

Mariner II May Bring Answers to Some Questions About Universe

By GERALD S. SNYDER
United Press International

New York—(UPI)—Beneath the dense clouds surrounding a mysterious planet millions of miles from Earth may lie key answers to man's questions about how the universe was created and how life evolved.

The answers, a prominent space physicist said, may be found in the vicinity of Venus—the Earth's sister planet—now being approached by America's Mariner II spacecraft.

The Mariner and subsequent space probes, he said, may cut through a near infinity of space and time to explain some of the most basic questions man has asked since he first became curious about his universe.

More of A Puzzle
Because of the cloud-like atmosphere which surrounds Venus, it has been more of a puzzle to man than the moon and Mars. For that reason, scientists the world around anxiously await December when the recently launched Mariner hopefully will come within 10,000 miles of Venus.

Is there life on Venus? Is it covered by a vast swamp-land? Or an ocean? Or a swirling dust bowl? Or, as is now mostly commonly believed, a fiercely hot, moistureless desert?

Mariner may reveal, at least in part, some of the answers.

Dr. Robert Jastrow, the brilliant, 37-year-old physicist who heads the Goddard Institute for Space Studies here, says man now knows little about Venus. If it were time to launch a manned exploration, he said, scientists would not know whether to send a plant scientist, a mineralogist, a petroleum geologist or even a deep sea diver.

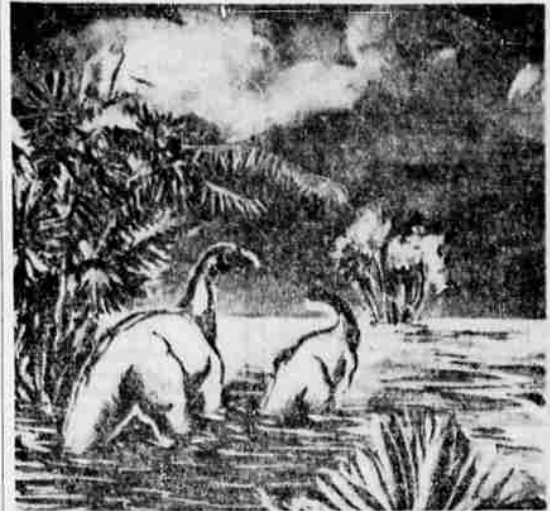
The space institute, a subsidiary of the Goddard space flight center operated by the National Aeronautics and Space Administration, is one of the scientific agencies which is carrying out basic research into the mysteries of the universe.

Dr. Jastrow said that some of the answers supplied by Mariner II and its space-voyaging successors may solve the mysteries of life itself.

Remarkable Effort
The attack on these mysteries, Dr. Jastrow said, "represents a remarkable effort to roll back the 4½ billion year history of the solar system and unravel the tangled complex events accompanying the birth of planets."

If Mariner brings back any information about life in space, he said, it could have a profound effect on medical research and other fundamental problems of science.

"Mariner II is the most sophisticated and complex interplanetary spacecraft produced by anyone to my



KEY ANSWERS UNDER CLOUDS—Beneath the dense clouds surrounding the planet Venus, millions of miles from earth, may lie key answers to man's questions about how the universe was created and how life evolved. These are two artist's concepts of what sort of atmosphere might be found on Venus—the earth's sister planet, as it is approached by America's Mariner II spacecraft. Discarded at beginning of 20th century was once-popular view that Venus is a swamp-covered planet inhabited by the same kind of primitive beasts which roamed the earth 500 mil-

lions years ago, left. The theory is in complete disrepute today, owing to the belief that no life of any kind can exist on blistering hot surface of the planet. Scientists have concluded that the temperatures on Venus range as high as 600 degrees Fahrenheit. Drawing at right presents literally the dimmest view into the nature of the Venus surface, namely the belief that the terrain is a vast, dust-shrouded desert absolutely impervious to sunlight and with high winds swirling dust particles through the air. (UPI)

knowledge," Dr. Jastrow said. "But even so, it is only a preliminary attack on the investigation into Venus."

Little is known for certain about the earth's nearest planetary neighbor, the bespectacled physicist acknowledged, but scientists believe this to be correct:

Agree On Little Else

—Venus is about the same size as the earth (Venus 7,800 miles in diameter, the Earth 7,926) and the mass and gravitational field of the two planets are similar.

