \$6,330  
 WESTERN KENTUCKY STATE COLLEGE, Bowling Green, Ky.; Undergraduate Research Participation Program; 1 year; \$5,950  
 WESTERN MICHIGAN UNIVERSITY, Kalamazoo, Mich.; Undergraduate Research Participation Program; 1 year; \$9,960  
 WESTERN RESERVE UNIVERSITY, Cleveland, Ohio; Undergraduate Research Participation Program; 1 year; \$19,180  
 WESTERN STATE COLLEGE OF COLORADO, Gunnison, Colo.; Undergraduate Research Participation Program; 1 year; \$4,930  
 WHITTIER COLLEGE, Whittier, Calif.; Undergraduate Research Participation Program; 6 months; \$1,150  
 UNIVERSITY OF WICHITA, Wichita, Kans.; Undergraduate Research Participation Program; 1 year; \$3,490  
 UNIVERSITY OF WISCONSIN, Madison, Wis.; Undergraduate Research Participation Program; 1 year; \$8,920  
 COLLEGE OF WOOSTER, Wooster, Ohio; Undergraduate Research Participation Program; 1 year; \$7,900  
 XAVIER UNIVERSITY, Cincinnati, Ohio; Undergraduate Research Participation Program; 1 year; \$6,410

YALE UNIVERSITY, New Haven, Conn.; Undergraduate Research Participation Program; 1 year; \$23,630  
 Summer Science Training Program for Secondary School Students  
 AGRICULTURAL AND TECHNICAL COLLEGE OF NORTH CAROLINA, Greensboro, N.C.; Summer Science Training Program for Secondary School Students; 4 weeks; \$17,040  
 AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station, Tex.; Summer Science Training Program for Secondary School Students; 5 weeks; \$10,910  
 UNIVERSITY OF ALASKA, College, Alaska; Summer Science Training Program for Secondary School Students; 3 weeks; \$12,790  
 AMERICAN ACADEMY OF ARTS AND SCIENCES, Boston, Mass.; Summer Science Training Program for Secondary School Students; 10 weeks; \$33,570  
 AMERICAN METEOROLOGICAL SOCIETY, Boston, Mass.; Summer Science Training Program for Secondary School Students; 7 weeks; \$25,940  
 AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Summer Science Training Program for Secondary School Students; 4 weeks; \$5,710  
 APPALACHIAN STATE TEACHERS COLLEGE, Boone, N.C.; Summer Science Training Program for Secondary School Students; 6 weeks; \$21,400  
 UNIVERSITY OF ARIZONA, Tucson, Ariz.; Summer Science Training Program for Secondary School Students; 9 weeks; \$8,130  
 ASSUMPTION COLLEGE, Worcester, Mass.; Summer Science Training Program for Secondary School Students; 6 weeks; \$15,600  
 UNIVERSITY OF CALIFORNIA, Berkeley, Calif.  
 Summer Science Training Program for Secondary School Students; 6 weeks; \$7,350  
 Summer Science Training Program for Secondary School Students; 8 weeks; \$4,100  
 BENNETT COLLEGE, Greensboro, N.C.; Summer Science Training Program for Secondary School Students; 6 weeks; \$40,570  
 BOSTON UNIVERSITY, Boston, Mass.; Summer Science Training Program for Secondary School Students; 8 weeks; \$1,230  
 UNIVERSITY OF BRIDGEPORT, Bridgeport, Conn.; Summer Science Training Program for Secondary School Students; 7 weeks; \$23,950  
 BRIGHAM YOUNG UNIVERSITY, Provo, Utah; Summer Science Training Program for Secondary School Students; 2 weeks; \$16,280  
 BUCKNELL UNIVERSITY, Lewisburg, Pa.; Summer Science Training Program for Secondary School Students; 5 weeks; \$12,050  
 BUTLER UNIVERSITY, Indianapolis, Ind.; Summer Science Training Program for Secondary School Students; 7 weeks; \$4,790  
 CALIFORNIA STATE POLYTECHNIC COLLEGE, San Luis Obispo, Calif.; Summer Science Training Program for Secondary School Students; 4 weeks; \$19,750  
 UNIVERSITY OF CHICAGO, Chicago, Ill.; Summer Science Training Program for Secondary School Students; 6 weeks; \$40,570  
 COLGATE UNIVERSITY, Hamilton, N.Y.; Summer Science Training Program for Secondary School Students; 6 weeks; \$14,550  
 COLLEGE OF THE HOLY NAMES, Oakland, Calif.; Summer Science Training Program for Secondary School Students; 6 weeks; \$13,290

COLORADO COLLEGE, Colorado Springs, Colo.; *Summer Science Training Program for Secondary School Students*; 8 weeks; \$12,330

COLUMBIA UNIVERSITY, New York, N.Y.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$33,800

COOPER UNION, New York, N.Y.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$18,080

CORNELL UNIVERSITY, Ithaca, N.Y.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$25,890

UNIVERSITY OF DETROIT, Detroit, Mich.; *Summer Science Training Program for Secondary School Students*; 8 weeks; \$10,540

EAST CAROLINA COLLEGE, Greenville, N.C.; *Summer Science Training Program for Secondary School Students*; 3 weeks; \$8,080

EAST TEXAS STATE COLLEGE, Commerce, Tex.; *Summer Science Training Program for Secondary School Students*; 5 weeks; \$5,940

EASTERN MONTANA COLLEGE OF EDUCATION, Billings, Mont.; *Summer Science Training Program for Secondary School Students*; 9 weeks; \$2,100

EMORY COLLEGE, Atlanta, Ga.; *Summer Science Training Program for Secondary School Students*; 5 weeks; \$11,450

EMORY AND HENRY COLLEGE, Emory, Va.; *Summer Science Training Program for Secondary School Students*; 5 weeks; \$4,960

FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; *Summer Science Training Program for Secondary School Students*; 2 weeks; \$8,600

UNIVERSITY OF FLORIDA, Gainesville, Fla.; *Summer Science Training Program for Secondary School Students*; 8 weeks; \$14,630

GENEVA COLLEGE, Beaver Falls, Pa.; *Summer Science Training Program for Secondary School Students*; 9 weeks; \$3,945

GEORGE PEABODY COLLEGE FOR TEACHERS, Nashville, Tenn.; *Summer Science Training Program for Secondary School Students*; 8 weeks; \$51,700

GODDARD COLLEGE, Plainfield, Vt.; *Summer Science Training Program for Secondary School Students*; 5 weeks; \$10,140

HOWARD PAYNE COLLEGE, Brownsville, Tex.; *Summer Science Training Program for Secondary School Students*; 4 weeks; \$7,700

HOWARD UNIVERSITY, Washington, D.C.; *Summer Science Training Program for Secondary School Students*; 8 weeks; \$14,320

HUMBOLDT STATE COLLEGE, Arcata, Calif.; *Summer Science Training Program for Secondary School Students*; 4 weeks; \$20,000

HUNTER COLLEGE, New York, N.Y.; *Summer Science Training Program for Secondary School Students*; 4 weeks; \$6,050

*Summer Science Training Program for Secondary School Students*; 6 weeks; \$4,710

ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.; *Summer Science Training Program for Secondary School Students*; 1 year; \$19,950

INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.; *Summer Science Training Program for Secondary School Students*; 8 weeks; \$20,620

INTER-AMERICAN UNIVERSITY OF PUERTO RICO, San German, P.R.; *Summer Science Training Program for Secondary School Students*; 8 weeks; \$5,500

UNIVERSITY OF KANSAS, Lawrence, Kans.; *Summer Science Training Program for Secondary School Students*; 4 weeks; \$14,740

KENYON COLLEGE, Gambler, Ohio; *Summer Science Training Program for Secondary School Students*; 9 weeks; \$480

KNOX COLLEGE, Galesburg, Ill.; *Summer Science Training Program for Secondary School Students*; 4 weeks; \$11,360

KNOXVILLE COLLEGE, Knoxville, Tenn.; *Summer Science Training Program for Secondary School Students*; 8 weeks; \$27,360

LOUISIANA POLYTECHNIC INSTITUTE, Ruston, La.; *Summer Science Training Program for Secondary School Students*; 7 weeks; \$19,710

LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge, La.; *Summer Science Training Program for Secondary School Students*; 9 weeks; \$12,020

LOYOLA UNIVERSITY OF LOS ANGELES, Los Angeles, Calif.; *Summer Science Training Program for Secondary School Students*; 1 year; \$3,150

UNIVERSITY OF MAINE, Orono, Maine; *Summer Science Training Program for Secondary School Students*; 4 weeks; \$42,780

MANHATTAN COLLEGE, New York, N.Y.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$10,770

MANKATO STATE COLLEGE, Mankato, Minn.; *Summer Science Training Program for Secondary School Students*; 2 weeks; \$7,980

UNIVERSITY OF MARYLAND, College Park, Md.; *Summer Science Training Program for Secondary School Students*; 10 weeks; \$3,820

UNIVERSITY OF MIAMI, Coral Gables, Fla.; *Summer Science Training Program for Secondary School Students*; 9 weeks; \$9,030

MICHIGAN STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, East Lansing, Mich.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$40,890

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$23,680

UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; *Summer Science Training Program for Secondary School Students*; 10 weeks; \$15,770

MISSISSIPPI SOUTHERN COLLEGE, Hattiesburg, Miss.; *Summer Science Training Program for Secondary School Students*; 2 weeks; \$12,500

UNIVERSITY OF MISSOURI, Columbia, Mo.; *Summer Science Training Program for Secondary School Students*; 7 weeks; \$17,600

MONTANA STATE COLLEGE, Bozeman, Mont.; *Summer Science Training Program for Secondary School Students*; 4 weeks; \$23,250

MONTANA STATE UNIVERSITY, Missoula, Mont.; *Summer Science Training Program for Secondary School Students*; 4 weeks; \$4,730

MORGAN STATE COLLEGE, Baltimore, Md.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$17,500

MORRIS BROWN COLLEGE, Atlanta, Ga.; *Summer Science Training Program for Secondary School Students*; 9 weeks; \$16,900

NEWARK COLLEGE OF ENGINEERING, Newark, N.J.; *Summer Science Training Program for Secondary School Students*; 4 weeks; \$3,600

NEW ENGLAND INSTITUTE FOR MEDICAL RESEARCH, Ridgefield, Conn.; *Summer Science Training Program for Secondary School Students*; 10 weeks; \$400

NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY, Socorro, N. Mex.

*Summer Science Training Program for Secondary School Students*; 9 weeks; \$14,150

*Summer Science Training Program for Secondary School Students*; 9 weeks; \$16,150

NEW YORK BOTANICAL GARDEN, Bronx Park, N.Y., N.Y.; *Summer Science Training Program for Secondary School Students*; 5 weeks; \$14,750

NEW YORK UNIVERSITY, New York, N.Y.

*Summer Science Training Program for Secondary School Students*; 6 weeks; \$5,660

*Summer Science Training Program for Secondary School Students*; 8 weeks; \$3,970

NORTH CAROLINA COLLEGE AT DURHAM, Durham, N.C.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$15,440

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$9,680

NORTHERN MICHIGAN COLLEGE, Marquette, Mich.; *Summer Science Training Program for Secondary School Students*; 4 weeks; \$16,500

NORTHWESTERN UNIVERSITY, Evanston, Ill.; *Summer Science Training Program for Secondary School Students*; 5 weeks; \$5,700

NORWICH UNIVERSITY, Northfield, Vt.; *Summer Science Training Program for Secondary School Students*; 4 weeks; \$5,830

UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.; *Summer Science Program for Secondary School Students*; 7 weeks; \$3,155

OHIO UNIVERSITY, Athens, Ohio; *Summer Science Training Program for Secondary School Students*; 3 weeks; \$21,600

OKLAHOMA STATE UNIVERSITY OF AGRICULTURE AND APPLIED SCIENCE, Stillwater, Okla.

*Summer Science Training Program for Secondary School Students*; 6 weeks; \$16,770

*Summer Science Training Program for Secondary School Students*; 7 weeks; \$4,710

OREGON STATE COLLEGE, Corvallis, Oreg.; *Summer Science Training Program for Secondary School Students*; 2 weeks; \$14,250

PRAIRIE VIEW AGRICULTURAL AND MECHANICAL COLLEGE, Prairie View, Tex.

*Summer Science Training Program for Secondary School Students*; 5 weeks; \$5,500

*Summer Science Training Program for Secondary School Students*; 5 weeks; \$4,980

UNIVERSITY OF PUERTO RICO, Rio Piedras, P.R.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$13,000

PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; *Summer Science Training Program for Secondary School Students*; 8 weeks; \$20,450

ROSWELL PARK MEMORIAL INSTITUTE, Buffalo, N.Y.; *Summer Science Training Program for Secondary School Students*; 9 weeks; \$7,050

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; *Summer Science Training Program for Secondary School Students*; 3 weeks; \$14,210

SAINT AUGUSTINE'S COLLEGE, Raleigh, N.C.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$11,250

ST. CLOUD STATE COLLEGE, St. Cloud, Minn.; *Summer Science Training Program for Secondary School Students*; 4 weeks; \$14,920

ST. OLAF COLLEGE, Northfield, Minn.; *Summer Science Training Program for Secondary School Students*; 8 weeks; \$34,740

SALEM COLLEGE, Salem, W. Va.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$2,820

UNIVERSITY OF SANTA CLARA, Santa Clara, Calif.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$14,490

SOUTH DAKOTA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Brookings, S. Dak.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$9,660

SOUTH DAKOTA SCHOOL OF MINES AND TECHNOLOGY, Rapid City, S. Dak.; *Summer Science Training Program for Secondary School Students*; 2 weeks; \$4,790

STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion, S. Dak.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$7,210

SOUTHERN ILLINOIS UNIVERSITY, Carbondale, Ill.; *Summer Science Training Program for Secondary School Students*; 7 weeks; \$11,840

SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.; *Summer Science Training Program for Secondary School Students*; 5 weeks; \$8,390

STEPHEN F. AUSTIN STATE COLLEGE, Nacogdoches, Tex.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$8,830

STETSON UNIVERSITY, De Land, Fla.; *Summer Science Training Program for Secondary School Students*; 8 weeks; \$23,140

TENNESSEE POLYTECHNIC INSTITUTE, Cookeville, Tenn.; *Summer Science Training Program for Secondary School Students*; 4 weeks; \$6,550

UNIVERSITY OF TENNESSEE, Knoxville, Tenn.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$17,120

TEXAS TECHNOLOGICAL COLLEGE, Lubbock, Tex.; *Summer Science Training Program for Secondary School Students*; 5 weeks; \$5,100

TEXAS WOMAN'S UNIVERSITY, Denton, Tex.; *Summer Science Training Program for Secondary School Students*; 11 weeks; \$14,110

UNIVERSITY OF TEXAS, Austin, Tex.

*Summer Science Training Program for Secondary School Students*; 6 weeks; \$9,885

*Summer Science Training Program for Secondary School Students*; 5 weeks; \$9,640

*Summer Science Training Program for Secondary School Students*; 5 weeks; \$9,390

*Summer Science Training Program for Secondary School Students*; 6 weeks; \$9,245

TRINITY COLLEGE, Hartford, Conn.; *Summer Science Training Program for Secondary School Students*; 7 weeks; \$21,950

UNIVERSITY OF TULSA, Tulsa, Okla.; *Summer Science Training Program for Secondary School Students*; 4 weeks; \$3,600

WALDEMAR MEDICAL RESEARCH FOUNDATION, INC., Port Washington, N.Y.; *Summer Science Training Program for Secondary School Students*; 8 weeks; \$15,950

WASHINGTON UNIVERSITY, St. Louis, Mo.; *Summer Science Training Program for Secondary School Students*; 5 weeks; \$2,015

WESTERN KENTUCKY STATE COLLEGE, Bowling Green, Ky.

*Summer Science Training Program for Secondary School Students*; 8 weeks; \$24,000

*Summer Science Training Program for Secondary School Students*; 8 weeks; \$22,800

WESTERN MICHIGAN UNIVERSITY, Kalamazoo, Mich.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$18,620

WISCONSIN STATE COLLEGE, La Crosse, Wis.; *Summer Science Training Program for Secondary School Students*; 6 weeks; \$6,600

WORCESTER FOUNDATION FOR EXPERIMENTAL BIOLOGY, Shrewsbury, Mass.; *Summer Science Training Program for Secondary School Students*; 9 weeks; \$20,870

YESHIVA UNIVERSITY, New York, N.Y.; *Summer Science Training Program for Secondary School Students*; 9 weeks; \$13,290

#### Other

ACADEMY OF SCIENCE OF ST. LOUIS, Oak Knoll Park, St. Louis, Mo.; *Science Project to Motivate Interest in Science Among Young People*; 1 year; \$17,760

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station, Tex.; *A Short Course for High School Science Teachers at the Galveston Marine Laboratory*; 3 weeks; \$17,950

AMERICAN ANTHROPOLOGICAL ASSOCIATION, LOGAN MUSEUM, BELLOIT COLLEGE, Beloit, Wis.; *Program of Visiting Lecturers in Anthropology*; 1 year; \$22,000

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Washington, D.C.

Hilary J. Deason, Project Director; *Traveling High School Science Library Program*; 1 year; \$500,000

*Traveling High School and Elementary School Science Library Program*; 1 year; \$300,000

AMERICAN ASSOCIATION OF JUNIOR COLLEGES, Washington, D.C.; *Exchange Visit of a Group of United States Technical Institute Educators With an Equivalent Group From the Intermediate Technicums of the USSR*; 3 months; \$28,100

AMERICAN ASSOCIATION OF PHYSICS TEACHERS, NORTHWESTERN UNIVERSITY, Evanston, Ill.; *Conference to Study Lecture Demonstrations in General College Physics*; 3 days; \$8,620

AMERICAN ASTRONOMICAL SOCIETY, U.S. Naval Observatory, Washington, D.C.; *Program of Visiting Scientists in Astronomy*; 1 year; \$38,115

AMERICAN CHEMICAL SOCIETY, Washington, D.C.

*Program of Visiting Scientists*; 15 months; \$85,000

*Visiting Scientists*; 9 months; \$27,550

AMERICAN CHEMICAL SOCIETY'S NEW YORK SECTION, INC., Richmond Hill, N.Y.; *Molecular Structure and Vital Processes*; 1 day; \$2,200

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Washington, D.C.

*Program of Visiting Lecturers in Biology to High Schools*; 1 year; \$23,000

*Program of Visiting Scientists in Biology*; 1 year; \$62,560

AMERICAN INSTITUTE OF PHYSICS, New York, N.Y.

*Preparation and Publication of Drawings and Instructions for Making of Apparatus for College Physics*; 1 year; \$25,470

*Program of Visiting Scientists in Physics (Colleges)*; 1 year; \$52,100

*Visiting Scientists to High Schools Program in Physics*; 1 year; \$28,230

*Visiting Foreign Scientists Program in Physics*; 1 year; \$27,270

*Writing, Reproducing, and Distributing of Three Career Booklets in Physics*; 1 year; \$17,700

AMERICAN METEOROLOGICAL SOCIETY, Boston, Mass.

*Visiting Lectures Program in Meteorology*; 1 year; \$30,800

*Visiting Scientists in Meteorology*; 1 year; \$61,000

AMERICAN PHYSIOLOGICAL SOCIETY, Washington, D.C.

*Two Career Information Brochures*; 1 year; \$22,080

*Visiting Lecturers in Physiology*; 2 years; \$11,940

*Workshop on the Teaching of Physiology in Undergraduate Colleges*; 2 weeks; \$8,370

AMERICAN SOCIETY FOR ENGINEERING EDUCATION, DIVISION OF ENGINEERING, Pasadena, Calif.; *Exchange Mission to USSR on Engineering Education*; 30 days; \$29,000

AMERICAN SOCIETY FOR ENGINEERING EDUCATION, NORTHEASTERN UNIVERSITY, Boston, Mass.; *Program of Visiting Scientists in Engineering*; 1 year; \$18,325

AMERICAN SOCIETY OF ZOOLOGISTS, STANFORD UNIVERSITY, Stanford, Calif.; *Refresher Course in Evolution*; 1 month; \$3,500

ARIZONA ACADEMY OF SCIENCE, Flagstaff, Ariz.; *Proposal for a Tour Lectureship and In-Service Teaching Program*; 1 year; \$22,120

UNIVERSITY OF ARIZONA, Tucson, Ariz.; *A Program for Research Participation for Teacher Training*; 9 weeks; \$13,950

BOSTON UNIVERSITY, Boston, Mass.; *Research Participation Program for Teacher Training*; 8 weeks; \$7,320

BRANDEIS UNIVERSITY, Waltham, Mass.; *Special Field Institute in Theoretical Physics*; 6 weeks; \$19,500

BRIGHAM YOUNG UNIVERSITY, Provo, Utah; *Research Participation Program for High School Science Teachers*; 9 weeks; \$14,260

BUFFALO SOCIETY OF NATURAL SCIENCES, BUFFALO MUSEUM OF SCIENCE, Buffalo, N.Y.; *Supplemental Science Program*; 1 year; \$19,480

UNIVERSITY OF BUFFALO, Buffalo, N.Y.; *Research Participation by Qualified High School Chemistry Teachers*; 9 weeks; \$6,380

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.

*Experimental Program in Training Secondary School Teachers*; 3 years; \$56,600

*High School Science Teachers' Summer Research Project*; 10 weeks; \$33,300

*Junior Research in Mathematics for Undergraduates, Secondary School Teachers and Secondary School Students*; 1 year; \$21,470

*Summer Field Training Institute for Graduate Students in Archaeology and Ethnology*; 9 weeks; \$15,400

CHICAGO ACADEMY OF SCIENCES, Chicago, Ill.; *Science Seminar and Workshop*; 1 year; \$4,180

UNIVERSITY OF CHICAGO, Chicago, Ill.; *Survey of Recent East European Literature in*



*Elementary, Secondary, and College Mathematics*; 2 years; \$101,200  
 CITY COLLEGE, New York, N.Y.; *A Series of Demonstration Lectures in Physics for High School and Junior High School Students*; 5 months; \$2,505  
 CLARKSON COLLEGE OF TECHNOLOGY, Potsdam, N.Y.; *Research Participation Program for Teacher Training*; 9 weeks; \$17,440  
 COLLEGE OF THE PACIFIC, Stockton, Calif.; *Research Participation Program for Teacher Training*; 7 weeks; \$5,730  
 COLLEGE OF WOOSTER, Wooster, Ohio; *Evaluation of Faculty and Undergraduate Research in the Liberal Arts College*; 10 days; \$14,170  
 COLORADO-WYOMING ACADEMY OF SCIENCE, COLORADO COLLEGE, Colorado Springs, Colo.; *Colorado-Wyoming Science Lectureship Program*; 1 year; \$3,250  
 COLORADO STATE UNIVERSITY RESEARCH FOUNDATION, Fort Collins, Colo.; *Research Participation Projects of High School and Junior College Science Teachers*; 12 weeks; \$22,860  
 UNIVERSITY OF COLORADO, Boulder, Colo.; *Research Participation Program for Teachers Training*; 10 weeks; \$22,980  
 UNIVERSITY OF COLORADO, HIGH ALTITUDE OBSERVATORY, Boulder, Colo.; *Summer Research Grants for College Science Teachers*; 11 weeks; \$3,890  
 COOPER UNION FOR THE ADVANCEMENT OF SCIENCE AND ART, Cooper Square, New York, N.Y.; *The Mathematics Speakers' Bureau of Metropolitan New York*; 1 year; \$1,520  
 CORNELL UNIVERSITY, Ithaca, N.Y.; *Summer Research Participation for Teacher Training*; 10 weeks; \$25,310  
 DEFIANCE COLLEGE, Defiance, Ohio; *Investigation in Allied Fields By Chemists in the Liberal Arts Colleges*; 5 days; \$8,500  
 UNIVERSITY OF DELAWARE, Newark, Del.; *Research Participation Program for Teacher Training*; 6 weeks; \$11,500  
 UNIVERSITY OF DENVER, Denver, Colo.  
*Research Participation Program for Teacher Training*; 9 weeks; \$29,750  
*Visiting Foreign Staff Project in 1959 Summer Institutes*; 6 months; \$13,300  
 DRAKE UNIVERSITY, Des Moines, Iowa; *Research Participation Program for Teacher Training*; 8 weeks; \$15,390  
 DUKE UNIVERSITY, Durham, N.C.; *Experimental Program in the Retraining of Armed Services Officers for Teaching Mathematics in High School and College*; 15 months; \$11,750  
 EDUCATIONAL TESTING SERVICE, Princeton, N.J.; *Horizons of Science*; 3 months; \$87,050  
 FLORIDA STATE UNIVERSITY, Tallahassee, Fla.; *Research Participation Program for Teacher Training*; 8 weeks; \$12,240  
 FURMAN UNIVERSITY, Greenville, S.C.; *Research Institute for Science Teachers*; 6 weeks; \$12,330  
 HARVEY MUDD COLLEGE, Claremont, Calif.; *Conference on the Preparation of Chemistry Students for Graduate Work*; 3 days; \$6,500  
 HAWAIIAN ACADEMY OF SCIENCE, Honolulu, Hawaii.  
*Hawaiian Science Clubs Service*; 1 year; \$22,000  
*Museums in Miniature*; 10 months; \$3,500  
*Teachers Science Seminar Series*; 10 months; \$4,160

HIGHLANDS BIOLOGICAL STATION, INC., Highlands, N.C.; *A Research Participation Program for Teacher Training*; 6 weeks; \$4,350  
 HIRAM COLLEGE, Hiram, Ohio; *Advanced Mathematics Program for Academically Talented High School Students*; 1 year; \$4,250  
 HOWARD UNIVERSITY, Washington, D.C.; *Research Participation Program for Secondary School Teachers*; 8 weeks; \$31,490  
 ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, Ill.; *Research Participation for Teachers of Biology*; 6 weeks; \$5,320  
 UNIVERSITY OF ILLINOIS, Chicago, Ill.; *Conference of High School and College Teachers of Chemistry*; 1 day; \$200  
 INDIANA ACADEMY OF SCIENCE, Indiana University, Bloomington, Ind.; *Visiting Scientists Program for High Schools*; 1 year; \$16,750  
 INDIANA UNIVERSITY FOUNDATION, Bloomington, Ind.  
*Conference on Training in Physiological Optics*; 11 days; \$7,400  
*Research Participation Program for High School and College Teachers*; 8 weeks; \$21,390  
*Visiting Foreign Staff Project for the 1959 Summer Institutes*; 6 months; \$13,800  
 INSTITUTE OF PAPER CHEMISTRY, Appleton, Wis.; *Research Participation Program for Teacher Training*; 8 weeks; \$12,100  
 IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Ames, Iowa; *Research Participation Program for Teacher Training*; 13 weeks; \$10,580  
 IOWA STATE TEACHERS COLLEGE, Cedar Falls, Iowa.  
*An Eight-Week Seminar in Science and Mathematics for Superior Junior High School Pupils, and an Accompanying Teacher-Participation Workshop*; 8 weeks; \$9,240  
*Research Participation Programs for Teacher Training*; 8 weeks; \$7,910  
 JOHNS HOPKINS UNIVERSITY, Baltimore, Md.; *Supplementary Teaching Aids in a New Introductory Chemistry Program*; 1 year; \$39,500  
 JUNIOR ENGINEERING TECHNICAL SOCIETY, INC., East Lansing, Mich.; *Preparation and Presentation of 32 Academic Units*; 1 year; \$16,680  
 KANSAS ACADEMY OF SCIENCE, KANSAS STATE TEACHERS COLLEGE, Emporia, Kans.; *Kansas Junior Academy of Science Program and Science Certification Requirements and Teacher Training Improvement Program*; 1 year; \$32,180  
 KANSAS STATE COLLEGE, Manhattan, Kans.; *Research Participation Program for Teacher Training*; 9 weeks; \$16,330  
 KANSAS STATE TEACHERS COLLEGE, Emporia, Kans.  
*Conference of Administrators of the Science Teachers in the In-Service Institute*; 1 day; \$900  
*A Research Participation Program for Teacher Training in Biology*; 12 weeks; \$7,720  
 UNIVERSITY OF KANSAS, Lawrence, Kans.; *Chemical Research for Training of High School Teachers*; 8 weeks; \$16,790  
 LOUISIANA ACADEMY OF SCIENCE, LOUISIANA STATE UNIVERSITY, Baton Rouge, La.; *A Program to Stimulate Interest in Science in Pre-College Students and to Provide Them*

- With Opportunities for Science Experience*; 1 year; \$16,310  
**LOUISIANA STATE UNIVERSITY**, Baton Rouge, La.; *Summer Research Participation Program for Science Teacher Training*; 9 weeks; \$25,320  
**MARYLAND ACADEMY OF SCIENCES**, Baltimore, Md.  
*Maryland Science Teaching Improvement Program*; 8 months; \$4,320  
*Program to Create, Maintain and Circulate Mobile Exhibits Among the Schools*; 1 year; \$24,420  
**UNIVERSITY OF MARYLAND**, College Park, Md.; *Research Participation Program for Training of High School Physics Teachers*; 7 weeks; \$5,720  
**MASSACHUSETTS INSTITUTE OF TECHNOLOGY**, Cambridge, Mass.  
 Jerrold R. Zacharias, Professor of Physics; *Accelerated Teacher Training Program*; 10 days; \$14,530  
*Summer Training Conference for PSSO Summer Institute Staff*; 1 week; \$11,500  
 Jerrold R. Zacharias, Professor of Physics; *The Teaching of Physical Science in the Secondary Schools*; 1 year; \$3,168,440  
**UNIVERSITY OF MASSACHUSETTS**, Amherst, Mass.; Maxwell H. Goldberg, Chairman, Committee on Cooperation for the American Humanities Seminar; *Three-Day Seminar Concerning the Citizen in a Scientific World*; 3 days; \$4,500  
**MATHEMATICAL ASSOCIATION OF AMERICA**, University of Buffalo, Buffalo, N.Y.  
*Conferences for Lecturers at 1959 Summer Institutes in Mathematics*; 10 days; \$58,000  
*Program of Visiting Lecturers*; 1 year; \$129,200  
*Program of Visiting Lecturers to Secondary Schools*; 1 year; \$63,500  
*Survey of European Mathematical Education*; 1 year; \$10,300  
**MICHIGAN STATE UNIVERSITY**, East Lansing, Mich.  
*Traveling Science Demonstration Lecture Program*; 1 year; \$349,700  
*Workshop in Microbiology for Secondary Teachers*; 2 weeks; \$7,850  
**UNIVERSITY OF MICHIGAN**, Ann Arbor, Mich.  
*Research Participation Program for Teacher Training in Nuclear Physics*; 10 weeks; \$7,120  
*Research Participation Program for Teacher Training in Psychology*; 8 weeks; \$18,590  
**MINNESOTA ACADEMY OF SCIENCE**, UNIVERSITY OF MINNESOTA, Minneapolis, Minn.; *A Program for Improvement of Science Education in Minnesota*; 1 year; \$21,836  
**MISSISSIPPI ACADEMY OF SCIENCES, INC.**, State College, Miss.; *A Program to Encourage and Improve Science Education in the High Schools*; 1 year; \$38,820  
**MONTANA STATE UNIVERSITY**, Missoula, Mont.; *Special In-Service Training Program in General Science*; 8 months; \$40,230  
**NATIONAL ACADEMY OF SCIENCES**, NATIONAL RESEARCH COUNCIL, Washington, D.C.  
*Preparation, Printing, and Distribution of Career Guidance Literature*; 1 year; \$5,925  
*Refugee Scientists Program*; 6 months; \$6,900  
*Visiting Foreign Scientists Program in the Geological Sciences*; 1 year; \$27,950  
*Visiting Geoscientists*; 1 year; \$60,400  
**NATIONAL ACADEMY OF SCIENCES**, Washington, D.C.; *Visiting Geological Scientists Program*; 1 year; \$25,600  
**NATIONAL 4-H CLUB FOUNDATION**, Washington, D.C.; *An Exploratory Conference on Expanding the Interest and Understanding of Science Through 4-H Club Work*; 2 days; \$9,545  
**NEBRASKA ACADEMY OF SCIENCES, INC.**, University of Nebraska, Lincoln, Neb.; *Visiting Scientists Program*; 1 year; \$15,500  
**NEWARK COLLEGE OF ENGINEERING**, Newark, N.J.; *Research Participation Program for Teacher Training*; 8 weeks; \$15,370  
**NEW HAMPSHIRE ACADEMY OF SCIENCE**, UNIVERSITY OF NEW HAMPSHIRE, Durham, N.H.; *A Program to Assist Science Teachers and Students in the Secondary Schools of New Hampshire*; 1 year; \$6,115  
**NEW MEXICO HIGHLANDS UNIVERSITY**, Las Vegas, N. Mex.; *Summer Research Participation for High School Teachers*; 10 weeks; \$20,320  
**NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY**, Socorro, N. Mex.; *Research Participation Program for Secondary School Physical Science and Mathematics Teachers*; 9 weeks; \$12,850  
**UNIVERSITY OF NEW MEXICO**, Albuquerque, N. Mex.; *A Summer Program for Participation in Engineering Research by Secondary School Teachers of Mathematics and Science*; 10 weeks; \$17,630  
**NEW YORK STATE SOCIETY FOR MEDICAL RESEARCH, INC.**, New York, N.Y.; *Supplementary Training of High School Biology Teachers*; 8 months; \$7,500  
**NORTH CAROLINA ACADEMY OF SCIENCE**, MEREDITH COLLEGE, Raleigh, N.C.; *Short-Term Science Institute for High School Science Teachers in North Carolina*; 6 weeks; \$19,970  
**NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING**, Raleigh, N.C.; *Southern Regional Graduate Summer Session in Nematology*; 6 weeks; \$36,360  
**NORTH CAROLINA STATE COLLEGE**, Raleigh, N.C.; *Research Participation Program for Teacher Training*; 9 weeks; \$30,900  
**UNIVERSITY OF NORTH CAROLINA**, Chapel Hill, N.C.; *Supplementary Training Program for Teachers of Mathematics*; 1 year; \$14,100  
**NORTH DAKOTA AGRICULTURAL COLLEGE**, Fargo, N. Dak.; *Science Teachers Research Program*; 8 weeks; \$15,700  
**UNIVERSITY OF NORTH DAKOTA**, Grand Forks, N. Dak.; *Research Participation Program for Teacher Training*; 9 weeks; \$1,570  
**UNIVERSITY OF NOTRE DAME**, Notre Dame, Ind.; *Science Teacher Summer Research Participation*; 10 weeks; \$12,420  
**OAK RIDGE INSTITUTE OF NUCLEAR STUDIES**, Oak Ridge, Tenn.  
*Traveling Science Demonstration Lecture Program*; 1 year; \$411,700  
*Traveling Science Demonstration Lecture Program*; 9 months; \$119,900  
**OBERLIN COLLEGE**, Oberlin, Ohio; *Visiting Foreign Staff Project in 1959 Summer Institutes*; 6 months; \$42,100  
**OHIO ACADEMY OF SCIENCES**, DEPARTMENT OF GEOLOGY, OHIO STATE UNIVERSITY, Columbus, Ohio; *Instruction in Inorganic Chemistry and Quantitative Analysis in the*

*Undergraduate Chemistry Curriculum*; 1 day; \$750

OKLAHOMA ACADEMY OF SCIENCE, UNIVERSITY OF OKLAHOMA, Norman, Okla.

*Consultative Service for Community Sponsored Improvement Programs in Science Education*; 1 year; \$30,600

*Oklahoma Junior Academy of Science Program*; 14 months; \$4,000

OKLAHOMA BAPTIST UNIVERSITY, Shawnee, Okla.; *Production of a 30-Minute, 16mm, Sound-Color Film*; 6 months; \$5,400

OKLAHOMA STATE UNIVERSITY, Stillwater, Okla.

*A Research Participation Program for Science and Mathematics Teachers*; 9 weeks; \$16,200

*Traveling Science Demonstration Lecture Program*; 1 year; \$335,700

UNIVERSITY OF OKLAHOMA, Norman, Okla.

*Combined High School Student-Teacher Institute in Mathematics*; 9 months; \$23,140

*Research Participation Program for Teacher Training*; 8 weeks; \$16,390

*Special In-Service Institute for College Teachers of Mathematics, Science, and Engineering*; 9 months; \$23,940

*Summer Science Training Program for Secondary School Teachers*; 6 weeks; \$29,250

OREGON MUSEUM OF SCIENCE AND INDUSTRY, Portland, Oreg.; *Field Research Program for Students of All Grade Levels*; 1 year; \$4,990

OREGON STATE COLLEGE, Corvallis, Oreg.; *Teacher Training in Computer-Centered Mathematical Research*; 9 weeks; \$5,420

UNIVERSITY OF OREGON, Eugene, Oreg.; *Traveling Science Demonstration Lecture Program*; 1 year; \$382,000

PACIFIC SOUTHWEST ASSOCIATION OF CHEMISTRY TEACHERS, IMMACULATE HEART COLLEGE, Los Angeles, Calif.; *Summer Conference on the Teaching of Chemistry*; 5 days; \$3,500

PENNSYLVANIA STATE UNIVERSITY, University Park, Pa.; *A Research Participation Program for Teacher Training*; 9 weeks; \$15,430

POMONA COLLEGE, Claremont, Calif.; *Research Participation Program for Teacher Training*; 9 weeks; \$3,000

UNIVERSITY OF REDLANDS, Redlands, Calif.; *A Research Participation Program for Teacher Training*; 9 weeks; \$5,780

REED COLLEGE, Portland, Oreg.; *Working Conference of High School and College Chemistry Teachers*; 6 weeks; \$33,000

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N.Y.; *A Research Participation for Teacher Training in Chemistry*; 8 weeks; \$13,050

UNIVERSITY OF ROCHESTER, Rochester, N.Y.; *Summer Research Participation Training Program for Teachers*; 9 weeks; \$19,920

ROCKEFELLER INSTITUTE, New York, N.Y.; *Lectures for High School Students*; 16 months; \$24,150

RUTGERS, THE STATE UNIVERSITY, New Brunswick, N.J.; *Short Institute of "Implications of the International Geophysical Year" for Elementary School Teachers and Supervisory Personnel*; 4 weeks; \$33,400

ST. JOHN'S UNIVERSITY, Jamaica, N.Y.; *Research Participation Program for Teacher Training*; 8 weeks; \$11,810

SAINT LOUIS UNIVERSITY, St. Louis, Mo.; *Research Participation Program for Teacher Training*; 6 weeks; \$7,420

SAINT MARY'S COLLEGE, Winona, Minn.; *Summer Field Course in Biology*; 2 weeks; \$11,390

SCIENCE SERVICE, Washington, D.C.; *Science Clubs of America and the National Science Youth Program*; 1 year; \$50,000

SOCIETY FOR INDUSTRIAL AND APPLIED MATHEMATICS, Philadelphia, Pa.; *Visiting Scientists in Industrial and Applied Mathematics*; 1 year; \$12,130

SOUTH DAKOTA ACADEMY OF SCIENCE, YANKTON COLLEGE, Yankton, S. Dak.; *State Academy of Science Project*; 14 months; \$18,560

SOUTH DAKOTA STATE COLLEGE, Brookings, S. Dak.; *Laboratory Training Program for Teachers*; 8 weeks; \$13,900

UNIVERSITY OF SOUTH CAROLINA, Columbia, S.C.; *Research Participation Program for Teachers*; 9 weeks; \$13,220

UNIVERSITY OF SOUTHERN CALIFORNIA, Los Angeles, Calif.; *Research Participation for Science Teachers*; 9 weeks; \$15,910

STATE UNIVERSITY OF IOWA, Iowa City, Iowa; *Research Participation Program for Teacher Training*; 9 weeks; \$10,640

STATE UNIVERSITY OF SOUTH DAKOTA, Vermillion, S. Dak.; *A Summer Research Participation Program for Teacher Training*; 9 weeks; \$14,600

SYRACUSE UNIVERSITY RESEARCH INSTITUTE, Syracuse, N.Y.

*Conference on Electrical Engineering Education*; 2 days; \$4,850

Alfred T. Collette; *Visiting Foreign Staff Project for the Academic Year Institutes During 1959-60*; 1 year; \$51,515

TEMPLE UNIVERSITY, Philadelphia, Pa.; *Visiting Foreign Staff Project in 1959 Summer Institutes*; 6 months; \$19,100

TENNESSEE ACADEMY OF SCIENCE, VANDERBILT UNIVERSITY, Nashville, Tenn.

*Experimental Program of Junior Academy of Science Activities*; 1 year; \$8,880

*Short Term Science Institutes for High School Teachers*; 1 year; \$15,670

UNIVERSITY OF TENNESSEE MEDICAL UNITS, Memphis, Tenn.; *A Research Participation Program for Teacher Training*; 8 weeks; \$5,200

TEXAS ACADEMY OF SCIENCE, NORTH TEXAS STATE COLLEGE, Denton, Tex.

*Conference on Training in Research for Promising Science Students in the Junior and Small Senior Colleges of Texas*; 1 year; \$12,560

*Project to Improve Status of Science and Mathematics Education in the State of Texas*; 1 year; \$18,380

TEXAS ACADEMY OF SCIENCE, UNIVERSITY OF TEXAS, Austin, Tex.; *A Visiting Lectureship Science Project (Mathematics)*; 8 months; \$9,130

UNIVERSITY OF TEXAS, Austin, Tex.

*Graduate Studies at the Institute of Marine During 1959 Summer Session*; 2 months; \$3,000

*Research Participation Program for Teacher Training*; 10 weeks; \$16,570

TUFTS UNIVERSITY, Medford, Mass.; *Visiting Foreign Staff Project for the 1959 Summer Institutes*; 6 months; \$23,000

U.S. ATOMIC ENERGY COMMISSION, Oak Ridge, Tenn.; *An Interagency Agreement for a College and University Summer Program*

*Utilizing Mobile Exhibits on Atomic Energy*; 11 weeks; \$16,000

U.S. FOREST SERVICE, DEPARTMENT OF AGRICULTURE, Washington, D.C.; *Forestry Exchange Mission to the USSR*; 4 weeks; \$2,400

UNIVERSITY OF UPPSALA, Rundelsgrand 2A, Uppsala, Sweden; *International Summer Institute in Quantum Chemistry*; 6 months; \$9,000

UNIVERSITY OF UTAH, Salt Lake City, Utah; *Research Participation Program for Teacher Training*; 11 weeks; \$20,340

VIRGINIA ACADEMY OF SCIENCE, Richmond, Va.; *Visiting Scientists Program*; 1 year; \$6,450

VIRGINIA FISHERIES LABORATORY, Gloucester Point, Va.; *Research Training Program in Marine Biology*; 6 weeks; \$16,030

UNIVERSITY OF VIRGINIA, Charlottesville, Va.; *A Critical Survey and Analysis of Existing and Possible Future Programs of the National Science Foundation in Mathematical Education*; 8 months; \$7,770

WASHINGTON ACADEMY OF SCIENCE, Washington, D.C.; *To Participate in Curricular Experiments Integrating Science and Mathematics, to Establish a Community Service, and to Organize Round-Table Discussions on Science*; 1 year; \$32,250

UNIVERSITY OF WASHINGTON, Seattle, Wash.; *In-Service Course for High School Algebra Teachers*; 11 weeks; \$1,100

WAYNE STATE UNIVERSITY, Detroit, Mich.; *Program of Chemical Research by High School and College Chemistry Teachers*; 8 weeks; \$12,810

WEST VIRGINIA UNIVERSITY, Morgantown, W. Va.; *Research Participation Program for Teachers Training*; 6 weeks; \$5,550

UNIVERSITY OF WISCONSIN, Madison, Wis. *Research Participation Program for High School Teachers*; 1 year; \$36,280

*Visiting Foreign Staff Project for the 1959 Summer Institutes*; 6 months; \$6,550

WOODS HOLE OCEANOGRAPHIC INSTITUTION, Woods Hole, Mass.; *Summer Program of Theoretical Studies in Geophysical Fluid Dynamics*; 3 months; \$11,500

YALE UNIVERSITY, New Haven, Conn. E. G. Begle; *School Mathematics Study Group*; 1 year; \$1,200,000

*Special Summer Institute in Dynamical Astronomy*; 4 weeks; \$40,800

#### THE PRESIDENT'S COMMITTEE ON SCIENTISTS AND ENGINEERS

NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.; Howard L. Bevis; *The President's Committee on Scientists and Engineers*; 32 months; \$51,814.72

#### SCIENTIFIC MANPOWER

AMERICAN CHEMICAL SOCIETY, Washington, D.C.; Everett G. Harris, Jr., American Chemical Society; *Register of Scientific and Technical Personnel in the Field of Chemistry*; 6 months; \$25,000

AMERICAN INSTITUTE OF PHYSICS, New York, N.Y.; Henry A. Barton; *To Assist in Defraying the Expenses of Maintaining the National Register of Scientific and Technical Personnel in the Fields of Physics and Astronomy*; 21 months; \$6,300

AMERICAN MATHEMATICAL SOCIETY, Providence, R.I.; John H. Curtiss, Executive Di-

rector; *To Assist in Defraying the Expenses of Maintaining the Register of Scientific and Technical Personnel in the Field of the Mathematical Sciences*; 6 months; \$13,600

AMERICAN METEOROLOGICAL SOCIETY, Boston, Mass.; *Meteorological Sciences Section of the Natural Scientists Register*; 6 months; \$4,300

AMERICAN PSYCHOLOGICAL ASSOCIATION, Washington, D.C.; *National Register of Scientific and Technical Personnel in Psychology*; 2 years; \$4,300

BUREAU OF LABOR STATISTICS, U.S. DEPARTMENT OF LABOR, Washington, D.C.; *Conduct of Survey of Non-Teaching Mathematical Employment*; 1 year; \$52,000

HARVARD UNIVERSITY, Cambridge, Mass.; *A Vertical Study of Early Childhood Characteristics That Distinguish Scientists From Nonscientists*; 1 year; \$9,542

LIBRARY OF CONGRESS, Washington, D.C.; *Study of Communist China's Scientific Technical Manpower*; 6 months; \$2,000

MATHEMATICAL ASSOCIATION OF AMERICA, Buffalo, N.Y.; *Direction and Evaluation of a Survey of Non-Teaching Mathematical Employment*; 1 year; \$10,000

NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.; *Doctorate Survey*; 6 months; \$2,500

NATIONAL SCIENCE TEACHERS ASSOCIATION, Washington, D.C.; *Registry of High School Science and Mathematics Teachers*; 1 month; \$12,900

UNIVERSITY OF UTAH, Salt Lake City, Utah; *Follow Up Research Conference on the Identification of Creative Scientific Talent*; 16 months; \$5,825

#### ATTENDANCE AT INTERNATIONAL MEETINGS

Algebraical and Topological Foundations of Geometry, Utrecht, Netherlands:

H. Busemann, Harvard University, Cambridge, Mass.

D. R. Hughes, The University of Chicago, Chicago, Ill.

N. Jacobson, Yale University, New Haven, Conn.

H. C. Wang, Northwestern University, Evanston, Ill.

All-Union Conference on the Physics of Dielectrics, Moscow, Russia:

Dr. Charles Kittel, University of California, Berkeley, Calif.

M. F. Smiley, State University of Iowa, Iowa City, Iowa

C. P. Smyth, Princeton University, Princeton, N.J.

All Union Congress for Theoretical and Applied Mechanics, Moscow, Russia:

H. W. Liepmann, California Institute of Technology, Pasadena, Calif.

American Automatic Control Council Delegation to the U.S.S.R., Moscow, Russia:

Dr. R. J. Kochenburger, University of Connecticut, Storrs, Conn.

American Exchange Delegation on Computers to the U.S.S.R.:

H. D. Huskey, Berkeley, Calif.

Annual International Conference on High Energy Physics, Moscow, Russia:

R. W. Thompson, Indiana University, Bloomington, Ind.

- Australian and New Zealand Association for the Advancement of Science, Perth, Western Australia :
- W. Baade, Australian National University, Canberra, Australia  
C. M. Wade, University Grounds, Sydney, N.S.W., Australia
- Carbon—14 Symposium, Groningen, Holland :
- W. S. Broecker, Columbia University, New York, N.Y.  
F. Johnson, Andover, Mass.  
E. K. Ralph, University of Pennsylvania, Philadelphia, Pa.  
T. L. Smiley, University of Arizona, Tucson, Ariz.
- Cellulose Meeting, Tashkent, Russia :
- M. Goodman, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.
- Chemistry and Biochemistry of Solanum Alkaloids, Berlin, Germany :
- G. S. Fraenkel, University of Illinois, Urbana, Ill.
- Commission on Geochemistry, Oxford, England :
- Dr. Earl Ingerson, Department of the Interior, U.S. Geological Survey, Washington, D.C.
- Commission on Geological Abstracts, Heerlen, Holland :
- Dr. Earl Ingerson, Department of the Interior, U.S. Geological Survey, Washington, D.C.  
Dr. Stanley Corrsin, The Johns Hopkins University, Baltimore, Md.  
Dr. Francois N. Frenkiel, The Johns Hopkins University, Baltimore, Md.
- Committee of International Standards, London, England :
- R. W. Carter, Department of Interior, Washington, D.C.
- Conference on the Axiomatic Method in Classical and Modern Mechanics, Paris, France :
- P. Suppes, Stanford University, Stanford, Calif.
- Conference on Biophysics, Cambridge, England :
- R. S. Bear, Iowa State College, Ames, Iowa  
R. H. Bolt, Massachusetts Institute of Technology, Cambridge, Mass.  
C. Levinthal, Massachusetts Institute of Technology, Cambridge, Mass.  
E. C. Pollard, Yale University, New Haven, Conn.  
F. O. Schmitt, Massachusetts Institute of Technology, Cambridge, Mass.  
A. K. Solomon, Harvard Medical School, Boston, Mass.  
G. S. Stent, The University of California, Berkeley, Calif.  
A. G. Szent-Gyorgyi, Institute for Muscle Research, Woods Hole, Mass.  
R. C. Williams, University of California, Berkeley, Calif.
- Conference Celebrating the Centenary of the Publication of the *Origin of Species*, London, England :
- W. H. Camp, University of Connecticut, Storrs, Conn.
- Conference on Crystallographic Apparatus, Stockholm, Sweden :
- B. Post, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.
- Conference of the International Union for the Scientific Study of Population, Vienna, Austria :
- O. D. Duncan, Chicago, Ill.  
J. D. Durand, United Nations, New York, N.Y.  
W. T. Martin, University of Oregon, Eugene, Oreg.  
D. O. Price, Chapel Hill, N.C.  
E. J. Ross, Trinity College, Washington, D.C.  
N. B. Ryder, University of Wisconsin, Madison, Wis.  
G. Sabagh, Pacific State Hospital, Pomona, Calif.  
C. F. Schmid, University of Washington, Seattle, Wash.  
I. B. Taeuber, Hyattsville, Md.
- Conference on Nuclear Forces and the Few Nucleon Problem, London, England :
- J. E. Brolley, Jr., Los Alamos Scientific Laboratory, Los Alamos, N. Mex.  
S. Meshkov, University of Pittsburgh, Pittsburgh, Pa.  
P. S. Signell, Bucknell University, Lewisburg, Pa.
- Conference on Precision Lattice Parameter Determination, Stockholm, Sweden :
- M. E. Straumanis, Missouri School of Mines and Metallurgy, Rolla, Mo.
- Conference on the Social Implications of Technological Progress, Paris, France :
- A. S. Feldman, University of Delaware, Newark, Del.
- Conference on Theoretical Aspects of Sintering, London, England :
- G. C. Kuczynski, University of Notre Dame, Notre Dame, Ind.
- Conference on Superconductivity, Cambridge, England :
- L. N. Cooper, Brown University, Providence, R.I.  
M. P. Garfunkel, University of Pittsburgh, Pittsburgh, Pa.  
W. D. Knight, The University of California, Berkeley, Calif.  
H. Meissner, Johns Hopkins University, Baltimore, Md.  
D. Pines, Institute for Advanced Study, Princeton, N.J.  
J. R. Schrieffer, University of Chicago, Chicago, Ill.  
B. Serin, University of Illinois, Urbana, Ill.  
M. Tinkham, University of California, Berkeley, Calif.
- Crystallographic Conference, Leningrad, Russia :
- D. Harker, Protein Structure Project, Brooklyn, N.Y.  
L. O. Brockway, University of Michigan, Ann Arbor, Mich.  
L. S. Bartell, Iowa State College, Ames, Iowa
- Crystallochemical Symposium, Leningrad, Russia :
- J. D. H. Donnay, 1 Place Aristide Briand, Bellevue (S. and O.), France
- Darwin-Wallace Centenary Celebration Symposium, Singapore, Malaya :
- D. Dwight Davis, Chicago Natural History Museum, Chicago, Ill.
- The Ear Underwater, London, England :
- M. J. Cohen, University of Oregon, Eugene, Oreg.

