SCIENCE NEWS

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SOME PAPERS READ AT THE CHICAGO MEETING OF THE AMERICAN PHYSICAL SOCIETY

HIGH altitude research at 14,200 feet has led to the identification of what physicists believe will be still another atomic particle known as the neutretto. The newest particle is without electrical charge and has the mass and other properties of the heavy electron. The latter has been known by a variety of names, including barytron. Recently, Dr. Carl D. Anderson and Dr. Seth D. Neddermeyer, of the California Institute of Technology, suggested still another name—the mesotron—for the heavy electron, in order to bring some order out of the chaos of nomenclature for this intermediate mass particle. Mention of the discovery was made in the report of Francis R. Shonka, of the University of Chicago and De Paul University, to the meeting of the American Physical Society. Mr. Shonka's report was introduced by Professor Arthur H. Compton, of the University of Chicago. The new research, leading to the discovery of the particle, consisted of measuring cosmic ray intensity at high altitudes when various thicknesses of lead were placed in several selected positions about the four Geiger-Muller detecting tubes. Great thicknesses of lead were required to bring out the maximum observed effects. "In view of the great thickness of lead required to give the maximum effect, these non-ionizing particles producing secondary barytrons (heavy electrons) must be much more penetrating than photons. This high penetrating power suggests their identification with the neutrettos (neutral particles having mass and other properties similar to the barytron) postulated by Heitler."

WORLD-WIDE variations of cosmic ray intensity can be explained by the presence of a great ring of electricity whirling around the earth, far out into space. Dr. S. E. Forbush, of the Department of Terrestrial Magnetism of the Carnegie Institution of Washington, stated that this ring of electricity is the same mechanism which can account for the drop of cosmic ray intensity that occurs during severe magnetic storms. Electrical rings, he added, were first postulated by Dr. Carl Stormer, of Norway, to explain certain characteristics of the aurora. The magnetic effect of the current in this ring of electricity, plus the magnetic effect of the earth's permanent magnetic field, would be expected to have a result equivalent to an increase in the earth's magnetic field. Such an increase, in turn, would account for a decrease in cosmic ray intensity. World-wide cosmic ray variation, Dr. Forbush explained, can be accounted for by the radius of the electrical ring of current and by the amount of current flowing in it.

PROFESSOR A. H. COMPTON and Dr. P. S. Gill, of the University of Chicago, reported that a comparison of all available data on cosmic ray intensities in relation to star, or sidereal, time shows that cosmic rays apparently originate within the same galaxy of stars as that which contains the earth and the sun. There is no evidence, they said, to indicate that the earth is moving appreciably with respect to the source of cosmic rays as would be the case if the rays came from outside the local galaxy.

USING the diffractive scattering of x-rays by molten sulfur, Professor Newell S. Gingrich, of the University of Missouri, has found a new orderliness in the liquid state of nature which ordinarily is considered without form. He described studies showing how liquid sulfur diffracts x-radiation in a manner which suggests that the atoms of sulfur possess a grouping at a distance of 2.05 Ångstrom units. An Ångstrom unit is a special standard of length used in spectroscopy which is equivalent to only .000,000,003,937 of an inch.

NEW studies which disclose the effects of bends in long chain molecules were described by Professor William D. Harkins and Robert T. Florence, of the University of Chicago. Using thin films of materials, only one molecule thick, the scientists investigated the shape of otherwise identical molecules as they affected the attraction between the molecules in the film. Stearic acid and stearyl amine with a straight chain of atoms in its molecule, elaidic acid with the same number of atoms in its chain but with a slight bend in the molecule, and oleic acid with a much larger bend, were all studies. Elaidic acid, which gives an extended type of film, was added to stearyl amine that ordinarily, of itself, gives a condensed type of film. The result was the formation of an even more condensed type of film. In contrast when stearyl amine, which gives a condensed film, was added to an expanded film of oleic acid it expanded it even more. These apparently contradictory effects can be explained by the differences in the bending of the molecules which has a great effect on the intermolecular attractive forces in the films.

To facilitate the control of energy of the particles, which are accelerated in cyclotrons for atomic bombardment, a new method has been devised. This was reported by J. L. Lawson and A. W. Tyler, of the University of Michigan. Using vacuum tubes a circuit has been designed which handles 250 amperes of current and keeps it accurate within one part in 5,000 even though the power supply voltages may vary by as much as 20 per cent. Control of the current flowing in the cyclotron is highly important for long periods because on this current is based the magnetic field of the instrument. In turn the steadiness of the magnetic field in the cyclotron determines the constancy of the energy of the accelerated particle beam which is used in atom smashing.

