PHYSICS

New Form of Matter Found In Cosmic Ray Bombardments

Unnamed and Unlike Other Recently Found Particles, It Fails To Fit Theories; Penetrates Platinum Brick

By DR R. M. LANGER

A NEW form of matter has been discovered. It has as yet no name. Unlike other recently discovered particles there is no empty niche in the present scheme of things to which the newcomer can be assigned.

The discoverers, Dr. Seth Neddermeyer and Dr. Carl D. Anderson of the California Institute of Technology, have just a few important properties to announce although they have concentrated on proving the existence and learning the nature of the new substance for over two years.

During that time the experiments seemed always to show the new particles, but because of the startling character of the particles the experimenters heretofore hesitated to emphasize the implications. It was the longest and most difficult problem undertaken with the famous apparatus built by Dr. Anderson.

With this apparatus, he discovered the positive electron in 1932, for which he received a Nobel Prize last year. It was necessary first to examine the behavior of electrons. Then protons had to be eliminated as a possible explanation of the apparent paradoxes.

Now they offer the latest striking evidence that the new particle is different from everything now accepted.

It is charged and carries about the same amount of electricity as is found on an electron or proton. Both positives and negatives are found. The particle is many times more massive than an electron and many times less massive than a proton. Its life here on earth is presumably very short for it is not found except in cosmic rays which have been bombarding the earth since the beginning of time. These properties are all inferred from a study of cosmic ray tracks in an expansion chamber.

The most recent conclusions were obtained from tracks which were seen to penetrate a platinum brick. The platinum, over a pound in weight, replaced the lead brick in the chamber in which five years ago Dr. Anderson discovered the positive electron. Platinum is twenty-one times as dense as water and almost twice as dense as lead. The platinum brick was lent to the scientist by the Baker Company.

The experiments consisted of measuring the curvature of the cosmic ray tracks before and after penetrating the plate.

Ordinary electrons produce many protons and secondary electrons. The new particles penetrate without much energy loss and almost never produce protons. All they do is to push aside the other particles and electrons in their way.

Other workers have recently become convinced that particles hitherto unknown occur among the cosmic rays. Drs. Neddermeyer and Anderson feel that some exciting and important results are due to come out in the near future. These are certain to clarify our understanding of ordinary electrons and protons as well as to extend our knowledge of cosmic radiation and of the fundamental forms of matter.

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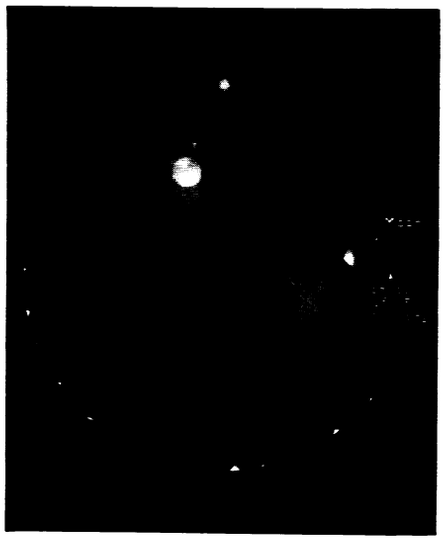

MEASURING WIND

This unusual picture shows how scientists measure the velocity of upper air winds at night. It is the view of the special "fish eye" camera which sees the entire sky from horizon to horizon. A small balloon sent aloft with magnesium flares timed to ignite every few seconds produces the flashes appearing as spots in the top left center. The dimmest flash occurred at an altitude of 13,000 feet and a distance of seven miles. The bright spot centered above the big circle is a point of light which indicates true south. The light of the moon shows at the right, and around the edge of the circle are lights of neighboring cities.

METEOROLOGY

Camera, Balloon and Flare Record Night Wind Velocities

A PHOTOGRAPHIC method of charting the directions and velocities of night winds high above the earth, a development expected to be of considerable value in weather forecasting and aircraft operation, has been developed in the Massachusetts Institute of Technology meteorological laboratory.

Cardinal feature of the method lies in its use of a "whole sky camera," one employing a wide-angle or 180-degree lens, and a sounding balloon equipped with flares so attached to an ordinary piece of blasting fuse that they flash at set time intervals.

Developed by Athelstan F. Spilhaus of the Woods Hole Oceanographic Institute, now conducting research at Technology, the new method is expected to permit studies of complicated wind structures not only in greater detail than has heretofore been possible but more accurately and more easily as well.

In operation the camera is set at a chosen observation point with its lens pointing directly overhead. As the balloon ascends the flashes of the magnesium flares, set off at time intervals as small as five seconds if desired, are recorded on the photographic plate. The picture taken by the wide-angle lens is circular, the circumference showing the horizon on all sides. Thus the brilliant magnesium flashes are recorded regardless of what direction the balloon takes.

By measuring the resulting angles of

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