

## BIOCHEMISTRY

# Origin of Photosynthesis

**Photosynthesis may have started on very primitive earth, much earlier than has ever before been suggested, American Association for the Advancement of Science is told.**

► A NEW THEORY of the origin of life on earth supposes that the ability to use the sunshine's energy arose almost in the beginning.

This speculation was proposed by Dr. Sam Granick, Rockefeller Institute for Medical Research plant physiologist, in a conference on spontaneous generation held in New York by the New York Academy of Sciences and the American Association for the Advancement of Science.

It means that photosynthesis could have happened earlier in the rise of life on our globe than anyone has yet dared to suggest.

In the past the general ideas were that only after life had developed to a rather complex state did photosynthesis occur. Photosynthesis is the mechanism for capturing the sun's energy by building up chemical compounds and it is the prime way in which energy is supplied to earth.

Dr. Granick supposes in his guess as to life's beginnings that there was a primordial mechanism which started off life by having some kind of energy supply that would act upon a mineral as a primitive energy unit. This would be a mineral that would operate in an oxygenless atmosphere with water, and with sunlight as the energy input.

A dark mineral, like magnetite, a form of iron ore, would absorb sunlight and have the ability to decompose water. It would be a photocatalyst and would develop organic materials. Life would begin in this high concentration of materials, through use of the sun's energy.

Dr. Granick pointed out that many of the enzymes of the body today are known to have metal atoms as the focal point of their activities and he compares them with inorganic metal ions and finds they have similar properties. The metal atoms have the capacity of concentrating around themselves some material, bringing about reactions and forming protoplasm. This kind of reaction is being studied in laboratories.

Pure magnetite, which he believes could have been the energy unit, has properties related to the solar batteries that have been invented recently, Dr. Granick explained.

Lightning's electric discharges could have synthesized organic compounds out of simple materials in the oceans early in the earth's history to give ingredients for living organisms, Dr. Stanley L. Miller, biochemist of Columbia University's College of Physicians and Surgeons, told the conference on spontaneous generation.

Dr. Miller sparked mixtures of gases for a week and made nine amino acids, of which glycine, alanine, aspartic and glutamic acids occur in proteins. Glycolic,

lactic, formic, acetic and propionic acids were also identified. (See SNL, July 2, 1955, p. 8).

Such compounds were formed when the earth was young, he believes. They were carried down by the rains and reacted in the ocean to give amino acids and other complex compounds.

Although synthesis of amino acids is not the synthesis of life, Dr. Miller suggested that it is a step toward understanding how living matter may have arisen on the earth.

He said one of the most fundamental problems of biology is posed by the question of how life arose on earth. Although the theory of evolution offers an explanation for the development of complex multi-celled living organisms from single-celled organisms, Dr. Miller noted, it does not explain the development of the first organism.

His experiments were designed to test the theory that a complex mixture of organic compounds can be synthesized by electric discharges, which are similar to lightning, in a mixture of reduced gases. The idea that organic compounds might be formed if the primitive earth had a re-

ducing atmosphere of methane, ammonia, water and hydrogen instead of the present oxidizing atmosphere of carbon dioxide, nitrogen, oxygen and water has been suggested by A. I. Oparin and Nobelist Harold C. Urey.

Experiments reported by Dr. Philip H. Abelson of the Carnegie Institution of Washington also demonstrated that lightning could have produced from atmospheric gases materials out of which life might have arisen. (See SNL, Nov. 17, 1956, p. 308).

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## VIROLOGY

## Virus Causes Disease In Both Plant and Animal

► THE FIRST KNOWN CASE of a virus causing disease both in a plant and an animal was reported to the American Association for the Advancement of Science meeting in New York by Dr. Karl Maramorosch of the Rockefeller Institute for Medical Research, New York.

The virus causing aster yellows is transmitted to leafhopper insects that feed on the plant. It multiplies in the infected insects which, however, live as long and breed as freely as non-infected individuals.

This past year, experiments by Mrs. Virginia C. Littau in collaboration with Dr. Maramorosch showed changes in the fat cells of insects that had acquired virus by feeding on diseased plants. The plant virus causes a comparatively mild insect disease.

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**BULLET-NOSED CANBERRA**—An Air Force B-57 Canberra jet bomber is shown here after being modified by Temco Aircraft Corporation, Dallas, Texas, as a flying test bed for Bomarc missile guidance systems. Attaching the 17-foot nose necessitated major weight and stress design changes in the bomber.