GENERAL SCIENCE

AEC's H-Bomb Edition of Nuclear Primer Published

➤ THE H-BOMB edition of the Atomic Energy Commission's primer for nuclear age living has been published.

The 579-page guide to the dangers of atomic and hydrogen explosions is called "The Effects of Nuclear Weapons." Seven years ago, in June, 1950, the AEC issued its first edition called "The Effects of Atomic Weapons."

Claiming to contain all the latest information on nuclear and thermonuclear weapons that can be released within the bounds of security, the $2.00 volume does not even admit that we do have an H-bomb.

In discussing fusion or thermonuclear reactions (H-bomb), the AEC says.

"In order to make the nuclear fusion reactions take place, temperatures of the order of a million degrees are necessary. The only known way in which such temperatures can be obtained on earth is by means of a fission explosion. Consequently, by combining a quantity of deuterium or tritium (or a mixture) with a fission bomb, it SHOULD be possible to initiate one or more of the thermonuclear fusion reactions . . . ."

In the 1950 edition, fusion was not discussed.

Fallout, which was almost all conjecture in 1950, receives more serious attention in the 1957 edition, with an entire chapter devoted to it. By the same token, strontium-90 was not discussed in 1950 and now receives four and one-half pages.

The book was edited by Dr. Samuel Glasstone and "is for use in planning against possible nuclear attack."

Science News Letter, July 27, 1957

AERONAUTICS

Planes Land On Thin Ice

➤ THE AIR FORCE has succeeded in landing wheeled aircraft weighing more than 60 tons on Arctic sea ice little more than four feet thick, the Air Research and Development Command has announced.

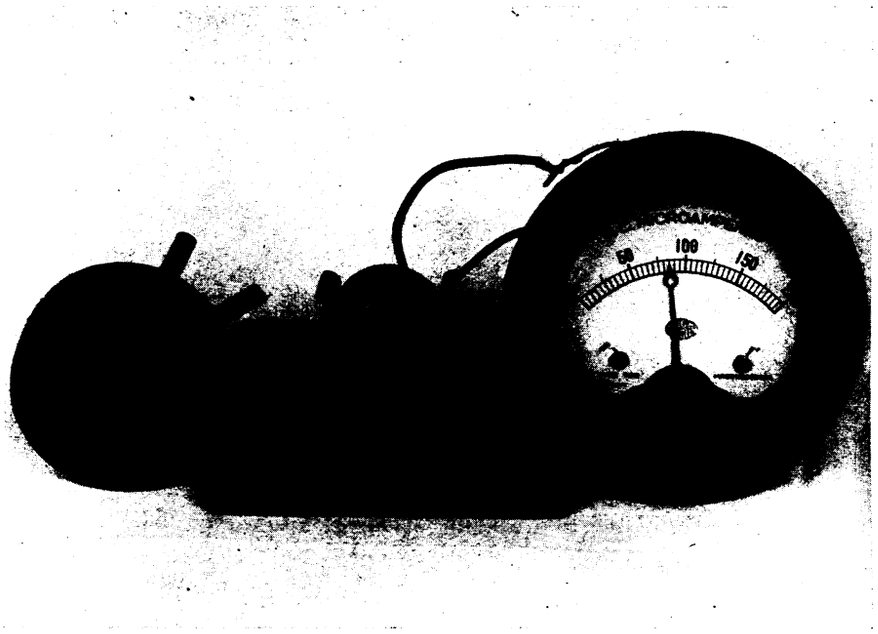
Tests conducted near Thule Air Force Base, Greenland, by ARDC's Air Force Cambridge Research Center showed jet planes and huge cargo transports could put down on Arctic sheet ice without melting or breaking it.

Using pickaxes for tools, and inner tubes for runway markers, four men from the AFCRC's Terrestrial Sciences Laboratory hacked out an 11,000-foot runway for the tests in only two days.

The purpose of the research program is to compile accurate tables of the bearing strengths of both fresh and sea water ice, and to develop an airborne indicator of ice thickness and strength using seismic, impact or electromagnetic principles.

Landing, parking and taxiing tests showed that neither the great weight of the aircraft nor the heat from the jet engines caused any serious destruction of the ice.

Science News Letter, July 27, 1957



TELL-TALE SOLUTION—A puff of air on the plastic solion, developed by the U. S. Naval Ordnance Laboratory, could push iodine atoms against delicate electrodes to cause a "surge" of electricity detectable by the meter on the right. A tiny rechargeable storage battery, the size of a quarter, is seen in the center. It delivers the 0.9 volt needed to orient the iodine atoms in solution.

TECHNOLOGY

Low Heat Triggers Solion

➤ THE WAY electrically charged atoms move and behave in solution is being put to work in new electrochemical devices called "solion units," the U. S. Naval Ordnance Laboratory has announced.

No larger than a sugar cookie, the units are expected eventually to replace ordinary vacuum tubes and transistors in certain electronic applications that require very sensitive responses with very low power consumption.

Nelson N. Estes, NOL physicist, was in charge of much of the research done on the new devices, which work on electrochemical principles first observed in 1904.

A typical solion unit consists basically of a solution of potassium iodide, a chemical somewhat similar to common table salt, and a little iodine solution. Positive and negative electrodes are placed in the solution and a very weak "polarizing voltage" is put across the electrodes, thereby "stimulating" the positive potassium and negative iodide molecules in solution. If kept very still in the dark, at constant temperature, nothing will happen. But if light falls on a sensitive diaphragm, or if the device is jarred, or exposed to acceleration or a change in temperature, ions around the electrode are pushed nearer, causing a "surge" of electric current. It is the measurement of this tidal-wave-like surge, resulting from minute stimuli, that makes the device so sensitive and valuable.

The solion units are expected to simplify greatly several types of electronic circuits using vacuum tubes or transistors that would otherwise be vastly complex.

Dr. Lyman C. Fisher, chief of the NOL Underwater Mechanical Engineering Department, predicts their use in:

"Rate" circuits, to get maximum accuracy and speed in operating heat controls, burglar alarms, fire alarms, furnace regulators and pressure indicators;

Small visual "exposure meters" to help protect persons working near high-intensity, low-frequency sound waves, as, for example, near jet engines. These waves are very harmful to the central nervous system;

Electrical circuits monitoring electrical or hydraulic flow, or both;

Electrical and small signal hydraulic amplifiers; and

Inertial guidance systems where changes in direction cause changes in acceleration or pressure in the solion fluids.

The devices are now restricted to low frequency use, and temperatures within the boiling and freezing point of the solution in the cell, but can be made so sensitive, that just blowing on them or holding a lighted cigarette nearby can trigger them.

NOL predicts the use in and simplification of many electronic circuits by the solion principle and units, chiefly in inertial and low frequency systems. Investigation of solion units in circuits using high frequencies is yet to come, but the basic theory and technology of the solion units are now fairly well understood.

Science News Letter, July 27, 1957