FOURTH ANNIVERSARY of the IAEA

The following summary of the aims and activities of the International Atomic Energy Agency was prepared for publication in these pages by members of the IAEA Secretariat. The Agency, which was established to serve as an international clearing house in matters involving the peaceful uses of atomic energy, has its headquarters in Austria. The photograph at left was taken last September during the fourth regular session of IAEA, which was held in Vienna's former Imperial Palace, the Hofburg. (All photos courtesy IAEA.)

JULY 29 marks the fourth anniversary of the date the International Atomic Energy Agency officially came into being, the date of ratification of the IAEA Statute by the required number of nations. In September all Member Nations, now numbering 74, will gather for the annual General Conference in Vienna to review policy and chart a course for next year.

The Agency, which deals strictly with peaceful applications of atomic energy, is carrying out a broad program of "packaging" atomic-energy "know-how" developed in advanced nations, and "transplanting this to

educational institutions, laboratories, hospitals, and agricultural stations in less advanced nations. Among IAEA approaches are fellowships, experts, research contracts, symposia and conferences, and publishing.

The Agency also has another broad field of activity. It assembles panels of experts to draft international agreements in such areas as health and safety requirements, the disposal of radioactive wastes, and legal liability in case of accidents.

Administration, Aims, and Functions

A NUMBER of widely known physicists and administrators are associated with IAEA. The secretariat, with about 200 professional employees from over 40 countries, occupies the former Grand Hotel in Vienna. It is headed by its director general, Sterling Cole, former congressman from Bath, New York; he was chairman of the Joint Congressional Committee on Atomic Energy during the drafting and adoption of the basic United States law in the field, the Atomic Energy Act of 1954.

Last month, President Kennedy appointed Henry D. Smyth of Princeton University to serve as the official representative of the United States government at important meetings of the IAEA, particularly the sessions of the Agency's 23-nation Board of Governors which are held four or more times a year. William I. Cargo of the State Department has been appointed to take charge of the US permanent mission to the IAEA in Vienna. The previous US ambassador to the Agency was Adm. Paul Foster, formerly of the US Atomic Energy Commission, who retired from his post in Vienna earlier this year.

The USSR representative on the Board is V. S. Emelyanov, who in the Soviet Union occupies the counterpart position of Glenn Seaborg, chairman of the Atomic Energy Commission, in the United States.

The same Scientific Advisory Committee serves both the IAEA and the United Nations, although the members act in their individual capacities when advising IAEA and as governmental representatives when advising the United Nations. (IAEA was formed under the United Nations auspices, and has close affiliations with the United Nations and such specialized UN agencies as the Food and Agriculture Organization, the World Health Organization, International Labor Organization, World Meteorological Organization, and Inter-Governmental Maritime Consultative Organization.) Committee members, mostly physicists by training, are V. S. Emelyanov of the USSR, I. I. Rabi of the United States, H. J. Bhabha of India, B. Goldschmidt of France, W. B. Lewis of Canada, and Sir William Penney of the United Kingdom. The Brazilian member, Bernhard Gross, recently resigned to become director of the Agency's Division of Scientific and Technical Information. His successor on the Committee is L. C. Prado of Brazil.

Delegation from the USSR at the General Conference: V. S. Emelyanov, K. M. Novikov, and V. M. Molotov. The latter is now serving as the Soviet Union's resident representative to the IAEA.

Two members of the United States delegation: I. I. Rabi and Paul Foster, US resident representative to IAEA.

The IAEA Statute carries this paragraph stating the Agency's objectives:

> The Agency shall seek to accelerate and enlarge the contribution of atomic energy to peace, health, and prosperity throughout the world. It shall ensure, so far as it is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose.

The Statute then lists seven functions, which may be summarized as (1) nuclear-energy research, development, and application; (2) services, equipment, and supplies; (3) scientific information; (4) exchange and training; (5) safeguarding of Agency-assisted projects against use for military purposes; (6) safety; and (7) facilities.

Chief Indonesian delegate T. Sudjarwo was president of 2nd IAEA General Conference.

Italian physicist Carlo Salvetti, IAEA's director of research and research contracts.

