

## 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 deuterium and deuterium, 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.

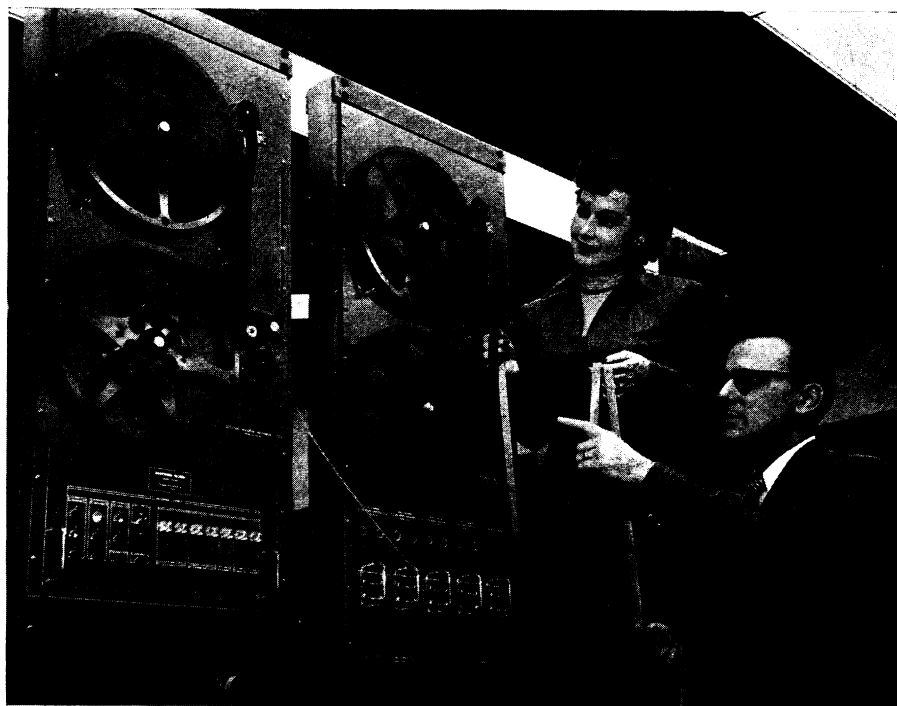
## AERONAUTICS-ENGINEERING

## 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.

recording both out-going and in-coming signals and words. It utilizes 14 wave-length channels and all may be used at the same time.

The records are permanent. With them, no disputes can arise following a crash relative to instructions given to a pilot and the pilot's answers. A record of communications during an emergency can not prevent accidents, but a reliable record for use in an investigation will provide investigators with information that may be of help in preventing future accidents.

This new two-way recorder is a product of the Brush Development Company, Cleveland, Ohio, and will be known as the Brush

Airport Recorder. The complete unit is made to mount on three seven-and-a-half-foot standard relay tracks. The first rack includes two complete tape transport mechanisms, and the master recorder control panel.

The second rack contains a third tape transport mechanism and the complete electronic set-up for the entire recorder. The third rack contains the play-back and speaker unit.

Each reel of recording tape will run for over four hours, and will automatically start a second reel before the first is finished. This means eight hours of unattended operation.

Science News Letter, February 18, 1950

#### PSYCHIATRY

## Threat to Veterans' Care

► THE quality of service to veterans needing psychiatric and neurologic care is threatened by some of the economy measures now proposed, the American Psychiatric Association warned in New York.

"Indefensible on scientific or humane grounds" are the terms applied to the proposed measures by this organization of 5,300 physicians who make up the bulk of the practicing psychiatrists of the United States and Canada.

"New hospital construction without competent personnel will not provide adequate care for sick human beings," the association's governing council states.

"Current demands that additional hospitals, 16,000 beds (7,000 neuropsychiatric), be constructed beyond the availability of professional personnel in places away from medical centers and in the face of present trends of reduction of personnel ceilings and lowered financial appropriations must result in a deterioration of good medical care to the veteran."

