

## *International Science Activities*

Many of the research and science education activities supported by the Foundation have international significance. In addition to such major multinational projects as the International Biological Program, the Arctic and Antarctic research programs, among others, international aspects are also reflected in fellowship programs, support for attendance at scientific meetings, exchange of science information, and the translation into English of scientific literature published in foreign countries. These programs are discussed elsewhere in this report, and the activities summarized below represent only those programs administered by the Office of International Programs.

### COOPERATIVE SCIENCE PROGRAMS

The Foundation's cooperative science programs include support for research projects, seminars, meetings, exchanges of scientists, and other scientific activities. The objective of these programs is to strengthen science in the United States. During fiscal year 1970, the Foundation acted as the lead agency for six bilateral cooperative science agreements (Australia, Republic of China, India, Italy, Japan and Romania). In addition, the Foundation supports the U.S.-U.S.S.R./Eastern European Exchange Program through the National Academy of Sciences. During the fiscal year, the Foundation and the National Center for Scientific Research (CNRS) of France made arrangements for a scientific exchange program. Highlights of these programs are presented below.

#### *United States-Australia Agreement for Scientific and Technical Cooperation*

No Foundation funds were awarded for projects under this agreement in fiscal year 1970. Most of the activity concerned plans for possible collaborative research projects in fiscal year 1971 and beyond. Some of the topics being discussed are scientific ballooning, drug abuse, biomedical research projects, photosynthesis, weather modification, and forest/brush fires.

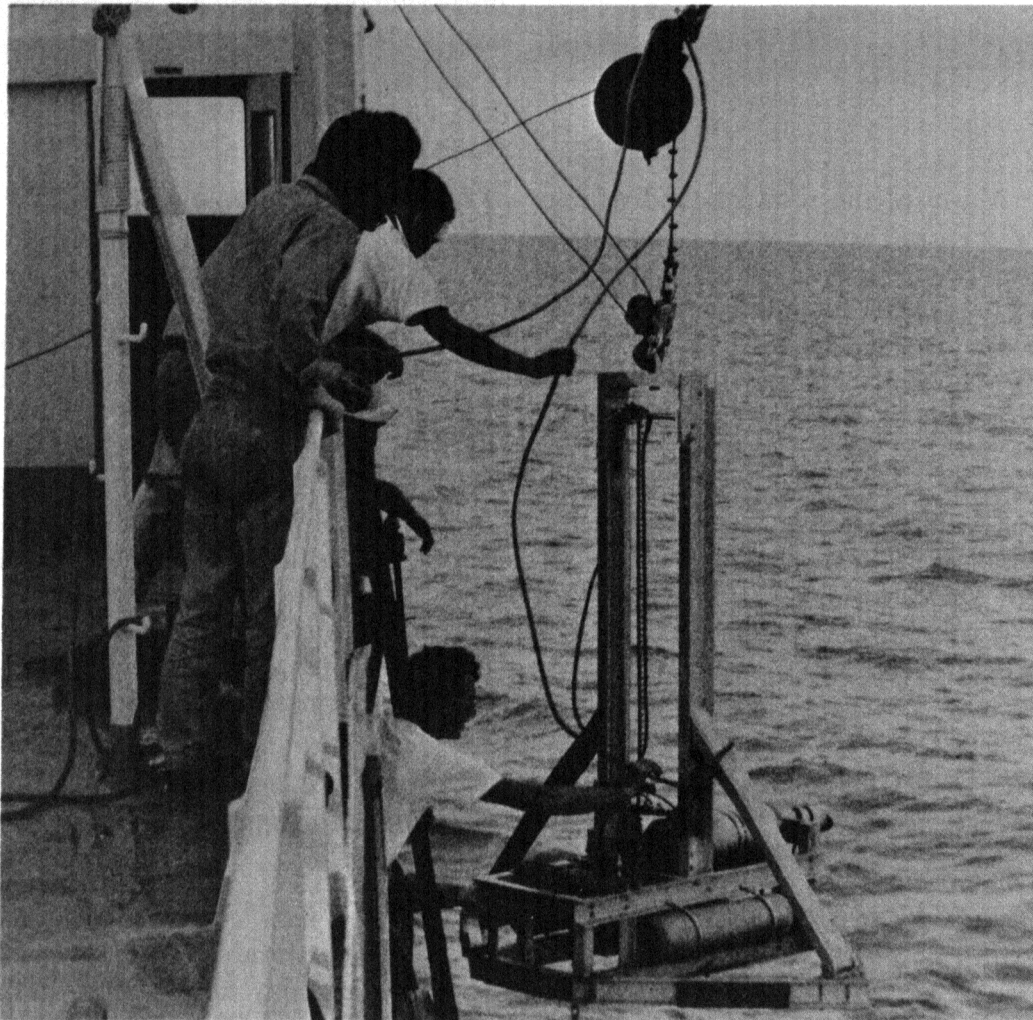
#### *United States-Republic of China (Taiwan) Cooperative Program*