NEW improvements in cyclotron technique are now enabling the bombardment of hitherto difficult targets like metallic sodium, according to Dr. Franz N. D. Kurie,

of Indiana University. Previously, he pointed out, it had been impossible to work with some materials because they spattered or could not be cooled when they were bombarded with the full power of the beam in the cyclotron at the University of California. New advances have stepped up the power in this beam, at the point where it strikes the target, to a kilowatt. A small chamber has been constructed, containing the sample to be bombarded, which is placed at the window of the cyclotron from which come the high energy atomic particles. In the chamber is a copper target plate whose back surface is water-cooled and whose front surface is heavily knurled. The material under study is either fused to this copper plate or pressed into the depressions with a spatula. In special cases a thin film of gold is used to cover the material and further protect it. When filled with hydrogen or helium gas this tiny chamber is placed in position. The presence of the gas helps keep the front window of the chamber cool. "With this arrangement," Dr. Kurie stated, "it has been found possible to bombard red phosphorus, sodium metal, lithium metal and other difficult targets with the full intensity of the cyclotron."

THE TANGANYIKA TERRITORY

OPPRESSED and battered Jewry's new Promised Land —Tanganyika Territory in East Africa, the most frequently mentioned colonization site—is one of the few sparsely settled districts in the world that still has areas in which Europeans will find it possible to live.

They won't find it easy, though, the best information available indicates. For it will take hardy pioneers—even hardier than those who opened up America's West or who are opening up to-day Siberia's North—to wrest a living from the former German colony, even though it is twice the size of the Nazi Reich from which they wish to flee.

The coastal plain is hot and damp; in it most of the 2,500 Europeans already in the territory are concentrated. In the interior is a hot and dry plateau to which city dwellers, in which classification most Jews belong, will find it no easy task to become accustomed. There is only one town of any size—Dar es Salaam, seat of the British authorities who govern by mandate from the League of Nations.

Yet with only some 5,000 Asiatics and 5,000,000 African natives, space for the new immigrants might be found. It may be tough on the natives, however; Britain in 1923 set the territory aside as one in which maintenance of the native tribes would be particularly favored. Some 75 native tribes, belonging mostly to the Bantu races, fill out most of the 365,000 square miles comprised in the British part of the territory. The former German colony was slightly larger, as two slices were given to Belgium and Portugal in the settlement following the World War.

Sisal and rubber are the principal exports, though cotton, coffee and lumber can be developed into profitable industries. Gold, mica, tin and diamond deposits might be made to produce by an industrious people, such as the Jewish people now in Palestine. An excellent basic network of transport and communication lines already exists. Twelve hundred miles of railroad and 15,000 miles of roads, easily traveled during the dry season, link the principal districts. Telegraph lines connect Dar es Salaam and many inland towns. The farm and range districts support 5,000,000 cattle, more than 2,000,000 sheep and 3,000,000 goats.

Tanganyika Territory, the largest of the old German colonies, is also considered to be the most desirable and the one most capable of development and exploitation. Perhaps, if the region is turned over to the Jews as a new national home, it will be so developed.—LEONARD H. ENGEL.

ITEMS

SEEKING a barking deer, an animal so rare that no museum in the world now contains a specimen, Arthur Vernay, C. Suydam Cutting and Dr. Harold E. Anthony set out from the American Museum of Natural History, New York City, on November 26, to traverse hitherto unexplored parts of northeastern Burma. *En route* they will be joined by J. K. Stanford, former deputy commissioner of Mytikyina, Burma, and Kingdon Ward, British botanist and plant collector. The expedition will be in the field until May. Besides the barking deer, they will collect specimens of the giant panda and the takin, which is a small but formidable buffalo, and also other species of mammals, birds, fishes, insects and plants. All botanical material taken will be divided between the New York Botanical Garden and the Kew Gardens, England.

A SCIENTIFICALLY designed little megaphone, one foot long, which would be far more efficient for football cheerleaders than the ordinary long ones, was described at the meeting in Cambridge of the Acoustical Society of America by Professor F. R. Watson, of the University of Illinois. The megaphone, which is an adaptation of acoustical principles known for many years, is shaped like a triangle two inches thick. It has a rectangular mouth about 12 inches high by 2 inches wide. Sound enters through an opening two inches square. The sides are flat. If the long side is held vertical, sound billows out of such a megaphone in a semicircular sweep which can take in one whole side of a stadium at once. The ordinary cone megaphone focuses sound on a relatively limited area. Professor Watson said that he has made up some of his new megaphones for football cheerleaders, but that there seems to be a preference still for the more spectacular, if less efficient cones.

NAMING the California Institute of Technology observatory on Palomar Mountain, site of the 200-inch telescope, in honor of the late Dr. George Ellery Hale, is being considered seriously. That Dr. Hale's name will form the permanent name for the observatory, is the hope of Captain Clyde S. McDowell, supervising engineer, who held that the man who envisioned the project be so honored. No formal action as to the selection of a name has been taken, however. At the time of his death Dr. Hale was in charge of the enterprise, and wrote the magazine article which resulted in the project's endowment.