Soviet scientist A. N. Rylov is in charge of Agency's training and information program.

Brazilian physicist B. Gross is the director of IAEA's Information Division.

Research, Development, and Application

THE Agency's newest activity under the first heading—research, development, and application of atomic energy—is a joint program with Norway. The program's objective is to obtain precise measurements of fundamental reactor-physics data for reactors which use as moderating material either light or heavy water or a mixture of the two. The program will be carried out on the zero-power reactor NORA at the Norwegian Institute for Atomic Energy. Chairman of the project is Raja Ramanna of India, since 1953 the head of the Nuclear Physics Division of India's Atomic Energy Establishment at Trombay.

Two reactor-physics meetings will be sponsored by the Agency this year in Vienna—one in August on the physics of fast and intermediate reactors and one in October on methods of programming research in connection with a reactor. The purpose of the latter symposium will be to provide nations with newly established research reactors or those in construction or in the planning stage with information on ways to obtain maximum research benefits in terms of priority experiments in various areas of science and technology. (Earlier IAEA physics symposia were devoted to such subjects as heavy-water lattices and codes for reactor computations. Proceedings of virtually all IAEA scientific conferences, symposia, and panels of experts end up as Agency publications.)

The Agency has also completed a number of studies on the technology and economics of small and medium power reactors and the methodology of comparing costs of nuclear-power installations. Among its publications is a continuing series of directories of training, research, test, and power reactors in various parts of the world. The Agency is in a position to provide advice to Member States on all aspects of the production, processing, fabrication, and utilization of nuclear materials. The laboratory the Agency is now completing at Seibersdorf in the outskirts of Vienna will be in a position to render valid quality controls for nuclear materials, including activation analysis, mass spectroscopy, and optical spectroscopy.

For the majority of Member States, it is the application of radioisotopes that is expected to produce immediate and practical benefits from nuclear energy. Fellowships, experts, "how to" publications, research grants, training courses, and even the utilization of two mobile radioisotope laboratories contribute to the spread of techniques in applying radioisotopes, in various parts of the world, in such diverse fields as medicine, agriculture, hydrology, and industry.

Services and Equipment

SOME 40 countries will have been visited by IAEA preliminary assistance missions by the end of 1962. Perhaps the major contribution of the specialists making up the missions has been the provision of a realistic assessment of the possibilities for nuclear-energy pro-

grams and of means to obtain outside aid for their implementation. The experts who have been assigned in these countries on six-month or one-year assignments have for the most part supplied assistance in the establishment of programs for the application of isotopes or the making of geological surveys and in the establishment of health-physics and radiation-protection services.

A number of less-developed countries also ask for planning consultants, who can advise on initial atomic-energy projects, the phased introduction of radioisotopes into national development plans, and the establishment of the necessary administrative framework and services.

Member nations may also call upon the Agency to supply equipment in connection with the services of an expert. These requests range from simple monitoring equipment to expensive radiation sources. There is also the matter of arranging for supplies, such as service as "broker" for the gift of Canadian natural uranium for a research reactor in Japan, and more recently the arrangement whereby enriched uranium from the United States will go into a research reactor in Finland, possibly this year.

The Agency's services and duties in the supply of nuclear materials are not limited to making arrangements for the procurement, processing, fabrication, shipment, delivery, and, in appropriate cases, the analysis and technical control of such materials. Experience has proved that each supply transaction raises new legal and statutory problems, and part of the Agency's function as an intermediary will continue to lie in facilitating and expediting the conclusion of supply agreements.

Scientific Information

GENERALLY, the Agency sponsors two or three large scientific conferences a year and ten or more symposia. The publications program stems very largely from the scientific and technical activities of the Agency, and a publication represents in many cases the end product of a project, e.g., the publishing of the proceedings of a scientific meeting or the recommendations of a panel. Other publications are of a program nature rather than functional, e.g., the Review Series and Directories.

In addition to publishing the proceedings of meetings, the Agency also publishes directories and catalogues, a series of safety manuals, training manuals, special studies (such as descriptions of nuclear instruments), bibliographical publications, technical reports (such as results of research contracts), periodic publications (such as the quarterly *Nuclear Fusion*), and general information, including brochures and a quarterly, semitechnical, 32-page *Bulletin*.

