PHYSICS

Successes in Atom Smashing Evaluated by Dr. Millikan

Heat of Sun and Stars Comes From Upbuilding Rather Than Annihilation of Atoms is View Now Gaining Acceptance

THE SUCCESS of recent atom-smashing experiments in upholding the famous Einstein equation for the equivalence of mass and energy gives fresh hope that the origin of cosmic rays in inter-galactic spaces is due to the building of heavy atoms out of energy-created hydrogen "cosmic ray dust."

Dr. R. A. Millikan of the California Institute of Technology re-assayed facts and theories in the light of recent developments when he presented to the American Association for the Advancement of Science's Century of Progress meeting at Chicago new results from his famous Pasadena laboratories. Speaking from the same platform as Dr. F. W. Aston, the British chemist who may be called the father of the isotopes, Dr. Millikan observed that Dr. Aston's success in measuring the exact masses of the elements gave the first quantitative information about the changes that occur inside the atomic hearts, which physicists are now studying so intently in order to solve the riddles of matter and energy.

Drs. Aston and Millikan are both Nobel Prize winners and they have gathered about them in two centers of physics, Cambridge and Pasadena, fruitful groups of associates.

Citing particularly the work of Prof. E. O. Lawrence, of the University of California, as an example of the experimental verification of Einstein's radiation-mass relationship in atom-smashing experiments, Dr. Millikan then applied the theories of Einstein and Aston to the cosmic rays.

Since 1925 Dr. Millikan and his group of experimentalists have been studying cosmic rays, and in the past four years special attention has been given to measurements of their energies. It was during this work last fall that Dr. Carl D. Anderson discovered that cosmic rays being absorbed by the nuclei of atoms give off a new kind of fundamental particle, a positive electron or positron.

At Chicago, Dr. Millikan incidentally presented the first quantitative measurement of the mass of the positron. Dr. Anderson has just found that its mass is the same as the mass of the more familiar negative electron to within about thirty per cent., which is a very accurate measurement when it is remembered that the mass of the proton, or atomic hydrogen heart, is some two thousand times that of the electron.

The cosmic ray energy measurements lie between a hundred million and three billion volts, with positive and negative energies (*Turn to Page* 15)

ENTOMOLOGY

Rare Butterfly Specimen Is Half Male, Half Female

IN THE butterflies the two sexes are ordinarily in different individuals which are either wholly male or wholly female. But as in all other animals in which the sexes are in separate individuals it occasionally happens that nature makes a mistake and combines both sexes in the same individual.

Two-sexed individuals among the butterflies are very rare, but a considerable number have been recorded. In most of these one side is male and the other side is female. Sometimes the sexes are combined in other ways, for instance parts of the wings sometimes show the male color pattern and other parts the female. But such combinations are inconspicuous in life so that they are seldom recognized and caught.

The picture below represents one of the common butterflies belonging to the group known as the skippers, in which the wings of the right side are male and in color mostly bright yellow, and those of the left side are female and are of a dull olive green. The two sexes are separated by a line down the middle of the body.

This individual, enlarged in picture, was captured at Cabin John, Maryland, and is now in the National Museum.

Science News Letter, July 1, 1933

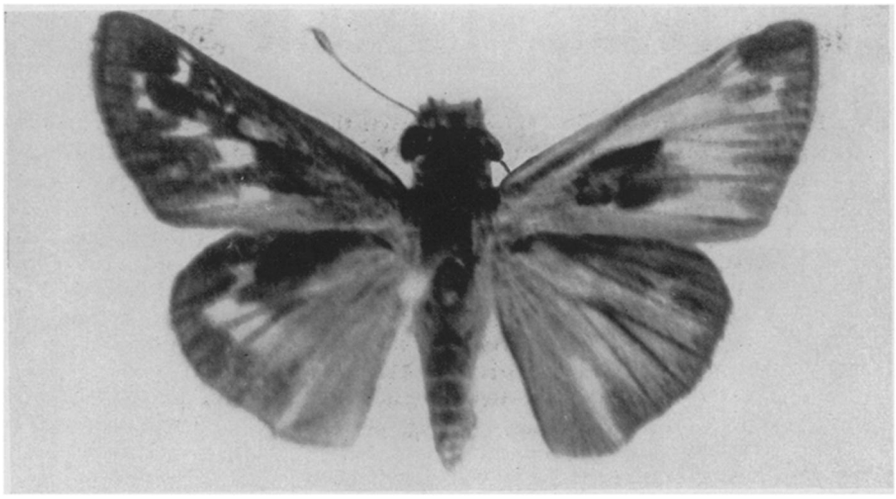
PHYSICS

Neon Atoms Smashed, Producing Rare Isotope

SMASHING atoms of neon, the once rare but now familiar gas, by the action of speeding neutrons, has been accomplished in the physics laboratories of the University of Chicago, by Dr. D. M. Gans, H. W. Newson and Prof. W. D. Harkins, a report to the American Association for the Advancement of Science reveals.

Neon is the heaviest element that has so far broken down under atomic bombardment. The products of its disintegration were helium and oxygen, mass 17. This particular type, or isotope, of oxygen is the rarest of the three isotopes now known. Most oxygen has a mass or atomic weight of 16. There is another isotope of mass 18.

Science News Letter, July 1, 1933



TWO IN ONE