

PHYSICS

"Positron" Confirmed As New Particle of Matter

Discovery of California Physicist Proved Reality As Positive Electron Is Found at Cavendish Laboratory

THE EXISTENCE of a positive electron has been confirmed and it will be christened the "positron."

The discovery of this fourth fundamental particle and atomic building block was made last fall by the American physicist, Dr. Carl D. Anderson, (SNL, Sept. 24, 1932, p. 197) and now physicists at famous Cavendish Laboratory, Cambridge, England, have announced confirmation.

Positive electrons were found in cosmic rays by Dr. P. M. S. Blackett, working with G. Occhialini. Their method makes the new positive electron rays photograph themselves. It has a life of only a fraction of a second and meets its end by colliding with an ordinary negative electron.

The Cavendish Laboratory work confirms the discovery and prediction made by Dr. Anderson of the California Institute of Technology, Pasadena, last September, who on evidence contained in several cosmic ray photographs reported the probable existence of a new particle of matter, positively charged but with the mass of the familiar negative electron.

Theory in Confusion

The demonstration of the existence of a positive electron, as a fundamental particle of matter, throws atomic structure theory into at least a momentary state of confusion. And since the positive electron was found in cosmic rays it may prove to be helpful in explaining the nature of this radiation.

Two years ago there were only two fundamental particles of matter or bricks out of which atoms might be built, the positive particle, or proton, and the negative particle, or electron. In 1931, Dr. J. Chadwick in Cambridge's Cavendish Laboratory forged the last link in the chain of experimental evidence for the reality of the neutron, the close combination of electron and proton that carries no electrical charge. Now out of the same famous laboratory presided over by Lord

Rutherford of Nelson has come the demonstration of the reality of the positive electron, confirming the discovery by Dr. Anderson.

The fundamental corpuscles or particles of matter may be listed as follows:

Electrons—Units of electricity, negatively charged, discovered by Sir J. J. Thomson in 1897, widely recognized in all electrical phenomena, considered to make up the "outer shell" of atoms or to revolve about atomic hearts like satellites about a sun, in the last few years proved to have many of the properties of light and partake of the nature of a wave motion, called beta rays when issued from radioactive substances.

Protons and Neutrons

Protons—Positive particles or corpuscles, nuclei or hearts of hydrogen atoms. Mass of protons 1850 times that of electrons.

Neutrons—Neutral particles of matter, consisting of a close combination of electron and proton, whose electrical charges neutralize each other. Discovered in 1931 by Dr. Chadwick.

Positive electrons—Positively charged particles or corpuscles or rays discovered in cosmic rays by Dr. Carl D. Anderson, 1932, just confirmed by Drs. P. M. S. Blackett and G. Occhialini. Mass of electrons but opposite electrical charge. (Turn to Page 124)

MEDICINE

Typhoid Carriers Made Safe By Gall-Bladder Removal

REMOVAL of the gall-bladder freed nine typhoid fever carriers of the germs and made them no longer a menace to society, reports a hospital in Trondheim, Norway.

The operation has been performed on four other patients. In one case it is too early to claim permanent results. The operation proved fatal in the other three cases. These were all elderly persons on whom the operation was not

urged by the hospital authorities, but was undertaken on the express wish of the patients and their relatives. The nine patients successfully operated on ceased to discharge typhoid or paratyphoid bacilli after the operation.

The lot of the typhoid carrier today is little better than that of the leper in the past. The typhoid or paratyphoid bacilli lurking in the gall-bladder of the carrier are constantly being discharged, and if she handles food in any way (the carrier is nearly always a woman for some unknown reason) the odds are she will sooner or later infect her neighbors and kill some of them.

Science News Letter, February 25, 1933

ARCHAEOLOGY

History Pushed Back In America and Asia

RECORDS in American history are being made and broken fast, just now.

Not long ago, Dr. Harold S. Colton of the Museum of Northern Arizona reported that his museum had set United States history back 76 years, by finding a timber dated 708 A.D. in an Indian dwelling in Arizona. And the next week Dr. Colton broke his own record for pushing United States history back into the dark centuries. The museum has discovered a charred timber cut about 660 A.D. (Turn Page)



MORE HISTORY

Prof. E. A. Speiser of the University of Pennsylvania Museum is holding one of the 3200-year-old cuneiform tablets that add 300 years to Assyrian chronology.

The building of this Indian house is established as the oldest dated event in United States history—until an older date is found.

Ages of Southwestern ruins are established by examining the house beams which serve as real corner-stones, authentically dated. Dates are read by matching the annual rings in a cross-section of timber with an unbroken series of tree-rings from present date back more than 1,200 years.

