COSMOGONY

Super-Radium Supplied Energy For Rapid Cosmic Evolution

Its Wasted Fragments Now Our Most Potent Radioactive Elements; Its Wandering Rays Part of Cosmic Radiation

SUPER-RADIUM, a hypothetical element or group of elements resembling radium but with vastly greater energy content, whose wasted fragments are now our most potent radioactive elements and whose wandering rays, at large in the universe for ten thousand million years, are the much-discussed cosmic rays, formed part of the picture of the world "in the beginning" as delineated by the noted young Belgian physicist, the Abbé G. Lemaitre of the University of Louvain, in an address at the Johns Hopkins University.

Might Explain Discrepancies

Such a hypothetic element might help explain the present discrepancies between the apparent age of the earth as calculated by the newer school of mathematical physics and the seemingly much greater age demanded by modern astronomy. The universe seems to be rushing apart with almost incredible yet constantly increasing speed, the Abbé Lemaitre said. The most distant nebulae we can see are apparently receding at a velocity one-fifteenth that of light, or twelve thousand miles a second; nearer nebulae are running away at lesser rates. Mathematical considerations based on these phenomena by such modern physicists as Prof. Einstein, Dr. Willem de Sitter of Holland, and the Abbé Lemaitre himself lead to the conclusion that this cosmic dispersal has been going on for about two thousand million years.

Astronomers Not Satisfied

But two thousand million years is not enough time to satisfy the astronomers. This little pebble of an earth which we ourselves inhabit is at least that old, if calculations based on the rate of radioactive radiation from ancient rocks are to be trusted. The stars must surely be much more ancient than the planets that attend them.

As a way out of this dilemma, the Abbé Lemaitre suggested that the evolution of the universe went on at a much faster rate in the days of its flaming youth, and that the energy with which it was then literally bursting may have come from radioactive elements much more massive and much more active than radium itself.

Projecting the story of his ever-expanding universe back into the past, like a motion picture film run backwards, the Abbé Lemaitre visioned a beginning-point when neither time nor space existed—when the whole universe as we partly know it today, spread across the diameter of millions of light-years, was all potentially contained in a single atom: a thing of no dimension, as we measure space, but massive enough and containing energy enough to furnish forth the uncountable billions of suns that since that movement have been rushing apart to the uttermost bounds of the cosmos. In a paper before the American Physical Society meeting at the University of Chicago, Prof. Lemaitre tied in his theory of a "superatomic" origin of the universe with recently observed facts about cosmic rays. Using the idea that cosmic rays are affected by the magnetism of the earth, just as electrons from the sun cause the aurora in in polar regions where magnetism is strong, Prof. Lemaitre has evolved a mathematical theory that shows that electrons of ten thousand million volts cannot reach the earth's surface at the equator. The great earth-magnet pulls the electrified particles into streams over the two ends of the earth. Prof. M. S. Vallarta of Massachusetts Institute of Technology collaborated in this theory with Prof. Lemaitre.

Science News Letter, December 3, 1932

EDUCATION-PHOTOGRAPHY

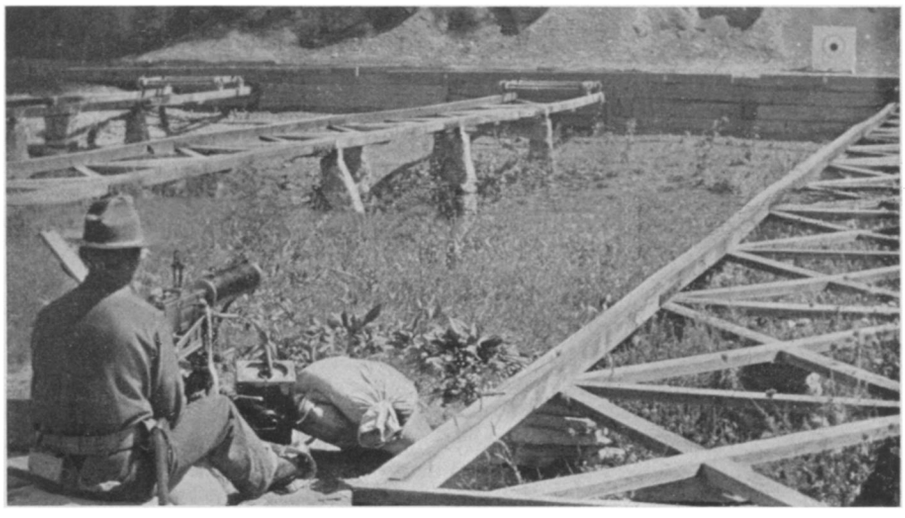
Talking Movies Become New Educational Tool

TWO ten-minute talking motion picture films, released by the University of Chicago, represent the entrance of the "talkies" into the university and high school classroom.

The films, called Oxidation and Reduction and The Molecular Theory of Matter, are said to provide in 20 minutes a presentation ordinarily requiring five or six hours in the classroom. They are dramatically illustrated with raging forest fires, burning oxyhydrogen blow torch and glowing coke oven. Apparatus found only in the best equipped universities is used and the voice of a master teacher explains the action of the experiments. Time-lapse and microscopic photography and animated drawings add to the effectiveness of the pictures.

