PHYSICS

Positron Formally Introduced; Negative Proton Predicted

Discoverer Has Found 15 Pictures of Positron Tracks Among 1300 Photographs of Cosmic Ray Tracks

THE POSITRON has been formally introduced to the world of physics in a communication by its discoverer, Dr. Carl D. Anderson of the California Institute of Technology, to the *Physical Review*.

August 2, 1932, is given as the date of the first photograph of the positive electron, christened positron for short, which has the mass of the older negative electron but a positive electric charge like the proton which is nearly 2000 times more massive. (*SNL, Sept.* 24, 1932, p., 197; *Feb.* 25, 1933, *p.* 115).

A search for a negative particle of the mass of the proton was urged by Dr. Anderson, who predicted the possibility of its existence.

To date Dr. Anderson has obtained 15 photographs of positron tracks in a group of 1300 photographs of cosmic ray tracks. Positrons are let loose from atoms bombarded with cosmic rays. Dr. Anderson offers the following suggestion as to what happens:

"From the fact that positrons occur in groups associated with other tracks it is concluded that they must be secondary particles ejected from an atomic nucleus. If we retain the view that a nucleus consists of protons and neutrons (and alpha particles) and that a neutron represents a close combination of a proton and electron, then from the electromagnetic theory as to the origin of mass the simplest assumption would seem to be that an encounter between the incoming primary ray and a proton may take place in such a way as to expand the diameter of the proton to the same value as that possessed by the negatron. This process would release an energy of a billion electron-volts appearing as a secondary photon. As a second possibility the primary ray may disintegrate a neutron (or more than one) in the nucleus by the ejection either of a negatron or a positron with the result that a positive or a negative proton, as the case may be, remains in the nucleus in place of the neutron, the event occurring in this instance without the emission of a photon. This alternative, however, postulates the existence in the nucleus of a proton of negative charge, no evidence for which exists. The greater symmetry, however, between the positive and negative charges revealed by the discovery of the positron should prove a stimulus to search for evidence of the existence of negative protons. If the neutron should prove to be a fundamental particle of a new kind rather than a proton and negatron in close combination, the above hypotheses will have to be abandoned for the proton will then in all probability be represented as a complex particle consisting of a neutron and positron."

Science News Letter, March 25, 1933

AGRICULTURE

Fallowing of Leased Land Will Pay Farmers Twice

FARMERS stand to make a second profit out of the portion of their land which would be leased from them by the Government under the provisions of the agricultural relief bill now before Congress.

They will get their first payment in immediate cash from the Treasury. They will get their second payment in increased fertility of their land through fallowing.

Land that "lies idle" for a year is not like a machine that lies idle for a year. The idle machine does not gain in value; even if it does not rust, it gets a year older and a year closer to obsolescence. Idle land, if it gets the stroking of plow and harrow called for by proper fallowing practices, grows better. It is not sucked out by hungry crop plants, and the busy bacteria living in the roots of leguminous plants or free in the soil capture nitrogen and leave it there, in the farmer's own personal bank, good against future drafts.

Science News Letter, March 25, 1933

PHOTOMICROGRAPHY

Common Box Camera Used with Microscope

THE COMMON low-priced box camera with which almost everybody begins his photographic career can be used effectively as a scientific instrument, to take photographs through a microscope. In the current issue of *The Botanical Gazette,* T. C. N. Singh, of Ravenshaw College, Cattuck, India, will describe a simple framework he has devised for holding such a camera in place on top of a microscope while the exposure is made.

The length of exposure varies according to a number of factors, including light, kind of film used and object to be photographed, Mr. Singh states. Under conditions of ordinary laboratory lighting, a two-second exposure produced good pictures.

Science News Letter, March 25, 1933

PHYSIOLOGY

Spring Found to be Season Of Least Growth in Children

CHILDREN don't sprout up in spring like lilies and onions, but get fat in the fall like apples and pumpkins, it seems from studies recently completed by Dr. Carroll E. Palmer of the U. S. Public Health Service.

So if Junior and Sister show disappointingly small gains at their weekly or monthly weighings from now on for the next few months, parents need not be discouraged. Spring, traditional season of greatest growth, is the season when the child between 6 and 14 years make the least gain in weight, Dr. Palmer found in a study of 2,500 native-born, white, elementary school children.

Average growth in weight was greatest in the fall, least in the spring, and intermediate in the winter, Dr. Palmer observed. In May the average growth in weight was the very lowest of all the year. During the summer the rate of

growth began to pick up, and the growth was about equal to that of the late winter months, February and March.

During the sixth and seventh years, boys and girls grow at about the same rate. During the eighth and ninth years, the boys grow a little faster than the girls. During the spring of the tenth year, the girls begin to speed up and their growth rates become greater than those for the boys and they continue to grow faster during each season of every year until fall of the fourteenth year, when the boys take a spurt that keeps their growth rate greater during the fifteenth year.