—Venus' atmosphere contains carbon dioxide and nitrogen but little free oxygen or water vapor. The surface temperature is thought to be about 600 degree Fahrenheit—an impossible heat for any kind of life.

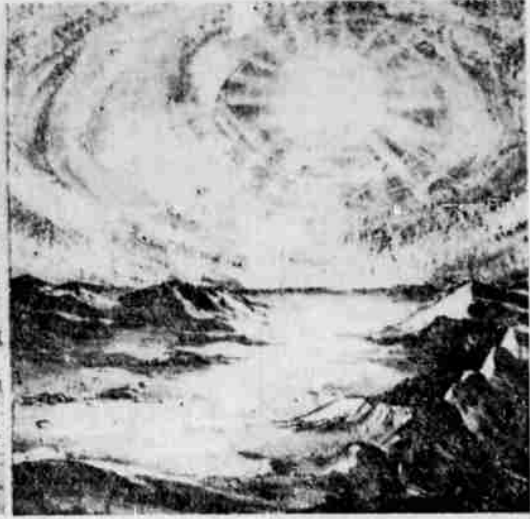
Scientists agree on little else about the planet. The state of Venus' cloud-con-

cealed surface is one of the greatest mysteries.

The most popular theory, Dr. Jastrow said, is that of Astronomer Carl Sagan. He believes the planet is a silent, sweltering desert world where petrified rocks heated by 600 degree temperatures dot the lifeless terrain. The sun is visible only as a faint glow through opaque, wind-free clouds.

Scientists F. L. Whipple and D. H. Menzel advance the theory that Venus is covered by an ocean of seltzer water, carbonated by the high carbon dioxide content in the atmosphere. In their conception, water filled clouds loom menacingly over the wind-swept ocean with no signs of land or life. Another scientist thinks the ocean may be petroleum covered.

The dimmest view of Venus in terms of the possibility of life is that of another school of scientists who picture the



planet as a huge dust bowl. The terrain, they think, is a vast, dust-shrouded desert impervious to sunlight and with winds swirling dust particles through the air.

A once-popular theory, generally discarded at the beginning of the 20th century, was that Venus is a swamp-covered planet inhabited by the same kind of primitive beasts which roamed the Earth some 500 million years ago. The acceptance of the newer theory that Venus' surface temperature is 600 degrees virtually eliminated the possibility of Earth-like life.

Venus, in all probability, is a world where life is out of the question. But scientists have not ruled out the possibility of some sort of life lower than that which exists on Earth.

It has been estimated that there are at least 100 billion planets in the Earth's galaxy and there may be 100 billion galaxies in the universe. Scientists doubt that in such vastness Earth is the only habitable planet.

The Mariner shot may reveal whether life is possible on Venus. Subsequent probes deep into space may open similar secrets about Mars and other known planets.

The Mariner spacecraft's scientific mission may substantiate one or more of the various theories about the makeup of Venus' surface, or it may produce a new one altogether.

An instrument called a microwave radiometer should help to solve these two vital questions: What is Venus' atmosphere like and what is the temperature at its surface?

Another thing Mariner may discover is whether Venus is surrounded by cosmic dust, possibly left behind during the formation of the solar system billions of years ago.

Such questions need to be answered before man can safely venture into the planet's environs.

In its 160,000,000-mile trip to the vicinity of Venus, Mariner won't discover the answers to all of these questions. But, if all goes well and the vehicle comes close to the planet during the second week of December, man will have made his biggest breakthrough in the exploration of the solar system.

The data collected so far about Venus has been gathered at an awesome distance. When the planet is at its nearest spot to earth, it still is 26 million miles away, and scientists have been unable to see through the white, cloud-like mass that permanently veils it.

"This," Dr. Jastrow said, "is one of the main reasons for the confused state of

OCEAN OF SELTZER WATER—In the theory advanced by Scientists F. L. Whipple and D. H. Menzel, the surface of Venus is covered with an ocean of seltzer water, carbonated by the high carbon dioxide content in the atmosphere. At left is artist's concept of this view of Venus, showing water-filled clouds looming menacingly over the wind-swept ocean—with no sign of terrain anywhere.

Drawing at right illustrates most popular theory about the surface of Venus—advanced by Astronomer Carl Sagan—that the planet is a silent, sweltering desert world. Petrified rocks heated by 600 degree Fahrenheit temperatures dot the lifeless terrain. The sun is visible only as a faint flow through the wind-free clouds. (UPI)

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