

# Cosmic Rays Signal Matter's Creation

Physics

Somewhere out in the reaches of the stellar universe, chemical elements, like oxygen, silicon, and iron, common here on earth, and helium, abundant in the heavens, are being made. First evidences of the wholesale continuous creation of matter were presented by Dr. Robert Andrews Millikan, Nobel prize winner and California physicist, in a leading address to the National Academy of Sciences meeting at Washington. Cosmic rays, oscillating a hundred times more rapidly than the most powerful rays hitherto known, are given off when the matter is formed and they brought the news to earth to be detected by Dr. Millikan and his associate, Dr. G. Harvey Cameron. The stuff out of which these elements are made are primordial electrons, the positive ones which are the nuclei or hearts of the simplest of the elements, hydrogen, and the negative ones which are the essence of electricity.

This startling discovery of the creation of matter long desired in the theoretical thinking of physicists, arose from the discovery last fall that the cosmic ray spectrum is not continuous, like the visible light, but banded. The highest frequency or shortest wavelength band has so enormous a penetrating power that it passes through 200 feet of water or 18 feet of lead before being absorbed. Dr. Millikan and his fellow physicists sent balloons miles high in the air, probed the depths of mountain lakes and climbed the Andes while discovering the properties of the strange and powerful



DR. R. A. MILLIKAN, Nobel Prize winner, Director of the Norman Bridge Laboratory of the California Institute of Technology, Pasadena, who told the members of the National Academy of Sciences of his newly developed proofs of the continual creation of matter in outer space

radiation from outer space.

Using Einstein's special theory of relativity, which Dr. Millikan declared never "thus far shown to be incorrect," the physicists showed that there are no possible atomic transformation capable of yielding the cosmic rays except the actual building up or creation of the abundant elements, helium, oxygen, silicon and iron out of hydrogen, or silicon and iron out of helium. The actual

frequencies of the three bands in the cosmic ray spectrum were found to correspond closely with those determined theoretically. Moreover since these elements are the most plentiful in the universe and the other rarer elements are created much less frequently and vigorously, there is reason to believe that nearly the whole elemental story of universal creation is told in the cosmic rays.

The secret of the powerful cosmic rays is contained in the loss of a minute amount of the mass of hydrogen atom when it combines with other hydrogen atoms to form the heavier elements. Eight thousandths of its mass goes off in the form of cosmic rays. Similarly when other elements are built a small fraction of their weight is transmuted into radiant energy and is shot out into the universe. The cosmic rays are signals of the continual rebirth of the universe.

At the same session of the National Academy, Dr. I. S. Bowen, one of Dr. Millikan's associates at the California Institute of Technology, relieved scientists of the necessity of looking for a hypothetical element, nebium, attributed to the nebulae or star clouds of the heavens because of presence of qualities in their light that could not be blamed upon any known elements. He announced that oxygen and nitrogen in these far parts of the universe act differently than they do on earth and can produce the effects attributed to nebium.

Science News-Letter, April 28, 1928

## Dr. Millikan's Own Statement

Physics

The formal scientific publication of Dr. Millikan's latest conclusions as to the origin of cosmic rays has not yet been made in a technical scientific journal, but Dr. Millikan has prepared for Science Service the following statement of his work which was done jointly with Dr. G. Harvey Cameron.

The evidence that the more stable and more abundant elements like helium (abundant in the heavens), oxygen, silicon and iron, are being formed at the present time out of the primordial positive and negative electrons, the former of which is the nucleus of the hydrogen atom, may be briefly summarized as follows:

First, the pilot balloon experiments of Millikan and Bowen, in which

they sent up recording electroscopes .92 of the way to the top of the atmosphere, and in which the absorption coefficient of the cosmic rays at or near the top of the atmosphere come out of the same order of magnitude as that found near sea-level, show conclusively that these rays consist of a definite and distinct region of spectral frequencies, or oscillations, a hundred times more rapid than those produced by the most powerful subatomic changes heretofore known, namely those accompanying radioactive changes.

Second. The experiments of Milli-

kan and Cameron of the last summer and fall made in deep, high-altitude California lakes, with new electroscopes ten times more sensitive than those the authors had theretofore used, brought to light the definite proof that the cosmic ray spectrum consists of definite bands like those of neon or mercury lamps containing spectral lines as much as three octaves apart. The highest frequency band having so enormous a penetrating power that it passes through as much as 200 feet of water (equivalent to 18 feet of lead) before becoming completely absorbed. This (*Turn to next page*)