

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

TANGIBLE 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

STRANGE, 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

HERE 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

"femininity" in the atmosphere of a head-hunter community. When he visited the Jivaros, he had at first the vague, subconscious sensation of living in a woman's world. This strangeness did not wear off for several days.

Early Spanish and Portuguese explorers who caught glimpses of the Jivaros must have thought that the warriors were women. That accounts for

their naming the Amazon River, under the mistaken idea that these Indians were women warriors, like the famous Greek Amazons.

The ladylike dress and manner of the Jivaro head-hunter, like his head-hunting proclivities, are long-established customs. There is nothing "sissy" about the Jivaro male beyond his appearance, says the ethnologist.

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PSYCHOLOGY

Cause of Happiness Sought By Psychologist

HOW CAN WE find happiness? This question, about which philosophers have speculated for ages, is now receiving scientific study by psychologists. Happy and unhappy college students have served as subjects for tests reported by Dr. George W. Hartmann of the Pennsylvania State College, to the Association of Consulting Psychologists.

Emotional stability, or a lack of neurotic tendency, is the most important single factor leading to happiness, he found. Nevertheless, enthusiastic mental hygienists will be disappointed in the finding that emotional health is far from the sole producer of happiness.

"The dominant individual apparently has slightly greater chances of being happy than the submissive person, a finding which is hardly comforting to an advocate of traditional Christian ethics," Dr. Hartmann said.

The "rugged individualist" is no more likely to be happy than the "clinging vine"—another upset to common opinion.

The ideal of the individual seems to have no relation to the extent of his happiness. No indication was found that adherence to orthodox religious beliefs makes for greater happiness.

No connection was found between intelligence and happiness, not even the inverse relation that some cynics have claimed. And neither high or low interest in the career being trained for, appears to be related to happiness.

Most of these college students studied consider themselves happier than the average, but Dr. Hartmann suggests that perhaps the average man considers himself also happier than average.

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ANTHROPOLOGY

Racial Hall of Fame Opened In Field Museum

THE FINEST racial portraiture that the world has yet seen.

This is the high praise bestowed by Sir Arthur Keith, eminent British anthropologist, on the new gallery of bronze statues which has just been opened at the Field Museum, Chicago. The hall is known as Chauncey Keep Memorial Hall, in honor of a former trustee of the Museum.

The bronzes, representing the world's

POPULATION

Industry Must Adjust Itself To Country's Slowing Growth

New Study Points to 17,000,000 Increase of Past Decade, 10,000,000 Present and Smaller Increments For Future

AMERICA is slowing down in her mad pace of increasing numbers.

In the year 1860 the population of the United States was eight times as great as it was in 1790, 70 years earlier. In 1930 it was four times as large as in 1860, also 70 years earlier. But in 2000 it will not be even twice the 1930 figure.

A million a year. That is the estimate of population growth just issued by two students of the statistics of population, Dr. Warren S. Thompson, director of the Scripps Foundation for Research in Population Problems and his associate, P. K. Whelpton. (McGraw-Hill)

Industry will need to adjust itself to this slower space, it is pointed out.

"Clearly an increase of 10,000,000 persons from 1930 to 1940 will demand less new housing than did the increase of 17,000,000 from 1920 to 1930. Also the smaller increase will require fewer new schools, factories, stores, and offices."

Industries will feel the effects of an approaching stationary population in proportion to the degree that they have a stable product or have already reached the saturation point.

"It is hard to conceive that the average family would use two radios or two kitchen stoves, for example; but the present radio may be replaced by an improved model at any time, while the kitchen stove is likely to be kept until worn out," the investigators indicate. And demand for necessities of life such as food, clothing, and shelter will expand less rapidly with rising incomes than demand for conveniences and luxuries.

But there are other industries, and

these probably produce the majority of all industrial goods, that are relatively independent of population growth. They could sell their products in increasing quantities and improving qualities, regardless of population increase, if only the public had the money to buy.

To these industries, the raising of the per capita purchasing power of the public will be an ever-increasing concern.

Another industrial problem is foreseen by the investigators in the decrease in size of family and the consequent increase in opportunity for savings by the heads of families. Since savings, in general, are invested in some form of business enterprise, capital may be increasing most rapidly at just the time when the number of persons for whom necessities must be provided has been increasing most slowly.

"In this manner the decline in the birth rate has contributed directly to the lack of balance in the industrial system which is in part responsible for the present troubles.

"It is not the intention of the authors to suggest that slower population growth has brought on the present depression; although the decline in annual growth since 1923 may have been a contributory factor. But because 'business as usual' has been predicated to such a large extent on a rapidly growing population in the past, it is reasonable to urge that the change in the rate of population growth now going on, and to be expected in the future, be given careful consideration in planning for the rationalization of social and economic life."

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