

imals and plants, while molybdenum, boron and possibly other metals are needed by plants and possibly by animals.

The green alga known as *Euglena gracilis* corresponds to human beings in

its need for various elements, Dr. Hutner said, and it can be used as a test animal for assaying the amount of vitamin B-12 and the effectiveness of liver extract.

Science News Letter, November 12, 1949

#### NUCLEAR PHYSICS

## Giant Atom Smasher

### See Front Cover

➤ A GIGANTIC machine with powder-puff nuclear punch has demonstrated for the first time in actual practice that multi-million dollar cosmic ray atom-smashers being financed by Uncle Sam will deliver the goods.

The machine is a quarter-scale model of the 6,000,000,000 volt bevatron now under construction at University of California Radiation Laboratory with Atomic Energy Commission funds.

Though only a model and capable of firing protons to only 6,000,000 electron volts, this machine is the biggest atom smasher yet. It has a near-oval magnet and accelerating chamber 25 feet in diameter, as shown on this week's cover of the SCIENCE NEWS LETTER. The path over which protons travel in one trip around the chamber is 100 feet, by far the longest in atom-smashing history.

Prof. Ernest O. Lawrence told University regents that the machine operates with efficiency "equalling our most optimistic advance estimates." The model proves that the revolutionary principles incorporated in the bevatron are practicable. Further experience gained will speed up the shake-down of full scale machine by many months. It will also make it possible to start the machine at 3,500,000,000 electron volts instead of 1,400,000,000 electron volts. The conversion to 6,000,000,000 electron volts will be only one stage further. The

completion of the full scale machine is four years away.

The model simulating the conditions of the big machine operates as follows: A ten-ton cyclotron, reminiscent of early ones, acts as injector, firing 20 bursts of protons a minute into the chamber at three-second intervals. An electrode in the chamber speeds protons up each time around. As protons gain energy, magnet strength is increased to keep them from straying out of their orbit. Also the frequency of the electrode pushes is slowed down to match a slight lagging tendency of the protons at higher energy. During the two-tenths of a second the protons are in the chamber they make 150,000 trips around the chamber, traveling 10,000 miles. Each burst of protons contains 100,000,000 particles.

The full scale machine is now being constructed. It will duplicate in the laboratory the cataclysmic atomic disintegrations now achieved only in the medium energy range of cosmic rays. And it will give physicists a better handle on the still mysterious force which holds nuclei together. A 3,000,000,000 electron volt accelerator is also being built at Brookhaven.

Science News Letter, November 12, 1949

#### PHYSICS

## See Atoms and Sun As Future Energy Sources

➤ THE atom and the sun will be the source of our energy in the future, when the

world's coal and oil supplies are exhausted, Dr. Farrington Daniels of the University of Wisconsin, predicted.

Speaking before the University of Michigan chapter of the Society of Sigma Xi, national society for the encouragement of scientific research, he stated that direct use of sunlight as a power source, though simpler politically than the use of atomic energy, was more difficult technically. Dr. Daniels recommended coordination of all the research work on utilization of solar energy.

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What may hold the key to milk yield in cows? p. 313.

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