- Eleventh Congress of the International Association of Logopedics and Phoniatrics, London, England:  
 J. Eisensohn, Queens College, Flushing, N.Y.  
 G. H. Shames, University of Pittsburgh, Pittsburgh, Pa.
- Enzyme Commission of International Union of Biochemistry, Munich, Germany:  
 S. P. Colowick, The Johns Hopkins University, Baltimore, Md.  
 A. L. Lehninger, The Johns Hopkins University, Baltimore, Md.
- European Committee for Concrete, Vienna, Austria:  
 C. P. Sless, University of Illinois, Urbana, Ill.
- Exchange Mission to USSR on Soil Mechanics and Foundation Engineering:  
 American Society of Civil Engineers, New York, N.Y.
- Fall Metallurgical Meeting, Paris, France:  
 Dr. Joseph W. Spretnak, The Ohio State University, Columbus, Ohio
- Faraday Society Conference on Cell Nucleus, Cambridge, England:  
 V. G. Allfrey, The Rockefeller Institute, New York, N.Y.  
 M. J. Bessman, The Johns Hopkins University, Baltimore, Md.  
 A. L. Donnce, The University of Rochester, Rochester, N.Y.  
 B. P. Kaufmann, Carnegie Institution of Washington, Cold Spring Harbor, N.Y.  
 M. S. Meselson, California Institute of Technology, Pasadena, Calif.  
 A. E. Mirsky, The Rockefeller Institute, New York, N.Y.
- Faraday Society Symposium on "Energy Transfer with Special Reference to Biological Systems," Nottingham, England:  
 B. Chance, University of Pennsylvania, Philadelphia, Pa.  
 J. J. Chang, National Institutes of Health, Bethesda, Md.  
 M. Furst, Hunter College, New York, N.Y.  
 F. H. Johnson, Princeton University, Princeton, N.J.  
 H. P. Kallmann, New York University, New York, N.Y.  
 R. S. Livingston, University of Minnesota, Minneapolis, Minn.  
 R. Lumry, University of Minnesota, Minneapolis, Minn.  
 E. Rabinowitch, University of Illinois, Urbana, Ill.  
 G. Wald, Harvard University, Cambridge, Mass.
- Fifth Conference of the International Commission for Optics, Stockholm, Sweden:  
 E. L. O'Neill, Itak Corporation, Boston, Mass.  
 L. Mertz, Block Associates, Inc., Cambridge, Mass.  
 E. Kornstein, Boston, Mass.  
 R. E. Hopkins, University of Rochester, Rochester, N.Y.  
 R. C. Lord, Massachusetts Institute of Technology, Cambridge, Mass.  
 J. M. Greenberg, Rensselaer Polytechnic Institute, Troy, N.Y.  
 D. H. Menzel, Harvard University, Cambridge, Mass.
- Fifth Glucuronic Acid Conference, Tokyo, Japan:  
 W. H. Fishman, Tufts University School of Medicine, Boston, Mass.
- Fifth General Conference on the International Council of Museums, Stockholm, Sweden:  
 R. T. Hatt, Cranbrook Institute of Science, Bloomfield Hills, Mich.  
 W. S. Thomas, Rochester Museum of Arts and Sciences, Rochester, N.Y.
- Fifteenth International Zoological Congress, London, England:  
 American Society of Zoologists, Princeton University, Princeton, N.J.
- Fifth International Ethological Conference, Cambridge, England:  
 J. Crane, New York Zoological Society, New York, N.Y.  
 L. R. Aronson, American Museum of Natural History, New York, N.Y.  
 T. H. Bullock, University of California, Los Angeles, Calif.  
 D. Davenport, University of California, Santa Barbara, Calif.  
 V. G. Dethier, University of Pennsylvania, Philadelphia, Pa.  
 W. C. Dilger, Cornell University, Ithaca, N.Y.  
 E. B. Hale, Pennsylvania State University, University Park, Pa.  
 S. Kramer, State University College on Long Island, Oyster Bay, N.Y.  
 D. S. Lehrman, Rutgers, The State University, Newark, N.J.  
 P. B. Marler, University of California, Berkeley, Calif.  
 M. H. Moynihan, Canal Zone Biological Area, Balboa, Canal Zone  
 M. W. Schein, Pennsylvania State University, University Park, Pa.
- First International Conference on Information Processing, Paris, France:  
 A. J. Perlis, Carnegie Institute of Technology, Pittsburgh, Pa.  
 F. M. Verzuh, Massachusetts Institute of Technology, Cambridge, Mass.  
 S. Gorn, University of Pennsylvania, Philadelphia, Pa.  
 J. W. Givens, Jr., Wayne State University, Detroit, Mich.  
 J. Moshman, Chevy Chase, Md.  
 R. Courant, New York University, New York, N.Y.  
 P. L. Garvin, Georgetown University, Washington, D.C.  
 M. Young, Jr., University of Texas, Austin, Tex.
- First Latin American Congress of Microbiology, Mexico City, Mexico:  
 R. A. Day, Rutgers, The State University, New Brunswick, N.J.
- First Symposium on Fleming's Lysozyme, Milan, Italy:  
 S. E. Hartsell, W. Lafayette, Ind.  
 G. Litwack, Rutgers, The State University, New Brunswick, N.J.  
 L. H. Muschel, Walter Reed Army Medical Center, Washington, D.C.  
 Q. N. Myrvik, University of Virginia, Charlottesville, Va.
- Flow Properties of Blood, and Other Biological Systems:  
 S. Baez, New York University, New York, N.Y.  
 L. V. Heilbrunn, Woods Hole, Mass.

Fluctuation Phenomena and Stochastic Processes, London, England :

S. A. Bowhill, Pennsylvania State University, University Park, Pa.

15th General Assembly of the Japan Medical Congress, Tokyo, Japan :

S. Ochoa, New York University, New York, N.Y.

Fourth Conference on Molecular Beams, Heidelberg, Germany :

B. Bederson, New York University, New York, N.Y.

W. A. Nierenberg, University of California, Berkeley, Calif.

H. Henry Stroke, Massachusetts Institute of Technology, Cambridge, Mass.

W. Lichten, The University of Chicago, Chicago, Ill.

Fourth International Conference on Ionization Phenomena in Gases, Uppsala, Sweden :

L. H. Fisher, New York University, New York, N.Y.

Fourth International Congress on Carboniferous Stratigraphy, Paleontology and Geology, Heerlen, Netherlands :

Paul E. Potter, Illinois State Geological Survey, Urbana, Ill.

Fourth Pan-African Congress on Prehistory, Leopoldville, Belgian Congo, Africa :

F. C. Howell, University of Chicago, Chicago, Ill.

W. W. Howells, Harvard University, Cambridge, Mass.

A. C. Spaulding, University of Michigan, Ann Arbor, Mich.

Fourth World Congress of Sociology, Milan, Italy :

J. A. Beegle, Michigan State University, East Lansing, Mich.

F. R. Eggen, Center for Advanced Study in the Behavioral Sciences, Stanford, Calif.

W. M. Evan, Columbia University, New York, N.Y.

W. H. Form, Michigan State University, East Lansing, Mich.

O. N. Larsen, University of Washington, Seattle, Wash.

R. Likert, The University of Michigan, Ann Arbor, Mich.

D. O. Price, Chapel Hill, N.C.

E. J. Ross, Trinity College, Washington, D.C.

C. F. Schmid, University of Washington, Seattle, Wash.

H. L. Sheppard, Wayne State University, Detroit, Mich.

A. L. Strauss, Michael Reese Hospital, Chicago, Ill.

XIV International Congress of Limnology, Vienna, Australia :

American Society of Limnology and Oceanography, University of Michigan, Ann Arbor, Mich.

Fourteenth Session of the International Commission on Illumination, Brussels, Belgium :

H. R. Blackwell, Ohio State University, Columbus, Ohio

R. M. Boynton, University of Rochester, Rochester, N.Y.

G. A. Fry, The Ohio State University, Columbus, Ohio

H. Helson, University of Texas, Austin, Tex.

Interamerican Course on Cosmic Rays, Bariloche, Argentina :

R. L. Chasson, University of Nebraska, Lincoln, Nebr.

International Colloquium on Fast Reactions in Solution, Hahnenklee, Germany :

H. Eyring, University of Utah, Salt Lake City, Utah

R. M. Noyes, University of Oregon, Eugene, Oreg.

A. Patterson, Jr., Yale University, New Haven, Conn.

A. C. Wahl, Washington University, St. Louis, Mo.

International Colloquium on Relativistic Theories of Gravitation, Abbaye du Royau-ment, France :

G. E. Tauber, Western Reserve University, Cleveland, Ohio

International Commission in Illumination, 14th Congress, Brussels, Belgium :

P. F. O'Brien, University of California, Los Angeles, Calif.

D. M. Finch, Illumination Laboratory, Richmond, Calif.

J. W. Griffith, Southern Methodist University, Dallas, Tex.

E. M. Strong, Cornell University, Ithaca, N.Y.

International Conference on High Energy Physics, Moscow, Russia :

C. Ning Yang, Institute for Advanced Study, Princeton, N.J.

International Conference on High Energy Accelerators and Instrumentation, Geneva, Switzerland :

S. DeBenedetti, Carnegie Institute of Technology, Pittsburgh, Pa.

E. M. Harth, Syracuse University, Syracuse, N.Y.

International Conference on Information Processing, Paris, France :

J. W. Mauchly, Ambler, Pa.

International Conference on Coordination Chemistry, London, England :

Arthur W. Adamson, University of Southern California, Los Angeles, Calif.

F. A. Cotton, Massachusetts Institute of Technology, Cambridge, Mass.

H. Freiser, University of Arizona, Tucson, Ariz.

R. E. Hamm, University of Utah, Salt Lake City, Utah

G. S. Hammond, California Institute of Technology, Pasadena, Calif.

G. Harris, University of Buffalo, Buffalo, N.Y.

S. Kirschner, Wayne State University, Detroit, Mich.

N. C. Li, Duquesne University, Pittsburgh, Pa.

G. Maki, Radiation Laboratory, University of California, Livermore, Calif.

A. E. Martell, Massachusetts Institute of Technology, Cambridge, Mass.

M. Orchin, University of Cincinnati, Cincinnati, Ohio

L. Vaska, Mellon Institute, Pittsburgh, Pa.

International Congress of the History of Science, Barcelona, Spain :

M. Claggett, Institute for Advanced Study, Princeton, N.J.

C. C. Gillispie, Princeton University, Princeton, N.J.

H. Gueric, Cornell University, Ithaca, N.Y.

**International Congress of the History of Science, Barcelona, Spain—Continued**

E. N. Hiebert, University of Wisconsin, Madison, Wis.  
B. Hindle, Ridgewood, N.J.  
K. Hujer, University of Chattanooga, Chattanooga, Tenn.  
M. Kerker, Clarkson College of Technology, Potsdam, N.Y.  
T. S. Kuhn, Center for Advanced Study in the Behavioral Sciences, Stanford, Calif.  
J. E. Murdoch, Harvard University, Cambridge, Mass.  
R. H. Shryock, American Philosophical Society, Philadelphia, Pa.  
W. D. Stahlman, Massachusetts Institute of Technology, Cambridge, Mass.  
J. R. Ravez, The University, Leeds, England

**International Congress on Optics, Stockholm, Sweden :**

G. R. Harrison, Massachusetts Institute of Technology, Cambridge, Mass.  
W. L. Hyde, American Optical Company, Southbridge, Mass.  
R. C. Jones, Polaroid Corporation, Cambridge, Mass.  
G. W. Stroke, Massachusetts Institute of Technology, Cambridge, Mass.  
J. Strong, Johns Hopkins University, Baltimore, Md.

**International Convention on Transistors and Associated Semi-conductor Devices, London, England :**

R. D. Middlebrook, California Institute of Technology, Pasadena, Calif.

**International Federation of Automatic Control Council Meetings, Rome, Italy :**

R. Oldenburger, Purdue University, Lafayette, Ind.

**International Mineralogical Association, Zurich, Switzerland :**

M. J. Buerger, Massachusetts Institute of Technology, Cambridge, Mass.  
D. J. Fisher, University of Chicago, Chicago, Ill.  
C. Frondel, Cambridge, Mass.  
G. T. Faust, U.S. Geological Survey, Washington, D.C.  
E. Ingerson, University of Texas, Austin, Tex.  
H. Winchell, Hamden, Conn.  
G. S. Switzer, Smithsonian Institution, Washington, D.C.

**International Nomenclature Commission for Veterinary Anatomy, Madrid, Spain :**

R. Getty, Iowa State College, Ames, Iowa  
D. K. Detweller, University of Pennsylvania, Philadelphia, Pa.  
L. E. St. Clair, University of Illinois, Urbana, Ill.

**International Symposium on Antibiotics, Prague, Czechoslovakia :**

D. Gottlieb, University of Illinois, Urbana, Ill.  
N. Molomut, Waldemar Medical Research, Port Washington, N.Y.

**International Symposium on Antitubercular Vaccination with Killed Tubercle Bacilli, Florence, Italy :**

A. J. Crowle, University of Colorado Medical School, Denver, Colo.  
D. W. Smith, The University of Wisconsin, Madison, Wis.

**International Symposium on Atmospheric Diffusion and Air Pollution, Oxford, England :**

Dr. Horace R. Byers, The University of Chicago, Chicago, Ill.

**International Symposium on Electrolytes, Trieste, Italy :**

E. Grunwald, Florida State University, Tallahassee, Fla.  
L. Onsager, Yale University, New Haven, Conn.  
F. A. Long, Cornell University, Ithaca, N.Y.  
G. J. Janz, Rensselaer Polytechnic Institute, Troy, N.Y.  
T. Shedlovsky, The Rockefeller Institute, New York, N.Y.

**International Symposium on Fluorine Chemistry, Birmingham, England :**

J. Bornstein, Boston College, Chestnut Hill, Mass.  
R. Filler, Illinois Institute of Technology, Chicago, Ill.  
G. C. Finger, Urbana, Ill.  
W. T. Miller, Cornell University, Ithaca, N.Y.  
P. Tarrant, University of Florida, Gainesville, Fla.

**International Symposium on Foundations of Mathematics: Infinitistic Methods, Warsaw, Poland :**

J. W. Addison, Jr., The University of Michigan, Ann Arbor, Mich.  
J. Douglas, Jr., Rice Institute, Houston, Tex.

A. Douglas, University of Maryland, College Park, Md.

L. Henkin, University of California, Berkeley, Calif.

S. MacLane, The University of Chicago, Chicago, Ill.

R. Montague, Oakland, Calif.

D. S. Scott, The University of Chicago, Chicago, Ill.

C. Spector, Ohio State University, Columbus, Ohio

A. Tarski, 462 Michigan Avenue, Berkeley, Calif.

A. Weinstein, University of Maryland, College Park, Md.

H. F. Weinberger, University of Maryland, College Park, Md.

R. L. Vaught, University of California, Berkeley, Calif.

**International Symposium on Hematin Enzymes, Canberra, Australia :**

W. D. Bonner, University of Pennsylvania, Philadelphia, Pa.

B. Chance, University of Pennsylvania, Philadelphia, Pa.

D. L. Drabkin, University of Pennsylvania, Philadelphia, Pa.

R. W. Estabrook, University of Pennsylvania, Philadelphia, Pa.

P. George, University of Pennsylvania, Philadelphia, Pa.

M. D. Kamen, Brandeis University, Waltham, Mass.

E. Margoliash, University of Utah, Salt Lake City, Utah

M. Morrison, University of Rochester Medical Center, Rochester, N.Y.

J. B. Neilands, The University of California, Berkeley, Calif.

L. Smith, Dartmouth Medical School, Hanover, N.H.

C. F. Strittmatter, Harvard Medical School, Boston, Mass.



**International Symposium on Hematin Enzymes, Canberra, Australia—Continued**

A. Tissieres, Harvard University, Cambridge, Mass.

S. F. Velick, Washington University School of Medicine, St. Louis, Mo.

J. H. Wang, Yale University, New Haven, Conn.

**International Symposium on Macromolecules, Wiesbaden, Germany:**

F. A. Bettelheim, Adelphi College, Garden City, N.Y.

P. J. W. Debye, Cornell University, Ithaca, N.Y.

M. Dole, Northwestern University, Evanston, Ill.

J. J. Hermans, State University College of Forestry, Syracuse, N.Y.

**International Symposium on Vegetation Mapping, Stolzenau an der Weser, Germany:**

A. W. Kuchler, University of Kansas, Lawrence, Kans.

**Joint Symposium on Radiation and Atmospheric Ozone, Oxford, England:**

F. N. Frenkiel, The Johns Hopkins University, Baltimore, Md.

Z. Sekera, University of California, Los Angeles, Calif.

**Mechanism of Antibody Formation, Prague, Czechoslovakia:**

F. J. Dixon, University of Pittsburgh, Pittsburgh, Pa.

R. A. Good, University of Minnesota, Minneapolis, Minn.

T. Makinodan, Oak Ridge National Laboratory, Oak Ridge, Tenn.

R. T. Smith, University of Florida, Gainesville, Fla.

**Meetings and Conferences in Russia, during May, 1959, Moscow, Russia:**

A. F. Kip, Cambridge University, Cambridge, England

**Meeting of European Molecular Spectroscopy Group, Bologna, Italy:**

G. M. Barrow, Northwestern University, Evanston, Ill.

B. L. Crawford, Jr., University of Minnesota, Minneapolis, Minn.

Brother C. Curren, University of Notre Dame, Notre Dame, Ind.

R. C. Lord, Massachusetts Institute of Technology, Cambridge, Mass.

G. C. Pimental, University of California, Berkeley, Calif.

K. Innes, Vanderbilt University, Nashville, Tenn.

**Meeting International Institute of Welding, Opatiya, Yugoslavia:**

A. M. Freudenthal, Columbia University, New York, N.Y.

**Meeting of Trade Waste Waters and the Prevention of River Pollution, New Castle, England:**

Brother J. McCabe, Manhattan College, New York, N.Y.

**Mendelev All-Union Chemical Society Conference on General and Applied Chemistry, Moscow, Russia:**

R. F. Baddour, Massachusetts Institute of Technology, Cambridge, Mass.

T. K. Sherwood, Massachusetts Institute of Technology, Cambridge, Mass.

**Ninth International Astrophysical Symposium, Liege, Belgium:**

L. H. Aller, The University of Michigan, Ann Arbor, Mich.

**Ninth International Astrophysical Symposium, Liege, Belgium—Continued**

E. M. Burbidge, Yerkes Observatory, Williams Bay, Wis.

G. Burbidge, Yerkes Observatory, University of Chicago, Williams Bay, Wis.

A. J. Deutsch, Mount Wilson and Palomar Observatories, Pasadena, Calif.

R. L. Sears, Indiana University, Bloomington, Ind.

O. Struve, University of California, Berkeley, Calif.

**Ninth International Congress of Radiology, Munich, Germany:**

W. S. Snyder, University of Tennessee, Knoxville, Tenn.

**Nineteen Fifty-nine Conference of Cosmic Ray Committee of the International Union of Pure and Applied Physics, Moscow, Russia:**

R. L. Chasson, University of Nebraska, Lincoln, Nebr.

G. Cocconi, Cornell University, Ithaca, N.Y.

L. Davis, Jr., California Institute of Technology Pasadena, Calif.

K. Greisen, Cornell University, Ithaca, N.Y.

D. H. Menzel, Harvard University, Cambridge, Mass.

P. Morrison, Cornell University, Ithaca, N.Y.

V. H. Regener, The University of New Mexico, Albuquerque, N. Mex.

J. A. Van Allen, State University of Iowa, Iowa City, Iowa

**Nineteen Fifty-nine Session of the International Commission on Illumination, Brussels, Belgium:**

B. H. Evans, Texas Engineering Experiment Station (Texas A. & M. College), College Station, Tex.

**Paris Symposium on Information Retrieval, Paris, France:**

B. C. Vickery, Imperial Chemical Industries Limited, Hertfordshire, England

**Scientific Lectures at Institutions of Higher Learning in Poland:**

G. C. Kuczynski, University of Notre Dame, Notre Dame, Ind.

**Second Australian Conference on Radiation Biology, Melbourne, Australia:**

I. I. Oster, Indiana University, Bloomington, Ind.

**Second International Conference on Medical Electronics, Paris, France:**

C. T. Dotter, University of Oregon Medical School, Portland, Oreg.

J. K. Hlchar, Ohio Wesleyan University, Delaware, Ohio

A. L. Hopkins, Western Reserve University, Cleveland, Ohio

W. L. Nyborg, Brown University, Providence, R.I.

F. Olmsted, Cleveland Clinic Foundation, Cleveland, Ohio

**Second International Congress of Rockets, Paris, France:**

E. V. Laitone, The University of California, Berkeley, Calif.

**Second Symposium on X-ray Microscopy and X-ray Microanalysis, Stockholm, Sweden:**

A. E. Austin, Battelle Memorial Institute, Columbus, Ohio

R. C. Greulich, University of California, Los Angeles, Calif.

J. F. McGee, Saint Louis University, St. Louis, Mo.

Series of Lectures in the U.S.S.R.:

E. Hille, Yale University, New Haven, Conn.

Seventh International Congress of Microbiology, Stockholm, Sweden:

American Institute of Biological Sciences, Washington, D.C.

Seventh Latin American Congress of Chemistry, Mexico City, Mexico:

H. R. Estremera, University of Puerto Rico, Rio Piedras, P.R.

Seventeenth International Congress of Pure and Applied Chemistry, Munich, Germany:

G. Atkinson, University of Michigan, Ann Arbor, Mich.

E. Banks, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.

G. H. Cady, University of Washington, Seattle, Wash.

H. S. Forrest, University of Texas, Austin, Tex.

F. A. Gunther, University of California, Riverside, Calif.

J. F. Guymon, University of California, Davis, Calif.

H. H. Jaffé, University of Cincinnati, Cincinnati, Ohio

J. F. Hazel, University of Pennsylvania, Philadelphia, Pa.

K. Kammermeyer, State University of Iowa, Iowa City, Iowa

F. A. Miller, Mellon Institute, Pittsburgh, Pa.

H. Neurath, University of Washington, Seattle, Wash.

A. O. C. Nier, University of Minnesota, Minneapolis, Minn.

J. H. Richards, California Institute of Technology, Pasadena, Calif.

K. L. Rinehart, Jr., University of Illinois, Urbana, Ill.

R. Roy, Pennsylvania State University, University Park, Pa.

D. Seyferth, Massachusetts Institute of Technology, Cambridge, Mass.

I. Shapiro, Los Angeles, Calif.

D. A. Shirley, University of Tennessee, Knoxville, Tenn.

A. Silverman, University of Pittsburgh, Pittsburgh, Pa.

H. H. Sisler, University of Florida, Gainesville, Fla.

J. M. Smith, Northwestern University, Evanston, Ill.

L. H. Sommer, Pennsylvania State University, University Park, Pa.

S. Sujishi, Illinois Institute of Technology, Chicago, Ill.

R. Ward, University of Connecticut, Storrs, Conn.

E. F. Westrum, Jr., University of Michigan, Ann Arbor, Mich.

M. Kent Wilson, Tufts University, Medford, Mass.

G. N. Kowkabany, The Catholic University of America, Washington, D.C.

Solid State Conference, Melbourne, Australia:

J. C. Fisher, General Electric Research Laboratory, Schenectady, N.Y.

J. J. Gilman, General Electric Research Laboratory, Schenectady, N.Y.

Spallanzani Congress, Reggio, Emilia, Italy:

R. L. Metcalf, University of California, Riverside, Calif.

Spallanzani Congress, Reggio, Emilia, Italy—Continued

D. Bodenstein, National Institutes of Health, Baltimore, Md.

G. S. Fraenkel, University of Illinois, Urbana, Ill.

Study in Endocrinology, Stockholm, Sweden:

L. R. Robbins, The Levy Clinic, Houston, Tex.

Summer Course in Chemistry at The Royal Institute of Technology, Stockholm, Sweden:

W. J. Peterson, North Carolina State College, Raleigh, N.C.

Summer Course in Mathematics at Aarhus University, Denmark:

E. Hemmingsen, Syracuse University, Syracuse, N.Y.

Summer Course in Mathematics at Teacher Training University, Stockholm, Sweden:

D. A. Johnson, University of Minnesota, Minneapolis, Minn.

Summer Course in Physics at Uppsala University, Uppsala, Sweden:

H. G. Hanson, University of Minnesota, Duluth, Minn.

Symposium on Brain Mechanisms and Learning, Montevideo, Uruguay:

K. L. Chow, The University of Chicago, Chicago, Ill.

R. W. Doty, The University of Michigan, Ann Arbor, Mich.

R. Galambos, Walter Reed Army Institute of Research, Washington, D.C.

J. Olds, The University of Michigan, Ann Arbor, Mich.

F. Morrell, University of Minnesota, Minneapolis, Minn.

Symposium on the Cytochemistry of Enzymes and Antigens, Copenhagen, Denmark:

American Institute of Biological Sciences, Washington, D.C.

Symposium on the Chemistry and Biochemistry of the Solanum Alkaloids, Berlin, Germany:

S. W. Pelletier, The Rockefeller Institute, New York, N.Y.

Symposium on Genetic Control of Protein Specificity, Copenhagen, Denmark:

American Institute of Biological Sciences, Washington, D.C.

Symposium on Glacier Movement, Chamoni, France:

Dr. Robert P. Sharp, California Institute of Technology, Pasadena, Calif.

Dr. James H. Zumberge, University of Michigan, Ann Arbor, Mich.

Symposium on the Immediate and Low Level Effects of Ionizing Radiation, Venice, Italy:

Group Travel for Seven Participants

Symposium on the Problems of the Late Neolithic (or Eneolithic) Period, Prague and Brno, Czechoslovakia:

R. W. Ehrich, Brooklyn, N.Y.

M. Gimbutas, Peabody Museum, Cambridge, Mass.

Symposium on Proteins, Melbourne, Australia:

R. E. Benesch, Marine Biological Laboratory, Woods Hole, Mass.

Symposium on Physiology of the Cell Membrane, Caracas, Venezuela:

J. M. Tobias, Chicago, Ill.

Tenth International Congress of Refrigeration, Copenhagen, Denmark :

F. G. Brickwedde, The Pennsylvania State University, University Park, Pa.  
B. H. Jennings, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Cleveland, Ohio.  
C. F. Kayan, Columbia University, New York, N.Y.  
R. M. Smock, Cornell University, Ithaca, N.Y.  
W. J. Taylor, Ohio State University, Columbus, Ohio

Tenth Congress of the International Astronautical Federation, London, England :

G. Lettmann, University of California, Berkeley, Calif.  
A. Miele, The University of California, Berkeley, Calif.

Third International Congress on Acoustics, Stuttgart, Germany :

G. von Bekesy, Harvard University, Cambridge, Mass.  
R. Beyer, Brown University, Providence, R.I.  
R. H. Bolt, Massachusetts Institute of Technology, Cambridge, Mass.  
H. A. Erf, Acoustical Society of America, Cleveland, Ohio  
J. Goodman, Ocean Avenue, Brooklyn, N.Y.  
E. A. Hiedemann, Michigan State University, East Lansing, Mich.  
F. V. Hunt, Harvard University, Cambridge, Mass.  
R. B. Lindsay, Brown University, Providence, R.I.  
H. Medwin, USN Postgraduate School, Monterey, Calif.  
R. W. Morse, Brown University, Providence, R.I.  
B. Scharf, Northeastern University, Boston, Mass.  
J. Tonndorf, Medical Research Center, Iowa City, Iowa  
R. A. Walking, Harvard University, Cambridge, Mass.

Twelfth Annual Congress of the International Science Film Association in Moscow, Moscow, Russia :

Dr. Willard Webb, Library of Congress, Washington, D.C.

XXI International Congress of Physiological Sciences, Buenos Aires, Argentina :

National Academy of Sciences-National Research Council, Washington, D.C.

#### SCIENTIFIC INFORMATION SERVICE

ACTA METALLURGICA, Schenectady, N.Y.

*An English Edition of the Russian "Abstract Journal-Metallurgy"*; 1 year; \$3,990

*An English Edition of the Russian Journal, "Physics of Metals and Metallography"*; 1 year; \$15,840

*An Expanded English Edition of the Russian "Abstract Journal-Metallurgy"*; 1 year; \$25,015

AMERICAN ASSOCIATION FOR ADVANCEMENT OF SCIENCE, Juneau, Alaska; *Study of the Possibility of a Central Alaskan Reference and Information Service*; 3 months; \$2,610

AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS; Cambridge, Mass.; *Compilation, Analysis, and Dissemination of Visual Observations of Variable Stars*; 2 years; \$16,000

AMERICAN ASTRONOMICAL SOCIETY, U.S. Naval Observatory, Washington, D.C.; *Preparation of the U.S. Portion of the International Astronomical Union Bibliography for 1881-1898*; 1 year; \$8,100

AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, Baltimore, Md.; *Critical Compilation of Crystal Data*; 1 year; \$17,800

AMERICAN GEOPHYSICAL UNION, Washington, D.C.

*An English Edition of the Russian "Bulletin of the Academy of Sciences of the USSR, Geophysics Series"*; 1 year; \$44,835  
*Seriia Geofizicheskata (Bulletin on the Academy of Sciences of the USSR, Geophysics Series); and a Study of the Trudy Geofizicheskogo Instituts Akademii Nauk (Proceedings of the Geophysics Institution of the Academy of Sciences)*; 1 year; \$38,436

*Transactions of the American Geophysical Union and of the New Journal of Geophysical Research*; 2 years; \$146,000

*Translation and Publication of the Russian "Transactions of the Geophysical Institute of the Academy of Sciences"*; 1 year; \$14,420

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, Washington, D.C.

*An English Edition of the Russian "Entomological Review"*; 1 year; \$30,100

*English Editions of Three Russian Journals: Microbiology, Plant Physiology, and Doklady (Biological Science and Botanical Science Sections)*; 1 year; \$83,718

*Experimental Publication of a Scientific Journal in Microform*; 3 years; \$11,274

*Preliminary Study Program for Improving the Communication of Biological Information*; 3 months; \$13,248

*Preparation of a Supplement to the "Bibliography of Eastern Asiatic Botany", by E. D. Merrill and E. H. Walker*; 1 year; \$30,211

*Publication of an English Translation Manuscript of a Russian Monograph, X-Rays and Plants, by L. P. Breslavets*; 6 months; \$7,600

*Publication of an English Translation Manuscript of "Arachnoidea, Vol. VI, No. 1, Fauna of the USSR", by A. A. Zachvatkin*; 6 months; \$9,578

*Publication of an English Translation Manuscript of "Arachnoidea, Vol. IV, No. 2, Fauna of the USSR"*; 6 months; \$10,625

*Translation and Publication of the Russian "Proceedings of the Academy of Sciences of the USSR—Biochemistry Section"*; 1 year; \$19,050

*Translation and Publication of the Russian Volume "Marine Biology," Trudi Instituta of Oceanography, Volume XX*; 1 year; \$13,494

AMERICAN INSTITUTE OF PHYSICS, New York, N.Y.

*English Edition of the Russian "Journal of Acoustics"*; 1 year; \$7,260

*An English Edition of the Russian Journal, "Astronomical Journal"*; 1 year; \$27,250

*An English Edition of the Russian Journal "Crystallography"*; 1 year; \$20,050

*English Edition of the Russian "Journal of Experimental and Theoretical Physics"*; 1 year; \$46,900

*An English Edition of the Russian Journal "Progress of Physical Sciences"*; 4 months; \$12,740

English Edition of the Russian "Journal of Technical Physics"; 1 year; \$17,750

English Editions of Three Russian Journals: "Journal of Technical Physics", "Doklady" (Physics Section) and "Journal of Acoustics"; 1 year; \$196,000

Journal of Mathematical Physics; 3 years; \$64,800

Support for a Series of Critical Reviews in Physics; 2 years; \$29,325

Translation and Publication of the Physics Section of the Russian Journal, "Doklady"; 1 year; \$23,850

Translation and Publication of the Russian "Journal of Experimental and Theoretical Physics"; 1 year; \$47,200

Translation of the Russian Book "Wave Propagation in Layered Media," by L. M. Brekhovskikh; 1 year; \$6,325

AMERICAN JOURNAL OF SCIENCE, New Haven, Conn.; Radiocarbon-Date Publication; 1 year; \$2,950

AMERICAN MATHEMATICAL SOCIETY, Providence, R.I.

Extend the Program for Translation and Publication of Russian Mathematical Literature To Include Mathematical Statistics and Probability; 5 months; \$7,602

Mathematical Reviews; 1 year; \$55,000

A Preliminary Project Leading to the Preparation of a Russian-English, English-Russian Mathematical Dictionary; 6 months; \$5,290

AMERICAN METEOROLOGICAL SOCIETY, Boston, Mass.; Translation and Publication of Selected Russian Monographs in the Field of Meteorology; 1 year; \$16,790

AMERICAN MUSEUM OF NATURAL HISTORY, New York, N.Y.; Butterflies of the American Tropics: the Genus *Anaea*; 1 year; \$12,000

AMERICAN PHYTOPATHOLOGICAL SOCIETY, c/o Plant Industry Station, Beltsville, Md.; Preparation of an Annotated Bibliography of Reviews in Plant Pathology; 18 months; \$8,000

AMERICAN ROCKET SOCIETY, INC., New York, N.Y.; The Translation and Publication of Selected Russian Material in the Field of Astronautics; 1 year; \$30,200

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, New York, N.Y.

Applied Mechanics Reviews; 1 year; \$10,000

Publication of a Book Entitled "Spray Literature Abstracts"; 1 year; \$5,000

Theory of Elastic Thin Shells; 3 years; \$13,500

Translation and Publication of the Russian Journal, "Applied Mathematics and Mechanics"; 1 year; \$40,000

Translation and Publication of the Russian Journal "Applied Mathematics and Mechanics"; 1 year; \$30,000

ARCTIC INSTITUTE OF NORTH AMERICA, Washington, D.C.; Arctic Bibliography; 1 year; \$25,000

ASSOCIATION FOR APPLIED SOLAR ENERGY, Phoenix, Ariz.; Partial Support of "Solar Energy": The Journal of Solar Energy Science and Engineering; 3 years; \$43,500

BERNICE P. BISHOP MUSEUM, Honolulu, Hawaii; Secretariat of the Pacific Science Association; 4 years; \$13,000

BIOLOGICAL ABSTRACTS, University of Pennsylvania, Philadelphia, Pa.; Expansion of Coverage of Biological Abstracts; 1 year; \$150,000

BROOKLYN COLLEGE, Brooklyn, N.Y.; Continued Partial Support of "Sociological Abstracts"; 1 year; \$5,200

BUREAU OF LABOR STATISTICS, U.S. DEPARTMENT OF LABOR, Washington, D.C.; Segmental Studies of Demand for Scientific and Technical Personnel; 1 year; \$45,500

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, Calif.; Tenth General Assembly of the International Astronomical Union; 2 months; \$200

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.

Compilation of Volume VII of the "World Bibliography of Fossil Vertebrates and Paleolithic Anthropology"; 4 years; \$25,050

Continued Support of Research on the Machine Translation of Russian Technical Literature; 1 year, \$57,900

Machine Translation of Russian Technical Literature; 1 year; \$40,500

UNIVERSITY OF CALIFORNIA, Los Angeles, Calif.; Mosquitoes of the South Pacific; 1 year; \$6,000

CAMBRIDGE LANGUAGE RESEARCH UNIT, Cambridge, England; New Logico-Mathematical Methods for the Analysis of Languages for Machine Translation; 1 year; \$35,650

CASE INSTITUTE OF TECHNOLOGY, Cleveland, Ohio.

Compilation of a Comprehensive Bibliography on Operations Research for 1957 Through 1959; 18 months; \$5,000

An Operations-Research Study of the Scientific Reading of Chemists and Physicists; 1 year; \$40,250

UNIVERSITY OF CHICAGO, Chicago, Ill.; Stars and Stellar Systems; 2 years; \$8,800

COLUMBIA UNIVERSITY, New York, N.Y.; Review of Studies of Scientists' Information-Gathering Behavior; 5 months; \$6,100

CORNELL UNIVERSITY, Ithaca, N.Y.; Preparation and Publication of the Bibliography of Extraterrestrial Radio Noise; 16 months; \$9,200

EARTHQUAKE ENGINEERING RESEARCH INSTITUTE, Pasadena, Calif.; Construction in Seismic Regions and Norms and Regulation in Seismic Regions; 1 year; \$4,350

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; \$4,500

ENGINEERING MANPOWER COMMISSION, New York, N.Y.; An Analysis of Salary and Other Income of Engineering Faculty Members; 3 months; \$6,800

FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY, Washington, D.C.; Study of a Mechanical System of Programming Large Scientific Meetings and Test of the System by Experimental Trial; 1 year; \$15,000

GENETICS, INC., University Station, Austin, Tex.; Publication of Manuscript Backlog—Genetics; 1 year; \$35,000

GEOCHEMICAL SOCIETY, GEOPHYSICAL LABORATORY, Washington, D.C.

An English Edition of the 1956 Issues of the Russian Journal, "Geochemistry"; 1 year; \$10,700

An English Edition of the 1957 Issues of the Russian Journal, "Geochemistry"; 1 year; \$10,700

- English Edition of the Russian Journal, "Geochemistry"; 1 year; \$13,200*
- HARVARD UNIVERSITY, Cambridge, Mass.; *Research on Automatic Translation of Russian Into English; 1 year; \$220,000*
- UNIVERSITY OF ILLINOIS, Urbana, Ill.; *An Index of Scientific Names of Algae; 2 years; \$16,000*
- INSTITUTE OF MATHEMATICAL STATISTICS, Ithaca, N.Y.; *The Annals of Mathematical Statistics; 3 years; \$18,000*
- INSTRUMENT SOCIETY OF AMERICA, Pittsburgh, Pa.; *An English Edition of the Russian Journal, "Automation and Remote Control"; 1 year; \$24,000*
- INTERNATIONAL ASSOCIATION FOR PLANT TAXONOMY, Cambridge, Mass.; *Index Bryologicus; 1 year; \$11,000*
- INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS, PALEIS-NOORDEINDE, The Hague, Holland; *International Abstracting Board; 1 year; \$7,500*
- INTERNATIONAL STATISTICAL INSTITUTE, Raleigh, N.C.; *Establishment of an Abstracting Journal Covering Statistical Theory and Method; 1 year; \$16,200*
- JOSIAH MACY, JR., FOUNDATION, New York, N. Y.; *For the Publication of the Proceedings of the Second Conference on the Central Nervous System and Behavior; 1 year; \$12,000*
- LIBRARY OF CONGRESS, Washington, D.C.  
*Bibliography of U.S. Abstracting and Indexing Services; 1 year; \$10,000*  
*Compilation of Accessions List of Scientific and Technical Serials of the Library of Congress; 1 year; \$420*  
*Partial Support of Compilation and Publication of World List of Future International Meetings, Part I, Scientific and Technical Meetings; 6 months; \$5,000*  
*Preparation and Publication of a Guide to International Information Facilities in Science, Technology, Medicine and Agriculture; 1 year; \$34,800*  
*Publication of a Selected Bibliography of Japanese Serial Publications in Science and Technology; 6 months; \$2,290*  
*Reference Center for Reports on Government-Supported Scientific Research; 1 year; \$1,005*  
*A Slavic Scientific Literature Specialist; 1 year; \$10,000*  
*Source File of Soviet Science Information; 1 year; \$13,112*  
*Study of the Availability and Utilization of Japanese Scientific Literature in the United States; 1 year; \$16,812*  
*Study of the Availability and Utilization of Japanese Scientific Literature in the United States; 1 year; \$262*  
*A Subject Index to the ASTIA "Title Announcement Bulletin"; 6 months; \$4,020*
- WILLIAM C. MARTIN, NATIONAL BUREAU OF STANDARDS, Washington, D.C.; *Partial Support of Excess Publication Costs of a Paper in the "Journal of the Optical Society of America"; 1 year; \$400*
- MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.  
*Basic Research on Methods of Translating Languages by Machine; 1 year; \$90,600*  
*English Editions of Three Russian Journals: "Radio Engineering," "Radio Engineering and Electronics," and "Telecommunications"; 1 year; \$52,500*
- UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.; *Compilation of a Russian-English and English-Russian Mathematical Dictionary; 1 year; \$16,790*
- UNIVERSITY OF MICHIGAN RESEARCH INSTITUTE, Ann Arbor, Mich.; *Preparation of "An Economic Atlas of the Soviet Union"; 1 year; \$9,500*
- MIDWEST INTER-LIBRARY CENTER, Chicago, Ill.; *Scientific Journals Center; 1 year; \$19,160*
- MIDWEST RESEARCH INSTITUTE, Kansas City, Mo.; *Exploratory Use of a System to Reveal New Uses for Chemical Compounds; 1 year; \$10,000*
- MUSEUM OF SCIENCE AND INDUSTRY, Chicago, Ill.; *Display of Brussels Fair Science Exhibits at the Chicago Museum of Science and Industry for Fostering Interchange of Scientific Information; \$31,714*
- NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL, Washington, D.C.  
*Atmospheric Chemistry of Chlorine and Sulfur Compounds; 1 year; \$3,550*  
*A Descriptive Area Scientific Research and Information Study in Indonesia; 3½ months; \$8,200*  
*Dissemination of Scientific Information; 5 months; \$7,475*  
*"High Energy Physics Newsletter"; 1 year; \$7,000*  
*International Conference on Scientific Information; 6 months; \$80,600*  
*Office of Critical Tables; 3 years; \$198,500*  
*Reorganization and Publication of Geological Abstracts; 18 months; \$60,285*  
*Support of an English Edition of the Russian "Bulletin (Izvestiia) of the Academy of Sciences of the USSR: Geology Series"; 1 year; \$40,200*  
*A Survey of the Accumulation and Dissemination of Scientific Information in Vietnam; 1 month; \$1,450*
- NATIONAL BOOK LEAGUE, London W. 1., England; *Preparation for Test of the Kyle Classification for the Social Sciences; 2 years; \$17,000*
- NATIONAL BUREAU OF STANDARDS, Washington, D.C.  
*Preparation of a Handbook of Mathematical Tables; 18 months; \$40,000*  
*Research Advisory Service on Information Processing; 9 months; \$105,000*  
*A Study of Multiple Relations in Information Retrieval Systems; 1 year; \$22,900*
- NATIONAL FEDERATION OF SCIENCE, Philadelphia, Pa.; *Partial Support for the Federation for the 1st year (Executive Secretary and Office, and Working Meetings); 1 year; \$15,500*
- NATIONAL FEDERATION OF SCIENCE ABSTRACTING AND INDEXING SERVICES, Philadelphia, Pa.; *Compilation of a Union List of Periodicals Covered by 12 Major U.S. Abstracting and Indexing Services; 1 year; \$13,500*
- NEW YORK PUBLIC LIBRARY, New York, N.Y.; *Support of a Study of the Organization of Science and Scientific Publishing in Poland; 1 year; \$8,050*
- NEW YORK UNIVERSITY, New York, N.Y.; *A Survey of Needs and Desirable Priorities for Russian-English Dictionaries in the Fields of Mathematics, the Natural Sciences, and Technology; 6 months; \$14,700*

- NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, Raleigh, N.C.; *Catalogue of the Homoptera of the World*; 2 years; \$39,200
- UNIVERSITY OF NORTH CAROLINA, Chapel Hill, N.C.; *Support of an Evaluation and Report on Automatic Programming and Numerical Analysis in the Soviet Union*; 1 year; \$6,900
- NORTHWESTERN UNIVERSITY, Evanston, Ill.; *Scientific Papers of Frans Boas*; 1 year; \$12,300
- OCHANOMIZU UNIVERSITY, Tokyo, Japan; *Translation From the Japanese of the Book "Invertebrate Embryology"*; 2 years; \$8,200
- OPTICAL SOCIETY OF AMERICA, Rochester, N.Y.; *Support of an English Edition of the Russian Journal "Optics and Spectroscopy"*; 1 year; \$74,750
- UNIVERSITY OF OREGON, Eugene, Oreg.; *Dissemination of Scientific Information in Connection With Basic Research Exhibit at Oregon Centennial Exposition*; 4 months; \$2,450
- ROBERT S. PEABODY FOUNDATION FOR ARCHAEOLOGY, PHILLIPS ACADEMY, Andover, Mass.; *Radiocarbon Samples and Their Dates*; 7 months; \$500
- UNIVERSITY OF PENNSYLVANIA, Philadelphia, Pa.  
*Bibliography of the Flowering Plants of Mexico*; 2 years; \$10,500  
*Continued Support of Research on Linguistic Transformations for Information Retrieval*; 2 years; \$321,800  
*Investigation of Linguistic Transformations for Information Retrieval*; 6 months; \$31,400
- PRINCETON UNIVERSITY PRESS, Princeton, N.J.; *Some Problems of Chemical Kinetics and Reactivity*; 6 months; \$1,000
- PURDUE RESEARCH FOUNDATION, Lafayette, Ind.; *Study of the Structure of Abstracting Sources With Respect to Coverage of Information on Thermophysical Properties*; 1 year; \$25,725
- UNIVERSITY OF RHODE ISLAND, Kingston, R.I.; *Preparation of a Manuscript on "The Characeae"*; 1 year; \$2,300
- SMITHSONIAN INSTITUTION, Washington, D.C.; *Partial Support for the Operating Expenses of the Bio-Sciences Information Exchange*; 1 year; \$25,000
- SOCIETY OF SYSTEMATIC ZOOLOGY, Chicago, Ill.; *Directory of Specialists in the Taxonomy of Animals*; 1 year; \$14,800
- SPECIAL LIBRARIES ASSOCIATION, New York, N.Y.; *Scientific Translations Center*; 1 year; \$24,124
- U.S. JOINT PUBLICATIONS RESEARCH SERVICE OFFICE OF TECHNICAL SERVICES, U.S. DEPARTMENT OF COMMERCE, New York, N.Y.  
*Translation of the "Referativnyi Zhurnal-Biologiya"*; 3 months; \$16,665  
*Translation From Russian to English of the Monograph "Basic Concepts in Contemporary Physics"*; 3 months; \$1,862
- UNIVERSITY OF UTAH, Salt Lake City, Utah; (Leo T. Samuels); *Travel in Australia and Orient to Visit Laboratories Studying Steroid Endocrinology*; 6 months; \$1,095
- YALE UNIVERSITY PRESS, New Haven, Conn.; *Translation of the Ecology of Food Fishes by Dr. V. S. Iolev*; 1 year; \$3,000

## APPENDIX E

### Grants for the International Geophysical Year Program

<b>AURORA AND AIRGLOW</b>			
AIR FORCE CAMBRIDGE RESEARCH CENTER:			
Data Reduction-Patrol Spectrograph-----	\$68, 060	Data Reduction-Antarctic Ice Sampling, Isotope Ratios-----	22, 990
<b>NATIONAL BUREAU OF STANDARDS:</b>		OHIO STATE UNIVERSITY:	
Airglow Data Reduction-----	21, 775	Antarctic Data Reduction and Publication-----	27, 150
Operational Costs and Coordination of Northern Stations----	10, 327	<b>UNIVERSITY OF WASHINGTON:</b>	
<b>COSMIC RAYS</b>		Meteorological Studies and Data Reduction in Western United States (Blue Glacier)-----	7, 300
UNIVERSITY OF IOWA:		Data Reduction of Arctic Sea Ice Physics-----	6, 022
Data Reduction in High Altitude Cosmic Ray Measurements in the Arctic-----	5, 482	<b>GRAVITY MEASUREMENTS</b>	
UNIVERSITY OF MARYLAND:		ARCTIC INSTITUTE OF NORTH AMERICA:	
Reduction of Cosmic Ray Counter Data-----	2, 000	Recruitment, Hiring, and Travel of Scientists for the Antarctic-----	1, 500
UNIVERSITY OF MINNESOTA:		UNIVERSITY OF CALIFORNIA:	
Monitoring and Data Reduction of Cosmic Ray Intensities at High Altitude-----	24, 380	Observation and Data Reduction of Mean Rigidity of the Earth-----	9, 450
UNIVERSITY OF NEW HAMPSHIRE:		COLUMBIA UNIVERSITY:	
Reduction and Study of Neutron Intensity-Time Variations----	3, 536	Reduction of Gravity Measurements-----	3, 200
UNIVERSITY OF NEW MEXICO:		UNIVERSITY OF WISCONSIN:	
Data Reduction-Semidiurnal Planetary Variation of Atmospheric Pressure-----	3, 600	Antarctic Data Reduction and Publication-----	9, 980
<b>GEOMAGNETISM</b>		Gravity Measurements in Connection with the International Geophysical Year Gravity Program-----	6, 500
UNIVERSITY OF CALIFORNIA:		<b>IONOSPHERIC PHYSICS</b>	
Operation of Jarvis and Palmyra Magnetic Stations-----	16, 000	UNIVERSITY OF ALASKA:	
U.S. COAST AND GEODETIC SURVEY:		Operation of an Atmospheric Whistler Station in Alaska---	5, 630
Data Reduction and Publication in Coordinating and Administering the Geomagnetism Program-----	103, 610	DARTMOUTH COLLEGE:	
<b>GLACIOLOGY</b>		Data Reduction of Atmospheric Whistlers-East-----	23, 900
AMERICAN GEOGRAPHICAL SOCIETY:		NATIONAL BUREAU OF STANDARDS:	
Data Reduction of Glacier Observations in Southern Alaska-----	13, 915	Operation of South American Ionospheric Sounding Stations-----	4, 461
Data Reduction of Photogrammetry and Mapping-----	7, 500	Operation of Six Antarctic Stations in Ionospheric Physics Network-----	16, 701
ARCTIC INSTITUTE OF NORTH AMERICA:		Ionospheric Quality Control and Training-----	5, 130
Recruitment, Hiring, and Travel of International Geophysical Year Scientists for the Antarctic-----	19, 280	Equatorial VHF Ionospheric Forward Scatter Measurements---	1, 012
Data Reduction in Glaciology on Mt. Michelson-----	29, 850	Fixed Frequency Backscatter Measurements-----	3, 599
Logistic Equipment and Supplies-----	8, 000	Data Reduction and Publication for VHF Oblique Incidence Sporadic-E Field Strength Measurements-----	14, 234
CALIFORNIA INSTITUTE OF TECHNOLOGY:		Ionospheric Quality Control and Publication-----	82, 017
Data Reduction-Glacier Dynamics of Blue Glacier Olympic Mountains-----	2, 000	PENNSYLVANIA STATE UNIVERSITY:	
		Atmospheric Absorption-Pulse Method-----	1, 848
		True Height Determination----	8, 488

