CHEMISTRY—PHYSICS

Triple Weight Element Made As Atoms Yield Energy

Heavy Hydrogen is Both Target and Projectile in Research Suspected of Producing Mass Three of Same Element

EXISTENCE of triple-weight hydrogen, hitherto suspected but unproved, may be demonstrated by a sensational atom-smashing experiment just made by Lord Rutherford, Drs. M. L. Oliphant and P. Hartleck in Cambridge's famous Cavendish Laboratory and announced in *Nature*.

Double-weight hydrogen, now being studied intensively in the world's chemical laboratories following its discovery in America two years ago, was both target and projectile in the new atomic bombardment. Hearts of heavy hydrogen, called deutons in America and diplons in England, were flung with hundred-thousand volt energy at salts of ammonia that contained heavy hydrogen instead of ordinary single-weight hydrogen. This impact of deutons upon deutons (or diplons upon diplons to follow the nomenclature preferred by the British scientists) gave striking results.

3,000,000 Volts

There was enormous emission of fast protons or hydrogen hearts with energies of three million volts. Particles released had thirty times the energy of those used in the atomic attack.

The Cambridge scientists have two ideas about what happened. Either two heavy hydrogen atomic hearts reacted to give a new hydrogen variety of mass three and an ordinary hydrogen atom, or they formed a helium atom of mass three and a neutron.

Important in Either Event

Even if it turns out that mass three helium instead of a triple weight hydrogen is formed, this will prove to be an important discovery. No atoms of mass three have been unequivocally demonstrated in the past although vigorous searches have been made for them. The weight of ordinary helium is four units on the chemical scale on which ordinary oxygen is sixteen.

This discovery of a mass three atomic heart and the enormous volume of atomic transmutations achieved is expected to have important influence upon the present feverish exploration for the secrets of matter's composition.

Science News Letter, March 24, 1934

CHEMISTRY—PHYSICS

New Element Will Complicate Chemistry

THE DISCOVERY by Lord Rutherford and his co-workers in England of the probable existence of triple-weight hydrogen tremendously complicates chemistry, and yet it would fit in with the ideas of physicists as to how matter is put together.

Before 1931 only one kind of hydrogen was known. Then in America double-weight hydrogen was conclusively demonstrated. This was followed by the production in several American laboratories of heavy hydrogen and the strange heavy water that it forms. The hearts of heavy hydrogen, called deutons in America, become useful projectiles in action smashing. Witness the Cavendish Laboratory experiment that seems to mean the existence of either hydrogen of mass three or helium of mass three.

The existence of mass three hydrogen has been suspected and searches have been made. In fact, last September Prof. Wendell M. Latimer and Dr. Herbert A. Young of the University of California found evidence of its existence in heavy water. They used the magneto-optic method of analysis developed by Prof. Fred Allison of the Alabama Polytechnic Institute, with which Prof. Allison found evidence for the existence of heavy hydrogen of mass two and also discovered the last two unknowns of the 92 chemical elements, alabamine and virginium.

If the existence of mass three hydrogen is conclusively proved, the number of chemical compounds in the universe is prodigiously increased. Take water, for instance. No longer is it simple H_2O. With three kinds of hydrogen and three kinds of oxygen, there can be eighteen kinds of water. When the thousands of compounds containing hydrogen are considered, the complexity becomes bewildering.

There will be controversy over the name of the new hydrogen. Americans will want to call it "tritium" and its heart or nucleus "triton," corresponding to protium and proton for ordinary hydrogen and deuterium and deuton for mass two hydrogen. The British will probably favor "triplogen" and "triplon."

Science News Letter, March 24, 1934

ENGINEERING

Wandering Bridge Scoops Coal From Pit

A GIANT wandering bridge more than a quarter of a mile long has been put in operation digging brown coal from open pit mines in northern Germany. This ponderous steel structure extends its 1312-foot length from the edge of the pit well out over the vast hole from which coal has been obtained for years. Excavators which are a part of the bridge scoop up the coal and load it into conveyors that lead to waiting railway cars.

Eighty-one electric mo- (*Turn page*)

COAL MINER

This unique structure is a coal mining bridge or excavator which is capable of filling 1000 railroad cars a day with brown coal from open pits of northern Germany.

tors move the clumsy structure to new "diggings." It travels at a speed of thirty-six feet per minute over two temporary railway tracks 450 feet apart under the middle of the bridge. Thus it wanders day and night through the open pit scooping up 58,000 cubic yards of coal in 24 hours, enough to fill 1,000 cars.

