BIOLOGY

Photosynthesis Achieved

Team of University of California scientists has discovered the complete process of photosynthesis, the American Association for the Advancement of Science meeting was told.

➤ DISCOVERY OF the complete process of photosynthesis, explaining how the green plant makes food out of the energy of the sunlight and air, water and chemicals, has been achieved and reported to the American Association for the Advancement of Science meeting in Berkeley, Calif.

This should mean the eventual production of chemically pure foods, like sugar and starches, by means of factories that ape or improve upon the green leaf.

A team of University of California scientists, headed by Dr. Daniel I. Arnon, has achieved this important step after six years of research. The scientists used also dozens of other painstaking discoveries made in other laboratories.

The whole process of photosynthesis takes place within the small particles in plant tissue that contain the green pigment called chlorophyll. These chloroplasts, as they are called, are the plant's food factories. The manufacturing process takes three steps:

1. The energy of sunlight is used to break down the water into hydrogen and oxygen. Part of oxygen goes off into the air. Part is used to build vitamins and a phosphate, adenosine triphosphate, called ATP, which are needed in the process.

2. Inorganic phosphate is changed to this ATP without need of atmospheric oxygen. This phosphorylation needs three vitamins made within the chloroplast, riboflavin or B-2, vitamin K and vitamin C.

3. With the aid of ATP and hydrogen, carbon is captured, some given off as carbon dioxide and some used in the starch, fructose sugar and other chemicals that photosynthesis produces.

This may seem complex, but it is one of the most important processes in the world and, until now, its details have been a major mystery.

When the University of California group was able to isolate the little green particles from spinach and make them function outside the living plant, the way opened to the solution of photosynthesis.

Dr. Arnon foresees the possibility of synthetic food production by a non-living photosynthesis, but he does not expect that it will ruin agriculture. Bulk foods and chemicals of high energy, like sugar, but that have no flavor, would probably be the first produced when artificial photosynthesis arrives.

Science stands, he believes, on the threshold of a practical and detailed mechanization of the necessary steps in such food production. Even more important, man is no longer overawed by the complexity of the living cell, for he has synthesized photosynthesis, just as he has made many chemicals that were once thought to be the monopoly of nature.

Drs. F. R. Whatley and M. B. Allen were Dr. Arnon's associates, assisted by John Capindale and Lois Durham, graduate students.

Once fermentation was thought to be a process that could only occur in living matter, but the enzymes were discovered, made and used for fermentation processes. Now what was done for fermentation has been done for photosynthesis.

Science News Letter, January 8, 1955

DENDROLOGY

Tree Rings for Dating

➤ TREE RINGS can date the exact year of landslides, glaciers and volcanic eruptions, Dr. Donald B. Lawrence, professor of botany at the University of Minnesota, reported to the American Association for the Advancement of Science meeting in Berkeley, Calif.

On June 23, 1925, Dr. Lawrence stated, 50,000,000 cubic yards of the north face of Sheep Mountain in Wyoming slid into the valley and across the Gros Ventre River, forming a dam 180 feet high and a mile and a half wide. A study of the firs, spruces, pines and aspens that fell with the slide and continued to grow, some in erect and others in tilted positions, showed that each had clearly marked the violent change in its ring pattern.

A second study of scarred and tilted trees still growing on Mt. Hood in Oregon similarly showed the exact year in which a glacial advance during the "Little Ice Age" of the 18th century made its maximum advance, the Minnesota botanist reported.

In a third study, made of the trees on Mt. St. Helens in southwestern Washington, one of the youngest volcanic peaks in North America, Dr. Lawrence stated that tree ring dating pinpointed a history of the various volcanic eruptions during the past five centuries.

As an example, tree ring dating recorded a violent eruption as having occurred on Mt. St. Helens within a few years of 1802 A.D.

Dr. Lawrence stated that tree ring dating has shown that important natural changes in the earth's features have occurred in the Rocky Mountains and in the Cascade Range within the lifetimes of ordinary forest trees living today.

Tree ring studies have heretofore been most commonly used to date prehistoric ruins and to work out changes in precipitation and temperature, and fluctuations in lake levels.

Science News Letter, January 8, 1955

EDUCATION

"Question" Is Most Misspelled Word

➤ THE WORD "question" is misspelled by elementary school children in more ways than any other word.

There are 152 different ways to misspell this common word, but the most often used are "qustion" by the younger children and "quistion" by the older ones. "Question" also leads in the total number of misspellings with 276.

This record for "question" was reported to the American Association for the Advancement of Science meeting in Berkeley, Calif., by Dr. George C. Kyte of the University of California.

His analysis of most common misspellings will aid the teacher in anticipating students' errors and by showing what to stress in teaching to prevent or eliminate the errors.

One group of common errors results from leaving out a silent letter, for example. Such misspellings include: Befor, carful, maks, mor, tabl and trad. In another group, a consonant is erroneously doubled. These include: allmost, allready, carefull and hopping (for hoping).

Some mistakes are directly due to faulty pronunciation, such as wile, pertty, famly and suprise.

Science News Letter, January 8, 1955

MEDICINE

47 Anti-Bite and Sting Remedies Available

➤ FOR TREATMENT of snake bites, spider bites and scorpion stings in all parts of the world, there are 47 different preparations. These include 36 products for treating snake bite, six for scorpion sting and five for spider bite.

Names, descriptions and uses of these were presented by Capt. Hugh L. Keegan of the Army Medical Service Graduate School at the first International Conference on Animal Venoms held in Berkeley, Calif., with the meeting of the American Association for the Advancement of Science.

All but one of the antivenins listed consist of serum from immunized horses. Consequently, Capt. Keegan warned, the doctor should find out before giving one of these whether the bite or sting victim is sensitive to horse serum.

Science News Letter, January 8, 1955

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