<b>STANFORD UNIVERSITY :</b>		<b>SOLAR ACTIVITY</b>	
Data Reduction in Establishing the Latitude Dependence and Occurrence at Conjugate Geomagnetic Locations of Whistlers in the West-----	35, 805	UNIVERSITY OF HAWAII Solar Activity Flare Patrol in Hawaii-----	3, 500
Fixed Frequency Backscatter Measurements-----	13, 275	HIGH ALTITUDE OBSERVATORY Visual Observations-----	5, 000
<b>LONGITUDE AND LATITUDE</b>		UNIVERSITY OF MICHIGAN Operational Costs and Data Reduction of McMath-Hulbert Observatory Solar Activity Program-----	3, 950
<b>U.S. COAST AND GEODETIC SURVEY :</b>		NATIONAL BUREAU OF STANDARDS Data Reduction and Publication-----	19, 686
Longitude and Latitude Measurements in Hawaii-----	4, 000	RENSELAER POLYTECHNIC INSTITUTE Data Reduction of Indirect Flare Detection Instrumentation---	1, 725
<b>METEOROLOGY</b>		<b>WORLD DAYS</b>	
<b>SMITHSONIAN INSTITUTION :</b>		NATIONAL BUREAU OF STANDARDS Operation of U.S. and World Warning Center-----	72, 810
Data Reduction-Earth Albedo Observations-----	4, 000	<b>GENERAL RELATED SCIENTIFIC SUPPORT</b>	
<b>U.S. WEATHER BUREAU :</b>		ARCTIC INSTITUTE OF NORTH AMERICA	
Data Reduction and Publication. Procurement of Equipment and Supplies for Antarctica-----	41, 950	Antarctic Scientific Field Supervision Costs (4)-----	790
Arctic Ice-Floe Meteorological Stations-----	103, 000	Antarctic Scientific Field Supervision Costs (6)-----	950
Reduction and Preparation for Publication of Arctic and Antarctic Meteorological Data----	7, 625	U.S. DEPARTMENT OF THE INTERIOR Scientific Station Leader in the Antarctic-----	3, 550
<b>OCEANOGRAPHY</b>		U.S. DEPARTMENT OF THE NAVY Antarctic Scientific Field Supervision Costs-----	6, 301
<b>UNIVERSITY OF CALIFORNIA :</b>		U.S. WEATHER BUREAU Antarctic Planning Staff-----	6, 290
Procurement of Equipment for Use in the Island Observatories-----	7, 000	<b>WORLD DATA CENTER</b>	
Data Reduction for Deep Current Program in the Pacific-----	5, 000	UNIVERSITY OF ALASKA Archives in Aurora-----	58, 310
<b>COLUMBIA UNIVERSITY :</b>		AMERICAN GEOGRAPHICAL SOCIETY Archives in Glaciology-----	40, 407
Operational Costs and Data Reduction of Deep Current Oceanography in the Atlantic-----	43, 000	U.S. COAST AND GEODETIC SURVEY Archives in Geomagnetism, Gravity, and Seismology-----	61, 800
<b>TEXAS A &amp; M :</b>		CORNELL UNIVERSITY Archives in Aurora-----	63, 750
Data Reduction in Deep Current Oceanography in the Atlantic.	3, 000	HIGH ALTITUDE OBSERVATORY Archives in Solar Activity-----	18, 360
<b>WOODS HOLE OCEANOGRAPHIC INSTITUTION :</b>		UNIVERSITY OF MINNESOTA Archives in Cosmic Rays-----	29, 774
Operational Costs and Related Expenses in Deep Current Oceanography in the Atlantic.	5, 000	NATIONAL BUREAU OF STANDARDS Operation of the Data Coordination Office-----	71, 660
<b>ROCKETRY</b>		Archives in Airglow and Ionosphere-----	113, 370
<b>U.S. DEPARTMENT OF THE ARMY :</b>		NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL Rocket and Satellite World Data Center "A"-----	19, 500
Procurement of Rockets and Equipment and Partial Operational Costs on Guam-----	20, 000	TEXAS A. & M. Archives in Oceanography-----	49, 372
<b>SEISMOLOGY</b>		U. S. WEATHER BUREAU Archives in Meteorology-----	71, 000
<b>ARCTIC INSTITUTE OF NORTH AMERICA :</b>		<b>INTERDISCIPLINARY RESEARCH</b>	
Antarctic Seismology Program (Personnel)-----	4, 690	CRUST AND CORE	
<b>CALIFORNIA INSTITUTE OF TECHNOLOGY</b>		CALIFORNIA INSTITUTE OF TECHNOLOGY	
Data Reduction-Equipment for Use in the Antarctic-----	3, 450		
Data Reduction in the Study of Crustal Strain Accumulation.	540		
<b>U.S. COAST AND GEODETIC SURVEY :</b>			
Procurement of Seismographs for Operations in the Pacific Ocean Area-----	2, 350		
<b>COLUMBIA UNIVERSITY :</b>			
Seismic Measurements in the Atlantic-----	8, 000		
Data Reduction and Publication.	12, 420		
<b>UNIVERSITY OF WISCONSIN :</b>			
Data Reduction and Publication.	19, 435		
Seismic Exploration of Coastal Areas-----	1, 500		



Study of Long Period and Extensometer Data-----	30, 000	UNIVERSITY OF MICHIGAN Solar Flare Studies-Flare Mechanism-----	29, 500
Analytical Studies of Crustal Structure-----	22, 195	Solar Flare Studies-Line Spectra-----	27, 500
UNIVERSITY OF CALIFORNIA Study of Marine Seismic Data-----	20, 882	UNIVERSITY OF MINNESOTA High Altitude Balloon Observations-----	10, 000
U.S. COAST AND GEODETIC SURVEY Analysis of Arctic, Antarctic, and Pacific Records-----	20, 000	NATIONAL BUREAU OF STANDARDS Theoretical Studies of High Atmosphere Data-----	200, 000
COLUMBIA UNIVERSITY Analysis of Land and Sea Gravity and Seismic Data-----	46, 000	NEW YORK UNIVERSITY Analysis of Synoptic Cosmic Ray Data-----	22, 000
UNIVERSITY OF WISCONSIN Analysis of Gravity Observations-----	29, 613	PENNSYLVANIA STATE UNIVERSITY Analysis of Height Distribution-RAND CORPORATION Ionospheric Dynamics-----	80, 000
Crustal Structure Determination Using Gravity and Travel Time Measurements-----	19, 435	RENSSELAER POLYTECHNIC INSTITUTE Analysis of Solar Phenomena and Radio Noise-----	22, 000
HEAT AND WATER		STANFORD UNIVERSITY : Ionospheric Backscatter Data--	40, 000
UNIVERSITY OF CALIFORNIA Geochemical Data (CO <sub>2</sub> Studies) - Analysis of Oceanographic Data-----	15, 000		
Polar Vortex Studies-----	54, 703	SPECIAL RESEARCH	
COLUMBIA UNIVERSITY Analysis of Oceanographic Data-----	32, 660	CARNEGIE INSTITUTION OF WASHINGTON : Special Research Surveys by Distinguished Scientists From Abroad-----	122, 300
HIGH ALTITUDE OBSERVATORY Theoretical Study of Ozone Data-----	44, 000	UNIVERSITY OF CHICAGO : Special Research Surveys by Distinguished Scientists From Abroad-----	46, 000
OHIO STATE UNIVERSITY Antarctic Water Budget Study-- Analysis of Antarctic Micrometeorological Data-----	12, 000		
TEXAS A. & M. Analysis of Oceanographic Data-----	10, 350	EARTH SATELLITE-SCIENTIFIC EXPERIMENTS	
UNIVERSITY OF WASHINGTON Analysis of Oceanographic Data-----	37, 973	U.S. DEPARTMENT OF THE ARMY : Micrometeor Detection-----	25, 000
Analysis of Blue Glacier Micrometeorological Records-----	30, 000	UNIVERSITY OF ILLINOIS : Radio Interferometry and Data Analysis-----	9, 627
U.S. WEATHER BUREAU Antarctic Troposphere and Stratosphere Structure-----	6, 568	LINFIELD RESEARCH INSTITUTE : Absolute Signal Strength and Frequency Measurements-----	5, 550
Atmospheric and Oceanic Circulation-----	149, 000	NATIONAL BUREAU OF STANDARDS : Interferometer and Doppler Measurements of Satellite Radio Transmissions-----	42, 732
WOODS HOLE OCEANOGRAPHIC INSTITUTION Analysis of Oceanographic Data-----	77, 000	Electron Density Profiles-----	14, 439
	60, 000	PENNSYLVANIA STATE UNIVERSITY : Doppler Measurements From Spaced Locations-----	33, 258
UPPER ATMOSPHERE		STANFORD UNIVERSITY : Electron Density and Radio Propagation Studies Utilizing Satellite Transmissions-----	23, 000
UNIVERSITY OF ALASKA Study and Analysis of Alaskan Data-----	200, 000	UNIVERSITY OF WISCONSIN : Radiation Balance of the Earth--	7, 500
UNIVERSITY OF CALIFORNIA Line Island Data-----	18, 287	EARTH SATELLITE - OPTICAL TRACKING	
U.S. COAST AND GEODETIC SURVEY Study of Equatorial Enhancement of Transients and Study of Activity Patterns and Magnetic Storm Onsets at Polar Latitude-----	32, 000	SMITHSONIAN INSTITUTION : Cost of Optical Tracking Stations-----	190, 000
UNIVERSITY OF COLORADO Analysis of High Atmosphere Data-----	50, 000	Operation of Optical Tracking Stations-----	102, 200
FRANKLIN INSTITUTE Analysis of Synoptic Cosmic Ray Data-----	38, 000	Administration of a Visual Observing Program-----	149, 000
HIGH ALTITUDE OBSERVATORY Research in Solar and Solar-Terrestrial Problems-----	6, 325	Observation, Reduction, Analysis, and Central Operation-----	325, 122
UNIVERSITY OF MARYLAND Analysis of Cosmic Ray Data--	8, 000	SOCIETY OF PHOTOGRAPHIC SCIENTISTS AND ENGINEERS : Volunteer Photographic Tracking-----	22, 000
			\$4, 882, 750

## APPENDIX F

### Fellowship Awards Offered

*National Science Foundation Fellowship Awards, by Type and Field, Fiscal Year 1959*

Field	Graduate	Cooper- ative graduate	Graduate teaching assistants	Post- doctoral regular	Post- doctoral senior	Science faculty	Second- ary school teachers	Total
<b>Life Sciences:</b>								
Agriculture.....	4	17	4	2	3	6	1	37
Anthropology.....	16	12	10	8	4	1	0	51
Biochemistry.....	30	38	13	16	11	6	9	123
Biophysics.....	9	3	1	4	1	2	0	20
Botany.....	17	18	22	6	1	13	12	89
General Biology.....	10	7	3	2	2	7	87	117
Genetics.....	19	20	8	2	5	2	1	58
Medical Sciences.....	11	10	6	10	4	9	0	50
Microbiology.....	11	13	8	3	0	7	5	47
Psychology.....	30	52	29	5	2	4	0	122
Zoology.....	59	48	61	15	7	26	35	251
<b>Subtotal.....</b>	<b>216</b>	<b>238</b>	<b>165</b>	<b>73</b>	<b>40</b>	<b>83</b>	<b>150</b>	<b>965</b>
<b>Physical Sciences:</b>								
Astronomy.....	13	5	0	0	0	2	1	21
Chemistry.....	201	205	162	36	12	32	82	730
Earth Sciences.....	75	50	39	7	4	9	11	195
Engineering Sciences.....	175	233	59	3	5	83	0	558
Mathematical Sci- ences.....	143	128	71	30	6	58	253	689
Physics.....	259	178	62	42	13	33	76	663
General.....	0	0	0	0	0	1	0	1
<b>Subtotal.....</b>	<b>866</b>	<b>799</b>	<b>393</b>	<b>118</b>	<b>40</b>	<b>218</b>	<b>423</b>	<b>2,857</b>
<b>Social Sciences:</b>								
General.....	18	13	22	3	3	0	0	59
<b>Natural Sciences:</b>								
General.....	0	0	0	0	0	1	55	56
<b>Total.....</b>	<b>1,100</b>	<b>1,050</b>	<b>580</b>	<b>194</b>	<b>83</b>	<b>302</b>	<b>628</b>	<b>3,937</b>

### *Names, Residences, and Fields of Study of Individuals Offered National Science Foundation Fellowships*

#### ALABAMA

##### *Graduate*

COULTER C. ALTON, Phenix City, Physics.  
 HOLMES, CHARLES H., LaFayette, Engi-  
 neering.  
 JANSSENS, THOMAS, S.J., Mobile, Physics.  
 MAGUIRE, JOHN A., III, Birmingham, Chem-  
 istry.  
 McMILLAN, D. RUSSELL, Jr., Montevallo,  
 Mathematics.  
 SANDERSON, JACK T., Birmingham, Physics.  
 ST. GEORGE, JOHN P., S.J., Mobile, Chem-  
 istry.

##### *Postdoctoral*

DISMUKES, JOHN P., Montgomery, Chem-  
 istry.

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

GILMORE, W. FRANKLIN, Birmingham, Chem-  
 istry.  
 GLENN, JOHN C., Birmingham, Agriculture.  
 KINZER, EARL T., Jr., Auburn, Physics.  
 VENABLE, WILLIAM H., Jr., University,  
 Physics.

##### *Summer Fellowships for Secondary School Teachers*

MCARTHUR, JEAN A., Birmingham, Zoology.  
 PETERMAN, WILLIE S., Birmingham, Mathe-  
 matics.  
 RIGOTTI, Sr. DOMINICA, O.S.B., Birming-  
 ham, Mathematics.  
 STOREY, JESSIE, Birmingham, Mathematics.

### Cooperative Graduate

ALLEN, LEON H., Jr., Opelika, Agriculture.  
FROMHOLD, ALBERT T., Jr., Cullman, Engineering.  
HILL, PAUL D., Dadeville, Mathematics.  
MARLOW, A. RANSOM, S.J., Mobile, Astronomy.  
MURRAY, ROYCE W., Birmingham, Chemistry.  
MURRELL, DAVID W., Birmingham, Mathematics.  
PROBST, FRANKLIN M., Anniston, Physics.  
SMITH, CLOYD V., Jr., Sylacauga, Engineering.  
SWEET, RICHARD F., Mobile, Physics.  
VENABLE, WILLIAM H., Jr., University, Physics.

### Science Faculty

EVANS, LAWRENCE E., Auburn, Agriculture.  
LOWRY, JAMES L., Auburn, Engineering.  
PRATHER, MARY E. S., Auburn, Biochemistry.  
WILCOX, HAROLD E., Birmingham, Chemistry.

### ALASKA

#### Science Faculty Fellowships

GENAUX, CHARLES T., College, Biochemistry.  
MENDENHALL, WILLIAM W., Jr., Fairbanks, Engineering.  
PRYTON, HAROLD R., College, Engineering.

### ARIZONA

#### Graduate

BROWN, KEITH S., Jr., Amado, Chemistry.  
COOK, DON B., Scottsdale, Chemistry.  
HAYDEN, JULIAN D., Jr., Tucson, Physics.  
KLOTZ, BENJAMIN P., Phoenix, Economics.  
LANGB, ROBERT V., Phoenix, Physics.  
PORTER, EVAN D., Mesa, Zoology.  
TOBEY, GENE E., Tucson, Engineering.  
WILLIAMSON, ROBERT E., Jr., Tucson, Mathematics.

#### Cooperative Graduate

DICKERSON, ROBERT H., Flagstaff, Physics.  
FENWICK, CHARLES A., Phoenix, Psychology.  
FENWICK, RICHARD C., Phoenix, Engineering.  
FENWICK, ROBERT B., Phoenix, Engineering.  
GREENBERG, STANLEY ARTHUR, Tucson, Chemistry.  
KENT, BRYAN P., Tucson, Engineering.  
WALLRAFF, EVELYN B., Tucson, Microbiology.

#### Science Faculty

BENHAM, MILFORD J., Phoenix, Earth Sciences.  
CHILDS, RICHARD F., Tucson, Medical Sciences.  
McCLEARY, JAMES A., Tempe, Botany.  
MARGOLIN, ABE S., Phoenix, Earth Sciences.

#### Summer Fellowships for Graduate Teaching Assistants

DOLE, JIM W., Phoenix, General Biology.  
TROLL, RALPH, Tucson, Zoology.

#### Summer Fellowships for Secondary School Teachers

BUCHALTER, BARBARA D., Tucson, Mathematics.  
COWAN, PAUL J., Phoenix, Physics.  
DUMERMUTH, DERRYL A., Marana, Mathematics.  
GARNER, CHARLES D., Tucson, Physics.

GILBERT, CHARLES R., Superior, Zoology.  
HALL, JOHN O., Tucson, Zoology.  
HUGHES, Rev. BARNABAS B., Phoenix, Mathematics.  
JONES, LOYAL H., Phoenix, Microbiology.  
KARLIN, MARVIN W., Tucson, Mathematics.  
MEYER, Sr. M. GIOVANNI, C.P.P.S., Phoenix, Mathematics.  
O'MALLEY, MARK, San Manuel, Mathematics.  
PLAS, Sr. MARY AGNES, C.P.P.S., Phoenix, General Biology.  
SASSE, KATHERINE J. S., Tucson, Mathematics.  
SHILL, WILSON T., Phoenix, General Biology.  
TORGERSON, KENNETH J., Tucson, Botany.

### ARKANSAS

#### Graduate

ARNOLD, RICHARD, Fayetteville, Physics.  
HILL, JOHN W., Fayetteville, Chemistry.  
RUSSELL, CHARLES D., El Dorado, Chemistry

#### Cooperative Graduate

BROWNE, JAMES C., Conway, Chemistry.  
HALPERN, LYNDA S., Fayetteville, Genetics.  
HATFIELD, LYNN L., Harrison, Physics.  
HEFLEY, JACK D., Fayetteville, Chemistry.  
OLIVER, VICTOR L., Arkadelphia, Zoology.

#### Postdoctoral

STALLINGS, JOHN R., Jr., Morrilton, Mathematics.

#### Science Faculty

CANNON, WALTON W., Fayetteville, Engineering.  
JOHNSON, ARTHUR A., Conway, Zoology.  
STICE, JAMES E., Fayetteville, Engineering.

#### Summer Fellowships for Graduate Teaching Assistants

BROWNE, JAMES C., Conway, Chemistry.  
BYRD, DAVID S., Stephens, Chemistry.  
GALLOWAY, LOUIE A., III, Pine Bluff, Physics.  
GREENE, DARYLE E., Garfield, Agriculture.  
JOHNSON, GROVER L., Fordyce, Chemistry.

#### Summer Fellowships for Secondary School Teachers

BRUCE, RAY E., Pine Bluff, General Science.  
BURKETT, DOROTHY R., Pine Bluff, General Biology.  
CATTERTON, ERMAL E., Hickory Ridge, Mathematics.  
HINES, SALLYLEE, Fayetteville, Botany.  
PRINCE, DENVER L., Malvern, Chemistry.  
WILLS, MARGERY T., Hazen, General Biology.

### CALIFORNIA

#### Graduate

ABERS, ERNEST S., San Francisco, Physics.  
ALBRIGHT, NORMAN W., Pasadena, Physics.  
BERKSON, EARL R., Los Angeles, Mathematics.  
BLOOMFIELD, VICTOR, Cotati, Chemistry.  
BOULWARE, DAVID G., Lafayette, Physics.  
BRIDGES, WILLIAM B., Berkeley, Engineering.  
BRONZAN, JOHN B., Los Angeles, Physics.  
BROWN, LOWELL S., Visalia, Physics.  
BROWN, STEPHEN L., Palo Alto, Physics.  
BURNS, JOHN M., Berkeley, Genetics.  
COLLINS, GEORGE F., Jr., Los Angeles, Chemistry.  
CZAMANSKE, GERALD K., Stanford, Earth Science.  
DAYBELL, MELVIN D., Pasadena, Physics.  
DRAGT, ALEX J., Berkeley, Physics.

**ENDERTON, HERBERT**, San Jose, Mathematics.  
**ENRIGHT, JAMES T.**, San Diego, General Biology.  
**FISH, ROBERT A.**, Los Altos, Chemistry.  
**FOSTER, EDWARD M.**, Cupertino, Mathematical Economics.  
**GAGE, DONALD H.**, Durham, Engineering.  
**GILLESPIE, BARBARA**, Los Altos, Botany.  
**GIULIANO, CONCETTO R.**, Gardena, Chemistry.  
**GOLDENBERG, H. MARK**, Los Angeles, Physics.  
**GOLDSBOROUGH, JOHN**, Stanford, Physics.  
**GRIFFITHS, ROBERT B.**, Stanford, Physics.  
**GRISWOLD, RALPH E.**, Palo Alto, Engineering.  
**GUNCKEL, THOMAS L., II**, Pomona, Engineering.  
**HAGADORN, IRVINE R.**, Dixon, Zoology.  
**HALL, JANE H.**, Berkeley, Chemistry.  
**HALL, RICHARD T.**, San Marino, Chemistry.  
**HAUGEN, RUTH M.**, Pasadena, Psychology.  
**HEARST, JOHN E.**, Pasadena, Chemistry.  
**HERMSEN, ROBERT W.**, Berkeley, Engineering.  
**HILL, E. ALEXANDER, III**, Pasadena, Chemistry.  
**HOLLIDAY, DENNIS**, Alhambra, Physics.  
**HONE, DANIEL W.**, San Francisco, Physics.  
**HONSAKER, JOHN L.**, Pasadena, Physics.  
**HULTGREN, GLEN O.**, Berkeley, Chemistry.  
**HUNDLEY, RICHARD O.**, Pasadena, Physics.  
**IRVINE, WILLIAM M.**, Beverly Hills, Physics.  
**JOHNSON, WALTER A.**, Covina, Engineering.  
**JORDAN, PETER C. H.**, Los Angeles, Chemistry.  
**JOSEPHSON, ROBERT K.**, Los Angeles, Zoology.  
**KAPLAN, DAVID**, Granada Hills, Philosophy of Science.  
**KEISLER, H. JEROME**, Pasadena, Mathematics.  
**KENT, WILLIAM L.**, San Diego, Mathematics.  
**KIEFER, EDGAR F.**, Pasadena, Chemistry.  
**KING, JACK L.**, Pleasant Hill, Genetics.  
**KIRK, WILLIAM L., Jr.**, Los Angeles, Psychology.  
**KLEINMAN, LEONARD**, Berkeley, Physics.  
**KLOTZ, EUGENE A.**, Montclair, Mathematics.  
**KRASNE, FRANKLIN**, San Francisco, Psychology.  
**KREPS, RODNEY E.**, Palo Alto, Physics.  
**LARSEN, JIMMY**, Pomona, Earth Sciences.  
**LEBOVITZ, NORMAN R.**, Van Nuys, Physics.  
**LEESON, DAVID B.**, Los Angeles, Engineering.  
**LEITNER, PHILIP**, Orinda, Zoology.  
**LEVINE, IRA N.**, Van Nuys, Chemistry.  
**LINDEN, DONALD A.**, Palo Alto, Engineering.  
**LINDSAY, SANDRA L.**, Concord, Genetics.  
**LINSON, LEWIS M.**, Oakland, Physics.  
**LOOMIS, ALDEN A.**, Palo Alto, Earth Sciences.  
**LYSER, KATHERINE M.**, Lafayette, Zoology.  
**MANJAREZ, VICTOR S.J.**, San Francisco, Mathematics.  
**MARSHALL, J. HOWARD, III**, Pasadena, Physics.  
**MCCONKEY, EDWIN II.**, Berkeley, Zoology.  
**MCIVOR, IVOR K.**, Stanford, Engineering.  
**MIHALAS, DIMITRI**, Hollywood, Astronomy.  
**MILDER, D. MICHAEL**, North Hollywood, Physics.  
**MILLER, ROGER H.**, Palo Alto, Physics.  
**MONK, JAMES D.**, Alamo, Mathematics.  
**MRAZEK, ROBERT V.**, San Bernardino, Engineering.  
**MUFFLER, L. J., PATRICK**, Claremont, Earth Sciences.  
**MULLER, RICHARD S.**, Los Angeles, Engineering.  
**MURRAY, BETTIE E.**, Fontana, Microbiology.  
**NEIGHBOR, JAMES E.**, Walnut Creek, Physics.  
**NEVILLE, DONALD E.**, Los Angeles, Physics.  
**NORTH, GEORGE G.**, Sacramento, Engineering.  
**OLMSTED, JOHN A., III**, Petaluma, Chemistry.  
**ORIANIS, GORDON H.**, Albany, Zoology.  
**PAOLILLO, DOMINICK J., Jr.**, Davis, Botany.  
**PARIS, OSCAR H., Jr.**, Albany, Zoology.  
**PARKER, BARBARA A.**, Los Angeles, Chemistry.  
**PARKER, EVELYN D.**, San Francisco, Biochemistry.  
**PAULIKAS, GEORGE A.**, Berkeley, Physics.  
**PECK, CHARLES W.**, Pasadena, Physics.  
**PEDERSEN, CHARLES R.**, Los Angeles, Engineering.  
**PIERCE, WILLIAM H.**, Palo Alto, Engineering.  
**RABINOWITZ, LAWRENCE**, San Francisco, Medical Sciences.  
**RAPIER, JERRY**, Baldwin Park, Physics.  
**RAVEN, PETER H.**, Los Angeles, Botany.  
**RENEAU, LEON R.**, San Mateo, Engineering.  
**RESSEQUIE, LAURENCE J.**, Berkeley, Zoology.  
**ROYCE, EDWIN B.**, Pasadena, Physics.  
**SCHROT, Sr., MARIS S., I.H.M.**, Los Angeles, Mathematics.  
**SCHWARZ, STEVEN**, Camarillo, Physics.  
**SEARLES, RICHARD B.**, Woodside, General Biology.  
**SLAGGIE, E. LEO**, Albany, Physics.  
**SOULE, MICHAEL**, San Diego, Genetics.  
**SOULE, GEORGE W., Jr.**, Van Nuys, Mathematics.  
**STERN, GEORGE J.**, Venice, Engineering.  
**STONE, JEREMY J.**, Menlo Park, Mathematical Economics.  
**STROMBOTNE, RICHARD L.**, Berkeley, Physics.  
**SWEENEY, DARYL**, El Cerrito, Zoology.  
**TAYLOR, AUSTIN L.**, Berkeley, Microbiology.  
**THIEBAUX, MARTIAL L.**, Whittier, Physics.  
**THORNTON, ROBERT M.**, Auburn, Botany.  
**THORPE, MANER L.**, Los Angeles, Anthropology.  
**VIDAVER, WILLIAM**, Brisbane, Botany.  
**VLASES, GEORGE C.**, Los Angeles, Engineering.  
**VOGEL, MARTIN**, Los Angeles, Chemistry.  
**WAGNER, TERRY, J.**, Albany, Engineering.  
**WATERS, JAMES F.**, Santa Barbara, General Biology.  
**WATTENBURG, WILLARD H.**, Greenville, Engineering.  
**WEIL, GERTRUDE W.**, Berkeley, Botany.  
**WEIL, JON D.**, Berkeley, Genetics.  
**WERTHAMER, N. RICHARD**, Studio City, Physics.  
**WILCOX, WILLIAM R.**, Albany, Engineering.  
**WOOLFOLK, ROBERT W.**, Riverside, Chemistry.  
**WULFF, DANIEL L.**, Arcadia, Chemistry.  
**YOUNG, LAEL M.**, Mentone, Mathematics.  
**YURA, HAROLD T.**, Los Angeles, Physics.

*Cooperative Graduate*

**AGGSON, THOMAS L.**, Berkeley, Physics.  
**ARNOLD, RICHARD F.**, Oakland, Communications.  
**BACK, LLOYD H.**, Berkeley, Engineering.  
**BAHR, ALFRED J.**, Redwood City, Engineering.  
**BAICHER, VLADIMIR V.**, Altadena, Engineering.  
**BARBER, MARY LEE**, Los Angeles, Biochemistry.  
**BECK, MYRL E., Jr.**, Beaumont, Earth Sciences.  
**BELKIN, DANIEL A.**, Los Angeles, Zoology.  
**BLISCHKE, WALLACE R.**, Tujunga, Mathematics.

- BOWSER, CARL J., Pomona, Earth Sciences.  
 BRUCKNER, JUDITH B., Los Angeles, Mathematics.  
 CANTOR, DAVID G., Van Nuys, Mathematics.  
 CATON, ROY D., Jr., Fresno, Chemistry.  
 CHAN, SUNNEY I., San Francisco, Chemistry.  
 CHAPPLE, WILLIAM M., Pasadena, Earth Sciences.  
 CHARNOW, ALLEN K., Berkeley, Mathematics.  
 COWAN, DWAIN O., Fresno, Chemistry.  
 CRAWLEY, PETER L., Pasadena, Mathematics.  
 CRANGE, JOHN E., Beverly Hills, Zoology.  
 DAVIS, GREGORY ARLEN, Berkeley, Earth Sciences.  
 DILLEHAY, RONALD C., Santa Cruz, Psychology.  
 DONG, STANLEY B., Berkeley, Engineering.  
 EVERINGHAM, JOHN W., Los Angeles, Biochemistry.  
 FRITSCH, A. EUGENE, Los Angeles, Earth Sciences.  
 GARDELLA, CAROLYN M., Windsor, General Biology.  
 GODDARD, JOE D., Albany, Engineering.  
 HAGGE, DONALD E., Berkeley, Physics.  
 HARRISON, WILLIAM F., Lafayette, Chemistry.  
 HERRMANN, LEONARD R., Albany, Engineering.  
 HICKMAN, ROY SCOTT, Albany, Engineering.  
 HILLER, FREDERICK S., Palo Alto, Engineering.  
 HIRSCHBERG, NANCY A., Burlingame, Philosophy of Science.  
 HUFBAUER, KARL G., La Jolla, Engineering.  
 ISRAEL, SHERRY R., Los Angeles, Psychology.  
 JONES, IAN R., Berkeley, Engineering.  
 JONES, PETER H., Los Angeles, Chemistry.  
 KAHN, PAUL M., Fairfax, Mathematics.  
 KOHLER, RUTH C., Millbrae, Chemistry.  
 KONRAD, MICHAEL W., Berkeley, Biophysics.  
 LANE, CHARLES A., Berkeley, Chemistry.  
 LANG, SIDNEY B., San Francisco, Engineering.  
 LANGWORTHY, WILLIAM C., Berkeley, Chemistry.  
 LOCKARD, ROBERT B., North Hollywood, Psychology.  
 MAGEE, PATRICK M., Los Angeles, Engineering.  
 MCCARTY, GEORGE S., Jr., Los Angeles, Mathematics.  
 MC MANIGAL, PAUL G., South Pasadena, Physics.  
 MICHIE, RICHARD W., Glendale, Astronomy.  
 MONSEN, ELAINE, Lafayette, Biochemistry.  
 MOYER, CARL B., Coronado, Engineering.  
 NAZAROFF, GEORGE V., San Francisco, Chemistry.  
 OGLESBY, LARRY C., Atascadero, Zoology.  
 PATTERSON, JOHN D., Santa Rosa, Engineering.  
 PULLIAS, CALVIN M., Los Angeles, Mathematics.  
 RALEIGH, CECIL B., Jr., Los Angeles, Earth Sciences.  
 RAND, JOAN E., Santa Barbara, Mathematics.  
 ROELOF, EDMOND C., Los Angeles, Physics.  
 ROSS, JAMES A., Berkeley, Chemistry.  
 ROWAN, LAWRENCE G., Oak, Physics.  
 RUMSEY, HOWARD C., Jr., Alhambra, Mathematics.  
 RYAN, ROBERT D., Sierra Madre, Mathematics.  
 SANDLER, REUBEN I., Los Angeles, Mathematics.  
 SHICK, ROBERT, Los Angeles, Zoology.  
 SEAMAN, LYNN, Albany, Engineering.
- SELTZER, EDWIN C., Encino, Physics.  
 SHAIN, STEPHEN A., Albany, Engineering.  
 SIMMONS, JERRY LEE, Rosemead, Engineering.  
 SIMONS, NANCY J., Belvedere, Medical Sciences.  
 SMART, JOHN R., Santa Cruz, Mathematics.  
 SMITH, RICHARD G., Glendora, Engineering.  
 SMITH, ROBERT B., Vista, Chemistry.  
 SPENGER, ROBERT E., Los Angeles, Chemistry.  
 STERN, DONALD, North Hollywood, Physics.  
 STONE, CHARLES J., Van Nuys, Mathematics.  
 STUART, DAVID W., Los Angeles, Earth Sciences.  
 SUNDFORS, RONALD K., Ventura, Physics.  
 SWANSON, DARWIN L., Bakersfield, Physics.  
 SWINEHART, JAMES H., Covina, Chemistry.  
 THOMASSEN, KEITH I., Palo Alto, Engineering.  
 TURNER, WALTER S., Berkeley, Psychology.  
 WAGNER, WILLIAM G., South Pasadena, Physics.  
 WHALEN, BARRY H., Albany, Engineering.  
 WILSON, DONALD, Los Angeles, Chemistry.
- Postdoctoral*
- BERMAN, SAM M., Arcadia, Physics.  
 BERTSCH, WALTER F., San Diego, Botany.  
 BROKAW, CHARLES J., El Segundo, Zoology.  
 DAVIS, ROWLAND H., Pasadena, Genetics.  
 DOLBY, LLOYD J., Berkeley, Chemistry.  
 FEFERMAN, SOLOMON, Palo Alto, Mathematics.  
 FONG, PAUL, San Francisco, Mathematics.  
 GALLAGHER, CHARLES J., Jr., Sierra Madre, Physics.  
 KAHN, ALBERT, Los Angeles, Botany.  
 KNOPP, MARVIN I., Los Angeles, Mathematics.  
 KOOSIS, PAUL J., San Francisco, Mathematics.  
 LANGENBERG, DONALD N., Berkeley, Physics.  
 LIBBERMAN, MIRIAM, Berkeley, Medical Sciences.  
 MACIEL, GARY E., Livermore, Chemistry.  
 MCCLUSKEY, ELWOOD S., Palo Alto, Zoology.  
 NEUSHUL, MICHAEL, Jr., Rolling Hills, General Biology.  
 ORBACH, RAYMOND L., Albany, Physics.  
 PHILLIPS, JAMES C., Berkeley, Physics.  
 RICHARDS, PAUL L., Riverside, Physics.  
 ROBERTSON, BALDWIN, Los Angeles, Physics.  
 ROBERTSON, RICHARD E., Pasadena, Chemistry.  
 SLEICHER, CHARLES A., Jr., Berkeley, Engineering.  
 THIESSEN, WILLIAM E., Oakland, Chemistry.  
 THORP, EDWARD O., Los Angeles, Mathematics.  
 WEITZMAN, RONALD A., Monrovia, Psychology.  
 WILSON, DONALD M., Los Angeles, Zoology.  
 WOLF, BEVERLY, Los Angeles, Biochemistry.  
 ZABUSKY, NORMAN J., Pasadena, Physics.
- Senior Postdoctoral Fellowships*
- CRESCITELLI, FREDERICK, Los Angeles, Medical Sciences.  
 DONOHUE, JERRY, Los Angeles, Chemistry.  
 GARDNER, WILFORD R., Riverside, Agriculture.  
 GELL-MANN, MURRAY, San Gabriel, Physics.  
 HAND, CADET H., Jr., Richmond, Zoology.  
 KOTIN, PAUL, Glendale, Medical Sciences.  
 KRATZER, FRANK H., Davis, Agriculture.  
 MITCHELL, HERSCHEL K., Pasadena, Genetics.

PATTEE, HOWARD H., Jr., Menlo Park, Biophysics.  
PENZIEN, JOSEPH, Concord, Engineering.  
PHINNEY, BERNARD O., Los Angeles, Genetics.  
SALT, GEORGE W., Davis, Zoology.  
WASHBURN, JACK, Berkeley, Engineering.  
WEBSTER, JOHN C., San Diego, Psychology.

#### *Science Faculty*

BLODGETT, CHARLES O., San Luis Obispo, Botany.  
BOEKELHEIDE, IRVING F., Chico, Physics.  
BRAND, RAYMOND H., Santa Barbara, Natural Sciences, General.  
CHILDS, HENRY E., Jr., La Mirada, Agriculture.  
COLLETTE, Sr. MARGARET, Los Angeles, Mathematics.  
EATON, CLYDE B., Jr., Pasadena, Mathematics.  
ERISMAN, EUGENE H., Riverside, Psychology.  
FREEMAN, J. ROBERT, Berkeley Engineering.  
HAASE, RICHARD H., Granada Hills, Engineering.  
HANSCH, CORWIN H., Claremont, Chemistry.  
HOLLENBERG, JOHN L., Fullerton, Chemistry.  
MANDRA, YORK T., San Francisco, Earth Sciences.  
MEL, PETER J., Torrance, Medical Sciences.  
ROSEN, ARTHUR Z., San Luis Obispo, Physics.  
RUDY, NORMAN, Sacramento, Engineering.  
SHULDINER, PAUL W., Berkeley, Engineering.  
SMITH, ARTHUR M., Arcata, Chemistry.  
STREITWIESER, ANDREW, Jr., El Cerrito, Chemistry.  
TROPF, HENRY S., Arcata, Mathematics.  
WHITE, PAUL A., Los Angeles, Mathematics.  
WILD, ROBERT L., Riverside, Physics.

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

ALVARADO, RONALD H., Alta Loma, Zoology.  
ASCHER, ROBERT, Santa Monica, Anthropology.  
BECK, MYRL E., Jr., Beaumont, Earth Sciences.  
BLY, ROBERT M., South Pasadena, Chemistry.  
CHAPPEL, WILLIAM M., Pasadena, Earth Sciences.  
CHRISTIANSEN, ROBERT L., Porterville, Earth Sciences.  
CRAWLEY, PETER L., Pasadena, Mathematics.  
BLACKWELL, ARLYN N., Berkeley, Engineering.  
BOOZER, GEORGE D., Long Beach, Engineering.  
BOEHME, THOMAS K., Pasadena, Mathematics.  
BRESHEARS, ROBERT R., Albany, Engineering.  
CHAKERIAN, GULBANK D., Dinuba, Mathematics.  
COGBURN, ROBERT F., Berkeley, Mathematics.  
COOK, GLENN M., Windsor, Chemistry.  
ESPENSON, JAMES H., Pomona, Chemistry.  
FISLER, GEORGE F., Albany, Zoology.  
GIOLLI, ROLAND A., Carmichael, Medical Sciences.  
GRUBBS, EDWARD J., Los Angeles, Chemistry.  
HOBBY, CHARLES R., Pasadena, Mathematics.  
HUELSMAN, LAWRENCE P., Berkeley, Engineering.  
ISRAEL, SHERRY R., Los Angeles, Psychology.  
KLOTZ, EUGENE A., Montclair, Mathematics.  
LAETSCH, WATSON M., Stanford, Botany.  
LANGWORTHY, WILLIAM C., Berkeley, Chemistry.

LENDARIS, GEORGE G., San Francisco, Engineering.  
LINSDALE, DONALD D., Carmel Valley, Zoology.  
MATSUNAMI, BETTY H., Whittier, Microbiology.  
MIER, MILLARD G., Los Angeles, Physics.  
MILLER, LYNN, Palo Alto, Genetics.  
MOISE, NORTON L., Pasadena, Physics.  
MYERS, GLENN E., Downey, Engineering.  
NOERDLINGER, PETER D., Pasadena, Physics.  
RICHMOND, RUTH J., Berkeley, Microbiology.  
ROBERTSON, RICHARD E., Pasadena, Chemistry.  
ROSENFELD, MELVIN, Los Angeles, Mathematics.  
SANDERS, TIMOTHY D., Palo Alto, Physics.  
SCHOENHERR, ALLAN A., Los Angeles, Zoology.  
SHULDINER, PAUL W., Berkeley, Engineering.  
SIMS, SAMUEL J., Indio, Earth Sciences.  
TERWILLIGER, ROBERT F., Los Altos, Psychology.  
TUCKER, VANCE A., Los Angeles, Zoology.  
VOORHEES, THOMAS E., Stanford, Anthropology.  
WAHRHAFTIG, ALBERT L., Piedmont, Anthropology.  
WEILL, DANIEL F., Oakland, Earth Sciences.  
WRIGHT, JOHN C., Stanford, Psychology.

#### *Summer Fellowships for Secondary School Teachers*

ABRAHAM, NORMAN B., Yuba City, Chemistry.  
ASH, JAMES W. (Bro. THOMAS WARREN), Fresno, Mathematics.  
ASH, LOWELL R., Downey, General Science.  
AULIE, VERE, Tahoe, Mathematics.  
BAGSHAW, THOMAS L., Los Angeles, General Science.  
BAINER, LOREN V., Fairfield, Chemistry.  
BALCH, PATRICK E., Yuba City, Zoology.  
BERGON, Sr. MARY ANDREW, I.H.M., Los Angeles, Zoology.  
CARY, GRANT R., Van Nuys, Mathematics.  
CHINN, WILLIAM G., San Francisco, Mathematics.  
COULSON, WILLIAM F., Bellflower, Mathematics.  
DAVID, IRA A., Brea, Physics.  
DAVIES, IRVEN W., Jr., Reedley, Biochemistry.  
DAVIS, JOHN N., San Jose, Mathematics.  
ELLIOTT, FRED L., McFarland, General Biology.  
ELLIS, BENSON, Mountain View, Zoology.  
FRENCH, ROBERT L., Santa Fe Springs, General Biology.  
GOTTLIEB, MARVIN S., Northridge, General Science.  
GRESHAM, CLARA T., Los Angeles, General Biology.  
HOLE, JOHN W., Jr., Whittier, General Biology.  
ISEBELL, DAVID W., Greenville, Chemistry.  
JOHNSON, EARL D., Reedley, Chemistry.  
JONES, ROBERT W., North Hollywood, General Science.  
KLEINFELTER, DALE F., Ojai, Chemistry.  
LOGAN, ROGER G., Fullerton, Mathematics.  
LOWRY, LESLIE D., Pasadena, Mathematics.  
MCCURDY, DONALD W., Bellflower, General Science.  
MILLER, LELIN R., Lemoore, General Science.  
MUZYKA, Sr. MARY ERMENTILDA, Pomona, General Science.

PENHALL, DELBERT F., Long Beach, Mathematics.  
 PETERSEN, RICHARD C., Antioch, Mathematics.  
 PICKUS, KATHRYN B., Lancaster, Mathematics.  
 PROETT, HAMPTON D., West Sacramento, Chemistry.  
 PROVO, Sr. MIRIAM, Sacramento, General Biology.  
 REINHART, MAURICE J., Oakland, Mathematics.  
 RICE, Mother CORNELIA AUGUSTA, Pasadena, General Biology.  
 SLAUSON, ROBERT S., Mendocino, Physics.  
 SMITH, FRANCIS W., Jr., Los Altos, General Biology.  
 STARKEY, ROBERT L., Palo Alto, Mathematics.  
 STUCKENSCHNEIDER, NORBERT A., Encinitas, Mathematics.  
 URTON, JOHN T., Alameda, Biochemistry.  
 VOGT, JAMES C., Healdsburg, Chemistry.  
 WALL, JAMES A., Compton, Zoology.  
 YORK, ROBERT, Porterville, Chemistry.

## COLORADO

### Graduate

BERTRAM, WILLIAM K., Denver, Biophysics.  
 DE VOTO, RICHARD H., Golden, Engineering.  
 IRWIN, CYNTHIA C., Morrison, Anthropology.  
 JOHNSON, HOLLIS R., Boulder, Astronomy.  
 JONES, ORVAL E., Ft. Collins, Engineering.  
 MC FARLANE, ARTHUR J., Towner, Engineering.  
 NEEPER, DONALD A., Monte Vista, Physics.  
 O'CONNOR, JOSEPH T., Boulder, Earth Sciences.  
 PICKEN, JAMES S., Loveland, Engineering.  
 ROHWER, WILLIAM D., Jr., Denver, Psychology.  
 SAKAKURA, ARTHUR Y., Boulder, Physics.  
 SHARP, JOHN V. A., Grand Junction, Earth Sciences.

### Cooperative Graduate

BIRKY, CARL W., Jr., Fort Collins, Genetics.  
 CAMPBELL, VIRGINIA W., Boulder, Chemistry.  
 DEVLIN, J. PAUL, Hale, Chemistry.  
 MARGART, RONALD C., Boulder, Chemistry.  
 MARSTON, NORMAN L., Hartman, Zoology.  
 RAMALEY, LOUIS, Boulder, Chemistry.  
 SHAW, MARION L., Colorado Springs, Physics.  
 SHOTWELL, DAVID A., Boulder, Mathematics.  
 WILCOX, RALPH M., Boulder, Physics.

### Postdoctoral

BLANPIED, WILLIAM A., Denver, Physics.  
 STOLLER, MARIANNE L., Denver, Anthropology.

### Senior Postdoctoral Fellowships

SAWREY, WILLIAM L., Denver, Mathematics.

### Science Faculty

BECK, FRANK R., Boulder, Earth Sciences.  
 GERSTLE, KURT H., Boulder, Engineering.  
 GRIFFITHS, THOMAS M., Denver, Earth Sciences.  
 WRIGHT, WILBUR H., Colorado Springs, Physics.

### Summer Fellowships for Graduate Teaching Assistants

ANDERSON, JAMES G., Boulder, Physics.  
 HIGGINS, ROBERT P., Denver, Zoology.  
 JUNE, REID R., La Junta, Engineering.  
 O'CONNOR, JOSEPH T., Boulder, Earth Sciences.

### Summer Fellowships for Secondary School Teachers

BOOTH, PAUL D., Cheraw, Mathematics.  
 JONES, W. RUSSELL, Jr., Ordway, General Biology.  
 MCINTOSH, DONALD L., Denver, Mathematics.  
 NORTON, ROBERT A., Boulder, Mathematics.  
 POAGE, MELVIN L., Denver, Mathematics.  
 RISSLER, ROLLA R., Aurora, Physics.  
 STEGNER, ROBERT W., Denver, General Biology.  
 VAN DYKE, MARTIN, Denver, Chemistry.  
 WALTER, RICHARD G., Lafayette, Botany.

## CONNECTICUT

### Graduate

BALDWIN, DAVID E., West Hartford, Physics.  
 BURN, AUDREY B., Hartford, Physics.  
 CARROLL, VERN, Branford, Anthropology.  
 CLINTON, WINONA M., Redding Ridge, Zoology.  
 DOANE, WINIFRED W., West Haven, Genetics.  
 DOLLARD, JOHN D., Hamden, Mathematics.  
 FISHER, GEORGE W., Hamden, Earth Sciences.  
 FOLEY, RICHARD J., East Haven, Engineering.  
 FOOTE, CHRISTOPHER S., West Hartford, Chemistry.  
 HIGBIE, PAUL R., West Hartford, Physics.  
 HUNT, EARL B., East Haven, Psychology.  
 KAHN, DONALD W., Bethany, Mathematics.  
 MASSO, JOSEPH F., Darien, Physics.  
 MELRIN, N. DAVID, New Haven, Physics.  
 MORGAN, DAVID L., Jr., Shelton, Physics.  
 PERKINS, CHARLES W., Watertown, Engineering.  
 RQUIST, RICHARD D., Bristol, Engineering.  
 SCOVILLE, RICHARD, Torrington, Mathematics.  
 SIMPSON, JAMES E., New Haven, Mathematics.  
 SNYDER, IRVING G., Jr., Stamford, Engineering.  
 STEPHENSON, R. RHOADS, Mt. Carmel, Engineering.  
 TANEBAUM, B. SAMUEL, Guilford, Physics.

### Cooperative Graduate

ABOWITZ, GERALD, New Haven, Engineering.  
 AVERY, DONALD H., West Hartford, Engineering.  
 DIEBOLD, ALBERT R., Jr., New Haven, Anthropology.  
 FENNICK, JOHN H., Danbury, Engineering.  
 FOSTER, EDWARD J., Bethel, Physics.  
 HANSON, KENNETH L., New Haven, Engineering.  
 POSNER, HERBERT B., New Haven, Botany.  
 PRATICO, SANTO D., Byram, Mathematics.  
 REIS, VICTOR H., New Haven, Engineering.  
 SMITH, DAVID A., New Haven, Mathematics.  
 SWEET, MERRILL H., Storrs, Zoology.

### Postdoctoral

CARO, LUCIEN G., New Haven, Biophysics.  
 GROSS, LEONARD, New Haven, Mathematics.  
 MAC DUFFIE, DUNCAN E., New Haven, Chemistry.  
 PIPA, RUDOLPH L., East Canaan, Zoology.  
 PURVES, WILLIAM K., New Haven, Botany.  
 SUMMERS, ROBERT, Hamden, Econometrics.

### Senior Postdoctoral

GILES, NORMAN H., Hamden, Genetics.  
 RODGERS, JOHN, New Haven, Earth Sciences.

SIMPSON, MELVIN V., Woodbridge, Biochemistry.

*Science Faculty*

APPLEZWEIG, MORTIMER, H., New London, Psychology.

KINSMAN, DONALD M., Storrs, Agriculture.

MCKEON, MARY G., New Haven, Chemistry.

POWDERLY, MARY, Middletown, Mathematics.

RICHARDSON, DOROTHY, New London, Zoology.

SPILTOIR, CHARLES F., Bridgeport, Microbiology.

*Summer Fellowships for Graduate Teaching Assistants*

BURCKBUCHLER, FREDERICK V., Willimantic, Physics.

KRIEG, NOEL R., Southbury, Microbiology.

LIPMAN, PETER W., Cannondale, Earth Sciences.

MACLEWICZ, JOHN S., Waterbury, Zoology.

MCKESTER, ARCIE L., Hamden, Earth Sciences.

MUNKRES, KENNETH D., New Haven, Genetics.

MURRAY, ROBERT W., Branford, Chemistry.

PIPER, JOHN, West Hartford, Chemistry.

SALAS, SATURNINO L., Hamden, Mathematics.

SWEET, MERRILL H., Storrs, Zoology.

THOMAS, MONTCALM T., Danielson, Physics.

WAGNER, RICHARD H., Woodmont, Botany.

WESTON, JAMES A., New Haven, Zoology.

*Summer Fellowships for Secondary School Teachers.*

CARR, CHARLES D., Bridgeport, Physics.

CHASE, GEORGE W., Watertown, Mathematics.

CHILINSKI, FRANCES K., Milford, Mathematics.

CONOVER, JOHN H., Jr., Kent, Mathematics.

CONSOLI, JOHN F., Waterbury, Mathematics.

CURNIN, WILLIAM L., Waterbury, Mathematics.

FRANKLIN, ROBERT A., Westport, General Science.

HODGE, CULLEN S., New Haven, Physics.

JAFFE, HERBERT, New Britain, General Biology.

LESSARD, ROLAND E., Danielson, Botany.

PAYLOVICH, JOSEPH P., Kent, Mathematics.

SMITH, MAURICE D., Wilton, Mathematics.

SPIERS, E. ELIZABETH, Windsor, Mathematics.

TAYLOR, Sr., M. AMANDA, Milford, Physics.

WALCH, RAYMOND E., Westport, Mathematics.

**DELAWARE**

*Graduate*

DAY, BENJAMIN D., Newark, Physics.

LEATHRUM, JAMES F., Dover, Engineering.

LOBAND, JOHN P., Wilmington, Chemistry.

*Cooperative Graduate*

BROWN, LEE F., Newark, Engineering.

JELLINGHAUS, SANDRA C., Wilmington, Biochemistry.

JORDAN, DAVID M., Wilmington, Chemistry.

*Science Faculty*

COBBLE, MILAN H., Newark, Mathematics.

REMAGE, RUSSELL, Jr., Newark, Mathematics.

*Summer Fellowships for Graduate Teaching Assistants*

KALEBL, MARY R., Wilmington, Biochemistry.

*Summer Fellowships for Secondary School Teachers*

WHEATLEY, GRAYSON H., Newark, Mathematics.

**DISTRICT OF COLUMBIA**

*Graduate*

DADE, EVERETT C., Mathematics.

HACKMAN, MATTHEW, Mathematics.

HOFFMAN, FREDERICK, Mathematics.

HOYME, LUCILE E., Anthropology.

MYERS, GARDINER H., Chemistry.

OLIVER, DAVID W., Physics.

RINEHART, GEORGE S., Mathematics.

TRUESDELL, ALFRED H., Earth Sciences.

WILSON, KENT R., Chemistry.

*Cooperative Graduate*

EARLY, JAMES G., Jr., Engineering.

GORDON, WILLIAM B., Mathematics.

JUMONVILLE, PRESTON C., Jr., Psychology.

MCKNIGHT, ANNE, Botany.

SPEITH, ARTHUR I., Mathematics.

*Postdoctoral*

WOJCICKI, ANDREW A., Chemistry.

*Senior Postdoctoral*

LIDE, DAVID R., Jr., Physics.