Scientific documentation is provided to member nations through the publication of selected reviews, bibliographies, and reference lists, as well as through studies giving information on specific problems, compiled upon individual request. The Agency's library receives annually about 12 000 research reports from member nations and acquires some 6000 books and 600 periodicals per year.

Exchange and Training

IN 1958, the Agency arranged for 200 students in underdeveloped nations to take special nuclear training in universities and laboratories in developed nations; now some 500 fellowships are awarded yearly. All told, over 1000 fellowships have been received by students in 45 nations. Thus, promising students from all over the world can be trained at such famous nuclear centers as those near Chicago, Moscow, London, or Paris.

The fellowship program takes the trainees to the instructors, but in many cases it is possible to reverse the process and provide training in the countries where it is needed. One such method utilized by the Agency is the program of visiting professors. Fifteen instructors were sent to eight requesting countries in 1960, and many requests had to be left unsatisfied because of lack of funds. The number of such requests for 1961 already amounts to 23, and this program is expected to assume increasing importance.

Another method of organizing training in the less-developed countries themselves is through regional or national training courses. There was a demand for eight courses in 1961 and the demands for 1962 are, already at this early date, even greater. An example is a March–April 1961 regional training course in the use of radioisotopes, arranged by the IAEA at the National Radioisotope Center of the United Arab Republic in Cairo. The course was attended by 20 trainees from Greece,

Ex-Foreign Minister Molotov meets ex-Congressman Sterling Cole, who is now director general of the International Atomic Energy Agency.

Mobile isotope laboratory was presented by the United States to the International Atomic Energy Agency in ceremony in front of the Hofburg in Vienna on September 24, 1958. The presentation was made by John A. McCone, then chairman of the US Atomic Energy Commission.

Jordan, Morocco, Nigeria, Saudi Arabia, and the United Arab Republic.

The Agency's two mobile isotope laboratories, donated by the United States Government, also bring training to the doorsteps of the trainees. Approximately 600 trainees have taken part in courses organized in the Far East, Latin America, and Europe with the help of these laboratories.

Safeguards

THE Agency applies the word "safeguards" to its system of accounting and inspection of fissionable materials to prevent any possible diversion to military uses of materials or other assistance obtained through the Agency.

The procedures cover requirements anticipated in the immediate future and relate only to reactors with less than 100 megawatts thermal output, to nuclear material used and produced in these reactors, and to small research and development facilities. Procedures covering other types of nuclear facilities will be developed as the need arises.

The provisions may include (a) examination and approval of designs by the Agency, (b) maintenance by the state concerned of an agreed system of records, (c) submission to the Agency of routine and special reports, and (d) inspections by the Agency.

The United States Government has offered to place two research reactors at Brookhaven, an experimental power reactor at Argonne, and a power reactor at Piqua, Ohio, under Agency safeguards.

Safety

BASIC safety standards have already been established by IAEA to apply to Agency-assisted operations. Regulations for the transport of nuclear materials have been adopted following drafting by experts from various nations. The IAEA continues its work with scientific panels which study problems of regulating the disposal of radioactive wastes, both in the ocean and in fresh waters, such as rivers which are shared by more than one nation. The compilation and publication of manuals on selected topics of radiation protection has proved useful in maintaining adequate standards and in harmonizing practices in Member Nations. The Agency also provides assistance in the implementation of safety measures and in the evaluation of hazards. For example, the Agency has completed hazards evaluations of research reactors in Switzerland and the Netherlands at the request of those member governments.

A large proportion of the Agency's research contracts have been awarded in radiobiology, health physics, and waste disposal for studies of short- and long-range effects. Measurements for radioactive contamination of samples from the environment are being carried out on request and the results transmitted to the state concerned and to the United Nations Scientific Committee on the Effects of Atomic Radiation. The program now includes the measurement of a number of radionuclides, and scientists from Member States will continue to receive in-service training in this field.

Absolute measurements of the absorbed dose in rads from external radiation will be made in the Seibersdorf

laboratory, and neutron and gamma radiation standards will be established which can be used for the control of neutron dosimeters of Member States as part of the entire work on calibration and standardization of radiation-measuring instruments.

