

BIOCHEMISTRY

Man-Made Life Closer

Experiments with a newly synthesized organic compound, suggest that life on earth may have evolved from organic matter supporting the theory of chemical evolution.

► THE ISOLATION of a complex organic compound from which chlorophyll and hemoglobin can be made has brought the possibility of man-made life much closer and has confirmed many hypotheses of chemical evolution.

Dr. Anton Szutka of the University of Detroit, department of chemistry, and his associates have been able to make artificially one of the porphines, they reported in *Nature*, 202:1231, 1964.

Porphines are metal-containing organic molecules, capable of thousands of chemical reactions.

They are so versatile that if they are treated one way, chlorophylls are formed. If treated another way, blood proteins such as hemoglobins are created.

The products of porphine reactions are especially useful in living organisms because of their ability to combine with atmospheric oxygen. The atom of inorganic metal in the porphine complex makes this combination possible.

The synthesis of the specific porphine molecule, 1, 2, 3, 4-tetraphenylporphine, has also confirmed, experimentally, the theories of chemical evolution predicting that porphine-like substances are necessary for life-synthesis. The creation and isolation of porphine by an enzyme synthesis process by Dr. Szutka has upheld these theories experimentally.

The porphine-like substance was formed

by treating a solution of simple organic compounds with ultraviolet and visible light.

The substance was identified and isolated with the aid of column chromatography, a process for the selective extraction of one particular chemical from a mixture using a solvent. On standing, the concentration of the porphine was found to increase, indicating that the reaction had become self-perpetuating.

These experiments suggest that life on the earth may have been formed from rich pools of organic matter. More than ten years ago Prof. A. I. Oparin, pioneer Soviet biochemist in the field of chemical evolution, suggested this theory of the evolution of life from chemicals.

Experiments in which amino acids were formed using lightning discharges only partially proved Prof. Oparin's theory. Dr. Szutka's work has experimentally confirmed Prof. Oparin's entire hypothesis.

Dr. Szutka and his staff are now trying to identify more of the compounds in their organic "pools" and deduce something about the nature of the earth's atmosphere that made such evolutions possible millions of years ago.

The first biological synthesis of porphines has given marked support to previous claims of chemical evolution that had been dismissed as mere speculation prior to these experiments.

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BACTERIOLOGY

Bacteria Produce Viruses

► BACTERIA can be made to produce tumor-causing viruses by adjusting their genetic apparatus.

The finding may have important implications in understanding the genetic code and in production of vaccines.

Drs. William R. Romig, bacteriologist at the University of California at Los Angeles, and Klaus Bayreuther, virologist at California Institute of Technology, Pasadena, who is now at the Max Planck Institute, Tubingen, Germany, collaborated in the effort.

They worked with the common soil bacterium *Bacillus subtilis* and polyoma virus, which produce tumors in mice and rats.

By rigid laboratory conditioning, the scientists caused the bacteria indiscriminately to take up DNA, the material that carries the genetic code. They then stripped polyoma virus of its protein coat, leaving only its DNA core.

After purifying the virus DNA, they then infected the conditioned bacteria with it. The bacteria proceeded to manufacture vir-

uses that were identical, by all available tests, with the original tumor-causing polyoma virus.

A German scientist, Dr. Pamela Abel, recently reported similar results with the cow pox virus, *Vaccinia*, from which the word vaccine is derived.

A particular virus specifically infects only a certain class of organism, Dr. Romig pointed out. For example, one virus may infect only a certain type of plant, another a certain type of animal.

Thus the ability to infect bacteria, which are classified in the plant kingdom, with a virus that under ordinary circumstances infects only a certain group of mammals, attests to the universality of the genetic code, Dr. Romig said.

In other words, the genetic apparatus of a plant-like organism is able to follow genetic instructions built into a mammal-like organism's DNA.

The research may have practical applications in vaccine production, Dr. Romig said. For example, the ability to reproduce

virus in bacteria might eliminate certain problems associated with polio vaccine.

Virus for the vaccine must be grown in monkey tissue, and contamination by the simian virus has presented problems.

Dr. Romig said the virus yield from bacteria with the present technique is too small for commercial processes. It might, however, be refined to increase the yield to a practical level, he added.

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BIOTECHNOLOGY

Muscle-Action Recorder Detects Causes of Limp

► A NEW INVENTION called a "force platform" will enable doctors to find out exactly what is causing a patient to limp and can help coaches train aspiring athletes.

So sensitive that it can detect the heart-beat of a person standing on it, the platform-and-treadmill device measures forces exerted by a person's muscles as he walks. It records on a graph, and a person's muscle action can thus be compared with that of a healthy or desired pattern; the desired pattern can then be achieved. Doctors, physical therapists, athletic coaches and others concerned with muscle development and coordination are expected to find the invention useful.

The "force platform" was invented by a group of professors at Purdue University in Lafayette, Ind. It was described by Prof. James Barney of Purdue at the annual meeting of the American Society for Engineering Education held at the University of Maine, Orono.

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DePaul University

TO TEST PERSISTENCE—Dr. Glen Jensen of DePaul University holds one of about 90 rats he uses each week in his experiments to determine what pattern of rewards and disappointments best reinforce persistence. An electric measuring instrument at the left counts the number of times the animals press a bar for rewards.