

dealt with at considerable length in reports issued by the Department—most recently and perhaps most eloquently in the report of its international science policy survey group, *Science and Foreign Relations*, which is concerned with the international flow of scientific and technological information. Among the fundamental premises upon which the report was declared to be based are the following:

"1. Since science is essentially international in character, it provides an effective medium by means of which men can meet and exchange views in an atmosphere of intellectual freedom and understanding. It is therefore an effective instrument of peace.

"2. The healthy development of American science and technology that is essential to our national existence requires that American scientists have free access to and be fully aware of scientific thought everywhere, and that they join in its creation. American access to foreign scientific sources implies of necessity a two-way flow of scientific information if our access is to be anything but sketchy and difficult. We in America are dangerously prone to underestimate the importance of foreign scientific progress. American preeminence as demonstrated thus far is in the application of scientific discovery; hence it is to our practical advantage to promote the fullest scientific intercourse."

With reference to the handling of visa applications of foreign scientists, the substance of the argument contained in this State Department report (issued in May 1950—several months before the McCarran Act) is that while the international exchange of scientific personnel is accepted as being favorable to American scientific progress and therefore unquestionably in the national interest, still the national laws with respect to immigration and the granting of visas make "no special allowance for such cases as scientists who are Communists or who have Communist affiliations and who, by invitation or otherwise, seek to visit the United States on a temporary basis in order to attend scientific meetings and to confer with American scientists". The determination of precisely what constitutes Communist or other totalitarian affiliation must be assumed to be even more difficult in the case of a foreign national than it is where an American citizen is concerned. Errors in judgment, false testimony, misleading evidence, and similar reasons for miscarriages of justice are not easy for a visa applicant to straighten out unless he is presented with a list of charges to refute. And since it clearly could not be considered diplomatic for American embassy representatives to accuse citizens of other nations of disloyalty to the United States, such a procedure must be considered unlikely.

Unfortunately, it appears that citizens of nations now maintaining cooperative relations with the United States are more apt to be affected by visa difficulties in entering this country than are those nationals residing behind the Iron Curtain, for the latter are not ordinarily encouraged to travel abroad by their home governments except in some official capacity, in which case the individual would travel with diplomatic credentials. In view

of State Department efforts to establish improved foreign scientific relations through its science staffs attached to selected United States diplomatic missions abroad, it might be assumed that the Department would not be anxious to stir up trouble for itself by capriciously refusing to grant or causing delays in the granting of visas to foreign scientists. The rigid prohibitions inherent in both the Immigration and Internal Security Acts, however, provide little latitude for liberal interpretation, and, even were it to be so disposed, the State Department, which has been obliged to absorb more Congressional punishment in recent months than have most other elements of the Administration, is not in the best position to embark on any adventure, however courageous, that might be termed in violation of national laws. This being the case, it seems self-evident that amendments to the Immigration Act, as well as to the McCarran Act, will be needed before any satisfactory solution to the visa problem can be found.

National Science Foundation

First Annual Report Submitted to Congress

The first annual report of the National Science Foundation was transmitted to Congress on January 15th by the President, who stated that the funds appropriated for the Foundation's programs "represent a long-term investment in the national security no less than the funds presently being invested in the expansion of productive capacity to carry us through a long period of partial mobilization". Since the Foundation has only recently begun to function and since few of its programs had actually been put into effect by the end of last year, the report "is by necessity a report of progress in formulating plans", as James B. Conant, chairman of the National Science Board, made clear in his foreword to the document.

Nearly half of the report's text is concerned with the case for federal support of basic scientific research, and much emphasis is placed upon the critical situation arising from the rapidly dwindling time lag between fundamental discoveries in science and their practical application. The most immediate problem before the Foundation, says the report, is the relation of the present emergency to the support of basic research, and in this respect, it is stated, the point of view from which the Foundation is planning its program may be summarized as follows:

Since both the degree and the duration of the present emergency are uncertain, it is clear that the United States must—

a. with all dispatch, put itself into what the military call "operational readiness," and

b. take the necessary steps to maintain itself in this state of readiness for an extended period, perhaps for many years.

This should be done with the realization that at any time the emergency may turn into a crisis.