*Science Faculty*

PERROS, THEODORE P., Chemistry.

DIMOND, Sr. MARIE, General Biology.

*Summer Fellowships for Graduate Teaching Assistants*

LOWE, JOHN C., Geography.

SCOTT, NOLVERT P. Jr., Sociology.

WALSH, JOSEPH H., S.M., Chemistry.

*Summer Fellowships for Secondary School Teachers*

BARNES, BEATRICE V., Mathematics.

BOYLE, Sr. M. MARGARET CHARLES, Chemistry.

COUNTEE, THOMAS H., Physics.

ROBINSON, MELBA B., Botany.

SAUNDERS, WILLIAM J., General Biology.

SMITH, MARIE M., Mathematics.

TOLSON, JUANITA S., Mathematics.

TREMBLAS, ERNESTINE, Mathematics.

**FLORIDA**

*Graduate*

BROCKMAN, HERMAN E., Tallahassee, Genetics.

CROKER, ROBERT A., Coral Gables, Zoology.

ECHOLS, RONALD, Naples, Earth Sciences.

FOX, EVELYN, North Miami Beach, Physics.

GOODMAN, ALAN L., Miami Beach, Chemistry.

HARTMAN, JOHN P., Orlando, Engineering.

HATHAWAY, RALPH R., Tallahassee, Zoology.

KAPLAN, RONALD M., Miami Beach, Engineering.

KAUFMAN, MYRON, North Miami Beach, Physics.

KOSS, WALTER J., Tallahassee, Earth Sciences.

RAMSPOTT, LAWRENCE D., Neptune Beach, Earth Sciences.

ROBERTS, CHARLES S., Miami, Chemistry.

SHAFFER, CHARLES V., Gainesville, Engineering.

*Cooperative Graduate*

ARANOFF, SANFORD, Miami Beach, Physics.

BARNES, WILSON M., Jr., Gainesville, Physics.



BEA, ROBERT G., Jacksonville, Engineering.  
BOGUE, DONALD C., St. Petersburg, Engineering.

BORROR, ARTHUR C., Tallahassee, General Biology.

CROUCH, HARRY R., Jr., Port Orange, Physics.  
GOEBRING, J. BROWN, Belleair, Chemistry.  
GOODMAN, ROE W., Lakeland, Mathematics.  
HILL, RICHARD A., Gainesville, Medical Sciences.

HUDSON, FREDERICK M., Miami, Chemistry.  
JUMPER, CHARLES F., Tallahassee, Chemistry.

MARCUS, ALVIN B., Miami Beach, Chemistry.  
NEALY, DAVID L., Sarasota, Chemistry.  
NEET, KENNETH E., St. Petersburg, Biochemistry.

SAPPENFIELD, DALE S., Miami, Chemistry.  
SMITH, WILFRED K., Winter Park, Engineering.

#### *Postdoctoral*

ROSEN, GERALD H., Surfside, Physics.  
WOOD, JOHN A., Jr., Jacksonville, Earth Sciences.

#### *Science Faculty*

EGAR, JOSEPH M., Jacksonville, Mathematics.

MITCHELL, ROGER D., Gainesville, Zoology.

RICHART, FRANK E., Gainesville, Engineering.

SARAFYAN, DIRAN, Gainesville, Mathematics.  
WIGGINS, MACDONALD J., Gainesville, Engineering.

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

BARKER, ROBERT E., Jr., Bonifay, Physics.  
COOPER, GEORGE W., Jr., Orlando, Zoology.  
EASTWOOD, DE LYLE, St. Petersburg, Chemistry.

KOOB, DERRY D., Vero Beach, Botany.  
KRUSE, DWAYNE N., Tallahassee, Zoology.  
RAMSPOTT, LAWRENCE D., Neptune Beach, Earth Sciences.

WING, ELIZABETH S., Gainesville, Zoology.

#### *Summer Fellowships for Secondary School Teachers*

BAILEY, WILLIAM G., Hollywood, Biochemistry.

BRUNS, ROBERT B., Tampa, General Science.

CATO, JESELYN M., Alachua, Mathematics.

EDWARDS, PAUL B., Tampa, Mathematics.

EDWARDS, SARAH B., Tampa, Mathematics.

HOLMES, LUCILLE V., West Hollywood, General Biology.

MORE, CLAIR K., Miami, Physics.

OLIVER, Sr., MARY ROBERT, Pensacola, General Biology.

ORTAGUS, Sr. MARIE DE LOURDES, Miami, Zoology.

PERKINS, THOMAS, Oceanway, General Biology.

RADFORD, CATHERINE C., Sarasota, General Biology.

REMINGTON, LLOYD D., St. Petersburg, Chemistry.

REYNOLDS, Sr. MARY JOAN, Pensacola, Chemistry.

RIGGS, MORRIS P., Fort Lauderdale, General Science.

TRUE, JOHN E., Daytona Beach, Mathematics.

WING, RUTH W., Tallahassee, Mathematics.

## GEORGIA

### *Graduate*

BRADLEY, NEAL E., Decatur, Mathematics.  
DOWNS, JAMES P., Savannah, Earth Sciences.  
JOHNSON, CHARLES S., Jr., Albany, Chemistry.

MCLAIN, KENNETH, Buford, Physics.

MORGAN, JASON, Savannah, Physics.

### *Cooperative Graduate*

ALLEN, GEORGE C., Cordele, Chemistry.

COLEMAN, MARION T., Decatur, Genetics.

EDWARDS, ROBERT S., Oglethorpe, Chemistry.

ELLER, JOY P., Georgia, Microbiology.

GASKINS, HENRIANNE, Griffin, Zoology.

HOLLEY, EDWARD R., Jr., Atlanta, Engineering.

PEDIGO, ROBERT A., Atlanta, Botany.

PROSSER, FRANKLIN P., Atlanta, Chemistry.

RHYNE, ROBERT L., Americus, Psychology.

SACKER, ROBERT J., Doraville, Mathematics.

SPENCE, RONALD K., Athens, Chemistry.

STEWART, BARBARA B., Decatur, Chemistry.

WILLIAMS, LYMAN O., Jr., Augusta, Earth Sciences.

WOROZBYT, THEODORE S., Columbus, Physics.

### *Senior Postdoctoral*

CURTIS, MORTON L., Athens, Mathematics.

### *Science Faculty*

BRILLHART, WILLIAM E., Clarkston, Zoology.

HENKEL, JOHN H., Athens, Physics.

JAYNE, JOHN W., Atlanta, Mathematics.

LNENICKA, WILLIAM J., Smyrna, Engineering.

SMITH, GEORGIA C., Atlanta, Mathematics.

### *Summer Fellowships for Graduate Teaching Assistants*

EDWARDS, ROBERT S., Oglethorpe, Chemistry.  
FLURRY, ROBERT L., Jr., Decatur, Chemistry.

GASKINS, HENRIANNE, Griffin, Zoology.

HAMILTON, DARRAUGH O., Smyrna, Mathematics.

SHEPPARD, ALBERT P., Griffin, Physics.

### *Summer Fellowships for Secondary School Teachers*

BLACKWELDER, CORA K., Atlanta, Chemistry.

BURNETT, LUCILLE S., Chamblee, Chemistry.

HENDRIX, DANIEL W., Washington, Mathematics.

HOWELL, CLARA W., Marietta, Chemistry.

NASH, JEFFERSON C., Atlanta, Zoology.

SHERIDAN, Sr. MARY ANTOINETTE, Savannah, Chemistry.

WESTBERG, RAYMOND, Jr., Winder, Mathematics.

WOOD, MARTHA M., Forest Park, Mathematics.

## HAWAII

### *Graduate*

FURUMOTO, AUGUSTINE S., Honolulu, Earth Sciences.

IZUNO, TAKUMI, Wahiawa, Genetics.

MASUMOTO, ELEANOR M., Kukuiahae, Chemistry.

MURABAYASHI, RICHARD J., Honolulu, Engineering.

STORY, ALFRED E., Puunene, Maui, Engineering.

WONG, QUERNIE, Honolulu, Psychology.

### *Cooperative Graduate*

DEVERILL, ROBERT S., Hilo, Chemistry.  
NAKAYAMA, PAUL I., Honolulu Engineering.  
NATSUYAMA, HARRIET H., Honolulu, Mathematics.  
TAKASHIMA, HERBERT T., KaaNapali, Lahaina, Chemistry.

### *Science Faculty*

CHIU, ARTHUR N. L., Honolulu, Engineering.

### *Summer Fellowships for Secondary School Teachers*

CHATFIELD, Sr. DOMINIC ROSAIRE, Kaneohe, Oahu, Biochemistry.  
NOSE, KATASHI, Lihue, Kauai, Mathematics.

### IDAHO

#### *Graduate*

BURDICK, GLENN, Pocatello, Physics.  
COWGILL, GEORGE L., Grangeville, Anthropology.  
MORTENSEN, GLEN A., Moscow, Engineering.  
NIELSON, CLAIR W., Pocatello, Physics.  
WALTZ, JAY A., Moscow, Zoology.

#### *Cooperative Graduate*

CONANT, DON R., Jr., Caldwell, Chemistry.  
HARPER, KIMBALL T., Oakley, Botany.  
KRUEGER, KENNETH W., Caldwell, Botany.  
LARSEN, GARELD R., Rexburg, Engineering.  
ROSS, CLEON W., Victor, Botany.

#### *Science Faculty*

BARR, WILLIAM F., Moscow, Zoology.  
TILLOTSON, DONALD B., Nampa, Mathematics.  
WILLIAMS, THOMAS L., Pocatello, Mathematics.

### *Summer Fellowships for Secondary School Teachers*

HEGG, RAYMOND J., Moscow, Mathematics.

### ILLINOIS

#### *Graduate*

ANDRES, RONALD P., Elmhurst, Engineering.  
ASH, MICHAEL E., Winnetka, Mathematics.  
AUVIL, PAUL R., Jr., Wayne, Physics.  
BALDWIN, JOHN E., Oak Park, Chemistry.  
BAUKOL, RONALD O., Downers Grove, Engineering.  
BENNETT, JAMES H., Wilmette, Mathematics.  
BLISS, JAMES C., Chicago Heights, Engineering.  
BLUMENTHAL, RALPH B., Park Forest, Physics.  
BODINE, ALAN G., Macomb, Physics.  
BOURGIN, MARCIA, Urbana, Biophysics.  
BRAVERMAN, MAXWELL H., Urbana, Zoology.  
BREITWEISER, GARY C., Alton, Engineering.  
BROWN, BARRY W., Riverside, Mathematics.  
BUCCINO, ALPHONSE, Chicago, Mathematics.  
BUSHNELL, JAMES C., Evanston, Physics.  
CHILTON, FRANK M., Jr., Chicago, Physics  
COLEMAN, SIDNEY, Chicago, Physics.  
CORRELL, DAVID, Lombard, Zoology.  
CUSHING, JAMES T., Chicago, Physics.  
DOVE, WILLIAM F., Jr., Oak Park, Biochemistry.  
DUDLEY, RICHARD M., Flossmoor, Mathematics.

ECKSTEIN, SHULAMITH, Chicago, Physics.  
EDWARDS, HAROLD M., Jr., Champaign, Mathematics.  
EHLERT, DAVID L., Bellwood, Mathematics.  
ELDER, JOHN W., S.J., Chicago, Chemistry.  
FOODEN, JACK, Chicago, Zoology.  
FRAENKEL, DAN G., Urbana, Medical Sciences.  
GOLDBERG, JAY M., Chicago, Psychology.  
GOLIN, STUART, Chicago, Physics.  
GUILLEMIN, VICTOR W., Oak Park, Mathematics.  
HALPERN, HERBERT P., Chicago, Mathematics  
HANNAUER, GEORGE, III, La Grange, Mathematics.  
HARBEK, RICHARD C., Wood River, Earth Sciences.  
HOLE, FRANK, Chicago, Anthropology.  
HUMPHREYS, TOM D., II, Chicago, Zoology.  
HUNGERFORD, THOMAS W., Chicago, Mathematics.  
KALLENBRONN, JAMES S., New Baden, Chemistry.  
KERMICLE, JERRY L., Dundas, Genetics.  
KEYSER, LEON F., Waukegan, Chemistry.  
KINGSLEY, JACK D., Urbana, Physics.  
KUJALA, ROBERT, Chicago, Mathematics.  
LELAND, KENNETH O., Chicago, Mathematics.  
LEVINE, MICHAEL J., Chicago, Physics.  
MAC LEAN, DAVID, Winnetka, Chemistry.  
MILLER, WILLARD, Jr., Dundee, Mathematics.  
MINN, FREDERICK L., Waukegan, Chemistry.  
MOOREHEAD, LYNN, Poplar Grove, Zoology.  
MULLIN, MICHAEL M., Mt. Carroll, Zoology.  
NORTON, KARL K., Urbana, Mathematics.  
OLOFSON, ROY A., Chicago, Chemistry.  
OLSON, KENNETH E., Chicago, Engineering.  
OFFER, JAMES, Shobonier, Physics.  
POTTER, JAMES E., Rockford, Mathematics.  
PRICE, JOHN C., Deerfield, Physics.  
READEY, DENNIS W., Aurora, Engineering.  
RENICK, REBECCA J., Manhattan, Chemistry.  
REYNOLDS, JOHN C., Glen Ellyn, Physics.  
ROWND, ROBERT H., Chicago, Medical Sciences.  
SCHLESSINGER, DAVID, Chicago, Biochemistry.  
SHREFFLER, DONALD C., Kankakee, Genetics.  
SIEGEL, DANIEL, Chicago, Physics.  
TALBOTT, RICHARD L., Elmhurst, Chemistry.  
TANGORA, MARTIN C., Evanston, Mathematics.  
TINKLER, JACK, Lansing, Engineering.  
TOWBER, JACOB, Chicago, Mathematics.  
VRENTAS, JAMES, Danville, Engineering.  
WARD, HAROLD N., Evanston, Mathematics.  
WAXMAN, NAHUM J., Chicago, Anthropology.  
WEINER, DANIEL, Chicago, Physics.  
WEINER, JOHN L., Chicago, Earth Sciences.  
WEISS, LAWRENCE H., Chicago, Engineering.  
WENTZEL, DONAT G., Chicago, Astronomy.  
WILKINS, JOHN W., Oak Park, Physics.  
WOLF, JOSEPH A., Chicago, Mathematics.  
YOUNGDAHL, CARL K., Chicago, Mathematics.  
YUND, RICHARD A., Farina, Earth Sciences.  
ZIMMER, RUSSEL L., Springfield, Zoology.  
ZIMMERMAN, STEVEN B., Chicago, Biochemistry.

#### *Cooperative Graduate*

BAKER, ROBERT H., Jr., Evanston, Biochemistry.  
BARNES, JEAN M., Chicago, Psychology.  
BENSON, RICHARD W., Chicago, Mathematics.  
BEUSCHLEIN, MURIEL L., Chicago, Zoology.

- BICKFORD, MARION E., Jr., Urbana, Earth Sciences.
- BISCHOFF, KENNETH B., Chicago, Engineering.
- BLANKENSHIP, FLOYD A., Champaign, Chemistry.
- BLANKENSHIP, VORRIS J., Decatur, Economics.
- BUSH, RICHARD W., La Grange Park, Engineering.
- CAWLEY, ROBERT G., Urbana, Physics.
- CHLOUPEK, FRANK J., Berwyn, Chemistry.
- COBLEY, WILLIAM G., Shelbyville, Engineering.
- CREEK, ROBERT O., Harrisburg, Zoology.
- CURRIE, NEVA L., Loda, Zoology.
- DARST, RICHARD B., Franklin Park, Mathematics.
- DERWENT, JOHN E., Chicago, Mathematics.
- DITTMER, DAVID L., Quincy, Physics.
- DOBN, GORDON L., Chicago, Genetics.
- DYBVIK, DOUGLAS H., Champaign, Chemistry.
- ERNEST, JOHN ARTHUR, Urbana, Mathematics.
- FOULKES, WILLIAM D., Chicago, Psychology.
- GARTH, JOHN C., Urbana, Physics.
- GRADY, LEE T., Chicago, Chemistry.
- HAGEN, CARL R., Chicago, Physics.
- HANNON, WILLARD J., Elk Grove Village, Earth Sciences.
- HAPP, GEORGE M., Elmhurst, Zoology.
- HEID, KERMIT K. W., Elizabeth, Engineering.
- HOLM, ROBERT A., Waukegan, Engineering.
- JANNINCK, ROBERT F., Chicago, Engineering.
- JOSEPH, DANIEL D., Chicago, Engineering.
- KANE, HARRISON, Urbana, Engineering.
- KELLOGG, REID E., Evanston, Chemistry.
- KEVERN, NILES R., Elizabeth, Zoology.
- KLEIN, HARVEY S., Chicago, Chemistry.
- KLEIN, MILES V., Chicago, Physics.
- KOCH, KAY F., Tremont, Chemistry.
- KORNFELD, LOTTIE, Chicago, Microbiology.
- KOPP, JAY P., Galena, Physics.
- LEE, KATHERINE W., Chicago, Biochemistry.
- LEIPZIGER, STUART, Chicago, Engineering.
- LIUVEVICIUS, ARUNAS L., Chicago, Mathematics.
- MADELL, JOHN T., Brookfield, Engineering.
- MALVICK, ALLAN J., Oak Lawn, Engineering.
- MATHEWS, WESLEY, N., Jr., Champaign, Physics.
- MCCLAUGHRY, JOHN, Paris, Engineering.
- MEYER, MARSHALL D., Champaign, Engineering.
- MICHELSON, LEO C., Chicago, Engineering.
- NORDELL, WILLIAM J., Urbana, Engineering.
- OLFE, DANIEL B., Homewood, Engineering.
- RAFF, LIONEL M., Champaign, Chemistry.
- REED, WILLIAM A., Evanston, Physics.
- RENNICK, PHILLIP M., Chicago, Psychology.
- ROUGHEAD, WILLIAM G., Jr., Normal, Mathematics.
- RUTLEDGE, ROBERT B. III, East St. Louis, Mathematics.
- SACKETT, JAMES R., Northbrook, Anthropology.
- SCHWARTZ, LYLE H., Chicago, Physics.
- SPITTLER, THOMAS M., S.J., Chicago, Chemistry.
- STAFFORD, ROGER A., Champaign, Mathematics.
- STEIN, NELSON, Urbana, Physics.
- STUEBEN, EDWIN F., Chicago, Mathematics.
- SUTER, WALTER R., Evanston, General Biology.
- SYLVESTER, RAYMOND M., Chicago, Chemistry.
- TURNER, FRED A., Chicago, Chemistry.
- TRAPP, CHARLES A., Chicago, Chemistry.
- WALL, ROBERT E., Mulberry Grove, Chemistry.
- WEBER, ERWIN W., Park Ridge, Engineering.
- WEBER, THOMAS A., Chicago, Physics.
- WEINER, HOWARD J., Chicago, Physics.
- WEISS, ALAN D., Chicago, Engineering.
- WILSON, JOHN P., Knoxville, Anthropology.
- WILSON, THEODORE A., Elgin, Engineering.
- WINNICK, JACK S., Rockford, Engineering.
- WOOD, ALLEN D., Palos Heights, Engineering.
- WORK, STEWART D., Homewood, Chemistry.
- ZAHNER, JOHN C., Centralia, Engineering.
- Postdoctoral*
- BARGHUSEN, HERBERT R., Chicago, Zoology.
- BISSHOPP, FRED E., Chicago, Physics.
- COLLINS, LORENCE G., Champaign, Earth Sciences.
- DRUYAN, ROBERT, Chicago, Medical Sciences.
- ENKE, CHRISTIE G., Champaign, Chemistry.
- FREIFELDER, DAVID M., Waukegan, Biophysics.
- HAHN, FRANK J., Champaign, Mathematics.
- LENNARZ, WILLIAM J., Champaign, Chemistry.
- LEWIS, SHELDON N., Chicago, Chemistry.
- LIPPINCOTT, BARBARA B., Eldorado, Zoology.
- LIPPINCOTT, JAMES A., Eldorado, Biochemistry.
- PAULUS, HENRY P., Winnetka, Biochemistry.
- TORGERSON, JOHN R., Park Ridge, Medical Science.
- WEISSMAN, SHERMAN M., Chicago, Biochemistry.
- Senior Postdoctoral*
- DOZIER, EDWARD P., Northwestern U., Anthropology.
- GOODMAN, LEO A., Chicago, Mathematics.
- MERRIAM, ALAN P., Evanston, Anthropology.
- NACHTRIEB, NORMAN H., Palos Park, Chemistry.
- TELEGI, VALENTINE L., Chicago, Physics.
- Science Faculty*
- BAUSCH, AUGUSTUS F., Chicago, Mathematics.
- BERMAN, MARTIN, Urbana, Mathematics.
- CAPPEL, CHARLES H., Glen Ellyn, Zoology.
- CURTIS, JAMES O., Champaign, Engineering.
- FREYHERM, HARVEY A., DeKalb, Zoology.
- HOLZBERLEIN, THOMAS M., Elmhurst, Physics.
- LANGERBECK, Sr. MARY, Chicago, Astronomy.
- SAYVETZ, AARON, Chicago, Physics.
- SCHMIDT, MILTON O., Urbana, Earth Sciences.
- SCHMIDT, ROBERT S., Normal, General Biology.
- WENDT, ARNOLD, Macomb, Mathematics.
- Summer Fellowships for Graduate Teaching Assistants*
- ADCOCK, WILLIAM E., Assumption, Chemistry.
- ANDERSSON, MYRNA C., Homewood, Zoology.
- BEULIGMANN, RAYMOND F., Mt. Carmel, Engineering.
- BILLIG, ERNST, Evanston, Chemistry.
- BLINN, WALTER C., Chicago, General Biology.
- BOOKER, JOHN F., Western Springs, Engineering.
- BOLLERO, ANGELO J., Christopher, Chemistry.
- BROTHERS, MARIETTA, Lawrenceville, Microbiology.

DARST, RICHARD B., Franklin Park, Mathematics.  
 DICKERHOOF, DEAN, W., Champaign, Chemistry.  
 ENGELMANN, MANFRED D., Chicago, Zoology.  
 ERLEBACHER, ALBERT, Chicago, Psychology.  
 FARRELL, ROGER H., Champaign, Mathematics.  
 FISHER, WILLIAM L., Marion, Earth Sciences.  
 FOSS, ROBERT F., Chicago, Chemistry.  
 FRANZAK, EDMUND G., Chicago, Physics.  
 FRANZEN, WILLIAM G., Chicago, Mathematics.  
 GABEL, NORMAN W., Chicago, Chemistry.  
 GOETSCHEL, ROY H., Jr., Arlington Heights, Mathematics.  
 GUFFEY, GEORGE R., Urbana, Earth Sciences.  
 HARRIS, ROBERT A., Chicago, Chemistry.  
 HAWBECKER, BYRON L., Lanark, Chemistry.  
 HERRINGTON, KATHERINE A., Chicago, Zoology.  
 JICHA, DONALD C., North Riverside, Chemistry.  
 JONES, ROGER S., Urbana, Physics.  
 KLEIN, MILES V., Chicago, Physics.  
 LARSON, CARL S., Urbana, Engineering.  
 LAUCK, DAVID R., LaSalle, Zoology.  
 LONG, CLIFFORD A., Chicago, Mathematics.  
 MATHEWS, WESLEY N., Jr., Champaign, Physics.  
 MEYERS, M. DOUGLAS, Rushville, Chemistry.  
 MORAN, DANIEL A., Chicago, Mathematics.  
 NEALE, ROBERT S., Champaign, Chemistry.  
 PALMER, GEORGE C., Charleston, Chemistry.  
 PANONTIN, JOHN A., Chicago, Chemistry.  
 PERRY, PRISCILLA A., Niles, Botany.  
 PETERS, JOSEPH A., Urbana, Mathematics.  
 PUGLIA, CHARLES R., Urbana, Zoology.  
 ROTMAN, JOSEPH J., Chicago, Mathematics.  
 SACHS, DAVID, Melrose Park, Mathematics.  
 SCHLETER, EVERETT S., Champaign, Economics.  
 SCHLUETER, DONALD J., Chicago, Physics.  
 SODERSTROM, THOMAS R., Oak Park, Botany.  
 SOMERS, BRUCE G., Urbana, Chemistry.  
 STUBBEN, EDWIN F., Chicago, Mathematics.  
 SUTER, WALTER R., Evanston, General Biology.  
 WAGNER, JOHN A., Riverside, Zoology.  
 WARD, HAROLD R., Mt. Vernon, Chemistry.  
 WEINER, HOWARD J., Chicago, Physics.  
 WICKSTROM, LEROY A., Chicago, Engineering.  
 ZELKO, JAMES J., Joliet, Chemistry.

*Summer Fellowships for Secondary School Teachers*

ANGUS, HARVEY L., Niantic, Mathematics.  
 BARTHOLOMEW, BERNARD R., Freeport, Mathematics.  
 BENNOON, CARMEL, Chicago, Chemistry.  
 BUCKLEY, ST. MARY ELLEN, S.N.D., Chicago, Physics.  
 BUKOVSAN, WILLIAM, Chicago, Zoology.  
 BURSTROM, WARREN F., Mt. Morris, Mathematics.  
 CAMP, DORIS J., Eldorado, Mathematics.  
 COOPER, WILLIAM E., Geneva, Physics.  
 DETERDING, H. ROLAND, Gilman, Mathematics.  
 DEESKA, ST. M. NOEL, O.S.F., Joliet, Physics.  
 HOBBING, ST. MARY VIVIAN, O.S.F., Joliet, General Biology.  
 HOFMAN, LEONA J., Chicago, Mathematics.  
 LEE, HENRY T., St. Anne, Physics.  
 LOBBE, RUSSELL L., Roseville, Mathematics.  
 LUDWIG, EDWARD E., Oak Park, Mathematics.  
 LUND, DONALD L., Malden, Mathematics.

MALLON, MOTHER M. SEBASTIAN, Chicago, General Biology.  
 MESKIMEN, IRVING C., Champaign, Mathematics.  
 MILLER, ST. MARY IVO, B.V.M., Chicago, General Biology.  
 NEVILLE, ST. MARY THERESE MARTIN, Chicago, Chemistry.  
 PERHAM, REV. ARNOLD, C.S.V., Springfield, Physics.  
 PIERCE, MAURINE M., Wapella, Genetics.  
 PIXLEY, LOREN W., La Salle, Mathematics.  
 QUATMAN, ST. FRANCIS MICHAEL, Belleville, Mathematics.  
 RILEY, CONSTANCE A., St. Joseph, Biochemistry.  
 ROARK, OAKLEY F., Jr., Sycamore, General Biology.  
 ROBINSON, MYRA Z., Skokie, Zoology.  
 RYCHTARIK, ALBERT J., Chicago, Physics.  
 SCHAFER, ST. MICHAEL, S.P., Galesburg, Chemistry.  
 STEJSKAL, JOHN W., S.J., Wilmette, Physics.  
 TAFT, KATHERINE D., Highland Park, Agriculture.  
 TRUCHAN, ST. MARY ETIENNE, O.S.F., Chicago, General Biology.  
 WHITEHEAD, ST. M. MICHELYN, O.S.F., Joliet, General Biology.  
 ZIEGLER, ROBERT E., Elgin, General Science.  
 ZINK, ST. MARY WILMA, La Grange Park, Chemistry.

INDIANA

*Graduate*

BELINFANTE, JOHAN G., West Lafayette, Physics.  
 CLAUS, STANLEY, Woodburn, Mathematics.  
 CROWTHERS, EDWARD J., North Liberty, Experimental Psychology.  
 DAVIDSON, MICHAEL L., Peru, Engineering.  
 DODD, JAMES R., Owensville, Earth Sciences.  
 DUNLEAVY, ST. M. ROSALEEN, C.S.C., Notre Dame, Microbiology.  
 FISH, FEROL F., Jr., East Chicago, Earth Sciences.  
 FISHER, THORNTON R., Indianapolis, Physics.  
 FRANZT, ALAN, North Manchester, Mathematics.  
 GOLDMAN, ELAINE D., Indianapolis, Mathematics.  
 HUEBER, FRANCIS M., Indianapolis, Earth Sciences.  
 HUNTER, RALPH E., Evansville, Earth Sciences.  
 JENKINS, THOMAS N., Indianapolis, Mathematics.  
 LUNDY, RICHARD A., Brazil, Physics.  
 MILES, GLEN A., Cloverdale, Engineering.  
 MONTGOMERY, DONALD R., Bloomington, Chemistry.  
 NEUMANN, HOLM W., Bloomington, Anthropology.  
 PARR, JAMES T., Lebanon, Mathematics.  
 PEALE, STANTON J., Indianapolis, Engineering.  
 POHL, WILLIAM F., Michigan City, Mathematics.  
 PRAIRIE, RICHARD L., Fort Wayne, Biochemistry.  
 RAGLAND, THOMAS E., Batesville, Biochemistry.  
 RIGG, ROBERT G., Hammond, Engineering.  
 ROGERS, MARION A., Richmond, Earth Sciences.  
 SCHMALBERGER, DONALD C., Bloomington, Astronomy.

SCHRECK, GEORGE L., Seymour, Physics.  
SIMS, CHARLES C., Elkhart, Mathematics.  
STARBUCK, WILLIAM H., Portland, Mathematical Economics.  
VOUGHT, ELDON J., South Bend, Mathematics.  
WHITE, HENRY E., Jr., Lafayette, Mathematics.

#### *Cooperative Graduate*

BALL, ROBERT E., Indianapolis, Engineering.  
BROWN, DONALD R., Evansville, Psychology.  
CALDWELL, JANET H., West Lafayette, Microbiology.  
CHIDDISTER, JERRY L., Goshen, Engineering.  
CURRENT, JERRY H., Anderson, Chemistry.  
DAVIDSON, MARILYN D., Whiting, Zoology.  
DILLING, WENDELL L., West Lafayette, Chemistry.  
EMERSON, JOHN L., Owensville, Medical Sciences.  
ENGELHARDT, DONALD W., Bloomington, Botany.  
GLAUZ, WILLIAM D., West Lafayette, Engineering.  
GRIFFIOEN, ROGER D., Lafayette, Chemistry.  
HAWLEY, JOHN W., Evansville, Earth Sciences.  
HARSHBARGER, RICHARD B., Bloomington, Mathematical Economics.  
KELLAM, JOHN M., Jr., Indianapolis, Engineering.  
KNILL, RONALD J., South Bend, Mathematics.  
LAWVERE, FRANCES W., Jr., Bloomington, Mathematics.  
LEARY, DONALD E., Notre Dame, Zoology.  
LEWELLYN, RALPH A., Jr., West Lafayette, Physics.  
MCCARTY, CHARLES B., Lawrenceburg, Engineering.  
MCLEAN, DOUGLAS H., Fort Wayne, Engineering.  
MICHAEL, JOE V., Fort Wayne, Chemistry.  
MONTGOMERY, ROBERT H., Scottsburg, Agriculture.  
MOSBY, JAMES F., Indianapolis, Engineering.  
NAYLOR, JAMES C., Lafayette, Psychology.  
NOBBE, LOUIS B., West Lafayette, Engineering.  
RHODE, J. IVAN, Lafayette, Physics.  
SCHERER, KIRBY V., Jr., Evansville, Chemistry.  
STOVE, JEANNE L., Newcastle, Microbiology.  
STOWERS, JULIAN L., Kirklint, Chemistry.  
SUGITA, EDWIN T., West Lafayette, Medical Sciences.  
THOMAS, ROBERT L., Speedway, Mathematics.  
THOMPSON, MAYNARD D., Michigan City, Mathematics.  
TOOMBS, HAROLD D., West Lafayette, Engineering.  
WEINBERG, ELLIOT C., South Bend, Mathematics.  
ZELL, ELIZABETH A., Kentland, Microbiology.

#### *Postdoctoral*

STEWART, THOMAS E., South Bend, Mathematics.

#### *Senior Postdoctoral*

GILLMAN, LEONARD, West Lafayette, Mathematics.  
LEWIS, DONALD J., South Bend, Mathematics.  
STEFFEN, ROLF M., West Lafayette, Physics.  
STOLNITZ, GEORGE J., Bloomington, Mathematical Economics.

#### *Science Faculty*

BLACK, HOWARD T., Terre Haute, Physics.  
EGAN, JAMES P., Bloomington, Mathematics.  
GELDMACHER, ROBERT C., Lafayette, Engineering.  
GERKING, SHELBY D., Bloomington, Zoology.  
INGRAM, GERALD E., West Lafayette, Engineering.  
LAUER, KENNETH R., South Bend, Engineering.  
LINDHOLM, JOHN C., Lafayette, Engineering.  
LOWRY, MURRILL M., Indianapolis, General Biology.  
NEBERGALL, WILLIAM H., Bloomington, Chemistry.  
PARLEE, NORMAN A. D., West Lafayette, Engineering.  
WAGNER, KENNETH A., Union City, General Biology.  
YAQUB, ADIL M., Lafayette, Mathematics.

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

BARNES, GERALD J., West Lafayette, Engineering.  
BAYER, HORST O., West Lafayette, Chemistry.  
BROWN, DONALD R., Evansville, Psychology.  
BORDERS, DONALD B., Logansport, Chemistry.  
BREWER, ROBERT H., Evansville, Zoology.  
CHALMERS, ROBERT K., West Lafayette, Medical Sciences.  
ERSKINE, JOHN R., Notre Dame, Physics.  
EUSTICE, DAN J., West Lafayette, Mathematics.  
FLEMING, JAMES R., Evansville, Engineering.  
GILLIOM, RICHARD D., Bluffton, Chemistry.  
GOODWINE, JAMES K., Jr., West Lafayette, Engineering.  
HINCKLEY, RICHARD A., Winchester, Genetics.  
JONAH, DAVID W., West Lafayette, Mathematics.  
LAW, JAY R., Richmond, Agriculture.  
MEYERS, BERNARD L., Indianapolis, Chemistry.  
NAYLOR, JAMES C., Lafayette, Psychology.  
PETRY, ROBERT F., Hebron, Physics.  
SAGE, ANDREW P., Jr., West Lafayette, Engineering.  
SPITLER, EVERETT E., West Lafayette, Engineering.  
THOMPSON, MAYNARD D., Michigan City, Mathematics.  
WARRICK, WALTER H., West Lafayette, Mathematical Economics.  
YAQUB, FAWZI M., West Lafayette, Mathematics.

#### *Summer Fellowships for Secondary School Teachers*

ALBIN, LEE H., Evansville, Mathematics.  
BANDELIER, KENNETH J., New Haven, Botany.  
CAIN, BRO. JOSEPH RICHARD, C.S.C., Evansville, Zoology.  
DAVIDSON, JAMES E., Indianapolis, Mathematics.  
DEARDORFF, CLETUS O., Wabash, Mathematics.  
KIRKMAN, GERALD L., Evansville, Chemistry.  
LUFF, JAMES R., Lafayette, Mathematics.  
MILLER, THOMAS J., Evansville, General Biology.  
MONRAD, Sr., CONRAD, Fort Wayne, Mathematics.  
MURRAY, JAMES F., Lafayette, Physics.

OVERMIRE, THOMAS G., Indianapolis, Zoology.  
 PARKER, FREDERICK A., Indianapolis, Mathematics.  
 REHM, JUSTIN G., Indianapolis, Mathematics.  
 ROBINSON, KENNETH S., Oakland City, Physics.  
 SALER, WILLIAM J., Indianapolis, Mathematics.  
 SCHILF, Sr. ANNE PAULINE, Fort Wayne, Physics.  
 SCHILLING, ROBERT G., Frankfort, Mathematics.  
 SEDGWICK, LLOYD C., Greentown, Mathematics.  
 SETTLE, RALPH D., Portland, Physics.  
 SIMS, WILLIAM HENRY, Washington, General Science.  
 THARP, CHARLES A., Berne, Mathematics.  
 WAGNER, WARREN W., Bedford, Mathematics.  
 WEINHIMER, ALLAN R., Indianapolis, Mathematics.  
 WELTY, CLARENCE P., Hammond, Physics.

## IOWA

### Graduate

BIERY, JOHN C., Ames, Engineering.  
 ECKER, RICHARD E., Ames, Microbiology.  
 EGGER, CARL T., Monticello, Engineering.  
 KOHLMAN, DAVID L., Lamoni, Engineering.  
 POLKING, JOHN C., Breda, Mathematics.  
 ROBERTS, WALDEN K., Lamoni, Biochemistry.  
 SARGEANT, PETER B., Cedar Rapids, Chemistry.  
 STRANDBURG, DONALD L., Sioux City, Physics.  
 STUDIER, F. WILLIAM, Waverly, Biophysics.  
 SUNDQUIST, BRUCE E., Davenport, Engineering.  
 WEYANT, ROBERT G., Iowa City, Psychology.

### Cooperative Graduate

ANDERSON, DENNIS E., Ames, Botany.  
 BELL, JERRY A., Bettendorf, Chemistry.  
 BENTRUDE, WESLEY G., Waterloo, Chemistry.  
 BERLYN, MARY K., Ames, Biochemistry.  
 CHASE, JOHN W., Council Bluffs, Chemistry.  
 COOK, CHARLES J., Des Moines, Physics.  
 DIVELBISS, JAMES E., Iowa City, Genetics.  
 FENSKA, RICHARD F., Ames, Chemistry.  
 HILLER, ROBERT J., Decorah, Mathematics.  
 HILTON, JAMES G., Ames, Econometrics.  
 HOFFMAN, LARRY R., Sigourney, Botany.  
 HOVERSTEN, ESTIL V., Ames, Engineering.  
 JOHNSON, KENT E., Davenport, Earth Sciences.  
 KLEBER, RICHARD S., Iowa City, Mathematics.  
 KLEESE, ROGER A., Ames, Agriculture.  
 KRAUS, KENNETH W., Waterloo, Chemistry.  
 LIGON, JAMES T., Ames, Engineering.  
 LINK, DAVID A., Ames, Engineering.  
 LUDVIGSON, H. WAYNE, Rock Rapids, Psychology.  
 MCCLENAHAN, MARY L., Sigourney, Psychology.  
 MAHONEY, LEE R., Ames, Chemistry.  
 MEYER, FRED P., Schaller, Zoology.  
 NOLE, BRUCE O., Iowa City, Earth Sciences.  
 PALMQUIST, JOHN C., Iowa City, Earth Sciences.  
 PETRO, JOHN W., Iowa City, Mathematics.  
 PULLEY, ARDEN O., Ames, Biochemistry.  
 RIDDELL, NANCY C., Ames, Zoology.  
 SAMUELS, ROBERT L., Ames, Engineering.  
 TIFFANY, FLOYD L., Des Moines, Engineering.

WAGNER, ROGER A., Burlington, Psychology.  
 WATSON, GEORGE A., Knoxville, Engineering.  
 WAUER, JOHN C., Sioux City, Engineering.  
 WOODY, ROBERT W., Newton, Chemistry.  
*Senior Postdoctoral*  
 HANSEN, ROBERT S., Ames, Chemistry.  
*Science Faculty*  
 RAUMANN, EDWARD R., Ames, Engineering.  
 FAHIEN, RAYMOND W., Ames, Engineering.  
 GLOWER, DONALD D., Ames, Engineering.  
 REED, ALVIN A., Ames, Engineering.  
 WILSON, LELAND L., Cedar Falls, Chemistry.  
 YOS, DAVID A., Burlington, Botany.

### Summer Fellowships for Graduate Teaching Assistants

CARLSON, ALBERT D., Iowa City, Zoology.  
 CARLSON, CLARENCE A., Ames, Zoology.  
 DIVELBISS, JAMES E., Iowa City, Genetics.  
 JOHNSON, BRUCE L., Ames, Engineering.  
 KLEBER, RICHARD S., Iowa City, Mathematics.  
 KRAUS, KENNETH W., Waterloo, Chemistry.  
 LONG, FRANCIS M., Iowa City, Engineering.  
 MATHEWS, JEROLD C., Des Moines, Mathematics.  
 MARTY, WAYNE G., LuVerne, Zoology.  
 MCINTOSH, THOMAS H., Ames, Microbiology.  
 MOYLE, RICHARD W., Iowa City, Earth Sciences.  
 NORTON, KATHERINE, Alta, Zoology.  
 ROISEN, BENJAMIN A., Northwood, Mathematics.

### Summer Fellowships for Secondary School Teachers

CAMPBELL, ARTHUR L., Iowa City, Chemistry.  
 DRAKE, ALLEN R., Indianola, General Science.  
 GEAREN, Sr. MARY MAURINE, B.V.M., Iowa City, Chemistry.  
 HAWTHORNE, FRANK C., Jr., Sergeant Bluff, Zoology.  
 HENNEY, ROBERT C., Quimby, Chemistry.  
 JACKSON, WALTER J., New Hampton, General Science.  
 JEFFRIES, VIRGINIA R., Corydon, General Biology.  
 KIRKPATRICK, HERMAN H., Des Moines, Physics.  
 LE MAIRE, Sr. MARY CHARMAINE, B.V.M., Clinton, Chemistry.  
 MILLER, ALVA J., Iowa City, Earth Sciences.  
 RICHARDS, JOHN F., Iowa Falls, Mathematics.  
 SCHRAMM, MERLE D., Onawa, General Science.  
 SNYDER, JOHN D., Correctionville, Physics.

## KANSAS

### Graduate

BATH, THOMAS D., Mission, Engineering.  
 CEDERBERG, JAMES, Herndon, Physics.  
 DAVIS, JOHN A., Jr., Topeka, Engineering.  
 ENOS, PAUL P., Perry, Earth Sciences.  
 FIOCK, FRANK D., Lawrence, Physics.  
 FRANZEN, HUGO F., Lawrence, Chemistry.  
 HAINES, HOWARD B., Kansas City, Zoology.  
 HANSON, DAVID L., Wichita, Mathematics.  
 HARMS, CLARENCE E., Hillsboro, Zoology.  
 HAYS, BYRON G., Wichita, Chemistry.  
 HOBBS, CHARLES F., Lawrence, Chemistry.  
 JONES, JERRY L., Lawrence, Physics.  
 RAMSAY, ARLAN, Dodge City, Mathematics.  
 REYNOLDS, WYNETKA A., Emporia, Zoology.  
 RICHERT, A. STUART, Wichita, Physics.

SETSER, DONALD W., Hudson, Chemistry.  
SINKHORN, RICHARD D., Wichita, Mathematics.

SOMMER, WARREN T., Manhattan, Physics.  
STRATTAN, ROBERT D., Newton, Engineering.  
STRICKLER, STEWART J., Hutchinson, Chemistry.

#### *Cooperative Graduate*

ADAMS, RUSSELL S., Jr., LaHarpe, Agriculture.

DEALY, JOHN M., Wichita, Engineering.  
FEDDE, MARION R., Mankato, Agriculture.  
FRANKENFELD, JOHN W., Prairie Village, Chemistry.

HAMILTON, THOMAS J., Atchison, Zoology.  
HARTKE, JEROME L., Herington, Physics.  
HORNE, FREDERICK H., Mission, Chemistry.  
KROTZ, BARBARA J., Wichita, Biochemistry.  
MANTEY, JOHN P., Sharon Springs, Engineering.

NEWTON, JOHN C., Grainfield, Chemistry.  
POOL, JAMES C., Wellsville, Physics.  
ROMARY, KIRK, Manhattan, Chemistry.  
ROOT, JOHN W., Shawnee, Chemistry.  
SCHMIDT, GARFIELD C., Larned, Mathematics.

SENECAL, REV. GERARD, O.S.C., Atchison, Physics.

SKINNER, JAMES L., Lincoln, Engineering.  
STUTEVILLE, DONALD L., Parsons, Agriculture.

WILSON, FREDDIE E., Lenexa, Zoology.  
WOLFE, HERBERT G., Lawrence, Genetics.  
WOODMANSEE, WAYNE E., Wichita, Chemistry.

ZAHNLEY, JAMES C., Manhattan, Biochemistry.

#### *Postdoctoral*

GASTON, LAMONT W., Lawrence, Medical Sciences.

#### *Senior Postdoctoral*

SOKAL, ROBERT R., Lawrence, General Biology.

#### *Science Faculty*

ALTENDORF, JAMES J., Winfield, Chemistry.  
CHOGUILL, HAROLD S., Hays, Chemistry.  
CRANK, ROBERT E., Manhattan, Engineering.  
LUNGSTORM, LEON G., Lindsborg, Medical Science.  
TAFT, DOROTHY L., Lawrence, Botany.

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

BOLES, ROBERT J., Manhattan, Zoology.  
BROMAN, JANIS C., Salina, Chemistry.  
FRANKENFELD, JOHN W., Prairie Village, Chemistry.

GAUGHAN, EDWARD D., Reading, Mathematics.

JOHNSON, WILLIAM J., Hillsboro, Chemistry.  
MCDOWELL, JOHN W., Jr., Halstead, Chemistry.

MICHAELS, KENNETH B., Manhattan, Engineering.

MOHILNER, DAVID M., Lawrence, Chemistry.  
RUMFEL, MAX L., Ogallah, Chemistry.  
SCHMITZ, EUGENE H., Alma, Zoology.

#### *Summer Fellowships for Secondary School Teachers*

BLAKE, WALTER P., Pratt, Biochemistry.  
CANINE, CELIA H., Wichita, Mathematics.  
COLYN, JOHN L., McPherson, General Biology.

FRAZIER, JAY L., McPherson, General Biology.

HIGHT, DONALD W., Wichita, Mathematics.  
HODGES, MARION L., Wichita, General Science.

JANTZ, DIETRICH B., Marion, Physics.  
KELLEY, Sr. MARY AMBROSE, C.S.J., Salina, Physics.

MEYER, ROLAND E., Attica, Mathematics.  
MOORE, Sr. M. HARRIET, C.S.J., Dodge City, Mathematics.

PETERS, ARTHUR J., Olathe, Mathematics.  
QUIRING, FRANK S., Kansas City, Chemistry.  
RAMSEY, JED J., Courtland, General Biology.

RIGGS, MARVIN L., Alton, General Biology.  
SHAW, NEALE D., Sublette, Mathematics.  
SIMMS, ROBERT A., S.J., Wichita, Mathematics.

WILLIAMS, Sr. MARY RAYMONDETTE, Wichita, Chemistry.

#### KENTUCKY

##### *Graduate*

COOK, MAURICE G., Hatton, Agriculture.  
HARDIN, BOBBY O., Lexington, Engineering.  
HIGGINS, LORETTA M., Newport, Biochemistry.

KOEHL, WILLIAM J., Jr., Covington, Chemistry.

KONSLER, THOMAS R., Henderson, General Biology.

LIND, JOHN E., Jr., Louisville, Chemistry.  
MELTON, CHARLES Jr., Henderson, Genetics.  
SUICH, JOHN E., Louisville, Engineering.  
WESSEL, WILLIAM L., Louisville, Physics.

##### *Cooperative Graduate*

ALVEY, FRANK B., Louisville, Chemistry.  
BIGGERSTAFF, JOHN A., Berea, Physics.  
BRYANT, TRUMAN R., Lexington, Botany.  
COOMES, HUGH R., Jr., Fort Thomas, Mathematics.

CRAWFORD, THOMAS H., Louisville, Chemistry.

DETWILER, BETTY C., Eminence, Mathematics.

DRESSMAN, JOHN B., Covington, Engineering.

GRAY, HARRY B., Bowling Green, Chemistry.  
HARRIS, MAX R., West Paducah, Physics.

HOHMAN, Sr. BENEDICT, S.C.N., Louisville, Chemistry.

INMAN, WILLIAM C., Lexington, Psychology.  
KAFESJIAN, RALPH, Louisville, Engineering.

KISSLING, ELIZABETH H., Lexington, Earth Sciences.

LACKEY, JACKSON B., Richmond, Mathematics.

LAMB, RICHARD C., Lexington, Physics.  
LAYSON, WILLIAM M., Millersburg, Physics.

REYNOLDS, RAY T., Lexington, Physics.  
SAMPSON, CHARLES H., Lexington, Mathematics.

SCHNEITER, GEORGE R., Louisville, Engineering.

##### *Postdoctoral*

BARNETT, LEWIS B., Lexington, Biochemistry.

##### *Science Faculty*

CRENSHAW, MARY A., Cave City, Biochemistry.

PITMAN, W. J., Murray, Zoology.

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

CURTIN, MARY E., Lexington, Psychology.  
DAWSON, WALLACE D., Jr., Midway, Zoology.

DINGUS, DOYLE R., Martin, Engineering.

*Summer Fellowships for Secondary School Teachers*

BENNETT, BERT A., Covington, Mathematics.  
BERTKE, Sr. MARY CHRISTOPHER, Erlanger, Mathematics.  
CAMERON, Sr. MARCELLA, S.C.N., Louisville, Mathematics.  
GARRISON, EDWINA R., Denton, Botany.  
JACOBS, Sr. MARY FRANCES, O.S.B., Covington, Mathematics.  
MATTINGLY, Sr. ALOYSIA, S.C.N., Nazareth, Mathematics.  
MUDD, Sr. JEANNETTE, S.C.N., Henderson, Mathematics.  
SMITH, CHARLES E., Jr., Bardstown, General Biology.

LOUISIANA

*Graduate*

CONWAY, EDWARD D., III, New Orleans, Physics.  
FRICKEN, RAYMOND L., New Orleans, Physics.  
FRIEDMAN, H. GEORGE, Jr., Shreveport, Chemistry.  
SMITH, WILLIAM N., Jr., Metairie, Chemistry.

*Cooperative Graduate*

ANDERSON, ELVON G., Baton Rouge, Earth Sciences.  
BEAUBOUFF, RICHARD T., Baton Rouge, Engineering.  
DECK, RONALD J., New Orleans, Physics.  
DONALDSON, DARRELL J., New Orleans, Chemistry.  
EDISON, WILLIAM W., New Orleans, Physics.  
ELDER, ELEANOR S., Baton Rouge, Chemistry.  
GILBERT, JIMMIE D., Quitman, Mathematics.  
GUILBAULT, GEORGE G., New Orleans, Chemistry.  
KNIGHT, L. WILLARD, Baton Rouge, Chemistry.  
OLIVIER, JOSEPH F., Arnaudville, Engineering.  
POYNOR, GEORGE V., Hammond, Mathematics.  
SIMPSON, SIDNEY B., Jr., New Orleans, Zoology.  
WATTS, ROBERT G., Lettsworth, Engineering

*Senior Postdoctoral*

TRAYNHAM, JAMES G., Baton Rouge, Chemistry.

*Science Faculty*

BRUMAGE, WILLIAM H., Ruston, Physics.  
ELIOFF, ROBERT, Monroe, Physics.  
JOHNSON, MELVIN A., Jr., Grambling, Medical Science.  
JOHNSON, MILTON R., Jr., Ruston, Engineering.  
WAHAB, JAMES H., New Orleans, Mathematics.

*Summer Fellowships for Graduate Teaching Assistants*

GIROD, WILLIAM P., Tallulah, Physics.  
GUILBAULT, GEORGE G., New Orleans, Chemistry.  
HUSSEY, ROBERT G., Shreveport, Physics.  
RICHARDSON, MILES E., New Orleans, Anthropology.  
ROGILLO, BYRON, L., Jackson, Engineering.  
WILLIS, DONALD E., Baton Rouge, Chemistry.  
YOUNG, WARREN L., Eunice, Chemistry.

*Summer Fellowships for Secondary School Teachers*

DANOS, Mother M. CARMELITA, Abbeville, Physics.

O'TOOLE, Sr., PATRICK ANN, New Orleans, Mathematics.  
SCHIEBER, ROBERT E., Amite, Mathematics.  
SCHMOLKE, RAYMOND L., Alexandria, Microbiology.  
STROY, JAMES S., New Orleans, General Science.  
WARD, MALCOM F., Lake Charles, Chemistry.

MAINE

*Graduate*

KNIGHT, WILLIAM S., Auburn, Chemistry.  
SCOTT, SARAH V., Bar Harbor, Anthropology.  
TOWNES, HARRY W., Auburn, Engineering.  
WALCH, CAROLYN R., Portland, Zoology.