Three other physical science subjects are now being "shot" as a part of a course of 20 films. Such courses are also planned for the biological and social sciences and the humanities.

Dr. Robert M. Hutchins, president



IN THE CLASSROOM

A machine gunner spatters a metal plate with bullets to explain the molecular theory of matter—striking illustration brought to the classroom with the new educational talkies.

of the University of Chicago, says: "We believe that talking films properly prepared and integrated with printed instructional material will contribute greatly to the effectiveness of our new general courses for freshmen and sophomores. . . . These films will be available to any high school, college, university or adult educational group in the country. . . ."

Erpi Picture Consultants, subsidiary of Western Electric Co., cooperated in the production of the pictures.

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CHEMISTRY

Neuton, Element Zero, May Gain Place in Periodic Table

Made up of Neutrons. a Thimbleful of it Would Weigh A Million Tons; But it Will Never be Thus Concentrated

WHEN the neutron was detected this year at the famous Cavendish Laboratory at Cambridge, England, it was not heralded as the discovery of a new chemical element.

Yet it can be so considered, and Dr. W. D. Harkins, the University of Chicago chemist, has suggested to the National Academy of Sciences that this remarkable new kind of matter should be recognized as a chemical element of atomic number zero and that it should be accorded a secure place in the list of chemical elements.

Just last year the last undiscovered two of the ninety-two chemical elements were discovered by the American chemist Allison and named after two American states, alabamine and virginium. Chemists thought that all possible elements had been found. But they had forgotten that there might be a building block of matter without electrical charge which nature uses in atom building and which might be considered an element itself.

Twelve years ago Dr. Harkins and Lord Rutherford, working independently, suggested the existence of the neutron and predicted its properties. Just as the neutron was experimentally detected in the rays from the element beryllium, so the theoretical existence of the neutron came out of the same element. Then as now, all the other atoms were considered to be made up out of combinations of hydrogen atoms and helium atoms. This idea gave an atomic weight of eight for beryllium whereas at that time only beryllium of atomic weight nine was known. Incidentally, since then beryllium eight has been discovered. So it was necessary to assume that each beryllium atom of the nine weight then known contained a neutron in its nucleus or heart.

The neutron is a close combination of electron and proton, the negative and positive units of matter, which is electrically neutral. It differs little from a hydrogen atom in mass. But hydrogen has a unit electrical charge upon its atom and its electron and proton do not make such a closely wedded pair as they do in the neutron.

Neuton is the new name suggested by Dr. Harkins for the new kind of matter which is made up of minute atoms called neutrons. He obtained chemical element zero's name by making its name end in "on" in conformity with the practice used in naming neon, argon, and the other inert gases of low atomic number. Undoubtedly, there will be confusion between neutron, the atom, and neuton, the element, until both words become more a part of the language.

Element zero or neuton is a strange substance which the chemists can never hope to isolate as they do the other elements. As neutrons are very much smaller than any atoms known previously, a lady's thimble tightly packed with neuton would weigh a million tons.

But the new element could not be kept in such a space since it easily passes through any known material. It streaks through the walls of any known container.

Neuton is always leaving earth faster than other elements and it escapes more easily. Dr. Harkins concludes that most of the neuton in the universe is almost certainly in the space outside the planets, sun and stars, although it is concentrated in such bodies by the weak force of gravitation.

Science News Letter, December 3, 1932

AVIATION

Parachutes Useless At Bolivian Altitudes

WHEN you decide to make a descent in a parachute, do not come down in Bolivia.

This advice is gathered from a report of Lieut. A. Y. Smith of the U. S. Army Air Corps. Lieutenant Smith, who recently returned from South America, stated that the Bolivian Air Force does not include the parachute as an item of equipment for its fliers and that many aviators who have attempted to use parachutes in this South American country suffered broken legs and other injuries.

The obvious reason is the high altitude of the greater part of Bolivia. La Paz, the capital of the country, at an altitude of 13,000 feet, is considered the highest capital in the world. Numbers of good landing fields are at elevations of about 12,000 feet. At such heights, which are common near the West Coast of South America, the atmosphere is so rare that a parachute descends dangerously fast.

Landing speeds for planes are unusually high, between 60 and 80 miles per hour, and take-offs require a very long run. Lieutenant Smith said that some planes are equipped with oversized wings in attempts to overcome the high altitude handicap.

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GEOGRAPHY

Yale Expedition Maps Unknown Land in Asia

MORE THAN 4,600 square miles of hitherto unexplored country, high in the Himalayas more than 14,500 feet above sea level, have been mapped in detail by the Yale North India Expedition, is the report received by President James Rowland Angell of Yale from the expedition's director, Prof. Hellmut de Terra.

"The geological data amassed tend to prove that Himalaya and Karakorum, the world's highest mountain ranges, possess a geological structure similar to that which characterizes the Alps in Europe, a result which will ultimately lead to a better understanding of the origin of high mountain ranges," Prof. de Terra's report says. "Collections of invertebrate fossils from hitherto unexplored regions will throw new light on the geological history of Central Asia."

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