Atomic Energy and confirmed through diplomatic channels. At the same time, the respective governments will specify the permissive travel to be afforded beyond the location of the facility involved.

"2. In all cases the sending country will pay the salary, subsistence, travel costs and other expenses of their own scientists and personnel both to and from their main destination and within the host country. The host country will be responsible for making suitable arrangements such as hotel accommodations and travel and to provide necessary interpreters.

Exchange of Information

"The Parties agree to exchange information on a reciprocal basis through the exchange of documents, reports and abstracts. Conferences may be held as agreed.

"The Parties agree to:

"1. The exchange of abstracts of unclassified work in peaceful uses of atomic energy being conducted in their countries. This would include abstracts of both formal reports which are published in the technical literature as well as informal and progress reports which are normally only circulated within the atomic energy programs of their respective countries.

"2. In the research reactor and power reactor field, the provision of full-size copies of such unclassified reports as are listed in the abstracts and as are requested by the other party.

"3. The exchange of information on radio-isotope production and processing development, techniques of application and high intensity sources.

"4. Abstracts and reports exchanged by the Parties shall also be made available to the International Atomic Energy Agency.

Joint Enterprises

"The Parties agree initially to examine separately the feasibility of engaging in joint projects in various unclassified areas.

"Included in the initial exploration are joint facilities and undertakings in controlled thermonuclear reactions; the design and construction of an accelerator of large and novel type; approaches to waste disposal problems; nuclear data evaluation and compilation; and the development of nuclear standards.

"Representatives of the U.S. Atomic Energy Commission and the USSR Main Administration for the Utilization of Atomic Energy will meet in the first half of 1960 to consider what enterprises merit further study and will request the International Atomic Energy Agency to assist in arranging such meetings.

Instruments

"The Parties agree to consider the possibility of making available new scientific instruments under agreed terms and on a reciprocal basis. Such arrangements will proceed only to the extent mutually agreed and permissible under the laws and export policies of the respective countries."

Efforts To Control Locusts in Africa Described

Devastations, famine, and misery caused by locust plagues in Africa and other tropical countries have been recorded since the beginnings of human history. For a long time peoples of those lands have had no means of defense, and it is now natural to ask whether the recent rapid progress of science has insured that crops will provide food for men, not locusts.

Technical methods of locust control are now extremely effective. There are poisons, harmless to man and domestic animals if reasonably used, but so powerful against locusts that a few ounces, diluted in oil and sprayed by aircraft as a fine mist on plants or into the flying swarm, will kill millions of the pests. These methods are used on a large scale in many countries and have been particularly successful in Morocco, Mauritania, Senegal, Chad, Sudan, Ethiopia, Somaliland, Kenya, Tanganyika, the Middle East, Pakistan, and India. Swarms extending over scores of square miles have been exterminated, and impending danger from them has been averted.

Antilocust Organizations

Most of the countries threatened by locusts now have special antilocust organizations, but as recently as 1953 locusts caused losses in the Somaliland Protectorate estimated at £250,000 ($700,000), and in 1954 crops in Somalia suffered to the extent of £600,000 ($1,680,000), while Morocco lost valuable export crops worth £4 million ($11.2 million). In 1958, locusts destroyed crops in Ethiopia which would have been sufficient to feed 1 million people for a year. In 1959 a similar disaster occurred, and food had to be imported to prevent famine.

Such disasters are less frequent now because many countries can put up a defense against invading locust hordes, but this is achieved at great expense by maintaining defensive organizations even during quiet years. Thus, the East African territories (Kenya, Tanganyika, and Uganda) have spent, on the aver-

A locust control officer in Africa views an approaching swarm. A single swarm may number 500 million and destroy 200 square miles of vegetation.

age, nearly £750,000 ($2.1 million) each year on organizations to control the desert locust.

Swarms of the desert locust roam freely over a vast area of Africa, from the Atlantic coast through West African territories (including Gambia, Sierra Leone, Ghana, and Nigeria) to the Chad and Sudan republics, Ethiopia, Somaliland, and Aden Protectorate, as well as to Kenya, Tanganyika, and Uganda and across the Middle East to Pakistan and India.

The main concentrations vary from year to year, and some countries may be free for a period while others are so heavily invaded as to be unable even to defend their crops. The result is that, in spite of every effort on the part of territorial forces, only part of the swarms present in one season over the whole vast invasion area are killed. In the next year, another group of territories is invaded and their antilocust forces may be overwhelmed, while the forces in the temporarily more fortunate countries are standing idle, but still demanding funds in order to be ready for the next onslaught.

