of inch-thick, two-layer cotton fabric coated with a low-temperature Neoprene compound that will withstand extreme cold. The dead-air space between the two layers provides the insulation.

Science News Letter, November 12, 1949

NUCLEAR PHYSICS

Meson Predictor Nobelist

➤ THE 1949 Nobel Prize winner in physics, Dr. Hideki Yukawa, predicts that there may be many more elementary particles similar to the meson which he won fame by predicting. The Japanese physicist predicted an elementary particle 200 to 400 times as heavy as the electron in 1934, three years before it was found in experiments with cosmic rays.

Dr. Yukawa also predicts that these heavier "tau mesons" will be 800 to 1000 times as heavy as the electron, but will be extremely hard to detect experimentally because they live only one one-hundred-billionth of a second.

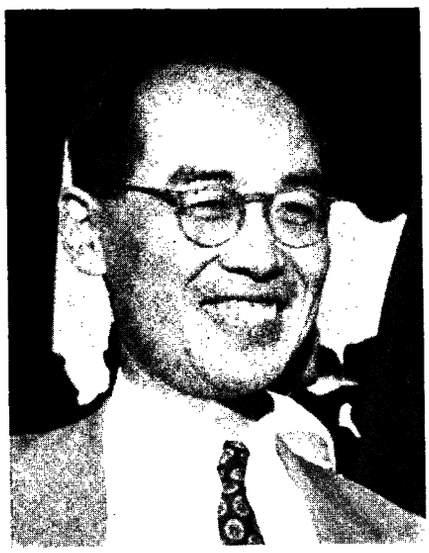
The original meson was predicted in 1934 as a means of explaining the attraction between protons and neutrons in the nucleus of atoms. When the predicted particle, with a mass 285 times the mass of the electron, was discovered in 1937, one of the names suggested for it was "yukon" in honor of Dr. Yukawa. "Meson", the name finally selected, was chosen because the particle is medium weight, heavier than the electron but lighter than the proton.

It was early suspected that the meson was more than one particle, and this suspicion was confirmed in 1947 by the discovery in cosmic rays of a slightly heavier meson 315 times heavier than the electron. It was called the pi meson. Pi mesons act as the binding force in the nucleus, as Dr. Yukawa originally predicted, and they decay into the lighter mu mesons, which were discovered in cosmic rays earlier, in 1937.

Pi and mu mesons have either positive or negative charges. There is also evidence for a neutral meson with a mass close to that of the pi meson.

At the present time, this extremely active branch of theoretical physics suffers from too many possible mesons. All may be predicted from different variations of the theory which Dr. Yukawa helped to develop, but physicists cannot yet say which theory is the right one. It will be very difficult to find the whole family of these elusive particles by experiments alone because most of the heavier mesons, if they do exist, must decay too quickly to be observed by any of the methods now in use.

Science News Letter, November 12, 1949

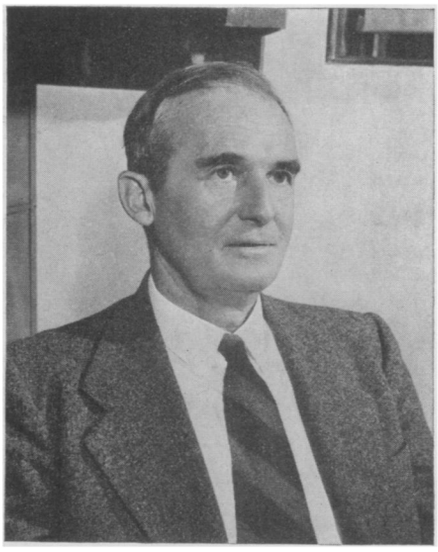


DR. HIDEKI YUKAWA

CHEMISTRY-PHYSICS

Low Temperature Study

➤ THE lowest temperatures ever reached by man, less than one one-hundreth of a degree above absolute zero, corresponding to 459.6 below zero on the Fahrenheit scale, are due to the researches for which Dr. William F. Giauque of the University of California won the 1949 Nobel prize for chemistry.



DR. WILLIAM F. GIAUQUE

One of the world's pioneers in low temperature research, Dr. Giauque proposed over 20 years ago the method of cooling below the temperature of liquid helium that uses what is known as the "adiabatic demagnetization of paramagnetic salts."

Dr. Giauque is planning a laboratory at the University of California which will contain the most powerful magnet in the world. For extending his low temperature researches, under the sponsorship of the Atomic Energy Commission and the Office of Naval Research, he hopes to build a one-hundred thousand gauss magnet. A gauss is a unit of magnetic attraction.

Before the award of the Nobel prize to Dr. Giauque, the University of California had earmarked half a million dollars for construction of the building in which the low temperature laboratory will be housed.

The most powerful magnet now in existence is a 40,000 gauss magnet at Leiden, in Holland. It was there that the first low temperature experiments were conducted about 40 years ago, including a test during which an electrical current was made to flow unimpeded for hours.

This persistent current experiment—a sort of "perpetual motion"—has also been startlingly demonstrated by R. B. Scott at the National Bureau of Standards. Cooling a lead saucer to about four degrees above absolute zero, a bar magnet is brought close to the saucer. This sets up an electric current in the lead which resists the further movement of the bar magnet toward the saucer. The magnet then floats above the saucer, literally suspended by nothing, like the legendary Mohammed's coffin.

So far no practical application of this achievement has been developed, but it is considered of great interest in understanding the properties of matter at very low temperatures. Some engineers have visualized transmission of electrical power with little loss over wires if they could be cooled down to the very low superconducting temperatures, which are far below ordinary frigid temperatures.

Science News Letter, November 12, 1949

CHEMISTRY

$25,000 Prize Announced For New Facts on Sugar

➤ ONE of the largest prizes of the scientific world, $25,000, will be awarded again next year in recognition of new knowledge about sugar or other carbohydrates, Dr. Harlow Shapley, chairman of the National Science Fund of the National Academy of Sciences in Washington, has announced.

The 1950 grand prize of the Sugar Research Foundation Inc., will be open for entries until Feb. 1. Scientific studies of sugar in living processes, as a food and as industrial raw materials, are being stimulated by the award. Four previous prizes annually have been given.

Science News Letter, November 12, 1949