PROTECTION AGAINST RADIATION RISKS

Some of the ways in which the Agency and other international bodies are working to ensure fullest protection of radiation workers and the public from possible hazards of radiation have been emphasized by recent conferences. These have provided opportunities for reports, discussions and recommendations based on research and experience in many parts of the world.

CONTAMINATION OF THE ENVIRONMENT

At the end of March a seminar, called in association with the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO), had as its subject the agricultural and public health aspects of environmental contamination by radioactive materials. More than 150 participants, who attended the week's sessions in Vienna, came from 39 countries and seven international organizations.

It was found that contamination from fall-out due to weapons tests reached its peak in 1964. Prospects up to the end of the century are, providing that there is no exceptional increase in such tests, that the resulting radioactive contamination will not add significantly to that existing in nature. Other radiation can come from such sources as outer space, natural substances, building materials such as slags, medical and dental X-ray treatment, materials used in nuclear power and artificial substances used for a variety of purposes. Advances in techniques could, it was felt, keep pace with these environmental problems and enable them to be kept at desired levels.

Besides reviewing the sources of radioactive materials likely to affect the environment, the seminar discussed ways in which these could be transferred through food and water to man; protection standards and acceptable levels; methods of keeping check on amounts of radioactive contamination; action to be taken in emergency situations and administrative responsibilities, including legal measures, for protecting the public.

Professor Ivan Zheludev, the Agency's Deputy Director General for Technical Operations, described the subject in an opening speech as being of vital concern to the atomic energy industry and of considerable importance to those responsible for ensuring that man's environment is not rendered harmful by any disposal of radioactive materials. The fact that the industry's record in this respect had so far been very satisfactory was due primarily to the awareness of the operators themselves of the hazards involved and the need to contain them and, secondly, to the vigilance of the authorities responsible for protecting the public. The meeting was timely because the industry was growing and could be expected to become a major contributor

Many hospitals in USSR use radioactive isotopes for diagnosis and therapy. For the safety of personnel individual dosimeters, here being checked after use, are worn by medical staff.

to increasing global demands for power over the next two decades. It was also going to provide much radioactive material for important and beneficial activities in medicine, agriculture, industry and hydrology. They must consider whether present protective measures were adequate and if not what steps should be taken, but it was equally important not to impose an undue burden on the industry by unnecessarily rigid precautions. The special responsibilities of the three sponsoring agencies to developing countries included making available the knowledge and experience which could be of economic benefit to them. It was also important to ensure that they should be fully aware of the safety aspects.

RADIATION AND CANCER

The possible relationship between radiation and cancer was discussed in Athens at a symposium held at the end of April which was convened by the Agency and WHO. Experts from 23 countries attended. At the opening of the session, Dr. E. Komarov (WHO) reminded the meeting that nuclear

radiation is a natural component of the human environment. In nature it comes from such sources as cosmic rays and from various materials such as radium and uranium occurring within the earth itself. Knowledge of the marvels of radioactivity as a tool for progress had existed since the end of last century. Recognition of the hazards which were thus added to the natural sources of radiation had also existed since then. A great deal of research had been in progress to develop and practice safety measures, particularly for the protection of people against undue exposure.

Both the establishment of effective safety standards, said Dr. Komarov, and the efficient use of nuclear methods of combatting and controlling cancer relied on a thorough understanding of the actual biological consequences of exposure to radiation. Rapid advances were being made and the symposium was designed to integrate the most recent knowledge and information acquired. It would also help to identify areas meriting further research at both national and international levels.

The results of extensive laboratory research and study of people exposed to radiation as long as 50 years ago were presented in the scientific papers. Cases of accidental exposure to radium and the results of large therapeutic radiation doses were also reported. Since nuclear radiation is a natural component of the human environment, research in this area assists in an understanding of the relationship between radiation and cancer. Experiments in the laboratory on animals are conducted at radiation dose levels that are far above those to which the human being is normally exposed from the natural background. Such dose-effect relationships do not permit a direct extrapolation of results to low background conditions normally met by human beings. Nevertheless, realistic estimates of possible risks of cancer from environmental radiation are important. It was therefore recommended that more extensive experimentation at lower dose levels be carried out.

