PUBLIC SAFETY

H-Bomb Contamination

➤ AN H-BOMB such as that exploded on March 1, 1954, in the Pacific would contaminate 7,000 square miles with deadly radioactivity, the Atomic Energy Commission revealed in its first public report on fall-out effects.

Admiral Lewis L. Strauss, chairman of the AEC, said the fall-out from that March 1 burst covered an elongated cigar-shaped area extending approximately 220 statute miles down-wind and varying in width up to 40 miles. In addition, there was a contaminated area up-wind and cross-wind extending possibly 20 miles from the point of detonation.

Data from this and other tests permits estimates of casualties that would have been suffered within this contaminated area if it had been populated, the AEC said. These estimates assume:

1. That the people in the area would ignore even the most elementary precautions.
2. That they would not take shelter but would remain out of doors completely exposed for about 36 hours.
3. That, in consequence, they would receive the maximum exposure.

Therefore, the estimates made, were extreme estimates since they assume the worst possible conditions.

On the basis of data from this test and other information, the AEC estimated, following the March 1 test explosion, there was sufficient radioactivity in a down-wind belt about 140 miles in length and of varying width up to 20 miles to have seriously threatened the lives of nearly all persons in the area who took no protective measures.

Some distance farther from the point of detonation, at about 160 miles down-wind and along the axis of the ellipse, the amount of radioactivity would have seriously threatened the lives of about one-half of the persons in the area who took no protective measures.

Near the outer edge of the ellipse, or approximately 190 miles down-wind, it is estimated that the level of radioactivity would have been sufficient to have seriously threatened the lives of 5 to 10 percent of any persons who might have remained exposed out of doors for all of the first 36 hours.

Thus, about 7,000 square miles of territory down-wind from the point of burst was so contaminated that survival might have depended upon prompt evacuation of the area or upon taking shelter and other protective measures.

At a distance of 220 miles or more down-wind, it is unlikely that any deaths would have occurred from radioactivity even if persons there had remained exposed up to 48 hours and had taken no safety measures.

These estimates do not apply uniformly throughout the contaminated area inasmuch as the intensity of radioactivity within a region of heavy fallout will vary from point to point, due to such factors as air currents, rain, snow, and other atmospheric conditions.

Because of this and because most persons, if given sufficient warning, probably would evacuate the area or take shelter and other precautionary measures, the actual percentage of fatalities could reasonably be presumed to be considerably smaller than these extreme estimates, the AEC said.

Larger Area Threatened

➤ THE AREA threatened by radioactive fall-out from an H-bomb exploded near the ground is at least twice as wide as the cigar-shape described in the official Atomic Energy Commission report.

Atoms spewing their lethal radioactivity as far as 200 miles down-wind could mean death to persons living a path at least 40 and perhaps 60 miles wide. They would probably not rain down on everyone inside such an area. But they could.

The reason all persons living in this larger area could be showered with radioactive dust is that winds might scatter the debris considerably more than indicated in the first official AEC report on fall-out.

That is, if intensely radioactive particles are carried 150 miles down-wind, turbulent winds are very likely to spread them over an area considerably wider than 20 miles.

But predicting exactly where debris would fall out is beyond present knowledge of meteorologists. Many of them believe that it will never be possible to pinpoint the precise location of an air mass 24 hours from any given time.

Civil defense officials thus should plan for evacuation of inhabitants from an area considerably greater than the recent official estimate if persons are to escape contamination by fall-out.

This larger danger area results from turbulence in the atmosphere. Occurrence of turbulence, whether in the air or in water rushing from a faucet, is not predictable as far as is now known. What is predictable is the probability of its occurrence, which follows the same laws of chance as coin tossing or the throw of dice.

Science News Letter, February 26, 1955

GENERAL SCIENCE

Reports of STS Winners

➤ THE ORIGINAL research projects of 40 of America's top high school scientists helped them win a trip to Washington to compete for $11,000 in Westinghouse Science Scholarships.

Here is the last in a series describing the work of the Science Talent Search Winners:

Extracts Drugs

➤ ALKALOIDS, ORGANIC substances that occur naturally in plants and animals, have been very important in medicine, as for example: morphine, the most important alkaloid of opium; and quinine, the most important alkaloid of cinchona bark.

Hoping to learn more about alkaloids, 18-year-old Winston Stanley Marshall of Nashville, Tenn., has extracted 24 different alkaloids. The Isaac Litton High School senior produced the alkaloids from leaves, roots, seeds and insects in an old horse shed which he has converted into a home laboratory.

Among the alkaloids that the teen-age researcher has extracted are cantharidin from powdered blister beetles, caffeine from tea leaves, berberine and hydrastine from golden seal, sparteine from Scotch broom, and sanguinarine from the blood root plant.

Builds "Clever" Machine

➤ AGRIS JANIS Kalnajs, a 17-year-old senior at Newton High School, Newtonville, Mass., can boast of having an electronic player that almost never loses in the ancient game of wits, known as "nim."

To play "nim," the young scientist explained, one must have another player and some objects, such as matches. Each player is allowed to take a small number of the objects in turn. The person who has to pick up the last object is the loser.

Inspired by a discussion of the game at a meeting of his high school Mathematics Club, Agris decided to construct the electronic device as a player.

He stated that the machine "plays perfectly," and that "once it has the upper hand it never loses it during the game." Construction of the nim player, the teenager reported, is a normal departure from his hobby of building audio equipment.

He hopes to become an electrical engineer after graduation from the Massachusetts Institute of Technology.

Million-Volt Generator

➤ A HIGH school senior of South Bend, Ind., has constructed a machine that is capable of generating between 500,000 and 1,000,000 volts.

As part of his entry in this year's Science Talent Search, Robert Earl Fassnacht has constructed a Van de Graaff generator. Substituting waxed mahogany for plastic or glass in building the insulating column, Robert is also using a paper belt for his generator.

The young scientist stated that he is going to use the generator to study the effects of radiation on the heredity of plants and animals.

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