SCIENCE NEWS

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RADIOACTIVE DISINTEGRATION OF MESOTRON PARTICLES

STONE walls may make a prison and strong armor plate will stop a shell, but physicists are now studying an amazing atomic particle which will penetrate dense solid material better than it will air or a gas. The particle is the heavy electron discovered in 1937 by American scientists in cosmic ray studies, to which the name mesotron has now been given.

In two reports published in *Nature*, Dr. P. M. S. Blackett, of the University of Manchester, and Dr. Bruno Rossi, Italian physicist now at the Institute for Theoretical Physics, Copenhagen, describe new properties about the strange mesotron. The mesotron has an electrical charge like an electron but has a mass intermediate between that of an electron and a proton. Dr. Blackett states that the mesotron has been shown to be radioactively unstable and breaks down with a mean time of decay of about 0.000002 seconds (two millionths of a second). It is this hitherto unrealized instability which explains the baffling differences of absorption of mesotrons in air and in dense materials like lead. It is this factor, probably, which explains the discovery that mesotrons penetrate deeply into the earth and appear in experiments performed deep under ground in mines and in caves.

Dr. Rossi reports experiments made at altitudes of 7,775 feet in which it was found that the mesotrons were much more reduced in intensity in passing through air than they were in passing through an equivalent amount of dense lead. "The difference between the lead and the air absorption," according to Dr. Rossi, "for which no satisfactory explanation had been found at that time, can now easily be accounted for on the disintegration hypothesis (of mesotrons)."

The seemingly queer disintegration of a single atomic particle is explained by saying that the mesotron breaks up into an electron and into a neutrino with the original heavy mass of the mesotron appearing in its offspring as great kinetic energy.

TANGANYIKA

TANGANYIKA, most discussed among potential new Promised Lands for Jewish exiles, could be made literally a land of milk and honey by industrious colonists who know how to farm and can adapt themselves to life in the tropics. Such is the opinion of Dr. H. L. Shantz, of the U. S. Forest Service, based on two visits to the territory during which he made studies of the ecological conditions that influence possible agricultural and ranching uses of the land.

Tanganyika is a big country, bigger even than Ethiopia, Dr. Shantz pointed out. Except for a malarious coastal strip, it offers good living conditions for white men, for although the climate is tropical it is never really hot.

The total area of Tanganyika is about 366,000 square miles, of which 299,000 square miles is potentially productive land and 67,000 square miles is desert or otherwise unusable. There is relatively little dense forest—only about eight per cent. of the total, or 11,000 square miles. The greater part of the natural cover is a kind of savanna-like open forest, with trees standing scattered in grass-land, as in a park. About 111,000 square miles carry this type of vegetation.

Of especial interest from the colonization point of view is the fact that a generous section of the country will grow temperate-zone crops, especially the small grains, and at the same time will produce bananas and coffee. This "cool-weather crop" area comprises some 56,000 square miles—a block about the size of Iowa or Wisconsin, and nearly one third the size of all post-war Germany. In addition, there are "warm-weather crop" areas totaling 243,000 square miles, capable of producing cotton, corn, casava, coconuts, etc.

The grazing possibilities of Tanganyika are very great. Approximately 289,000 square miles might be used for high-production ranch lands, with an additional 66,000 square miles capable of carrying smaller numbers of cattle, sheep and goats. At present, the livestock population, owned principally by natives, comprises nearly five million cattle and more than five million sheep and goats. There are still enormous herds of big game, ranging all the way from elephant and rhinoceros to antelopes and apes. Problems of wildlife adjustment will come very much to the fore if extensive European colonization is undertaken.

Under cultivation at present are about two and one half million acres in large European-owned plantations and over four million acres farmed by natives. The plantations produce money crops, principally sisal, coffee, cotton and corn, with a few coconuts. The natives raise a great variety of crops, principally for their own use. Millet is the great food grain of the natives; more than a million acres are in that crop alone. Others are corn, wheat, potatoes, beans, peas, bananas, peanuts, tobacco, sisal, cotton, etc.

At present there are so few white men in Tanganyika that they fairly rattle around in the country. There are only about 6,600 of them, embedded in a dark matrix of nearly 4,800,000 Negroes and 24,000 Asiatics. The possible effects of rapidly introducing half a million or more white people into the land are hard to calculate.—FRANK THONE.

THE EXTINCT ANTHROPOID APE PARANTHROPUS

THREE broken pieces of bone, newly found at Kromdraai in South Africa, give strong evidence that the extinct anthropoid ape Paranthropus walked on two legs like a man. The discoverer, Dr. Robert Broom, of the Transvaal Museum at Pretoria, reports his find in *Nature*.

The three bone fragments, which Dr. Broom states almost certainly belong to Paranthropus, are the lower end of a right humerus (the elbow), the lower end of

one of the bones of the right arm, and a bone of a toe. So nearly human are these three bones, that Dr. Broom says that they are almost indistinguishable from those of a man. They are quite unlike the corresponding bones in either chimpanzee or gorilla. But as Dr. Broom, in sorting over between three and four thousand bones which have been collected from the Kromdraai site, has not found a single bone or tooth belonging to man, and the bones now found were quite close to the place where the skull lay, he feels justified in attributing them to Paranthropus.

