BIOLOGY

Origin of Life Theory

➤ SOME OF THE SIMPLE chemicals contained in comets have been used to reinforce one of the theories of the origin of life.

Dr. J. Oro of the University of Texas mixed a solution of hydrogen cyanide, ammonia and water and for the first time isolated a compound called adenine, which scientists agree is basic to life everywhere on earth.

Dr. Oro reported his work to fellow biologists at the meeting of the Federation of American Societies for Experimental Biology in Atlantic City. Adenine is necessary for the structure and the function of genes, for energy metabolism and for a host of other biochemical functions.

It belongs to a family of nitrogen-containing compounds called purines. It is known to be one of the four bases scattered repeatedly but systematically along the nucleic acid molecule, and is thus believed to play a crucial part in the transfer of genetic information.

"Nobody till now has obtained purines from such simple compounds," Dr. Oro said. He told of having let a mixture of hydrogen cyanide, ammonia and water stand for about a day at room temperature and of then isolating adenine as well as a precursor of the same compound from the solution that resulted.

Hydrogen cyanide, ammonia and water are often theorized to have been present on the primeval earth, and through the passage of millions of years to have converged and combined into the kind of organization required for the origin of life.

"We also found the amino acids glycine, alanine and aspartic acid," Dr. Oro said, "and we're looking for guanine, which is related to adenine, and for nucleosides."

Amino acids are the units from which are built the thousands of different proteins in living things. There are about 20 in all, arranged repeatedly, depending on the kind of protein.

Guanine is also part of the nucleic acid molecule. The nucleosides are simply what is left after the long molecule of nucleic acid is broken down. They consist of only the one nitrogen base attached to a molecule of sugar. Comets are known to have been traveling seemingly aimlessly through space for millions of years. So, according to Dr. Oro, they might be strong hints of what the earth resembled long time ago.

The aim of scientists working on the origin of life is to implicate simple primeval compounds into an evolutionary scheme. The organization implied in evolution demands the presence of enzymes, long protein molecules that control the thousands of reactions of metabolism.

"The next step in our work would be to isolate a polypeptide with enzyme properties," Dr. Oro said, "then look for organization." But he admitted that duplicating organization was possible only in the far future.

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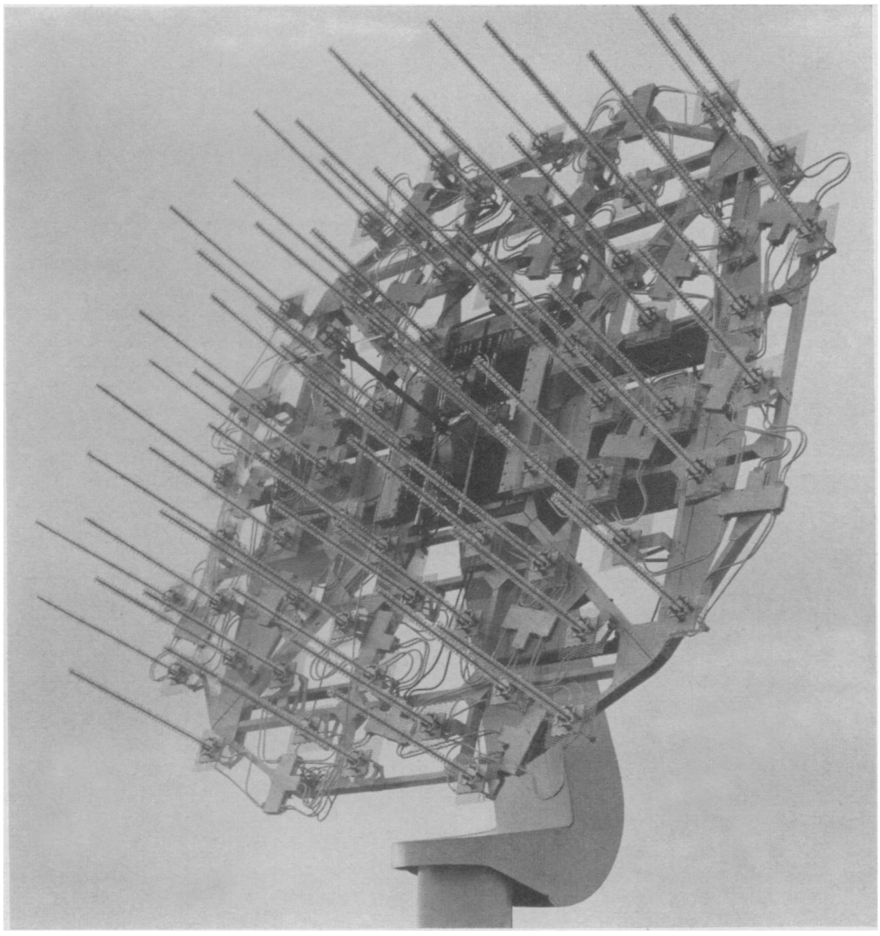

FOR UNMANNED TRACKING—The modular construction Avien-Bogner antenna will be used at the first unmanned tracking station to be built this year. Designed by Avien, Inc., Woodside, N.Y., it will be used for telemetry reception of high speed, low flying vehicles.

Brain Chemicals Studied

➤ BIOLOGISTS are taking some close looks at the mysterious chemistry of the brain.

Canadian biologist, Dr. William C. McMurray of the University of Western Ontario, has singled out for study the little understood phospholipids. These compounds, also called phosphatides, are distributed in varying concentrations in the gray and white matter of the brain and are believed to play important roles in the structure and metabolism of the brain.

Dr. McMurray studied the amounts of two types of phosphatides, the lecithins and myelins, in the brains of growing rates. The lecithins are found mostly in the gray matter of the brain, where thought processes are believed to take place; the myelins are located in the outer white matter, which scientists say functions as an electrical insulator.

"We are trying to find out something about the role of these phosphatides in the metabolism of protein," said Dr. McMurray, "with the hope of understanding the enzyme system in the developing brain."

For example, he explained, the myelins might also be necessary for maintaining the structure of the white portion of the brain, which is made up mostly of protein. Since it is thought that metabolism is related to the structure of tissue, the myelins may maintain the proper structure for growth to occur.

The amount of both the lecithins and myelins were highest during the early stages of growth, when the enzyme systems were most active, and dropped off as the rat reached maturity.

Both phosphatides are needed for proper brain function, scientists agree. A deficiency of lecithin results in serious impairment of energy metabolism throughout the body—the patient tires easily. Myelin deficiency causes the vicious nerve disease, multiple sclerosis.

A unique feature of the phosphatides, said Dr. McMurray, is their solubility in water and fat. This property makes them adaptable to either a water or fat environment—the protoplasmic medium.

He reported his findings at the meeting of the Federation of American Societies for Experimental Biology in Atlantic City.

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