possibilities of training and exchange of scientists and other matters of common interest. The Philippine Atomic Energy Commission offered to publish and distribute this newsletter for the first year.

Countries in the area were eager to participate in joint research and training programmes, and a number of offers of assistance were received.

An important suggestion was that an advisory group on reactor safety should be set up in the region. Such a group would have the advantages of familiarity with local conditions, greater continuity, and of being relatively inexpensive to assemble. On request, the group could make an objective evaluation of procedures for operation of the reactor and associated equipment; it could help with hazards evaluations of research reactors in existence or being planned, and could advise on procedures for qualifying reactor operators.

Another valuable step could be the establishment of a small advisory group on research reactor utilization in the Far East and South East Asia. Several countries in the area have had extensive experience with research reactors and could probably provide senior scientists who are familiar with local conditions. Such a group could help the new centres with the technical aspects of the programme, and could also be helpful in furthering regional collaboration.

There is evidently no lack of local talent and initiative in the regions where these meetings have been held. Given the lead, they should be able to organize a more fruitful utilization of research facilities, with the Agency supplementing local effort by acting as a clearing-house for information and assistance, on the lines indicated in its long-range plan.

The study group meetings are also helping to create greater awareness in the advanced countries about the work and needs of the developing centres. As a result, it may be hoped that the advanced centres will take greater interest in these new centres and establish closer relations with them. One method of achieving this could be through "sister laboratory" arrangements, whereby two centres join forces - at first in order to assist the newly-established one, but eventually for mutual benefit.

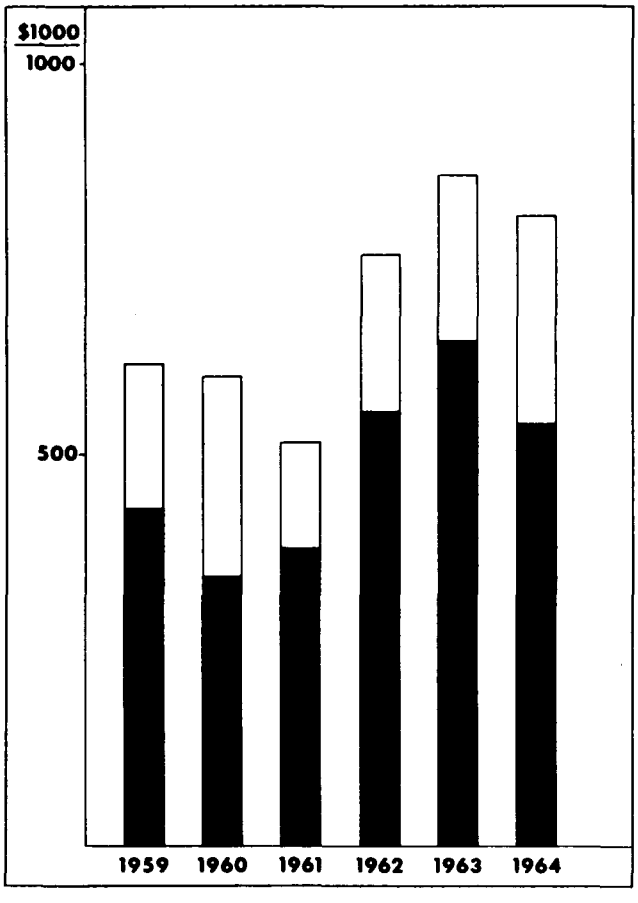
THE 1964 PROGRAMME OF HELP IN ATOMIC DEVELOPMENT

A wide variety of projects for the provision of experts and equipment to 32 countries has been approved by the IAEA Board of Governors for 1964. Further work is being financed under the United Nations Expanded Programme of Technical Assistance; altogether, the services of about 100 experts in the field are called for, in addition to those who are still at work on earlier assignments.

The estimated cost of the Agency's 1964 programme is $804 600, of which $459 200 is for the services of experts, and $345 400 for the provision of equipment and supplies. In addition, $513 500 is being allocated for EPTA programmes. It is becoming increasingly difficult, however, for the Agency to meet the growing number of requests and lack of finance may prevent its programme from being carried out in full. Many of these requests come from newly independent countries which have become Member States, and which seek assistance in developing national atomic energy programmes. In addition, numerous research reactors and radioisotope laboratories are being built or have recently been completed under bilateral arrangements which are normally limited to the period of construction. Most of these new centres then require some form of assistance in their programmes of research and training.

The programme outlined below forms a part only of the Agency's work in the field of technical assistance, which includes a number of other closely related activities, such as exchange of visiting professors, provision of fellowships, and organization of regional training courses - the latter often involving the provision of equipment. All these matters are now being administered by the Agency's Department of Technical Assistance.

