

## PUBLIC HEALTH

# Life's Radiation Tallied

Dr. W. F. Libby, tabulating the amounts of natural radioactivity and cosmic ray dosages affecting humans, found that seafarers receive less than landlubbers.

► THE INTREPID mariner receives less natural atomic radiation than does his landlubber brother, Dr. W. F. Libby, a member of the atomic Energy Commission, reported in *Science* (July 8).

Dr. Libby made a statistical analysis of the radiation dosages people receive from natural radioactivity and cosmic rays. His tabulations showed that earth dwellers are absorbing natural atomic radiation daily from their neighbors and their surroundings.

People, packed in a crowd, for instance, receive radioactivity from the potassium in their neighbors' bodies at the rate of two milliroentgens per year. However, this does not mean that people are poisonous to other people on account of radiation.

Dr. Libby pointed out that altitude and environment play an important role in the amount of natural radiation man is exposed to.

"It is interesting," he stated, "that the variations in natural dosage are large and under certain conditions the natural dosage may be nearly 100 times higher than the minimum, the dosage of seafarers."

A seafarer on the open ocean at the equator is subjected to an average of 53 mr/yr (milliroentgens per year), whereas the same voyager at a latitude of 55 degrees north, or about Moscow's latitude, absorbed 57 mr/yr. At sea level at 55 degrees north, there was an average of 147 mr/yr, and at 20,000 feet, 560 mr/yr.

Dr. Libby also pointed out that the biological effects per unit energy may be larger for cosmic radiation, because it consists of high-energy particles rather than gamma radiation.

Wearing 24 hours a day a wrist-watch that has a luminous dial would give the central body, including the sex organs, a dosage of 40 mr/yr.

In making a list of other types of exposure that occur in normal living, the AEC commissioner listed each X-ray of the lumbar spine, lateral, as giving a dosage of 5,700 mr/yr; uranium ore on the ground, 2,800 mr/yr; a uranium mine with all walls of ore, 5,600, and phosphate rock fertilizer on the ground, 280 to 700.

Humans also take in radiation when they drink water. Radium is assimilated in drinking waters throughout the normal lifetime, Dr. Libby said, and radium in the bones gives off 6.7 mr/yr.

Dr. Libby listed direct measurements made as background count in human environments. In the streets of Stockholm, the total cosmic ray and gamma radiation count was from 121 to 150 mr. In wood houses it was 104, in brick and concrete

homes from 145 to 296. Outdoors in Brookhaven, N. Y., the count was 98, and 90 on Fordham University's campus.

The fallout dosage from atomic tests on Jan. 1, 1955, Dr. Libby reported, was about 1 mr/yr, with the total dose during 1954 estimated at about 15 mr "principally because of the Pacific tests in the spring."

All these figures fall far below the roentgens that must be absorbed by the body to bring on sickness or death. To bring about radiation sickness, 100,000 or more milliroentgens in one dose would be necessary.

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## AERONAUTICS

## Double-Rotor Helicopter Adapted for Civil Use

► FAST, LONG-RANGE helicopter "bus" service is seen a step nearer reality with the announcement that the military twin-rotor H-21 "Work Horse" helicopter has been adapted for commercial use.

The civil version, scheduled for initial delivery by the Piasecki Helicopter Corporation in 1956, will be known as the PH-42. The powerful "whirlybird," which cruises at 98 miles an hour, will seat from 16 to 19 passengers.

The "Work Horse" has demonstrated its ability to tow minesweeping gear and free trucks mired in the sand. The ship has a pulling force of from 6,000 to 8,000 pounds.

The body of the 'copter hangs between two large rotors, one at the front and one in the rear. The aircraft is described as particularly easy and safe in loading operations. Since the spinning blades clear the ground by 14 feet, personnel can walk near the helicopter in complete safety. Trucks can drive alongside for loading or unloading baggage.

New York Airways and Sabena Belgian Airlines are currently evaluating the PH-42 as a possible replacement for their present lower capacity helicopters. Civil Aeronautics Administration certification procedures on the "Work Horse" are under way.

The new helicopter will carry mail and baggage externally in a detachable "Heli-pack" under the fuselage, making additional cabin room for passengers. The outside baggage system will also speed loading and unloading and avoid doorway congestion.

The passenger cabin will be spacious as helicopter cabins go, measuring 20 feet long, nearly six feet high and over five and a half feet wide. Passengers may sit wherever they desire, since balance of the aircraft does not require special weight distribution in the cabin.

The company expects widespread use of the double-rotor helicopter in industry. It could carry 5,300 pounds of equipment in its stripped-down version, and could be used as a "flying crane" lifting loads up to 4,500 pounds. Its use is also foreseen in forest fire control, disaster evacuation, aerial mapping and photography, and meteorological observation.

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**EASILY LOADED HELICOPTER**—The rapidity and ease with which the commercial Piasecki PH-42 helicopter can be loaded is demonstrated by a military version of the same aircraft receiving cargo from a ton and a half category truck. The loading height of most trucks is within a few inches of the PH-42's door sill.