The huge machine is under the direction of a "commander" who has a stand as imposing as the bridge of an ocean liner, and from it he keeps in touch with all parts of the structure by telephone and remote control devices. Electricity for the operation of the bridge is supplied from a trolley at a potential of 5,000 volts.

Science News Letter, March 24, 1934

RADIO-METEOROLOGY

New Research Links Radio Layer With Weather

WILL the radio become an aid to the weather forecaster in making his prediction of the following day's sunshine or rain?

New evidence linking the ionization density of the radio reflecting layer of the upper atmosphere, and hence the intensity of radio signals with the weather on the ground, has been reported to *Nature* by Dr. D. F. Martyn, of the University of Sydney, Australia.

When night measurement of radio signals reveals that the layer which reflects radio waves of broadcasting frequency has a greater density of electrified particles than it had the preceding night, then the barometer invariably rises within 12 to 36 hours, Dr. Martyn found in experiments conducted under the auspices of the Australian Radio Research Board. In most cases the time lag is nearer 12 hours.

These results agree with those obtained by American scientists, Drs. R. C. Colwell and I. O. Myers at West Virginia University, measuring the signals from Station KDKA. The Americans interpreted them differently, however, concluding that this correlation between radio signal strength and barometric pressure indicates that the lower reflecting layer, which turns back waves of broadcasting frequency, is located in the region affected by changes of barometric pressure, while the short waves are turned back at heights not affected.

The experiments of Dr. Martyn strongly suggest the presence of winds in the high levels of the stratosphere, he said.

Science News Letter, March 24, 1934

ASTRONOMY

Used to Shooting From Hip, Plainsman Snaps Meteorite

See Front Cover

IN THE NOVEL, "Cranford," (does anybody read that delightful old-fashioned tale any more?) a returned cousin from India, as mendacious as he is rich, tells of hunting on a Himalayan alp so high that when he fired at what he took to be a huge bird he found to his astonishment that he had "shot a seraphim." A feat quite as astonishing was really accomplished by a New Mexico rancher, Charles M. Brown, in obtaining the photograph reproduced on the cover of this issue of SCIENCE NEWS LETTER.

This, the first general publication of Mr. Brown's snapshot of a great meteoritic fireball, is in a way the commemoration of an anniversary, for it was just one year ago, on March 24, 1933, that the great flaming invader from outer space flared its way across the skies of the Southwest, visible to thousands of people in seven states.

Many photographs were taken of the persisting trail of the great meteorite after it had passed, but Mr. Brown's is believed to be the only one of its head —and indeed probably the only photograph that ever caught the head of any meteorite in its flight. To get such a picture requires a combination of quickness, skill and luck that would suffice to catch a snapshot of a cannonball. Probably nobody but a plainsman, born of a generation that survived the wild and woolly days largely through its ability to "shoot from the hip" could have taken the photograph.

Mr. Brown did not consider his feat unique at the time, nor even particularly extraordinary. The thing that interested him was the uniqueness of the meteorite, and that was why he wanted—and got—a picture of it.

He told his story to H. H. Nininger, secretary of the Society for Research on Meteorites. He had just sat down to a very early breakfast, a little before dawn on that memorable March morning, when the whole heavens suddenly lighted up. As suddenly, the thought "Meteor!" flashed into his mind. With Mr. Brown, action is almost as quick as thought. He snatched his camera off the top of the radio cabinet, was out of the house in a couple of jumps, clear of the ranch buildings in about three more, pointed his camera and "fired." When the film was developed he found he had scored a clean hit.

When he told his story to Mr. Nininger, the latter could hardly believe that anyone could be quick enough to catch a snapshot of a meteorite in flight. He asked his host to repeat his actions, as nearly as he could, while he timed him. The rancher went through the performance from chair at breakfast table to snapshot "stance" in the open, in about eight seconds.

Finding actual pieces of the meteorite has proved to be a much longer task than getting its portrait. It was not until a couple of weeks ago that Mr. Nininger began receiving them, together with fragments of another, less spectacular meteorite that fell in the same region on August 8, 1933. Two of the fragments of the March 24 meteorite were found near its course of flight, as mapped by Mr. Nininger from data obtained last spring; they were 35 miles short of the end of its visible flight, and another fragment was found twelve miles farther along. Ranchers of the region are still searching for more pieces.

The fragments recovered from both meteorites are of stone, with no iron in them. Mr. Nininger states that they constitute an uncommon variety of aerolite.

Science News Letter, March 24, 1934