NEUTRINO COLLISION DEBRIS—The nuclear particles formed when a neutrino, generated from a beryllium target in Brookhaven's 30 billion-electron-volt accelerator, collides with matter in a ten-ton aluminum spark chamber. The spark tracks show a mu meson, the long straight path, created by an incident neutrino and what is believed to be a gamma ray.

PHYSICS

Four Neutrinos Found

➤ THE ATOMIC CORE, or nucleus, has four neutrinos instead of only two as previously thought.

The neutrino is known as the ghost particle because it has no mass and no electrical charge. It shoots out of the nucleus at the speed of light when atoms split due to their radioactivity.

A neutrino is so small that one billion trillion trillion trillion neutrinos (one followed by 45 zeroes) could fit into a square inch of space. Neutrinos react so little with matter that they can, on the average, penetrate 100 trillion miles of lead.

The experiments establishing that two different types of neutrinos exist, each of which has a mirror twin, were made by physicists from Columbia University and Brookhaven National Laboratory using the world's most powerful atom smasher. This is the 33 billion-electron-volt accelerator at Brookhaven, Upton, N.Y.

The physicists succeeded in detecting collisions of high-energy neutrinos with nuclei, using a heavily shielded spark chamber. They found that one type of neutrino is connected with mu mesons, subatomic particles. The other type is connected with electrons, a negatively charged particles that carry electricity.

The neutrino experiment is the first in which the so-called "weak" force was studied at high energy. It was possible because the Brookhaven machine can accelerate particles to extremely high energies in a sufficiently intense beam.

The research team conducting the neutrino experiments included Drs. Leon Lederman, Melvin Schwartz, and Jack Steinberger of Columbia and Gordon Danby of Brookhaven, working with Jean-Marc Gaillard, Konstantin Goulianos and Nariman Mistry, also of Columbia. Their report appeared in the Physical Review Letters 9:36, 1962.

In order to observe 50 neutrino interactions, some 100 trillion neutrinos were sent flashing through a ten-ton detector, or spark chamber. The particles produced by the neutrino collisions left a trail of sparks along their paths, and these were automatically photographed.

Old battleship armorplate, 42 feet thick, is placed between the beam of particles from a target in the accelerator and the spark chamber detector, to screen out unwanted particles. The detector is also shielded, although not as heavily, on its three other sides and roof, to reduce background radiation from cosmic rays.

The neutrinos detected were of the type known to be associated with mu mesons. The experiment showed that these neutrinos were not able to produce electrons, and therefore must differ from the type of particle associated with electrons.

• Science News Letter, 82:22 July 14, 1962

MEDICINE

Deformed Babies Born As Result of Sedative

➤ SOME 800 deformed babies are expected to be born in the United Kingdom as a result of their mothers taking a dangerous sleeping pill during early pregnancy.

The drug, thalidomide, was previously reported in West Germany as causing some 400 abnormal births. It has now been withdrawn from the market. (See SNL 81:360, 1962)

Two Birmingham, England, investigators, Drs. Ian Leck and E. L. M. Millar, said that from the time thalidomide was put on the British market in April, 1958, till its ban in December, 1961, numerous deformities of limbs, absence of arms and legs or digits of the hands, webbed fingers and undersized ears had appeared in the offspring of mothers taking the drug. The end will not be seen till the second half of 1962 when all the babies have been born that might have been affected before the drug was banned.

Although stunted limbs are the usual result of taking thalidomide, dislocation of the hip, absence of kidney or gall bladder, abnormal liver and lungs are among other malformations that can occur.

A peculiarity of thalidomide effects is that children with normal limbs do not have internal defects. It is only those whose limbs are malformed or absent that show deformities of other organs. About half of the malformed infants will live with their deformities, requiring special care and training, researchers estimate.

Tests with rodents have shown that riboflavin or vitamin B-2 deficiency in pregnant rats and mice produces malformations resembling those of the human from thalidomide. The skeleton is more susceptible than internal organs to thalidomide, and rodents show similar results when they lack riboflavin.

They said that undersize of the external ear, or microtia, sometimes occurs in children with normal limbs, but most of those affected by thalidomide had stunted limbs. Three Birmingham babies born in 1961 showed this ear defect, but in 1957-1960 all ears were normal. The report of Drs. Leck and Millar appeared in the British Medical Journal July 7, 1962.

• Science News Letter, 82:22 July 14, 1962

ORNITHOLOGY

13 Bird Species Scarce, Government List Shows

➤ THIRTEEN SPECIES of American birds may be doomed to extinction, according to a new list presented by a Government scientist.

The popular whooping crane, the California condor and the American ivory-billed woodpecker head the list of well-known bird species endangered in the United States alone, Dr. John W. Aldrich of the U.S. Fish and Wildlife Service warned. The Florida Everglade kite has been reduced to only six individuals and three species of Hawaiian birds are all but gone.

Most of the threatened species are large and beautiful birds, he pointed out, including three species of geese and two of ducks. There are only a few hundred individuals of the most abundant of these species, and in several of the species, the number that remain is fewer than 50.

Wildlife and conservation groups and agencies are combining forces to stop the decreases in the remaining populations, but natural predators are, in many cases, adding to the plight of these rare birds, Dr. Aldrich added.

At least 27 other species and sub-species of birds (13 alone from the Hawaiian forests) could easily become endangered if present land use trends continue, he said.

The trumpeter swan, Hudsonian godwit and Eastern turkey are no longer considered endangered because of protection and changes in environmental conditions.

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