The projects approved by the Board for this year cover a fairly wide range of topics - from raw materials prospecting and treatment to reactor construction, and from use of radioisotopes in fisheries research to their use in medicine. A number of common needs and interest are evident, however. Six of the countries require assistance in scientific documentation; they need some publications - princi-



EXPERTS AND EQUIPMENT

Value of assistance approved to be financed from the Agency's own resources. Shaded portion represents funds actually made available (preliminary estimate only for 1964)

pally reference books and back numbers of scientific periodicals - some equipment such as microfilm and copying apparatus, and expert advice on systems and procedures. Five countries need assistance in health and safety matters, and five in radioisotope applications in medicine. Applications of isotopes in agriculture account for five more projects, applications in control of insect pests for three and applications in hydrology for two.

The following is a brief summary of the assistance to be given to the respective countries, grouped by regions.

Africa

The Congo (Leopoldville), in co-operation with the Agency, is extending its research reactor and laboratory facilities. A radiochemist will help set up the laboratories and initiate programmes, and radiochemical equipment will be provided.

In Ghana an expert has already been conducting agricultural research with particular reference to soil fertility, soil fertilization and mineral nutrition of plants. He will continue this work, and also advise on the use of radioisotope techniques in plant production and protection.

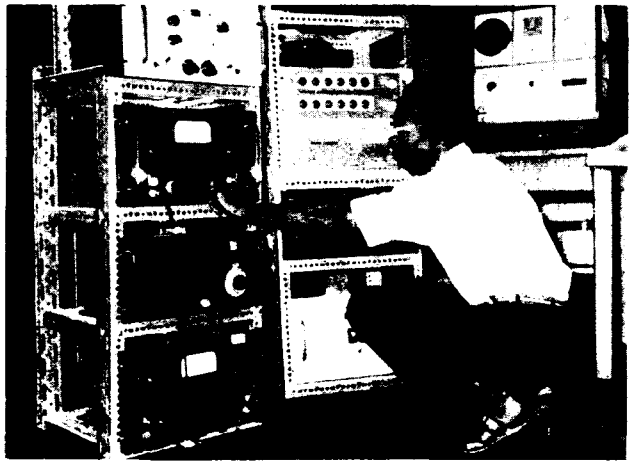
At Casablanca, in Morocco, the Centre Bergonie is at present mainly concerned with diagnosis and therapy of cancer. It is to be enlarged to become a national institute of radiological and pathological sciences. The Agency is providing equipment consisting of a medical radioisotope scanner, scaler, power supply unit, and scintillation detector and is sending an expert to install it and to advise on its functioning and maintenance.

Nigeria has a modern and well-equipped University College Hospital in Ibadan and plans to develop radioisotope facilities for detecting liver abscesses, function and location of the thyroid, location of brain tumours, etc. The Agency is providing a medical radioisotope scanner with accessories and the services of an expert.

The Sudan will receive the services of an expert in soil chemistry and fertility using radioisotopes, together with a scaler, shielding equipment, autoradiograph equipment and moisture meter.

Tunisia has a problem of water flow measurement in water-courses known as "oueds" which are dry for long periods, but may be filled in a day or two by heavy rain. Conventional methods of flow measurement are not practicable, so that radioactive tracers are to be used. The Agency is providing an expert and a counter for this work. In addition, Tunisia uses great quantities of pesticide chemicals which leave potentially toxic residues; assistance is being provided to determine these, and to perform research in pest control, including a complete counting set for accurate radioactivity measurements. A third project provides for help in scientific documentation, and the supply of publications together with documentation equipment.

At Legon, Ghana, Mr. J.K.E. Amusah works on an analyzer supplied by IAEA



The United Arab Republic imports a large number of cattle, but the productivity of the animals is reduced by the severe climate, and studies are therefore proposed to determine precisely the factors affecting heat tolerance, as an aid to breeding. An Agency expert will help to evaluate the project and prepare a programme. Two others will advise respectively on methods and installations for treating radioactive wastes, and on prospecting for beryllium ores; a field berylometer is being provided. Aid is also being given in scientific documentation in the form of periodicals and some library equipment.

Latin America

Argentina has found a number of promising occurrences of radioactive minerals, but some of the ores are complex. An Agency expert in hydrometallurgy will advise on methods of separation, and a laboratory test column for continuous countercurrent treatment of leach liquors from uranium ores will be provided. Another expert in reactor physics will advise on the operation of a research reactor now nearing completion, and some equipment will be provided.

Bolivia will receive an expert in medical applications of radioisotopes, and another expert in nuclear science documentation.

Brazil is establishing a standard graphite pile for use as a national reference standard and for training. An expert in neutron physics will advise on its operation; a neutron source will be provided. A specialist in testing and processing uranium ores already working in Brazil is to continue for a further period.

Studies on underground water flow and other aspects of hydrology are being carried out in Chile, which will be visited by an expert hydrologist experienced in radioisotope techniques. Scintillation counters, watertight detectors, probes and a scaler are being provided. An expert will also advise on scientific documentation.

Colombia is installing a research reactor and is undertaking design of some electronic equipment. It will be assisted by an Agency expert and the provision of a pulse generator, a generator of constant amplitude signals, a tube tester, transistor tester and other items.

