

PHYSICS

Idea That Light Leaks Away May Explain Redward Shift

THE NOVEL IDEA that light "leaks away" as it speeds through the intergalactic spaces of the universe was presented to the National Academy of Sciences by Prof. P. I. Wold of Union College, Schenectady, N. Y. It may smash the idea of an expanding or "exploding" universe.

The idea arose from an attempt to explain the redward shift that astronomers have observed in the light of the far distant star aggregations called nebulae. This shifting of the light spectrum lines to the red has been interpreted as being caused by a rushing away of these nebulae outward at tremendous speeds. This is the observational basis of the theory that the universe is expanding.

Prof. Wold first speculated that the velocity of light decreased very slightly with time, instead of being a function of space. This explained the redward shift of light observed without assuming an expanding universe.

This suggestion has now been carried further and has led Prof. Wold to the idea that there is what is called a "photon leak." The photon is the unit of radiation, a gob of light. If velocity of light changes as a function of the time that it has been traveling, then the energy of a photon changes with the velocity. But the momentum of the photon remains constant, the radiation density for a volume traveling with the light wave remains constant and the number of photons passing an observer remains constant. This last suggestion, Prof. Wold explained, is hard to reconcile with any present picture of the nature of the photon.

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PHYSIOLOGY

Hormone From Animals Speeds Flowering in Plants

FEMALE sex hormone, taken from animal glands and purified into a white crystalline form, has been proved to speed the reproductive processes of plants, by two German biochemists, Walter Schoeller and Hans Goebel, of Berlin. It is probable that their experiments will be repeated in America and an effort made to put them to practical application.

The two German biochemists used the female sex hormone usually known in the United States as theelin and by other names, and in Germany called folliculin. Their first experiments were made with the drug as put up for therapeutic use. It brought about a marked acceleration of flower production in hyacinths, onions and corn. Later on, similar results were obtained also with lilies-of-the-valley.

Doubts arose in their minds, however, as to whether the hastening of blooming might not have been due to the powerful growth-stimulating hormone of plants, called auxin, which has been found in animals as well, and in commercial preparations of the female growth hormone.

Accordingly they made a new set of experiments, this time using a crystallized sex hormone, beta-folliculin, which subsequent tests proved to be quite free from auxin. They applied measured amounts of this in water solution to the roots of three calla lilies. Each of the three plants had a matched "twin" plant which got none of the sex hormone; these served as "controls."

In every experiment the flowering was decidedly hastened by the hormone and in at least one experiment the treated plant was in full bloom before any flower bud could be seen on the check plant. The series of experiments were repeated a second time a short time later, with the same result.

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ETHNOLOGY

Shows Merrie England Had Nudist Problem

THE NUDIST problem is nothing new. Merrie England back in the fifteenth century had nudists who danced nonchalantly in processions.

Evidence to this effect has been found in a carved wooden panel formerly in Lancaster Castle, showing seven people engaged in a morris dance—one quite unattired. A photograph of the panel has been published in the *Journal of the English Folk Dance and Song Society*.

The photograph indicates what the Puritans in England railed at when they denounced "light, lewde and lascivious dancing" and the greatest abuse of all which they called "dancing naked in nets." The nets, some commentators have thought, were akin to the skin-tight, flesh-colored suits known in modern theatricals as fleshings.

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IN SCIEN

PALEOBOTANY

Seed-Fern Fruits From Southwest Identified

FOSSIL FRUITS of a new genus of seed-fern, originally found in the Hermit shale formation in the Grand Canyon of Arizona, were confirmed as actually belonging to the parent leaves by means of other specimens recently discovered in the Supai formation of the Apache Indian reservation in Arizona. The first specimens contained both fruits and leaf fragments, but their connection was not clear; the newly found material shows the pedicels, or fruit stems, quite plainly.

The extinct plant genus has been named *Supaia*, for the rock formation that was its source, by Dr. David White of the U. S. Geological Survey. Dr. White described the fossils before the National Academy of Sciences.

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METEOROLOGY

Thundercloud Charge Picture Upside Down

WE NEED to turn our picture of the lightning charges in a cloud completely over. So said Dr. B. F. J. Schonland, South African meteorologist, when he presented results of his studies of lightning before the meeting of the American Meteorological Society. He is convinced, on the basis of recent observations, that the old idea of a thundercloud as being charged negatively at the top and positively at the bottom is just wrong side uppermost. The negative charge is at the bottom of the cloud, he declared.

Lightning is a terrific expender of energy, Dr. Schonland stated. The annual wastage of energy through lightning discharges, over the whole world, amounts to something over a thousand million kilowatts. His figures for lightning potential in a cloud are just as staggering: ten thousand volts per centimeter of height; or for a cloud a mile high about one billion 580 million volts.

