MEMBERSHIP

Initial membership consisted of States which signed the Statute within ninety days after it was opened for signature, and deposited an instrument of ratification. The number at that stage was 26.

Subsequent membership results from the deposition of an instrument of acceptance of the Statute after membership has been approved by the General Conference on the recommendation of the Board of Governors, both of which shall determine that the State concerned is able and willing to carry out the obligations of membership and to act in accordance with the purposes and principles of the Charter of the United Nations. The number is now 97.

* The Agency is based on the principle of the sovereign equality of all its members.

FULFILLING THE ATOMIC PROMISE

TEN YEARS HISTORY GIVES POINTERS FOR THE FUTURE

Ten years is a short period in human history, and a short period in the life of an international organization. Nevertheless the ten years now completed by the International Atomic Energy Agency has seen much work accomplished and has brought greater realization than ever before of the promise held out by the atom for peaceful benefits leading to the promotion of peace, health and prosperity throughout the world.

Demonstrations are already in progress of the contributions which can be made by nuclear techniques to aid the solution of universal problems. They can help to make more food and water available, to raise living standards in developing areas, to combat disease and to provide the power which in the long run will be the best answer of all to the questions posed by growing populations.

Many of these possibilities were not clearly in view when, on 29 July 1957 the Agency came legally into being with the ratification of its Statute by 26 countries. At that time the control of hazards and the development of power were mainly in mind. They are still vital considerations and great progress has

In Bogotá, Colombia, the Agency's Technical Assistance Programme is helping to ensure full use of a research reactor and also to investigate iodine content of people and animals. The latter work is part of investigations into goitre in children. In the centre of the picture, on the herdsman's right, is Dr. Sonia Nassiff, an IAEA visiting professor.

This photo was taken during a meeting at Dubna, USSR, in which experts from nine countries debated the best methods for research and exchange of information on the problems of radioactive waste.

been made with both, but many benefits have become possible in other areas, making it necessary to engage in widespread and diverse activities with good practical results. When these become combined with the development of economic nuclear power then the atomic promise of a decade ago will be well on the way to fulfillment.

In trying to open the gateways to the future the Agency has become a great clearing house for current knowledge and a sponsor of research. Much of the research which it carries out either in its own laboratories or by collaboration has clearly defined aims, but there is also room for the scribbling genius, the thinker with the pencil or blackboard whose logic can often point the way to important advances.

A summary of the Agency's first decade of work gives indications of the progress that has been made. Behind it lie stories, some of which have been told in this Bulletin, of exploration in high mountains and arid deserts, of ships and safaris, of great seminars and small classrooms, of painstaking work in paddyfields and polar regions but above all of the development of a single scientific world in which men and women of many nations have worked together without consideration of creed, colour or class.

HOW IT BEGAN

That the world as a whole was desperately interested in turning atomic energy into a beneficial force was evident soon after the war by discussions in the United Nations, but in the stresses of the time no acceptable formula could be found until 1953. Then Dwight D. Eisenhower, at that time President of the United States of America, put forward an "Atoms for Peace" programme, urging the establishment of an international organization. His hope was that the technically developed countries would dedicate some of their strength to serve the needs rather than the fears of mankind, and he announced the willingness of his country to put nuclear material at the disposal of an international organization.

In the following year, on 4 December 1954, the General Assembly of the United Nations passed unanimously an "Atoms for Peace" resolution expressing the hope that the IAEA be established without delay. A group consisting originally of Australia, Belgium, Canada, France, Portugal, South Africa, United Kingdom and United States, soon to be augmented by Brazil, Czechoslovakia, India and the Union of Soviet Socialist Republics, set to work preparing a draft Statute. In October 1956 the Statute was approved unanimously at a conference of 81 nations and within ninety days was signed by 80 States. On 29 July 1957 ratification by 26 of them, the first of the "atomic powers" having been USSR, brought the Agency legally into being.

