were the activities in medicine, food, agriculture and industry; training courses; the attention given to expanded application of nuclear energy and desalination; preparation of codes and standards for safety; the proposed international nuclear information system (INIS); the programme of scientific meetings; and stimulation of regional co-operation.

Speakers were the representatives of Argentina, Australia, Austria, Bulgaria, Canada, Czechoslovakia, Hungary, India, Indonesia, Japan, Mexico, the Netherlands, Poland, USSR and USA. A resolution submitted by Argentina, Bulgaria and Indonesia that the General Assembly should take note of the report was carried unanimously.

STUDYING THE INSECTS

Among the many millions of species of insect, large numbers are useful to man, but some are harmful. Nuclear techniques have made it possible to study them in minute detail, as well as to evolve methods of controlling those which destroy food and carry disease. Important successes are now being achieved in some of the control applications.

One of the biggest gatherings of radiation entomologists to be held in recent years took place during December in Vienna. Organized by the FAO/IAEA Joint Division of Atomic Energy in Food and Agriculture, its purpose was to discuss and review the most recent information on the use of isotopes and radiation in entomology. Twenty-nine countries and six international organizations were represented among those who took part.

Much information was given of research making use of nuclear techniques to assess the effects of radiation on insects, to learn about their behaviour from the beginning to the end of their lives and to find ways of reducing harmful insect populations.

At the beginning of the meetings Dr Henry Seligman, the Agency's Deputy Director General for Research and Isotopes, said that the nuclear age had made possible a new arsenal of weapons against harmful insects. One method

An entomologist working on an IAEA project in West Pakistan examines the stubble of rice to investigate damage caused by the rice stem borer insect.

of dealing with them was to release masses of insects sterilized by radiation to stop reproduction of a species. Success of this method in the USA against the screw-worm fly, which caused great damage to cattle, had given impetus to its use against other destructive pests. The FAO/IAEA Joint Division is instrumental in two programes, aimed at control of the Mediterranean fruit fly, in Central America and Capri. Data from both areas indicated that the method could be used to control this pest and save much fruit from destruction. Thus after years of basic research in radiobiology and entomology this application was well on the way to success. The result is a great encouragement to them to make studies of other species. In terms of saving food, reducing the spread of disease and even of saving life, atomic energy could bring immense benefits both directly and in combination with other methods.

TSETSE FLIES AND TICKS

Among the other species which pose a serious problem for man is the tsetse fly. Much research is in progress to find whether control programmes can be undertaken, and a special session was arranged to review present trends of the work in Kenya, Nigeria, Uganda, UK and the IAEA laboratories in Austria. One suggestion put forward was that radiation could be used to induce

genetic changes through chromosome rearrangements and thus bring about degrees of sterility persisting through more than one generation. Theoretical calculations were submitted to support the idea, but it still has to be tested in natural conditions.

A discovery made in Israel about cave-dwelling ticks which are disease vectors and attack both animal and human intruders, may be useful in research on other insects. It had been established that after irradiation in specific conditions these ticks, which can live for years while waiting for their next meal, feed on blood only once more. This means that if they are sterilized by radiation, given one meal and then released, there is no further risk of them biting, and their sterile matings bring about a decrease in, or eradication of, a tick population.

Encouraging reports of research relating to the sterile male technique came from several countries. Tests in Indonesia on a destructive sugar cane pest known as the white top borer, had given favourable results. Similarly it appeared that eradication of a pine caterpillar was feasible if large-scale rearing could be accomplished. In Peru an insect which attacks cotton crops had been reared and sterilized successfully.

A review paper presented by a USSR scientist summarized the reasons for and results of research in many parts of the world as well as in his own country, and indicated that both radiation and chemical methods might be employed against a number of insects, including the locust.

Studies in Switzerland into the habits of cockchafers was of particular interest to a number of European countries which suffer from swarmings in late spring and early summer. From information accumulated over twelve years scientists can now make accurate predictions of movements of this insect, and experiments had shown that the irradiation method to produce sterility could be used during the white grub stage. It had also been shown that these grubs remain alive under refrigeration for years.

Despite the progress which has been made, it was clear that entomologists will continue to work cautiously in developing control methods which might change the balance of insect populations. It was emphasized that extension of the radiation sterilization method will depend on the acquisition of a great deal more basic biological and radiobiological knowledge.

INVESTIGATIONS WITH RADIOACTIVITY

Use of radioactive materials in research had helped to establish that one of the major pests harming cocoa production in Ghana, the cocoa capsid, was itself a prey to approximately thirty other insects. In France, radioactive gold added to honey as a tracer had provided information showing the importance of the bumble bee in plant pollination. Another report from the same country indicated that silk-worm production may be stimulated in certain circumstances. The relationship between aphids and the plants on which they live is being studied by the tracer method in the Federal Republic of Germany.