The present use of highly efficient antilocust forces for local defense only is the main cause of failure to reduce the current desert locust plague, which has continued, with only brief intervals of respite, for the last 20 years. The locust swarms move over hundreds and even thousands of miles, across frontiers which often present unsurmountable barriers to territorial antilocust forces.

Efficient Information

Major concentrations of locusts are now predictable, because of the efficient International Desert Locust Information Service, operated by the Anti-Locust Research Center in London, with support from the Food and Agriculture Organization of the United Nations. It would be possible, therefore, to move the technical personnel and equipment to any danger points and to attack the locusts in an area where a far-reaching victory, not merely a minor local success, would be scored.

Practical plans for organizing strategically important operations against the desert locust are being considered by FAO. They envisage a free exchange of antilocust forces across frontiers, so that help could be given to a heavily-engaged neighbor. This can be done, provided there is a previous general agreement on mutual help between adjoining territories, and provided a strong and highly mobile antilocust reserve unit, which would give powerful support to local forces when necessary, is created.

Control of Two Kinds of Locusts

Such cooperation has already proved to be practicable and effective in the control of two other kinds of locusts which devastated Africa until recently. They are the migratory locust and the red locust, and their main areas of destructive action were to the south of the desert-locust region, in many of the most fertile countries in Africa. Scientific investigations showed that each of these species had main areas of outbreak, from which swarms spread over the greater part of the continent. Once these sources of invasion were discovered, agreements were concluded between the countries to establish and to maintain jointly an international control organization for each locust species.

These permanent organizations have now been in existence for some 15 years, maintaining a close watch on the locusts and killing the first small swarms that threaten to develop and to escape from the breeding areas. No such escapes have occurred since these organizations were formed.

The desert locust, unfortunately, presents a much more difficult problem. Since it has no narrowly delimited outbreak areas, its swarms migrate freely over enormous distances and breed wherever rain occurs. It is, therefore, not yet possible to hope to prevent plagues of desert locusts, but effective international and interterritorial cooperation can do much to reduce the danger to the rapidly expanding agriculture of Africa and the Middle East.

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Foundation Makes Grant for Woods Hole Research Vessel

Oceanographers are to have a new research vessel that is being provided through a $3–million National Science Foundation grant to the Woods Hole Oceanographic Institution. The new vessel will replace the R.V. *Atlantis*, 28-year-old "flagship" of the institution's fleet.

The grant results from a foundation-sponsored series of informal conferences among government and private oceanographers to assess the problem of inadequate vessels for oceanographic investigations. Because of the probability that NSF would be asked to support research-vessel construction, it made a grant to Woods Hole in 1958 to study capabilities and preliminary designs of various sizes and types of craft. This study, in turn, benefited from earlier studies made by the institution with funds provided by the Office of Naval Research.

A new and distinctive type of research vessel has been evolved from these studies, which combines the best features of seaworthiness and performance to be found in the "fat" trawler and the "lean" Coast Guard cutter. The new vessel will be able to operate under weather conditions too severe for all but one of the present Woods Hole vessels and is expected to be one of the most efficient and versatile research ships afloat.

The vessel will have an over-all length of 175 feet, a beam of 36 feet, and a displacement, when loaded, of 1040 tons. She will have an operating range of 7500 miles and a cruising speed of 12 knots. The ship's complement will be 37 people, of whom 19 will be scientists and the rest officers and crew. Preliminary design plans were prepared by the firm of M. Rosenblatt and Son of New York.

Public attention was focused on the needs of U.S. oceanography in February 1959 when the Committee on Oceanography of the National Academy of Sciences published a report, *Oceanography 1960 to 1970*. The report recommended that the United States Government, as well as private sources, should expand support of the marine sciences sufficiently to stimulate a doubling of basic research in the field within the next 10 years, and that several agencies, including the National Science Foundation, should assist in the financing of new research ship construction.

Actually, the National Science Foundation as early as 1956 had considered the advisability of providing financial support for the construction of oceanographic vessels. It was recognized that existing oceanographic vessels would require replacement, and also that the total "United States fleet" of oceanographic vessels would have to be enlarged. Because of the increasing importance of this field of science and the great cost of the vessels, it was early realized that the Federal Government would have to play a significant role.