Some of the other ideas proposed by the experts at the final round-table meeting included:

The need for better communication between radiobiologists and radiotherapists to ensure early application of research findings;

The necessity to institute training courses in various aspects of radiation carcinogenesis that can be effectively conducted by international bodies;

The need for standardization of therapeutic radiation doses in treatment of cancer in the various countries;

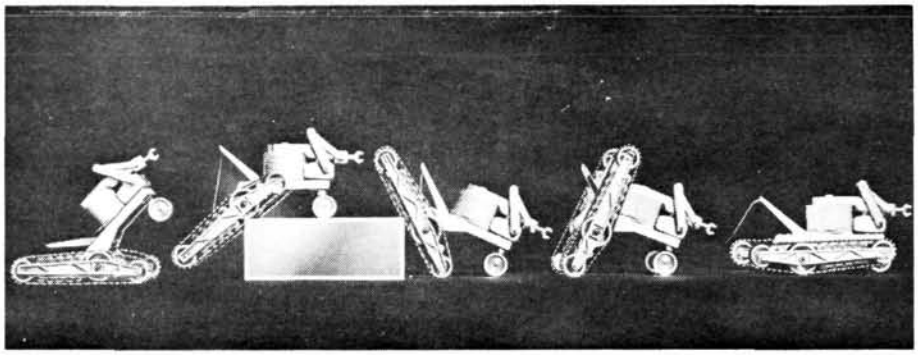
The need for intensification of training in radiobiology in the educational programmes of medical universities;

Establishment of international committees to recommend standardized procedures for studies of therapy and research on malignant diseases;

Evaluation of environmental factors that may be involved as cocarcinogens with radiation.

In the National Reactor Testing Station, Idaho, USA, clothing used by staff members is checked for radioactivity after washing. Photo: Idaho Operations Office

A report from the World Health Organization showed that collaboration had been inaugurated internationally on many aspects of this problem and that a biomedical information service has been set up by WHO to provide comprehensive and up-to-date information about current activities in the biomedical fields. This and the newly-established IAEA International Nuclear Information System would enable both the research activities and results from published literature to become more rapidly and readily available to research scientists.



Working model of a remote inspection vehicle developed at Harwell, UK, for damage control is shown climbing an obstacle. Photo: UKAEA

HANDLING RADIATION ACCIDENTS

Another symposium held in Vienna during May had as its subject the handling of radiation accidents. The Agency and WHO were again responsible for calling the meeting, which was attended by more than 200 scientists from 34 countries and seven international organizations. The two organizations have a co-ordinated programme in co-operation with other international bodies to make adequate preparations for incidents and this was the first scientific meeting to deal comprehensively with all aspects of the problem.

A reminder that the extremely good safety record in developing the uses of nuclear energy must not give rise to complacency was given by Professor Zheludev. "With the increasing number of reactors under construction and the ever-widening use of radioactive sources" he said "it is obvious that radiation accidents can occur. As we can never predict exactly the form an accident will take we must plan in advance for those we can reasonably foresee and make sure that our plans are flexible enough to be adapted to those that actually occur."

He added that in the period immediately following the discovery of X-rays and radium little was known of the harmful properties of radiation with the result that the personal sufferings of many pioneers provided much basic knowledge of the effects of ionizing radiation on the human body. When the release of nuclear energy became possible a cautious attitude was adopted and great emphasis was rightly placed from the very beginning on safety. Because of this the accessible records showed that the incidence of all types of accidents was less in nuclear energy establishments than in many other types of industrial concern and that accidents involving radiation were an extremely small fraction of the total. Very few deaths and serious injury caused by radiation had been reported throughout the world.

Nevertheless, it was necessary to learn as much as possible from accidents that had already occurred. Serious radiation accidents called for the co-operation of many experts with diverse backgrounds and qualifications and experience. Specialists were also required to plan for the prevention of accidents and for providing the necessary emergency services. This meeting had been arranged with the intention of bringing together those with interests in many diverse fields and to enable the problem to be looked at from different points of view.

Much of the symposium was devoted to an examination of protective measures and emergency planning, but a further reminder of the vigilance continually necessary was provided by several reports of accidents and overdoses of radiation which had actually occurred. During a round-table discussion at the end of the week some subjects put forward as calling for further attention were: support of and research on emergency radiation and criticality dosimetry; extension of emergency assistance agreements between neighbouring countries, the Agency and WHO; establishment of a data collection on all radiation accidents; more information on diagnosis and treatment of acute radiation illness; the feasibility of incorporating physical dosimeters into clothing; development of biological dosimetry; co-operation with workers in other fields of environmental hazards; and more public education in the hazards and safety precautions of nuclear work.

EMERGENCY ASSISTANCE

In order to be prepared for a radiation accident calling for emergency assistance, fourteen members of the Agency staff have been nominated to deal with requests at any time of the day or night. They would be ready to advise, to establish contact between the correct authorities in countries of the area affected and if necessary to travel to the spot immediately.

Thirty-nine Member States of the Agency, FAO and WHO have provided details of services, equipment and other help they might be able to provide. They are Argentina, Australia, Belgium, Brazil, Canada, Chile, China, Congo, Czechoslovakia, Denmark, Finland, France, Federal Republic of Germany, Greece, India, Italy, Israel, Japan, Korea, Luxembourg, Malaysia, Mexico, New Zealand, Norway, Pakistan, the Philippines, Poland, South Africa, Spain, Sudan, Sweden, Switzerland, Thailand, United Arab Republic, UK, USA, Yugoslavia, Venezuela and Vietnam.