GEOPHYSICS

Storm Zone on Venus

A stormy region, 1,000 miles across and ten degrees Fahrenheit hotter than the surrounding atmosphere, has been discovered near the southern tip of Venus—By Barbara Tufty

➤ A STORM about 1,000 miles across has been spotted for the first time raging near the southern tip of the planet Venus. The temperature in the stormy region was about ten degrees Fahrenheit hotter than in the surrounding atmosphere.

The storm was clearly visible in the most detailed observations yet reported of the upper atmosphere of Venus, Dr. Bruce Murray of the California Institute of Technology told the 44th annual meeting of the American Geophysical Union in Washington, D. C.

It was seen with a heat-sensitive detector fitted to the 200-inch Hale telescope on Mt. Palomar. Observations were made last December when Venus was comparatively nearby, only 36 million miles away. At that time, about a quarter of its disk was sunlit, so temperature readings of both the light and dark areas of the planet's atmosphere were possible.

The earth observations were taken at the same time as the Mariner II was flying past Venus.

The temperature of Venus' upper atmosphere is the same on the dark side as on the sunny side, Dr. Murray reported. This shows a surprisingly efficient distribution of the sun's energy that falls on the sunlit side. It could be explained by a slow rotation of Venus on its axis as the planet makes its 225-day journey around the sun.

Because the planet is covered with dense clouds that conceal its surface, astronomers have long been puzzled about the speed and direction of its rotation. Recent interpretations of radar observations indicate a very slow reverse rotation, he pointed out.

The apparent temperature of the atmosphere is about minus 75 degrees Fahrenheit in the central region of the planetary disk and gradually grows colder toward the poles of the planet. The maximum difference in temperature is about 18 degrees.

The instrument that first mapped in detail atmospheric temperatures on Venus is 20 to 50 times more sensitive than any previous one devised for measuring temperatures of comparatively "cold" celestial bodies. The infrared radiation measuring instrument can scan temperatures on areas as small as 260 miles in diameter on the planet's atmosphere. The instrument "sees" heat waves through a "wavelength window" in the earth's atmosphere that admits infrared radiation with wavelengths about 20 times longer than those of visible light. The long infrared waves are collected by the Hale mirror, filtered and focused onto a special germanium crystal detector that changes them to electrical currents, which are then amplified about a million times

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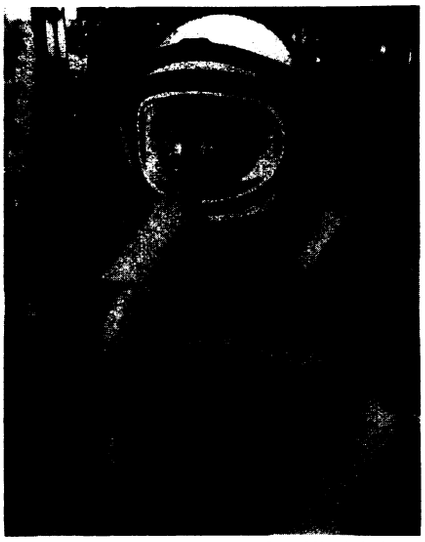

Republic Aviation

MOON SUIT TESTS—Arnold Beck, human factors engineer of Republic Aviation Corporation, wears the uncomfortable-looking apparatus used in making tests in experimental spacesuits. He is one of a scientific team that is trying to make things as comfortable as possible for astronauts when they explore the moon.

Earth's Crust Measured

➤ THE EARTH'S CRUST, a relatively thin layer of rock that covers the world, is composed of three main layers having markedly different electrical properties.

Heavy equipment and new techniques have permitted scientists to probe deeper and more accurately into the earth's rocky rind, which extends from the surface to depths of some 60 miles.

"For the first time," stated Dr. George V. Keller of the U. S. Department of the Interior's Geological Survey, Denver, "we have obtained a better understanding of the electrical properties of the earth."

Geologists can now measure the resistance of crustal rocks to electric currents sent through one pair of electrodes and received through another pair as far away as 60 miles, Dr. Keller told the 44th annual meeting of the American Geophysical Union at Washington, D. C. To obtain the resistance at greater depths, Dr. Keller described a method which measures the earth's magnetic field and associated electric currents induced in the earth by electrical currents in the ionosphere, the electrically charged atmospheric layer that reflects radio waves.

Three principal layers are recognized within the earth's crust, he pointed out, as result of his studies at several dozen locations in New England and in the southwestern states.

The surface layer, which extends to depths of about six miles, consists of sedimentary rocks or fire-fused and pressured rocks. This layer has low electrical resistance and varies markedly in different areas.

The next layer is a highly resistive layer ranging to depths of approximately six to 18 miles.

The third layer, extending to about 60 miles below the surface of the earth, is composed of rocks that are more electrically conductive.

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PHYSICS

New Short-Lived Atomic Particle Discovered

➤ THE DISCOVERY of another elementary sub-atomic particle has been reported by two teams of physicists from the East and West Coasts.

It has been named the "phi meson."

The scientists found this latest addition to the slowly lengthening list of heavy sub-atomic particles during studies of the fragments resulting from the bombardment of ordinary hydrogen atoms by the so-called "K" mesons.

Investigation of K meson pairs shows that each pair was in fact the decay product of an extremely short-lived radioactive particle.

This particle is the now-named phi-meson, which exists for no more than two ten-thousandths of a billionth of a billionth of a second before it breaks up into a pair of K mesons.

The phi meson belongs to a fairly numerous group of unstable particles whose existence is incredibly brief before disintegration. The phi meson is distinguished by the fact that it is surprisingly heavy on the sub-atomic scale. It actually has a mass of 1020 million electron volts.

Quite a few types of these highly unstable particles have been found, and they are beginning to fall into a fairly clear pattern.

It is this overall pattern, when it is finally determined through the patient efforts of nuclear physicists all over the world, that will justify the time and expense that go into atomic research.

Detailed properties of the phi meson are reported in Physical Review Letters 10:371, 1963.

The East Coast team included Drs. P. L. Connolly, E. L. Hart, K. W. Lai, G. London, G. C. Moneti, R. R. Rau, N. P. Samios, I. O. Skillicorn and S. S. Yamamoto, working at Brookhaven National Laboratory, Upton, N. Y., and Drs. M. Goldberg, M. Gundzik, J. Leitner and S. Lichtman of Syracuse University, Syracuse, N. Y.

The West Coast team was Drs. Peter Schlein, William E. Slater, Donald H. Stork and Harold K. Ticho and Lewis Smith of the University of California, Los Angeles.

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