

## PHYSICS

# Matter Created Experimentally From Light and Cosmic Rays

Process Seems To Be Going on All the Time on Earth But No Bulk Substance, Only Electrons, Are Formed

**T**ANGIBLE matter is being created out of light and cosmic rays which come to earth from outer space. Radiation produced here on earth is also manufacturing in some proved instances matter out of intangible waves.

Conversion of mass of the stars to produce light and heat has been the favorite method of explaining their long life. That has been the classic example of the interchange of matter and radiation.

## Evidence Accumulating

Now evidence is accumulating for the reverse process, the creation of matter out of radiation, not in the far-distant stars, but here on earth.

The idea that matter is created by light or photons was put forth by Dr. P. M. S. Blackett and G. Occhialini of Cambridge's Cavendish Laboratory, in England. The light prefers to perform this miracle only in the neighborhood of an atomic nucleus. The matter is created in the form of a pair of electrons, one positive and one negative.

These Cambridge physicists formulated their theory on the basis of Dr. Carl D. Anderson's discovery of the positive electron and their own subsequent confirming researches.

Experimental evidence for the creation of matter is contained in the bursts of electrons due to cosmic rays observed by Dr. Anderson in his apparatus located at the California Institute of Technology. And Dr. Anderson recently found pairs of electrons formed by the gamma rays given off by thorium. The positrons or positive electrons so formed do not live long, however, since they unite with negatives to form photons or light again.

## Dirac's Equation Substantiated

The latest development is that Dr. J. P. Oppenheimer of the California Institute of Technology and Dr. Milton Plesset, a National Research fellow, have found that the theoretical equation of Dr. P. A. M. Dirac is quite in accord

with the facts. This had led to important predictions bearing on cosmic rays.

Photons of high energy much prefer to produce the pair of electrons than to transfer their energy to a single ordinary electron. All of the photons or cosmic rays are equally effective in producing new pairs.

After discussing these new developments with Pasadena scientists, Dr. Niels Bohr, the Danish physicist who is spending some weeks at the California Institute of Technology, commented that the calculations by Drs. Oppenheimer and Plesset have convinced him that the Dirac equation instead of being false is the greatest acquisition to human knowledge in the past few years.

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## BOTANY

## Plant Parts Move as Decisively as Fingers

**S**TRANGE, how hard traditions die. The distinction between animals as "moving" and plants as "non-moving" is at least as old as Aristotle: and like many other things in Aristotle, more at home in logic than in actual fact. True,

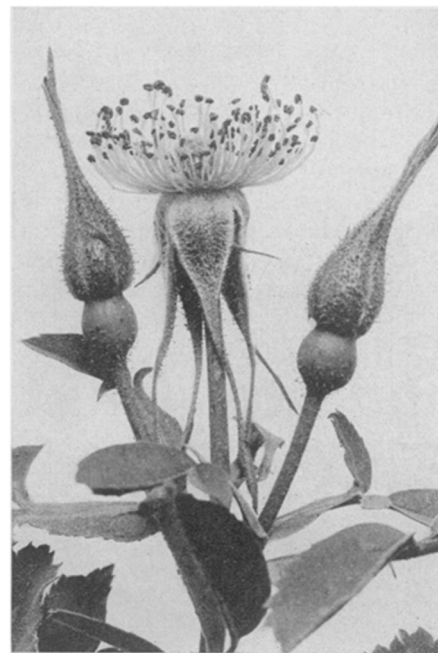
## ETHNOLOGY

# World's Fiercest Fighters Called "Ladylike" Men

**H**ERE is a paradox discovered by science. Some of the world's most bloodthirsty fighters, Jivaro head-hunters, are so "ladylike" that it is hard for a stranger to distinguish these men from their wives and sisters.

Jivaro men wear long hair and skirts, says Matthew W. Stirling, chief of the Bureau of American Ethnology, who studied the Jivaro Indians down in their homeland jungles in Peru and Ecuador.

Jivaro warriors paint their faces in



**BUT PLANTS DO MOVE**

most plants do not go galloping around over the landscape like the animals that prey on them, but they do have the power of movement nevertheless. The five sepals of the rose, for example, are closed up tight around the bud, like the five fingers of a man's hand guarding a precious jewel; but when the flower is ready they fold back as decisively as fingers making a generous offering. This action is strikingly shown in the Cornelia Clarke photograph reproduced on this page, of a wild rose that has already shed its petals, between buds as yet unopened.

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feminine fashion, and speak softly.

Most Indians have nearly hairless bodies and smooth muscles, but these characteristics are exaggerated among the Jivaros. Among the class of young men who become warriors, feminine characteristics are especially pronounced.

Mr. Stirling, who reported this neglected angle of Jivaro ethnology before the American Psychopathological Association, said that there is a sort of