By 1 October 1957 when the first session of the General Conference began, there were 54 members, increased to 59 by the time it ended. Now the total is very close to 100. The first session approved an initial working programme drafted by a Preparatory Commission and voted $4 339 000 for its

Usually where goitre is endemic there is a shortage of iodine, but the disease also occurs in parts of Japan where the element is contained in edible seaweed. The School of Medicine, Hokkaido University, is investigating "coast goitre" under an IAEA contract. This view of Rishiri Island shows seaweed ready for collection.

execution; elected the first members to the Board of Governors, the policy making body consisting then of 23 but since 1963 of 25 Member States; and appointed the first chief executive, the Director General, Mr. Sterling Cole (USA). He hold office until 1961; since then the Director General has been Dr. Sigvard Eklund (Sweden), who was reappointed for a second term in 1965.

SCIENTIFIC GUIDANCE

Evolution of an organization and recruitment of the staff to set the programme in motion proceeded rapidly and scientific activities began in 1958 when laboratories were set up in the first headquarters, arrangements were made for the first symposia, experts were appointed for technical assistance and the first fellowships for research were awarded.

Any important scientific programme is undertaken only after deep consideration of requirements, feasibility and relevance to main objectives. The Agency is in the unique position, as far as the nuclear sciences are concerned,

of being able to call on the wisdom of the best brains in the world for advice. The Director General has a Scientific Advisory Committee consisting of scientists of the highest distinction. The first Committee, appointed in 1958, consisted of the late Professor Homi J. Bhabha (India), Sir John Cockcroft (UK), Professor V.S.Emelyanov (USSR), Professor B. Goldschmidt (France), Dr. B. Gross (Brazil), Dr. W. B. Lewis (Canada) and Professor I.I. Rabi (USA). Homi Bhabha, whose services to science to his own country and to the world have ensured him an honoured place in history, remained a member of the Committee until his death in an accident to an aircraft, bound for Vienna to attend one of its meetings in January 1966. By a decision in 1966 the membership was increased to ten; Professor Goldschmidt, Dr. Lewis (Chairman) and Professor Rabi are still members, the others now being Dr. M.A.M. El-Gebeily (UAR), Dr. I. Malek (Czechoslovakia), Dr. S. Mitsui (Japan), Sir William Penney (UK), Professor L. Cintra de Prado (Brazil), Dr. H. Sethna (India) and Professor V.I. Spitsyn (USSR).

Their recommendations are considered by the Director General. When it comes to implementing the proposals, the call on the world's brains becomes even greater. For many projects panels of the leading experts in the subject are brought together to work out the most efficient ways of obtaining results, of attacking problems or indicating areas where effort would be unprofitable. Working groups are formed to give continuing advice. Usually as a result of the deliberations of the panels and working groups arrangements are made for subjects of major importance to be discussed at symposia and scientific conferences at which research workers from all parts of the world present and discuss the latest developments.