*Cooperative Graduate*

FROST, GEORGE W., Orono, Zoology.  
PINKHAM, GORDON N., Bath, Mathematics.  
TURNER, JAMES H., Skowhegan, Engineering.

*Science Faculty*

GUSTAFSON, ALTON H., Brunswick, Genetics.

*Summer Fellowships for Graduate Teaching Assistants*

SNIDER, MARVIN, Portland, Psychology.  
WOODBREY, JAMES C., Sebago Lake, Chemistry.

MARYLAND

*Graduate*

ANDERSON, DON L., Baltimore, Earth Science.  
BAROFF, JAMES H., Cheverly, Physics.  
BROWN, ROBERT L., Kensington, Chemistry.  
CURTIS, EDWARD B., Annapolis, Mathematics.  
FERGUSON, JOHN D., Bishop Head, Mathematics.  
GOREN, SIMON L., Baltimore, Engineering.  
HAINES, LARRY K., Towson, Physics.  
HAUK, PETER, Chevy Chase, Chemistry.  
HAUK, ROBALIND, Chevy Chase, Biochemistry.  
KANTOR, PAUL B., Silver Spring, Physics.  
KAUFMANN, JOHN H., Towson, Zoology.  
MAHOWALD, ANTHONY P., Baltimore, Biochemistry.  
MILTON, DANIEL J., Silver Spring, Earth Sciences.  
MORRIS, JOHN E., Silver Spring, Biochemistry.  
MURPHY, FREDERICK V., Jr., Chevy Chase, Physics.  
SHARNOFF, MARK, Chevy Chase, Physics.  
SIGER, ALVIN, Baltimore, Biophysics.  
STAGNER, MARILYN L., Bethesda, Zoology.  
VAN TREES, HARRY L., Jr., Glen Burnie, Engineering.  
WARNER, JONATHAN R., Bethesda, Biophysics.  
WHITLOCK, HOWARD W., Jr., University Park, Chemistry.  
ZDANIS, RICHARD A., Baltimore, Physics.

*Cooperative Graduate*

AKS, STANLEY, College Park, Physics.  
BLAKLEY, GEORGE R., West Hyattsville, Mathematics.  
BOLLINGER, ROBERT E., Baltimore, Engineering.  
FINK, DONALD L., Baltimore, Engineering.  
FULLER, GEBALD LEE, Baltimore, Engineering.  
GLICK, LEONARD B., Baltimore, Anthropology.  
IRELAND, KENNETH F., Baltimore, Mathematics.  
JONES, DONALD G., Takoma Park, Chemistry.  
LATIMER, GEORGE W., Jr., Bethesda, Chemistry.



LEON, MELVIN, W. Hyattsville, Physics.  
MARTIN, RICHARD L., Baltimore, Engineering.  
MASERICK, PETER H., Silver Spring, Mathematics.  
MULLALLY, JANET J., Bethesda, Mathematics.  
MULY, EMIL C., Baltimore, Engineering.  
SEINKMAN, PAUL G., Bethesda, Psychology.  
TEPLITZ, VIGDOR L., Hyattsville, Physics.  
WEBER, HARRY W., Jr., Baltimore, Chemistry.

#### *Postdoctoral*

BERNSTEIN, EUGENE M., Baltimore, Physics.  
CARROLL, ROBERT W., West Hyattsville, Mathematics.  
LIPPS, FRANK B., Baltimore, Earth Sciences.  
MOORE, ROBERT H., College Park, Mathematics.  
TRAYSER, KENNETH A., Baltimore, Biochemistry.  
WEBBER, WILLIAM R., University Park, Physics.

#### *Senior Postdoctoral Fellowships*

BROIDA, HERBERT P., Bethesda, Physics.  
FERRELL, RICHARD A., Greenbelt, Physics.  
WATERS, AARON C., Lutherville, Earth Sciences.  
WEISSBACH, ARTHUR, Bethesda, Biochemistry.

#### *Science Faculty Fellowships*

CALLAHAN, Sr. MARY, Baltimore, Chemistry.  
JACKSON, STANLEY B., Takoma Park, Mathematics.  
KING, JOHN W., Baltimore, Botany.  
MILLER, PAUL P., Baltimore, Mathematics.  
PECK, MAHLON F., Westminster, Mathematics.

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

ACHINSTEIN, PETER J., Bethesda, Philosophy of Science.  
BRIERLEY, GERALD P., Greenbelt, Biochemistry.  
DI GIORGIO, JOSEPH B., Baltimore, Chemistry.  
FORMAN, RICHARD T., Easton, Botany.  
GINI, ELAINE M., Baltimore, Chemistry.  
HURLBUTT, HENRY W., College Park, Zoology.  
LAZARUS, MAXINE B., Baltimore, Chemistry.  
LYNCH, CHARLES T., Chevy Chase, Chemistry.  
MAYERS, MARVIN K., Silver Spring, Anthropology.  
TEPLITE, VIGDOR L., Hyattsville, Physics.  
TEWS, MELVIN C., College Park, Mathematics.  
WINKLER, ROBERT R., College Park, Chemistry.

#### *Summer Fellowships for Secondary School Teachers*

CASSELL, DOUGLAS H., Aberdeen, General Biology.  
DYKE, BARBARA S., Rockville, Mathematics.  
FINNEGAN, Sr., REGINA, S.N.D., Brooklandville, General Biology.  
KENNEDY, VELMA S., Centerville, Mathematics.  
MCKINLEY, CLARENCE P., Prince George's Co., Physics.  
MORRIS, JAMES T., Montgomery County, General Science.  
PRESSLER, AUDREY E., Frederick, General Biology.  
SCOTT, JOHN R., Beltsville, General Biology.  
WILLIAMS, LOUISE C., Towson, Mathematics.  
WINTERS, JOHN M., Sandy Spring, General Science.

## MASSACHUSETTS

#### *Graduate*

ADLER, ALICE, Cambridge, Chemistry.  
AIKENS, DAVID A., Cordaville, Chemistry.  
AYERELL, JOHN P., Cambridge, Physics.  
BAYM, GORDON A., Pittsfield, Physics.  
BENEDICT, MARY H., Weston, Chemistry.  
BOLGER, JUSTIN C., Boston, Engineering.  
BROWN, PAUL S., Dorchester, Engineering.  
CLEARY, RICHARD T., S.J., Weston, Zoology.  
COOPER, BERNARD E., Hyde Park, Physics.  
COTTER, EDWARD, Chelsea, Earth Sciences.  
DIAMOND, JARED M., Brookline, Medical Sciences.  
DIXON, WILLIAM B., Fall River, Chemistry.  
EYDE, RICHARD H., Cambridge, Botany.  
FEDERER, CHARLES, III, Belmont, Agriculture.  
FLEXER, ABRAHAM S., West Medford, Zoology.  
FULTON, ROBERT L., East Weymouth, Chemistry.  
GELB, ARTHUR, Cambridge, Engineering.  
GIBBS, SARAH P., Belmont, Zoology.  
GOLD, L. PETER, Brockton, Chemistry.  
GOLDSTEIN, RUBIN, Cambridge, Physics.  
GOODRICH, ROBERT L., Cambridge, Physics.  
GOSSARD, ARTHUR C., Quincy, Physics.  
GROLL, DONALD S., South Walpole, Engineering.  
HARTSHORNE, ROBERT C., Cambridge, Mathematics.  
HATCH, THEODORE F., Jr., Cambridge, Mathematics.  
HOWARD, WEBSTER E., Jr., Cambridge, Physics.  
HUNT, THOMAS K., Belmont, Physics.  
KADANOFF, LEO P., Cambridge, Physics.  
KAYTON, MYRON, Lowell, Engineering.  
LECHNER, ROBERT J., Watertown, Engineering.  
LOCKSHIN, RICHARD A., Northampton, Zoology.  
MARCUS, DANIEL H., Boston, Engineering.  
MCGOFF, DAVID J., Somerville, Engineering.  
MONTGOMERY, CHARLES G., Winchester, Physics.  
PERSHAN, PETER S., Cambridge, Physics.  
POULTNEY, SHERMAN K., Leominster, Physics.  
ROZIN, PAUL, Cambridge, Psychology.  
SCHLESINGER, JAMES W., Allston, Mathematics.  
STEARNS, DORIS L., Ayer, Psychology.  
SULLIVAN, RICHARD F., Needham, Chemistry.  
VASQUEZ, ALPHONSE T., Braintree, Mathematics.  
WEINREB, SANDER, Cambridge, Engineering.  
WHARTON, LENNARD, Cambridge, Chemistry.  
WHITNEY, PHILIP R., Marshfield, Earth Science.  
WHITTIER, DEAN P., Millbury, Botany.  
WILLIAMS, DAVID C., Belmont, Chemistry.

#### *Cooperative Graduate*

ADLER, DAVID, Cambridge, Physics.  
BURGIEL, JOSEPH C., Ware, Engineering.  
BURSTYN, HAROLD L., Cambridge, History of Science.  
CARLIN, RICHARD L., Plymouth, Chemistry.  
CARLSON, GERALD L., Cambridge, Biochemistry.  
CHIN, GILBERT Y., Boston, Engineering.  
DEBETZ, JAMES J., Cambridge, Anthropology.  
DUREN, PETER L., Cambridge, Mathematics.

ELLETT, MILDRED H., Boston, General Biology.

FBAIZE, WILLARD E., Waltham, Engineering.

GRANT, WALTER J., Lawrence, Physics.

HAKES, DAVID T., Wilbraham, Psychology.

HOBBIE, RUSSELL K., Cambridge, Physics.

IMPINK, ALBERT J., Jr., Watertown, Engineering.

MCQUARRIE, DONALD A., Lowell, Chemistry.

MELOY, THOMAS P., Brookline, Engineering.

MESSER, MELANIE B., Revere, General Biology.

MILLER, MARY B., Watertown, Philosophy of Science.

PASTERCZYK, FRANCIS W., Chicopee Falls, Engineering.

PLOCKE, DONALD J., S.J., Boston, Biophysics.

REITZEL, JOHN S., Cambridge, Earth Sciences.

SANDERSON, RICHARD B., Jr., Cambridge, Physics.

SIBLEY, MURRAY J., Malden, Chemistry.

SWENEY, EDWARD F., Tewksbury, General Biology.

YEGIAN, CHARLES D., Amherst, Physics.

#### *Postdoctoral*

HOLM, RICHARD H., Falmouth, Chemistry.

LANGFORD, COOPER H., Holyoke, Chemistry.

MILBURN, RICHARD H., Cambridge, Physics.

OFENGAND, EDWARD J., Taunton, Biochemistry.

PALAIS, RICHARD S., Brookline, Mathematics.

ROBINSON, ALLAN R., Marblehead, Earth Sciences.

#### *Senior Postdoctoral*

COHEN, I. BERNARD, Cambridge, History of Science.

GIMBATUS, MARIJA, Boston, Anthropology.

GOLDEN, SIDNEY, Lexington, Chemistry.

JEANLOZ, ROGER W., Newton, Biochemistry.

#### *Science Faculty*

CARITO, WILLIAM A., Watertown, Mathematics.

CLARKSON, JAMES A., West Medford, Mathematics.

COGHLAN, ANNE E., Milton, Microbiology.

CROOKER, BENJAMIN C., Jr., Amherst, Physics.

EPSTEIN, HERMAN T., Waltham, Biophysics.

GOLDSTEIN, MOISE H., Jr., Belmont, Engineering.

GREENWOOD, FRED L., Medford, Chemistry.

HILBERTY, FRANK J., Bridgewater, General Biology.

HOLTON, GERALD J., Lexington, Physics.

KEFFE, Sr. MARY, Boston, Zoology.

O'BYRNE, JOSEPH M., Amherst, Engineering.

WEINSTEIN, ROY, Lexington, Physics.

WILSON, LOUISE P., Wellesley, Biochemistry.

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

BACH, MARILYN L., Boston, Biochemistry.

BLACK, CRAIG C., Cambridge, Zoology.

BRACE, C. LORING, Cambridge, Anthropology.

BURKE, EILEEN E., Lawrence, Chemistry.

DEVELIS, JOHN E., Somerville, Physics.

ENGLISH, PAUL W., Worcester, Geography.

FORD, DWAIN L., Lancaster, Biochemistry.

HAGOPIAN, ELAINE C., Cambridge, Anthropology.

HAKES, DAVID T., Wilbraham, Psychology.

HALL, JOHN S., Westfield, Zoology.

HOBBIE, RUSSELL K., Cambridge, Physics.

KARNOPP, DEAN C., Cambridge, Engineering.  
LIBERA, RICHARD J., Thorndike, Mathematics.

MOSKOWITZ, JULES W., Boston, Chemistry.

MOSTOFKY, DAVID I., Roxbury, Psychology.

OLVER, JOHN W., Cambridge, Chemistry.

PAQUETTE, LEO A., Cambridge, Chemistry.

SARGENT, THEODORE D., Peabody, Zoology.

SCHNEIDER, WILLIAM A., Watertown, Earth Sciences.

VANDEN HEUVEL, WILLIAM, Harwich, Chemistry.

VOLKMAN, FRANCES C., South Hadley, Psychology.

WIRKKALA, ROBERT A., Baldwinville, Chemistry.

#### *Summer Fellowships for Secondary School Teachers*

ANDRUS, FELIX W., Haverhill, Physics.

ANGELLI, Sr. MARY CABRINI, C.S.J., Brookline, General Biology.

BURKE, GEORGE W., Jr., Quincy, Mathematics.

CURRAN, JAMES M., Springfield, General Biology.

GATES, DAVID A., Orleans, Zoology.

LANDRY, JEROME R., Northampton, Mathematics.

MACALOUSKI, Sr. MARY CYRILLE, Milton, Mathematics.

MIKULA, THOMAS M., Andover, Mathematics.

SCHICKEL, Mother RUTH M., Newton, Mathematics.

SPILLANE, TIMOTHY J., Hyde Park, General Science.

WELD, PHILIP B., Andover, Chemistry.

#### MICHIGAN

##### *Graduate*

BACHMANN, ROGER W., Ann Arbor, Zoology.

BICKEL, THOMAS F., Detroit, Mathematics.

BOUWSMA, WARD D., Grand Rapids, Mathematics.

BROWN, ROBERT T., Milan, Physics.

BUTCHER, SAMUEL S., Gaylord, Chemistry.

CLOSSON, WILLIAM D., Pontiac, Chemistry.

CONLEY, CHARLES C., Royal Oak, Mathematics.

DAVENPORT, RICHARD, Battle Creek, Biology.

DAVIES, HAROLD W., East Lansing, Botany.

DIETERLE, CAROLINE, Ann Arbor, Botany.

DOMINIAK, KENNETH E., Ann Arbor, Engineering.

EDMONDS, KATHERYN, Kalamazoo, Chemistry.

FISCHER, PATRICK C., Ann Arbor, Mathematics.

GARWOOD, DONALD C., Cassopolis, Chemistry.

GEBBEN, ALAN I., Grand Rapids, Botany.

HAMELANK, RONALD C., Holland, Mathematics.

HARGER, ROBERT O., Midland, Engineering.

JORDAN, TRUMAN H., Saline, Chemistry.

KESSLER, DAVID P., Ann Arbor, Engineering.

KNOLL, GLENN F., Frankenmuth, Engineering.

LAZAROV, CONNER, Detroit, Mathematics.

LILLYA, CLIFFORD P., Ann Arbor, Chemistry.

LITWIN, GEORGE, Detroit, Psychology.

MATWIZOFF, NICHOLAS A., Rogers City, Chemistry.

MCBRIDE, DAVID W., Dearborn, Chemistry.

MILLER, DAVID C., East Lansing, Engineering.

MITCHELL, LAWRENCE C., Ann Arbor, Chemistry.

NELSON, FREDERIC F., Grand Rapids, Chemistry.

OWENS, JAMES C., Grosse Pointe, Physics.  
PORTER, WILLIAM A., South Haven, Engineering.  
POUTSMA, MARVIN L., Grand Rapids, Chemistry.  
ROBERTSON, WAYNE M., Fremont, Engineering.  
ROSS, DAVID W., Detroit, Physics.  
RUSKIN, ARNOLD M., Ann Arbor, Engineering.  
SANDEL, VERNON, L'Anse, Chemistry.  
SCHRIEBER, THOMAS J., Muskegon, Engineering.  
SMITH, GENE E., Morenci, Engineering.  
SPIEGELMAN, PHILLIP P., Ann Arbor, Engineering.  
STENGER, ROBERT A., Midland, Chemistry.  
STREET, JAMES R., Detroit, Engineering.  
TREADO, PAUL A., Kingsford, Physics.  
VALENTINE, JO ANNE, Clarkston, Zoology.  
WIDEMAN, JAMES M., Detroit, Medical Sciences.  
WILLIAMS, JOHN A., Dearborn, Astronomy.  
WISER, NATHAN, Detroit, Physics.  
ZIER, ROBERT E., Detroit, Physics.

#### *Cooperative Graduate*

ALLEBERTON, SAMUEL E., Kalamazoo, Biochemistry.  
BARRY, RUSSELL F., Bath, Engineering.  
BECK, JONATHAN M., Lansing, Mathematics.  
BENKARD, J. PHILIP, Ann Arbor, Mathematics.  
BETZ, ROBERT S., Huntington Woods, Mathematics.  
BRAKE, JON M., Livonia, Biochemistry.  
BOYD, JOHN W., East Lansing, Physics.  
BROCKMEIER, RICHARD T., Grand Rapids, Physics.  
CARLTON, BRUCE C., East Lansing, Agriculture.  
CLIFFORD, L. THOMAS, Farmington, Psychology.  
CURTIS, SARAH L., Ann Arbor, Psychology.  
DUNLAP, ROBERT W., Farmington, Engineering.  
FARRAND, WILLIAM R., Ann Arbor, Earth Sciences.  
FINNEY, ROSS L., Ann Arbor, Mathematics.  
GREENMAN, DAVID L., Williamston, Zoology.  
GULLAHORN, JEANNE E., East Lansing, Psychology.  
HOUTMAN, JACK A., Kalamazoo, Engineering.  
HUNT, ROBERT H., Ann Arbor, Physics.  
JACKSON, ANNE-LOUISE, Ann Arbor, Microbiology.  
JULIAN, JAMES W., Gladwin, Psychology.  
KAPLAN, STEPHEN, Ann Arbor, Psychology.  
KAUFFMAN, ERLE G., Ann Arbor, Earth Sciences.  
KLANDERMAN, BRUCE H., Grand Rapids, Chemistry.  
KUZMA, DENNIS C., Lincoln Park, Engineering.  
LA POINTE, CLAYTON W., Detroit, Engineering.  
MCKNIGHT, LEE G., Ann Arbor, Chemistry.  
MINNE, RONN N., Menominee, Chemistry.  
MOOS, HENRY W., Ann Arbor, Physics.  
PARKER, JAMES E., East Lansing, Physics.  
PATTERSON, DONALD J., Birmingham, Engineering.  
PETERSON, RUTH A., Frankfort, Chemistry.  
PETRULOVICH, ADAM, Jr., Detroit, Earth Sciences.  
PLOURDE, GAIL R., Norway, Chemistry.

RICHARDSON, ROBERT W., Grosse Pointe, Physics.  
SANFORD, THOMAS A., Milford, Engineering.  
SCHOENHALS, ROBERT J., Ypsilanti, Engineering.  
SCHREIBER, CHARLES L., Warren, Physics.  
SCHUMACHER, CLIFFORD R., Detroit, Physics.  
SCHWARTZ, ARTHUR J., Detroit, Mathematics.  
SHETLER, STANWYN G., Ann Arbor, Botany.  
SILBAR, RICHARD R., Fenton, Physics.  
SMITH, GLEN C., Morenci, Engineering.  
SOMMERFELD, JUDE T., Ann Arbor, Engineering.  
STODDARD, JAMES H., Ann Arbor, Mathematics.  
SUMMERFIELD, GEORGE C., Detroit, Physics.  
SUND, RAYMOND E., Dearborn, Physics.  
TRANHAM, BOBBIE J., East Lansing, Engineering.  
WAKELEY, JOHN H., East Lansing, Psychology.  
WOLSEY, WAYNE C., Battle Creek, Chemistry.  
YELEN, DONALD R., Dearborn, Psychology.  
ZERRA, ROSE D., Ferndale, Psychology.

#### *Postdoctoral*

BLATT, FRANK J., Haslett, Physics.  
VIDAVER, GEORGE A., Detroit, Biochemistry.

#### *Senior Postdoctoral*

CHRISTENSEN, JAMES B., Detroit, Anthropology.  
SUSSMAN, ALFRED S., Ann Arbor, Botany.  
YIH, CHIA-SHUN, Ann Arbor, Engineering.

#### *Science Faculty*

BRADLEY, GEORGE E., Kalamazoo, Physics.  
FENNELL, RICHARD A., Okemos, Medical Science.  
FUTRAL, SAMUEL M., Jr., East Lansing, Engineering.  
MARKLE, GERALD E., Detroit, Mathematics.  
RATNER, STANLEY C., Haslett, Psychology.  
REID, RICHARD J., Lansing, Engineering.  
SAUNDERS, KENNETH W., Weldman, Physics.  
SMITH, HADLEY J., Ann Arbor, Engineering.  
THORSON, PHILIP J., East Lansing, Engineering.  
VANDER LUGT, LEONARD A., Grand Rapids, Chemistry.  
WOLTHUIS, ENNO, Grand Rapids, Chemistry.

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

ALLARD, MARVEL J., Grosse Pointe, Psychology.  
BASS, JON D., Midland, Chemistry.  
BORCHERTS, ROBERT H., Detroit, Engineering.  
CALDWELL, JAY S., Ann Arbor, Psychology.  
DEAL, ERVIN R., Ann Arbor, Mathematics.  
DE VRIES, DONALD L., Zeeland, Chemistry.  
EPEL, DAVID, Detroit, Zoology.  
FINNEY, ROSS L., Ann Arbor, Mathematics.  
GORDON, GILBERT, East Lansing, Chemistry.  
HAWLEY, ARTHUR J., Whitmore Lake, Geography.  
HEIMBRACH, CLINTON L., Ann Arbor, Engineering.  
HEMINGWAY, PETER W., Lansing, Psychology.  
HUVER, CHARLES W., Battle Creek, Zoology.  
JACOBS, GERALD D., East Lansing, Chemistry.  
LANG, JOSEPH J., Okemos, Engineering.  
LESNOY, SELIG D., Ann Arbor, Econometrics.  
MOHRIG, JERRY R., Grand Rapids, Chemistry.

MOORE, RODERICK K., St. Charles, Earth Sciences.  
 PAYLEY, RICHARD F., Detroit, Mathematics.  
 RASMUSSEN, DAVID I., Ann Arbor, Zoology.  
 RAUTIOLA, CLIFTON A., Ann Arbor, Medical Sciences.  
 RAZNIAK, STEPHEN L., Livonia, Chemistry.  
 SMITH, HARRY A., Grand Rapids, Chemistry.  
 STAFFORD, STEWARD L., Jackson, Chemistry.  
 STEINMETZ, CHARLES, JR., Ann Arbor, Zoology.  
 STODDARD, JAMES H., Ann Arbor, Mathematics.  
 SZCZARBA, ROBERT H., Dearborn, Mathematics.  
 WAKELEY, JOHN H., East Lansing, Psychology.  
 WHITE, BRUCE S., East Lansing, Engineering.  
 WIRTH, JOHN L., Three Oaks, Engineering.  
 WOZNICK, BENJAMIN J., Grand Rapids, Physics.

*Summer Fellowships for Secondary School Teachers*

BEACH, WILLIAM E., Alpena, Mathematics.  
 BEDOR, JAMES D., Oak Park, General Science.  
 BIES, Sr. MARY BONAVIDA, Detroit, Chemistry.  
 BLASYK, EDWIN A., Detroit, Physics.  
 DUNWOODIE, JOHN W., Detroit Mathematics.  
 ENGEL, Sr. VITA MARIE, I.H.M., Detroit, Physics.  
 FLANNERY, Sr. MARY JANE, O.P., Saginaw, General Biology.  
 GRAPEB, EDWARD H., East Lansing, Zoology.  
 HARBOLD, JOHN P., Midland, General Biology.  
 HOLMAN, PAUL C., Flint, General Science.  
 HOYT, GEORGE W., Brown City, Mathematics.  
 HYMAN, RICHARD S., Utica, Physics.  
 JONES, HAROLD M., Kalamazoo, General Science.  
 KANE, Mother EVELYN ELIZABETH, Bloomfield Hills, Mathematics.  
 KULLBERG, RUSSELL G., Flint, General Biology.  
 LANIGAN, CHARLES F., Midland, General Science.  
 LEHTO, PAUL N., Hancock, Mathematics.  
 McNAMARA, PATRICK J., Detroit, Physics.  
 MENNINGA, CLARENCE, Grand Rapids, Mathematics.  
 MERCER, ALEXANDER R., Detroit, Zoology.  
 MURASKI, VIRGINIA S., Grand Rapids, General Science.  
 NORTHRUP, RICHARD H., Spring Lake, General Biology.  
 PASLAY, LUCILLE A., Birmingham, Botany.  
 POTRUDE, WILMA W., Oak Park, General Biology.  
 SNOW, ROBERT E., Sturgis, Mathematics.  
 SOUCY, ROGER F., Detroit, Mathematics.  
 ST. AUBIN, NORMAN G., Detroit, Mathematics.  
 SUN, Sr. M. AGNES JOSEPH, Monroe, Chemistry.  
 VAUGHAN, THOMAS J., Midland, General Science.  
 VON STEIGER, Sr. ANNE AGNES, Marquette, Mathematics.  
 VRUGINK, ELMER H., Grand Rapids, Mathematics.  
 ZURAKOWSKI, PAUL R., Mt. Clemens, Chemistry.

MINNESOTA

*Graduate*

ANDERSON, ROBERTA K., Carlton, Microbiology.  
 BRETHOWER, DALE M., Nevis, Psychology.  
 BURNS, RAND H., Minneapolis, Chemistry.  
 CARLSON, BRUCE M., Minneapolis, Zoology.  
 CULBERT, T. PATRICK, Minneapolis, Anthropology.  
 GALVIN, FRED, St. Paul, Mathematics.  
 GUTTMAN, BURTON S., Minneapolis, Zoology.  
 HAAKE, PAUL C., Winona, Chemistry.  
 KIRCHNER, ROGER B., Edina, Mathematics.  
 MOFFET, ALAN T., Rochester, Astronomy.  
 MUELLER, AUGUST, Mahanomen, Microbiology.  
 OLSON, EDWIN S., Cannon Falls, Chemistry.  
 OSTBY, MARNOLD, Jr., McIntosh, Mathematics.  
 OSTERCAMP, DARYL LEE, Minneapolis, Chemistry.  
 PASS, THEODORE, Minneapolis, Physics.  
 RADLOFF, LENORE S., Minneapolis, Psychology.  
 SPAETH, ROBERT L., Foley, Physics.  
 SPANGLER, JOHN D., Atwater, Physics.  
 THURNAUER, PETER, St. Paul, Physics.  
 TORGERSON, RONALD, Minneapolis, Physics.  
 WALL, ROBERT E., St. Paul, Earth Sciences.  
 WHITE, ROSCOE, Minneapolis, Physics.  
 WILDER, STEPHEN P., Minneapolis, Engineering.  
 WILLETT, ROGER D., Northfield, Chemistry.  
 YOUNGQUIST, MARY J., Balaton, Chemistry.

*Cooperative Graduate*

ADAMS, ROBERT D., St. Paul, Mathematics.  
 CAMPBELL, DAVID P., Minneapolis, Psychology.  
 CONE, RICHARD A., St. Paul, Astronomy.  
 D'ANDREA, JOANNE M., Keewatin, Psychology.  
 DAWES, CLINTON J., Jr., Robbinsdale, Botany.  
 DUSSERE, PAUL L., Moorhead, Mathematics.  
 FISKE, TIMOTHY, Long Lake, Genetics.  
 FRISTEDT, BERT E., Hopkins, Mathematics.  
 GROSS, LINDA A., Minneapolis, History of Science.  
 HEDIN, ALAN E., St. Paul, Physics.  
 HELLING, JOHN F., Madella, Chemistry.  
 HELLING, ROBERT B., Madella, Genetics.  
 JOHNSON, WILLIAM W., Minneapolis, Genetics.  
 KLAIMON, JEROLD H., St. Louis Park, Engineering.  
 MAHER, LOUIS J., Jr., Minneapolis, Earth Sciences.  
 MULLIN, ROBERT, St. Paul, Genetics.  
 NORDLIE, FRANK G., New London, Zoology.  
 OAKES, ROBERT J., Minneapolis, Physics.  
 ORIEL, PATRICK J., Stillwater, Chemistry.  
 RICHARDS, J. IAN, St. Paul, Mathematics.  
 RIES, RICHARD R., New Ulm, Physics.  
 SCHOENIKE, ROLAND E., Winona, Agriculture.  
 SCHULTZ, GERALD E., Minneapolis, Earth Sciences.  
 SWEDBERG, KENNETH C., Pillager, Botany.  
 VISTE, ARLEN E., Austin, Chemistry.  
 WALSTEDT, RUSSELL E., Mound, Physics.  
 WARMING, ROBERT F., Minneapolis, Engineering.  
 WINSTON, DONALD, II, Minneapolis, Earth Sciences.  
 YAPEL, ANTHONY F., Jr., Soudan, Chemistry.

### *Postdoctoral*

ANDERSON, KINSEY A., Preston, Physics.

### *Senior Postdoctoral*

STORCKELER, JOSEPH H., St. Paul, Agriculture.

HINTZ, MORTON M., Minneapolis, Physics.

LUMRY, RUFUS W., Minneapolis, Biochemistry.

STEPHENS, GROVER C., Minneapolis, Zoology.

### *Science Faculty*

ALDERS, CLARENCE D., Mankato, Mathematics.

ANDERSON, ROWLAND C., St. Cloud, Mathematics.

BRADEN, CHARLES M., Minneapolis, Mathematics.

KLEINHENZ, WILLIAM A., Minneapolis, Engineering.

LARSON, SIDNEY C., Minneapolis, Engineering.

LINDGREN, BERNARD W., Minneapolis, Mathematics.

VAN DYKE, HENRY, Northfield, Microbiology.

### *Summer Fellowships for Graduate Teaching Assistants*

AUNE, BRUCE A., Minneapolis, Philosophy of Science.

BRANDT, JAMES A., Minneapolis, Engineering.

BRIGGS, DAVID G., St. Paul, Engineering.

CAMPBELL, DAVID P., Minneapolis, Psychology.

HELLING, ROBERT B., Madella, Genetics.

HUMPAL, EDWIN F., Jr., Virginia, Engineering.

JOHNSON, DONALD C., St. Paul, Chemistry.

JOHNSON, WILLIAM W., Minneapolis, Genetics.

JONES, DUANE A., Northfield, Chemistry.

LARSON, OMER R., Pencer, Zoology.

MANCUSO, JOSEPH J., Hibbing, Earth Sciences.

MARKUS, NEIL A., St. Paul, Geography.

NORDLIE, FRANK G., New London, Zoology.

FLORDE, DONALD E., Fairmont, Chemistry.

ROSENWINKEL, EARL R., St. Paul, Botany.

SCHALEGER, LARRY L., Minneapolis, Chemistry.

SOUTHWICK, DAVID L., Rochester, Earth Sciences.

SWATEZ, GERALD M., Minneapolis, Psychology.

YOUNGQUIST, GORDON R., Biwabik, Engineering.

### *Summer Fellowships for Secondary School Teachers*

ACQUARD, RICHARD H., Lynd, Mathematics.

ANGLIN, JOHN B., Alexandria, Mathematics.

BERNARD, ELMER A., Duluth, Mathematics.

CARLSON, CALVIN R., Perham, Chemistry.

DYE, DAVID L., Bemidji, Mathematics.

EASTER, GEORGE R., Canby, Chemistry.

FINCO, ARTHUR A., Coleraine, Mathematics.

SVERDRUP, GEORGE M., Minneapolis, Physics.

WARREN, MURRAY L., Crookston, Chemistry.

### MISSISSIPPI

#### *Graduate*

CERNY, JOSEPH, III, University, Chemistry.

CLIBURN, J. WILLIAM, Hattiesburg, Zoology.

CROW, TERRY T., Amory, Physics.

DAVIS, JAMES E., State College, Chemistry.

#### *Cooperative Graduate*

BUNTIN, ROBERT R., Gulfport, Engineering.

GILMER, ROBERT W., Jr., Pontotoc, Mathematics.

LESTER, ANNE, Inverness, Mathematics.

WEIDIE, ALFRED E., Jr., Pascagoula, Earth Sciences.

#### *Postdoctoral*

MANGUM, BILLY W., Mize, Chemistry.

STOREY, CHARLES R., Jr., Gulfport, Mathematics.

THOMPSON, GUY A., Jr., Rosedale, Biochemistry.

#### *Science Faculty*

CAPLENOR, CHARLES D., Jackson, Botany.

CLISBY, MARION B., Starkville, Engineering.

MOAK, JAMES E., State College, Agriculture.

#### *Summer Fellowships for Graduate Teaching Assistant*

HOWELL, JOHN F., Magnolia, Zoology.

KING, ROBERT D., Hattiesburg, Mathematics.

#### *Summer Fellowships for Secondary School Teachers*

ALEXANDER, KATHERINE, Laurel, Chemistry.

HULL, HENRY C., Cleveland, Chemistry.

LANGFORD, TED G., Redwood, General Science.

PATTON, GEORGE G., Jr., Jackson, Physics.

### MISSOURI

#### *Graduate*

ALT, DAVID, Kirkwood, Earth Sciences.

BIBDSALL, WILLIAM, S.J., St. Louis, Mathematical Economics.

BLACKBURN, THOMAS R., Webster Groves, Chemistry.

COPPOLA, PATRICIA T., Richmond Heights, Zoology.

CUSHING, EDWARD J., Steelville, Earth Sciences.

DREITLEIN, JOSEPH F., Ferguson, Physics.

ELSON, ELLIOT, Ladue, Biochemistry.

FOX, Sr. ALICE MARIE, B.V.M., St. Louis, Zoology.

HARTING, GARY L., Kirkwood, Engineering.

KENOYER, Sr., MARIE FRANCIS, Webster Groves, Psychology.

MIDGLEY, JAMES E., Kansas City, Physics.

NAUMAN, EDWARD B., Kansas City, Engineering.

PALMER, THEODORE W., Webb City, Mathematics.

PARKHURST, LAWRENCE J., Kansas City, Chemistry.

PRATT, RICHARD L., Jefferson City, Mathematics.

REGAN, GERALD T., St. Louis, General Biology.

RODABAUGH, DAVID, Kansas City, Mathematics.

ROTE, RICHARD F., St. Louis, Physics.

SAIN, MICHAEL K., St. Louis, Engineering.

SCHAEFFER, KATHERINE, Clayton, Earth Sciences.

SLOAN, MARTIN F., University City, Chemistry.

#### *Cooperative Graduate*

ANDALAFTE, EDWARD Z., Springfield, Mathematics.

BARNETT, DONALD L., Hannibal, Mathematics.

BORISON, SIDNEY L., St. Joseph, Physics.

- BROWN, LARRY N., Springfield, Zoology.  
 CANTWELL, JOHN C., St. Louis, Mathematics.  
 CARVER, ROBERT E., Columbia, Earth Sciences.  
 CONDON, JOSEPH H., St. Louis, Physics.  
 CONDON, PAUL E., St. Louis, Physics.  
 CRISTAL, EDWARD G., University City, Engineering.  
 FREESE, RAYMOND W., Columbia, Mathematics.  
 GAINES, JAMES R., St. Louis, Physics.  
 GAILKER, CHARLES D., Kingston, Physics.  
 GLASCOCK, HOMER H., Jr., Hannibal, Physics.  
 HAGEN, DAVID C., St. Louis, Engineering.  
 HARBECK, HARRY E., Rolla, Engineering.  
 HARMONY, MARLIN D., Kansas City, Chemistry.  
 HORTON, H. ROBERT, Rolla, Biochemistry.  
 JACKSON, ELTON F., St. Louis, Sociology.  
 KRONB, WILLIAM J., Ferguson, Engineering.  
 LICHT, PAUL, St. Louis, Zoology.  
 MEIER, KARL L., St. Louis, Engineering.  
 MULLIN, WILLIAM J., Brentwood, Physics.  
 NEGEN, JOHN W., Independence, Chemistry.  
 NOELKEN, MILTON E., St. Louis, Chemistry.  
 REEVES, BARRY L., St. Louis, Engineering.  
 SATER, VERNON E., Kansas City, Engineering.  
 SHIELDS, JIM L., Columbia, Medical Sciences.  
 SMITH, LEWIS P., St. Louis, Physics.  
 ZEY, ROBERT L., St. Clair, Chemistry.
- Postdoctoral*  
 SHER, ARDEN, Clayton, Physics.
- Senior Postdoctoral*  
 SARD, ROBERT D., St. Louis, Physics.
- Science Faculty*  
 BLACK, JOHN D., Kirksville, Zoology.  
 DOWNS, THOMAS L., St. Louis, Mathematics.  
 GINGRICH, NEWELL S., Columbia, Physics.  
 HILTON, WALLACE A., Liberty, Physics.  
 MCCABE, WILLIAM M., University City, Engineering.  
 SMITH, SR. ALONZA, Webster Groves, Chemistry.  
 WRIGHT, LUCILLE, Springfield, Medical Sciences.
- Summer Fellowships for Graduate Teaching Assistants*  
 ANDALASTE, EDWARD Z., Springfield, Mathematics.  
 BELL, RONDALL E., Kennett, Biochemistry.  
 BEST, WILLIAM V., Brunswick, Chemistry.  
 EIGEL, EDWIN G., Jr., St. Louis, Mathematics.  
 FREESE, RAYMOND W., Columbia, Mathematics.  
 KUEST, LOUIS J., Jr., Hazelwood, Earth Sciences.  
 LADINSKY, JACK, St. Louis, Sociology.  
 MUMMA, MARTIN D., Columbia, Earth Sciences.  
 PUTNEY, RICHARD T., Columbia, Psychology.  
 SHIELDS, JIM L., Columbia, Medical Sciences.  
 RECHTIEN, RICHARD D., St. Louis, Earth Sciences.
- Summer Fellowships for Secondary School Teachers*  
 BARRATT, GEORGE W., Hickman Mills, Mathematics.  
 BECKER, HENRY, St. Louis, General Biology.  
 BOERCKER, FRED D., Clayton, Physics.
- BOYD, FREDERICK K., Webster Groves, Chemistry.  
 CONNELL, SR. MARY ST. JAMES, C.S.J., St. Louis, General Biology.  
 DANUSER, ELMER W., Hermann, Mathematics.  
 DIX, RICHARD J., S.M., St. Louis, Microbiology.  
 FAST, KENNETH V., St. Louis, Chemistry.  
 HALL, WALTER B., Seymour, General Science.  
 HANICK, EMMET J., St. Louis, Physics.  
 HARTMAN, BERNARD W., Boonville, Chemistry.  
 HEADLEE, ELMER W., Kirkwood, Chemistry.  
 KELLER, SR. MARY FREDERICK, Cape Girardeau, Physics.  
 MCINTOSH, ROY, Atchison County, Chemistry.  
 MEADOWS, ROY W., St. Louis, Mathematics.  
 RINK, SR. MARY MICHAELA, B.V.M., St. Louis, General Biology.  
 ROE, BRO. L. CHARLES, F.S.C., St. Louis, Physics.  
 RYKOWSKI, EDWARD V., Springfield, Mathematics.  
 WEICHINGER, THEODORE, Jr., Maryville, Physics.
- MONTANA
- Graduate*  
 KEMP, DANIEL S., Missoula, Chemistry.  
 MORTON, THOMAS E., Great Falls, Mathematics.  
 WOODWARD, LEE A., Missoula, Earth Sciences.
- Cooperative Graduate*  
 HEANEY, DAVID P., McAllister, Agriculture.  
 MITCHELL, WILLIAM W., Rounduin, Botany.  
 SWENSON, ROBERT J., Bozeman, Physics.
- Senior Postdoctoral*  
 WRIGHT, JOHN C., Bozeman, General Biology.
- Science Faculty*  
 HANES, N. BRUCE, Bozeman, Engineering.  
 KEIGHTLEY, WILLARD O., Bozeman, Engineering.  
 UHLRICH, PAUL E., Bozeman, Engineering.
- Summer Fellowships for Graduate Teaching Assistants*  
 EVENSON, KENNETH M., Bozeman, Physics.  
 SWENSON, ROBERT J., Bozeman, Physics.
- Summer Fellowships for Secondary School Teachers*  
 BOULET, E. RITA, Lewistown, Chemistry.  
 HOLLAND, SR. MARY MICHELLE, Missoula, Chemistry.  
 LIVERS, JAMES H., Whitefish, Mathematics.  
 MONROE, KENNETH E., Bozeman, Mathematics.  
 MYERS, BERNARD D., Billings, Mathematics.  
 MYSHAK, ST. MARIE PAULA, Anaconda, Chemistry.
- NEBRASKA
- Graduate*  
 ALLINGTON, ROBERT W., Lincoln, Engineering.  
 DOMINGO, JOHN J., Weeping Water, Physics.  
 HAYES, JOHN B., Omaha, Earth Sciences.  
 JONES, NOEL D., Hastings, Chemistry.  
 MCARTHUR, DONALD E., Atlanta, Physics.  
 MURDOCK, WARREN F., Lincoln, Chemistry.  
 SITTLER, O. DAYLE, Martell, Biophysics.  
 VAN VLECK, LLOYD D., Clearwater, Agriculture.  
 WHEAT, MARY, Hastings, Mathematics.

### *Cooperative Graduate*

BINDER, FRANK H. III, Omaha, Earth Sciences.  
CHRISTENSEN, RICHARD M., Miller, Earth Sciences.  
CONLEY, CURTIS D., Nebraska City, Earth Sciences.  
EBERHART, STEVE A., Bassett, Genetics.  
GROSS, MILDRED L., Lincoln, Mathematics.  
LANG, WAYNE W., Craig, Physics.  
SKOV, CHARLES E., Riverdale, Physics.  
STIEHL, JACK G., Hay Springs, Engineering.  
SWANSON, JAMES A., Lincoln, Chemistry.

### *Science Faculty*

CLOUTIER, ELMER J., Papillion, Zoology.  
HAACK, DONALD C., Lincoln, Engineering.  
LEAVITT, WILLIAM G., Lincoln, Mathematics.

### *Summer Fellowships for Graduate Teaching Assistants*

BOHN, S. ELWOOD, Lincoln, Mathematics.  
HENZLIK, RAYMOND E., Lincoln, Zoology.  
MASCHKE, ALFRED W., Lincoln, Physics.  
QUIST, ARVIN S., Blair, Chemistry.

### *Summer Fellowships for Secondary School Teachers*

ACKERSON, PAUL B., Omaha, General Science.  
BRANDT, IRVIN C., Norfolk, Chemistry.  
BRINEY, RUTH E., Bradshaw, General Biology.  
BRYAN, JOHN C., Omaha, Mathematics.  
BURESH, JULIA D., Omaha, Chemistry.  
BURGER, MABEL M., Fairbury, Mathematics.  
DE LANO, CALVIN F., Wilcox, Chemistry.  
HINSDALE, GLENN L., Wayne, General Science.  
JOHNSON, GEORGE L., Fairbury, General Biology.  
PAYNE, HOLLAND I., Scottsbluff, General Biology.  
PETERSEN, DAVID, K., Omaha, Astronomy.  
RICE, JOHN D., JR., Omaha, Mathematics.  
RYAN, SR. M. FINTAN, O.S.F., Omaha, General Biology.

### NEVADA

#### *Graduate*

CARL, ERNEST A., Reno, Zoology.  
SHANKLAND, THOMAS J., Boulder City, Physics.

### *Summer Fellowships for Graduate Teaching Assistants*

WISE, WILLIAM S., Carson City, Earth Sciences.

### NEW HAMPSHIRE

#### *Graduate*

KING R. BRUCE, Rochester, Chemistry.  
ROBINSON, PETER, Hanover, Earth Science.  
SHACKFORD, ROLAND F., Durham, Mathematics.

### *Senior Postdoctoral*

KUIVILA, HENRY G., Durham, Chemistry.

### *Science Faculty*

BAUER, LENIN A., Durham, Psychology.  
SHAFFER, PAUL R., Hanover, Chemistry.

### *Summer Fellowships for Graduate Teaching Assistants*

NORMANDIN, ROBERT F., Laconia, Zoology.

### *Summer Fellowships for Secondary School Teachers*

DAVIS, JOHN D., Exeter, Chemistry.  
LEONARD, EDWARD H., Hanover, Chemistry.

### NEW JERSEY

#### *Graduate*

ANDREWS, PETER B., Tenafly, Mathematics.  
BARNERT, NYLES N., West Orange, Mathematics.  
BARTH, ROBERT H., Jr., Ridgewood, Zoology.  
BASSON, DAVID, Perth Amboy, Engineering.  
BRANT, DAVID A., Summit, Chemistry.  
BRAULT, JAMES W., Princeton, Physics.  
BROWN, W. STANLEY, Princeton, Physics.  
BURKE, JAMES A., Andover, Physics.  
CALDWELL, DENNIS J., Penns Grove, Chemistry.  
CARLSMITH, JAMES M., Summit, Psychology.  
COBURN, STEPHEN P., Summit, Biochemistry.  
COHAN, MORTON D., Bayonne, Engineering.  
DARLINGTON, RICHARD B., Woodstown, Psychology.  
DAVIS, BRIAN T. C., Summit, Earth Sciences.  
D'HEBENE, ROBERT N., New Vernon, Mathematics.  
FEIT, SIDNIE, Princeton, Mathematics.  
FRENCH, BEVAN M., Nutley, Earth Sciences.  
GILES, WILLIAM B., Newark, Mathematics.  
GILLE, JOHN C., Teaneck, Earth Science.  
GLUCK, HERMAN R., Princeton, Mathematics.  
GREENLEAF, NEWCOMB, Short Hills, Mathematics.  
HALL, DANIEL N., Princeton, Chemistry.  
HAYS, JAMES F., Short Hills, Earth Sciences.  
HUBER, DAVID, Toms River, Physics.  
JOHNSON, JOSEPH, Jr., Upper Montclair, Mathematics.  
JOHNSON, ROBERT P., Ridgefield Park, Chemistry.  
KALANTAR, KENNETH, New Brunswick, Chemistry.  
KOCH, JOHN F., Oakhurst, Physics.  
KOVER, WARNER B., Rochelle Park, Chemistry.  
LAIDLAW, WILLIAM J., Fair Lawn, Psychology.  
LARSEN, DAVID, Hawthorne, Physics.  
LOVELAND, ROBERT E., Camden, Zoology.  
MALLAY, JAMES F., Morris Plains, Engineering.  
MATHER, WILLIAM B., Jr., Princeton, Chemistry.  
MEANS, WINTHROP D., Summit, Earth Sciences.  
MENNITT, P. GARY, Bayville, Chemistry.  
RICHTER, WAYNE H., Leonia, Mathematics.  
RITCHIE, ROBERT W., Princeton, Mathematics.  
ROMBERG, BERNHARD W., Clifton, Mathematics.  
SANDERS, DAVID, Metuchen, Mathematics.  
SCHNITZER, HOWARD J., Newark, Physics.  
SILVERS, STUART, South Orange, Biochemistry.  
STEARNS, RICHARD E., Westfield, Mathematics.  
TRETIAK, OLEH J., Passaic, Engineering.  
VAUGHAN, WORTH E., Tenafly, Chemistry.  
WALDRON, SIDNEY R., Ringwood, Anthropology.  
WESNER, JOHN W., JR., Berkeley Heights, Engineering.

#### *Cooperative Graduate*

ARTIN, MICHAEL, Princeton, Mathematics.  
BLANCHARD, ANN M., Ramsey, Zoology.

BOHL, ROGER H., Trenton, Engineering.  
 BRADEN, ROBERT T., Princeton, Physics.  
 BUMBAY, RICHARD T., Princeton, Mathematics.  
 CANN, ROSS S., Ridgewood, Earth Sciences.  
 CRAWFORD, CHARLES K., South Orange, Engineering.  
 CRISBACHER, LOIS, New Brunswick, Chemistry.  
 DE HAAN, FRANKLIN P., Midland Park, Chemistry.  
 DEINDOERFER, FRED H., New Brunswick, Engineering.  
 EATON, PHILIP E., Budd Lake, Chemistry.  
 FLEISCHER, EVELY B., Livingston, Biochemistry.  
 HARDGRAVE, WILLIAM W., Caldwell, Engineering.  
 HERSH, REUBEN, Teaneck, Mathematics.  
 HOROWITZ, DANIEL H., Atlantic City, Earth Sciences.  
 HOWARD, JOHN H., Metuchen, Earth Sciences.  
 HULL, DAVID G., Westfield, Engineering.  
 HULL, FREDERICK H., Princeton, Engineering.  
 JEFFERSON, JAMES W., Westwood, Medical Sciences.  
 LITVAK, MARVIN, East Orange, Physics.  
 LOEFFLER, LARRY J., Hightstown, Chemistry.  
 MARIK, ROBERT H., Westfield, Engineering.  
 MASON, HOWARD L., Springfield, Engineering.  
 MITZNER, KENNETH M., East Paterson, Engineering.  
 PECINA, ROBERT G., Elizabeth, Engineering.  
 PEPPER, STEPHEN V., Margate City, Physics.  
 PETERSON, ERNEST A., New Brunswick, Psychology.  
 POLLAK, FRED H., West Orange, Physics.  
 RICHTER, G. PAUL, Plainfield, Chemistry.  
 RIEGER, PHILIP H., Teaneck, Chemistry.  
 ROSENTHAL, ELI, Newark, Chemistry.  
 ROTH, SHIRLEY H., Lakewood, Chemistry.  
 STAGAS, JAMES, Palisades Park, Physics.  
 SILVESTRI, ANTHONY J., Glassboro, Chemistry.  
 STEIGLITZ, KENNETH, West New York, Engineering.  
 TURNER, ROBERT E. L., Montclair, Mathematics.  
 WALSH, THOMAS E., Kearny, Physics.  
 WEISBERG, ROBERT A., Bayonne, Microbiology.  
 WIMER, CYNTHIA C., New Brunswick, Psychology.

#### *Postdoctoral*

ALBERSHEIM, PETER, Madison, Biochemistry.  
 BACHELOR, FRANK W., Carteret, Chemistry.  
 BERNSTEIN, JEREMY, Princeton, Physics.  
 GREENBERG, OSCAR W., Newark, Physics.  
 MENAKER, MICHAEL, Princeton, Zoology.  
 MILLER, ALLEN H., New Brunswick, Physics.  
 MORIARTY, ROBERT M., Princeton, Chemistry.  
 NEUWIRTH, LEE P., Princeton, Mathematics.  
 ROBLANSKY, JOHN D., Princeton, Biochemistry.

#### *Senior Postdoctoral*

KRUSKAL, MARTIN D., Princeton, Physics.

#### *Science Faculty*

BATHO, EDWARD H., Jersey City, Mathematics.  
 FABLES, DAVID G., Roselle, Botany.  
 LEVY, MARTIN J., Newark, Engineering.  
 PAPOULIS, ATHANASIOS, Palisade, Engineering.  
 PHILLIPS, JOY B., Morristown, Zoology.  
 TAYLOR, EDWARD C., Princeton, Chemistry.