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CE FIELDS

PLANT PHYSIOLOGY

Measure Plant's Carbon Dioxide Fixing Efficiency

TO CAPTURE one molecule of carbon dioxide, the green cell of a water plant requires the energy of 32 quanta of sunlight. A quantum is the fundamental unvarying unit of radiant energy. The experiment in which the engineering efficiency of a living plant cell was determined was reported to the National Academy of Sciences by Prof. B. M. Duggar of the University of Wisconsin.

With his associates, J. F. Stauffer and Farrington Daniels, Prof. Duggar arranged a special apparatus for the task. The central part of the instrument was a closed glass vessel in which a quantity of the one-celled green plant *Chlorella* was kept actively stirred up in water. Through the water carbon dioxide was passed, while light of known energy content was shot through it. The light energy was measured as it entered and again as it left, and the gases that came out of the water were analyzed.

A careful check-up of the data from many experiments gave a figure of 32 quanta for each carbon dioxide molecule absorbed. This value of the efficiency of the cell, Prof. Duggar said, is considerably less than heretofore reported by other investigators.

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ASTRONOMY

Methane on Outer Planets Hints They Are Not so Cold

LIFELESS under the feeble rays of the distant sun, the surfaces of the great outer planets have no air as we know it. They have atmospheres—very thick heavy ones at that—but those atmospheres are dominated not by our familiar oxygen-nitrogen mixture but by the noxious compound of carbon and hydrogen known as methane, familiar as the dangerous "fire-damp" of mines, and a constituent of natural gas.

This most recent of the discoveries of planetary astronomy was disclosed at

the meeting of the National Academy of Sciences through a telegram sent by Director V. M. Slipher of Lowell Observatory, Flagstaff, Ariz. The tell-tale lines in the spectra of Jupiter, Saturn, Uranus and Neptune were interpreted in considerable part by Dr. Arthur Adel of the University of Michigan.

Presence of massive quantities of methane in the atmospheres of the giant planets has a possible significance for the still unsolved riddle of their surface temperatures, Dr. Henry Norris Russell of Princeton University said in commenting on Dr. Slipher's telegram.

At a temperature of 161.4 degrees below zero Centigrade this gas becomes a liquid, unable to betray its presence through reflected light rays. Of course, under the different gravity and atmospheric-density conditions on the great planets this low boiling point of methane might be different.

But in any case, the data of Drs. Slipher and Adel tend to indicate that the surface temperatures of the outer planets are not so low as it has been the custom to assume in the past.

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BACTERIOLOGY

Nitrogen-Fixing Bacteria Work Best When Well Fed

NITROGEN-FIXING bacteria that live in nodules on the roots of clover, beans, and similar plants become more abundant and work more effectively when their host plants are encouraged to form more carbohydrates, or foods of the sugar-starch class.

This is the gist of the report presented before the meeting of the National Academy of Sciences by Drs. E. B. Fred and P. W. Wilson of the University of Wisconsin.

The two experimenters controlled the rate of carbohydrate formation in a number of ways. They gave their plants an over-supply of carbon dioxide to convert into food. They reduced the quantity of nitrogen in the atmosphere. They varied the oxygen supply. Finally, they added nitrogen compounds, both with and without extra carbon dioxide.

"The results of all these studies were consistent," Drs. Fred and Wilson stated, "and showed that the carbohydrate-nitrogen relationship is an extremely important although not the only factor in the various functions of symbiotic nitrogen fixation."

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ENGINEERING

Big Pipes Are Used In Boulder Canyon Project

See Front Cover

THE PHOTOGRAPH on the front cover of this week's SCIENCE NEWS LETTER shows graphically the size of things at the Boulder Canyon project. The locomotive is passing through a section of steel pipe, 30 feet in diameter, which has been prepared for laying in the Upper Nevada Tunnel. The picture was taken by the Bureau of Reclamation, U. S. Department of the Interior at the Babcock and Wilcox Company plant.

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MEDICINE

Find Lack of Food Cause Of Alcoholic Neuritis

THE SERIOUS nervous disease resulting in paralysis and often in death which afflicts persons partaking too freely of alcoholic beverages is due to lack of food and not, as generally believed, to a poisonous effect of the alcohol on the peripheral nerves of the body, Dr. Maurice B. Strauss of Thorndike Memorial Laboratory, Boston, reported to the American Society for Clinical Investigation.

Six patients suffering from the disease got well when forced to eat certain foods, although they were allowed to go on drinking their customary amounts of alcoholic beverages.

"In general the daily intake of these patients varied from one pint to one quart of 100-proof whiskey," Dr. Strauss said in describing his experiment with them.

At the same time each patient was compelled to eat a nutritious diet, particularly rich in red meats, fruit and vegetables. Vitamin B concentrate was injected into their muscles.

The fact that they all recovered Dr. Strauss presented as evidence that the disease is due to dietary deficiency and not to the poisonous effect of the alcohol on the nerves.

The experiment was undertaken to test a theory developed by Dr. Strauss and Drs. George R. Minot and Stanley Cobb of Boston, that the disease is due to failure of chronic alcoholics to eat sufficient food of the right sort and that in certain instances these persons are unable to absorb or utilize certain food substances.

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