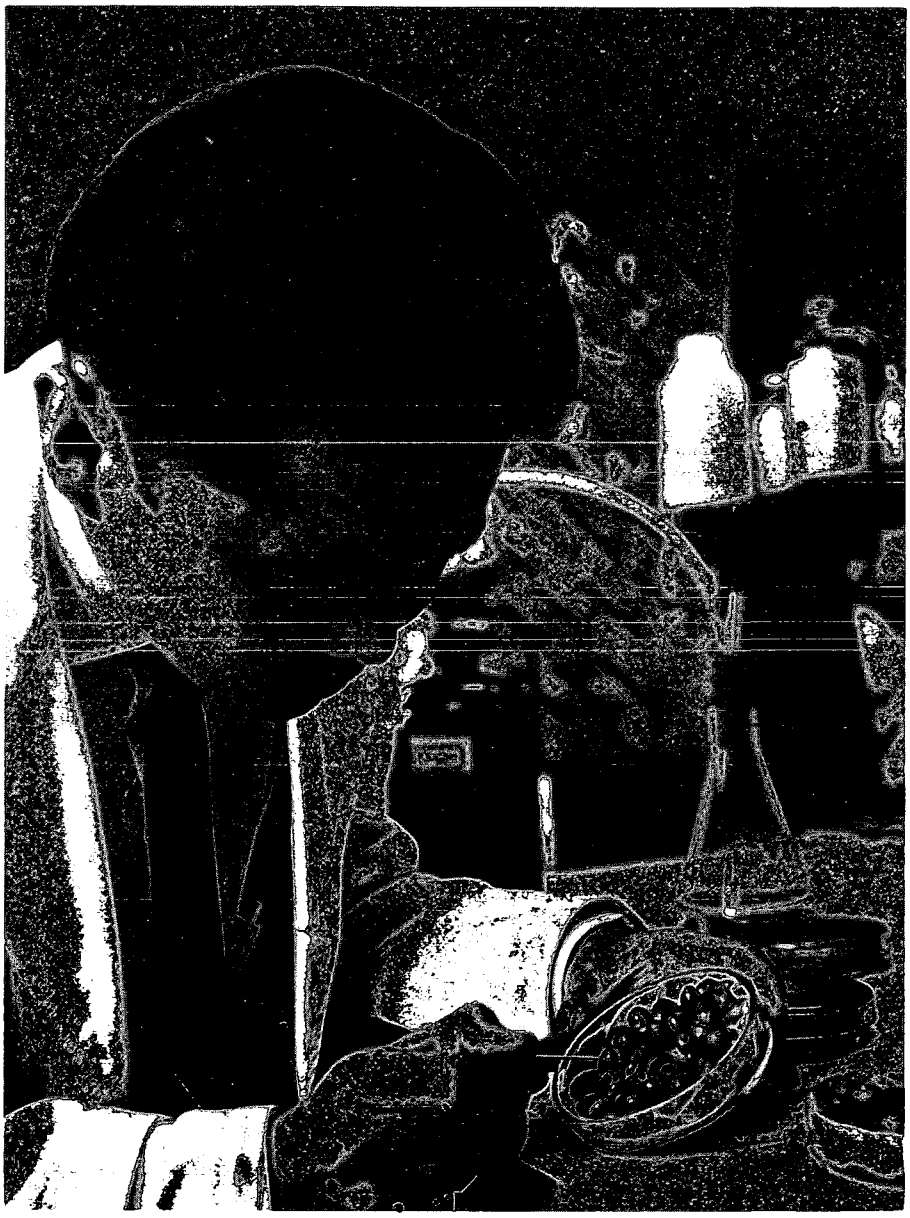
NUCLEAR KNOW-HOW

One of the main factors to encourage wider use of nuclear energy is the spreading of scientific and technical know-how. Realization of this has played an important part in the Agency's planning. The first major enterprise to be set in motion was the fellowships programme. By now nearly 3000 fellowships have been awarded. In addition a thousand persons have been trained in Agency-organized courses and 120 visiting professors provided. Something like 15 000 scientists have met at 100 conferences and symposia to discuss 5 500 scientific papers. Furthermore nearly 200 panels, 21 study groups and 13 other meetings were convened. The proceedings of the meetings, panel reports, surveys, manuals, scientific journals and other publications which have been issued, most of them in English, French, Russian and Spanish, add up to nearly a thousand titles, making the Agency one of the largest publishing houses in atomic energy.

PUTTING ISOTOPES TO WORK

The central point of all atomic technology is the reactor. From it is obtained heat which in large reactors is used to generate power. Within it new elements are created by transmutation, or new forms of the atoms of existing

At the Instituto de Asuntos Nucleares, Bogotá, Colombia, where Agency Technical Assistance experts are helping, Dr. Cristobal Corredor studies the effect of irradiation on beans. It is thought that spiders cause more damage than radioactivity.



elements known as isotopes. When these are unstable, or in other words are trying to restore themselves to normal by ejecting unwanted particles, they are radioactive and are called radioisotopes. Sometimes, more usually when they occur naturally, isotopes are content to remain as they are, slightly different in weight from other atoms of the same element but subject to the same chemical rules. They are then called stable isotopes. Knowledge of the properties of stable isotopes and radioisotopes has led to great advances in research and technology.

