NUCLEAR PHYSICS

Hydrogen-Tritium Bomb

Hints point to a super-bomb of hydrogen and tritium. Tritium is very rare and can only be produced by the few existing uranium piles in the world.

➤ THE super bomb will probably be known as the HT-bomb. HT for hydrogen-tritium, the reaction likely to be used in the bomb, and HT, of course, for Harry Truman.

The hydrogen-tritium reaction was made public nine months ago at a meeting of the American Physical Society in Washington by six scientists of the Los Alamos Atomic Energy Commission laboratory.

The reaction between hydrogen protons and tritium, which is hydrogen that is three times as heavy as ordinary hydrogen, produces helium and billions of electron volts of energy.

The scientists told the assembled physicists how they bombarded atoms of tritium with accelerated hydrogen protons in the laboratory. The result of the bombardment of each atom of tritium was one atom of helium and gamma rays carrying 20,000,000 electron volts of energy. It is this energy which will be the punch of the HT-bomb.

The six scientists who delivered the paper are H. V. Argo, H. T. Gittings, A. Hemmendinger, G. A. Jarvis, H. Mayer and R. F. Taschek.

Tritium is a very rare material which is not found in nature and which can only be produced in the few uranium piles now existing in the world. The uranium piles also produce plutonium, which is essential in the manufacture of the old-type A-bombs. It is believed that the piles produce even less tritium than plutonium.

There is another hydrogen-helium reaction which might be used—that between deuteron and deuteron, called the D-D reaction. Deuterium, from which deuterons come, is only twice as heavy as ordinary hydrogen.

However, deuterium is relatively plentiful. Tons of it have been manufactured and anyone can buy heavy water, take out the oxygen and have plenty of deuterium.

It would seem that if deuterium were the super bomb material, it would have been manufactured and tested long ago.

A hint that such a critical and rare material as tritium will be used in the HT-bomb came in the "$50,000,000,000" speech of Chairman Brien McMahon of the Congressional Atomic Committee on Feb. 2. He said, "The scientific facts surrounding the hydrogen bomb more than ever render necessary the general kind of technical program which the United Nations, after exhaustive study, has approved." That program, the Baruch plan, was based on the ease of keeping track of all sources of rare plutonium. It could easily be adapted to controlling by inspecting all uranium piles which produce the even rarer tritium.

The Baruch program, however, could not begin to control all sources of deuterium which already is manufactured easily and in very great quantities.

Sen. McMahon went on to say that, "more than ever there is no escape from strict control of raw materials, strict control of plants, and continuous inspection." It would be impossible to get the manufacture of deuterium back into any kind of control.

The Los Alamos physicists of course did not tell the scientists at last April's Physical Society meeting that the HT reaction will be the basis of the HT-bomb. They merely reported their observation and measurement of the energy released when a hydrogen proton hits an atom of tritium.

Their laboratory experiment, also, was in no sense like what would happen in an HT-bomb. They probably used a well-known laboratory machine to speed up the protons somewhat so that when they were aimed at the tritium atoms they would stand some chance of penetrating into the heart of the tritium atoms.

It is certain that, in the experiment, only a few tritium atoms fused with the hydrogen protons aimed at them and thus released energy.

In order to make sure that most or all the atoms in a mass of tritium would fuse with the protons, an intense heat would have to be created. So far, this can only be done by setting off an old-fashioned uranium-plutonium bomb.

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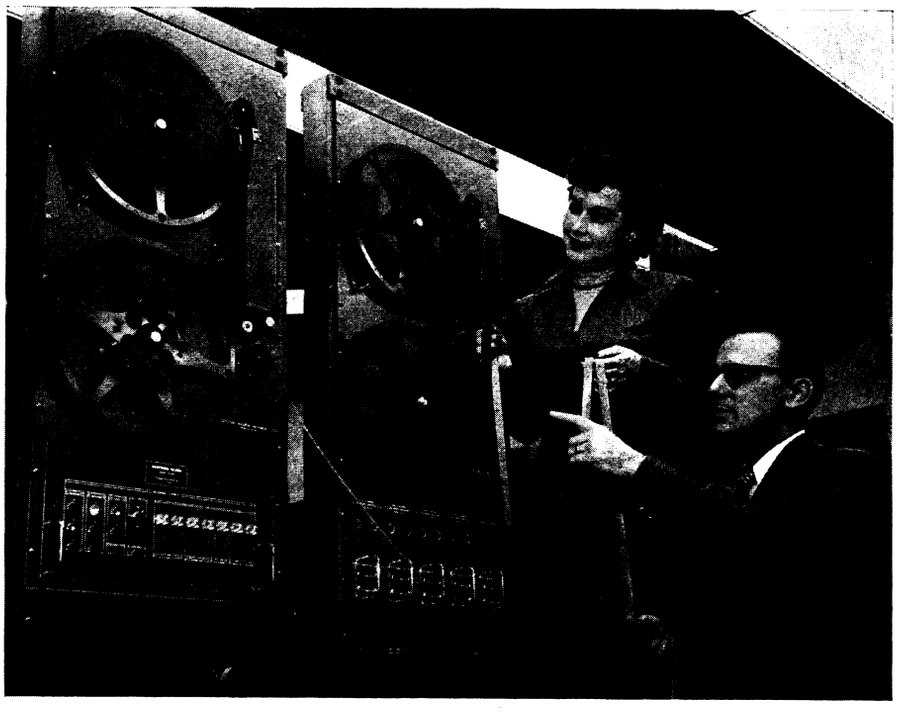
AERONAUTICS-ENGINEERING

Crashes May Be Reduced

➤ FOURTEEN two-way conversations may be recorded at the same time on a single magnetic paper tape less than three-quarters of an inch wide in a new ingenious machine for use in airport control.

It is a machine to make complete recordings of all communications between control tower operators and pilots in planes,



AIRPORT RECORDER—The ingenious machine makes possible for the first time a permanent record of all communications between pilots and control towers, thus permitting a detailed study of factors leading to air crashes. Hailed as a great advance in aviation safety, it records up to 28 voices on a single magnetic paper tape less than three-quarters of an inch wide.