"Unless the Veterans Administration—and behind it the Congress and the voters—are prepared to recognize the value of well administered programs and the direct as well as the long term economy of early diagnosis and appropriate care, the public might well stand advised that inefficiency, frustration, and general deteriorations in the neuropsychiatric care of veterans will rapidly set in."

Situations which the association feels are particularly threatening to the best interests of disabled and sick veterans are:

1. Elimination of Branch offices, thus reducing supervision at the field level, with danger of further restrictions.

2. Decrease in funds for travel and consultation, thus cutting down the frequency, availability, and quality of medical supervision.

3. Continued construction of hospitals in isolated areas; thus resulting in staffing problems, forced transfer of physicians to these hospitals, secondary resignations and disturbed morale.

4. Proposed cut for outpatient clinic care will result in increased hospitalizations and decreased care in the community.

5. Lay executive officers have become assistant managers, i.e., acting managers in the absence of managers; thus the very real danger exists of medically untrained nonprofessional personnel assuming control of the care of sick veterans.

Science News Letter, February 18, 1950

#### ENGINEERING

### Pulverized Coal Fuels Steam-Electric Station

► PULVERIZED anthracite, some 600,000 tons annually, is fuel for the new 150,000 kilowatt steam-electric station just erected near Sunbury, Pa., on the Susquehanna river. It is a giant plant, costing \$31,000,000, and will feed the energy created into the 6,000,000 kilowatt interconnection from Staten Island, N.Y., to Washington, D.C.

To burn this face-powder fine coal, more than 432,000 cubic feet of air per minute are required to keep the furnace fires roaring, the American Society of Mechanical Engineers was told in Washington, D.C. by George M. Keenan, Melvin D. Engle and Stanley C. Townsend of the Pennsylvania Power and Light Company. Condensers need 93,000 gallons of water per minute for cooling. Four years were required for construction.

Science News Letter, February 18, 1950

#### MEDICINE

### Leukemia Cells Build Resistance to Drugs

► DEVELOPMENT of drug resistance by leukemic cells may be the reason why leukemia patients get only temporary improvement from treatment with anti-folic acid chemicals such as aminopterin and amethopterin.

Complete resistance to one of these drugs

has been brought on in one strain of leukemic mice by continued treatment, generation after generation, although untreated mice from the same strain continued to be sensitive to the effects of the drug.

The experiments which led to development of this drug resistance in the leukemic mice are reported by Drs. J. H. Burchenal, E. Robinson, S. F. Johnston and M. N. Kushida, of the Sloan-Kettering Institute for Cancer Research in New York, in the journal, *SCIENCE* (Feb. 13).

Cells of the drug-resistant and sensitive mice show no difference in size and structure. The scientists are now trying to learn whether there are chemical differences in the cells.

Science News Letter, February 18, 1950

#### ENGINEERING

### 200,000 Revolutions Per Minute Expected in Wheels

► SPEEDS up to 200,000 revolutions per minute are expected in new tiny grinding wheels for use in ultra-precision metal shaping, W. W. Goehring, SKF Industries, Inc., revealed in Philadelphia, Pa.

Spindle speeds of some grinding machines can now attain 100,000 revolutions per minute, he said, but these speeds are being doubled in current tests. The higher rates are made possible by stronger and more versatile metals, precision ball and roller bearings and improved lubricants.

Delicate parts for precision instruments must be ground and polished to extremely exact measurements. The grinding and polishing tools must revolve at ultra high speeds if proper accuracy in dimensions is to be obtained. The new high-speed grinders are for use in meeting current demands for various instruments of ultra-high precision.

Science News Letter, February 18, 1950

#### Words in Science—

### MAGNESIUM-MAGNESIA

► MAGNESIUM is a light metal, used as an alloy with aluminum for airplane construction. When heated to about 800 degrees Centigrade, it gives off a brilliant white light and thus is the material used for photographic flash bulbs and, sometimes, for signalling. Magnesium, one of the elements, is never found in nature by itself; it is always in combination with other elements.

Magnesia is a result of one of these combinations, a magnesium oxide, a light earthy white substance obtained by heating magnesium hydroxide. The familiar "milk of magnesia" is magnesium hydroxide suspended in water.

Science News Letter, February 11, 1950