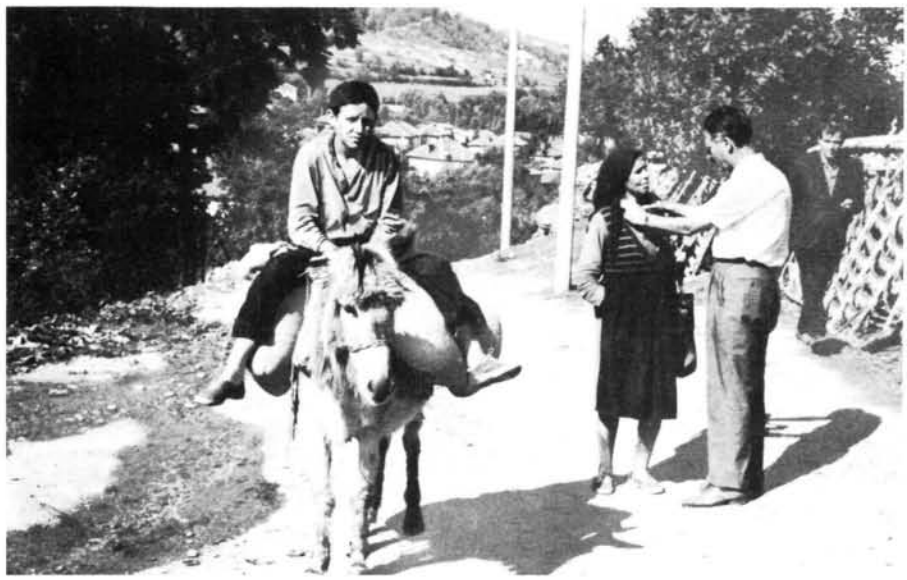
The innumerable ways in which isotopes and instruments associated with them can be turned to useful purposes easily, often cheaply and with a promise of relatively quick practical results, many of them particularly valuable to developing countries, made them an obvious field for the Agency's attention. Among the ways found of making use of them have been:

In Agriculture: improvement of yields through collective research efforts to make better use of fertilizers, as for rice, studied in 12 countries, and for maize in eight countries; production of better rice, wheat and barley through radiation-induced mutations; control or eradication of insect pests such as the fruit fly in Central America and the olive fly in Greece; protection of food against contamination; preservation of stored food by irradiation; studies designed to make fullest use of water in the soil; preparation by radiation of vaccines for animals.

In Hydrology: For six years a continuing world survey of the content of tritium (the radioactive isotope of hydrogen, three times as heavy in its core as the normal atom) as well as of some stable isotopes has been carried out jointly with the World Meteorological Organization. Its principal object has been to determine the water turn-over on earth. More than 20 countries have been helped to estimate their local water development problems. Studies of 20 large rivers in various parts of the world were carried out jointly with UNESCO as part of the programme of the International Hydrological Decade now in progress.

In Medicine: goitre research ranged from the heights of the Andes in Peru to those of the Himalayas in Nepal. Arrangements were made for the provision of equipment for radiological treatment of cancer to seven countries. Radioisotope techniques and charts for medical diagnosis and treatment have been developed and standardized. The highest priority has been given to four groups of subjects—anaemia, endemic goitre, malnutrition and the effects of parasitic infections on human beings, and research has been promoted in 44 countries.

In Industry: Increasing efforts have been made to acquaint nations with radioisotope techniques for improving the quality or production of manufactured goods; process, wear and tear and flow control; sterilization of medical products—all ways to realize savings of the order of hundreds of millions of dollars a year as well as leading to more rapid industrial development.



In Bulgaria the Postg-aduate Medical Institute, Sofia, is using radioisotopes to study goitre in its Clinic of Endocrinology and Diseases of Metabolism. Dr. G. Papasov is here seen examining a resident of the village of Bistritza.

RESEARCH AND LABORATORIES

Research is carried out at the Agency's own laboratories, unique in their international character; it is linked with the direction of internationally concerted efforts for the solution of specific problems.

The first provisional laboratory was set up in the temporary headquarters in 1958 and then dealt with physics and some chemistry involving low radioactivity. It is still maintained, partly for hydrological work, partly for investigations into radiation accidentally or medically introduced into the human body, with the help of a whole-body equipment for measuring radiation, developed by members of the staff.

A functional laboratory has been in operation since 1961 at Seibersdorf, about 20 miles south-east of Vienna, with sections for nuclear and medical physics, chemistry, agricultural research, hydrology and electronics. The variety of its work is shown by the fact that among subjects dealt with have been foodstuffs, the age and content of meteorites, quality of ores and sedimentation in rivers. Its radioisotope standards, of which nearly 8 000 have been ordered in four years and sent throughout the world, have served to calibrate instruments and check on research work in 56 countries. Ready support from the Austrian Government and collaboration with its Reactor Research Centre has been of great assistance to the laboratory.