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

ABRAHAM, BARBARA W., Madison, Physics.  
 ANDER, PAUL, New Brunswick, Chemistry.  
 BLANCHARD, ANN M., Ramsey, Zoology.  
 BODKIN, RONALD G., Wenonah, Econometrics.  
 BRUNO, GERALD A., Little Silver, Medical Sciences.  
 CAMPBELL, NEIL C., Teaneck, Engineering.  
 CRISBACHER, LOIS, New Brunswick, Chemistry.  
 DE FALCO, FRED, New Brunswick, Engineering.  
 FASSNACHT, JOHN H., Woodbury Heights, Chemistry.  
 FORREST, HELEN F., Upper Montclair, Zoology.  
 GIBSON, DANIEL M., JR., Trenton, Engineering.  
 GLEASON, ROBERT W., Somerville, Chemistry.  
 GREENBERG, EDWARD, West New York, Economics.  
 HAIDLE, CHARLES W., Annandale, Microbiology.  
 HAINES, DONALD B., Mount Holly, Psychology.  
 HULL, FREDERICK H., Princeton, Engineering.  
 ILLINGER, KARL H., West Orange, Chemistry.  
 KERR, JOHN P., Nutley, Zoology.  
 KLEINFELTER, DONALD C., Princeton, Chemistry.  
 KOWAL, NORMAN E., Rochelle Park, Botany.  
 LLOYD, JAMES N., Dover, Physics.  
 MCHAFFEY, RONALD A., New Brunswick, Mathematics.  
 MOLNAR, DONNA A., Woodbridge, Biochemistry.  
 MUTCH, THOMAS A., Princeton, Earth Sciences.  
 ORNA, MARY V., Nutley, Chemistry.  
 ORTH, GERTRUDE M., Passaic, Biochemistry.  
 PERRY, CLARK W., Ridgefield, Chemistry.  
 POWER, JOHN L., Short Hills, Chemistry.  
 SCHMIDT, RICHARD A., Roselle Park, Earth Sciences.  
 WIMER, CYNTHIA C., New Brunswick, Psychology.

#### *Summer Fellowships for Secondary School Teachers*

BORST, KENNETH E., Leonia, Chemistry.  
 BUSCEMI, THOMAS V., Clayton, Mathematics.  
 CLEVELAND, RAY W., Rahway, Mathematics.  
 CONBOY, ST. REGINA CORDIS, S.C., Westfield, Physics.  
 DIMONT, JULIUS, Jersey City, General Biology.  
 KUTNER, PHILIP, Bergen County, Earth Sciences.  
 MAGID, EMANUEL, Newark, Mathematics.  
 MOLL, Sr. M. JULIANA, O.S.B., Elizabeth, Mathematics.  
 PAPARELLO, FRANK N., Montclair, Zoology.  
 RODDY, JACQUELINE A., Long Branch, General Biology.  
 SHAFFREY, Sr. MARY GERMAINE, Fort Lee, Mathematics.

#### *NEW MEXICO*

##### *Graduate*

DIEBOLD, ROBERT E., Los Lunas, Physics.  
 HARRIS, ARTHUR H., Albuquerque, Zoology.  
 WALSH, JOSEPH M., Santa Fe, Biochemistry.

##### *Cooperative Graduate*

PIERCE, ALLAN D., Las Cruces, Physics.  
 TAYLOR, JOHN F., Albuquerque, Engineering.



### Senior Postdoctoral

KUILLMER, FREDERICK J., Socorro, Earth Sciences.

### Science Faculty

JANZA, FRANK J., Albuquerque, Engineering.

### Summer Fellowships for Graduate Teaching Assistants

POORBAUGH, JOHN H., Roswell, Zoology.  
WIDDISON, JEROLD G., Albuquerque, Geography.

### Summer Fellowships for Secondary School Teachers

BARKER, LEWIS L., Hobbs, Physics.  
COOPER, JOHN R., Jal, Mathematics.  
HIGGINS, M. LOUISE, Tucumcari, Botany.  
MOSES, ANDREW D., Corona, General Science.  
NEAL, RICHARD W., Albuquerque, General Biology.  
ROZEMA, WESLEY J., Zuni, Mathematics.

### NEW YORK

#### Graduate

ALFF, CYNTHIA, Long Island City, Physics.  
ANDERSON, CHARLES H., Briarcliff Manor, Physics.  
ARNUSH, DONALD, New York, Physics.  
BARAFF, GENE A., Elmhurst, Physics.  
BARTLETT, DAVID F., New York, Physics.  
BATTERMAN, STEVEN C., Brooklyn, Engineering.  
BAUER, VICTOR J., White Plains, Chemistry.  
BAUM, PAUL F., New York, Mathematics.  
BECK, BERNARD, Bronx, Quantitative Sociology.  
BERNICE, RONALD J., Buffalo, Mathematics.  
BERSOHN, MALCOLM, New York, Chemistry.  
BIENENSTOCK, ARTHUR, New York, Physics.  
BLACK, FISCHER S., Jr., Bronxville, Physics.  
BLATT, JOEL, Beechhurst, Physics.  
BLOOM, DAVID M., New York, Mathematics.  
BOIKESS, ROBERT S., Brooklyn, Chemistry.  
BOYLAN, EDWARD S., New York, Mathematics.  
BRAY, RICHARD C., New York, Biochemistry.  
BUHRER, CARL F., Hempstead, Chemistry.  
BUTENSKY, MARTIN, Brooklyn, Engineering.  
CARROLL, ALAN S., Rochester, Physics.  
CASEY, KENNETH, Jackson Heights, Mathematics.  
CATANIA, A. CHARLES, New York, Psychology.  
CHASE, STEPHEN U., New York, Mathematics.  
COHEN, H. DANIEL, Larchmont, Physics.  
COHEN, JULIA, Larchmont, Zoology.  
COHEN, NATALIE S., Floral Park, Medical Sciences.  
COMLY, JAMES B., Bayside, Engineering.  
CONSIDINE, JAMES P., New York, Chemistry.  
COOK, DAVID M., Troy, Physics.  
DAVIS, PERCIVAL W., Jr., Port Washington, Zoology.  
DAWSON, ROBERT L., Rochester, Chemistry.  
DJORUP, FRANS M., Jr., Ithaca, Mathematics.  
DOBBINS, ROBERT R., S.J., Shrub Oak, Physics.  
DOSTIS, IRVING, Brooklyn, Engineering.  
DOUGHERTY, HARRY W., Brooklyn, Biochemistry.  
DWOJIN, LOWELL, Brooklyn, Physics.  
EICHBERG, JOSEPH, Jr., Great Neck, Medical Sciences.  
EISENBERG, JUDAH M., Forest Hills, Physics.  
ENGELS, JOAN, Malverne, Earth Sciences.  
FAGAN, JOHN J., New York, Earth Sciences.

FELDMAN, MARTIN, Brooklyn, Physics.  
FELDMAN, MARTIN, New York, Chemistry.  
FELDMAN, MARVIN, Brooklyn, Engineering.  
FERZIGER, JOEL H., Brooklyn, Engineering.  
FINE, TERRENCE L., New York, Engineering.  
FRANCO, VICTOR, New York, Physics.  
FRANKEL, JOSEPH, New York, Zoology.  
FRED, JACK, Brooklyn, Chemistry.  
FRUCHTBAUM, HAROLD, Brooklyn, History of Science.  
FUCHS, NORMAN H., Staten Island, Physics.  
GALLANT, JONATHAN A., Mount Vernon, Genetics.  
GEORGE, ALBERT R., Jr., Carle Place, Engineering.  
GIBSON, EDWARD G., Kenmore, Engineering.  
GILBERT, GERALD B., Slaterville Springs, Engineering.  
GILBERT, IRA H., Jamaica, Physics.  
GINSBERG, EDWARD, New York, Physics.  
GOLDBERG, CHARLES, Brooklyn, Mathematics.  
GOLDSTEIN, PAUL, Brooklyn, Chemistry.  
GOLUB, ROBERT, New York, Engineering.  
GRANT, DAVID C., Rockville Centre, Zoology.  
GROSS, LUCY M., Williamsville, Chemistry.  
GRUHN, RUTH, Cornwall on Hudson, Anthropology.  
HAHN, ROGER, Ithaca, History of Science.  
HALPERN, ALVIN, Bronx, Physics.  
HANDEL, DAVID, Flushing, Mathematics.  
HARMAN, MARY E., Brooklyn, Zoology.  
HARRINGTON, DAVID R., North Tonawanda, Physics.  
HARRIS, CHARLES S., Great Neck, Psychology.  
HARTE, KENNETH J., Mount Vernon, Physics.  
HERZOG, STANLEY, New York, Engineering.  
HILL, CHARLES G., Elmira, Engineering.  
HOFF, MARCIAN E., Jr., Rochester, Engineering.  
HOLZEMAN, ERIC, Bronx, Zoology.  
HORTMANN, ALFRED G., Woodside, Chemistry.  
KAHN, DANIEL S., Brooklyn, Mathematics.  
KAISER, ROBERT, New York, Engineering.  
KARG, GERHART, New York, Chemistry.  
KESSLER, DIETRICH, Hamilton, Microbiology.  
KORENMAN, VICTOR, Brooklyn, Physics.  
KRAMER, GORDON, Brooklyn, Physics.  
KRIEGER, JOSEPH, Brooklyn, Physics.  
KRIPKE, BERNARD, Scarsdale, Mathematics.  
KUSCH, KATHRYN, New York, Chemistry.  
LANDE, ALEXANDER, New York, Physics.  
LANDSMAN, EMANUEL, New York, Engineering.  
LARCHER, ROBERT H., New York, History of Science.  
LARRABEE, ALLAN R., Great Neck, Biochemistry.  
LEERMAKERS, PETER, Rochester, Chemistry.  
LEIBOWITZ, GERALD, New York, Mathematics.  
LEIF, ROBERT C., New York, Biochemistry.  
LENT, ARNOLD, New York, Engineering.  
LEVIEN, ROGER E., Brooklyn, Engineering.  
LEVINE, ISAAC J., New York, Chemistry.  
LEVINS, RICHARD, New York, Genetics.  
LEVY, JEROME F., Mt. Vernon, Chemistry.  
LEVY, PETER M., New York, Engineering.  
LEWIS, FRANCIS H., East Aurora, Physics.  
LIEBLING, GERALD, Brooklyn, Chemistry.  
LOWENTHAL, FRANKLIN, New York, Physics.  
MAGID, RONALD, Rego Park, Chemistry.  
MARIANO, CHARLES, Long Island City, Physics.  
MASTERS, MILLIE, Flushing, Biochemistry.  
MAYER, ALAN L., Flushing, Mathematics.  
MCCABE, JOHN P., New York, Mathematics.

MCLEOD, DONALD W., Ithaca, Physics.  
 MEYER, STUART L., New York, Physics.  
 MILLER, WILLIAM H., S.J., Shrub Oak, Physics.  
 MITTMAN, CALVIN, Brooklyn, Mathematics.  
 MONSKY, PAUL, Queens, Mathematics.  
 MYERS, ROBERT A., Mount Vernon, Physics.  
 NIBLACK, WALTER K., Buffalo, Physics.  
 NILSSON, WILLIAM A., Middlevillage, Chemistry.  
 NORDLANDER, J. ERIC, Schenectady, Chemistry.  
 NOVIN, DONALD, Brooklyn, Psychology.  
 OSOFSKY, ABRAHAM J., Ithaca, Engineering.  
 OSOFSKY, BARBARA L., Ithaca, Mathematics.  
 PANKIWSKYJ, KOST A., Larchmont, Earth Sciences.  
 PHINNEY, ROBERT A., Rochester, Earth Sciences.  
 PIERSON, EDWARD S., Syracuse, Engineering.  
 PLATEK, WALTER A., Buffalo, Chemistry.  
 POULSON, THOMAS L., Manhasset, Zoology.  
 RICHER, IRA, New York, Engineering.  
 RIND, KENNETH, Brooklyn, Chemistry.  
 RINDE, JOHN J., New York, Engineering.  
 ROSEN, ALLAN J., New York, Chemistry.  
 RUBENFELD, FRANK A., New York, Psychology.  
 RUSSIN, BRENDA, Brooklyn, Psychology.  
 SACKS, GERALD E., Ithaca, Mathematics.  
 SALTHER, STANLEY N., Brooklyn, Zoology.  
 SANDY, FRANK, New York, Physics.  
 SCADUTO, FLORENCE C., Seaford, Chemistry.  
 SCHEELE, GEORGE F., Yonkers, Engineering.  
 SCHEINBAUM, MONTE L., Brooklyn, Chemistry.  
 SCHILDKRAUT, CARL, Woodmere, Chemistry.  
 SCHIEME, EUGENE E., Flushing, Chemistry.  
 SCHULT, ROY L., Geneva, Physics.  
 SCHULTZ, JONAS, New York, Physics.  
 SCHUSTER, DAVID I., Cedarhurst, Chemistry.  
 SCHWEITZER, PAUL A., Pelham, Mathematics.  
 SEGRE, GINO, Peekskill, Physics.  
 SHAKIN, CARL, New York, Physics.  
 SHELUPSKY, DAVID I., Brooklyn, Physics.  
 SHEPP, LAWRENCE, Brooklyn, Mathematics.  
 SILVER, BETTE, New York, Mathematical Economics.  
 SMITH, DAVID Y., Schenectady, Physics.  
 SNELLGROVE, RICHARD A., Mount Vernon, Chemistry.  
 SOCOLOW, ROBERT H., New York, Physics.  
 SOVERS, OJARS J., Brooklyn, Chemistry.  
 STERNHEIM, MORTON M., New York, Physics.  
 STRAUSS, HERBERT L., Kew Gardens, Chemistry.  
 STRAUSS, WALTER A., Kew Gardens, Mathematics.  
 STURN, ANNA MARIE, Richmond Hill, Genetics.  
 SUTHERLAND, IVAN E., Scarsdale, Engineering.  
 TANNENBAUM, MICHAEL J., Bronx, Physics.  
 TAYLOR, TERLA, New York, Mathematics.  
 THOMPSON, PHILIP A., Berlin, Engineering.  
 THORNDIKE, EDWARD H., Montrose, Physics.  
 TOWELL, DAVID G., Fillmore, Earth Sciences.  
 VINCOV, GERSHON, Forest Hills, Chemistry.  
 WAHLIG, MICHAEL A., Woodside, Physics.  
 WATSON, GEORGE E., III, New York, General Biology.  
 WEBB, JULIAN P., Rochester, Physics.  
 WEINBAUM, SHELDON, Brooklyn, Engineering.  
 WEININGER, STEPHEN J., Whitestone, Chemistry.

WEISBERGER, WILLIAM, Scarsdale, Physics.  
 WHINSTON, ANDREW, Flushing, Mathematical Economics.  
 WILLOUGHBY, GRACE, New York, Chemistry.  
 ZVENGROWSKI, PETER D., Bronx, Mathematics.  
*Cooperative Graduate*  
 ANDERSON, CARL A., Jr., Sound Beach, Engineering.  
 AX, JAMES, New York, Mathematics.  
 BARBETTA, RAYMOND J., Green Island, Engineering.  
 BARONE, STEPHEN R. J., Brooklyn, Physics.  
 BAYLESS, BRUCE J., Syracuse, Agriculture.  
 BEAK, PETER A., Syracuse, Chemistry.  
 BECK, SIDNEY L., New York, Genetics.  
 BENNETT, STEWART, Ithaca, Physics.  
 BERGER, CHARLES A., Brooklyn, Mathematics.  
 BERNABEI, BRO. AUSTIN, Riverdale, Physics.  
 BERNOLD, STANLEY, Flushing, Earth Sciences.  
 BOLLINGER, JOHN G., Manhasset, Engineering.  
 BRAGG, LINCOLN E., Orchard Park, Mathematics.  
 BRESLAU, MICHAEL, Flushing, Engineering.  
 BRIGGS, JAMES E., Glen Cove, Engineering.  
 BRODY, NATHAN, Brooklyn, Psychology.  
 BROEK, HOWARD W., Bronxville, Physics.  
 BROGAN, THOMAS R., Syracuse, Engineering.  
 BRYANT, CYRUS A., Almond, Physics.  
 CAVETT, ROBERT H., Troy, Engineering.  
 CHERN, BERNARD, Brooklyn, Physics.  
 CLORFEINE, ALVIN S., Long Island City, Engineering.  
 COTTER, MAURICE J., Astoria, Physics.  
 CURRIE, DOUGLAS G., Rochester, Physics.  
 DAVIS, JOEL, Ontario, Physics.  
 DEAN, SHELDON W., Jr., Flushing, Engineering.  
 DEMETRIOU, PETER, Brooklyn, Engineering.  
 DENSLow, LATHROP V., Brooklyn, Earth Sciences.  
 DRISCOLL, JOHN D., Far Rockaway, Mathematics.  
 EHRLICH, DAVID, Brooklyn, Mathematics.  
 EIDSON, JOHN C., Scarsdale, Engineering.  
 EINHORN, JANE W., New York, Psychology.  
 ENGELHART, JOHN E., Woodhaven, Chemistry.  
 ESRIG, MELVIN I., Long Beach, Engineering.  
 FALB, PETER L., Brooklyn, Mathematics.  
 FINNERTY, ANTHONY E., Brooklyn, Chemistry.  
 FITCHEN, DOUGLAS B., New York, Physics.  
 FLEISCHER, HENRY, Jackson Heights, Chemistry.  
 FOX, JOEL S., Brooklyn, Engineering.  
 FREDDMAN, STEVEN I., New York, Engineering.  
 GASSMAN, PAUL G., Ithaca, Chemistry.  
 GASTWIRTH, JOSEPH L., Rego Park, L.I., Mathematics.  
 GEISS, GUNTHER R., Richmond Hill, L.I., Engineering.  
 GELERINTER, EDWARD, Bronx, Physics.  
 GELMAN, HARRY, New York, Physics.  
 GERSHENSON, HILLEL H., New York, Mathematics.  
 GERSTEIN, IRA S., Rego Park, L.I., Physics.  
 GILLESPIE, JOHN R., Kenmore, Physics.  
 GILLMAN, DAVID S., Woodmere, Mathematics.  
 GLASS, GEORGE, New York, Physics.  
 GOLD, PHILLIP J., New York, Mathematics.  
 GREENE, SAMUEL L., Syracuse, Physics.  
 GROSSER, ARTHUR E., Brooklyn, Chemistry.

- GRUENFELD, NORBERT, New York, Chemistry.  
 GUSTAVSON, FRED G., Yonkers, Mathematics.  
 HARRINGTON, JOSEPH J., Brooklyn, Engineering.  
 HARTMANN, ALOIS J., Staten Island, Engineering.  
 HERBERT, JOYCE M., Buffalo, Chemistry.  
 HERZBERG, NORMAN P., Brooklyn, Mathematics.  
 HESKETH, JOHN D., Ithaca, Agriculture.  
 HIRSCHFELD, WILLIAM J., Whitestone, Zoology.  
 HOOK, SUSAN A., Port Washington, Mathematics.  
 HORNREICH, RICHARD M., Bronx, Engineering.  
 HULTQUIST, DONALD E., Jamestown, Biochemistry.  
 JACOBOWITZ, RONALD, Flushing, Mathematics.  
 JOHNSON, STANLEY L., Ithaca, Biochemistry.  
 JORDAN, NEAL F., Buffalo, Engineering.  
 KALANTAR, ALFRED H., Ithaca, Chemistry.  
 KARASS, ABRAHAM, Brooklyn, Mathematics.  
 KART, MERNA R., Flushing, Biology.  
 KATZPER, MEYER, Bronx, Physics.  
 KENEDY, ROSEMARY, New York, Zoology.  
 KIVELEVICH, DORIS, Yonkers, Chemistry.  
 KRUMBEIN, SIMEON J., Brooklyn, Chemistry.  
 KUBIS, JOSEPH J., Brooklyn, Physics.  
 KUBY, GEORGE H., Bronx, Mathematics.  
 LASHER, RICHARD J., Germantown, Engineering.  
 LEVINE, ELLIOT M., Bayside, Biochemistry.  
 LEVINE, EUGENE, Brooklyn, Mathematics.  
 LEVY, LAWRENCE S., Brooklyn, Mathematics.  
 LEVY, PAUL F., Bronx, Biochemistry.  
 LIDSKY, LAWRENCE M., Queens, Engineering.  
 LIFF, ALLAN I., New York, Engineering.  
 LINDBERG, JOHN A., Jr., Brooklyn, Mathematics.  
 LINTON, FRED E. J., New York, Mathematics.  
 LINZER, MELVIN, Brooklyn, Chemistry.  
 LOGCHER, ROBERT D., Scarsdale, Engineering.  
 LOSTAGLIO, VINCENT J., Woodside, Chemistry.  
 LUBELL, DAVID, Brooklyn, Mathematics.  
 LUBIN, JONATHAN D., Staten Island, Mathematics.  
 LUBOWE, ANTHONY G., New York, Engineering.  
 MALANIFY, JOHN J., Troy, Physics.  
 MARCUS, BRUCE D., Ithaca, Engineering.  
 MCCracken, DANIEL D., Ossining, Mathematics.  
 MIDLER, MICHAEL, Jr., New Rochelle, Engineering.  
 MILLER, AUDREY E., Chappaqua, Chemistry.  
 MORSIK, FREDERICK L., Forest Hills, Chemistry.  
 MORAN, JAMES P., Jr., Brooklyn, Chemistry.  
 MOSHER, ROBERT E., Larchmont, Mathematics.  
 MULLANEY, PAUL F., Staten Island, Physics.  
 NIEDERCORN, JOHN H., Pearl River, Economics.  
 NOVICK, AARON J., Brooklyn, Physics.  
 O'BRIEN, ROBERT E., New York, Chemistry.  
 O'MALLEY, THOMAS F., New York, Physics.  
 OWELLEN, RICHARD J., Rochester, Chemistry.  
 PADNOS, NORMAN, Brooklyn, Chemistry.  
 PARKER, ALFRED B., Jamestown, Earth Sciences.  
 PEREL, JAMES M., Bronx, Chemistry.  
 PERRY, FREDERICK W., Holley, Engineering.  
 PETERSON, SUZANNE C., Jamestown, Chemistry.
- PIRONE, THOMAS P., New York, Botany.  
 PITTARO, MAURO J., Jr., Long Island City, Engineering.  
 PRINZ, MARTIN, New York, Earth Sciences.  
 REIFENBERG, GERALD H., Brooklyn, Chemistry.  
 REMINI, WILLIAM C., Long Island City, Engineering.  
 RESSLER, ROBERT H., New York, Psychology.  
 RICKERT, RICHARD M., Brooklyn, Engineering.  
 RIEGELHAUPT, JOYCE F., Rego Park, L.I., Anthropology.  
 ROHAN, DENNIS M., Middletown, Engineering.  
 ROSE, ROBERT M., Flushing, Engineering.  
 ROSEN, ERWIN S., New York, Psychology.  
 ROSS, DONALD C., Rochester, Psychology.  
 ROST, ERNEST S., New Paltz, Physics.  
 ROTHSCHILD, WALTER G., New York, Chemistry.  
 SARASON, LEONARD, Rego Park, L.I., Mathematics.  
 SCHLEE, FRANK H., Flushing, Engineering.  
 SCHWARTZ, WALTER L., Brooklyn, Engineering.  
 SCHULZE, ARTHUR W., Forest Hills, Chemistry.  
 SIBNER, ROBERT J., New York, Mathematics.  
 SIEBERT, BIRGID M., Newburgh, Physics.  
 SILVERMAN, SYDEL F., New York, Anthropology.  
 SMOLINSKY, BARBARA L., New York, Chemistry.  
 SOBEL, ALAN, Brooklyn, Physics.  
 SOLOMON, LEONARD, Brooklyn, Chemistry.  
 STEIN, REINHARDT P., Middletown, Chemistry.  
 STEINBERG, ARTHUR, Brooklyn, Mathematics.  
 STEINBERG, NAOMI, New York, Chemistry.  
 STEVENS, ALAN M., New York, Anthropology.  
 STRIFER, WILLIAM, New York, Engineering.  
 TEIGER, MARTIN L., Brooklyn, Physics.  
 THIBLE, EVERETT A., Roslyn Heights, Chemistry.  
 TREANOR, KATHERINE P., Buffalo, Genetics.  
 TSANG, WING, Forest Hills, Chemistry.  
 VOLKER, RONALD E., Lancaster, Engineering.  
 WAGNER, LEONARD S., Ithaca, Engineering.  
 WALSH, JOHN F., New York, Psychology.  
 WECKER, STANLEY C., New York, Zoology.  
 WEISMAN, ROBERT A., Kingston, Biochemistry.  
 WELT, CAROL, New York, Anthropology.  
 WIDMIER, J. MICHAEL, Cortland, Earth Sciences.  
 WORTIS, MICHAEL, New York, Physics.  
 WORTIS, ROCHELLE P., New York, Psychology.  
 YOUNGER, DANIEL H., Flushing, Engineering.  
 ZELNY, WILLIAM B., Syracuse, Physics.
- Postdoctoral*
- BARSHAY, SAUL, Beacon, Physics.  
 BEHRENS, RALPH E., East Patchogue, Physics.  
 BOCK, WALTER J., Woodhaven, Zoology.  
 BROWDER, WILLIAM, Ithaca, Mathematics.  
 BURNETT, ALLISON L., Ithaca, Zoology.  
 BYRON, JOSEPH W., New York, Medical Sciences.  
 ECKERT, ROGER O., New York, Zoology.  
 ERTEL, NORMAN H., Brooklyn, Medical Sciences.  
 FLEISCHMAN, JULIAN B., Riverdale, Biochemistry.  
 GLIMM, JAMES G., New York, Mathematics.  
 GOLDMAN, NORMAN L., Brooklyn, Chemistry.

GOODMAN, JOEL W., Brooklyn, Microbiology.  
HAJIAN, ARSHAG B., Rochester, Mathematics.  
JOHNSGARD, PAUL A., Ithaca, Zoology.  
KRISHNER, LAWRENCE C., Livonia, Chemistry.  
LANDAU, HENRY J., New York, Mathematics.  
LIGHT, JOHN C., Mount Vernon, Chemistry.  
MARVIN, DONALD A., Chappaqua, Biophysics.  
MATIN, LEONARD, Bronx, Psychology.  
MCCUMBER, DEAN E., Rochester, Physics.  
MITTA, LAURENCE, Brooklyn, Physics.  
SCHULTZ, SHELDON, NEW YORK, Physics.  
SCHWENDINGER, RICHARD B., Bronx, Agriculture.  
STAFFORD, FRED E., Bronx, Chemistry.  
STERNBERG, SAUL H., New York, Psychology.  
TAYLOR, HOWARD S., New York, Chemistry.  
WEISS, JANE M., Brooklyn, Psychology.  
WELLNER, MARCEL N., Great Neck, Physics.  
WEST, LA MONT JR., Saranac Lake, Anthropology.  
WIDOM, HAROLD, Ithaca, Mathematics.  
WONG, EUGENE, New York, Engineering.  
YOUNG, RICHARD W., New York, Medical Sciences.

#### *Senior Postdoctoral*

BUFF, FRANK P., Rochester, Chemistry.  
COBLISS, LESTER M., Blue Point, L.I., Chemistry.  
DINN, WILLIAM L., Brooklyn, Earth Sciences.  
FRENCH, JAMES B., Rochester, Physics.  
FULLER, R. CLINTON, Shoreham, L.I., Biochemistry.  
GROSS, ROBERT A., Huntington, Engineering.  
HAVENS, WILLIAM W., Jr., Dobbs Ferry, Physics.  
HELLMAN, C. DORIS, New York, History of Science.  
HOBERMAN, HENRY D., Scarsdale, Biochemistry.  
KAPLON, MORTON F., Rochester, Physics.  
ROTHSTEIN, ASER, Rochester, Medical Science.  
SCHNEIDERMAN, HOWARD A., Ithaca, Zoology.  
SINGER, MARCUS, Ithaca, Medical Science.  
STEINBERGER, JACK, Hastings, Physics.  
THOMPSON, JOHN F., Ithaca, Biochemistry.

#### *Science Faculty*

AARONSON, SHELDON, Jericho, L.I., Microbiology.  
BAKER, ROBERT C., Ashville, Engineering.  
BEEMAN, ELIZABETH A., Yonkers, Zoology.  
BENUMOF, REUBEN, Long Island City, Physics.  
BRENOWITZ, HARRY, No. Merrick, L.I., Zoology.  
CHILDS, WYLIE J., Schenectady, Engineering.  
DUTCHER, BARRY C., Waterloo, Mathematics.  
GREENWALD, DAKOTA U., Syracuse, Mathematics.  
HARDY, TRULY C., New York, Physics.  
HART, HIRAM E., New York, Biophysics.  
KATZ, J. LAWRENCE, Troy, Chemistry.  
KING, EDWARD J., New York, Chemistry.  
KING, RENO C., New York, Engineering.  
KRAUSE, IRVIN, Bronx, Engineering.  
KURZ, LUDWIK, New York, Engineering.  
LEWIS, CHARLES J., New York, Mathematics.  
MCDONALD, JANET, Poughkeepsie, Mathematics.  
MICHON, CATHERINE A., Schenectady, Medical Science.  
MODREY, JOSEPH, Schenectady, Engineering.  
PETRO, LOUIS G., Jamestown, Engineering.

POTTER, LOUISE F., Poughkeepsie, Microbiology.  
READ, ALBERT J., Oneonta, Physics.  
RICHARDSON, MOSES, Brooklyn, Mathematics.  
SALETAN, EUGENE J., Crompond, Physics.  
VEIGEL, WILLIAM J., Thornwood, Physics.  
VITAGLIANO, VINCENT J., Mount Vernon, Engineering.  
WEBER, ROBERT L., Ithaca, Engineering.

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

ADLER, IRVING, Bayside, L.I., Mathematics.  
BARRETO, DELIA M., Manhasset, Zoology.  
BIESTERFELDT, HERMAN J., Jr., Woodhaven, Mathematics.  
BISHOP, GEORGE H., Jr., Elmira, Engineering.  
BRAUNER, JOSEPH W., Rochester, Chemistry.  
BROOKS, KATHERINE, Rochester, Genetics.  
BURTON, DONALD J., Ithaca, Chemistry.  
BURTON, MARTHA B., Rochester, Mathematics.  
CHERN, BERNARD, Brooklyn, Physics.  
CHILTON, BRUCE L., Tonawanda, Mathematics.  
COTTER, MAURICE J., Astoria, Physics.  
CURRIE, DOUGLAS G., Rochester, Physics.  
DAVIS, ROBERT P., Ithaca, Zoology.  
DE LUCA, DONALD C., Sharon Springs Chemistry.  
DE POE, CHARLES E., Southampton, Botany.  
DOUGHERTY, THOMAS J., Buffalo, Chemistry.  
DRISCOLL, JOHN S., Jamestown, Chemistry.  
DU BRIN, ANDREW J., New York, Psychology.  
FICKLER, STUART I., Syracuse, Physics.  
GANLEY, WILLIAM P., North Tonawanda, Physics.  
GELMAN, HARRY, New York, Physics.  
GILLESPIE, JOHN R., Kenmore, Physics.  
GILLMAN, DAVID S., Woodmere, Mathematics.  
GOLDSTEIN, MARVIN S., Ellenville, Chemistry.  
GORMAN, ANTHONY L., Rochester, Psychology.  
GREEN, JONATHAN P., Great Neck, L.I., Zoology.  
GREENWALT, BOYD R., Syracuse, Botany.  
GRIERSON, JAMES D., Jr., Ithaca, Botany.  
GRUENBERG, LEONARD W., Brooklyn, Physics.  
HARRIS, MORTON E., Brooklyn, Mathematics.  
HOFFMAN, MORTON Z., New York, Chemistry.  
ISAAC, RICHARD E., New York, Mathematics.  
ISAACSON, ROBERT B., New York, Chemistry.  
KAZAN, JOHN, High Falls, Chemistry.  
LAPORTE, LEO F., New York, Earth Sciences.  
LEROI, GEORGE E., Peekskill, Chemistry.  
LEVINE, ELLIOT M., Bayside, L.I., Biochemistry.  
LEVY, LAWRENCE S., Brooklyn, Mathematics.  
LIST, ALBERT, Jr., Ithaca, Botany.  
LONGOSZ, EDWARD J., Rochester, Chemistry.  
MCMANUS, LAWRENCE R., Ithaca, Zoology.  
MORRISON, HARRY, Brooklyn, Chemistry.  
POPE, DANIEL L., Ithaca, Engineering.  
PRINZ, MARTIN, New York, Earth Sciences.  
REDLICH, ROBERT W., Troy, Physics.  
RUSH, FRANCIS T., Brooklyn, Mathematics.  
RUSZKAY, RICHARD J., New York, Engineering.  
SANDVIK, ERIK I., Rochester, Chemistry.  
SCARFONE, LEONARD M., Troy, Physics.  
SCHER, HARVEY, Syracuse, Physics.  
SCHWARTZ, LEONARD H., New York, Chemistry.

- SCOTTI, FRANK, West Babylon, L.I., Chemistry.
- SEDLAK, JOHN A., Peekskill, Chemistry.
- SHORTT, BRIAN A., New Rochelle, Physics.
- SILVERMAN, ARNOLD J., Brooklyn, Earth Sciences.
- SMITH, JOHN H., Ithaca, Mathematics.
- STEIN, REINHARDT P., Middletown, Chemistry.
- STEINBERGER, NAOMI, New York, Chemistry.
- STERNLICHT, HIMAN, New York, Chemistry.
- SWENEY, DONALD R., Floral Park, L.I., Psychology.
- TEICHMAN, PAUL, Brooklyn, Physics.
- TILSON, SEYMOUR, New York, Earth Sciences.
- TUFARIELLO, JOSEPH J., Bayside, L.I., Chemistry.
- WEBER, DUDLEY L., Rego Park, L.I., Medical Sciences.
- YASSO, WARREN E., Brooklyn, Earth Sciences.
- ZBLENY, WILLIAM B., Syracuse, Physics.
- Summer Fellowships for Secondary School Teachers*
- ADLER, RUTH R., Rockville Centre, L.I., Mathematics.
- ALEXANDER, SAM, New York City, Mathematics.
- ALPER, LOUIS, Brooklyn, Chemistry.
- AUERBACH, LOUIS, Elmhurst, Chemistry.
- BACKAL, BLOSSOM L., Long Island City, Mathematics.
- BALL, Sr. SAINT AUGUSTINE, Buffalo, Mathematics.
- BANTLE, RAYMOND O., Fairport, Earth Sciences.
- BERGLASS, ISIDORE M., Long Beach, L.I., Mathematics.
- BERWIND, Sr. HELEN CECILIA, S.S.J., Geneva, Physics.
- BRESLAU, ABRAHAM, Brooklyn, Earth Sciences.
- BROCH, EDMUND S., Saranac Lake, General Biology.
- BUCHMAN, AARON L., Buffalo, Mathematics.
- BUGLIOSI, ETTORE, Clifton Springs, Botany.
- BURGDORF, OTTO P., Long Island City, Chemistry.
- CONNELLY, Sr. MARY EDWARD, Rochester, Earth Sciences.
- CUMMINGS, Sr. M. ALICE VERONICA, Rome, Chemistry.
- DOE, PAUL R., Hyde Park, Earth Sciences.
- DRISCOLL, Mother M. BRIGID, Tarrytown, Mathematics.
- FELDMAN, LOUIS H., Brooklyn, Physics.
- FIFE, ERNA J., Flushing, Mathematics.
- FOLSTER, KENNETH, Poughkeepsie, Physics.
- FRIIA, Sr. MARY LITA, S.S.N.D., Brooklyn, Chemistry.
- FUCHS, REUBEN, Jamaica, Microbiology.
- GALLO, ROBERT R., Clyde, Zoology.
- GANTERT, Sr. ANN XAVIER, Geneva, Mathematics.
- GARDNER, CLAYTON H., White Plains, Mathematics.
- GENISE, LOUIS R., Brentwood, Mathematics.
- GWIRTZ, HERMAN, New York City, Physics.
- GILBERT, ANN C., Brooklyn, Physics.
- GOODNESS, DEANE, Watertown, Mathematics.
- GOTTLIEB, MEYER L., New York City, General Biology.
- HABBE, LOUIS, White Plains, Biochemistry.
- HARRIS, SIDNEY P., Bayside, Chemistry.
- HECK, Rev. HARRY C., Bronx, Physics.
- HENDLER, HAROLD, Cambria Heights, Mathematics.
- HERRY, DONALD F., Lyndonville, Mathematics.
- HEYMONT, JOSEPH, Brooklyn, General Biology.
- HUFFMIRE, DONALD W., Walton, General Science.
- HUNT, PATRICIA C., Elmhurst, L.I., Mathematics.
- JABIN, BELMONT, Brooklyn, Mathematics.
- JAECKLE, Sr. MARY AQUIN, R.S.M., Rochester, Mathematics.
- JOSLIN, PAUL H., Elba, Earth Sciences.
- LENNON, Sr. MARY STANISLAUS, Rochester, Chemistry.
- LOVE, LEWIS E., Great Neck, L.I., General Biology.
- MALLEY, Sr. MARY AUGUSTINE, Rochester, General Biology.
- NASH, JAMES H., New York City, Mathematics.
- NICK, JOHN R., New York City, Mathematics.
- O'LOUGHLIN, THOMAS M., Homer, Mathematics.
- O'REGAN, PATRICK J., Armonk, Mathematics.
- PATTERSON, MAURICE L., Interlaken, Mathematics.
- PAYENSON, IRVING, Brooklyn, General Biology.
- PAYNE, HARRISON H., Pawling, General Biology.
- REYNOLDS, Sr. MARY PAUL, O.S.F., Hastings-on-Hudson, General Biology.
- ROTHMAN, IRWIN M., Brooklyn, Mathematics.
- RYAN, Bro. AGATHO JOHN, F.S.C., Newburgh, Mathematics.
- RYAN, Sr. M. JULIA, Rochester, Mathematics.
- SALISBURY, ROBERT L., Nedrow, Zoology.
- SAUER, HERBERT G., Cornwall-on-Hudson, Mathematics.
- SCHACKER, EMANUEL, New York City, Mathematics.
- SCHOR, HARRY, Brooklyn, Mathematics.
- SCHWARTZBURT, ALBERT N., Brooklyn, Mathematics.
- SOFFER, MURRAY B., New York City, Mathematics.
- STARKWEATHER, ALBERT W., Alexandria Bay, Mathematics.
- STEINBERG, JACOB, Brooklyn, Physics.
- STEINBERG, LEO L., Brooklyn, Physics.
- TUCKER, KATHARINE, Penfield, General Biology.
- WEINBERG, MORRIS, New York City, General Biology.
- WEINBERG, STANLEY L., New York City, Microbiology.
- WEISS, EMANUEL M., New York City, Physics.
- YOKER, JOHN F., So. Glens Falls, Earth Sciences.
- NORTH CAROLINA**
- Graduate*
- BREHME, ROBERT W., Chapel Hill, Physics.
- BRYANT, DAVID, Greensboro, Chemistry.
- DAVID, HOWARD T., Hendersonville, Chemistry.
- GRIFFITHS, PHILLIP A., Raleigh, Mathematics.
- HORNER, SALLY M., Chapel Hill, Chemistry.
- HOUSHOLDER, WILLIAM R., Jr., Asheville, Engineering.
- HUBBARD, ROBERT L., Chapel Hill, Physics.

LINDSLEY, DONALD H., Asheville, Earth Sciences.

LOHR, LAWRENCE L., Jr., Raleigh, Chemistry.  
NANNEY, CECIL A., Black Mountain, Physics.  
VAUGHAN, MAURICE H., Jr., Wilmington, Biophysics.

#### *Cooperative Graduate*

BAIRD, FRANCES G., Valdese, Chemistry.  
BURTON, PAUL R., Burnsville, Zoology.  
CATE, ROBERT B., Jr., Raleigh, Agriculture.  
FALLAW, WALLACE C., Hillsboro, Earth Sciences.

WALKER, W. SCOTT, Statesville, Physics.  
WRENCH, DAVID F., Chapel Hill, Psychology.  
WYKE, THOMAS F., Shelby, Engineering.

#### *Postdoctoral*

COWAN, MONROE J., Durham, Physics.  
LINK, WILLIAM J., North Wilkesboro, Chemistry.

NEWBORN, ANCEL C., Carrboro, Mathematics.  
RADLOW, ROBERT, Guilford College, Psychology.

WARNER, SETH L., Durham, Mathematics.

#### *Senior Postdoctoral*

BRADSHAW, CHARLES K., Durham, Chemistry.  
KRIGBAUM, WILLIAM R., Durham, Chemistry.

#### *Science Faculty*

GRAVES, ARTIS P., Greensboro, Zoology.  
HOWE, H. BRANCH, Jr., Winston-Salem, Botany.

MCCOLLUM, IRVING A., Durham, Mathematics.

MERZBACHER, EUGEN, Chapel Hill, Physics.  
PENDERGRAST, JAMES, Greensboro, Chemistry.

TOTTON, EZRA L., Durham, Chemistry.  
WILLIAMS, LEO, Jr., Greensboro, Engineering.

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

BISHIR, JOHN W., Raleigh, Mathematics.  
BURTON, PAUL R., Burnsville, Zoology.

DEARMAN, HENRY H., Statesville, Chemistry.  
FLANAGAN, DAVID L., Raleigh, Mathematics.  
FUNDERBURG, JOHN B., Jr., Castle Hayne, Zoology.

GOFORTH, SAMUEL T., Jr., Clemmons, Engineering.

JONES, LEONIDAS J., Warrenton, Engineering.

LINK, WILLIAM J., N. Wilkesboro, Chemistry.  
LOVEN, ANDREW W., Crossnore, Chemistry.  
NIXON, DAVID E., Charlotte, Mathematics.

#### *Summer Fellowships for Secondary School Teachers*

DULIN, PALMER M., Belmont, Mathematics.  
FOIL, WILLIAM C., Winston-Salem, General Biology.

FORD, JAMES R., Grifton, Mathematics.  
LEVI, LOUIS E., Charlotte, General Science.

SAMPSON, BENNY R., Pembroke, General Science.

SCOTT, JOHN N., Charlotte, Physics.

SPARROW, HILBURN, Reidsville, Mathematics.  
PYLES, JULIAN W., Charlotte, Physics.

#### **NORTH DAKOTA**

##### *Graduate*

NORRIS, JAMES, Fargo, Chemistry.  
SPANDE, THOMAS F., Mayville, Chemistry.  
UTGAARD, JOHN, Minot, Earth Sciences.

##### *Cooperative Graduate*

BUUS, ROBERT G., Grand Forks, Engineering.

LANCASTER, DOUGLAS A., Fargo, Zoology.  
MOHBERG, JOYCE, Milnor, Biochemistry.

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

SCHREIBER, PAUL O., Grand Forks, Engineering.

##### *Summer Fellowships for Secondary School Teachers*

BARRON, GEORGE L., Jamestown, General Science.

BLISS, HARALD N., Grafton, Physics.  
HANS, VALBORG, Wahpeton, Mathematics.

MUSCHA, Sr. ELIZABETH ROSE, Grafton, Mathematics.

SABBY, LELAND C., Valley City, Chemistry.

#### **OHIO**

##### *Graduate*

BALDWIN, CAROL, Beach City, Botany.

BEISNER, HENRY M., Tiffin, Physics.  
BERNDT, DONALD C., Toledo, Chemistry.

BERNER, ROBERT A., Cincinnati, Earth Sciences.

BESHINSKE, RAYMOND J., Cleveland, Chemistry.

BLOOM, SANFORD G., Columbus, Engineering.  
BROWN, THOMAS A., Dayton, Mathematics.

BURNETT, DONALD S., Dayton, Chemistry.  
BYRNE, RICHARD N., Columbus, Physics.

CARROLL, TOM W., Cincinnati, Engineering.  
CARRUTHERS, PETER A., Middletown, Physics.

COX, GEORGE W., Delaware, Zoology.  
DEUTSCH, ELIZABETH J., Shaker Heights, Zoology.

EK, FREDERICK L., Cuyahoga Falls, Physics.  
FOOTE, J. LINDSLEY, Cleveland, Chemistry.

FROMMER, GABRIEL P., Cincinnati, Psychology.

GRIFFIN, DAVID H., Cincinnati, Botany.  
HEMPFLING, WALTER P., Cincinnati, Microbiology.

HETRICK, EDWIN H., Fremont, Engineering.  
HORN, WILLIAM A., Cincinnati, Mathematics.

HUFF, ROBERT W., Canton, Physics.  
KEHOE, JAC S., Dayton, Psychology.

KOENIG, DONALD F., Cuyahoga Falls, Biophysics.

KRAMER, DAVID A., Cleveland, Physics.  
KRAPP, PAUL J., Springfield, Chemistry.

KREIMBER, H. FREDERICK, Jr., Cincinnati, Mathematics.

LEBOR, ANDREW S., Cincinnati, Physics.  
MARSHALL, THOMAS C., Cleveland, Physics.

MAWBY, JOHN E., Dayton, Earth Sciences.  
MENGERT, PETER, Painesville, Physics.

MENNINGER, JOHN R., Dayton, Biophysics.  
MERKEL, ARTHUR W., Cincinnati, Chemistry.

MESSINGER, JOHN C., Burton, Botany.  
NETTING, ROBERT M., Cincinnati, Anthropology.

NICHOLS, LARRY D., Xenia, Chemistry.  
NICHOLS, THOMAS S., Batavia, Chemistry.

PATTY, RICHARD R., Columbus, Physics.  
PELECH, IVAN, Cleveland, Engineering.

REILLY, BERNARD E., Cleveland, Microbiology.

SEIELSTAD, GEORGE A., Lakewood, Astronomy.

SLOAN, JAMES R., Shaker Heights, Mathematics.

SNIVELY, FRANK T., Yellow Springs, Physics.

- SORRELL, CHARLES A., Hamilton, Earth Sciences.
- SWEENEY, THOMAS L., Cleveland, Engineering.
- TAYLOR, LYNN J., Cuyahoga Falls, Chemistry.
- VANDEN EYNDEN, CHARLES, St. Bernard, Mathematics.
- WAGNER, WILLIAM F., Cincinnati, Engineering.
- WEBB, DAVID K., Jr., Chillicothe, Earth Sciences.
- YOUNG, ANDREW T., Massillon, Astronomy.
- YOUNG, PAUL, St. Marys, Mathematics.
- Cooperative Graduate*
- ARNSTEIN, WALTER, Cleveland Heights, Engineering.
- BEAN, RALPH J., Cleveland, Mathematics.
- BEARD, JAMES B., Bradford, Agriculture.
- BRANDTS, JOHN F., Celina, Chemistry.
- BRUNGS, WILLIAM A., Jr., Columbus, Genetics.
- BURK, CARL J., Troy, Botany.
- BUYANSKY, DONALD V., Cleveland, Engineering.
- CLARK, ALLAN H., Cincinnati, Mathematics.
- CORNELL, ROSS H., Bowling Green, Mathematics.
- CRANO, JOHN C., Euclid, Chemistry.
- CRUDEN, ROBERT W., Berea, Botany.
- DAMIAN, RAYMOND T., Akron, Zoology.
- ELLIS, DAVID G., Marietta, Physics.
- FELTY, EVAN J., Columbus, Chemistry.
- FINZEL, JEAN E., Westlake, Zoology.
- GIFFORD, PHILLIP H. II, Worthington, Engineering.
- GWYNN, DONALD E., Columbus, Chemistry.
- HAYBRON, RONALD M., Zanesville, Physics.
- HEINTZ, ROGER L., Jackson Center, Biochemistry.
- HERBERT, NICHOLAS C., Columbus, Physics.
- HUHEY, JAMES E., Batavia, Chemistry.
- JULYAN, FREDERICK J., Columbus, Zoology.
- KHOE, BRANDT, Dayton, Physics.
- KELLER, JAMES M., Cincinnati, Physics.
- KILNER, JOSEPH R., Cleveland, Physics.
- KRAUSE, DANIEL J., Columbus, Engineering.
- KURTZ, STEWART K., Columbus, Physics.
- LARSEN, ARTHUR B., Parma Heights, Engineering.
- MARZLUF, GEORGE A., Columbus, Genetics.
- MCATEER, PHILLIP J., Cincinnati, Engineering.
- MCCONNELL, JOHN L., Akron, Genetics.
- MOUNT, DONALD I., Columbus, Zoology.
- MUSHENHEIM, HAROLD G., Cincinnati, Mathematics.
- NINKE, WILLIAM H., Toledo, Engineering.
- PFLIEGER, WILLIAM L., Columbus, Zoology.
- POOS, WILMA J., Eaton, Biochemistry.
- REINECKE, WILLIAM G., Dayton, Engineering.
- SANFORD, JAMES R., Vermillion, Physics.
- SHELLMAN, RICHARD W., Columbus, Chemistry.
- SHERA, E. BROOKS, Cleveland, Physics.
- SHERIDAN, CHARLES L., Columbus, Psychology.
- SKAATES, J. MICHAEL, Worthington, Engineering.
- SKUBIAK, MICHAEL T., Akron, Engineering.
- SOPKOVICH, NICHOLAS J., Canfield, Physics.
- STEINBOCK, MARY A., Bedford, Physics.
- TOBIN, DON G., Reynoldsburg, Earth Sciences.
- WALTERS, VIRGINIA F., Cleveland, Physics.
- WAMPLER, DALE L., Lima, Chemistry.
- WARNER, HUBER R., Kent, Biochemistry.
- WHITEHEAD, JACK M., Zanesville, Anthropology.
- WOLFE, EDWARD W., Columbus, Earth Sciences.
- ZWOLNIK, JAMES J., Cleveland, Chemistry.
- Postdoctoral*
- FRANGE, RICHARD E., Berea, Physics.
- Senior Postdoctoral*
- BERNE, ROBERT M., University Heights, Biochemistry.
- SABLE, HENRY Z., Cleveland, Biochemistry.
- VARNER, JOSEPH E., Columbus, Biochemistry.
- Science Faculty*
- BAUM, JOHN D., Oberlin, Mathematics.
- BURI, PETER F., Gambler, General Biology.
- CRENSHAW, JOHN W., Jr., Yellow Springs, Zoology.
- DEAN, DONALD S., Berea, Botany.
- GOLDBERG, SAMUEL, Oberlin, Mathematics.
- HOVORKA, EDWARD J., Granville, Mathematics.
- KRABILL, DAVID M., Bowling Green, Mathematics.
- KRIEGER, IRVIN M., Cleveland Heights, Chemistry.
- LIPSICH, H. DAVID, Cincinnati, Mathematics.
- MCDOWELL, Sr. MARGARET, Columbus, Zoology.
- NORSTOG, KNUT J., Springfield, Botany.
- STERRETT, ANDREW, Jr., Granville, Mathematics.
- SWANSON, CARROLL A., Columbus, Botany.
- TURNBULL, BRUCE F., Cedarville, Physics.
- WATSON, RONALD, Cleveland, Engineering.
- WHEELER, SAMUEL C., Jr., Granville, Physics.
- Summer Fellowships for Graduate Teaching Assistants*
- ARCHBOLD, NORBERT L., Cleveland, Earth Sciences.
- ATCHLEY, RALPH W., Cincinnati, Chemistry.
- BEAN, RALPH J., Cleveland, Mathematics.
- BRANDTS, JOHN F., Celina, Chemistry.
- BURK, CARL J., Troy, Botany.
- BURLEY, J. WILLIAM, Columbus, Botany.
- COOKE, DEAN W., Bowling Green, Chemistry.
- CORNELL, ROSS H., Bowling Green, Mathematics.
- COSTANZA, JAMES L., Cleveland, Engineering.
- CROSS, HENRY A., Columbus, Psychology.
- EISELE, JOHN A., Columbus, Physics.
- FACKLER, JOHN P., Jr., Toledo, Chemistry.
- FERNER, BEVERLY R., Coldwater, Mathematics.
- GOCHENAUR, SALLY E., Cincinnati, Botany.
- GRANNEN, EDWARD A., Jr., Cincinnati, Chemistry.
- GWYNN, DONALD E., Columbus, Chemistry.
- HADFIELD, SYDNEY, Hamilton, Zoology.
- HUTCHISON, ROBERT B., Ravenna, Chemistry.
- JOHNSON, EUGENE C., Columbus, Mathematics.
- KERNAN, ROY W., Columbus, Biochemistry.
- KERN, GARY R., Cleveland, Chemistry.
- KURTZ, STEWART K., Columbus, Physics.
- LOEHLIN, JAMES H., Bellefontaine, Chemistry.
- MANERI, CARL C., Columbus, Mathematics.
- MCDONEL, EVERETT T., Shaker Heights, Chemistry.

