

ASTRONOMY

# Carbon Dioxide Discovered In Atmosphere of Venus

**D**ISCOVERY that carbon dioxide is probably present in the atmosphere of the planet Venus, next-door neighbor of the earth toward the sun, has been announced by the Carnegie Institution of Washington.

Speculation as to the existence of life on the earth's twin sister planet will be revived by the studies of the infra-red or heat spectrum of Venus made with the world's largest telescope, the 100-inch reflector, at Mt. Wilson, Calif., Observatory by Dr. Walter S. Adams, director, and Dr. Theodore Dunham.

The reported discovery is also notable because it is the first time that a gas of any kind has been detected upon any planet except the earth.

For years it has been known that Venus is covered with an atmosphere of considerable extent. Upon the rare occasions of the transit of Venus, when it passes in front of the sun, the planet is surrounded by a ring of light when it is in line with the edge of the sun. This light aura is due to refraction of the sun's rays by the atmosphere of Venus. Clouds cover the surface of Venus so completely that it is believed that astronomers seldom if ever see its real surface. The thickness of the atmosphere below the clouds is estimated to be about 4,000 feet.

Drs. Adams and Dunham used a powerful telescope and spectroscope on the infra-red sunlight reflected from Venus and discovered that three bands of invisible heat-light were missing. These were absorption bands that they concluded were due to carbon dioxide in the Venus atmosphere cutting off these particular wavelengths as the light passed through the planet's atmosphere.

Previous searches for Venus gases, such as oxygen, water vapor and carbon dioxide, all essential to life as we know it on earth, were fruitless.

Carbon dioxide is the gas given off by animal and plant breathing and used by plants in the making of starches and sugars. Its discovery on Venus will justify renewed discussion of the possibility of life of some sort on that planet. Research has shown that the surface temperatures of Venus are somewhat like those of the earth although

probably warmer. If future researches should show oxygen and water present, life on Venus might be considered more probable.

The Mt. Wilson discovery of carbon dioxide on Venus will undoubtedly encourage those who like to believe that the earth is not the only life-bearing speck of dust in the universe.

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PUBLIC HEALTH

## Depression Blamed For Increase in Trench Mouth

**D**EPRESSION is blamed for an increase in trench mouth, scientifically known as Vincent's infection, Dr. Alfred Walker of the American Dental Association has announced after studying data secured in a survey by the association. The disease has increased 100 per cent. in New York State in the last nine years, the survey showed. Similar alarming increases have been reported elsewhere.

While kissing was formerly blamed for the spread of this gum and mouth infection, lowered resistance due to worry over the depression is now sharing the blame in the opinion of dentists. Use of glasses instead of paper drinking cups in public places, and of unclean tableware is also blamed for the spread of the disease. The disease is extremely contagious. In the mild form it attacks the gums, resulting in a tender mouth. In the extreme cases it is characterized by high temperature, headaches, nausea, loss of appetite, bleeding and glandular enlargement. Death may follow an acute attack. The chronic form is more prevalent now, the survey showed.

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PSYCHIATRY

## Mental Disease In Identical Twins Affects Both

**N**EW LIGHT on the relative importance of heredity and environment as factors causing certain types of mental disease, and also juvenile delinquency and criminal tendencies, is gained as a

result of a study of identical and non-identical twins being conducted at the University of Southern California by Dr. Aaron J. Rosanoff.

A total of one thousand pairs of twins with mental diseases is being sought by the scientist, and already records of 404 have been obtained. This is believed to be the largest collection of such records ever gathered. A preliminary report of the data now available will be published in *Eugenical News*.

Of those twins that were of the same sex and probably with origin in a single ovum, or egg cell, and therefore with the same hereditary equipment, 116 pairs had both twins affected and only fifteen pairs with but one individual affected, it was found by Dr. Rosanoff.

An entirely different picture is presented by the group containing twins of opposite sex and therefore origin in separate egg cells with different heredity. Of these 26 pairs had both twins affected and 75 pairs where only one member was involved.

Of the twins of the same sex, but probably non-identical, 53 pairs had both members affected and 67 had only one with the trouble.

The "disorders" considered included mental deficiency, epilepsy, dementia praecox, manic-depressive psychoses, and also behavior problems in children, adult crime, and juvenile delinquency.

As a check on these results, an associate of Dr. Rosanoff, Doncaster G. Humm, has undertaken a parallel study of brothers and sisters who are not twins.

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GENETICS

## Flower Surgery Makes Heredity Control Possible

**D**ELICATE surgical operations on parts of flowers are used by three research scientists at the Station for Experimental Evolution at Cold Spring Harbor, N. Y., to control the heredity of the plants in their breeding experiments. The experimenters are Dr. J. T. Buchholz and C. C. Doak of the University of Illinois, and Dr. A. F. Blakeslee of the Carnegie Institution of Washington.