The International Marine Radioactivity Laboratory created at Monaco in 1961, studies the effects and dispersal of radioactivity in the sea, its living creatures and its plants. Its work will give guidance on the future disposal from the growing numbers of nuclear installations (including ships) of radioactive waste. Generous assistance has been provided by the Government of Monaco and its Oceanographic Institute.

Encouragement for the scientific thinkers, especially those in developing countries who previously found it difficult to maintain contacts and standards of work, came in 1964 with the inauguration of the International Centre for Theoretical Physics in Trieste. While carrying out its basic aims, it has also been of value to the world as a whole, partly because of the 328 original papers which have been produced and partly because of the collaborative research efforts in which leading scientists of the major nuclear powers have taken part. So far 534 physicists from 45 countries have taken part in the work. Significant seminars in important subjects, as well as training courses and research groups, have resulted in useful publications. A system of associate membership, Fellowships, senior and junior physicists positions and a new scheme of affiliations with institutions organized with the least formality necessary, give opportunities which have been accepted in satisfactory numbers by scientists from developing countries. Major contributions to the financing of the Centre have come from the Italian Government, and other support from the University and City of Trieste.

POWER FOR ELECTRICITY AND WATER

Power production will, in the long term, probably be nuclear energy's greatest contribution to human welfare, and the Agency was conceived, above all, to promote its progress and to prevent its diversion to military purposes. In fact the expectation was to establish a bank or broker for nuclear materials for this purpose. Early offers of such material were not, however, taken up in quantity for reasons such as delay in making nuclear power competitive and a comparative abundance of commercially available uranium. More recently there has been a call for special materials.

During the last four years or so, however, there have been noticeable and rapid improvements in the prospects and these have influenced the programme. At the present stage the Agency has become to a large extent an international adviser on feasibility for individual countries or regions, to provide information enabling a choice to be made, to help in choosing sites, in making cost evaluations and giving guidance for safe operation. Another possibility has arisen and is clearly of future importance, the use of power stations for the additional purpose of converting sea and brackish water into fresh water. One idea is to build stations which can serve two purposes, producing electricity and fresh water, and studies with this in mind have been in progress since 1965 in conjunction with Mexico and USA. For a similar project between Israel and USA the Agency is acting as an observer. Power and desalination missions have been sent to Chile, El Salvador, Finland, Republic of Korea, Pakistan, Peru, the Philippines, Thailand, Tunisia and Turkey.

Power units are not only becoming more economic than conventional stations for large units, but types of reactors are emerging which will enable much fuller use to be made of the uranium available. One is the fast breeder reactor, during the operation of which more fuel can be created in a surrounding blanket of material than is consumed in the core. The Agency is encouraging the fullest exchanges of information and experience on all types by means of international conferences, panels and working groups.

MAKING THE ATOM SAFE

As a corollary to the rapidly growing use of radioactive materials both for isotope work, research and power production, the IAEA's protective functions have assumed increasing importance.

Basic safety standards for radiation protection and regulations for the safe transport of radioactive materials have been evolved and are mandatory for all activities with which the Agency is connected. They have also already served as the basis for protective legislation in many countries. Nearly 100 000 copies of various manuals for the safe handling of radioactive materials have been distributed. In many other ways the advice on rules and legislation emanating from IAEA's Legal Division is helping to add to the protection of communities.

SAFEGUARDS FOR PEACE

One of the two objectives laid down in the Agency Statute is to establish and administer safeguards designed to ensure that assistance made available by the Agency or under its control is not used in such a way as to further any military purpose; and to apply safeguards at the request of the parties to any bilateral or multilateral agreement.

To meet this objective a system of safeguards procedure has been established which applies to reactors of any size, as well as to installations where the used nuclear fuel is reprocessed which contains the materials from which explosives can be manufactured. Means are also being studied for extending it to the installations where nuclear fuels are fabricated.

