

only carbon, oxygen and hydrogen were in the picture. And combined with the rare sugars, ribulose and sedoheptulose, it ties in with other chemicals, such as deoxyribose, known to lie very close to the heart of all life chemistry.

Ribose is a sugar formed of five carbon atoms to the molecule, instead of the six that make up the more familiar glucose. Ribulose and deoxyribose are close chemical relatives of the five-carbon sugar.

Heptulose is similarly akin to heptose, a seven-carbon sugar. To find such complicated forms appearing among the first products of carbon dioxide and water is very startling. The phosphorus, of course, was present in the plant tissues all the time. Early plant chemists just did not look for it, or forgot to mention it if they did.

Built To Be Torn Down

The appearance of these sugars with their odd numbers of carbon atoms is another evidence that nature works in mysterious ways, for they seem to be built up only to be torn down again.

Somewhere, however, in the cycle of building up and tearing down, a repeating reaction has been achieved by which incoming carbon can always be seized, incorporated into the moving machinery, and finally passed on to replenish the structures of the whole plant, which is always growing, changing, repairing itself, furnishing sustenance to all the so-called higher forms of life.

Yet the source of all this vital energy is being narrowed down to non-vital causes. Out of the living leaf scientists have extracted small green granules that they have named chloroplasts. They are complex structures, but they are not even as much "alive" as the enzymes.

Living Structures Eliminated

Drs. Daniel I. Arnon, M. B. Allen and F. R. Whatley of the University of California in Berkeley report in *Nature* (Aug. 28) how they made chloroplasts carry on photosynthesis without the aid of more complicated living structures.

These scientists have, moreover, found chemicals that will stop each of the processes of photosynthesis singly or in combination, so that the man in the laboratory can separate or combine the plant processes at will, and see what happens.

With the knowledge of how to do this, other scientists working in similar fields are making haste to apply these findings to their own photosynthesis problems. The goal of controlled photosynthesis is almost in sight.

Science News Letter, December 18, 1954

The eyes of an *ostrich* often weigh more than twice as much as its brain.

Japan leads the world in fisheries production, with an average of almost 3,000,000 metric tons of *fish* a year, the United States is next with 2,500,000 and Russia is third with 2,000,000.

GENERAL SCIENCE

1954 Carnegie Report

Annual report tells of discovery of fall of Mayapan, which is likened to destruction of Troy. Also notes progress in astronomy, sex reversal and probing fossil records.

► DISCOVERY OF the sacking and burning of Mayapan, the last great city of the pre-Columbian Maya civilization of Yucatan, Mexico, about 1450, resulted from excavations announced in the annual report of the Carnegie Institution of Washington.

This confirmation of events described in old pre-conquest records "parallels in many ways the archaeological verification of the Homeric account of the destruction of Troy," Dr. Vannevar Bush, president, told the trustees at their annual meeting.

In the ruins of the same city, a mural painting done on plaster in colors was unearthed. Heads of monsters were painted in green, red, yellow, white and blue against a black background.

Houses of ordinary people, which were previously neglected because of concentration upon the striking Maya temples, were found in Mayapan in such numbers that the city must have been large in the ancient days, even in terms of present-day Yucatan.

Mammalian Sex Reversal

The first sex reversal accomplished in the mammal male was reported by Dr. Robert K. Burns of the department of embryology.

This is declared to be of great importance for the study of sex differentiation in higher animals. Using the opossum, in which embryonic animals are accessible in the mother's brood pouch, he obtained by injection of sex hormones the reversal of the primary sex organs of male opossums.

Spot Proteins in Fossils

Fossils as old as 360,000,000 years can still be analyzed for their building blocks of protein, amino acids, Dr. Philip H. Abelson, director of the geophysical laboratory, discovered.

This discovery opens the opportunity for investigating the bodily chemistry or biochemistry of creatures long extinct.

Some of the amino acids, identical with those in present-day proteins, that were found included alanine, glycine, valine, leucine, aspartic acid and glutamin acid.

Because experiments showed that the rate of breaking-down of the amino acids increased with temperature, scientists may be able to use fossils as a recording geological thermometer for sediments.

