

PHYSICS

Cosmic Tortoise-Hare Race Origin of "Hard" Rays

A COSMIC "tortoise and hare" race in inter-galactic space is suggested as the origin of the piercing "hard" cosmic radiation which comes down through the earth's atmosphere to strike every person on earth.

In a report to the American Geophysical Union, Dr. Thomas H. Johnson of the Bartol Research Foundation of the Franklin Institute described the tortoise-hare race.

The scientist's picture, simply, is that in the universe there is a source of cosmic rays which is emitting high-speed electrons in a fashion somewhat comparable to the emission of electrons from a vacuum tube filament in a radio set.

These electrons, carrying a negative electrical charge, leave the source of cosmic rays charged positively. The more electrons go off the more the source becomes positive.

There is a dual effect of the positive charge: It acts as a brake on the fast electrons and eventually slows them down, and, at the same time, it speeds up any positively charged ions floating in inter-galactic space. These ions may be protons (the ions of hydrogen atoms) or ions of even heavier elements. Positive electrons, too, would be accelerated.

Thus, as the race goes on, the massive ions (the slow tortoises) start to speed up and the swift hares (the electrons) start to slow down.

At some point, far out from the source of the cosmic rays, the speeds of the

electrons and the speeds of heavier ions will be equal. At this point, however, the energy possessed by the heavy ions will be nearly two thousand times as great as the energies of the electrons.

Cosmic ray studies near the top of the atmosphere with radio sounding balloons disclose that the soft component of cosmic rays—which never are detectable on earth—are formed by charged particles about equal in number. These, it is pictured, are the "weakened" electrons and positrons striking the atmosphere.

The hard component of cosmic rays, however, apparently is formed by highly energetic positively charged particles. It is the hydrogen ions—or even more massive charged atoms—which Dr. Johnson believes causes the hard component of cosmic rays found on earth.

These "hard" rays are now known to be the mesotrons, particles having a mass intermediate between protons and electrons. That mesotrons are formed in the top of the atmosphere by impacts with primary rays from the outside is known, Dr. Johnson said, because the mesotrons are particles whose half life is only about one two-millionth of a second.

Traveling at nearly the speed of light, they have time to get down through the earth's atmosphere but their short life makes it virtually impossible for them to originate at any distance outside the earth's belt of air.

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AERONAUTICS

"Alphabet-Number Soup" For Army and Navy Planes

"OH, THAT BT-9's a mean one. It'll turn around and bite its tail in a minute."

"It's easier than messing around with a P-36, I say. But I like a real comfortable job, a B-17, for instance, or even a C-39. Best of all is the Navy's PBV."

Newspaper readers will be seeing this "alphabet-number soup" more and more frequently during the next few months

as the New Deal's air armament program gets under way, and hear it more often, too, as young men become involved in a program to make a nation air-conscious.

It's the airplane naming system of the Army and Navy in action, a form of government abbreviation that was here long before the New Deal began making initials popular.

Letters refer to a warplane's type and numerals to a particular model, the U. S. Army Air Corps explains. The Navy system is generally similar. The higher a number, in general, the more up-to-date the model is, although every now and then one comes along just to cross up the innocent layman. They've even got letters to show whether a plane is experimental, on service test, has finally won a place as a full-fledged weapon, or even whether it is modified from a standard type.

All bombers are designated "B." The "flying fortress," pride of the Air Corps, is the B-17. But when the Boeing Aircraft Company fitted it with special superchargers to permit high altitude operation, it became the YB-17A. The "Y" tells the cognoscenti it is on service test, the A that it is slightly different from the standard "flying fortress."

The B-15 is the "super flying fortress," half again as large as the Army's most famous airplane. Standard Air Corps equipment is the B-18, twin-engined bomber by Douglas.

Pursuit ship designations begin with "P." The P-26, a Boeing product, is now on its way out of service. It is being replaced with P-35s, built by Seversky; P-36s, Curtiss jobs with radial engines; and P-37s, similar to the P-36s, except for in-line engines. Deep and dark secrets are two later pursuit ships bearing the experimental designation "X"—the XP-38, a twin-engined fighter which streaked across the United States a few weeks ago at 400 miles an hour, and the XP-40, a single-engined affair. The BT-9 is a basic trainer for embryo pilots, as is the "BC-1," the basic combat ship.

Attack planes are the "A" class. Standard type now is the Northrop A-17; a modified version has been ordered and will probably be known as the YA-17A until it has been proved, after which it will become the A-17A. The YA-18 is a new twin-engined type by Curtiss. The observation plane in widest use is the O-47. Cargo planes, for ferrying personnel and supplies from one Army field to another, are principally the C-33, really a Douglas DC-2 14-passenger airliner without the upholstery; and the C-39, a DC-3. An experimental stratosphere plane is the XC-35. The "X" shows the Army isn't through fiddling with it yet.

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The bulk of the wildlife population in the United States is on farms, says an officer of the American Forestry Association.