

BIOCHEMISTRY

Chemical of Life Created

Adenine, one of the most important of the chemical compounds essential to life processes, has been synthesized for the first time.

► **MAN HAS NOW** created for the first time a chemical molecule, called adenine, essential to all life processes.

Adenine is a versatile and important base for building up more complicated systems of life, scientists report in the Proceedings of the National Academy of Sciences (May). It is the most important of the purines, chemicals that are the basis of nucleic acids (DNA and RNA) and a wide range of energy compounds driving chemical reactions in living systems. Nucleic acids are found in all living cells.

In laboratories that mimic the primitive atmosphere of the earth about four billion years ago, scientists are moving closer to life's secrets.

Adenine is the most complex molecule synthesized so far in scientists' search for the origin of life. It was created by bombarding a "primitive earth environment" with electrons from a 4.5 million electron volt linear accelerator, Dr. Melvin Calvin, Nobelist, and his associates at the University of California Lawrence Radiation Laboratory, Berkeley, report. Dr. Cyril Ponnamperuma, Ruth Mariner and Dr. Richard Lemmon joined in the studies, which were supported by the Atomic Energy Commission, the National Aeronautics and Space Administration and the Ames Research Center, Moffett Field, Calif.

This research is the latest chapter in finding out how life evolved on this planet. It strengthens the theory that life could have developed from simple chemicals and

forces existing in the primeval environment of earth.

Dr. Calvin and other scientists began working on the puzzle of life's origin more than 12 years ago. One of the theories they postulated was that the earth's atmosphere some four billion years ago consisted of hydrogen, methane, ammonia and water. These materials contain four basic elements—hydrogen, carbon in methane, nitrogen in ammonia and oxygen in water.

By combining these elements, simple organic molecules could be created.

Energy forces necessary to combine these elements, the scientists believe, come from cosmic rays, radioactivity from the earth's crust, ultraviolet light from the sun, and possibly electrostatic discharges in the atmosphere.

• Science News Letter, 83:323 May 25, 1963

BIOLOGY

Control Over Cell Growth Seen Near Achievement

► **CONTROL** over normal and abnormal cell growth could be achieved from a discovery made leading to the understanding of cell division.

At Columbia University a scientist obtained evidence that deoxyribonucleic acid (DNA) molecules, the keys to heredity, reproduce themselves by unraveling in an orderly fashion from one end to the other.

This is "an exciting step toward firm

understanding of the processes of genetics," Dr. Francis Ryan, chairman of Columbia's zoology department, said. He noted that the studies of Dr. Toshio Nagata, now at Harvard University, show how the powerful techniques of genetics can be used to understand the detailed behavior of invisible molecules.

It has been an unsettled question up to now whether the strands of DNA molecules unwind from only one end or from both ends at once.

Scientists have proposed that DNA is composed of a pair of threads that wind about each other to form a double-stranded helix. In the process of reproduction, the strands unwind from one another and "manufacture" a new partner complementary to the other, thus producing two double-stranded daughters exactly the same as the parent.

Dr. Nagata's determination that the replication is a one-way process has been confirmed by three other laboratories, using different techniques. His method was to use three strains of *Escherichia coli* bacteria, "synchronizing" them to divide at the same time. Normally, cells divide haphazardly as a mass.

Dr. Nagata found that the unraveling process, which results in gene duplication, begins at the "F factor" located at the rear end of the chromosomes. This is the last element of the male chromosome to enter the female cell. It determines whether the cell will be male and whether it will donate a chromosome to female cells.

How the "F factor" works and how DNA replication is controlled in the female cell, which has no F factor, must be determined next.

• Science News Letter, 83:323 May 25, 1963

AGRICULTURE

New Chinese Chestnuts Replace Destroyed Trees

► **THE SPREADING CHESTNUT** tree may once again cast its shade over New England streets.

Two new blight-resistant Chinese chestnut varieties have recently been released to commercial nut growers and nurserymen along the East Coast, J. W. McKay, U.S. Department of Agriculture's research service, stated in Beltsville, Md.

The new varieties, called Crane and Orrin, will take the place of the beloved native chestnut trees that were destroyed in the United States by a blight in the early 1900's. Special chestnut trees from Italy are growing well in blight-free California, Mr. McKay reported in Agricultural Research, May 1963. However the Eastern United States still retains the deadly blight, and this is where the new Chinese varieties will make their stand.

The Crane chestnut was named for Dr. Harley L. Crane, retired U.S. Department of Agriculture scientist who worked for years in selecting and testing blight-resistant species; the Orrin variety was named for Orrin S. Good, who grew the valuable trees in his Pennsylvania orchard.

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Merck Sharp & Dohme

RAT AIDS RESEARCH—A rat is taught to press a lever to avoid an unpleasant shock in the Merck Sharp & Dohme Research Laboratories. Later the animal will be used to evaluate tranquilizing compounds. Its actions before and after the drug is taken are recorded on an automatic tracer shown at the left.