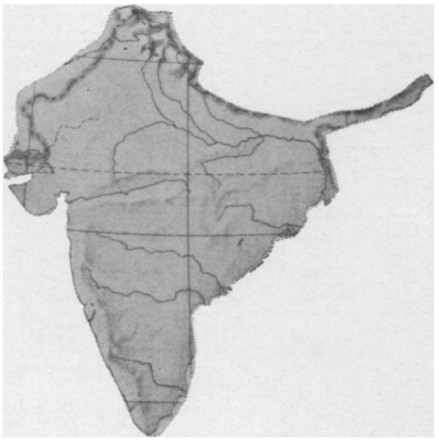
LETTER FROM BOMBAY



Radiation safety

Asian countries are adopting techniques to deal with the atomic age

by S. K. Ghaswala

Though India has no nuclear capability in weaponry, and officially denies any interest in developing one, research in atomic energy is the nation's priority item in science spending. Nuclear energy as a source of electric power, for radiation treatment of disease and manipulation of genetic characteristics of crops is a goal India has been striving to reach since independence. And, guided mainly by the hand of the late Dr. Homi Bhabha, a close friend of the late Prime Minister Nehru, the nation has been making progress.

But with nuclear facilities, now available at some 1,000 institutions, comes the problem of protection from radiation hazards. That problem, in relation to both natural and man-made sources of radiation, was the topic of a recent seminar. More than 100 scientists from all over the world gathered at the Tata Institute for Fundamental Research, just across Bombay harbor from India's main atomic station.

At the meeting, convened by the International Atomic Energy Agency and the World Health Organization, participants scrutinized the problems and reviewed methods of measuring levels of radiation exposure. Though most of the original science involved in the various methods emerged from Western nations 20 or more years ago, its use in developing countries, and their adaptations to fit local needs, constitute for them a significant upgrading of scientific expertise.

The problem is becoming universal, says Dr. J. N. Karamourtzounis of the World Health Organization's radiation health unit in New Delhi. "Everyone during his life will have had one or more X-rays taken for diagnostic purposes. The doses received, depending on the site examined, will not harm the individual, but from the genetic aspect the increasing use of X-ray examinations presents a danger because almost the whole population is involved."

As the result of a radiation program established by Dr. Bhabha, nearly 12,000 workers are protected, reports Atomic Energy Commission chairman Dr. Vikram Sarabhai. "Ten years ago barely 100 workers used the services of the Directorate of Radiation Protection."

Dr. Carl Unruh of the Battelle Memorial Institute in Richland, Wash., discussed new methods of radiation monitoring. While ionization chamber methods have proved dependable and accurate at reasonable cost, they are more suitable for measuring radiation quantities in air than they are for handling special problems such as measurement of skin exposure, he observes. He went on to describe newer tissue equivalent detectors in which a compound of paraffin and various chemicals reacts to radiation exposure in the same way human flesh does and provides means of monitoring actual levels in skin.

Existing methods discussed at the educational seminar included use of silica gel as an adsorbent. P. R. Kamath and R. P. Gurg reported a study of its application in monitoring and cleaning radio iodine from the air. Nuclear reactors give rise to radio iodine in a vapor state. Silica gel, as do activated charcoal and other materials, grabs iodine molecules and traps them on its surface.

K. S. V. Nambi and his colleagues reviewed a simple system of monitoring airborne radiation particles that uses the thermoluminescent property of calcium fluoride powder. The powder, which can be put into a small badge workers wear, stores radiation energy. When heated by a reading device, the energy is released in the form of fluorescent light which can be measured to determine the amount of radiation that was present. In the United States, such badges are commonly used.

S. K. Mehta discussed the application of electrostatic precipitators for measuring plutonium 239. Precipitators, which are by no means new in principle, have been adapted to separate particulate plutonium 239 so that it can be measured.

One Indian situation the seminar failed to consider is the potential radiation hazard to persons living in the Kerala coast, a lush, palm dotted area in the southwest. There radioactive sands are found in abundance.

In fact, that part of the country forms one of the world's richest resources of monazite sand. Because of the presence of these naturally radioactive sands, the level of background radiation in Kerala is many times higher than the world average. Estimates are that a Kerala fisherman receives a much larger dose of radiation in his lifetime than is received by average individuals anywhere else in the world from all nuclear tests put together.

In general, however, the seminar showed that, in Asia, India is in the vanguard of radiation protection science and could afford to help other developing nations in this field.

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