

BOTANY-AAAS

First Photosynthesis Step

Mysterious "Factor B", first material made by plants using sunlight, may hold the key to the artificial manufacture of food in the future.

► THE discovery of the first material that is manufactured by the living plant through the energy of the sunlight has been made.

This may be to the artificial manufacture of food of the future what discovery of the fission of uranium was to the atomic bomb.

A scientific team from the University of Chicago, Drs. Hans Gaffron, A. H. Brown and E. W. Fager, has determined just what is the primary product that is made out of carbon dioxide and water, energized by the light acting through chlorophyll, the green stuff of the plant.

It is a mysterious "Factor B," unidentifiable as any known chemical. Hidden in the composition of this unknown substance may be the key to duplicating the year round in factories what the farms and forests of the world work at only in the summer growing season.

Promising Development

Scientists of the American Association for the Advancement of Science, who spent two days on discussions of photosynthesis, as this process of sugar and starch manufacture in the living plant is called, rate this factor B as the most promising development so far made.

Tagged atoms of carbon, a byproduct of atomic bomb research, were used to track down just what is made out of the carbon dioxide, one of the waste gases of the air that every animal breathes out. In the experiments, a slimy green alga named *scenedesmus* was put in contact with carbon dioxide, all of the carbon atoms of which were artificially radioactive "carbon 14." Wherever this isotope or variety of carbon travels can be told by the clicks that its exploding atoms cause in a Geiger counter. The carbon dioxide raw material can be traced to any part of the growing plant by this method.

The Chicago scientists found that it takes only a very few seconds for the green algae to snatch up some of the tagged carbon dioxide and convert it by means of the light energy into the new mysterious factor B.

They used hundreds of quarts of the algae in getting enough of this first product of photosynthesis to analyze in various ways. All manner of tests failed to identify it. They know it is not sugar starch, a protein-like substance or the common organic acids. The one thing they do know is that it acts more like an acid than anything else, although it is much less active than most such substances.

Used by Plant for Building

The plant uses factor B material with great rapidity and ease to build up the many complex parts of the living plant. This is shown in other experiments by the speedy spread of the tagged carbon atoms to all parts of the plant.

The search for the secret of photosynthesis is getting hotter. Large vats of the convenient green algae are being grown at the University of Chicago to give more material on which to experiment.

At the University of California, radioactive carbon is being used in working with another simple green plant, the alga called *chlorella*. At Antioch College in Ohio, scientists are trying to discover the way chlorophyll is put together chemically, which may lead to reproducing or bettering the substance that captures light energy and puts it to work.

Scientists do not dare guess how long it will be before an artificial green plant can be built or whether a chemical process can be achieved to convert sunshine economically into sugar and starch for food or factory material. But that is the practical goal for these tedious experiments with the simplest of growing plants.

Upon these researches may depend whether the world continues to be hungry as future decades bring hundreds of millions more people to the earth. The scientists doing the work, unlike those who made the atomic bomb, have easy consciences as to what the future will bring forth. For they do not see how their discoveries can be fashioned into weapons for destruction.

Science News Letter, January 10, 1948

Stories from the meeting in Chicago of the American Association for the Advancement of Science are designated by AAAS in the line above the head. For other reports from the conference see SNL, Jan. 3.

GENERAL SCIENCE-AAAS

AAAS Prize Awarded for Paper on Earth's Origin

► THE thousand-dollar prize of the American Association for the Advancement of Science was awarded to 30-year-old Dr. Harrison S. Brown, of the University of Chicago's Institute for Nuclear Studies, for his paper on elements in meteorites and the earth's origin. Dr. Brown is the youngest scientist ever to receive this prize, which was given for the 21st time at the meeting in Chicago.

The research which was the subject of Dr. Brown's prize-winning paper is expected to become the basis of further studies which may lead to a closer estimate of the age of the earth and of the known universe. Since the age of the cosmos is now variously estimated at from three to ten billion years there is plenty of room for closing the bracket.

