

PHYSICS

New Theory on Cosmic Ray Origin Offered by Physicists

American and Chinese Scientists Suggest Possibility Of Terrific Explosion, Following Lemaitre's Hint

A NOBEL Prize winner in physics and a Chinese scientist joined forces, through the printed word, this week to tell the world of a new hypothesis on the origin of the cosmic ray. The men are Prof. Arthur H. Compton, University of Chicago, and Dr. P. Y. Chou, physicist at National Tsing Hua University, Peiping, China. Their medium of expression was the highly technical journal of the American Physical Society, *The Physical Review*.

In the present stage of cosmic ray knowledge, say Prof. Compton and Dr. Chou, there is no known act of nature—even the annihilation of the atomic nucleus—which can provide sufficient energy to fit the observed energies of some of the cosmic rays.

The only possibility, they feel, is the primeval explosion that sent worlds and galaxies literally rocking and reeling into space.

Particles and Photons

Every kind of particle and the packets of energy known as photons would be the debris of such a staggering catastrophe, they admit. To account for the known preponderance of electrically charged particles, they suggest that the non-charged photons and neutrons have been lost in space because they could penetrate the magnetic field of stars and galaxies. But these same magnetic fields might trap the charged particles and so produce the observed particle component of the cosmic rays.

The scientists acknowledge the expanding universe theory of Abbé LeMaitre, the Belgian scientist-priest, as the inspiration for this newest cosmic ray origin hypothesis. The Compton-Chou report is the first one in considerable time which has tackled the origin of the cosmic ray. For some years scientists have been content to study and obtain more and more experimental data, leaving the fitting together of the pieces to a later time.

Discussing the high energy of cosmic rays and their apparent origin somewhere out in space, the scientists said, "If the cosmic rays come from beyond

the Milky Way, at a really typical place in intergalactic space the density of cosmic-ray energy would be of the order of 100 times as great as that of starlight. It is thus apparent that either the source of the rays must be a radiator which is very powerful compared with stars as a source of light, or the cosmic rays once emitted must be retained by the metagalactic system instead of being lost as is starlight.

"Although nuclear processes occurring in interstellar space might result in an adequate total energy," they add, "it ap-

PSYCHOLOGY

Oxygen Face Tent For Pilots Advocated as Safety Measure

AN OXYGEN face tent for airplane pilots, worn at high altitudes, will make flying much safer for the public, Dr. Alvan L. Barach, Columbia University College of Physicians and Surgeons, stated in a report to the American Medical Association.

Pilot error is considered a primary cause of 16 out of 27 recent airplane accidents, according to the U. S. Department of Commerce.

That oxygen want is a frequent factor in pilot error is the opinion expressed by Dr. Barach. (*Journal, American Medical Association*, May 29).

He recommends that commercial airplane companies adopt compulsory oxygen inhalation for pilots navigating at from 10,000 to 12,000 feet or over.

The oxygen face tent, which this physician recommends for use by pilots, was originally developed for the treatment of anoxemia—deficiency in the oxygen content of the blood—in clinical medicine.

Oxygen want, says Dr. Barach, is capable of producing mental impairment and certain bodily changes at altitudes at which transcontinental flying now takes place.

These changes include poorer vision,

hand tremors, fatigue and reduced control of other nervous and muscular processes.

Most important—and most disastrous—of these is impairment of vision. The importance of good sight in finding a landing place is obvious.

Existing eye defects become exaggerated and unsuspected eye defects are unmasked when tests are made at high altitudes. The general visual field is found to darken.

The fact that a pilot has once been able to fly at 20,000 feet without conspicuous symptoms of oxygen want does not mean that he is a safe flyer without oxygen at 10,000 feet, Dr. Barach contends.

An aviator may be exposed to a reduced oxygen pressure at a certain period in a flight and the effects may not manifest themselves until three or four hours later when he is traveling at low altitudes.

The Columbia physician thinks that oxygen inhalation will protect flyers from premature loss of usefulness, as many men who do high flying find their "ceiling" getting progressively lower so that they cannot tolerate even such moderate altitudes as 10,000 feet.

Science News Letter, June 26, 1937

Science News Letter, June 26, 1937