During fiscal year 1970, the Foundation provided travel support to U.S. scientists for 25 short-term visits to Taiwan for consultation, teaching, and research. A grant was awarded to the University of California to study the "Ecology of *Fusarium* Species in Taiwan with Special Reference to the *Gibberella* stage of *F. moniliforme* on Rice."

Foundation funding in this program amounted to \$105,140; funds from other sources equalled \$51,000. Total funds: \$156,140.

#### *United States-India Exchange of Scientists and Engineers*

During fiscal year 1970 12 scientists from India visited the United States under this program. Fields of interest included engineering (soil mechanics and foundation engineering; integrated circuits; fire safety; desalination techniques; textile technology), paleontology; solid state physics, chemistry, and science information. Each of the visits consisted of a study tour of selected



American and Japanese scientists on the Research Vessel *Seifu Maru* lower a Brunogradmeter into the Philippine Sea for measurement of terrestrial heat flow through the shallow ocean bottom.

academic, industrial, and governmental laboratories and participation in conferences. Eleven American scientists participated in the program in 1970. Fields of interest included physics; engineering (aerodynamics, materials research, fuel research, foundation engineering); operations research; biomedicine (hematology, pharmacology); and mathematics.

#### *United States-Italy Cooperative Program in Science*

The Foundation provided \$35,000 for the continuation of cooperative research under this program in

fiscal year 1970. There are presently 27 active research projects as follows: physics, 10; biology, 5; agricultural sciences, 5; chemistry, 5; geological sciences, 1; and engineering, 1. An example of collaborative research is the study of proton channeling through gold crystals by American and Italian physicists. The Proton Channeling Spectrometer, located at the University of Bologna, is constructed partly with U.S. and partly with Italian funds.

#### *United States-Japan Cooperative Science Program*

The Foundation awarded grants to 13 U.S. scientists during fiscal

year 1970 to visit and conduct research in Japan. Twenty-two seminars were held—12 in the United States and 10 in Japan—in which 224 American and 226 Japanese scientists participated. The Foundation funded seven new research grants in chemistry, engineering, biology, geology, and meteorology. Two ongoing projects were extended with additional funds.

An example of a cooperative research project is one being conducted by the Lamont-Doherty Geological Observatory and the Maisuru Marine Observatory. The objective of the project is to study the tectonic development of the Pacific Ocean floor by geothermal and geomagnetic investigations, with particular emphasis on the Philippine Sea basin. American scientists joined Japanese scientists on the Research Vessel *Seifu Maru* to make a geophysical survey in the seas around the Ryukyu Island Arc. The American scientists worked at the Earthquake Research Institute, University of Tokyo, on the results of the U.S.-Japan field work. A Japanese scientist joined American researchers on the Research Vessel *R. D. Conrad* for geothermal and geomagnetic studies in the seas around the Aleutian Islands. The Japanese scientists then visited the Lamont-Doherty Geological Observatory to work on the results of this trip and to plan future cooperative research.

Total NSF funds awarded under this program during fiscal year 1970 amounted to \$421,315; other U.S. funding sources provided \$164,937, for a total of \$586,252 in U.S. funds.

#### *United States-Romania Cooperative Science Program*

During fiscal year 1970, the Foundation accepted the nomination of seven Romanian scientists for 48 man-months of study and travel in the United States. Two

U.S. scientists have visited Romania under the terms of this program. The Romanian National Council for Scientific Research has submitted applications for an additional 40 candidates for visits in fiscal year 1971. The Foundation obligated \$35,000 under this program in fiscal year 1970.

### *United States-U.S.S.R./East European Exchange Program*

These exchanges of scholars are conducted between the U.S. National Academy of Sciences (with Foundation funds) and the Academies of the Union of Soviet Socialist Republics, Poland, Yugoslavia, Romania, and Czechoslovakia. In fiscal year 1970, eight American scientists went to the U.S.S.R. for 1-month lecture and survey visits, and another 28 made research visits totaling 106 months. U.S. interest was divided evenly among biological, chemical, physical, and mathematical sciences; least interest was shown in engineering and the social sciences. Eleven Russian scientists made 1-month visits, and 25 spent a total of 92 months conducting research in the United States. Their emphasis was overwhelmingly on the physical, chemical, and engineering sciences.