The first country to accept the safeguards was Japan, which in 1959 obtained three tons of fuel through the Agency's intermediary. Since then the safeguards have been applied to the great majority of all Japan's activities in nuclear energy. Altogether 34 agreements have now been concluded with Member States under which safeguards are applied, involving 27 States. Some of the agreements provide for the supply by or through the Agency of nuclear materials, whereas some are arrangements by which safeguards on bilateral agreements between States are executed. Also, some States have unilaterally submitted nuclear installations to the safeguards control. Installations subject to control number 120, including 60 reactors; in many cases these represent the sole or the major nuclear activity in the country concerned.

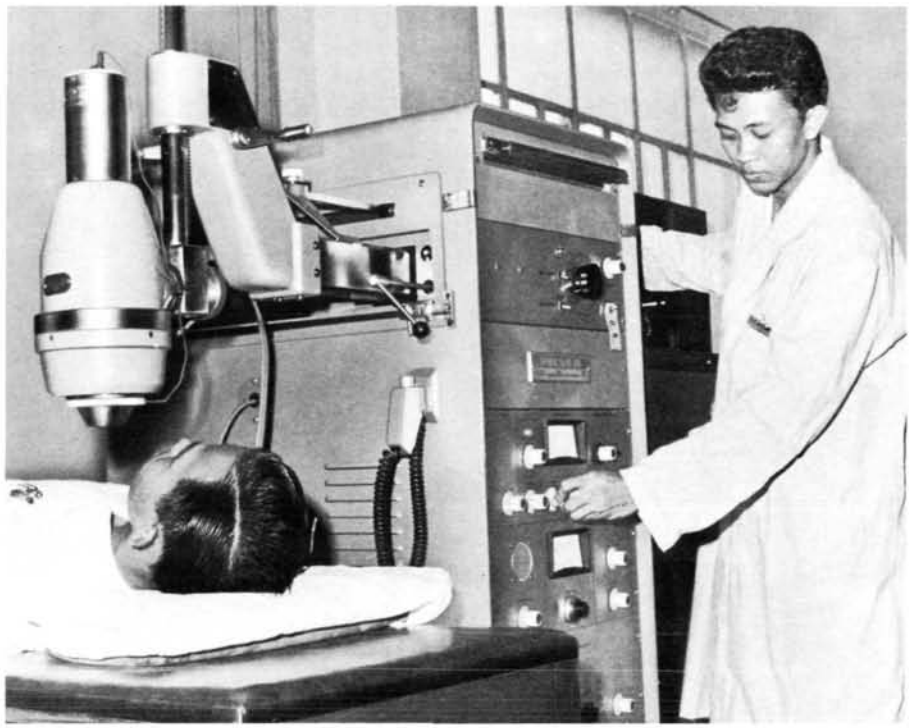
At La Molina experimental station, Lima, Peru, Gulio Lugo (left) and R.E.Franklin, an IAEA Technical Assistance expert, discuss an experiment connected with maize fertilization.

Under the system, Member States maintain records of the materials under safeguards and report periodically. One important element is the inspection by which the Agency assures itself that the materials reported on are physically present and used for the purposes stated. The Agency maintains a team of inspectors, headed by an Inspector General. The team is steadily gaining more experience. If the Agency should be called upon to increase its range of activities, it is confident that it could cope with this task, once it has enrolled and trained the necessary number of additional inspectors.

The Treaty for the Prohibition of Nuclear Weapons in Latin America, now open for ratification, foresees that the Agency will apply its safeguards to the nuclear activities of the contracting parties.

INTERNATIONAL CO-OPERATION

All the achievements of the first decade have been due to the work of people from all parts of the earth; to the co-operation of the Member States, who have to a considerable extent excluded politics from their discussions



Ile Ombrog, a medical technologist in the Rizal Provincial Hospital, the Philippines, setting up a thyroid scan in the radioisotope laboratory. The equipment was supplied under the Agency's programme of Technical Assistance.

aimed at universal benefit; and to the ready support of the United Nations Organization and other international bodies, both governmental and non-governmental.

