

PHYSICS

Using American Photos, Britons Find Double Weight Neutron

Calculations Based on Thousands of Collision Pictures Show Existence of Heavier Brother to Building Block of Atoms

THE recently discovered building block of atoms, the neutron, may have a heavier brother. Evidence for the existence of a neutron of mass two instead of usual mass one is presented by Harold Walke in a communication to *Nature*. Mr. Walke is physicist at the Washington Singer Laboratories, Exeter, England.

This evidence is based on photographs taken in the United States by Prof. William D. Harkins, Dr. D. M. Gans and H. W. Newson at the University of Chicago and by Prof. F. N. D. Kurie at Yale University.

No Charge on Neutrons

These experimenters took thousands of instantaneous pictures of actual collision between neutrons and nitrogen atoms. Calculations based on these pictures of these atomic disasters and disintegrations showed that some of the bombarding neutrons were twice as heavy as the original neutrons found by Dr. James C. Chadwick at Cambridge University, England, over a year ago.

The ordinary neutron of mass one is unique as a fundamental atomic building block because it does not have an electrical charge. It only has weight or mass. This mass is the same as the mass of the heart of a hydrogen nucleus or atomic heart called a proton. The neutron has proved to be immensely valuable to theoretical physicists in explaining how the hearts of heavier atoms are built up. Neutrons are produced by bombarding beryllium, one of the lightest elements with alpha particles which are the hearts of helium atoms.

Secondary Units

These conjectures of the ways in which heavy atom hearts are built up led Lord Rutherford of Nelson, Cambridge University physicist, to postulate that uncharged units of mass two as well as neutrons of mass one might be secondary units in the structure of nuclei.

Dr. Chadwick had found that the

energy of a neutron was 8,000,000 electron volts whereas the American photographs showed energies as high as 16,000,000 and 17,000,000 electron volts. Mr. Walke has concluded that these high energies are due to a rarer neutron of mass two.

Science News Letter, August 26, 1933

PHYSICS

Gold Soaks Up Water And Gets Hot

GOLD when exposed to water gradually produces heat, Prof. Frederick Barry and Elliott P. Barrett of Columbia University state in a communication to the *Journal* of the American Chemical Society.

A piece of massive gold exposed to water vapor at room temperatures gradually gave off heat for seven hours. They state that heat would be generated indefinitely but in gradually decreasing amounts. By weighing they have found that water is adsorbed but do not believe that an explanation can be given on this basis alone.

The amount of heat liberated by this process is very small for it would take about 250,000,000 square inches of gold to generate enough heat energy to run a one horse power machine for one hour.

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BOTANY

Seeds Undrowned After 23 Years Under Water

SEEDS of the common weed known as velvet-leaf or butter-print are proof against drowning.

Such at least would seem to be the conclusion justified by a long-time experiment performed by Prof. W. E. Davis of Kansas State Agricultural College at Manhattan, Kans. In 1910 he put sample lots of 100 seeds each of this plant in small bottles of water, and

corked them tightly. At the time he did not intend the experiment to be one of such long duration, but merely meant to show to his students how seeds differed in the permeability of their coats.

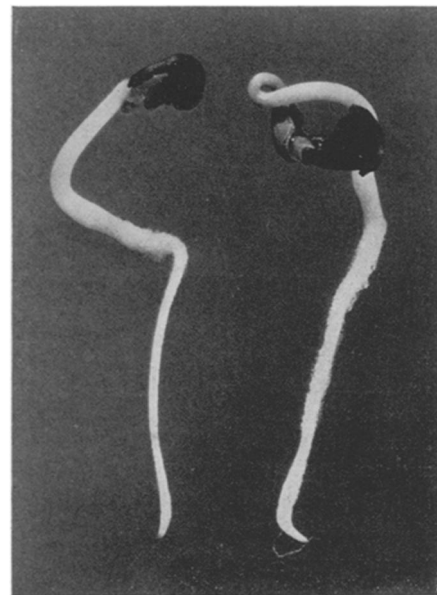
The seeds showed this nicely: about a third of them soaked in water and swelled up within a few days after they had been corked. The bottles were accordingly uncorked and the swelled-up seeds removed.

However, at the end of 20 years, two bottles remained containing seeds that had never swelled, indicating that they had never permitted any water to pass through their seed coats. One of the bottles was then opened, and its two remaining seeds were taken out. Their tough coats were chipped with a knife and they were put in a germinator. They promptly sprouted, the two decades of total immersion they had undergone apparently making no difference in their behavior.

Prof. Davis still has one bottle containing four seeds, which are now in their twenty-third year of soaking. They have not changed their appearance in any way, and presumably would germinate now as readily as their two companions did three years ago.

A high degree of impermeability seems to be a distinct advantage to seeds of many plant species, enabling them to lie in the ground for several years, as a sort of reserve, while their companion seeds sprout immediately.

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CHAMPION SUBMARINE SEEDS

Twenty years under water in a tightly corked bottle had no terrors for these seeds, which sprouted promptly when they were given the chance.