Interviewed after receiving the prize, Dr. Brown mentioned that one of his colleagues has recently succeeded in isolating a few milligrams of lead from an iron meteorite. Since lead is the final



PRESIDENT-ELECT — Dr. Elvin Charles Stakman of University Farm, St. Paul, Minn., will head the AAAS in 1949.

stage in the radioactive decay of uranium, this accomplishment should materially aid in the determination of the age of meteorites, and hence of other material in the universe, as soon as the uranium content of the original sample has been ascertained.

Dr. Brown, who was assistant director of the chemistry division at Oak Ridge during the war, stated that the techniques for separation of chemical

isotopes developed as part of the work on atom-bomb production will be highly useful in his researches from here on.

In a book, "Must Destruction Be Our Destiny?" which was published shortly after the atom-bombings of Hiroshima and Nagasaki, Dr. Brown was one of the first to raise the disturbing questions of the relation of atomic energy to world peace that are still being debated in world forums.

Science News Letter, January 10, 1948

ZOOLOGY-AAAS

Killer Trait in Animals

This inherited deadliness to other strains of the same species was discovered in microscopic animals and traced to their possession of the factor Kappa.

► PEACEFUL, unaggressive citizens of the microscopic world within a drop of water can be transformed into killers by giving them access to the weapons of slain aggressors of their own species. Not only that, but they can also hand down this acquired killer trait to their descendants.

This sinister situation among invisible animals, which might well be a parable for present times in our more magnified cosmos, is a new discovery by Prof. T. M. Sonneborn of Indiana University, whose earlier work on peculiarly inherited deadliness in the so-called slipper animalcule, paramecium, won him the \$1,000 prize of the American Association for the Advancement of Science a year ago. It was disclosed in a discussion with a group of other zoologists who have been working on the same minute animals.

Strain Deadly to Own Species

Among slipper animalcules there are strains whose mere presence is deadly to other strains of the same species. This lethal action is due to their possession of a factor called Kappa, or K (for killer). This killer factor is handed down through the generations in the general protoplasm of the cell, not by means of genes in the chromosomes of its nucleus.

Prof. Sonneborn took large numbers of such K-equipped micro-organisms and made a kind of mash of them by squirting them very forcibly through a hollow needle against a plate; into this debris of dead killer-animals he introduced small numbers of non-killers, each in its own individual kit of this witch-brew. They picked up the killer

factor and made it part of themselves, and thereafter they and their descendants were killers.

Each Carries Killer Factor

In the same discussion, Dr. John R. Preer of the University of Pennsylvania stated that each killer individual carries an armament of between 200 and 800 particles of the killer factor. If a suitably disposed paramecium possesses even a single particle, this particle can multiply itself up to the number necessary to make its owner a killer. Dr. Preer has also measured the size of the deadly particles by means of X-rays. He found that they are larger than genes, more nearly the size of larger filterable virus particles. Dr. Mary L. Austin of Wellesley College added her contribution: a killer individual, to keep the neighborhood unsafe for its fellows, needs to release only one particle of its deadly substance every five hours. One particle is enough to kill an unaggressive neighbor.

Snapping Shrimp Studied

◀ DARWINIAN competition for survival goes on not only among the individual animals but among individual cells in the tissues of the same animal, Dr. Hugh H. Darby of the Carnegie Institution of Washington pointed out. He has demonstrated this in experiments in the re-growth of pieces of claw clipped off the snapping shrimp of gulf waters.

When the shrimp next shed its shell and grew a new one, the replacement

growth on the partially amputated claw was not as large as it would have been under normal conditions. On the other hand, the other end of the claw, which should have merely remained the same size, became larger. Dr. Darby interprets this as indicating a competition for growth material between the two parts of the same claw.

The snapping shrimp, incidentally, has been in the news already. During the war, the underwater noise made by millions of them snapping their claws together fouled up very badly some of the Navy's sound detectors used in tracking submarines.

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Corn is Mexico's most important crop.

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