Indications have already been given in this article of projects involving numbers of countries. There are others. One, the NPY agreement with Norway, Poland and Yugoslavia, is aimed at improving knowledge of reactor physics, using experimental facilities in each of the countries. It has benefitted scientists and technicians from other countries through training and fellowship arrangements, and has proved so fruitful that the original arrangement for three years has been extended for an extra three years. Another joint programme of research in reactor physics uses the reactor NORA in Norway, has provided useful data for the development of power reactors and has given experience to scientists from many nations. It started in 1961 for three years, has already had one extension of three years and will now go on for an extra year. In South East Asia a regional training and research programme using a neutron crystal spectrometer was established in 1965 at the Philippine Atomic Research Centre, Quezon City, administered by a committee with representatives from the Philippines, India and the Agency. India built the spectrometer with its necessary electronics

as well as providing scientists and technical physicists. Indonesia, Korea, Republic of China and of course the Philippines, whose research reactor is also used, have been taking part. The Middle Eastern Regional Radioisotope Centre for the Arab countries, set up under Agency auspices in Cairo in 1963, trains specialists for work and for research. There has been participation from Algeria, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Saudi Arabia, Sudan, Syrian Arab Republic, Tunisia, the United Arab Republic and Yemen, as well as trainees from Nigeria and Ghana.

The Agency is a member of the United Nations "family" and has concluded relationship agreements with UN and seven of its specialized agencies. With one of them, the Food and Agriculture Organization, a Joint Division of Atomic Energy in Food and Agriculture has been established in Vienna. Close links have been created with the World Health Organization and with the European Nuclear Energy Agency of the Organization for Economic Cooperation and Development. There has been participation in various projects financed from the UN Special Fund and Expanded Programme of Technical Assistance, now incorporated in the UN Development Programme, and the Agency has been the executing body for some major projects. One of these, a study in the Philippines, showed that nuclear power could be of value to the area. Another, in Turkey, was for a method of preventing grain infestation. In Central America the campaign to eradicate the losses caused by the Mediterranean fruit-fly is making good progress. In Yugoslavia valuable work to assist agricultural methods and animal husbandry has been accomplished.

Looking to the future, it seems clear that there will be more demand for assistance along many of the lines already followed, that nuclear power will be wanted by more and more countries as the economics improve, that the hopes of providing the supplies of usable water at reasonable prices will be brought nearer for the same reason and that the Agency will be called upon to strengthen its activities for protecting the people of the world both from radioactive hazards and from the risks of military operations.

One great task, connected with the spreading of information, will be to keep scientists everywhere acquainted with the immense amounts of technical detail becoming available. Proposals to use the most modern techniques, including computers, in a system linking the world for the purpose, have already been formulated, and have been given the title of INIS—International Nuclear Information System.

With the massive international effort now engaged in research and application, trends may continue to be influenced in unexpected ways. But the last ten years have clearly demonstrated two things. One is that with collaboration between nations and scientists the potential benefits of atomic energy and its related disciplines are becoming even greater than the early optimists envisaged. The other is that the Agency has moved steadily along the lines of the great objectives for which it came into existence. It will continue to "seek to accelerate and enlarge the contribution of atomic energy to peace,

health and prosperity throughout the world". It will continue to "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".

IN HONOUR OF MARIE SKLODOWSKA-CURIE

This year marks the hundredth anniversary of the birth in Poland of Marie Sklodowska-Curie, originator of the word "radioactivity", whose early research in the subject has had far-reaching consequences for the nuclear sciences. The Government of Poland's arrangements for marking the occasion include an international symposium, restoration of her house in Warsaw, publications and films, and the Agency is happy to collaborate. This article from a distinguished Austrian scientist indicates how her work was carried out in an atmosphere of co-operation between scientists of many nations.

By Dr. Berta Karlik

(The author has been since 1945 Director of the Institute for Radium Research and Nuclear Physics, Austrian Academy of Sciences, where she succeeded Professor Stefan Meyer. A graduate of Vienna University and member of a number of learned societies, she has produced many scientific papers, including one published in 1944 dealing with the occurrence in nature of element 85, Astatine. This element was the last in the atomic table to be identified and occurs naturally only in minute quantities. It was first produced artificially by E.C.Segré, D.R.Corson and K.R.MacKenzie in 1940 at the University of California).

The fact that the International Atomic Energy Agency has established its headquarters in Vienna prompts one to consider briefly, on the occasion of the 100th anniversary of Marie Curie's birth, the important part played by