

PHYSICS

Heavy Electrons Originate High in Upper Atmosphere

Flight Into Sub-Stratosphere Enables Scientists To Study Penetrating Components of Cosmic Rays

DATA gathered by two University of Chicago scientists in an airplane flight into the substratosphere indicate that the mysterious heavy-electron cosmic rays originate in the upper atmosphere of the earth.

This was the first time such measurements were made in an airplane at high altitude. This flight, on July 30, bids fair to make scientific history.

One of science's newest subatomic building blocks, the heavy electron, identified as the penetrating part of the cosmic ray, originates through the impact of photons on the cores of atoms high in the atmosphere, Dr. Marcel Schein of the University told Science Service.

Not Much Doubt

Although Dr. Schein and his colleague, Dr. Volney C. Wilson, are, in keeping with the best scientific practice, not completely certain that this is so, evidence they gathered in a giant transport plane 25,000 feet over Chicago is so strong as to leave not much room for doubt, he declared.

A report on their experiment, in which they carried cosmic ray recording equipment aloft and during which they spent at least 90 minutes at an altitude of 25,000 feet, appears in the *Physical Review* (Aug. 15).

Four Geiger-Mueller counters and a sheet of lead 2.2 centimeters thick gave the evidence for which the two scientists were looking.

Cosmic rays include both a penetrating, ionizing component and a "soft" component. The University of Chicago scientists wished to check on the occurrence of the penetrating rays in the upper atmosphere, feeling that such a check might give them a clue to their formation. It did.

Setting their four Geiger-Mueller tubes in such a position that penetrating rays coming vertically downward through all four were the only ones that registered, Dr. Schein and Dr. Wilson placed the sheet of lead so that it gave them a direct clue.

When the lead was placed above all four tubes the number of penetrating rays recorded during a three-minute interval at 25,000 feet was more than twice the number recorded under similar conditions when the lead was placed between the second and third tubes. This indicated, Dr. Schein explained, that heavy electrons were being formed in the lead itself, probably through the impact of photons on lead atom nuclei.

This indicates the impact origin of the heavy electron and, since similar occurrences must be taking place in the air, tells the story that heavy electrons are being formed in the atmosphere.

Increasing rarity of the atmosphere, plus the fact that the proportion of these heavy electrons is less as the altitude rises, indicates further that an altitude of maximum heavy electron formation should exist, Dr. Schein also stated.

Hoping to find that maximum, Dr. Schein is already investigating the possibility of further stratosphere flights. Such tests in planes have the advantage

over those made in unmanned balloons that more equipment plus such items as the lead plates used in this experiment can be carried, whereas the equipment for unmanned balloons must be made as light as possible.

Science News Letter, August 27, 1938

ARCHAEOLOGY

"Houses of Dead" Possible Link With Moundbuilders

SKULLS of eight Indians with curiously arched foreheads have been unearthed in ancient "houses of the dead" near Kansas City by Dr. Waldo R. Wedel of the Smithsonian Institution.

Dr. Wedel says he found the extraordinary skulls, with natural bony ridge from front to back of the head, while he was unearthing low mounds just over the Missouri line. The mounds, less than three feet high, contain partly sunken stone burial chambers. Known as houses of the dead, the mounds have been locally famed for many years, and have been so looted by pothunters that the Smithsonian archaeologist has found few which he could investigate to reconstruct the history of the ridge-headed people.

Scientific interest is aroused in these extraordinary looking Indians because they are believed to be a western link in the story of famous Hopewell Indian Moundbuilders who attained high culture in the Ohio Valley.

Science News Letter, August 27, 1938



PILOT'S NIGHTMARE

Only in the movies or in a pilot's worst dreams could a plane ice up like this one. Tests in the "ice box" wind tunnel at Akron, Ohio, produce severe icing conditions beyond anything experienced in actual flying, so that scientists can test the efficiency of de-icing equipment under all imaginable conditions.