IAEA FELLOWS REPORT

More than 500 scientists and technicians had completed their studies abroad under IAEA's fellowship programme at the end of 1961. At the same time, some 300 fellows were studying at universities, research institutions and atomic energy establishments in Member States.

It is the policy of the Agency to keep in touch with fellows also after their training has been completed and they have returned home to put into practice what they have learnt during their time of study. The short reports which most of the former fellowship holders send to the Agency's secretariat give a good indication of the usefulness of the training and the extent to which the newly acquired knowledge is being constructively absorbed in the fellow's native country. The following short extracts and summaries of a few of the fellows' reports should only be regarded as a sample. It is intended to carry a few such reports in each forthcoming issue of the Bulletin.

O.O. BETTI, a neuro-surgeon from Buenos Aires, received a fellowship to study his speciality at hospitals in Paris. He spent nine months in the hospitals St. Anne and La Pitié and took particular interest in new encephalographic techniques utilizing gamma radiation. He is now organizing a gamma-encephalographic laboratory at the Institute for Neurosurgery in Buenos Aires. He writes to the Agency: "The knowledge acquired as an IAEA fellow permits me to perfect the stereotaxical techniques for the utilization of radioactive materials destined to destroy zones or growth in the brain which cause various syndromes."

Dr. LIONEL SIRIWARDENE went to the Isotope School of the United Kingdom Atomic Energy Authority in Berkshire as an IAEA fellow for a three-month training period. In the course of his training he was also enabled to visit many atomic centres in the United Kingdom, as for instance Harwell, Windscale, Calder Hall and Wantage, and also a number of university laboratories at Cambridge, Oxford, London and Leeds. Soon after his return to Ceylon, Dr. Siriwardene was appointed Director of the Isotope Centre, University of Ceylon, where he is in charge of the training of undergraduate and postgraduate students in radiochemistry and the use, handling and measurements of radioisotopes; he also directs the research programmes of the centre. One postgraduate course was organized and conducted by the IAEA technical expert in Ceylon, Dr. F.H. Kendall. Dr. Siriwardene writes: "The training has without doubt been of immense value. It has made possible the introduction of the teaching of radiochemistry and training in the use of radioisotopes for the first time in Ceylon. It is expected that this field will prove to be of much value to this country in the near future."

The effects of ionizing radiation at the molecular level were studied by Dr. ZDENKA HRADECNA (Czechoslovak Socialist Republic), during a period of fourteen months at the Biophysical Laboratory of the Geneva University, Switzerland. She specialized in the irradiation and protection effects on lysogenic and phage lambda bacteria. Dr. Hradecna is now Head of the Department of Molecular Biophysics at the Institute of Biophysics of the Academy of Sciences, Brno. She writes: "My training in radiobiology and biophysics was very useful for my further work. I learned several new methods used in radiobiology nowadays and I saw the importance of studying the basic mechanism of ionizing radiation. Now I continue to work on the research problem started in Geneva."

A health physicist from the Danish Atomic Energy Establishment at Risø, Mr. HENNING JENSEN, followed the United States AEC one-year course on Nuclear Reactor Hazards Evaluation at Oak Ridge National Laboratory as an IAEA fellow.

Mr. Jensen reports that the first six months were spent following the regular curriculum of the Oak Ridge School of Reactor Technology. The next three months were devoted to reactor hazard studies and the final three months on the writing of a reactor safety report, in this case a report on the Experimental Gas-cooled Reactor at Oak Ridge. Mr. Jensen now heads a group of six health physicists and seventeen assistants at Risø. This group is responsible for the applied health physics and safety related to health physics within the Risø laboratory area. He writes that his training "has given me a fundamental background knowledge which I use as secretary of a working group for hot cell construction". The trainee also often becomes a teacher. Mr. Jensen writes that "I am teaching an IAEA fellow now visiting the health physics department".

REZA HAGHPARAST from Iran spent one year at the Royal Agricultural College in Uppsala, Sweden, studying the uses of radioisotopes in soil fertility research. He also visited some agricultural research stations in the United Kingdom during his period of training as an IAEA fellow.

Mr. Haghparast is now Head of the Atomic Energy Research Division, Ministry of Agriculture, and Member of the Radiobiological Section of the University Nuclear Centre, Teheran. He writes: "I am really satisfied with my training in Sweden and I believe we shall be able to carry out some isotope research work in agriculture. I hope that our research will help increase and improve our agricultural production, directly and indirectly."

Dr. DARKO STOŠIĆ, from Belgrade, Yugoslavia, studied six months at the All-Union Institute of Experimental Veterinary Science, Laboratory of Animal Physiology, Moscow, under an Agency fellowship. The Head of the Laboratory was Dr. Alexander Kudriavtsev.

Dr. Stošić studied in particular the metabolism of phosphorus-32 in hens and ruminants. He also visited other Soviet agricultural institutes in Moscow and Leningrad. Dr. Stošić is an adviser to the Yugoslav Federal Nuclear Energy Commission on agricultural questions. He plans and co-ordinates the work on agricultural applications of atomic energy in Yugoslavia and conducts scientific experimental research in the fields of animal nutrition and applied physiology.

Dr. Stošić writes that during his training in Moscow he "studied the organization of scientific work with radioisotopes in agriculture and the methods of experimental work in this field. This training helped me to improve my knowledge of the organization of scientific work" which, he writes, will help him to "improve my scientific work and in training my collaborators".

USE OF ISOTOPES IN HYDROLOGY

Water is often spoken of as the most important commodity of human societies. It is, of course, not possible to make a gradation of basic necessities - sunshine, for example, is important also. Nevertheless, it is clear that where water is lacking in its patchwork distribution over the globe, human settlement is generally impossible. Further, in areas where water is scarce living conditions can certainly be improved if it is made available in greater quantities.

This has been recognized for centuries and in ancient times the art of water management was considered more or less the key to progress. Most of the water then used by man was drawn from neighbouring rivers, but more accessible parts of the groundwater were also utilized.

Measuring flow rate of water in UN Special Fund ground water project in Greece (Photo: Greek Atomic Energy Commission)

In our time groundwater is being utilized on an increasing scale. This has brought benefits but it has also created problems. Groundwater resources are obviously not inexhaustible and proper planning for the future must consider to what extent they should be tapped. Such determinations have not been easy to make. Although hydrology, both as a science and as an engineering art, has developed rapidly, it has until recently lacked the tools needed for thorough groundwater exploration. With conventional hydrological methods, for example, it is not in general possible to assess the rate at which groundwater reservoirs are recharged, and in many cases it is difficult or impossible to estimate the amount of groundwater stored in a certain area. Therefore, these two problems - how much groundwater is in an area and what is the recharge rate - are repeatedly encountered by hydrological engineers. Radioisotope methods seem to be promising tools for solving the problems.

Radioisotopes can be applied to hydrological studies in two principal ways: as a tracer to identify water, or as an age measuring device. Applications of each method are discussed in the following paragraphs.

Tracing Water with Radioisotopes

Radioisotope tracers are added to groundwater in order to determine such characteristics as the water's rate or direction of flow. Techniques for conducting such studies are being developed satisfactorily. The main problem has been to find a tracer with a suitable half-life - neither too short nor too