

PHYSICS

New Nuclear Particles

Two nuclear particles, yet undiscovered, are described by Dr. Teller. They would be neutral in charge and possess the properties of energy and momentum.

► TWO NEW NUCLEAR PARTICLES and some other ideas about nuclear forces were proposed by Dr. Edward Teller, professor of physics at the University of California, in a lecture at New York University.

The two particles, as yet unnamed and undiscovered, would be neutral in charge and have only the properties of energy and momentum, Dr. Teller predicted.

The scientist said the number of nuclear particles keeps growing and that probably not all of them have been found.

"We probably see only those which because of their relatively greater stability will show up with particular clarity in our experiments," Dr. Teller said.

With only presently known particles, it is difficult to explain nuclear forces satisfactorily, the scientist continued. All of the known particles have some complicated characteristics that do not correspond to the relatively simple behavior of the nuclear forces giving birth to those particles. Nuclear forces are different from any others known, operate over the shortest distances and have the shortest range.

In an effort to overcome some of the difficulties, Dr. Teller and his colleagues have proposed two particles that may be close to the simplest form of radiation. There is no direct evidence for such particles. They are theoretical conceptions based on indirect evidence. In the past other particles, for example, the neutrino, have been proposed on a similar basis. Experiments may demonstrate whether the two particles exist.

The two particles would have such short lives they could not be detected by present methods. They would be neutral in charge. The masses of the particles are undetermined, but they probably would be somewhat heavier than pi mesons and not heavier than K mesons.

The particles would have only the properties of energy and momentum—the minimum characteristics that particles with the properties of light can have.

They would not have the usual particle properties of charge and spin, which are associated with the difficulties found in other particles that are not found in nuclear forces alone.

Dr. Teller proposed some interesting consequences of a nuclear world inhabited by such particles:

1. Neutrons and protons move within nuclei as though they had only half the mass they have in the free state. The changed mass would give a better explanation of nuclear properties.

2. It is possible to propose that pi mesons may be combinations of protons and neutrons and antiprotons and antineutrons. The relatively smaller mass of the pi meson compared to the combined masses of the two particles would result from the surrender of mass to provide enormous binding energy for the complex particle.

3. It is possible more easily to explain why antiprotons have an exceedingly strong attraction for nuclear matter and why the interaction between antiprotons and protons is greater still than the attraction between protons and neutrons.

4. The particles permit a new set of ideas that propose a more satisfactory representation of the distribution of electric charges and currents found in the neighborhood of protons and neutrons.

"The foundation for the new kind of particles which we introduce is indirect and furthermore it is obvious that they are not capable of explaining all observations in high energy physics," Dr. Teller said. "They do, however, introduce greater simplicity in some of the observed phenomena."

Science News Letter, March 30, 1957

● RADIO

Saturday, April 6, 1957, 1:45-2:00 p.m., EST "Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Genevieve Stearns, research professor, School of Medicine, State University of Iowa, Iowa City, will discuss "Food for Healthy Children."

VETERINARY MEDICINE

Make Anesthetic Device For Dogs and Cats

► DOGS AND CATS can have the same precision oxygen therapy for surgery and emergency treatment that humans receive, thanks to a device developed for veterinary clinics.

The unit automatically adjusts itself to the lung capacity of a tiny kitten or a large St. Bernard. It will deliver any desired mixture of oxygen and ether during anesthesia, the flow being controlled by a dial. If necessary, the device can be shifted to provide 100% oxygen.

Medical engineers of National Cylinder Gas Co. of Chicago devised the unit to take the guesswork out of small-animal anesthesia.

They said that family pets whose lives might be lost in shock by conventional treatment, administration of barbiturates, have a much better chance of pulling through chest and intestinal system surgery when the device is used.

Science News Letter, March 30, 1957



ANESTHETIC DEVICE—A dog's life has a better chance of being saved, in surgery or accident, with the resuscitator-anesthetizer perfected by medical engineers of National Cylinder Gas Company. With it, small animals can have the same precisely controlled respiration given humans.