scientific bonus from peaceful nuclear explosions

The possibility of tapping natural resources and creating excavations for civil engineering provide the principal reasons for studying and developing peaceful nuclear explosions. An incidental bonus may come from the opportunities they could provide for increasing scientific knowledge in some fields. Examples were given in March at an Agency panel on such explosions attended by experts from 30 countries.

During the meeting Mr. Milo D. Nordyke (USA), speaking as a consultant to the Agency, after referring to applications underground to tap natural resources and on the earth's surface for large-scale civil engineering, spoke of scientific applications. Here international co-operation and experiments would be fully consistent with traditions of science.

He recalled that the 1954 Bikini nuclear tests had been used to study and define the structure of the earth's crust under Australia; an underground test in the United States led to a re-evaluation of the structure of the crust and mantle of the central U.S. He cited three main advantages of nuclear explosions over earthquakes for seismic studies. First, they are at known places; secondly, they are planned to take place at a known time, so that the best use can be made of instruments to record and analyse the seismic disturbance they cause; and thirdly they can be arranged to take place in areas which are normally earthquake free, and thus difficult to study in this way.

In addition, the intense nuclear activity inside nuclear explosives had made it possible to practice a modern alchemy, to produce new elements and to explore the physics of matter beyond the end of the periodic table. Heavy elements produced by neutron bombardment of other elements could be useful in studies not only of the nucleus and nuclear forces, but in diagnostic and therapeutic applications in medicine, as neutron radiation sources, and as energy sources for such applications as artificial hearts and space satellites.

Mr. O.L. Kedrovski (USSR) dealt with plans for the exploitation of nuclear explosions for industrial purposes in his country. He described them as being of great significance, and much scientific and industrial research was being done. The programme envisaged the carrying out of a whole programme of research work, test and industrial explosions, and of studying the optimum conditions for applying these explosions for specific applications.

Both speakers stressed that great attention was paid to safety, in respect both of the seismic and of the radiation effects of nuclear explosions.

Eight panel members presented statements of their countries' national programmes. Mr. Nordyke's paper was a technical status summary; in addition, experts from the USSR, the USA, the United Kingdom and France presented a total of 17 papers for discussion.