In January 1970, a new Inter-Academy Exchange Agreement (National Academy of Sciences-Academy of Sciences of the U.S.S.R.) for 1970-71 was negotiated in Washington. The agreement continues the level of subsidized individual visits at 90 man-months per annum. A provision for joint research projects involving United States and Russian scientists was included for the first time. The U.S. National Academy of Sciences has submitted a proposal to the Academy of Sciences of the U.S.S.R. on behalf of an American zoologist who wishes to conduct a joint field trip to Siberia with a Russian colleague.

### *United States-France Exchange of Scientists Program*

An additional bilateral agreement is expected to be implemented in the near future. During fiscal year 1970, representatives of the Foundation and the French Centre National de la Recherche Scientifique (CNRS) developed the terms for an exchange of scientists for study and research in the respective countries. Eligible individuals will be citizens or nationals of the United States and France who will have earned a doctoral degree or its equivalent normally not more than 5 years prior to the commencement of the exchange visit. The period of the visit will be normally between 5 and 15 months. The Exchange Agreement will be signed early in fiscal year 1971.

## DEVELOPMENT ASSISTANCE PROGRAMS

In fiscal year 1970 the Foundation continued to manage two programs on behalf of the Agency for International Development (AID): (1) Science Education Improvement Program in India, and (2) Technical Cooperation and Evaluation Program—Worldwide Program.

### *Science Education Improvement Program in India*

The collaborative program for the improvement of science education in India is defined by a contract between the United States and India. Funding is provided by the Agency for International Development and the Indian Ministry of Education. It is implemented jointly by the Foundation and the (Indian) National Council for Science Education. There are three

main efforts: (1) the training of personnel through summer institutes, workshops, seminars, and short courses; (2) the development of new teaching materials including syllabi, textbooks, examinations, laboratory equipment, handbooks, and journals; and (3) the development of institutions which can sustain the improvement effort.

The jointly sponsored Summer Institute Program became a fully Indian institution in 1970, as this was the final year in which U.S. consultants are to be supplied to the Indian directors of the summer projects.

### *Technical Cooperation and Evaluation Program—Worldwide Program*

With funds provided by AID's Technical Assistance Bureau, the Foundation in 1970 supported three continuing projects of worldwide scope and initiated a fourth:

1. Study of Low Cost Science Teaching Equipment, conducted at the Science Teaching Center of the University of Maryland, to gather information and materials from all parts of the world on science teaching equipment of low cost and easy manufacture from locally available materials;

2. Activities of the Biological Sciences Curriculum Study (BSCS) headquarters in support of adaptation of BSCS materials by local groups in AID countries;

3. Study by the International Education Committee of the Conference Board of Mathematical Sciences of the demand for and supply of U.S. mathematics educators for service in international projects, especially those in the developing nations;

4. Planning and monitoring an evaluation of BSCS adaptation activities in AID countries.

## PLANNING AND DEVELOPING INTERNATIONAL PROGRAMS

The Foundation provides support for U.S. scientists and scientific organizations in their effort to organize, plan, and develop international scientific programs and activities.

### *U.S. National Committees for International Nongovernmental Scientific Organizations*

Foundation funds supported the activities of the committees and staffs established by the National Academy of Sciences to represent

the interests of the U.S. scientific community in the affairs and programs of the international scientific unions of which the Academy is the U.S. National Member.

### *Science Program and Policy Development*

During fiscal year 1970, the Foundation awarded grants which provided partial funding to the American Academy of Arts and Sciences for the support of a U.S. Joint Committee for the International Center for Insect Physiology and Ecology (ICIPE). The joint committee participates in the planning and development of ICIPE (in Nairobi, Kenya) which will be administered by an international consortium of academies of sciences.

Table 12

#### U.S.S.R. and East European Exchange of Scientists Programs, Number and Duration of Individual Visits Initiated, Fiscal Year 1970

	Number	Length of time (in man-months)		Number	Length of time in the United States (in man-months)
U.S. Scientists to:			Foreign scientists from:		
Czechoslovakia.....	12	49	Czechoslovakia.....	7	38
Poland.....	12	33	Poland.....	8	52
Romania.....	16	26	Romania.....	10	45
Yugoslavia.....	4	12	Yugoslavia.....	5	13
U.S.S.R.....	36	114	U.S.S.R.....	36	103
<b>Total.....</b>	<b>80</b>	<b>234</b>	<b>Total.....</b>	<b>66</b>	<b>251</b>