When pollen grains are deposited in a flower, they adhere to the sticky end of a long, slender projection called the "style," which rises from the seed-bearing part or ovary. Each grain then sprouts a slender tube, that grows downward through the style until it reaches the ovary. This is a real race of males,

and speed of growth determines which shall possess the limited number of females, the egg cells, waiting below and thus become parents to new plants.

Prof. Buchholz and his associates found that some of the pollen-tubes, the hereditary effects of which they especially wished to study, were slugs in the race and arriving late found no unfertilized females and therefore had no opportunity to leave offspring to bear the particular hereditary qualities which they carried. The differences in growth rate of pollen-tubes defeated the purpose of the experiment.

Not to be outdone, the investigators next conceived the idea of cutting a piece out of the base of the style, decapitating the faster-growing tubes while leaving the slower-growing ones intact. The shortened style was then re-united and the pieces held in place with a splint consisting of a hollow grass straw. Arriving at the cut the slow-growing tubes crossed this barrier and proceeded on in the race without the handicap of having to run against faster competitors.

In practice the method should prove valuable to plant breeders, for its success has been proven by the heredity of plants thus produced. Other scientifically valuable seeds obtained by this method are available for planting during the present growing season.

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## ENTOMOLOGY

## Far Eastern Beetle Pest Discovered on Long Island

**A**N INSECT pest apparently new to this country has been discovered breeding in the stems of greenhouse grapes at Oyster Bay, on Long Island, and is reported by E. P. Felt, director of the Bartlett Tree Research Laboratories at Stamford, Conn.

The insect belongs to the group known as the ambrosia beetles, and was identified by an expert on beetles at the British Museum of Natural History, London, as a species known only from Korea, Japan and Formosa, where it occurs on several native shrubs. It was probably brought to America, half way round the world, in some plant introduced from one of those countries.

It is well to watch for minute holes, a twenty-fifth of an inch in diameter, and recent borings in sickly plants, since these are most likely to be attacked, Mr. Felt suggests.

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## ASTROPHYSICS

# Cosmic Rays Caused by Solar Activity, Says French Physicist

By DR. VICTOR COFMAN,  
Science Service Correspondent

**E**XTREMELY fast electrons, coming from the sun with a speed practically identical with that of light, may be responsible for the production of the cosmic radiation, whose origin is still wrapped in mystery. Dr. Alexandre Dauvillier, of the Institut des Hautes Etudes of Paris, puts forward this view in a theory that links together several happenings of the sky.

"My theory," stated Dr. Dauvillier, "gives definite shape to a view which has also been suggested by Lord Rutherford, namely that very fast electrons accelerated in very weak cosmic electric fields may account for the formation of cosmic rays."

The source of the electrons, according to the new theory, is to be found in the bright spots ("faculae") which are seen on the sun's surface. They represent regions where the temperature reaches seven thousand degrees centigrade. The negatively charged electrons stream out of these hot regions with relatively slow velocity, but are enormously speeded up as they move through the positively charged "atmosphere" of the sun. This atmosphere consists mostly of hydrogen and calcium atoms, positively charged because the ultraviolet radiation from the sun knocks out some of their electrons. The electrical field surrounding the sun thus resembles that around the earth.

### Deflected Into Arcs

The speeded-up electrons coming from the sun are deflected in the form of arcs by the earth's magnetic field as they approach our planet. They strike the upper atmosphere and produce secondary electrons, which are responsible for the luminous effects seen as auroral arcs—first observed by Nordenskjöld in 1878. From the curvature of these arcs one may calculate the velocity and the energy of the original fast electrons, whose course was bent by the earth's magnetism. The velocity is found to be only 30 centimeters per second less than that of light. Hence the electron needs only a few minutes to reach

the earth, and arrive practically at the same time as the light itself. This may explain a few remarkable cases of bright flashes on the surface of the sun accompanied immediately by electro-magnetic disturbances upon the earth. The earth is so completely surrounded by traces of these swift electrons, that the cosmic radiation seems to be coming from all parts of the sky.

The energy of the fast moving electrons corresponds very closely to that of the cosmic rays, and Dr. Dauvillier believes that there is no need to look elsewhere for an explanation. He brings in support of his view another set of calculations, based upon the frequency of the auroras seen at different latitudes.

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## EVOLUTION

## Birds of Different Families Look Almost Like Twins

**S**TRANGE tricks of "convergent evolution"; by which creatures only remotely related to each other come to look like twins, are being studied among birds by Dr. Herbert Friedmann, curator of birds in the Smithsonian Institution. There can be no question of so-called mimicry in most of these instances, for the members of these pairs of mutually resembling birds are usually found in widely separated regions.

The familiar yellow-breasted meadowlark, for example, has a "twin" in a North African pipit, belonging to an entirely different bird family. There is no discernible advantage to either bird in looking like the other. Dr. Friedmann inclines to the opinion that it is merely a case of a relatively limited number of feather patterns being possible, and these two birds having happened to hit on the same combination.

There is something of the same nature to be found in bird songs, too, he says, although it cannot be checked so exactly as in the case of colors. He cites the case of a South African cuckoo that has a call closely similar to that of the American whippoorwill.

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