Spiral Arms Young

Observations with the 100-inch telescope of Mt. Wilson Observatory upon stars both in the inner and the outer region of our Milky Way and in the similar Andromeda galaxy showed that the stars in the outer

spiral arms were formed late in the history of the galaxies, from the huge clouds of dust and gas existing there.

The stars nearer the center of the galaxies are believed to be nearly as old as the galaxies themselves.

SCIENCE NEWS LETTER

VOL. 66 DECEMBER 18, 1954 NO. 25

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N. W., Washington 6, D. C., North 7-2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

Copyright, 1954, by Science Service, Inc. Reproduction of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service. Science Service also publishes CHEMISTRY (monthly) and THINGS OF SCIENCE (monthly).

Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C., under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 34.40, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925; 39 U. S. Code 283), authorized February 28, 1950. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index.



Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 1 E. 54th St., New York 22, ELdorado 5-5666, and 435 N. Michigan Ave., Chicago 11, SUpperior 7-6048.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: Karl Lark-Korovitz, Purdue University; Kirtley F. Mather, Harvard University; Paul B. Sears, Yale University. Nominated by the National Academy of Sciences: Homer W. Smith, New York University; Edward U. Condon, Corning Glass Works; Harlow Shapley, Harvard College Observatory. Nominated by the National Research Council: Duane Roller, American Association for the Advancement of Science; Ross G. Harrison, Yale University; Leonard Carmichael, Smithsonian Institution. Nominated by the Journalistic Profession: Neil H. Swanson, Baltimore, Md.; O. W. Riegel, Washington and Lee University; Michael A. Gorman, Flint Journal. Nominated by the Scripps Estate: Charles E. Scripps, Cincinnati, Ohio; Edward J. Meeman, Memphis Press-Scimitar; John T. O'Rourke, Washington Daily News.

Officers—President: Leonard Carmichael; Vice President and Chairman of Executive Committee: Charles E. Scripps; Treasurer: O. W. Riegel; Secretary: Watson Davis.

Staff—Director: Watson Davis. Writers: Jane Stafford, Marjorie Van de Water, Ann Ewing, Howard Simons. Science Clubs of America: Joseph H. Kraus, Margaret E. Patterson. Photography: Fremont Davis. Sales and Advertising: Hallie Jenkins. Production: Priscilla Howe. Interlingua Division in New York: Alexander Gode, Hugh E. Blair, 80 E. 11th St., GRamercy 3-5410.

Telescopes will go electronic instead of photographic as now if a study conducted by the Carnegie Institution of Washington, the National Bureau of Standards, U. S. Naval Observatory and the California Institute of Technology is successful.

The photographic method used by the larger telescopes is limited by the inability of photographic emulsions to store useful information beyond a certain point.

This limit is set by the ever-present glow of the night sky and the focal length of the telescope. A committee is considering the possibility of applying to astronomical observations some sort of image storage tube adapted from television-like techniques.

Structure of Nucleus

Much has been found out about the heart of atomic elements by bombarding them with charged helium atoms of relatively low speed and energy.

In the Department of Terrestrial Magnetism research, the atoms do not actually crash into each other. The electric field of the passing particle merely sweeps the atomic nucleus into an excited quantum state, from which it recovers by emitting a gamma ray.

Measuring the gamma radiation with scintillation crystals locates the energy levels in the nucleus, which is valuable basic information about the elements.

Cosmic Ray Variation

A variation in cosmic rays, correlated with the sunspot cycle, has been discovered through continuous measurements at four points since 1937.

The report suggests that the same mechanism may also be responsible for an 11-year variation in the earth's magnetic field. Cosmic rays may be localized or even trapped in orbits in our solar system.

Such a theory involves assumption of extensive magnetic fields in large regions of space.

Atmosphere of Mars

A marking on Mars resembling the letter "W," which moves at about the same speed the planet rotates, was discovered on motion picture films taken during its close approach early last summer.

The "W" marking was near the Martian equator and is presumably a "cloud formation in the upper atmosphere of the planet," the Carnegie Institution of Washington revealed in its annual report.

The fact that the letter "W" is sometimes taken by people to stand for "war" is completely without significance in this case, Dr. Ira Bowen, director of the Mount Wilson and Palomar Observatories, said.

It was chosen as a "convenient letter" roughly similar to the formation. The spread of the "W" was measured as 1,100 miles from tip to tip.

