their bearings in order to return to their aircraft carrier or base.

The device consists of a mirror, a lens, and a small star map showing each star in its correct position in relation to the rest of the stars. By adjusting the mirror so that it reflects images of the actual stars in the sky onto the stars on the printed sky map, and looking through the lens, the pilot can determine his field of vision. Then by referring to a special graphic chart and to his watch, he can automatically read his exact location in latitude and longitude.

By using this new instrument, it is expected that pilots will be able to make the necessary calculation in a matter of seconds. Now it takes several minutes to perform the figuring, and an error made by a tired pilot may have serious results.

Science News Letter, June 10, 1944

PHYSICS

Post-War Betatron

Plans for a 250,000,000-volt machine to open new fields of research by bringing cosmic ray effects into the laboratory.

➤ PLANS for the post-war construction of a 250,000,000-volt betatron, also called the rheotron, the most powerful X-ray and atom-smashing machine ever built, which will open wholly new fields to scientific research by bringing cosmic ray effects into the laboratory, were announced by Prof. G. M. Almy of the physics department, University of Illinois.

The new betatron will be similar to the 225-ton cyclotron, another type of atom-smasher, in size, shape and method of operation. It is constructed so that a powerful magnet surrounds the doughnut-shaped accelerating chamber. One of the distinguishing features of the machine is that it whirls electrons, the lightest constituents of the atom, while the cyclotron whirls the deuterons, or heavier parts. It does this operation in one "kick," while the cyclotron requires many "kicks." In the betatron the magnetic field changes, while in the cyclotron it remains constant.

Three betatrons have already been designed by Prof. Donald W. Kerst of the University of Illinois. Two of the machines, one having an eight-inch accelerating chamber and producing 2,500,000 volts, and the other having a 20-inch accelerating chamber and producing 20,000,000 volts, are located at the University of Illinois. The third betatron, much larger than the first two, produces 100,000,000 volts and is located at the General Electric Company laboratories in Schenectady.

"The first 2,500,000-volt betatron proved the idea workable. The 20,000,000-volt betatron in its two years of operation has made several valuable contributions to the knowledge of atoms, electrons and X-rays, and has opened the possibility of its use for the deep treatment of cancer by sending the electrons directly into the body of the patient, a whole new field of high energy physics," Dr. Almy stated.

At present the 20,000,000-volt betatron is being used for research in the above fields.

Dr. Almy pointed out that increasing the energy to 250,000,000 volts opens wider the field of cosmic rays to new phenomena of the deepest significance.

It is believed that a 250,000,000-volt betatron will also provide a laboratory source of mesotrons, heavy electrons, particles of fundamental importance in studies of atomic nuclei and of, as yet, unknown practical usefulness.

Science News Letter, June 10, 1944

AGRICULTURE

Hillculture for Erosion

➤ COMMON WEEDS successful in checking erosion of productive cropland are regarded as more valuable than wheat or corn, it was announced by the Department of Agriculture.

At a time when obtaining a maximum yield per acre is vital to victory, the U. S. Soil Conservation Service is developing new and more effective ways to halt fissuring and cross-wash of top-soil, which have already ruined 50 million acres of American farmland.

On the Department of Agriculture's 1,700 acre experiment station at Beltsville, Md., northeast of Washington, an effort is being made to single out those strains of plants that make the best growth on poor, eroded soils, require a minimum of cultivation, and at the same time bring in the best income for the farmer. This phase of conservation is called hillculture because it is designed

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