The great importance of this discovery, however, does not lie merely in the close resemblance of these bones to those of man. Not only do they confirm Dr. Broom's conclusion from the conformation of certain bones of the skull, that this man-like fossil walked upright when he was alive, but they extend it. The toe bone is a little longer than that of man, but it belonged to a foot which was habituated to upright walking, while the humerus reveals that the upper limbs were not used for locomotion. Hence the upper limbs of Paranthropus were freed for that development of the use of arm and hand which led to the specifically human activity of tool-making, as well as tool-using, this activity in its turn helping on the development of the distinctively human characters of the brain.

The discovery of part of the thighbone of the Sterkfontein fossil, to which Dr. Broom has given the name Plesianthropus, on account of its resemblances to man, indicates that this anthropoid also probably walked upright.

A further discovery at Sterkfontein is that of the brain cast of what, it is believed, must have been a male skull of Plesianthropus. It is considerably larger than the brain cast made from the type skull which was found at Sterkfontein, and is believed to be that of a female. The new brain cast has a capacity of from 600 to 650 cubic centimeters.

The new skull of *Pithecanthropus erectus*, the ape-man of Java, which was found recently, has a capacity of 750 cubic centimeters, so that Dr. Broom's Sterkfontein brain cast comes very close to that of a skull which is regarded definitely as coming within the human line.

On the evidence of the fossil teeth of horse which have been found on the Kromdraai site, Dr. Broom now thinks that the Kromdraai skull may be considerably older than was at first estimated, and possibly belongs to the middle period of the Pleistocene, or Ice Age.—E. N. FALLAIZE.

ROCK FOOTPRINTS

GEOLOGY and ethnology seem to be at odds regarding the nature of the now famous impressions in the rocks, shaped somewhat like human footprints yet certainly not made by human feet.

Geologists for the present are confining their attention mainly to two sets of the markings, both near Berea, Ky., which Professor W. G. Burroughs, of Berea College, is sure were made by actual animal feet, back in Coal Age days when the stuff that is now stone was soft, wet sand. He has the backing of Charles W. Gilmore, of the Smithsonian Institution, who calls attention to the fact that tracks in other localities that most nearly resemble the Berea prints are in rocks of the same geological age. Mr. Glimore has not visited the Berea site, but he has examined critically detailed photographs of the markings.

So confident is Professor Burroughs that the tracks are real footprints that he has given the unknown animal a scientific name, *Phenanthropos mirabilis*. The name was suggested by Dr. Frank Thone, editor in biology of Science Service, with the concurrence of Mr. Gilmore. The first part of it translates as "looks human," and the second word simply means "remarkable." Dissent is registered by David I. Bushnell, Jr., Smithsonian Institution ethnologist. Mr. Bushnell said, in a statement issued to the press, that every print he examined was undoubtedly an Indian carving. A prehistoric tribe or tribes, he believes, attached to them some symbolic meaning. The disagreement may be more apparent than real. Unquestionably many, perhaps most, of the footprint-like marks in the rocks over a wide stretch of country were carved by human sculptors. Their artificial nature is manifest at a glance, especially when they are found paired, arranged in even rows, and accompanied by other symbols such as circles and three-pronged figures like great bird tracks.

It is quite as possible that other tracks are genuine footprints, especially when they are arranged quite at random, as the Berea tracks are, and where the prints vary greatly in size, as some of them do. It is this circumstance, in part, that has convinced Professor Burroughs that the Berea markings are not artificial.

Dr. Alson Baker, a physician of Berea, recently wrote Science Service that he and Dr. A. F. Cornelius had made a critical examination of the tracks there, using a strong magnifier mounted on a tripod. He states: "We examined the arrangement of the sand grains in the deepest portions of the prints, with especial attention to the heels. The sand grains in the bottoms of the prints were much more closely packed than those in the slopes, and those in the slopes were more closely packed than those in the rock an inch from the margins of the prints, or at any other point. Each member of the party certified and checked these findings and we all agree that the imprints were made by pressure when the sand was soft and wet. The fact that the sand grains in the bottoms and slopes of the imprints are of exactly the same kind as those in all other parts of the rock surface examined, seems to prove conclusively that the closer arrangement observed was not due to any possible drifting in of extraneous material."

NEW CHEMICAL USES FOR MILK WASTES

YOUR next automobile may be a milk wagon—parts of it, at least, made from chemicals derived from dairy wastes. Milk products may be in the lacquer that shines on its body, also in the plastic glass in its shatter-proof windshield.

In his annual report to the Secretary of Agriculture, O. E. Reed, chief of the Bureau of Dairy Industry, tells of a new resin made from lactic acid by chemists of the Department of Agriculture. It promises to be useful in the varnish and lacquer industries. A method is now

being worked out for turning lactic acid into acryllic acid, a glass-like transparent plastic.