MCLARNAN, CHARLES W., Columbus, Engineering.  
 MICKEL, JOHN, T., Hudson, Botany.  
 NICHOLAS, RALPH W.,<sup>1</sup> Lakewood, Anthropology.  
 PATTEE, PETER A., Columbus, Microbiology.  
 PFLEGER, WILLIAM L., Columbus, Zoology.  
 ROWLAND, RICHARD L., Mansfield, Chemistry.  
 SMITH, DONALD E., Columbus, Zoology.  
 SMITH, GLENN E., Hilliards, Botany.  
 STAPP, PAUL R., Euclid, Chemistry.  
 WAMPLER, DALE L., Lima, Chemistry.  
 WEBB, DAVID K., Jr., Chillicothe, Earth Sciences.  
 WICK, LINDA M.,<sup>1</sup> Cleveland, Chemistry.  
 WILLIAMS, ROBERT E., Columbus, Zoology.  
 WILSON, ROBERT G., Columbus, Physics.  
 YAMASHIRO, DONALD H., Cleveland, Chemistry.  
 ZEPF, THOMAS H., Cincinnati, Physics  
 ZERLA, FREDERIC J., Dillonvale, Mathematics.  
 ZWOLENIK, JAMES J., Cleveland, Chemistry.

*Summer Fellowships for Secondary School Teachers*

ABOOD, Sr. MARY MYRON, S.N.D., Cleveland, Physics.  
 BASINGER, DALE, Yellow Springs, Mathematics.  
 BENICH, Sr. MARY IDA, S.N.D., Elyria, General Biology.  
 BOYLE, FRANCIS K., Louisville, Mathematics.  
 BREWER, DAVID L., Medina, Mathematics.  
 BRINKMAN, VERENA H., Fort Jennings, Mathematics.  
 BYERS, Sr. MARY HUBERT, S.N.D., Elyria, General Biology.  
 DONOGHUE, Sr. M. IGNATIANA, I.H.M., Akron, Zoology.  
 EDWARDS, RAY J., Toledo, Mathematics.  
 EICHHOLZ, Sr. MARY ARSENIA, O.S.F., Mansfield, Physics.  
 FUREY, Sr. MARY JOSANNE, S.N.D., Cleveland, Mathematics.  
 GALLAGHER, Sr. MAURA, C.S.J., Cleveland, Physics.  
 HASTINGS, Sr. MARY PATRICK, C.S.J., Cleveland, General Biology.  
 HENDRICKSON, CHARLES W., Cleveland, Chemistry.  
 HOUK, CLIFFORD C., Troy, Chemistry.  
 JARVIS, Sr. JULIE, S.N.D. de N., Cincinnati, General Biology.  
 KAENZIG, JOSEPH G., Vandalla, General Biology.  
 KITKO, FRANK V., Brookfield, Chemistry.  
 KUEHLS, ERNEST A., Rocky River, Mathematics.  
 LAUTENBACH, HERMAN W., Bellefontaine, Physics.  
 LYNE, SANFORD F., Cambridge, Mathematics.  
 PFRIEM, RAYMOND C., Greenhills, Mathematics.  
 RECKER, FRANK W., Parma, Mathematics.  
 SCHICKER, JOSEPH S., Cleveland, Mathematics.  
 SCHIMMOLER, Sr. M. LEO, O.P., Akron, Mathematics.  
 SCHOLL, DOROTHY M., Lyndhurst, Earth Sciences.  
 SEIFFERT, Sr. MARY CARMELETTE, Cleveland, Chemistry.  
 SKILKEN, JACOB M., Cincinnati, Chemistry.  
 SMART, ROBERT E., Columbus, Mathematics.  
 STEINBERGER, PETER G., Newark, Physics.  
 TATUM, ALAN, Cleveland, General Science.

TUSHAR, CHARLES L., Cleveland, General Science.  
 WERNER, Sr., MARIJANE, O.P., Youngstown, Mathematics.

## OKLAHOMA

### Graduate

ABLES, JON G., Miami, Physics.  
 CHRISTIAN, JOE C., Marshall, Genetics.  
 DENISON, GILBERT W., Norman, Engineering.  
 DOUGLAS, JAMES N., Stillwater, Astronomy.  
 FRETWELL, LYMAN J., JR., Tulsa, Physics.  
 GOLDWYN, ROGER M., Tulsa, Engineering.  
 HILL, JAMES L., Norman, Engineering.  
 KECK, DARWIN W., Stillwater, Botany.  
 KRUGER, CHARLES H., Oklahoma City, Engineering.  
 KRUGER, ROBERT A., Oklahoma City, Engineering.  
 PARKER, JERALD D., Ponca City, Engineering.  
 PAUL, JOHNNY C., Stillwater, Engineering.  
 ROBINSON, ROBERT L., JR., Muskogee, Engineering.  
 SANMANN, EVERETT E., Geronimo, Physics.  
 SHOVER, EDWARD F., Tulsa, Earth Sciences.  
 THOMSON, GEORGE H., Chickasha, Chemistry.  
 WATSON, JOHN, Norman, Earth Sciences.  
 ZAVODNY, EUGENE N., Redrock, Engineering.

### Cooperative Graduate

BOWERS, VIRGINIA GREEN, Stillwell, Zoology.  
 COOK, BILL D., Arnett, Physics.  
 COOPER, JANE E., Tulsa, Zoology.  
 CRAIG, ROY R., JR., Durant, Engineering.  
 CRAWFORD, JOHN C., Ponca City, Physics.  
 DAVIS, ALLEN S., Oklahoma City, Mathematics.  
 DECKER, ROLAN V., Ada, Medical Science.  
 EDWARDS, JIMMIE G., Stillwater, Chemistry.  
 GREEN, DON W., Tulsa, Engineering.  
 HENDERSON, VINSON D., JR., Drumright, Engineering.  
 HERRIN, CHARLES B., Duncan, Chemistry.  
 LESTER, DICK M., Norman, Physics.  
 LEWIS, ROBERT E., Vinita, Chemistry.  
 LEWIS, SCOTT C., Tulsa, Engineering.  
 LOW, LEONE Y., Stillwater, Mathematics.  
 MCCracken, CURTIS W., Vici, Astronomy.  
 RUSSELL, KENNETH J., Stillwater, Physics.  
 SLAUGHTER, EUGENE E., JR., Durant, Mathematics.  
 TIPTON, DONALD D., Fairland, Engineering.  
 WERTZ, HARVEY J., Muskogee, Engineering.

### Science Faculty

BRAFMAN, FRED,<sup>1</sup> Norman, Mathematics.  
 GOETSCH, DENNIS D., Stillwater, Medical Science.  
 OTT, BILLY J., Stillwater, Agriculture.  
 PORTERFIELD, JAY G., Stillwater, Engineering.

### Summer Fellowships for Graduate Teaching Assistants

COCHRANE, GLENN F., JR., Jay, Engineering.  
 COOPER, KARL O., Miami, Engineering.  
 HOLT, JAMES A., Antlers, Biochemistry.  
 JONES, JERRY L., Stillwater, Chemistry.  
 LESTER, DICK M., Norman, Physics.  
 OSFOVAT, ALEXANDER M., Norman, History of Science.  
 SPENCER, MAX M., Crescent, Engineering.  
 STARKS, CHARLES M., Oklahoma City, Chemistry.

<sup>1</sup> Deceased.



*Summer Fellowships for Secondary School Teachers*

BRANDENBURG, ROBERT L., Alva, Zoology.  
CALLIS, LEONARD S., Spencer, General Biology.  
CLEMENT, ELLA L., Oklahoma City, Mathematics.  
COFFIA, WILLIAM J., Oklahoma City, Mathematics.  
DOUGLAS, CHARLES H., Oklahoma City, Earth Sciences.  
GREER, LOLA B., Oklahoma City, Mathematics.  
HALL, GEORGE W., Tulsa, Chemistry.  
MOON, BLANCHE G., Bethany, Mathematics.  
NEWBERRY, EARL R., Gould, General Science.  
STONE, CHARLES K., Frederick, Mathematics.

OREGON

*Graduate*

AMMANN, EUGENE O., Portland, Engineering.  
BROWN, ROBERT B., Portland, Mathematics.  
BURROUGHS, JOHN D., Salem, Engineering.  
DE BAR, ROGER B., Eugene, Physics.  
DIXON, RICHARD W., Woodburn, Engineering.  
DURYER, FRANCES L., North Bend, Microbiology.  
EMRICH, ROBERT, Eugene, Anthropology.  
KERR, JAMES R., Portland, Engineering.  
LIEPPE, EDWARD, Eugene, Physics.  
MAHAN, GERALD D., Portland, Physics.  
ONDUFF, ROBERT, Portland, Botany.  
PERSON, JAMES C., Salem, Chemistry.  
RUSSELL, DALE A., Enterprise, Earth Sciences.  
SCHEUCHENPFLUG, DORIS, Gearhart, Microbiology.  
WETHERELL, CLYDE E., Mt. Hood, Earth Sciences.

*Cooperative Graduate*

COWLEY, RICHARD T., Tigard, Engineering.  
EGGAN, LAWRENCE C., Eugene, Mathematics.  
GRITTON, GEORGE V., Corvallis, Chemistry.  
LOWE, JAMES N., McMinnville, Chemistry.  
PEARSON, GARY A., Corvallis, Engineering.  
RAUCH, JOHN E., Rainier, Chemistry.  
ROCKHOLT, CELIA R., Corvallis, Chemistry.  
ROSENFELD, HOWARD M., Portland, Psychology.

*Postdoctoral*

TAUBENECK, WILLIAM H., Corvallis, Earth Sciences.  
WHEELER, NICHOLAS A., The Dalles, Physics.

*Science Faculty*

ALEXANDER, GERALD C., Corvallis, Engineering.  
BEHLKE, CHARLES E., Corvallis, Engineering.

*Summer Fellowships For Graduate Teaching Assistants*

BENTLEY, ROBERT D., Portland, Earth Sciences.  
EMRICH, ROBERT L., Eugene, Anthropology.  
GILES, DONALD E., Corvallis, Zoology.  
HESTON, ALAN W., Portland, Econometrics.  
JENKINS, LYLE V., Corvallis, Zoology.  
JOHNSON, ARNOLD R., Jr., Corvallis, Chemistry.  
SCHAAD, LEWIS H., Newberg, Chemistry.  
STEPHENSON, JOHN L., Corvallis, Chemistry.

*Summer Fellowships for Secondary School Teachers*

BIEDERMAN, ARTHUR A., Tigard, Zoology.  
DOTY, ROBERT G., Canby, Biochemistry.  
HEWELCKE, SR. M. MARGARET, O.P., Portland, General Biology.  
LAMB, RONALD D., Central Point, General Biology.  
LE COURS, ARTHUR A., Klamath Falls, General Science.  
MCFADDEN, SCOTT D., Eugene, Mathematics.  
MONKS, HOWARD I., Jr., Coos Bay, Chemistry.  
NAEZIGER, RALPH L., Springfield, Physics.  
NEAL, ERNEST L., Bandon, General Biology.  
PORTER, DAVID D., Portland, General Science.  
STUDER, LOREN E., Portland, Mathematics.

PENNSYLVANIA

*Graduate*

ADLER, RONALD J., Pittsburgh, Physics.  
ALBRIGHT, JOHN R., Jr., Reamstown, Physics.  
ANDERSON, ANSEL C., North Warren, Physics.  
BARR, MICHAEL, Drexel Hill, Mathematics.  
BARRETT, DENNIS, Philadelphia, Genetics.  
BERMON, STUART, Philadelphia, Physics.  
BERTRAM, WALTER J., Jr., Pittsburgh, Physics.  
BLUMENTHAL, SAUL, Philadelphia, Engineering.  
BOHACHEVSKY, IHOR O., Philadelphia, Mathematics.  
BOOK, DAVID, L., Norristown, Physics.  
BRAUMAN, JOHN I., Pittsburgh, Chemistry.  
BURTNER, ROGER L., Hershey, Earth Sciences.  
CARROLL, CLARK E., Pittsburgh, Physics.  
COCIVERA, MICHAEL, Pittsburgh, Chemistry.  
DAVIES, K. THOMAS, Pittsburgh, Physics.  
EARDLEY, DAVID B., Pittsburgh, Engineering.  
EARLE, CLIFFORD, Jr., Abington, Mathematics.  
EVANS, DAVID W., Erie, Agriculture.  
FANTE, RONALD L., Philadelphia, Engineering.  
FARR, KENNETH E., Paxinos, Engineering.  
FLIEGEL, HENRY F., Havertown, Astronomy.  
FRENCH, THAYER C., Sewickley, Biochemistry.  
GEISSINGER, LADNOR, Zionsville, Mathematics.  
GILBERT, ALLEN W., Montoursville, Engineering.  
GOODMAN, JUDITH C., Pittsburgh, General Biology.  
GREEN, JOHN P., Jr., Philadelphia, Engineering.  
GREENLEAF, FREDERICK P., Allentown, Physics.  
GRENDER, GORDON C., State College, Earth Sciences.  
GRIM, SAMUEL O., Dallastown, Chemistry.  
GROOM, DONALD E., Turtle Creek, Physics.  
GUYER, ROBERT A., Pittsburgh, Physics.  
HALL, ROBERT D., Philadelphia, Psychology.  
HENDRIX, THOMAS E., Landisville, Earth Sciences.  
HIRSCHFIELD, JUDITH B., Pittsburgh, Mathematics.  
HOUGHTON, DAVID D., Media, Earth Sciences.  
HUGUENIN, G. RICHARD, Buck Hill Falls, Astronomy.  
HUNT, RICHARD, Doylestown, Chemistry.

**INFANGER, Sr. ANN MARTIN**, Greensburg, Genetics.  
**JOHNS, LEWIS E., Jr.**, Pittsburgh, Engineering.  
**JOSEPH, PETER M.**, Chester, Physics.  
**KAMPMEIER, JACK A.**, Wyncote, Chemistry.  
**KAUFFMAN, JOEL M.**, Huntingdon Valley, Chemistry.  
**LAISON, GARY**, Philadelphia, Mathematics.  
**MAGID, LEONARD M.**, Philadelphia, Engineering.  
**McFADDEN, JAMES T.**, State College, Zoology.  
**McNUTT, DOUGLAS P.**, Philadelphia, Physics.  
**MITCHEL, BARRY J.**, Pittsburgh, Engineering.  
**MITRONOVAS, WALTER**, Erie, Earth Sciences.  
**MOLLENAUER, JAMES F.**, Radnor, Chemistry.  
**MORRISON, JAMES L.**, Pittsburgh, Physics.  
**NOBLE, ROBERT W., Jr.**, Ardmore, Biochemistry.  
**OSTERHOLTZ, FREDERICK D.**, Drexel Hill, Chemistry.  
**PERRIN, CHARLES**, Pittsburgh, Chemistry.  
**PHILLIPS, THOMAS O.**, Lansdowne, Physics.  
**PORTER, JAMES D.**, Chambersburg, Engineering.  
**SARTORY, WALTER K.**, Pittsburgh, Engineering.  
**SEIDERS, VICTOR M.**, York, Earth Sciences.  
**SHAFFER, RUSSELL A.**, Philadelphia, Physics.  
**SHEPPARD, RICHARD A.**, Lancaster, Earth Sciences.  
**SHORT, JAMES J.**, Philadelphia, Philosophy of Science.  
**SILVERSTEIN, MARIANNE**, Philadelphia, Mathematics.  
**SQUIRES, ROBERT G.**, Ambridge, Engineering.  
**STEINING, RAE F.**, Pittsburgh, Physics.  
**STONER, JOHN O., Jr.**, Berlin, Physics.  
**SUNA, ANDRIS**, Broomall, Physics.  
**THORINGTON, RICHARD W., Jr.**, Wynnewood, General Biology.  
**TURNER, LARRY**, Pittsburgh, Physics.  
**WARNER, FRANK W., III**, State College, Physics.  
**WEISS, CHARLES, Jr.**, Philadelphia, Biochemistry.  
**WELSH, ROBERT E.**, Pittsburgh, Physics.  
**WILLIAMS, DEBORAH C.**, Moylan-Rose Valley, Zoology.  
**WOOD, DON J.**, Cory, Engineering.  
**WOODS, ROBERT M., Jr.**, New Wilmington, Physics.  
**YOUNG, FREDERICK D.**, Marianna, Engineering.  
**ZARTMAN, ROBERT E.**, Lititz, Earth Sciences.

*Cooperative Graduate*

**AARON, RONALD**, Philadelphia, Physics.  
**ANGSTADT, CAROL N.**, Ardmore, Biochemistry.  
**ARMSTRONG, DONALD G.**, Pittsburgh, Engineering.  
**BARRETT, JOSEPH J.**, Scranton, Physics.  
**BEANS, E. WILLIAM**, State College, Engineering.  
**BEDBSEM, WILLIAM B.**, Philadelphia, Engineering.  
**BERGEY, JAMES A.**, Lansdale, Engineering.  
**BERKOWITZ, DAVID B.**, Pottsville, Medical Sciences.  
**BERNECKER, RICHARD R.**, Allentown, Chemistry.  
**BIBHL, EDWARD R.**, Pittsburgh, Chemistry.  
**BLUM, ROBERT A.**, Wynnewood, Engineering.  
**BOLON, DONALD A.**, Meadville, Chemistry.  
**BUTTE, WALTER A., Jr.**, Reading, Chemistry.

**CARMAN, ROBERT A.**, Pittsburgh, Psychology.  
**CONDON, PATRICIA G.**, Philadelphia, Biochemistry.  
**DANNIN, JORDAN E.**, Philadelphia, Chemistry.  
**DAVIS, EDWARD D.**, Philadelphia, Mathematics.  
**DE COURSEY, GEORGE E., Jr.**, Paoli, Zoology.  
**DELAHANTY, EVERETT J., Jr.**, Havertown, Psychology.  
**DIENER, DAVID A.**, West Reading, Engineering.  
**DRAUGGLIS, EDMUND**, Philadelphia, Chemistry.  
**FALKIE, THOMAS, V.**, State College, Engineering.  
**FERNELIUS, NILS C.**, State College, Physics.  
**FONDER, EDWARD F.**, Philadelphia, Chemistry.  
**FONDY, THOMAS P.**, Pittsburgh, Biochemistry.  
**FOX, IRWIN R.**, Philadelphia, Chemistry.  
**FUDALI, ROBERT F.**, State College, Earth Sciences.  
**GALLAGHER, W. PATRICK**, Ridgway, Chemistry.  
**GARGANI, ARNOLD J.**, Philadelphia, Engineering.  
**GLENN, WILLIAM H.**, Philadelphia, Engineering.  
**GRIFFIN, RODGER W., Jr.**, Verona, Chemistry.  
**HAAS, C. WARREN**, Philadelphia, Physics.  
**HALL, RICHARD C.**, Pittsburgh, Psychology.  
**HARE, CURTIS R.**, Clifton Heights, Chemistry.  
**HAY, JAMES E.**, Pittsburgh, Physics.  
**HAYWEISER, LOIS J.**, Pittsburgh, Psychology.  
**HEINDEL, NED D.**, Red Lion, Chemistry.  
**HILL, DAVID G.**, Tarentum, Physics.  
**HINICH, MELVIN J.**, Pittsburgh, Mathematics.  
**HOYLAND, JAMES R.**, Pittsburgh, Chemistry.  
**IBANEZ, MANUEL L.**, University Park, Microbiology.  
**KAUFMANN, HARRY**, Clifton Heights, Psychology.  
**KELLER, ANNE**, Perkasie, Genetics.  
**KINZER, GEORGE R., Jr.**, Lancaster, Physics.  
**KOCH, WILLIAM E.**, York, Zoology.  
**KUSHNICK, STEPHEN A.**, Pittsburgh, Psychology.  
**LANDY, RICHARD A.**, Clearfield, Earth Sciences.  
**LEBOY, PHOEBE S.**, Philadelphia, Biochemistry.  
**MAXWELL, WILLIAM L.**, Philadelphia, Engineering.  
**McMICHAEL, EDWARD V.**, Imperial, Anthropology.  
**MICHEL, GERTRUDE M.**, Radnor, Zoology.  
**MOORE, ALBERT L.**, Rome, Engineering.  
**MORLOCK, HENRY C., Jr.**, Philadelphia, Psychology.  
**MURPHY, JOHN V.**, Philadelphia, Engineering.  
**ORTTUNG, WILLIAM H.**, Narberth, Chemistry.  
**PACHMAN, JERROLD M.**, State College, Earth Sciences.  
**POLLACK, SOLOMON R.**, Philadelphia, Physics.  
**RIEFF LOUIS P.**, Ashland, Chemistry.  
**REINKRAUT, EVA D.**, Pittsburgh, Psychology.  
**ROSENAU, WILLIAM A.**, State College, Agriculture.  
**ROSENBERG, RONALD C.**, Philadelphia, Engineering.  
**SAX, MARTIN**, Pittsburgh, Chemistry.  
**SEYLER, RICHARD G.**, Du Bois, Physics.  
**SHERWOOD, W. CULLEN**, Bethlehem, Earth Sciences.

SHULL, HARRY E., State College, Engineering.  
 SNELSER, ROBERT W., Pittsburgh, Engineering.  
 SOUTH, RICHARD L., Beaver Falls, Chemistry.  
 SPENCER, JORDAN L., Cynwyd, Engineering.  
 SQUIRES, BURTON E., Jr., State College, Physics.  
 TIETJEN, JAMES J., State College, Engineering.  
 VON FRANKENBERG, CARL A., Philadelphia, Chemistry.  
 WEBER, CAROLYN J., Philadelphia, Zoology.  
 WILLIAMS, JOHN E., Clarion, Zoology.  
 WILSON, ERIC L., Sharpsville, Mathematics.  
 WOLL, EDWIN J., Jr., Pittsburgh, Physics.  
 ZOLTOWICZ, JOHN A., Plymouth, Chemistry.

*Postdoctoral*

BAIRD, WILLIAM C., Jr., McKeesport, Chemistry.  
 FOLK, ROBERT T., Allentown, Physics.  
 GRUBER, JACOB W., Plymouth Meeting, Anthropology.  
 KLINEDINST, PAUL E., Jr., York, Chemistry.  
 LOVE, WILLIAM A., Pittsburgh, Physics.  
 PETERSON, DONALD B., Erie, Chemistry.  
 WALLEN, LAWRENCE J., Philadelphia, Mathematics.  
 WINEGRAD, SAUL, Cynwyd, Medical Science.

*Senior Postdoctoral*

GROSSWALD, EMIL, Philadelphia, Mathematics.  
 OPPENHEIMER, JANE M., Bryn Mawr, Zoology.  
 TIMASHEFF, SERGE N., Philadelphia, Chemistry.

*Science Faculty*

BADGER, PARKER H., State College, Engineering.  
 DUNBAR, DAVID L., Washington, Mathematics.  
 EDWARDS, WILLIAM E., Pittsburgh, Anthropology.  
 GILES, RANALD V., Drexel Hill, Engineering.  
 HOLZINGER, JOSEPH R., Landisville, Astronomy.  
 LEVEY, MARTIN, Philadelphia, Mathematics.  
 LONG, HOWARD C., Gettysburg, Physics.  
 MILLER, BERNARD L., Havertown, Mathematics.  
 MOHN, NANCY, Pittsburgh, Genetics.  
 NEWLLN, CHARLES W., Springfield, Engineering.  
 ROHRER, WESLEY M., Jr., Glenshaw, Engineering.  
 RUDD, DE FOREST P., Lincoln University, Chemistry.  
 SCHWEIGERT, GEORGE E., Philadelphia, Mathematics.  
 TASSONEY, JOSEPH P., McKeesport, Engineering.  
 TENO, JOSEPH, Bath, Engineering.  
 THORNTON, CHARLES P., State College, Earth Sciences.  
 WARD, GILBERT H., Conyngham, Physics.  
 WISNER, ROBERT J., Haverford, Mathematics.

*Summer Fellowships for Graduate Teaching Assistants*

ANDERSON, ROBERT B., Pittsburgh, Engineering.

BACHMAN, JERALD G., Philadelphia, Psychology.  
 BERNECKER, RICHARD R., Allentown, Chemistry.  
 BERT, GRACE R., Greencastle, Genetics.  
 BILLINGHAM, EDWARD J., Lebanon, Chemistry.  
 BOOK, RONALD G., State College, Engineering.  
 BRIEGER, GOTTFRIED, Philadelphia, Chemistry.  
 BROGAN, MARIANNE C., Jim Thorpe, Chemistry.  
 BRUMBERG, PAUL G., Ridgway, Mathematics.  
 BUTTE, WALTER A., Jr., Reading, Chemistry.  
 CARLILE, CLAYTON G., Meadville, Chemistry.  
 COLEBOB, CAROLE J., Pittsburgh, Mathematics.  
 CONDON, PATRICIA G., Philadelphia, Biochemistry.  
 COX, RAYMOND H., Meadville, Mathematics.  
 DANNIN, JORDAN E., Philadelphia, Chemistry.  
 DETIG, ROBERT H., Pittsburgh, Engineering.  
 EVANEGA, GEORGE R., Fullerton, Chemistry.  
 FARWELL, ROBERT W., Bellefonte, Biophysics.  
 FORSMAN, WILLIAM C., Lansdowne, Chemistry.  
 GORDON, ALBERT M., New Brighton, Physics.  
 GREENBERG, BERNARD, State College, Chemistry.  
 GUBER, ALBERT L., Bridgeville, Earth Sciences.  
 HOLOWINSKY, ANDREW W., Philadelphia, Botany.  
 HOSTLER, LEVERE C., Red Lion, Physics.  
 KORNBLAU, MARVIN J., Philadelphia, Chemistry.  
 LEBOX, PHOEBE S., Philadelphia, Biochemistry.  
 MCCAULLY, RONALD J., West Lawn, Chemistry.  
 MEYER, VINCENT D., McKees Rocks, Chemistry.  
 MORGAN, CHARLES R., Plymouth, Chemistry.  
 MORLOCK, HENRY C., Jr., Philadelphia, Psychology.  
 MOTT, THOMAS E., State College, Mathematics.  
 PAWLING, JOHN, State College, Geography.  
 REIFF, LOUIS P., Ashland, Chemistry.  
 ROHRER, JOAN H., Pittsburgh, Mathematics.  
 RUSSO, THOMAS J., State College, Chemistry.  
 SEPAN, ANTHONY V., Philadelphia, Mathematics.  
 SIEBER, JAMES L., Blairs Mills, Mathematics.  
 SMOLENSKY, EUGENE, Philadelphia, Econometrics.  
 SQUIRES, BURTON E., Jr., State College, Physics.  
 STAFFORD, HOWARD A., Jr., West Chester, Geography.  
 STELTER, CHARLES J., Pittsburgh, Psychology.  
 SUBASH, JOHN J., Nazareth, Chemistry.  
 TABER, JULIAN I., Pittsburgh, Psychology.  
 VOGEL, HARVEY, State College, Earth Sciences.  
 WILLIAMS, NINA J., Gettysburg, Zoology.  
 WILLIAMSON, KENNETH D., Jr., Williamsport, Engineering.  
 ZWIBEL, HARRY, Pittsburgh, Physics.  
 ZUCKERMAN, JEROLD J., Philadelphia, Chemistry.

*Summer Fellowships for Secondary School Teachers*

ASHLBER, DANIEL, Philadelphia, Mathematics.  
BLEBECKER, WILBERT L., Jr., Fallsington, Physics.  
BOWERS, ROBERT S., York, Zoology.  
BRAXTON, WILBERT L., Philadelphia, Chemistry.  
DE BERNARDINIS, ELIZABETH F., Ridley Park, General Biology.  
DECK, ROBERT E., Mechanicsburg, Zoology.  
DEVINE, Sr. M. ASSUMPTA, O.S.U., Pittsburgh, Biochemistry.  
DRUMMOND, Sr. THERESE of the S.H., Philadelphia, General Biology.  
EVANS, DAVID C., West Lawn, Botany.  
GEHRIS, CLARENCE W., Allentown, Chemistry.  
GERMERSHAUSEN, Sr. JOSEPH MARIE, Reading, Chemistry.  
HANSEN, ROBERT E., McKean, General Science.  
HAYS, HERBERT E., Jr., Mechanicsburg, Zoology.  
HELTERRAN, RAYMOND, California, Mathematics.  
HOAR, Sr. M. ROSEANNE, Pittsburgh, Zoology.  
KNEPP, THOMAS H., Stroudsburg, Zoology.  
KUNZLER, Sr. M. CAROLYN, O.S.B., Pittsburgh, Chemistry.  
LOVE, EDNA, M., Derry, Mathematics.  
MARTINO, JAMES M., Luthersburg, General Science.  
PIETRUCH, Sr. M. CANISIA, C.S.B., Reading, Mathematics.  
RICHMAN, PAUL T., Media, Mathematics.  
RODGERS, JOSEPH K., Coraopolis, General Science.  
SABOL, Sr. M. MARGARET, S.S.C.M., Danville, Physics.  
SCHNEURMANN, Sr. M. JULIA, R.S.M., Pittsburgh, Chemistry.  
SHAAK, ROBERT S., West Lawn, Mathematics.  
SHOOK, WILLIAM H., Jr., Harrisburg, Physics.  
SKALESKI, Sr. MARY OLGA, Pittsburgh, Physics.  
STECKBECK, Sr. JOHN GERTRUDE, Philadelphia, General Biology.  
STOVER, H. DEAN, Littlestown, Mathematics.  
STROUP, ROBERT H., Mifflintown, General Science.  
SUPERDOCK, DAVID A., Freeland, Physics.  
UBINGER, Sr. M. TERESE CLARE, O.S.B., Conellsville, Physics.  
VAN GORDON, CHARLES L., Lancaster, Mathematics.  
WHITELEY, GEORGE C., Jr., Pottstown, General Biology.  
YODEB, HAROLD D., Altoona, Zoology.

RHODE ISLAND

*Graduate*

BEAUDT, ROBERT A., Woonsocket, Chemistry.  
BURTON, PAUL E., Warwick, Chemistry.  
MOULTON, DAVID M., Providence, Chemistry.  
POIRIER, LIONEL A., North Providence, Medical Sciences.  
SAVIN, HARRIS B., Providence, Psychology.

*Cooperative Graduate*

DUFFY, MARCELLUS, Jr., Barrington, Mathematics.  
KNUTSON, CHARLES D., Providence, Physics.

MAINE, ELLSWORTH C., Cranston, Agriculture.

*Senior Postdoctoral*

GREENE, EDWARD F., Providence, Chemistry.

*Science Faculty*

CLARKE, C. BERNARD, Peace Dale, Engineering.  
TEST, FREDERICK, L., Wakefield, Engineering.

*Summer Fellowships for Secondary School Teachers*

MURPHY, Sr. MARY COLETTE, R.S.M.,<sup>1</sup> Providence, Mathematics.

SOUTH CAROLINA

*Graduate*

KING, HAROLYN, Marion, Chemistry.

*Cooperative Graduate*

CANTRELL, THOMAS S., Columbia, Chemistry.  
DAVIS, K. JOE, Spartanburg, Mathematics.  
FOLEY, JOHN M., Anderson, Psychology.  
KELLETT, JAMES C., Jr., Spartanburg, Chemistry.  
KELLEY, RALPH E., Greenville, Physics.  
STRICKLAND, ERASMUS H., Jr., Columbia, physics.

*Postdoctoral*

LAURIE, VICTOR W., Columbia, Chemistry.

*Science Faculty*

BRADBURY, DOUGLAS W., Clemson, Engineering.  
FELTON, MARGEURITE N., Charlestown, Chemistry.  
HUDSON, WILLIAM G., Clemson, Engineering.

*Summer Fellowships for Secondary School Teachers*

HORTON, FRANCIS H., Kingstree, Mathematics.  
HUBBARD, WILLIAM B., Hyman, Physics.  
MOORE, WILLIAM L., Orangeburg, Mathematics.  
MOORE, ROBERT H., Harleyville, Mathematics.  
PENNEL, FRANCES E., Rock Hill, Zoology.  
STROUD, MARY B., Columbia, Chemistry.

SOUTH DAKOTA

*Graduate*

MINEHART, RALPH C., Mitchell, Physics.  
PIERCE, ROBERT L., Huron, Mathematics.  
RASMUSSON, GARY, Clark, Chemistry.

*Cooperative Graduate*

FISCHBACH, THOMAS J., Rapid City, Sociology.  
HURWITZ, CHARLES E., Sioux Falls, Engineering.  
LOHE, JEROME J., Raymond, Engineering.

*Science Faculty*

ESTE, CHARLES R., Vermillion, Chemistry.

*Summer Fellowships for Graduate Teaching Assistants*

KOENIG, JACK L., Winner, Chemistry.  
SCHWARTZ, ALBERT T., Freeman, Chemistry.

*Summer Fellowships for Secondary School Teachers*

BROWN, JOHN L., Rapid City, Mathematics.  
PALMQUIST, DELORIS F., Salem, General Biology.  
PROSSER, JAMES B., Vermillion, Mathematics.

**TENNESSEE**

*Graduate*

BANKS, THOMAS H., Nashville, Earth Sciences.  
CARMICHAEL, HALBERT, Oak Ridge, Chemistry.  
COOK, CLARENCE E., Jefferson City, Chemistry.  
CULVER, RICHARD S., Oak Ridge, Engineering.  
DIETRICH, FRANK S., Memphis, Physics.  
GOTTO, ANTONIO M., Nashville, Biochemistry.  
KLOW, JANET, Memphis, Biochemistry.  
KROHN, KENNETH, Nashville, Physics.  
LANIER, RANDOLPH D., Nashville, Chemistry.  
MCCORD, MICHAEL C., Knoxville, Mathematics.  
MCHARRIS, WILLIAM C., Knoxville, Chemistry.  
NUNNALLY, DAVID A., Memphis, Zoology.  
REKEMEYER, MARY L., Oak Ridge, Zoology.  
WALLACE, WILLIAM J., Clinton, Chemistry.

*Cooperative Graduate*

ASHLEY, JAMES C., Bristol, Physics.  
BEAUCHAMP, NICHOLAS A., Nashville, Physics.  
BLOOMER, JAMES L., Knoxville, Chemistry.  
DORMAN, ED S., Memphis, Physics.  
DREWRY, GEORGE E., Nashville, Zoology.  
GRAY, ROBERT I., Knoxville, Engineering.  
HEIMBERG, LAURA K., Nashville, Psychology.  
HOLLADAY, THOMAS M., Knoxville, Physics.  
MCCURE, JOSEPH A., Jr., Nashville, Physics.  
MCDANIEL, WILLIAM L., Jefferson City, Mathematical Economics.  
RADER, CHARLES P., Greeneville, Chemistry.  
SMITH, ALPHONSO L., Memphis, Mathematics.  
TODD, AARON W., Murfreesboro, Chemistry.  
WOODFIN, BEULAH M., Nashville, Biochemistry.

*Postdoctoral*

KEY, JOE L., Troy, Biochemistry.

*Senior Postdoctoral*

VON BORSTEL, ROBERT C., Oak Ridge, Genetics.

*Science Faculty*

CAMPBELL, ALPHEUS N., Martin, Chemistry.  
COLEMAN, JAMES T., Memphis, Zoology.  
COPELAND THOMPSON P., Johnson City, Zoology.  
FRY, KENNETH A., Chattanooga, Microbiology.  
PRESCOTT, WALLACE S., Cookeville, Engineering.  
ZEALY, MARION E., Nashville, Biochemistry.

*Summer Fellowships for Graduate Teaching Assistants*

ANDERSON, ROBERT G., Chattanooga, Chemistry.  
FREY, WILLIAM F., Bristol, Physics.

GRINDSTAFF, TEDDY H., Knoxville, Chemistry.  
HUGGIN, MARY K., Knoxville, Mathematics.  
ROBBINS, HERBERT C., Nashville, Botany.

*Summer Fellowships for Secondary School Teachers*

AMOS, ELDORA, Memphis, Mathematics.  
BECK, Sr. JANE FRANCES, O.P., Memphis, Mathematics.  
BEVINGTON, Rev. WILLIAM S., Memphis, Physics.  
LAYCOCK, MARY C., Oak Ridge, Mathematics.  
SCHRANK, Sr. HYACINTH, Chattanooga, Mathematics.  
TURNER, AUBREY E., Memphis, General Science.  
TURNER, JUANITA R., Memphis, Mathematics.

**TEXAS**

*Graduate*

ABBOTT, WALTER P., Bellaire, Zoology.  
ANDERSON, JOHN E., Austin, Engineering.  
ANDERSON, LOUIS W., Houston, Physics.  
ASHBY, NEIL, Dalhart, Physics.  
BARNES, VIRGIL E., Austin, Physics.  
BECHTEL, NORBERT G., Jr., Groves, Engineering.  
BEYERS, ROBERT J., Austin, Zoology.  
BILLIG, LEON O., Houston, Engineering.  
BLAND, RICHARD P., Farmersville, Mathematics.  
BOTT, JERRY F., Tyler, Engineering.  
BRANS, CARL, Dallas, Physics.  
CLARK, BARRY G., Canyon, Astronomy.  
COLLIER, ROBERT J., Fort Worth, General Biology.  
COLLINS, FRANCIS A., Austin, Physics.  
CYPRUS, JOEL, Houston, Engineering.  
DAHM, DAVID M., Dallas, Physics.  
DOLGOFF, ABRAHAM, Houston, Earth Sciences.  
GROSS, MEREDITH G., Jr., Amarillo, Earth Sciences.  
HANES, HAROLD B., Jr., Fort Worth, Mathematics.  
HARRIS, DONALD P., Austin, Engineering.  
HEICHELHEIM, HUBERT R., Jr., Victoria, Engineering.  
HYDER, MONTE L., Rockdale, Chemistry.  
JONES, BENJAMIN F., Houston, Mathematics.  
KELLY, WILLIAM F., Sweetwater, Engineering.  
LESIKAR, ARNOLD V., Houston, Physics.  
MANUEL, THOMAS A., Austin, Chemistry.  
MCNELL, MICHAEL B., Houston, Chemistry.  
MONGER, JOANNE, Beaumont, Mathematics.  
MYERS, RALPH, II, Wichita Falls, Earth Sciences.  
NISBET, ALEX R., San Angelo, Chemistry.  
OSBORNE, ZACK, Pampa, Physics.  
RANDOL, BURTON S., San Antonio, Mathematics.  
SIMMONS, MARVIN G., Carrollton, Earth Science.  
STOVER, HARRY L., Dallas, Physics.  
STREETER, STEPHEN, Houston, Earth Sciences.  
STUBBLEFIELD, TRAVIS E., Denton, Medical Sciences.  
WEBB, MORTON W., Austin, Psychology.  
WILLEY, FRED, Garland, Chemistry.  
WILSON, ROBERT W., Houston, Astronomy.  
WISDOM, NORVELL E., Jr., Crane, Chemistry.

### *Cooperative Graduate*

ASHCRAFT, THOMAS L., Jr., Austin, Chemistry.  
AYERS, ROBERT C., Jr., Fort Worth, Chemistry.  
BARLOW, CARL A., San Antonio.  
BILYEU, RUSSELL G., Denton, Mathematics.  
BROWN, JUDITH C., Bryan, Chemistry.  
CLABORN, LUTHER E., Lubbock, Mathematics.  
COX, PAUL F., Tyler, Chemistry.  
CRAMER, JOHN G., Jr., Houston, Physics.  
CUBBRINGTON, AARON M., Bryan, Engineering.  
DARBY, RONALD, Dallas, Engineering.  
DAVENPORT, MONTY E., Lubbock, Engineering.  
DOBBING, JOHN P., Dallas, Chemistry.  
DURBIN, LEONEL D., Houston, Engineering.  
ECONOMY, RICHARD, San Antonio, Physics.  
ERMA, VICTOR A., Corpus Christi, Physics.  
EVERY, RICHARD L., Austin, Chemistry.  
FRITZ, ROSE MARY, Houston, Chemistry.  
GRIFFY, THOMAS A., Houston, Physics.  
HENDERSON, JAMES R., Mineola, Physics.  
HERRON, ELMER W., Houston, Psychology.  
HUNTER, FLORA V., Austin, Biochemistry.  
KENNEY, MARY A., Slaton, Biochemistry.  
KOB, DONALD H., Austin, Physics.  
LEE, WILLIAM J., Sweetwater, Engineering.  
MARTIN, JAMES N.,<sup>1</sup> Fort Worth, Mathematics.  
MONOSTORI, BENEDICT J., Irving, Physics.  
MOORE, NEAL, Dallas, Physics.  
PAIGE, MARETTA T., San Antonio, Chemistry.  
PERRY, PATRICIA L., Corpus Christi, Psychology.  
PORTER, RICHARD N., Texarkana, Chemistry.  
QUADE, C. RICHARD, Dallas, Physics.  
RICHARDSON, RICHARD H., Mexia, Agriculture.  
SANDERS, BOBBY L., Canton, Mathematics.  
SMITH, HOMER A., Jr., Fort Worth, Chemistry.  
STALKUP, FRED I., Bellmead, Engineering.  
TOMBELLO, THOMAS A., Jr., Dallas, Physics.  
UNDERWOOD, JAMES R., Jr., Corpus Christi, Earth Sciences.  
URDY, CHARLES E., Austin, Chemistry.  
VOIGHT, MARIAN W., Houston, Microbiology.  
WHITEMAN, CHARLES D., Jr., Tyler, Earth Sciences.  
WILLIAMS, VICK F., Belton, Medical Sciences.  
WORLEY, FRANK L., Jr., Houston, Engineering.

### *Postdoctoral*

CLARK, JOHN W., Lockhart, Physics.  
HAY, WILLIAM W., Dallas, Earth Sciences.  
KASHY, EDWIN, Houston, Physics.  
KINSY, JIMMY L., Midland, Chemistry.  
LEADBETTER, EDWARD R., Austin, Microbiology.  
WEAVER, JAMES N., College Station, Zoology.

### *Senior Postdoctoral*

LOH, WELLINGTON H. T., Fort Worth, Engineering.  
RIGGS, AUSTIN F., Austin, Biochemistry.

### *Science Faculty*

BENNER, CHARLES P., Houston, Mathematics.  
BISCHOFF, HARRY W., Seguin, Botany.  
DILLON, LAWRENCE S., College Station, Zoology.  
ECHOLS, RENETTE B., Austin, Physics.  
FOUST, SR. CLAUDE M., San Antonio, Mathematics.

GRAHAM, FREDERICK M., Prairie View, Engineering.  
HARDIN, RICHARD L., Beaumont, Chemistry.  
HELMERS, DONALD J., Lubbock, Engineering.  
HUGGINS, FRANK N., Zephyr, Mathematics.  
KIRKWOOD, JAMES I., Prairie View, Agriculture.  
KOEPEL, WELLINGTON W., Dallas, Engineering.  
KROSCHEWSKY, JULIUS R., Odessa, Zoology.  
LOGAN, EARL JR., College Station, Engineering.  
MCLEOD, CLAUDE A., Huntsville, Botany.  
MARMION, KEITH R., Lubbock, Engineering.  
RIGNEY, CARL J., Beaumont, Physics.  
STALEY, RAYMOND C., Austin, Earth Sciences.  
WARDLAW, ALVIN H., Houston, Mathematics.  
WIERUM, FREDERIC A., Houston, Engineering.

### *Summer Fellowships for Graduate Teaching Assistants*

ASHCRAFT, THOMAS L., Jr., Austin, Chemistry.  
AVERITT, ROBERT T., Austin, Mathematical Economics.  
BORDEN, EUGENE W., Beaumont, Earth Sciences.  
CANNON, JOHN R., Houston, Mathematics.  
CANTRELL, WALLACE G., College Station, Physics.  
CLABORN, LUTHER E., Lubbock, Mathematics.  
ELLEGE, JESSE L., Corpus Christi, Chemistry.  
FETZER, HOMER D., San Antonio, Physics.  
GILL, JACK M., Lufkin, Chemistry.  
GROVES, WILLIAM E., Dallas, Biochemistry.  
JACKA, ALONZO D., Houston, Earth Sciences.  
JENNINGS, ALBERT R., Bryan, Earth Sciences.  
JONES, CHARLES E., College Station, Physics.  
LOCKE, CARL E., Jr., Austin, Engineering.  
PAXSON, JOHN B., College Station, Botany.  
POOL, ALEXANDER S., Kirbyville, Earth Sciences.  
RESO, ANTHONY, Houston, Earth Sciences.  
SHANAHAN, RALPH L., Bryan, Engineering.  
SYBERT, JIM R., Morton, Physics.  
WELCH, NATHAN E., Baytown, Engineering.

### *Summer Fellowships for Secondary School Teachers*

ADAMS, CARL R., Sr., Liberty, Physics.  
ANTHONY, JESSIE M., Houston, General Biology.  
BARRETT, ARTHUR T., Sonora, Physics.  
BOURQUEIN, RUSSELL L., Lufkin, Chemistry.  
CARLSON, KENNETH E., Denton, Mathematics.  
CLARKSON, LLAYRON L., Houston, Mathematics.  
DE BAULT, MARY E., Austin, Mathematics.  
DE SHAZO, CHARLES W., Sheridan, Mathematics.  
ESTERGARD, LE ROY C., Agua Dulce, Mathematics.  
FOX, AUGUSTA M., Dallas, Mathematics.  
FOX, REX E., Dumas, Mathematics.  
HARRIS, ORVILLE B., Houston, Mathematics.  
HENDRIX, MARY B., Grand Prairie, Mathematics.  
HOLLIMAN, BILLY C., Gladewater, Zoology.  
JOHNSON, JOEL M., Baytown, Zoology.  
KITCHEN, JAMES W., Port Neches, General Science.  
LOWRANCE, HAZEL M., Port Arthur, Mathematics.  
MILLER, Sr., M. CHRYSOSTOM, O. P., Houston, Mathematics.

MORTON, GWYN H., Dallas, General Science.  
NEY, DONALD P., Crosby, Mathematics.  
NORMAN, MARY R., Webster, Mathematics.  
OWENS, CHARLES W., Dallas, General Science.  
PETRI, ANTHONY, JR., Devine, General Biology.  
RADFORD, GRACE E., Quanah, Mathematics.  
SHURLEY, D'VOE, Galena Park, Mathematics.  
SOWELL, JOHN C., Bloomington, General Science.  
WADE, BELA T., Galena Park, Mathematics.  
WHITE, ST. MARY CLETUS, Laredo, Chemistry.  
WILSON, LOUBERTA B., Houston, Chemistry.  
WOOD, ERMA A., Houston, Mathematics.

#### UTAH

##### *Graduate*

BERGESON, HAVEN E., Salt Lake City, Physics.  
BREWER, JOHN M., Vernal, Biochemistry.  
BROWN, DAVID L., Salt Lake City, Psychometrics.  
EVERETT, GLEN E., St. George, Physics.  
GILES, EUGENE, Salt Lake City, Anthropology.  
ISRAELSEN, BOYD P., Logan, Engineering.  
LAWRENCE, GEORGE M., Salt Lake City, Physics.  
MORTIMER, ROBERT G., Logan, Chemistry.  
PICKERING, RANARD J., Provo, Earth Sciences.  
ROSS, KENNETH A., Salt Lake City, Mathematics.  
RUNNELLS, DONALD D., Salt Lake City, Earth Sciences.

##### *Cooperative Graduate*

ANDERSEN, TERRELL N., Salt Lake City, Chemistry.  
BOYACK, JAMES R., Salt Lake City, Chemistry.  
CANNON, LAWRENCE O., Logan, Mathematics.  
CAPNER, ROBERT L., Salt Lake City, Physics.  
COATES, RALPH L., Salt Lake City, Engineering.  
CRIDDLE, RICHARD S., Salt Lake City, Biochemistry.  
EYRING, EDWARD M., Salt Lake City, Chemistry.  
JENSEN, GORDON E., North Salt Lake, Engineering.  
JOHNSON, DAVID L., Dugway, Engineering.  
JOHNSON, OWEN W., Salt Lake City, Physics.  
MONTGOMERY, JOEL K., Provo, Earth Sciences.  
OLSEN, JANET MAUDE R., Ogden, Mathematics.  
PAUL, EDWARD G., Salt Lake City, Chemistry.  
ULRICH, GAIL D., Devils Slide, Engineering.

##### *Postdoctoral*

MORTENSEN, EARL M., Salt Lake City, Chemistry.  
PINCOCK, RICHARD E., Ogden, Chemistry.

##### *Science Faculty*

BISHOP, A. ALVIN, Logan, Engineering.  
CLYDE, CALVIN G., Lake City, Engineering.  
JONES, LEWIS W., Logan, Microbiology.

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

ANDERSEN, TERRELL N., Salt Lake City, Chemistry.  
BOYACK, JAMES R., Salt Lake City, Chemistry.

TEERLINK, WILFORD J., Salt Lake City, Chemistry.  
WAGNER, RICHARD L., JR., Salt Lake City, Physics.  
WISER, HORACE C., Salt Lake City, Mathematics.

#### VERMONT

##### *Graduate*

FINEMAN, JOSEPH C., Shaftsbury, Physics.  
NORCROSS, BRUCE E., Island Pond, Chemistry.  
SARGENT, G. DANN, Barre, Chemistry.  
VILLERS, PHILIPPE, Bellows Falls, Engineering.

##### *Science Faculty*

HARTNETT, JOHN C., Burlington, Medical Science.  
SAUL, GEORGE B., Norwich, Zoology.  
TUTHILL, ARTHUR F., Willistown, Engineering.

##### *Summer Fellowships for Secondary School Teachers*

THERRIEN, ST. MARTHA FRANCIS, Swanton, Mathematics.

#### VIRGINIA

##### *Graduate*

ADAMS, JOHN B., Charlottesville, Physics.  
BAILEY, ROBERT E., Arlington, Chemistry.  
GARRICK, MICHAEL D., Hampton, Biochemistry.  
GOOGE, WILLIAM D., Arlington, Mathematics.  
GRAY, FRANCES E., Richmond, Chemistry.  
HALEY, JOSEPH A., Ashland, Mathematics.  
JOLLY, H. PAUL, JR., Richmond, Physics.  
LIGHT, ROBLEY J., Roanoke, Chemistry.  
MURRAY, JOSEPH J. JR., Lexington, Genetics.  
RENNINGER, GEORGE H., Fredericksburg, Physics.  
STARNES, WILLIAM H., JR. Ewing, Chemistry.  
THOMPSON, JOSEPH B., Arlington, Medical Science.  
WAMPLER, JESSE M., Linville, Earth Science.

##### *Cooperative Graduate*

BARNARD, MARLENE B., Richmond, Chemistry.  
BOWEN, LAWRENCE H., Lynchburg, Chemistry.  
DENNIS, ROBERT T., Falls Church, Earth Science.  
FLOURNOY, PHILIP A., Charlottesville, Physics.  
GIBERT, ANNE J., Arlington, Zoology.  
HOLOVIAK, DENNIS, Vienna, Physics.  
JOHNSON, CARL R., Orange, Chemistry.  
LOBE, LYDIA R., Manassas, Mathematics.  
MCCLANAHAN, CHARLENE, Grundy, Genetics.  
MCDIARMID, ROBERT C., Vienna, Engineering.  
PENNEY, CARL M., Newport News, Engineering.  
PENNINGTON, JOHN T., Fairfax, Chemistry.  
PLEASANTS, BEVERLY A., Richmond, Genetics.  
QUESENBERY, CHARLES P., Centerville, Mathematics.  
SETTLES, RONALD D., Blacksburg, Physics.  
SHULL, DON L., Fredericksburg, Chemistry.  
STONE, J. CONLEY, Bassett, Engineering.  
THOMAS, KEITH S., Weyers Cave, Physics.

YEATTS, VIRGINIA D., Meadows of Dan, Ge-  
netics.

#### *Postdoctoral*

FLANAGAN, JOHN F., Blacksburg, Medical  
Sciences.

ROSENBLUM, MARVIN, Charlottesville, Mathe-  
matics.

#### *Science Faculty*

DAVIS, ROBERT L., Charlottesville, Mathe-  
matics.

KAPP, MARY E., Richmond, Chemistry.

KENDALL, HARRY W., Emory, Physics.

PACE, W. EMORY, Blacksburg, Mathematics.

PAP, ARPAD A., Blacksburg, Engineering.

UPDIKE, OTIS L., Jr., Charlottesville, Phys-  
ical Sciences General.

