PHYSICS

Tritide in H-Bomb?

In Eniwetok experiments, leading to the development of thermonuclear weapons, according to the AEC, uranium or plutonium tritide was almost certainly exploded.

➤ URANIUM OR plutonium tritide was almost certainly exploded in the Eniwetok experiments that the Atomic Energy Commission cryptically explained are leading to the development of thermonuclear weapons —familiarly called H-bombs.

The tritide is a compound of the older fissionable element, uranium or plutonium, and the most likely of the fusionable lightweight elements, tritium, or triple weight hydrogen. It is the simplest and most intimate way to bring together the fissionable stuff of the now familiar A-bombs and the light element that should have its mass converted into energy under the sunlike immense heat of the fissioning of the A-bomb.

The big question that the AEC announcement does not answer, except by inference, is whether the tritium acted the way expected theoretically. Presumably the answer comes from the power generated in excess of that of a plutonium bomb without the tritium in it. Since all the tritium might not be used or fused, the success of the experiment would also be measured by chemical analysis of the debris in the air after a blast.

A Soviet agent measuring the power of an experimental blast might know little more than anyone else not in the AEC "knows" of all the facts of the experiment. For there are little and big A-bombs now and there undoubtedly are varied amounts of the fusionable tritium being used. What is in the explosion needs to be known to judge the success of the experiment.

Tritium, the triple weight hydrogen or isotope mass three, is not the only possible fusionable element. There is also ordinary hydrogen, mass one, and deuterium, mass two. The scientific betting is that ordinary hydrogen and deuterium will not do the job, but you can bet that they are being tried nevertheless.

If the lighter and slower-acting hydrogens can be used, H-bombs would be cheaper and easier to make. Perhaps all the hydrogen will not need to be tritium, as a mixture of tritium and deuterium may be made to react successfully by a plutonium explosion.

Some of these questions may have been long since answered by small-scale laboratory experiments not involving explosions, but some may not be determined without an actual test explosion.

In the Nevada series of atomic tests last year some of the H-bomb information may have been obtained. The determination of the smallest size of A-bomb that would explode would be useful for H-bomb manufacture as well as for making a bomb to be delivered by the new atomic cannon recently unveiled.

One of the Nevada series did not explode, and it may not have been a failure but merely an intended "dud" that proved the lower limit of the size of the fissionable material needed for an A-bomb to explode. For a certain amount of plutonium must be put in one place, probably about 50 pounds or so, in order to explode. A smaller quantity than this critical mass is safe.

The present Eniwetok explosions have similarly bracketed the possibilities, you may be sure. More tritium or other hydrogen would be crowded into the bomb than the experts believe will be fused successfully. The tritium would be placed in the bomb in the form of a gas, or a liquid or frozen to a solid. Most likely is tritium combined chemically to be a solid, as with plutonium or uranium 235.

Exploration may be including tests upon the changing of the mass of some of the other light elements, such as lithium, into energy under the immense heat of the A-bomb.

If the first H-bomb has been successfully exploded, it may take more than the few weeks from Alamogordo to Hiroshima to have a successful military weapon that could be used in combat.

Is the H-bomb actually or potentially a thousand or a hundred times the power of the A-bomb? What is the destruction factor?

We probably shall not know until the Smyth report on the H-bomb, or thermonuclear reaction, is written and issued—if it ever is.

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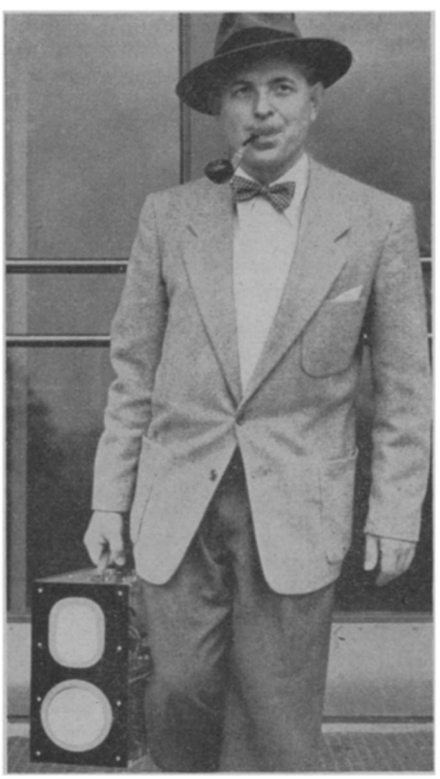

PORTABLE TV VIEWER—George C. Sziklai of the David Sarnoff Research Center at Princeton, N. J., carries an experimental battery-operated TV receiver. The set, weighing only 27 pounds, uses transistors entirely, except for the five-inch kinescope picture tube.

PHYSICS

More H-Bomb Tests Scheduled at Eniwetok

➤ A NEW joint task force will go to Eniwetok to conduct more bomb tests sometime within the measurable future, SCIENCE SERVICE has learned. Other tests are planned for Nevada, it was also learned.

The task force now at Eniwetok which has tested a research H-bomb is already in the process of packing up and coming home. A complete report of its test of a thermonuclear weapon was probably on President Truman's desk when President-elect Eisenhower visited him on Nov. 18.

These task forces are expensive. They transport up to 30,000 military and civilian personnel out to Eniwetok, take care of them for several months and then bring them back. The 1951 trip cost taxpayers something like $115,000,000, exclusive of the cost of the bombs which were exploded. The 1952 job probably cost more.

Nevada tests are cheaper, but there is greater danger either from spies or from what might happen if the scientists lost control. Tests of H-bombs and the materials which go into them must be conducted in as isolated a spot as possible, it is believed.

Plans to go to Eniwetok again mean that more research tests are necessary before the construction of an H-bomb to be used against enemy forces can begin. Construction of H-bombs in any number awaits completion of the great Savannah River plant in South Carolina.

Science News Letter, November 29, 1952

Metal food *containers* must be distributed carefully throughout the Navy's new nonmagnetic minesweepers to prevent concentrations of magnetic materials from exploding nearby mines.

The *sting ray's* stinger is a sharp-pointed, saw-edged barb that lies in a groove on top of the ray's whip-like tail.