

lasts. However, they are no longer monsters to be dreaded, but like conquered genii in ancient Oriental tales, they become the servants of those who have bested them, steadily stimulating the production of substances that protect against new invasions.

This theory of immunity following virus diseases was presented to the meeting by Dr. Thomas M. Rivers, director of the hospital of the Rockefeller Institute, New York City.

Other diseases caused by viruses leave the recovered patient immune for only a relatively short time. This is the case, for example, with influenza and the common cold. Following these maladies the body does rid itself of the virus. As a consequence, it has no continuing stimulus to produce immune substances, and when a new infection attacks there is no effective defense ready to repel the invader.

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## Held Together by Chemical

**WHAT KIND** of perfume does Paramecium use?

Paramecium is a microscopic one-celled animal that swims in stagnant waters. Its aggregations, forming the most elementary kind of social groupings, are held together by chemical attraction, more irresistibly than a "swell" is drawn to his belle by the exotic scent that breathes from her dainty person.

The chemical basis of this simple society was described by Dr. H. S. Jennings of the University of California at Los Angeles.

The water around an individual Paramecium becomes faintly acid, Dr. Jennings said. Another Paramecium, chancing into this acidified zone, becomes unable to leave it. Every time it approaches the boundary, it is impelled to turn back. Others swim into the charmed circle, and are held as if by the fumes from an ancient magician's potent philtre.

Dr. Jennings found that he could reproduce this chemical social attraction simply by introducing a bubble of carbon dioxide into the water. It set up a charmed chemical boundary just like that of the Paramecium's natural secretion, which the little animals could enter but which they could not leave. Since carbon dioxide is a product of respiration by Paramecium as well as by Man, it is just possible that the only chemical foundation for the charmed social circle in the world of the waterdrop is nothing more than an attractive "breath".

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## PHYSICS

# Cosmic Rays Created by Self-Annihilation of Atoms

## Discovery of Identifying Bands for Five Elements Critical for Hypothesis Proposed by Prof. Millikan

**COSMIC RAYS** are created by the suicide of atoms in the loneliness of interstellar space, in the same manner that light is created by the partial self-destruction of atoms in the densely packed interiors of the stars. Prof. Robert Andrews Millikan, Nobelist of the California Institute of Technology, proposed this hypothesis at the symposia arranged by the American Association for the Advancement of Science in connection with the fiftieth anniversary celebration of the University of Chicago.

The hypothesis, said Prof. Millikan, rests on discoveries made in five recent research projects by his fellow-workers in the Norman Bridge Laboratory of Physics. In sum, these researches indicate that atoms of five elements are far more abundant in interstellar space than those of any other element, and that such atoms are capable of transmutations, giving rise to high-speed particles like those that constitute cosmic rays.

The broad surface of the earth itself is the spectroscopic screen on which should be spread the distinctive bands of cosmic rays, each characteristic of the element from which it originated. If they actually are found distributed in accordance with Prof. Millikan's prediction, this will constitute substantial evidence in favor of its validity. They are predicted as being thus distributed because the magnetic field of the earth should bend each band aside in proportion to the energy or speed of the incoming rays.

The five elements for which the five identifying bands are sought are: helium, carbon, nitrogen, oxygen and silicon. At least partial evidence has already been discovered that some of the bands exist, Prof. Millikan stated. The discovery or non-discovery of the remaining ones will be critical for his hypothesis.

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## Cosmic Rays Are Protons

**COSMIC RAYS** are protons, "hard," high-speed atomic particles, when they arrive at the outer boundary of the earth's atmosphere, it is indicated by experiments reported by three Univer-

sity of Chicago physicists, Dr. William P. Jesse, Dr. Marcel Schein and Dr. Ernest O. Wollan. On striking the atmospheric atoms, they give rise to the "middle-weight" particles known as mesotrons. Evidence supporting this conclusion was obtained by sending recording instruments aloft attached to free balloons that reached heights as great as 14 miles.

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## Earth Mostly 9 Elements

**NINETY-NINE** per cent of the weight of the earth is made up of only nine of the 88 known elements, Prof. Henry Norris Russell, Princeton University astronomer, told the meeting. All the rest have only one per cent to divide among them.

The same group of elements also make up the bulk of the other objects in the visible universe: stars, nebulae, comets, and the meteorites that bring to us the only samples of the cosmos that we can actually get our hands on. Proportions are different, however: hydrogen, for example, makes up only one-half of one per cent of the accessible earth-parts, whereas it constitutes the bulk of some of the stars.

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## PSYCHOLOGY

## Women More Susceptible To Glare At Night

**THE HIGHLY** debated question of whether men or women are the better automobile drivers has been studied from a scientific viewpoint by researchers at the University of California. Tests devised by Dr. C. W. Brown, associate professor of psychology, show that men are probably better drivers, at least at night.

Glare blindness resulting from facing oncoming headlights is doubtless responsible for many of the after-dark highway accidents.

"During the normal hours of darkness, from 6 p.m. to 6 a.m., deaths from