#### *Summer Fellowships for Graduate Teach- ing Assistants*

GARLAND, JAMES W., Jr., Arlington, Physics.

JOHNSTON, NORMAN J., Charlottesville, Chemistry.

NEWSOME, ROSS W., Jr., Ettrick, Physics.

#### *Summer Fellowships for Secondary School Teachers*

BECKER, MARIANA R., Norfolk, Chemistry.

BENSON, WILLIAM L., Arlington, Mathe-  
matics.

GRABEEL, J. GENE, Ewing, General Science.

HILLMAN, THOMAS P., Arlington, Mathe-  
matics.

HODGE, ROBERT A., Fredericksburg, General  
Science.

JAMESON, RICHARD E., Arlington, Mathe-  
matics.

MCCULLOUGH, JAMES M., Arlington, Chem-  
istry.

PACKARD, HARRY B., Arlington, Physics.

SCOTT, MARY J., Shipman, General Biology.

WOOD, MARY L., Arlington, Zoology.

#### WASHINGTON

##### *Graduate*

ARMSTRONG, RICHARD L., Seattle, Earth Sci-  
ences.

BIRKELAND, PETER W., Bellevue, Earth Sci-  
ences.

BRAUN, ROBERT L., Issaquah, Chemistry.

BROOKS, FLOYD L., Jr., Seattle, Chemistry.

BROWN, RONALD E., Everett, Physics.

CHANG, DAVID B., Seattle, Physics.

CRASWELL, KEITH J., Port Orchard, Mathe-  
matics.

CRICHTON, JAMES H., Seattle, Physics.

ESPER, HILDEGARD, Seattle, Genetics.

FAHRNEY, DAVID E., Tacoma, Biochemistry.

FIDDLER, RICHARD W., Kirkland, Physics.

FLEMING, RONALD F., Aberdeen, Engineer-  
ing.

HSU, ROBERT W., Seattle, Mathematical Lin-  
guistics.

JENKINS, DAVID A., Seattle, Engineering.

JOHNSON, DEAN M., Tacoma, Earth Sciences.

KUEHL, LE ROY, Cook, Biochemistry.

LANPHERE, MARVIN A., Spokane, Earth Sci-  
ences.

LARSON, DONALD C., Seattle, Engineering.

LEPSE, PAUL A., Seattle, Chemistry.

LUBAN, MARSHALL, Seattle, Physics.

MACLAREN, M. DONALD, Seattle, Mathe-  
matics.

MCNEILL, DALE, Tacoma, Physics.

MILLER, RONALD E., Seattle, Mathematical  
Economics.

PEEKEMA, RICHARD M., Pullman, Chemistry.

SAGLE, ARTHUR A., Seattle, Mathematics.

SHACKLEFORD, WILLIAM L., Seattle, Engi-  
neering.

TOBLER, WALDO R., Tacoma, Geography.

WRIGHT, JON A., Tacoma, Physics.

YOWELL, CAROL E., Seattle, Physics.

#### *Cooperative Graduate*

BISHOP, NANCY H., Wapato, Microbiology.

CALVO, JOSEPH M., Seattle, Biochemistry.

FAIBCHILD, CLIFFORD E., Seattle, Physics.

HARDY, ROBERT J., Port Angeles, Physics.

HARRIS, THOMAS, Seattle, Chemistry.

HOWES, WILLIAM V., Tacoma, Biochemistry.

JOHNSON, LAWRENCE D., Tacoma, Engineer-  
ing.

LOBRE, THOMAS R., Vancouver, Physics.

MATHEWS, WILLIAM G., Wenatchee, Physics.

MCDANIELS, DAVID K., Seattle, Physics.

MCINTYRE, DAVID H., Renton, Earth Sciences.

PARKS, JACK G., Seattle, Physics.

PERESSINI, ANTHONY L., Pullman, Mathe-  
matics.

REPLOGLE, LANNY L., Seattle, Chemistry.

ROBINSON, RICHARD C., Seattle, Engineering.

SCHMIDT, VICTOR HUGO, Seattle, Physics.

THORNTON, JOHN A., Seattle, Engineering.

ULRICH, MARIAN I., Walla Walla, Microbi-  
ology.

WAKE, DAVID B., Parkland, Zoology.

WHITMORE, CHARLES F., Seattle, Engi-  
neering.

#### *Postdoctoral*

BAYES, KYLE D., Edmonds, Chemistry.

CRAVEN, JAMES M., Seattle, Chemistry.

GETOOR, RONALD K., Seattle, Mathematics.

HUGHES, DANIEL R., Bothell, Mathematics.

MYHRE, PHILIP C., Tacoma, Chemistry.

ROE, DAVID K., Tacoma, Chemistry.

TONKYN, RICHARD G., Seattle, Chemistry

#### *Senior Postdoctoral*

EDMONDSON, W. T., Seattle, Zoology.

#### *Science Faculty*

COLCORD, JOSIAH E., Jr., Seattle, Earth  
Sciences.

GIDEON, EDITH M., Bremerton, Physics.

KINGSTON, J. MAURICE, Seattle, Mathematics.

KNAPMAN, FRED W., Bellingham, Chemistry.

KNOX, RICHARD F., Pullman, Engineering.

SAVEDOFF, LYDIA G., Spokane, Chemistry.

WOOD, REV. FRANCIS P., Seattle, Engineer-  
ing.

#### *Summer Fellowships for*

##### *Graduate Teaching Assistants*

ACTON, HORACE C., Pullman, Microbiology.

LANPHERE, MARVIN A., Spokane, Earth  
Sciences.

LINDHOLM, FRED A., Seattle, Engineering.

PEARCE, JACK B., Seattle, Zoology.

PEEKEMA, RICHARD M., Pullman, Chemistry.

WAKE, DAVID B., Parkland, Zoology.

#### *Summer Fellowships for*

##### *Secondary School Teachers*

AHO, WILLIAM M., Kelso, General Science.

ALEKSEY, VINCENT R., Aberdeen, Mathe-  
matics.

ASMAN, SR. MONICA, O.S.F., Winlock, Zool-  
ogy.

CAMARA, JOSEPH, E. Wenatchee, Zoology.

CROSS, HAROLD D., Tacoma, Mathematics.



HARRIS, ROBERT L.,<sup>1</sup> Chewelah, Zoology.  
LOUDERBACK, HUESTON M., Spokane, Physics.  
MERRILL, GERALD E., Enumclaw, Chemistry.  
PERRY, JANET L., Ridgefield, Mathematics.  
STAKKESTAD, JAMES M., Pasco, Mathematics.

#### WEST VIRGINIA

##### *Graduate*

BURDICK, DONALD S., Huntington, Mathematics.  
CAMPBELL, LAURENCE J., Huntington, Physics.  
FRAME, ROBERT A., Jr., Charleston, Chemistry.  
LAND, HUGH C., Huntington, Zoology.  
MANN, JAMES E., Jr., Bluefield, Engineering.  
WILLIAMSON, THOMAS G., Bluefield, Physics.

##### *Cooperative Graduate*

ARMSTRONG, JAMES C., Parkersburg, Physics.  
CHISLER, JOHN A., Mt. Clare, Botany.  
GWINN, JOEL A., Morgantown, Physics.  
PARDUE, HARRY L., Big Creek, Chemistry.  
ROE, DONALD W., Wheeling, Chemistry.  
WHEELER, JAMES W., Jr., Fairmont, Chemistry.

##### *Postdoctoral*

BAULD, NATHAN L., Clarksburg, Chemistry.

##### *Senior Postdoctoral*

NASH, JOHN, Bluefield, Mathematics.

##### *Science Faculty*

GILBERT, CHARLES R., Bluefield, Zoology.  
POPOVICH, PETER, Morgantown, Chemistry.

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

ARMSTRONG, JAMES C., Parkersburg, Physics.  
CLARKSON, ROY B., Morgantown, Botany.  
COLE, DAVID D., Fairmont, Psychology.  
FRAME, ROBERT A., Jr., Charleston, Chemistry.  
JEWETT, JOHN G., Huntington, Chemistry.  
PACOSKY, EDWARD A., Morgantown, Chemistry.

##### *Summer Fellowships for Secondary School Teachers*

BOONE, WELDON W., Sandstone, General Biology.  
SIMON, JACK L., Parkersburg, General Science.  
SIMON, RUTH F., Parkersburg, Mathematics.

#### WISCONSIN

##### *Graduate*

AITKEN, DONALD W., Jr., Madison, Physics.  
BRONIKOWSKI, THOMAS A., Milwaukee, Chemistry.  
BUSHNELL, WILLIAM R., Madison, Botany.  
HABERSTROH, ROBERT A., Wauwatosa, Physics.  
HARRIMAN, JOHN E., Appleton, Chemistry.  
HARTMAN, THOMAS F., Oshkosh, Psychology.  
HENSEL, GUSTAV, Sheboygan, Mathematics.  
HEYERDAHL, NORMAN E., Fond du Lac, Physics.  
HOBEN, ALLAN, Milwaukee, Anthropology.  
HOUGEN, JON T., Sheboygan, Chemistry.  
HUNDHAUSEN, ARTHUR J., Wausau, Physics.  
JACOBS, STANLEY J., Hartland, Mathematics.  
JONES, EVAN T., Madison, Chemistry.

KADLEC, ROBERT, Racine, Engineering.  
KOHLER, ROBERT E., Jr., Kohler, Chemistry.  
LINK, JOHN K., Madison, Physics.  
MAKOUS, WALTER, Wauwatosa, Psychology.  
MILLER, GERALD R., Milwaukee, Chemistry.  
ONTZEL, GEORGE N., Beloit, Engineering.  
PEFFERKORN, ELMER R., Jr., Manitowoc, Medical Sciences.  
PREIFFER, RUSSELL R., Milwaukee, Engineering.  
POMRANING, GERALD C., Oshkosh, Engineering.  
ROESSLER, FRED L., Wauwatosa, Physics.  
SHARP, TERRY E., La Crosse, Chemistry.  
SMITH, DOUGLAS L., Madison, Chemistry.  
SMITH, TIMOTHY A., Milwaukee, Psychology.  
STEIGELMANN, EDWARD F., Milwaukee, Chemistry.  
SUTTON, PAUL W., Sparta, Chemistry.  
TREICHEL, PAUL M., Jr., Madison, Chemistry.  
WAGNER, EUGENE R., Madison, Chemistry.

##### *Cooperative Graduate*

BANASZAK, LEONARD J., Milwaukee, Biochemistry.  
BRANDT, JOHN C., Williams Bay, Astronomy.  
BRILL, WESLEY A., Beloit, Engineering.  
CIRACKS, KENNETH W., West Bend, Earth Sciences.  
FREA, JAMES I., Sturgeon Bay, Microbiology.  
GOSHAW, ALFRED T., West Bend, Engineering.  
HANN, ROBERT A., Mazomanie, Engineering.  
HOLBROW, CHARLES H., Madison, Physics.  
KRAUSE, EUGENE F., Kenosha, Mathematics.  
LEYSIEFFER, FREDERICK W., Wauwatosa, Mathematics.  
MARTEN, GORDON C., Wausau, Agriculture.  
MEYER, Sr. GREGORY MARIE, O.S.F., Milwaukee, Mathematics.  
MUELLER, HELMUT C., Milwaukee, Zoology.  
OLSON, GENE E., Bristol, Engineering.  
REESE, ERNST S., Madison, Zoology.  
SCHMIDT, JOHN E., Port Washington, Engineering.  
SOULEN, THOMAS K., Madison, Biochemistry.  
STEINHART, JOHN S., Madison, Earth Sciences.  
SUTTIE, JOHN W., Ettrick, Biochemistry.  
WILLIAMS, MICHAEL C., Waukesha, Engineering.  
ZAWADZKI, JOSEPH F., Withee, Chemistry.

##### *Postdoctoral*

BURNS, WILLIAM C., Madison, Zoology.  
ERNST, FREDERICK J., Jr., Madison, Physics.  
HAMMES, GORDON G., Fond du lac, Chemistry.  
OHM, JACK E., Milwaukee, Mathematics.  
WALECKA, JOHN D., Wauwatosa, Physics.

##### *Senior Postdoctoral*

MORRISON, PETER R., Madison, Zoology.  
STONE, WILLIAM H., Madison, Genetics.

##### *Science Faculty*

BRADISH, JOHN P., Milwaukee, Engineering.  
FRASER, LEMUEL A., Madison, Zoology.  
KENNINGTON, GARTH S., Appleton, General Biology.  
KOCH, GILBERT H., Milwaukee, Biochemistry.  
LAY, ANNE B., Milwaukee, Zoology.  
MIKOL, EDWARD P., Madison, Engineering.  
NELSON, ROGER R., Madison, Engineering.  
RIDEOUT, VINCENT C., Madison, Mathematics.

<sup>1</sup> Deceased.

**Summer Fellowships for Graduate Teaching Assistants**

AUSMAN, JOHN M., Manitowoc, Engineering.  
 CIRIACKS, KENNETH W., West Bend, Earth Sciences.  
 HANSCHKE, WESLEY J., Madison, Psychology.  
 HAZELWOOD, DONALD H., Necedah, Zoology.  
 KILIAN, KENNETH C., Juneau, Agriculture.  
 KITZE, PAUL T., Lake Geneva, Engineering.  
 KRAHANEZEL, CHARLES S., Madison, Chemistry.  
 LAW, JOHN JR., Madison, Engineering.  
 MAIER, CLIFFORD L., Madison, History of Science.  
 NORDMAN, JAMES E., Manitowac, Engineering.  
 SEGUIN, CHARLES P., Madison, Mathematics.  
 STRUIK, GWENDOLYN J., Madison, Botany.  
 THOMPSON, LEE F., Madison, Chemistry.  
 WOOLSEY, NEIL F., Madison, Chemistry.  
 ZAWADZKI, JOSEPH F., Withee, Chemistry.

**Summer Fellowships for Secondary School Teachers**

AUSLAND, ROBERT C., Delafield, Chemistry.  
 BARTELT, JOHN M., Marlon, Mathematics.  
 BAUER, RUSSELL P., Edgerton, Physics.  
 BYERS, WILLIAM M., Milwaukee, Mathematics.  
 DALTON, LE ROY C., Wauwatosa, Mathematics.  
 DALTON, ROBERT E., Oshkosh, Mathematics.  
 DOUGLAS, JAMES R., Coleman, Mathematics.  
 DUFFY, THOMAS H., Wauwatosa, Mathematics.  
 FARRELL, PATRICK J., Green Bay, General Science.  
 GALE, CALVIN W., Madison, Physics.  
 HAGLUND, ROBERT J., Green Bay, Mathematics.  
 HANSON, ROBERT G., Marlon, Mathematics.  
 KARNATH, BRUCE A., Mosinee, Chemistry.  
 KELLY, ROY E., Kohler, Mathematics.  
 KLYSEN, HENRY P., Green Bay, Mathematics.  
 KRAUSE, PHILIP L., Racine, Chemistry.  
 LARSON, ROBERT G., West Bend, Botany.  
 LICHTENBERG, DONOVAN R., Madison, Mathematics.  
 MACKERTICH, ALEX, Milwaukee, Mathematics.

NICHOLSON, THOMAS W., Poynette, Earth Sciences.  
 OLSON, HERMAN M., Schofield, Mathematics.  
 PEACOCK, BENJAMIN N., Wauwatosa, Physics.  
 REINDERS, Sr. M. HENRIELLA, Superior, General Biology.  
 REYNOLDS, JAMES R., Sturgeon Bay, General Biology.  
 STONEBARGER, CHARLES W., Hartland, General Biology.  
 WEILBER, JOHN F., Kiel, Mathematics.  
 WETAK, HUBERT F., Appleton, Mathematics.  
 ZIEGLER, Sr. MARY BRUNO, Marinette, Mathematics.

**WYOMING**

**Graduate**

BARNES, WILLIAM C., Casper, Earth Sciences.  
 SADDLER, JOHN R., Riverton, Biochemistry.

**Cooperative Graduate**

HENDERSON, RICHARD N., Casper, Anthropology.  
 SCHWID, JULIE D., Laramie, Mathematics.  
 SHAVER, FRED H., Laramie, Engineering.  
 THOMAS, KATHRYN H., Cody, Medical Sciences.

**Postdoctoral**

KLEINDIENST, MAXINE R., Worland, Anthropology.

**Science Faculty**

MULLER, BURTON H., Laramie, Physics.

**Summer Fellowships for Graduate Teaching Assistants**

HENDERSON, RICHARD N., Casper, Anthropology.

**Summer Fellowships for Secondary School Teachers**

BEITEL, MILTON J., Casper, General Biology.  
 KINZER, RICHARD E., Kinnear, Physics.

**PUERTO RICO**

**Science Faculty Fellowships**

FROHNHOEFFER, JOSEPH H., Ponce, Physics.

**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
Alabama, University of, University, Ala.	3	2					2
Alabama Polytechnic Institute, Auburn, Ala.	3						1
Albert Einstein College of Medicine, Yeshiva University, New York, N.Y.			1				
Albertus Magnus College, New Haven, Conn.					1		
American University, Washington, D.C.						2	
Amherst College, Amherst, Mass.					1		
Antioch College, Yellow Springs, Ohio.							1
Arizona State College, Flagstaff, Ariz.					1	2	2
Arizona, University of, Tucson, Ariz.	4	2			1	5	2
Arkansas, University of, Fayetteville, Ark.	4	1			1	4	
Atlanta University, Atlanta, Ga.						2	
Ball State Teachers College, Muncie, Ind.						2	2
Boston College, Chestnut Hill, Mass.						1	
Boston University, Boston, Mass.	4						6
Brandeis University, Waltham, Mass.		1					

*Institutes Chosen by Fellowship Awardees—Continued*

	A	B	C	D	E	F	G
Brigham Young University, Provo, Utah							1
Brooklyn, Polytechnic Institute of, Brooklyn, N.Y.	4	4					
Brown University, Providence, R.I.	6	5	1		3	1	3
Bryn Mawr College, Bryn Mawr, Pa.	2						2
Buffalo, University of, Buffalo, N.Y.	1	1				1	2
California Institute of Technology, Pasadena, Calif.	15	88	6	2	5		11
California, University of, Berkeley, Calif.	42	86	6	2	19	4	25
California, University of, Davis, Calif.		1	1		1		
California, University of, La Jolla, Calif.		1			1		
California, University of, Los Angeles, Calif.	18	12	1		6	9	3
California, University of, San Francisco, Calif.		1					
California, University of Southern, Los Angeles, Calif.	2	1			2	6	2
Carleton College, Northfield, Minn.						1	
Carnegie Institute of Technology, Pittsburgh, Pa.	10	15					2
Case Institute of Technology, Cleveland, Ohio	5	1			2	1	3
Catholic University of America, Washington, D.C.	1				1	14	
Central Michigan College, Mt. Pleasant, Mich.						1	
Chattanooga, University of, Chattanooga, Tenn.						1	
Chicago, University of, Chicago, Ill.	23	57	4		7	2	16
Cincinnati, University of, Cincinnati, Ohio.	1					2	3
Clark University, Worcester, Mass.	1					1	1
Clarkson College of Technology, Potsdam, N.Y.						1	
Clemson Agricultural College, Clemson, S.C.						1	
Colby College, Waterville, Maine.						1	
Colgate University, Hamilton, N.Y.						1	
Colorado School of Mines, Golden, Colo.	1	1					
Colorado State College of Education, Greeley, Colo.					1	5	
Colorado State University, Fort Collins, Colo.					1	1	
Colorado, University of, Boulder, Colo.	7	4			3	21	5
Columbia University, New York, N.Y.	29	41	4	2	3	14	11
Columbia University Teachers College, New York, N.Y.		1					
Connecticut, Teachers College of, New Britain, Conn.						1	
Connecticut, University of, Storrs, Conn.	4						2
Cornell University, Ithaca, N.Y.	32	25	3		5	7	14
Dartmouth College, Hanover, N.H.		1					
Delaware, University of, Newark, Del.	7	2				1	
Denver, University of, Denver, Colo.						1	
De Paul University, Chicago, Ill.						2	
Detroit, University of, Detroit, Mich.						6	
Drake University, Des Moines, Iowa.						3	
Duke University, Durham, N.C.	1	5	1		1	4	4
Duquesne University, Pittsburgh, Pa.	1						
Emory University, Atlanta, Ga.	3	1				3	2
Evansville College, Evansville, Ind.						1	
Florida State University, Tallahassee, Fla.	5	5			1	5	3
Florida, University of, Gainesville, Fla.	6	4			2	5	2
Fordham University, New York, N.Y.	6	2				16	4
Fort Valley State College, Fort Valley, Ga.						1	
Georgia Institute of Technology, Atlanta, Ga.	6	3			3		1
Georgia, University of, Athens, Ga.	2					2	2
Georgetown University, Washington, D.C.	1	1					2
George Washington University, Washington, D.C.	2		2			3	1
Gonzaga University, Spokane, Wash.						1	
Harvard University, Cambridge, Mass.	21	177	11	2	10	10	9
Hawaii, University of, Honolulu, Hawaii.	1			1	1	2	
Hendrix College, Conway, Ark.					1		
Hofstra College, Hempstead, N.Y.						1	
Holy Cross, College of the, Worcester, Mass.						1	
Houston, University of, Houston, Tex.	4	1				1	
Idaho, College of, Caldwell, Idaho.						1	
Idaho, University of, Moscow, Idaho.						2	
Illinois Institute of Technology, Chicago, Ill.	8	3			1	1	5
Illinois, University of, Urbana, Ill.	47	27	2		12	7	33
Immaculate Heart College, Los Angeles, Calif.						1	
Indiana University, Bloomington, Ind.	9	9	2		3	10	3
Institute for Advanced Study, Princeton, N.J.			18	3	2		
Iowa State University of Science and Technology, Ames, Iowa.	21	4			5		5
Iowa State, University of, Iowa City, Iowa.	12	4			4	4	8
Iowa State Teachers College, Cedar Falls, Iowa.						3	
John Carroll University, Cleveland, Ohio.						1	
Johns Hopkins University, Baltimore, Md.	9	22	4				4
Kansas State College, Manhattan, Kans.					1		
Kansas State College of Agriculture and Applied Science, Manhattan, Kans.		1					
Kansas State Teachers College, Pittsburg, Kans.						1	
Kansas State Teachers College, Emporia, Kans.						5	
Kansas State University, Manhattan, Kans.	7						5
Kansas, University of, Lawrence, Kans.	8	8			2	2	5
Kent State University, Kent, Ohio.						1	
Kentucky, University of, Lexington, Ky.	11	1			1	2	3
Knox College, Galesburg, Ill.						1	
Lamar State College of Technology, Beaumont, Tex.						1	
Lehigh University, Bethlehem, Pa.	5				1	1	2
Long Beach State College, Long Beach, Calif.						1	

*Institutes Chosen by Fellowship Awardees—Continued*

	A	B	C	D	E	F	G
Louisiana State University and Agri. and Mech. College	9	1			1	1	6
Louisville, University of, Louisville, Ky.	3						1
Loyola University, Chicago, Ill.	3	2					2
Loyola University, Los Angeles, Calif.						1	
Marquette University, Milwaukee, Wis.						7	
Maryland, University of, College Park, Md.	9					9	7
Massachusetts Institute of Technology, Cambridge, Mass.	46	103	4	1	8	1	28
Medical College of Virginia, Richmond, Va.	1						
Miami, University of, Coral Gables, Fla.		1			1		
Michigan State University of Agriculture and Applied Sciences, East Lansing, Mich.	20	2			4		12
Michigan, University of, Ann Arbor, Mich.	41	31			9	11	22
Midwestern University, Wichita Falls, Tex.						1	
Minnesota, University of, Minneapolis, Minn.	28	15			5	8	16
Mississippi College, Clinton, Miss.						1	
Mississippi, University of, University, Miss.						2	
Missouri, University of, Columbia, Mo.	11					2	7
Montana State College, Bozeman, Mont.						3	
Montana State University, Missoula, Mont.						2	
Morehead State College, Morehead, Ky.						1	
Morgan State College, Baltimore, Md.						1	
Nebraska State Teachers College, Wayne, Nebr.						1	
Nebraska, University of, Lincoln, Nebr.	7	3				3	5
New Hampshire, University of, Durham, N.H.						1	
New Mexico Highlands University, Las Vegas, N. Mex.		1				1	
New Mexico, University of, Albuquerque, N. Mex.	2				1	1	1
New School for Social Research, New York, N.Y.	1						
New York State University of, College for Teachers at Albany, N.Y.							
New York State, University of, Syracuse, N.Y.					2	1	
New York State, University of, Teachers College at New Paltz							
New York University, New York, N.Y.	30	3	1		4	1	3
North Carolina, Agricultural and Technical College of, Greensboro, N.C.						6	
North Carolina College, Durham, N.C.						1	
North Carolina State College of Agriculture and Engineering Raleigh, N.C.		1					
North Carolina State College, Raleigh, N.C.	8				1		6
North Carolina, University of, Chapel Hill, N.C.	7	7			2	6	5
North Dakota Agricultural College, State College, N. Dak.						1	
North Dakota, University of, Grand Forks, N. Dak.	1					3	1
North Texas State College, Denton, Tex.						2	
Northeast Missouri State Teachers College, Kirksville, Mo.						1	
Northwestern State College of Louisiana, Natchitoches, La.						1	
Northwestern University, Evanston, Ill.	12	7			2	1	5
Northwestern University, Stranewey Laboratory, England.			1				
Notre Dame, University of, Notre Dame, Ind.	7	3			1	48	2
Ohio State University, Columbus, Ohio.	31	7			4	7	23
Ohio University, Athens, Ohio.						2	
Oklahoma City University, Okla.						1	
Oklahoma State University of Agriculture and Applied Science		4				8	
Oklahoma State University, Stillwater, Okla.	8				5		6
Oklahoma, University of, Norman, Okla.	7	5			3	24	3
Oregon State College, Corvallis, Oreg.	10		1	1	1	6	6
Oregon, University of, Eugene, Oreg.	2	2				5	1
Pacific, College of the, Stockton, Calif.						8	
Pennsylvania State University, University Park, Pa.	21	7	3		3	14	14
Pennsylvania, University of, Philadelphia, Pa.	13	3			2	6	9
Pittsburgh, University of, Pittsburgh, Pa.	12				3	5	6
Princeton University, Princeton, N.J.	17	71	4	1	10	1	9
Purdue University, Lafayette, Ind.	35	4			8	12	17
Queens College, New York					1		
Radcliffe College, Cambridge, Mass.	3	13					1
Reed College, Portland, Oreg.						1	
Rensselaer Polytechnic Institute, Troy, N.Y.	6	3			1		5
Rice Institute, Houston, Tex.	6	7			2		3
Rochester, University of, Rochester, N.Y.	8	3			1	2	6
Rockefeller Institute, New York City, N.Y.			3				
Rutgers, The State University, New Brunswick, N.J.	6	1			1	2	9
St. Bonaventure University, St. Bonaventure, N.Y.						1	
St. Johns University, Brooklyn, N.Y.						1	
St. Louis University, St. Louis, Mo.	5	3			1	16	3
San Francisco State College, San Francisco, Calif.						1	
San Jose State College, San Jose, Calif.						2	
South Carolina, University of, Columbia, S.C.	1					1	
South Dakota State College of Agriculture and Mechanical Arts, Brookings, S. Dak.							1
South Dakota, University of, Vermillion, S. Dak.						12	
Southern Illinois University, Carbondale, Ill.						1	
Southern Methodist University, Dallas, Tex.						2	
Southern Oregon College, Ashland, Oreg.						1	
Stanford University, Stanford, Calif.	21	44	2		19	6	14
State College of Washington, Pullman, Wash.	6	1			1	2	5

*Institutes Chosen by Fellowship Awardees—Continued*

	A	B	C	D	E	F	G
State Teachers College, East Stroudsburg, Pa.						1	
Stevens Institute of Technology, Hoboken, N. Y.					2		
Syracuse University, Syracuse, N. Y.	5				2	6	6
Temple University, Philadelphia, Pa.	3						2
Tennessee, University of, Knoxville, Tenn.	8	3			1	1	2
Texas, Agricultural and Mechanical College of, College Station, Tex.	1				2	4	7
Texas College of Arts and Industry, Kingsville, Tex.						1	
Texas Southern University, Houston, Tex.						1	
Texas, University of, Austin, Tex.	18	8			3	9	8
Trinity College, Hartford, Conn.						1	
Tufts University, Medford, Mass.						1	
Tulane University, New Orleans, La.	3						2
Tuskegee Institute, Tuskegee, Ala.						1	
Utah State University, Logan, Utah.	3						
Utah, University of, Salt Lake City, Utah	10	1			1	2	5
Ursuline College, Louisville, Ky.						1	
Vanderbilt University, Nashville, Tenn.	5	1					3
Vermont, University of, Burlington, Vt.					1		
Villanova University, Villanova, Pa.						1	
Virginia Polytechnic Institute, Blacksburg, Va.	4	1			1	1	
Virginia, State College, Petersburg, Va.						2	
Virginia, University of, Charlottesville, Va.	6	3			1	2	2
Washington University, St. Louis, Mo.	7	4	1			4	3
Washington, University of, Seattle, Wash.	13	11	1		8	3	2
Wayne State University, Detroit, Mich.	6					6	
Wesleyan College, Macon, Ga.						1	
Wesleyan University, Middletown, Conn.						4	
West Virginia University, Morgantown, W. Va.	2						3
Western Illinois University, Macomb, Ill.						3	
Western Michigan University, Kalamazoo, Mich.						3	
Western Reserve University, Cleveland, Ohio.	3	1	1			3	3
William and Mary, College of, Williamsburg, Va.						1	
Wisconsin, University of, Madison, Wis.	44	33	1	2	11	32	32
Wittenberg College, Springfield, Ohio.						1	
Worcester Polytechnic Institute, Worcester, Mass.						1	
Wyoming, University of, Laramie, Wyo.	3					8	
Xavier University, Cincinnati, Ohio.						1	
Yale University, New Haven, Conn.	17	31	1	3	6	2	12

*Foreign Institutions*

	Graduate	Post-doctoral	Senior post-doctoral	Science faculty
Aix-Marseilles, University of, France.				1
Amsterdam, University of, Netherlands.			2	
Basel, University of, Switzerland.		3	1	
Bern, University of, Switzerland.		1	1	
Birmingham, University of, England.		1		1
Bonn, University of, Germany.		1	1	
Bristol, University of, England.		1		
British Columbia, University of, Canada.				2
Cambridge, University of, England.	5	12	10	4
College de France, France.		1	3	
Cologne, University of, Germany.			1	
Copenhagen, University of, Denmark.		9	6	2
Durham, University of, England.				1
Ecole Polytechnique, France.		1		
Frankfurt, University of, Germany.		1		
Free University of Brussels, Belgium.		4		1
Geneva, University of, Switzerland.		1	2	1
Glasgow, University of, Scotland.		1		2
Goethe University, Germany.		1		
Gottingen, University of, Germany.		1		
Grenoble, University of, France.			1	
Heidelberg, University of, Germany.		2		1
Helsinki, University of, Finland.			1	
Innsbruck, University of, Austria.				1
Institute of Theoretical Physics, Netherlands.		1		
Karolinska Institute, Sweden.		2	2	
Leeds, University of, England.		1		
Liverpool, University of, England.		1		
London, University of, England.			14	3
Lovanium, University of, Belgian Congo.				1
Lucknow University, India.		1		
Manchester, University of, England.		2	2	
Melbourne, University of, Australia.				1
Milan, University of, Italy.			1	

*Foreign Institutions—Continued*

	Graduate	Post-doctoral	Senior post-doctoral	Science faculty
Munich, University of, Germany		2	1	3
Munster, University of, Germany		1		
Nancy, University of, France		1		
Nottingham, University of, England		1		
Oxford, University of, England	6	8	4	1
Paris, University of, France	1	9	1	1
Pavia, University of, Italy			2	
Philippines, University of, Republic of the Philippines			1	
Pisa, University of, Italy				1
Politecnico di Milano, Italy			1	
Queensland, University of, Australia			1	1
Reading, University of, England			1	1
Rhodesia, University College of, Southern Rhodesia			1	
Rome, University of, Italy				1
Rothamsted Experimental Station, England		1		
San Marcos, University of, Peru			1	
Sheffield, University of, England				1
Stockholm, University of, Sweden		5		1
Strasbourg, University of, France			2	
Swiss Federal Institute of Technology, Switzerland		1	4	1
Sydney, University of, Australia		1		
Technical College at Delft, Netherlands				2
Technische Hochschule, Barunschweig, Germany				1
Technische Hochschule, Munich, Germany		2		1
Technische Hochschule, Stuttgart, Germany		2		
Toronto, University of, Canada				1
Tubingen, University of, Germany		2		
Uppsala, University of, Sweden		1		1
Utrecht, University of, Netherlands			3	
Weizmann Institute of Science, Israel		1		
Zurich, University of, Switzerland	1	1	1	1

*Present or Most Recent Institutional Affiliation of Individuals Offered National Science Foundation Science Faculty, Senior Postdoctoral, and Postdoctoral Fellowships*

	Science faculty	Senior post-doctoral	Post-doctoral
Adelphi College, Garden City, N.Y.	1		
Agricultural and Mechanical College of Texas, College Station, Tex.	4		
Agricultural and Technical College of North Carolina, Greensboro, N.C.	3		
Alabama Polytechnic Institute, Auburn, Ala.	3		
Alaska, University of, College, Alaska	3		
Albert Einstein College of Medicine, Yeshiva University, New York, N.Y.		1	
Antioch College, Yellow Springs, Ohio	1		
Arizona State University, Tempe, Ariz.	1		
Arizona, University of, Tucson, Ariz.	2		
Arkansas, University of, Fayetteville, Ark.	1		
Baldwin-Wallace College, Berea, Ohio	1		
Baltimore Junior College, Baltimore, Md.	1		
Barnard College, New York City, N.Y.	1		
Bethany College, Lindsborg, Kans.	1		
Bethune-Cookman College, Daytona Beach, Fla.	1		
Birmingham-Southern College, Birmingham, Ala.	1		
Bluefield State College, Bluefield, W. Va.	1		
Boston College, Chestnut Hill, Mass.	1		
Bowdoin College, Brunswick, Maine	1		
Bowling Green State University, Bowling Green, Ohio	1		
Brandeis University, Waltham, Mass.		1	3
Bridgeport, University of, Bridgeport, Conn.	1		
Brookhaven National Laboratory, New York, N.Y.		2	
Brooklyn College, Brooklyn, N.Y.	1	1	
Brown University, Providence, R.I.	1	1	
Bryn Mawr College, Bryn Mawr, Pa.		1	
Buffalo, University of, Buffalo, N.Y.		1	1
Burlington College, Burlington, Iowa	1		
Butler University, Indianapolis, Ind.	1		
California Institute of Technology, Pasadena, Calif.		2	7
California State Polytechnic College, San Luis Obispo, Calif.	1		
California, University of, Berkeley, Calif.	3	3	15
California, University of, Davis, Calif.		2	
California, University of, Los Angeles, Calif.	1	2	8
California, University of, Riverside, Calif.	2		
California, University of Southern, Los Angeles, Calif.		2	

*Present or Most Recent Institutional Affiliation of Individuals Offered  
National Science Foundation Science Faculty, Senior Postdoctoral, and  
Postdoctoral Fellowships—Continued*

	Science faculty	Senior post- doctoral	Regular post- doctoral
Calvin College, Grand Rapids, Mich.	2		
Cambridge, University of, Cambridge, England			1
Carleton College, Northfield, Minn.	1		
Carnegie Institute of Technology, Pittsburgh, Pa.			1
Case Institute of Technology, Cleveland, Ohio	2		
Catholic University of Puerto Rico, Ponce, Puerto Rico	1		
Cedarville College, Cedarville, Ohio	1		
Central Michigan College, Mount Pleasant, Mich.	1		
Cerritos Junior College, Norwalk, Calif.	1		
Chance Vought Aircraft, Fort Worth, Tex.		1	
Chattanooga, University of, Chattanooga, Tenn.	1		
Chicago, University of, Chicago, Ill.	2	3	13
Chico State College, Chico, Calif.	1		
Cincinnati, University of, Cincinnati, Ohio	2		
Clemson Agricultural College, Clemson, S.C.	2		
Colby Junior College for Women, New London, N.H.	1		
Colorado College, Colorado Springs, Colo.	1		
Colorado, University of, Boulder, Colo.	1	1	
Columbia University, New York City, N.Y.	1	2	11
Connecticut College, New London, Conn.	3		
Connecticut, University of, Storrs, Conn.	1		1
Cooper Union, New York, N.Y.	1		
Copenhagen, University of, Copenhagen, Denmark			1
Cornell University, Ithaca, N.Y.	1	2	2
Cornell University School of Nursing, New York, N.Y.	1		
Creighton University, Omaha, Nebr.	1		
Dartmouth College, Hanover, N.H.	2		
Delaware, University of, Newark, Del.	2		1
Denison University, Granville, Ohio	3		
Denver, University of, Denver, Colo.	1		
Detroit, University of, Detroit, Mich.	1		
Drew University, Madison, N.J.	1		
Drexel Institute of Technology, Philadelphia, Pa.	1		
Duke University, Durham, N.C.		2	2
East Tennessee State College, Johnson City, Tenn.	1		
East Texas State College, East Texas Station, Tex.	1		
El Camino College, El Camino College, Calif.	1		
Eastern Regional Research Laboratory, U.S. Dept. Agri., Philadelphia, Pa.		1	
Emmanuel College, Boston, Mass.	1		
Emory and Henry College, Emory, Va.	1		
Emory University, Atlanta, Ga.	1		
Fairchild Engine Division, Huntington, N.Y.		1	
Florida, University of, Gainesville, Fla.	4		
Fordham University, New York, N.Y.	1		
Fort Hays Kansas State College, Hays, Kans.	1		
Franklin and Marshall College, Lancaster, Pa.	1		
Fullerton Junior College, Fullerton, Calif.	1		
George Washington University, Washington, D.C.	1		
Georgia Institute of Technology, Atlanta, Ga.	2		
Georgia, University of, Athens, Ga.	1	1	
Gettysburg College, Gettysburg, Pa.	1		
Gonzaga University, Spokane, Wash.	1		
Grambling College, Grambling, La.	1		
Harvard University, Cambridge, Mass.	1	2	13
Haverford College, Haverford, Pa.	1		
Hawaii, University of, Honolulu, Hawaii	1		
Hendrix College, Conway, Ark.	1		
Hofstra College, Hempstead, Long Island, N.Y.	1		
Houston, University of, Houston, Tex.	2		
Humboldt State College, Arcata, Calif.	2		
Idaho State College, Pocatello, Idaho	1		
Idaho, University of, Moscow, Idaho	1		
Illinois Institute of Technology, Chicago, Ill.	1		
Illinois State Normal University, Normal, Ill.	1		
Illinois, University of, Urbana, Ill.	2		9
Incarinate Word College, San Antonio, Tex.	1		
Indiana State Teachers College, Terre Haute, Ind.	1		
Indiana University, Bloomington, Ind.	4	1	3
Institute for Advanced Study, Princeton, N.J.			2
Institute Henri-Poincare, Paris, France			1
Iowa State University of Science and Technology, Ames, Iowa	4	1	
Iowa State Teachers College, Cedar Falls, Iowa	1		
Iowa, State University of, Iowa City, Iowa			2
Jamestown Community College, Jamestown, N.Y.	1		
Johns Hopkins University, Baltimore, Md.		1	2
Kansas State College of Agriculture and Applied Science, Manhattan, Kans.	1		
Kansas, University of, Lawrence, Kans.			

*Present or Most Recent Institutional Affiliation of Individuals Offered  
National Science Foundation Science Faculty, Senior Postdoctoral, and  
Postdoctoral Fellowships—Continued*

	Science faculty	Senior post-doctoral	Regular post-doctoral
Kenyon College, Gambier, Ohio.....	1		
King's College, London, England.....			1
Lake States Forest Experimental Station, U.S. Dept. Agri., St. Paul, Minn.		1	
Lamar State College of Technology, Beaumont, Tex.....	3		
Lawrence College, Appleton, Wis.....	1		
Lawrence College, Sarah, Bronxville, N.Y.....	1		
Leeds, University of, Leeds, England.....			1
Lehigh University, Bethlehem, Pa.....	1		1
Lincoln University, Lincoln University, Pa.....	1		
Louisiana Polytechnic Institute, Ruston, La.....	3		
Louisiana State University and Agricultural and Mechanical College, New Orleans, La.....	1		
Louisiana State University and Agricultural and Mechanical College, Baton Rouge, La.....		1	
Macalester College, St. Paul, Minn.....	1		
Manhattan College, New York, N.Y.....	1		
Mankato State College, Mankato, Minn.....	1		
Marquette University, Milwaukee, Wis.....	1		
Mary Washington College of the University of Virginia, Fredericksburg, Va.....	1		
Maryknoll Seminary, Glen Ellyn, Ill.....	1		
Maryland, University of, College Park, Md.....	1	1	3
Massachusetts General Hospital, Boston, Mass.....	1	1	
Massachusetts Institute of Technology, Cambridge, Mass.....	2	1	7
Massachusetts State Teachers College, Bridgewater, Mass.....	1		
Massachusetts, University of, Amherst, Mass.....	2		
Meharry Medical College, Nashville, Tenn.....	1		
Michigan State University of Agriculture and Applied Science, East Lansing, Mich.....	5		
Michigan State University, East Lansing, Mich.....			2
Michigan, University of, Ann Arbor, Mich.....	1	2	3
Millsaps College, Jackson, Miss.....	1		
Milwaukee-Downer College, Milwaukee, Wis.....	1		
Minnesota, University of, Minneapolis, Minn.....	3	3	4
Mississippi State University, State College, Miss.....	2		
Missouri, University of, Columbia, Mo.....	1		
Montana State College, Bozeman, Mont.....	3	1	
Morgan State College, Baltimore, Md.....	1		
Mount Mercy College, Pittsburgh, Pa.....	1		
Mount St. Mary's College, Los Angeles, Calif.....	1		
Mundelein College, Chicago, Ill.....	1		
National Bureau of Standards, Washington, D.C.....		2	
National Institutes of Health, Bethesda, Md.....		1	
U. S. Naval Electronic Laboratory, San Diego, Calif.....		1	
Nebraska, University of, Lincoln, Nebr.....	2		
New Hampshire, University of, Durham, N.H.....	1	1	
New Mexico Institute of Mining & Technology, Socorro, N. Mex.....	1	1	
New York, College of the City of, New York, N.Y.....	4		
New York State Teachers College, Oneonta, N.Y.....	1		
New York University, New York, N.Y.....	1		1
Newark College of Engineering, Newark, N.J.....	1		
North Carolina College at Durham, Durham, N.C.....	2		
North Carolina State College, Raleigh, N.C.....			2
North Carolina, University of, Chapel Hill, N.C.....	1		1
Northeast Missouri State Teachers College, Kirksville, Mo.....	1		
Northern Illinois University, DeKalb, Ill.....	1		
Northwest Nazarene College, Nampa, Idaho.....	1		
Northwestern University, Evanston, Ill.....		2	3
Notre Dame of Maryland, Inc., College of, Baltimore, Md.....	1		
Notre Dame, University of, Notre Dame, Ind.....	1	1	1
Oak Ridge National Laboratory, Oak Ridge, Tenn.....	2	1	
Oberlin College, Oberlin, Ohio.....	2		
Odessa College, Odessa, Tex.....	1		
Ohio State University, Columbus, Ohio.....	1	1	2
Oklahoma State University of Agriculture and Applied Science, Still- water, Okla.....	2		
Oklahoma, University of, Norman, Okla.....	1		
Olympic College, Bremerton, Wash.....	1		
Oregon State College, Corvallis, Oreg.....	2		
Panhandle Agricultural and Mechanical College, Goodwell, Okla.....	1		
Paris, University of, Paris, France.....			2
Pasadena City College, Pasadena, Calif.....	1		
Pennsylvania State University, Behrend Campus, Erie, Pa.....	1		
Pennsylvania State University, Hazleton, Pa.....	1		
Pennsylvania State University, State College, Pa.....	2		
Pennsylvania State University, University Park, Pa.....			1
Pennsylvania, University of, Philadelphia, Pa.....	1	1	4
Phoenix College, Phoenix, Ariz.....	2		
Pittsburgh, University of Pittsburgh, Pa.....	3		
Polytechnic Institute of Brooklyn, Brooklyn, N.Y.....	1		
Pomona College, Claremont, Calif.....	1		



*Present or Most Recent Institutional Affiliation of Individuals Offered National Science Foundation Science Faculty, Senior Postdoctoral, and Postdoctoral Fellowships—Continued*

	Science faculty	Senior post-doctoral	Regular post-doctoral
Prairie View Agricultural and Mechanical College, Prairie View, Tex.	2		
Pratt Institute, Brooklyn, N.Y.		1	
Princeton University, Princeton, N.J.	1	1	10
Principia College, Elsau, Ill.	1		
Purdue University, Lafayette, Ind.	5	2	2
Queens College, Flushing, N.Y.	1		
Rensselaer Polytechnic Institute, Troy, N.Y.	2		
Rhode Island, University of, Kingston, R.I.	2		
Rice Institute, Houston, Tex.			2
Rochester, University of, Rochester, N.Y.	2	4	
Russell Sage College, Troy, N.Y.	1		
Rutgers, The State University, New Brunswick, N.J.			1
Sacramento State College, Sacramento, Calif.	1		
St. Cloud State College, St. Cloud, Minn.	1		
St. Joseph's College, Philadelphia, Pa.	1		
St. Louis University, St. Louis, Mo.	1		
St. Mary of the Springs, College of, Columbus, Ohio.	1		
St. Michael's College, Winooski, Vt.	1		
Sam Houston State Teachers College, Huntsville, Tex.	1		
San Francisco State College, San Francisco, Calif.	1		
San Luis Obispo Junior College, San Luis Obispo, Calif.	1		
Sarah Lawrence College, Bronxville, N.Y.	1		
Seattle University, Seattle, Wash.	1		
South Dakota State, University of, Vermillion, S. Dak.	1		
Southern California, University of, Los Angeles, Calif.	1		
Southern Methodist University, Dallas, Tex.	1		
Southwestern College, Winfield, Kans.	1		
Spelman College, Atlanta, Ga.	1		
Stanford University, Stanford, Calif.		1	7
State College of Washington, Pullman, Wash.	1		
Staten Island Community College, Staten Island, N.Y.			
Stockholm, University of, Stockholm, Sweden			1
Swarthmore College, Swarthmore, Pa.	1		
Syracuse University, Syracuse, N.Y.	1		
Talladega College, Talladega, Ala.	1		
Temple University, Philadelphia, Pa.	1		
Tennessee Polytechnic Institute, Cookeville, Tenn.	1		
Tennessee, University of, Martin, Tenn.	1		
Texas Lutheran College, Seguin, Tex.	1		
Texas Southern University, Houston, Tex.	1		
Texas Technological College, Lubbock, Tex.	2		
Texas, University of, Austin, Tex.	1	1	2
Trinity College, Washington, D.C.	1		
Tufts University, Medford, Mass.	2		
Tulane University, New Orleans, La.			1
Union College and University, Schenectady, N.Y.	1		
Union Junior College, Cranford, N.J.	1		
U.S. Nutrition Laboratory, Dept. of Agri., Ithaca, N.Y.		1	
U.S. Salinity Laboratory, Dept. of Agri., Riverside, Calif.		1	
Utah State University of Agriculture and Applied Science, Logan, Utah.	2		
Utah, University of, Salt Lake City, Utah	1		1
Vassar College, Poughkeepsie, N.Y.	2		
Vermont and State Agricultural College, University of, Burlington, Vt.	1		
Virginia Polytechnic Institute, Blacksburg, Va.	2		
Virginia, University of, Charlottesville, Va.	2		1
Wake Forest College, Winston-Salem, N.C.	1		
Washington and Jefferson College, Washington, Pa.	1		
Washington University, St. Louis, Mo.	1	1	8
Washington, University of, Seattle, Wash.	2	1	2
Wayne State University, Detroit, Mich.		1	
Webster College, Webster Groves, Mo.	1		
Wellesley College, Wellesley, Mass.	1		
West Virginia, University, Morgantown, W. Va.	1		
Western Illinois University, Macomb, Ill.	1		
Western Maryland College, Westminster, Md.	1		
Western Michigan University, Kalamazoo, Mich.	1		
Western Reserve University, Cleveland, Ohio.		2	1
Western Washington College of Education, Bellingham, Wash.	1		
Westmont College, Santa Barbara, Calif.	1		
William Jewell College, Liberty, Mo.	1		
William and Mary, College of, Richmond Professional Institute, Richmond, Va.	1		
William and Mary, College of, Norfolk, Va.	1		
Wisconsin, University of, Madison, Wis.	4	2	5
Wisconsin, University of, Milwaukee, Wis.	1		
Wittenberg College, Springfield, Ohio.	1		
Woman's College of the University of N.C., Greensboro, N.C.	1		
Wyoming, University of, Laramie, Wyo.	1		
Yale University, New Haven, Conn.		3	6

## APPENDIX G

### Publications of the National Science Foundation

This listing includes publications issued by the National Science Foundation during fiscal year 1959. 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 REPORT

Eighth Annual Report, For Fiscal Year Ending June 30, 1958 : \$1

#### MANPOWER AND EDUCATION REPORTS

1. Scientific Manpower—1958 (Contains papers of the Seventh Conference on Scientific Manpower and of the Symposium on Demographic and Sociological Aspects of Scientific Manpower held in conjunction with the annual meeting of American Association for the Advancement of Science, Dec. 1958).
2. Scientific Manpower Bulletins
  - No. 9. Foreign Language Knowledge of American Scientists, 1954-55.
  - No. 10. Scientists and Engineers in American Industry—January 1957.
3. Brief Summary of Data on the Training of Scientists and Engineers.
4. National Science Foundation Programs for Education in the Sciences (Brochure describing all Foundation education programs).
5. A Program of National Information on Scientific and Technical Personnel.
6. Fellowship, Institute, and Other Education Program Announcements (with instructions for applying).

#### RESEARCH AND DEVELOPMENT ECONOMIC REPORTS

1. Federal Funds for Science VII. The Federal Research and Development Budget, Fiscal Years 1957, 1958, and 1959: 45 cents
2. Proceedings of a Conference on Research and Development and Its Impact on the Economy (Held May 20, 1958 in Washington, D.C.: \$1.25)
3. Reviews of Data on Research and Development (A series of leaflets devoted to specific aspects of research and development economics).

No. 11. Highlights of Conference on Research and Development and Its Impact on the Economy.

No. 12. Recent Legislative and Executive Actions on the Federal Budget for Scientific Research and Development, Fiscal Years 1958, 1959.

No. 13. Research and Development and Economic Growth.

4. Scientific Activities in Six State Governments. Summary Report on a Survey. Fiscal Year 1954: 40 cents
5. Scientific Research and Development in Colleges and Universities, Expenditures and Manpower, 1953-54: \$1
6. Funds for Scientific Activities in the Federal Government, Fiscal Years 1953 and 1954.

#### SCIENCE INFORMATION EXCHANGE REPORTS

1. Science Information News (Bimonthly periodical publication reporting national and international developments in scientific and technical information dissemination): Single copy 25 cents, subscription \$1.25 per year.
  - Vol. 1 No. 1 February-March 1959
  - Vol. 1 No. 2 April-May 1959
  - Vol. 1 No. 3 June-July 1959
2. Scientific Information Activities of Federal Agencies. (A series of leaflets describing the policies and procedures of Federal agencies relative to their scientific information activities).
  - No. 1 Department of Agriculture
  - No. 2 Office of Naval Research
3. Current Research and Development in Scientific Documentation (Semiannual reports containing descriptive statements from individuals and organizations involved in this field).
  - No. 3 October 1958 15 cents
  - No. 4 April 1959 30 cents
4. Nonconventional Technical Information Systems in Current Use, No. 2. (Consists of descriptions of technical information systems embodying new principles).
5. Information for Scientists (A national program for increasing the availability of the results of scientific research).

#### SCIENCE ADMINISTRATION REPORTS

Supplement to the Report of the Advisory Panel on High Energy Accelerators.