Last year the Agency carried out a dosimetry project in connection with a research reactor at Vinca, Yugoslavia, aimed at throwing light on the relationship between exact doses received in an uncontrolled run of the reactor in 1958, and the clinical effects observed afterward in the six scientists who had been exposed to a heavy dosage of radiation.

A plan to provide emergency assistance in the event of a nuclear accident has already been given preliminary study and it is expected that a workable system can be established soon. Partly as a necessary prerequisite to such an emergency service and partly as a scientific information service to Members it is intended to start collecting all information on nuclear accidents.

It is hoped that the Agency's work on the establishment of international conventions on liability for nuclear damage in connection with the operation of nuclear ships and of land-based reactors will be largely completed in 1961, although some further work and follow-up action may be required. Efforts to achieve international agreement upon measures to facilitate insurance against nuclear damage have been started.

Facilities

THE new laboratory at Seibersdorf will supply analytical services of particular interest to nations that are newcomers in the field of nuclear energy, and a number of standardization and calibration services will also be available, including in-service training in standardization techniques.

Studies of methods for the relative and absolute measurements of radionuclides and neutron sources have been carried out in the headquarters laboratory for some years, and it will be possible to develop this work further in the Seibersdorf laboratory. The mobile radioisotope laboratories, which have visited eight nations, will continue their training missions.

The International Organizations

A WORD should also be said about IAEA collaboration with the United Nations and its specialized agencies. The Agency often consults with and engages in joint projects with the World Health Organization (WHO) and with the Food and Agriculture Organization (FAO), for example, on training courses, conferences, and technical assistance in the application of radioisotopes to medical treatment and agriculture, respectively. It cooperates with the World Meteorological Organization (WMO) in studies of the world's water turn-over and with the Inter-Governmental Maritime Consultative Organization (IMCO) on nuclear ship problems. It has common ground with UNESCO in nuclear education and with the International Labor Organization (ILO) in the application of health and safety regulations, and with the United Nations itself in studies of power needs of nations, conventional and nuclear.

The future should see an increase in these mutual projects and the beginning of new ones with regional organizations such as the European Nuclear Energy Agency of the Organization for European Economic Cooperation, and the Inter-American Nuclear Energy Commission of the Organization of American States. This cooperation is not only a protection against duplication, but can extend the peaceful applications of atomic energy to increasingly wider areas.

The Future

OF its future, the Agency itself has reported as follows in an appraisal of IAEA's anticipated activities as they are expected to extend into the mid-1960s:

> The rates of growth of the Agency's programmes are likely to differ for various reasons. It is natural that at this stage, in anticipation of the much wider use of atomic energy, particular stress should be placed on research and development work, on health and safety standards, codes and manuals and on the regulation of problems of waste disposal. Two factors of particular importance in determining future growth will be the speed of development of the various branches of nuclear technology and the number of stages through which the Agency's Member States have to pass in order to make full use of a particular branch.
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> Thus, for instance, demands on the Agency for the supply of fissionable and source materials can arise only when Member States have the plant and trained staff needed to operate a nuclear facility. Since most of the help which the Agency gives direct to its Members is to countries in the less developed areas, it must be expected that the Agency's work of arranging for the supply of such materials (work to which the Statute attaches particular importance) will gain momentum later than its training and technical assistance activities.
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> In very general terms, it can therefore be expected that there will be a gradual change from the present emphasis in the Agency's programmes on surveys of national resources and needs and on the training of scientists and technicians. As national programmes advance and more trained personnel becomes available, the number of individual projects for the use of isotopes, the building of laboratories and pilot plants and the establishment of local or regional training centres can be expected to increase; so too can the number of requests to the Agency for technical assistance other than fellowships.
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> With time it can also be expected that more work relating to the supply of plant and materials, on a commercial rather than a grant basis, will have to be undertaken. As more countries obtain experience in the operation of small plants and as nuclear power becomes economically more attractive, the types of plant with which the Agency has to deal are likely to grow in number until they include reprocessing and other facilities as well as various kinds of reactors. This is, however, only a very general picture.