This announcement of the new earliest date in American history followed the addition of 300 years to the history of ancient Assyria by tablets discovered by a joint expedition of the University of Pennsylvania and the American Schools of Oriental Research. (SNL, Feb. 11, '33, p. 83). The discovery, which was made at Tell Billa in Mesopotamia reveals that the old Assyrian system of naming each year in honor of an official was practised as early as 1300 B.C.

Science News Letter, February 25, 1933

PSYCHOLOGY

Employee Attitudes Important to Management

DISSATISFIED workers are expensive. It pays the management to find out what is on the worker's mind, and attempts are now being made to analyze and measure employees' attitudes, members of the American Management Association learned from a round table discussion led by Prof. Arthur W. Kornhauser, of the University of Chicago, at the annual Personnel Conference held in Chicago.

Favorable feelings and attitudes make for efficiency—antagonistic attitudes or depressed emotions lead to unnecessary waste, friction, poor quality of work, withheld effort, and increased costs, it was brought out during the discussion.

"Skilled, sympathetic, sincere interviewing is required if employees are to talk frankly," it was said. "The interviews and question blanks must be planned with extreme care and must eliminate personal bias as far as is humanly possible. Moreover, employees must be fully convinced that the inquiry is honest, is in their own interests, and will harm none of them. Feelings of suspicion make the study worthless. Accordingly few concerns—especially in these days of stress—can be advised to conduct such inquiries."

Science News Letter, February 25, 1933

CHEMISTRY

Alcohol-Gasoline Mixture Suggested as Motor Fuel

Mixing With Dry Alcohol Successful, So Czechoslovakia Makes Dilution Imperative to Encourage Potato Industry

A COMPULSORY diet of alcohol is now prescribed by law for automobiles in Czechoslovakia. The strength is 20 per cent., suggestive of a decidedly intoxicating liquor; but the other 80 per cent. is gasoline. The Czechoslovakian government, far from prohibiting the manufacture of alcohol, has decided to give a national boost to the industry by requiring the use of spirits as motor fuel. The special aim is to encourage the potato industry. Potato starch yields the desired alcohol by hydrolysis and fermentation. Motor fuel is now required to be treated with the specified percentage of alcohol before retail sale.

Alcohol as motor fuel is no novelty, but in the past has suffered from at least from handicaps. In the first place it will not work under the same motor adjustment as gasoline, and thus is unable to compete with petroleum fuel at the corner service station. Its substantial cost of production and limited supply forbids the marketing of cars specially designed for alcohol alone. An obvious treatment of the problem, employed occasionally in various countries, is the mixing of alcohol with gasoline in amounts at least roughly proportioned to the probable supply. Motors are then adjusted to the uniform mixed fuel.

Unfortunately this scheme runs into the second handicap. Alcohol, as produced by economical distillation methods directly from fermented sugar solutions, insists on carrying along with it from four to six per cent. of water. Such water content makes it impossible to mix the alcohol with many of the straight-run gasolines, particularly fuel of the Pennsylvania or paraffin type.

Until recent years the water problem seriously interfered with blending schemes, as the riddance of water required an expensive chemical treatment. More recently a new distillation process, economical on a large scale, permits dry or "absolute" alcohol to be made with the aid of benzene. Such a product will of course be available un-

der the new Czechoslovakian edict. Under the new law common gasoline will go on the restricted list, like undenatured alcohol in the United States. Only pharmacies, scientific research laboratories and the like may receive permits to purchase pure gasoline. The alcohol-gasoline mixture will cost slightly more than straight gasoline, and will give slightly lower mileage per gallon.

A decade ago, before the discovery of the newer and greater oil fields in Texas and California, American automotive authorities were interested in the possibilities of alcohol with mounting consumption of gasoline. Preliminary surveys indicate that large areas in the Philippines are suited to the gross production of carbohydrates, perhaps from such a plant as the cassava. Such production, together with American corn, cane, beets, etc., now almost a drug on the market, could be made to carry a large part of the motor fuel burden through the alcohol route. Advices from the oil industry suggest that this enterprise will be delayed, as far as the United States is concerned, for some time.

Science News Letter, February 25, 1933

CHEMISTRY

Two Elements Have Atomic Weights Changed

THE 1933 MODEL table of atomic weights of the chemical elements has two changed figures.

Iodine's atomic weight is changed from 126.932 to 126.92 and the figure for lanthanum is changed from 138.90 to 138.92.

Each year an international committee of the International Union of Chemistry reviews the research on atomic weights and makes necessary changes. Prof. G. P. Baxter of Harvard is chairman and the American member. Mme. M. Curie, discoverer of radium, is another member.

Science News Letter, February 25, 1933