

## NUCLEAR PHYSICS

# "Death Sand" Kills Subtly

**An invisible death sand which is made by drying fission product salt solutions on sand or metal powder kills quietly. However, use of this weapon would be difficult.**

► AN INVISIBLE dust of radioactive "death sand" could spread over cities of the earth and kill their populations by radioactivity without the noisy warning of an atomic bomb.

This specter of radioactive poisons is raised again by Dr. Louis N. Ridenour, dean of the University of Illinois Graduate School, in a report appearing in the *BULLETIN OF THE ATOMIC SCIENTISTS*.

Citing a brief paragraph in the famous Smyth report of 1945 and an Austrian discussion of 1948 by Dr. Hans Thirring, the present analysis concludes that insidious use of the fission products of nuclear reactors would be a difficult weapon to use because of delivery to the target, chemical separation of the poisons and amounts available (enough for only two or three major cities a month).

This use of radioactive poisons in warfare is different from the radioactivity produced by atomic bomb explosions, whether the radiation of the bomb itself, the induced radioactivity in materials of the target city, or in chemical elements placed in the bomb to produce enhanced radioactivity.

What would be done would be to collect the debris of smashed uranium atoms from atomic "furnaces" in which fissionable material is being "burned." About a dozen of these products would be useful in warfare. These emit beta rays (electrons) or gamma rays of substantial energy, and half of their substance would be disintegrated in periods from about a week to a year.

Very fine sand would be coated with these radioactive poisons and spread very thinly over the area where it is desired to wipe out life.

The person in a poisoned area has no way of knowing that he is in danger either by the evidence of his senses or by any unsophisticated tests. He may receive a lethal dose of radiation before he knows that he is endangered, and yet a few days later he may die. Radioactivity detectors would tell of the danger. If a person is aware of the danger he may survive if he flees the area at once with a dampened handkerchief over his nose and mouth. Walls of a sturdy building or even heavy clothing would lower exposure risk, but half an hour of breathing of dust stirred up by passing winds would give a fatal internal dose.

Radioactive "death sand" because of its novel and unique properties may be useful in special situations, but its proper use in war would be very difficult.

The "death sand" is prepared by drying fission product salt solutions on sand or metal powder. It is described as the lightest and most transportable of all the weapons of mass destruction. A highly deadly layer on the surface of the ground would weigh only 12 milligrams per square meter and would be quite invisible.

Secrecy has been clamped down in the United States on any hints about this kind of warfare since 1945, but Dr. Ridenour figures out that enough radioactive fission products are produced each month at the Hanford, Wash., plant to contaminate 144 square miles, or more than six and a half times the area of Manhattan.

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## Radiological Warfare Agents Spotlighted

► ATTENTION was focussed on radiological warfare agents by a sentence in the

latest (eighth semiannual) report of the AEC to Congress. The sentence merely states that "studies on the feasibility of radiological substances as a method of warfare were continued."

But six months ago Secretary of Defense Louis Johnson reported on the subject in some detail.

"The possibility of radiological warfare is another outgrowth of atomic energy applications for national defense," he stated.

"The objective of this form of warfare would be to make a given area untenable through the presence of radioactive particles, called RW agents."

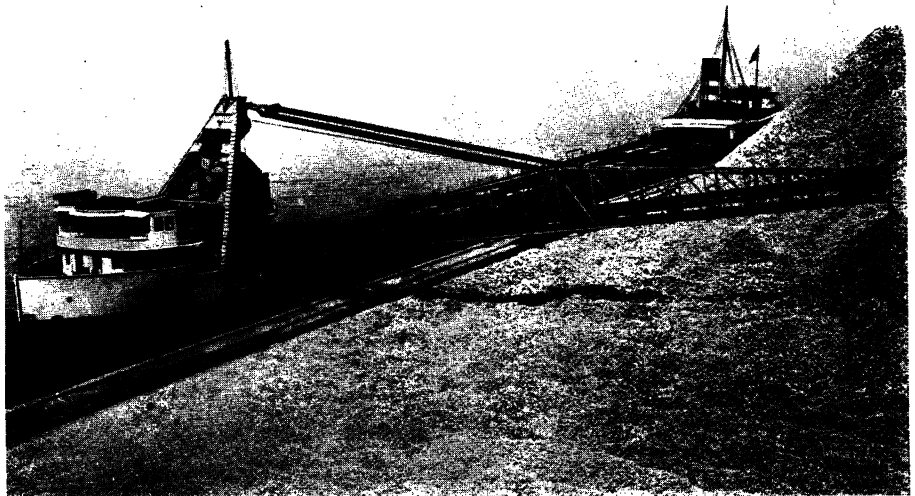
He warned that "every atomic pile of suitable size, irrespective of its design or purpose, is a potential source of significant quantities of RW agents, and RW weapons could become available to another country whether or not they produced an atomic bomb."

At present, RW is a "mystery weapon," he said. It could therefore cause panic unless people are informed about it.

Chief reassurance to those who are frightened by the possibility of RW is his statement that "orderly evacuation from contaminated areas should be possible."

One of the technical problems to be solved before RW could be used is that of separating desired agents from the complex of fission products.

It is not practical now to separate these products, Dr. George G. Brown, director



**SELF-UNLOADING SHIP**—Ten thousand tons of bulk cargo can be discharged and neatly piled ashore in about five hours, with as few as three men handling the conveyors and, if dock space permits, without assistance of any shore-based equipment. These ships, however, need not be built specifically for self-unloading. Successful conversions have been made of cargo ships that have operated for as long as 30 years by old-fashioned methods of unloading.