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NATIONAL ACADEMY OF SCIENCES REPORTS ON

"THE BIOLOGICAL EFFECTS OF ATOMIC RADIATIONS"

Washington, D. C., June 12--: The National Academy of Sciences in releasing a report on a year-long study of the biological effects of atomic radiations, warned today that radiation from any source--bombs, nuclear reactors, the natural environment, even medical Xrays--is harmful to life. The report emphasized that exposure of individuals and of the world's population as a whole be carefully controlled and regulated and it recommended that individual records be kept of the lifetime radiation exposure of all persons.

With proper safeguards, the report added, a full-scale, worldwide, peaceful atomic energy program should not bring with it undue biological hazards. A vigorous program of research is needed, however, to make clear what the necessary safeguards are.

Research is also pointing the way to dramatic benefits which radiation techniques can being in many fields such as medicine, biology and agriculture.

These major conclusions were announced at the headquarters of the Academy by its president, Dr. Detlev W. Bronk, and by six committee chairmen who are leading more than one hundred U.S. scientists in a continuing study of radiation problems.

The areas covered by the committees are: genetics, pathology, agriculture and food supplies, and disposal of radioactive wastes.

The scientists also stated that atomic weapons testing has not raised world-wide radiation to biologically dangerous levels, nor will it do so if continued at the same rate as in the past. They say there is no evidence that the tests have affected weather or climate.

The report makes clear that of the body's physiological systems, the inheritence mechanism is by far the most sensitive to radiation. Any radiation, no matter how little, which reaches the human reproductive cells can cause mutations (changes in the material governing heredity) that are passed on to succeeding generations. Human gene mutations which produce observable effects are believed to be almost always harmful.

For these reasons, the scientists recommend a limit on the amount of radiation reaching people's reproductive glands over and above the amount they receive naturally from cosmic rays and radioactive deposits. This limit, as an average for the population as a whole, is set at 10 roentgens from conception to age 30. (A roentgen is a unit measuring the strength of radiation. An average dental Xray, for example, delivers 5 roentgens to the patient's jaw but only five thousandth of a roentgen of stray radiation to more remote parts of the body such as the sex glands.)

At present, the report states, the average U. S. citizen is getting about three roentgens or 30 per cent of the recommended limit in medical and dental Xrays.

The scientists propose that records should be kept of the total accumulated lifetime exposure to radiation of every

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person and that the use of medical and dental Xrays should be reduced as much as possible consistent with medical necessity.

When a world-wide atomic power industry becomes fully developed, the report points out, its accumulated radioactive waste products may represent more radiation than would be released in an atomic war. The prevention of widespread contamination which might expose large numbers of people to dangerous radiation depends on man's ability to keep these wastes out of the great network of ocean and air currents, food and water supplies, upon which he depends for life.

The scientists also state that radiation from fall-out inevitably contaminates man's food supply. At present this contamination is negligible but the maximum tolerable level of radioactivity in food is not known. Research on this problem is, therefore, vital.

The study committees of the National Academy of Sciences have accordingly recommended that:

We should develop improved techniques to monitor world-wide fall-out from atomic radiation.

The national agency should control and keep records of all dumping of radioactive material in the ocean.

An international body should set up safe standards without delay, based on present knowledge, for the marine disposal of radioactive materials.

Research in marine disposal of radioactive waste products should be carried out on a cooperative international basis.

Until advances in reactor technology lessen hazards substantially, reactors located near populated areas should be sealed against the release of radioactive materials in the event of an accident.

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We urgently need accelerated research in the problems of: genetics; radiation pathology; mixing between various parts of the atmosphere and the oceans; the concentration of radioactive materials by plants and animals, both on land and in the oceans; geophysical and geochemical aspects of the ultimate disposal of radioactive wastes; selection of biologically suitable sites for various atomic facilities, such as nuclear power plants; and safety devices for the control of accidental power surges in reactors.

If, through careful control of all atomic activity, general exposures to radiation are limited to what geneticists consider reasonable, there should be no direct ill effects on the people who receive the radiation. Larger exposures, however, of 100 roentgens and up, to the whole body or a large part of it are harmful. But much higher doses may be safely delivered to limited parts of the body under controlled conditions of medical treatments.

One of the pathological effects of radiation is a general increase in the rate of aging and a consequent shortening of life. Dose levels such as the geneticists believe reasonable, or as have been established for persons working with radiation, do not appear to have this effect. However, it is not known what minimum dose, if any, would be needed to give a noticeable reduction in life span if very large numbers of people were exposed.

Radiation can enhance man's food supply through solution of practical problems in the use of fertilizer, the production of new and superior strains of food plants by mutations, and the sterilization of packaged food with reduction of the need for refrigeration and extension of shelf life of many products.

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Research through radioactive tracer materials offers promise in the study of biochemical reactions, to chart ocean and air currents, and to study the interrelationships of marine animals. Such investigations may be possible only within the next 10 to 20 years since increasing radioactive contamination of the sea and atmosphere, as atomic activity rises, may make detection of these tracers impossible against the hightened background.

The findings announced today were made possible by financial support from the Rockefeller Foundation. The Atomic Energy Commission and the Department of Defense cooperated in the continuing study; the reports, however, are private and independent.

The study committees and their chairmen are: Genetics, Dr. Warren Weaver, Vice President for the Natural and Medical Sciences of the Rockefeller Foundation; Pathology, Dr. Shields Warren, Director of the New England Deaconess Hospital in Boston; Agriculture and Food Supplies. Professor A. Geoffrey Norman, of the Department of Botany of the University of Michigan; Oceanography and Fisheries, Roger Revelle, Director of the Scripps Institution of Oceanography at La Jolla, California; Meteorology, Harry Wexler, Director of Meteorological Research of the U. S. Weather Bureau; and Disposal and Dispersal of Radioactive Wastes, Abel Wolman, Professor of Sanitary Engineering The John Hopkins University.

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