In respect to science, our national policy requires that urgent military uses of science should be expe-

dited, where these uses may be put to practice in a short time, say 2 or 3 years. Clearly, this should be done with all the care that can be spent on an emergency problem. The United States certainly cannot undertake all possible scientific applications in a limited period and hope to complete them in time for operational use. There must be careful selection as to the practical uses which are both feasible and of high priority.

This country also must remain in scientific readiness over a long period of years. This will require the utmost effort to strengthen our scientific progress and maintain that strength at the highest possible level. In this second phase, the United States must keep the initiative, scientifically speaking, in as direct a sense as it intends to keep the initiative with respect to the effectiveness of its military forces. It is here that the program of basic research to be supported by the National Science Foundation can be most effective.

For its part, the Foundation has listed among its first tasks a thorough review of the present national pattern of research and development in order to provide a picture of the total effort in the main fields of science, together with a breakdown in terms of funds and manpower and the state of the art to show in what areas additional work is needed.

The Foundation's graduate fellowship program is to be the first order of NSF business. Emphasis will be given to fellowships rather than scholarships, it is stated, because the completion of graduate work will have the most immediate effects upon the national supply of trained manpower. In this connection, the Foundation has announced that twenty-eight hundred applications for NSF graduate fellowships in the mathematical, physical, medical, biological, and engineering sciences had been received by January 7th, the last date for filing applications for the 1952-53 academic year. Because of the limited funds appropriated for NSF operations for this year, only about four hundred of these applicants can be selected to receive fellowships under the program, which is the only major fellowship program in the United States emphasizing fellowships to first-year graduate students. Although the majority of awards will be granted to graduates working for their doctorates, a small number will be given to fellows who already have the doctor's degree but who are carrying on additional postdoctoral study. It is expected that final awards will be announced in April.

The Foundation has also announced the appointment of an advisory divisional committee on Scientific Personnel and Education. This panel of experts from educational and scientific fields will be concerned with development of national policies in scientific personnel and education, and includes among its members: Joel H. Hildebrand, professor of chemistry, University of California; Frank J. Welch, dean of the University of Kentucky College of Agriculture and Home Economics; Douglas Whitaker, dean of humanities and science, Stanford University; Katherine McBride, president of Bryn Mawr College; and Harry A. Winne, vice president for engineering, General Electric Company.

Copies of the Foundation's first annual report are listed for sale (20 cents each) by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Atoms into Plowshares

Arco and Harwell Use Reactor Heat

Both the British and U. S. atomic energy projects have announced that successful means have been determined for making use of heat drawn directly from experimental nuclear reactors as an incidental source of energy. In November, according to the British Ministry of Supply, a heating system employing coils of pipes carrying water heated by a reactor was put into service to warm an eighty-room building at the Atomic Energy Research Establishment at Harwell.

One month later, the U. S. Atomic Energy Commission announced that small amounts of electric power had been produced from heat energy released in the operation of the experimental breeder reactor at the National Reactor Testing Station near Arco, Idaho. In a trial run in mid-December, electrical power of more than one hundred kilowatts was generated and used to operate the pumps and other reactor equipment and to provide light and electrical facilities for the reactor building. The heat energy was removed from the reactor by a liquid metal (not further identified) at a temperature high enough to generate steam to drive a turbine. The power generation phase of the experimental program, according to the AEC, is being carried out to secure experimental information on the handling of liquid metals at high temperatures under radioactive conditions and on the extraction of heat from a reactor in a useful manner.

The Arco breeder reactor, which has as its principal long-range goal the converting of nonfissionable material (uranium-238) into fissionable material (plutonium) more rapidly than the uranium-235 used as fuel is consumed, was designed and is being operated by the Argonne National Laboratory. It was constructed at a cost of about \$2,700,000.

College Enrollment

Decline Less Severe Than Predicted

Total college and university enrollments for the 1951 fall semester, including part-time as well as full-time students, have dropped 7.8 percent from the 1950 total—a decline that is less than had been anticipated one year ago. An increase in the number of part-time students, according to Raymond Walters, president of the University of Cincinnati, is largely responsible for the more encouraging 1951 figures, although a gain was also seen in freshman engineering enrollment for the year. Dr. Walters, whose thirty-second annual statistical study of attendance figures appeared in the educational weekly *School and Society*, reported that the decrease in the number of full-time college and university stu-