

GENERAL SCIENCE

Science Advances in 1965

Mars photographs show life on that planet unlikely; Russian and U.S. astronauts walk in space, and most distant and most ancient astronomical object discovered.

By **WATSON DAVIS**

► **MAN'S PROGRESS** in the conquest of space continued during 1965. Both Russian and American astronauts "walked in space" outside their capsules.

Mariner 4 photographed Mars relatively close up. The Martian pictures showed that the surface of the ruddy planet was more like the moon than the earth. This discouraged the idea that life exists on that planet because there is every indication that the moon is a lifeless satellite of the earth. The "canals" of Mars appear to be due to an optical illusion of elevation on Mars' surface.

In space also Comet Ikeya-Seki, the brightest visible so far in the 20th century, appeared for a short period. Farther in the depths of space, far outside the solar system or even our own galaxy, explosively brilliant objects called quasars were studied by astronomers. One quasar 3 C-9 was found and pronounced the most distant and most ancient object in the universe today. The study of quasars tended to support the idea of a "big bang" start of the universe.

Life Existence More Ancient

On the earth itself, the time that life has existed was pushed into the more remote past with evidence from chemical molecules in Minnesota rocks that life existed 2.7 billion years ago and from African rocks, 3 billion years ago.

From the Olduvai Gorge in Tanzania, East Africa, where other evidences of prehistoric man had been unearthed in previous years, evidences of a different type of human being living about 600,000 years ago were discovered, indicating that three different types of prehistoric man existed near to each other in this ancient area.

For the benefit of the health of modern Americans, legislation was passed by Congress on Medicare which will have a great influence on health and medical practice. A new heart, cancer and stroke program was also implemented. Besides bringing medical benefits to many of the older people in our population, there will be an increase in medical research to continue the development of new methods of treating illnesses and increasing longevity.

One promising accomplishment was the detection of brain tumors by ultrasonic waves. In another advance, steps were taken to overcome the Rh negative factor by giving high-antibody gamma globulin to the mother shortly after the birth of her first child.

In a constant effort to develop through animal experimentation the new methods of treating diseases, an artificial heart was implanted partially in a calf. Dog brains

were successfully transplanted, aiming at the better understanding of brain tumors, cancer growths and multiple sclerosis.

New studies of nucleic acid structure brought science closer to discovering the secret of life. For the first time in history, the structure of a nucleic acid, carrier of hereditary messages, was determined. The first complete nucleotide sequence was detected in one of the smallest biologically active nucleic acids known—an alanine transfer RNA, or ribonucleic acid, isolated from yeast. This discovery could lead to understanding many important processes of living cells and to synthesis of a biologically active nucleic acid.

Chromophore, Key to Growth

Scientists are understanding what makes some plants grow tall and others short by the isolation of a small bile pigment called chromophore which, in essence, triggers a protein molecule that governs the growth of plants. The chromophore, highly sensitive to light, is the key to growth and flowering of certain plants at certain times of the year as the timing and intensity of sunlight change.

The five nucleotides or building blocks of life's basic material DNA (deoxyribonucleic acid) and RNA (ribonucleic acid) were synthesized from chemicals in a laboratory by an "astonishingly simple" method of adding simple phosphate to ammonia, methane and water, believed to have been earth's principal ingredients when life began billions of years ago.

The perceptual system of newborn babies was found to be more highly organized than previously thought, and this will undoubtedly have a bearing upon early training and education of children—a field of research and practice that has been continually important and interesting.

Poverty Program Educates

The making of public education available to younger and younger children, particularly the underprivileged who do not have the advantage of home life and care, is an accomplishment of the enrichment of educational experience being provided by the poverty program of the Federal Government applied to local conditions.

A striking buildup of more interest in science for youth, increasing effectiveness of science courses in the elementary and secondary schools, and a growth of science youth activities in science clubs and fairs was noted, not only in the United States, but in other parts of the world.

