

PHYSICS

Scientists Reach Agreement On Cosmic Ray Problems

Physicists Concur in Opinion That Radiation Consists Of Both Light Photons and High Speed Particles

THE MUCH publicized cosmic rays, ever bombarding the earth, and causes of many a scientific difference of opinion, are passing from the debatable stage to one of agreement among the various investigators in the field.

At the meeting of the American Philosophical Society just concluded at Philadelphia, the three foremost American scientists working on cosmic rays presented reports which show agreement on most of the experimental findings. Dr. Robert A. Millikan, Nobel Laureate from California Institute of Technology, Dr. Arthur H. Compton, also Nobel Prize winner, from the University of Chicago, and Dr. W. F. G. Swann, director of the Bartol Research Foundation of the Franklin Institute of Philadelphia, all agree that much of the incoming cosmic radiation consists of electrified particles.

They differ, however, in the exact percentage of corpuscular rays among the incoming primary radiation. Dr. Millikan says from 15 to 20 per cent. may be so classified; Dr. Compton reported that all but a fraction of one per cent. are corpuscular; while Dr. Swann adheres to the intermediate ground with an estimate of at least 31 per cent.

All three men agree on the difficulty of detecting the original primary radiation and agree, too, that what affects the measuring instruments are secondary rays predominantly, created by the shattering of air atoms and molecules as the primaries strike them.

The situation is much more difficult to observe than it would be to take observations on a flying shell by measuring the range of bricks knocked out of a building which the shell might hit.

Key to the whole mystery, of whether the rays are completely corpuscular or if they are a mixture of particles plus the light packets known as photons, may reside in the nature of the way these two different and distinct types of rays will act on atoms.

As Dr. Swann expresses the situation: "Cosmic rays, if photons, would liberate energy along their path like bullets going

through a forest, occasionally hitting a tree, and giving up almost all their energy in one burst at impact. If the rays are particles, however, they will act like bullets going through cheese and would give up their energy gradually and in small amounts all along their path."

These two types of energy transfer yield different curves as the rays are absorbed in the earth's atmosphere. All three scientists agree that Dr. Millikan's theory of the photon nature of the rays would produce such a known curve most simply. And yet there is the conceded fact that many of the rays are particles.

Taking the conservative stand, Dr. Millikan feels that until proved otherwise photons must still be regarded as present in the incoming primary cosmic radiation. Dr. Compton goes the whole way and says the initial rays are all particle in nature and even gives the kind they are: alpha particles—cores of helium atoms—, electrons, and protons—the cores of hydrogen atoms. Dr. Swann is working to provide some explanation of hom cosmic rays, all particle in nature, can yield experimental curves like those observed and more easily explained by photons. At the recent meeting he presented such a hypothesis. The explanation of cosmic rays seems nearer a solution than ever before. Another year may solve the mystery.

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MEDICINE

Huge Blood Transfusions Now Given for Anemia

BLOOD transfusions which break the world's record both for amount of blood given to the patients and the length of time consumed in the process are reported by Drs. H. L. Marriott and A. Kekwick of Middlesex Hospital, London.

A total of over fifteen gallons of citrated blood was given by these physicians to seventeen patients. The customary amount for a single transfusion is a

little over a pint of blood. One of the patients in the group at Middlesex Hospital received over five quarts of blood collected from ten donors plus almost a quart of citrate solution, used to keep the blood from clotting. The smallest amount given in one transfusion was over two quarts of blood plus about a pint of citrate solution.

The blood was allowed to run into the patient's vein very slowly, a drop at a time, by what physicians term the continuous drip method. The total time for all seventeen transfusions was 537½ hours, which aggregates more than 26 days.

The transfusions proceeded without a technical hitch, the Middlesex physicians state. (*Lancet*)

The enormous quantities of blood used were obtained from one hundred donors, mostly friends and relatives of the patients. The donors were bled in pairs at 8 a. m. and 8 p. m. The amounts taken from each varied from about half a pint to nearly a quart of blood.

The method is essentially one of slow, controlled transfusions lasting from many hours to several days and is designed for use in cases of anemia resulting from prolonged illness or from large losses of blood following surgical operations.

Science News Letter, May 4, 1935

PSYCHOLOGY

East Less Emotional Than West In Trying Situation

PSYCHOLOGISTS have at last tested the proverbial calmness of Orientals—and found it the real thing.

Stolid Orientals not only appear calmer than Americans, they are really less emotional within, results of a test reported to the National Academy of Sciences indicate. Japanese in the test proved no less calm than Chinese, to the surprise of the experimenting psychologists, Dr. George M. Stratton and Franklin M. Henry, of the University of California.

Dropping a hammer close to outstretched fingers, in place of William Tell's famous stunt of shooting an apple off a head, is the ingenious test devised by these psychologists for probing a racial difference. For subjects they used volunteer men students, 50 of whom were Caucasian and 100 Orientals, about evenly divided as Japanese and Chinese.

Familiar as the mechanical drop of the huge wooden hammer became, Dr. Stratton declared that, for himself, the loud sudden bang always caused him