Science News Letter, March 25, 1933

PHYSICS

Russian Physicist Explains Genesis of Gamma Rays

JUST what happens within an atom when gamma rays, such as are shot off from radium, are emitted is pictured by Prof. G. Gamow, of the Radium Institute, Leningrad, in a report to *Nature*. Gamma rays are those that produce effects on cancer and they are electro-magnetic waves more penetrating and shorter in length than light and X-rays.

Generally accepted views visualize the hearts or nuclei of the atoms made up of alpha particles, neutrons and, in the case of atoms of odd atomic number, one proton. The alpha particle is the heart of the helium atom.

Prof. Gamow explains that the alpha particles in the nucleus are all on the same level of energy while the neutrons are distributed on different levels of energy. The proton when it is present occupies the lowest energy level that is occupied by neutrons.

Suppose a neutron becomes unstable and shoots off part of itself as an electron in the form of a beta ray. A proton is the fragment of the neutron remaining. It seeks a drop in energy where protons belong. In changing from high to low energy level, energy is emitted in the form of hard gamma rays. This is the picture of the mechanism of radioactivity that Prof. Gamow has visualized. It explains why beta rays or electrons are often accompanied by high energy gamma rays.

Prof. Gamow's theory is supported by some experiments and he looks forward to its testing by other experiments.

Science News Letter, March 25, 1933

ARCHAEOLOGY

Stone Tool In Nebraska Cliff May Reveal Ice Age Americans

Study of Thumb Nail Scraper and Soil Where It Was Found Point to American Migration Before Last Ice Advance

A NEW, important-sounding clue to the oldest human inhabitants of America is reported by Dr. Earl H. Bell and Dr. William Van Royen of the University of Nebraska. The discovery may raise the question of man's presence in the New World as far back as the last great Ice Age, when mighty glaciers slowly moved down from their Arctic headquarters.

The clue to America's ancient men is a small stone tool such as primitive men shaped for their work of cleaning skins. It is a type that archaeologists call a snub nose or thumb nail scraper.

The tool was found in a partially cemented sand cliff, eight feet below the present surface. The discovery was made by Gladys Cape, of Dalton, along a creek ten miles from her home. Her father and a paleontology student at the University of Nebraska removed the artifact in a block of matrix for study.

As the resting place of the flint tool suggested great antiquity, Dr. Bell was consulted. He arranged to visit the site to examine the geological evidence in the hope of learning how long ago the tool-makers lived. The expedition was sponsored by the University of Nebraska, Science Service, and Col. G. L. Waters, of Lincoln.

Dr. Bell now reports that the flint tool, and several others from the same creek, must have come to their resting place before the sand bank took on its present contour. No evidence could they find of gopher holes, cracks, or other means whereby the flint objects could have been inserted into their hard bed. Nor could the tools have been buried by recent Indians. The ground is undisturbed.

"There can be little doubt," Dr. Bell declared, "that the age of the artifacts may be counted in thousands, rather than hundreds, of years."

As a conservative estimate, he figures that the tools were made no less than six thousand years ago.

There is some possibility, however, that the tools point indirectly to much earlier inhabitants than this. They may show that men were in America in the inter-glacial period, before the ice sheet crept down for the fourth and last time from its polar home. This would mean that America has been inhabited at least 30,000 years.

Studies of the glacial age, by the Swedish scientist, Ernest Antevs, demonstrate that the last advance of the ice sheet raised an ice blockade across Alaska that would have shut out immigrants for thousands of years. This means that America's earliest immigrants from Asia must have crossed Bering Strait before the great ice blockade, or else they waited until it lifted. Either man is a really old inhabitant of the New World, over 30,000 years old, or else he is just a newcomer, occupying the land merely some eight or nine thousand years.

Studying the story of deposited soil and climate fluctuations recorded in the sand and gravel layers of the Nebraska creek, the University of Nebraska scientists are inclined to believe that the tools embedded here may point to an American migration before the last advance of the ice sheet.

The tools themselves are not so old as that. But it is believed that any race of men who reached Nebraska early enough to have their stone tools embedded in the sand bank must have entered the continent before the ice blockade formed across northern America.

Dr. Bell and Dr. Van Royen expect to make further studies of the site.

Science News Letter, March 25, 1933

ANIMAL PSYCHOLOGY

Stray Dog Nurses Full-Grown Cat

ONE ANIMAL waif that has adopted another as a foster-child, is the strange hard-times story told—and backed up with photographic evidence—by Miss Margaret Stanger, of Riverside Drive, New York. Tales of cats that nurse puppies are common