A long-term sea mystery of what creature has been making spirally coiled tracks deep on the ocean floor was solved by special



Smithsonian Astrophysical Observatory

IKEYA-SEKI—This picture of the Comet Ikeya-Seki was taken on Oct. 29 at Maui, Hawaii, by one of the observers at the Smithsonian Astrophysical Observatory's observing station located there. It was taken with a 35 millimeter camera.

photographs showing for the first time the acorn worm, known as "giant" enteropneust, 15,534 feet below the surface of the South Pacific Ocean. These fragile, pinkish-tan marine worms, measuring two inches to two feet long, have a rounded snout that fits into a collar looking much like an acorn. They burrow into mud and sand, swallowing the mud to digest their food and leaving casings lined with mucus to form the odd spirals and coils on the ocean floor.

Science's continued investigation of the moon was advanced not alone by the human astronaut Gemini flights accomplished and planned, but by the readying of sophisticated robots that will precede man on the surface of the moon to send back to earth signals reporting their lunar discoveries.

While space explorations concentrated largely upon the moon and Mars, astronomical observations of various sorts have determined new facts about some of the other planets. The rotation of Mercury has been determined to be different than what was believed in the past. By radar observations and a reanalysis of optical ones, the

rotation rate was determined to be 58.6 days.

The discovery of the antideuteron during the year gave new strength to the intriguing idea of an antimatter world, the particles of which are opposite in charge to those in our own part of the universe.

Scientists continued to be intrigued at the idea that some of the phenomena causing the gigantic disasters on the earth may have been caused by chunks of antimatter smashing into our atmosphere causing such explosions as the one in Siberia in 1908.

The location of the 200 billion electron volt particle accelerator, projected to cost \$350 million over a period of years, was not decided during the year. Competition between various parts of the country are complicating its location.

New artificial "metals," made by applying very high pressures to non-metals, were produced in laboratory experiments, leading the way to production of improved metallic-like substances and giving great promise of better understanding of how and why materials react as they do.

Drought Causes Apprehension

The drought of the northeastern United States area continued to cause apprehension that water shortages for large cities like New York will become even more serious, requiring desalination plants and major changes in utilization of rivers.

Scientists are exploring the sea in various ways more intensively than in the past. Dwelling places beneath the ocean have been developed. New depths of the sea have been reached in craft withstanding the pressures encountered.

Publication of a map that was drawn in 1440 by Viking explorers reinforced the idea that Columbus was not the first white man to reach America, but that Scandinavian explorers preceded the first settlements which are credited in our history books.

By assembling panels of experts, the National Academy of Sciences, the elite body advising the Government and the nation on science and research, issued reports on pollution of water and atmosphere, chemistry, botany, use of computers, the search for life on Mars and other planets, and 10 years' progress studying the solid earth.

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10 Top Science Advances Chosen by Science Service

THE TEN TOP science, medicine and technology advances in 1965 as selected by Dr. Watson Davis, director of SCIENCE SERVICE, are:

- 1. Photographs of Mars obtained by Mariner 4, indicating the improbability of life there.
2. Space walks by Russian and United States astronauts.
3. Advances in transplantation, including transfer of brains of dogs from one animal to another and implantation of an artificial heart into a calf, techniques foreshadowing possible use in humans.
4. Passing of Federal legislation for Medicare, as well as a new heart, cancer and stroke program.
5. Discovery of the antideuteron, sustaining theories that an antimatter, or negative type, exists in the universe.
6. Comet Ikeya-Seki, most brilliant in the century.
7. Advances in learning the structure of nucleic acid that may bring science closer to knowledge of the secret of life.
8. Discovery of the most distant and most ancient object in the universe, the immense astronomical explosion of quasar 3C-9.
9. Discoveries during continued exploration for traces of early man in Africa indicating that human beings existed two million years ago.
10. Recovery of a map drawn in 1440 A.D. showing that America was visited by Norsemen before Columbus landed.

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