Lactic acid, which already has a number of other industrial uses, is manufactured, by a process originated in the bureau, from whey, the thin waste liquor which is all that is left of milk after the production of cheese. Another profitable outlet for whey, which has for years been a burdensome waste in the cheese industry, has been found in the extraction of milk sugar from it by a method which produces a soluble albumin and a residue rich in flavins. The albumin is useful in infant foods and the flavin product is in demand by feed manufacturers.

A method for making a synthetic wool-like yarn from casein has also been developed. This was first done in Italy, where the process was kept secret. The American chemists developed their own method and made the process available to everybody by putting it under a public service patent. Although large quantities of casein "wool" are now being manufactured in Italy, it has not yet been considered economically justifiable to put its American counterpart into commercial production.

HIGHWAY SAFETY

OUT of the thrilling curves of giant roller coasters in amusement parks has come the newest idea for increasing highway safety.

Parabolic deflection down the center line of a roadway have been found to give positive redirection to a speeding motor vehicle which may strike them, it was reported to the meeting of the Highway Research Board in Washington by Dr. Miller McClintock, of the Bureau of Street Traffic Research of Yale University.

The parabolic barrier wall, Dr. McClintock said, was an outgrowth of observations in amusement parks where the cars of a roller coaster negotiate curves which are so sharp that neither flanges on the wheels nor superelevation of the curve would normally keep the car on its track. On roller coasters the trick is to have the side of the car mounted with rollers so that an additional restoring force is obtained. Adapting this idea for a central barrier wall Yale traffic experts devised a sloping metal surface whose profile is a parabolic curve.

As the front tire of a car starts to ride up this surface it gradually reaches a point where the side walls of the tire press against the barrier wall. This creates a restoring force which redirects the car away from the barrier and back on to the roadway. The action is positive and gentle if the driver only allows the car to guide itself for the instant it is on the barrier. No part of the car, except the sides of the tires, touches the barrier wall. Extensive tests of the barrier have been made in cooperation with the Michigan State highway department, Dr. McClintock said, with all types of motor vehicles, from light passenger cars to 15-ton trucks, and at speeds from 10 to 60 miles an hour. In no case was any car out of control, damaged in any way or the occupants harmed.

A full size parabolic deflector would be four and a half feet high and four feet wide at its base. It would be adapted for any highways wider than two lane roads.—ROBERT D. POTTER.

ITEMS

A NEW seismological observatory has been established by the University of California, in the town of Mineral, which is situated in Lassen National Park, near the only active volcano in the United States proper. This is the seventh station for the study of earthquakes to be established in the state by the university. Setting up instruments at Mineral does not mean that seismologists expect renewal of volcanic activity on the part of Lassen peak, it was explained, but only that a station was needed in this part of the state, and that its work can be facilitated by the presence of scientists of the National Park Service in the region, together with the cooperation of the Seismographical Society of America.

THE U. S. Public Health Service reports that the number of influenza cases has been greater this fall than during the same period last year or than the average for the five-year period ending in 1937. For the four weeks ending November 5, there were 3,836, which is about 50 per cent. higher than the average for the five-year median, 1933–1937. For the week ending November 19, latest on which figures for the whole country are available, there were 1,207 cases reported. Probably about three times that many occurred, as health officials have found that only one third of the total number of influenza cases is likely to be reported.

AT least 10,000,000 Americans suffer from some form of the now fashionable ailment known medically as an allergy, according to an estimate made by Dr. Theodore D. Beckwith, professor of bacteriology at the University of California. Allergy is described in the statement as being a condition of hypersensitiveness to certain foods, drugs, animals, plants, climatic conditions and emotional disturbances. Hives, hayfever, asthma and sick headaches are among the ailments suffered by allergic persons when in contact with the particular offending substance.

YOUNG men of the CCC camps were given credit for saving millions of acres of farm and pasture land, in a communication from H. H. Bennett, chief of the Soil Conservation Service, to Robert Fechner, director of the Civilian Conservation Corps. Mr. Bennett said that CCC camps furnished 70 per cent. of the labor used to advance the soil conservation program. In fighting gullies, the last and worst stage of soil erosion, CCC workers have built almost 3,000,000 check dams, dug 48,000,000 linear feet of diversion ditches and seeded or sodded 300,000,000 square yards of gullied land. In combating the less spectacular but more insidiously destructive sheet erosion, they have planted approximately 500,000 acres, put in 18,000 miles of terraces and 41,404 miles of contour furrows and quarried 1,403,659 tons of limestone.

THE "absolute altimeter," introduced to the aviation industry a month ago by the United Air Lines and the Western Electric Company and potentially probably the single most important air navigation advance in years, is now being checked by the U. S. Army Air Corps at Wright Field, Ohio. The instrument warns of obstacles such as mountains, since it records height over land or other obstructions, and not height above sea-level.