

## PHYSICS

## Cosmic Ray Energy Difficult to Measure

**D**IFFICULTY in measuring the energy of cosmic rays presents the greatest problem to the physicists studying them, Dr. R. A. Millikan declared in a discussion at Pasadena, Calif., following a summary of recent experiments presented by his colleague in the California Institute of Technology's cosmic ray research, Dr. H. Victor Neher.

Dr. Paul S. Epstein presented a very successful theory which pictured the cosmic rays as a stream of photons accompanied by several weaker groups of electrons. But the experimenters were warned against accepting theories until energy measurements of the rays became more complete.

Meanwhile, all the investigations indicate that photons predominate in cosmic rays but that some electrons also enter the earth's atmosphere.

A strong support for the photon idea was presented by Dr. Carl D. Anderson, who announced that he had produced positive electrons or positrons with photons from thorium. If photons are known to produce positrons and if no other method is known then the positrons which are found with cosmic rays were probably produced by photons.

Thus the point of view which has long been urged by Dr. Millikan is considered still the most plausible description of cosmic rays.

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## GENERAL SCIENCE

## Idealism Reigning, Says Jeans in New Book

**I**DEALISM, the view of nature that sees mechanical concepts continually giving place to mental, is reigning in the physical world of science, as interpreted by Sir James Jeans, the eminent British astronomer-physicist, in his latest book, *The New Background of Science* (Macmillan).

He describes recent progress in physical science "as resulting from a continuous emancipation from the purely human point of view."

It would be interesting to eavesdrop on a chat between Sir James Jeans and Sir Isaac Newton if time could be so distorted that such a meeting could take place. For it was Newton's *Principia* in which the mechanistic view of nature

was first put forth in perfect logical form and Sir James contrasts the beginning of the *Principia* written in 1687 with the beginning of Dirac's Quantum Mechanics, written in 1930, to show that mechanistic determinism is passé.

So the idealist or mentalist seems to be on the top of the intellectual heap these days, and the realist or materialist is distinctly out of favor.

Sir James in his book gives an extremely understandable review of the present situation in theoretical physics which has just undergone a succession of kaleidoscopic changes. Those who still insist on believing what they see, those raised in the materialistic world of one, two and three decades ago, will find it a road map to new conceptions.

What of the future? Sir James writes:

"Idealism has always maintained that, as the beginning of the road by which we explore nature is mental, the chances are that the end also will be mental. To this present-day science adds that, at the farthest point she has so far reached, much, and possibly all, that was not mental has disappeared, and nothing new has come in that is not mental. Yet who shall say what we may find awaiting us round the next corner?"

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## BIOPHYSICS

## One-Celled Animals Shine Under Ultraviolet Light

**U**LTRAVIOLET light causes one-celled animals to shine with a ghostly visible light, which changes its color according to the wavelength of the ultraviolet with which they are being rayed. Experiments bringing out these points are reported by A. C. Giese and Prof. P. A. Leighton of Stanford University in *Science*.

The light given off by various organic substances as well as by living cells and tissues when rayed with ultraviolet is known technically as fluorescence. It is not a reflection effect, but is due to the excitation of the molecules in the substances, causing them to shine with a light of their own.

Mr. Giese and Prof. Leighton discovered that the ability of their organisms to fluoresce did not necessarily cease at death. Depending on the cause of death, some became non-fluorescent, but others retained their ability to shine under the ultraviolet. One lot of the organisms dissolved into the water as they died, and the entire fluid then fluoresced.

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## ECOLOGY



### Children of the Cold

**H**ERBS are children of the cold. That vast army of non-woody plants, including the highly important grasses, such vegetable staples as potatoes, tomatoes, cabbages and carrots, as well as such ornamentals as violets, tulips and peonies, belong to times and climates that supply alternations of summer and winter. Herbs are relatively less abundant in the tropics than they are in the temperate zones, says Prof. William B. Scott of Princeton University; and in past ages, when the earth had a mild climate from pole to pole, there is little evidence in the fossil record that herbs were plentiful anywhere.

Until winters came, woody plants were the rule. And why not? A plant that dies at the end of the growing season, whether it perishes altogether as annuals do, or merely withers back to the root, as perennials and biennials, thereby gives up all the advantage of height it has gained during the summer. When the next season begins, it must start again from the ground level, while its woody companions can start from the top buds of their highest branches. That gives the woody plants an overwhelming advantage in the yearly race for a place in the sun. Thus it is that in all tropical lands you will find woody plants dominating; as dense forests of vine-draped tall trees where there is water enough, as thickets of shrubs in desert and semi-desert lands.

Even in our own cooler lands, the regions with most moisture will develop a high proportion of trees and shrubs, as compared with the non-woody plants.

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