Ecuador will receive an expert in dosimetry to assist in a training course, and relevant equipment.

Guatemala will be assisted by an expert in nutritional studies using radioisotopes and may also receive some equipment.

Mexico is continuing and extending a programme of nuclear electronics involving the construction of a variety of nuclear instruments; the Agency is sending an expert in the design and construction of radioactive detectors. Another expert in the separation of radioisotopes will assist in a programme of investigation and in training staff.

Europe and the Near East

An expert in nuclear physics will help in Afghanistan with a programme of training and research; a microscope and other equipment are being provided.

Greece has been investigating the possibility of eradicating by the sterile male technique certain insects which attack fruit and grain. An expert will make the necessary preparations to carry out field experiments. Another expert will work on dosimetry problems and radiation physics.

Iceland is being advised by an Agency expert on planning and operation of a marine radiobiological laboratory; additional equipment is being provided, including a scaler and accessories.

In Iran an expert is advising on health physics and establishment of film badge services; another is advising on the construction of a research reactor. Iraq also is being advised on radiological protection.

Turkey is another country which has progressively developed uranium resources, and is being assisted by the Agency with expert advice on testing of ores with a view to eventual erection of a treatment plant. An expert in radiochemistry is also being sent to the University of Ankara to initiate and guide research. A fluorimeter and accessories are being supplied.

South and East Asia

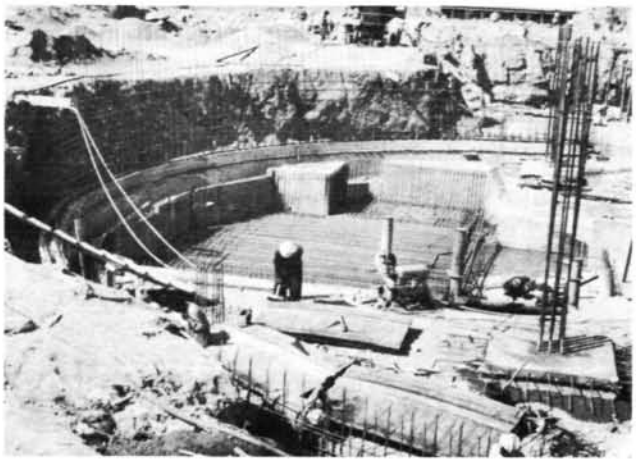
Cambodia is being helped by an expert in radioisotope applications in agriculture, and also by an expert in the use of radioisotopes for measuring soil density and moisture, as an aid to civil engineering works. Some equipment is being provided.

Ceylon plans to test various forms of phosphate fertilizers for rice-growing; the Agency will provide an expert and equipment.

India has an important programme of studies in food science and technology, designed to avert food wastage. The Agency will assist through an expert in radiobiology, including food irradiation, together with a cobalt-60 gamma-cell irradiator, a moving boundary electrophoresis apparatus and an ultrasonic disintegrator. It is also assisting with scientific documentation by providing scientific periodicals.

An Agency expert in radiobiology has been working in Indonesia, and counting equipment is now being provided.

Korea is setting up a plant for radioactive waste treatment and disposal; an Agency expert and some equipment are being provided.



An IAEA nuclear construction adviser, Mr. G. Jenkins, has helped in the building of the new Pakistan Institute for Technology. Foundations for the nuclear reactor. (Photo. Pakistan AEC)

Pakistan has established a centre for post-graduate training and for research in nuclear physics; the Agency is supplying a multi-channel pulse-height analyser and other items.

Thailand is setting up a laboratory for research in agriculture (rice diseases), medicine and biochemistry. An expert and liquid scintillation equipment are being supplied.

Viet-Nam is already being advised on medical uses of radioisotopes by an Agency expert, whose term is being extended.

Other Projects

A number of other projects have been approved, subject to the funds being available. These include provision of an expert in reactor physics and some equipment for China, an expert in nuclear chemistry and some equipment for Colombia, equipment for nutrition studies in Guatemala, an expert in nuclear electronics and equipment for Indonesia, an expert in radiochemistry for Iraq, scientific publications and reference books for Korea, an expert in radioisotope training and equipment for Mexico, an expert in radioisotope applications in entomology for Morocco, and an expert in solid-state physics and equipment for Yugoslavia.

RADIATION IN DEFENCE OF THE OLIVE CROP

Entire insect populations can sometimes be eliminated, under suitable circumstances, by the "sterile male technique". This necessitates the mass-rearing of large numbers of male insects which are sterilized by radiation and released. IAEA, in collaboration with FAO, is supporting research into the possibility of using the method against the fruit-fly which causes havoc in the Mediterranean olive crop.

Olive-growing is the sole industry which supports the 800 inhabitants of Rovies, Greece. In Greece alone, damage to the extent of about $15 million a year is caused by the fruit-fly, Dacus OLEA.

The fly lays its eggs in the ripening olive, and the resultant larvae consume the fruit. Greek scientists have been studying the habits of the insect and the possibility of eliminating it by the sterile male technique.