The marking shows only in photographs taken in blue light, not on those taken in yellow light on the same nights. The

yellow-light films do, however, show other markings "easily visible on dozens of exposures" at about the same position as several of the well-known canals.

These, presumably, are surface markings, but the report notes that they appear as "irregular streaks or broad bands rather than as the lines shown on most drawings and maps of the planet."

A new formation in a region often shown as blank was also spotted on the movie films taken by Drs. Edison Pettit and Robert S. Richardson, astronomers of Mount Wilson and Palomar Observatories. The area appeared as a dark blue-green sea that "seems to be a development of the fine complicated structure northeast of the Syrtis Major," a patch visible with a small telescope.

Photographs of Mars in blue light are usually featureless except for bright caps over the poles. Occasionally, however, the atmosphere becomes exceptionally transparent in blue light, so that the surface markings can be seen.

These "blue clearings," as they are known, have previously been thought to be sudden occurrences, but this year's observations showed that they are a phenomenon that takes place gradually rather than abruptly.

Science News Letter, December 18, 1954

NUTRITION

Dehydrofreezing Tested

► SCIENTISTS HAVE added a new process to the food-preservation industry and, at the same time, given the American housewife a new word, dehydrofreezing.

Developed by Government food technologists, dehydrofreezing combines the space- and weight-saving qualities of dehydration with the convenience and flavor-retaining qualities of freezing. Dehydrofrozen apples, for example, have been found to have a much firmer texture when thawed, and to have made better pies than apples frozen in the ordinary way, the scientists report.

Ordinary freezing, the technologists point out, tends to rupture cellular structure, causing many fruits and vegetables to break down when thawed. Partial dehydration prevents much of the initial rupturing. In addition, dehydrofrozen foods retain just the right amount of moisture.

The dehydrofreezing process works in five basic steps: conventional preparation of the food for canning or freezing; an inactivation of the enzymes to prevent browning; rapid drying; packaging and freezing, and storing at zero degrees Fahrenheit.

Dehydrofrozen foods can be reconstituted simply by cooking or soaking in water. Fruits and vegetables now being dehydrofrozen, the U.S. Department of Agriculture scientists who developed the process report, include apples, apricots, peas and pimentos. They also state that six commercial firms are now employing the process.

WILDLIFE

Three Cranes Missing; Fear Population Decline

► THE POPULATION of America's rarest and tallest bird, the whooping crane, may have been reduced by three this year.

Although it is still too early to definitely determine the bird's total population, three whooping cranes have failed to return to the Aransas Wildlife Refuge in Texas.

The U. S. Fish and Wildlife Service reported that, in April, 24 birds migrated north, and, to date, only 21 have returned to their winter quarters.

Conservationists are even more concerned about the fact that no young have been identified in the 21 birds that have returned south. There is still hope, however, that the three missing birds will show up and, possibly, bring young birds.

The Service stated that a final count has been planned for late in December, but that if the three birds are still missing by then, the final count may be delayed.

Each year, in the spring and in the fall, the whooping cranes are carefully surveyed by conservationists in the United States and Canada. The count of the Aransas Wildlife Refuge is carried out by aerial survey.

Science News Letter, December 18, 1954

Dehydrofreezing is available for public use through a patent issued to the Secretary of Agriculture, the Department reports in *Agricultural Research* (Dec.).

"Estimates based on these experimental studies indicate that the processing cost in dehydrofreezing is somewhat greater than in freezing. But lower packaging, freezing, storage, and distribution costs should result in overall saving to users," the food specialists conclude.

Science News Letter, December 18, 1954

CHEMISTRY

New Amino Acid in Apple Peel, Not Pulp

► HERE MAY be another reason for eating the peel as well as the pulp of apples:

The peel, but not the pulp, contains an amino acid, one of the so-called protein building blocks.

Discovery of the acid, which has apparently not been found previously in plant material, is announced by Dr. A. C. Hulme of the Department of Scientific and Industrial Research, Maidstone, Kent, England, in *Nature* (Dec. 4).

The acid was isolated, by using a series of ion-exchange columns, as fine, silky needle crystals. Dr. Hulme believes, on the basis of chemical tests so far, that the new acid is a methyl-hydroxyl-proline.

Science News Letter, December 18, 1954