

## METEOROLOGY

# Mars 'Air' Found Thinner

► THE ATMOSPHERE on Mars is as thin as the earthly air 15 miles above the surface, the American Meteorological Society meeting in Los Angeles was told. Martian "air" is mostly nitrogen, with a little carbon dioxide and traces of oxygen and water vapor, unlike that on earth.

The Martian atmosphere has now been found to be about a third as dense as previously believed. The finding has forced scientists to revise their designs of capsules that could land on Mars, Dr. Lewis Kaplan of California Institute of Technology's Jet Propulsion Laboratory, Pasadena, reported.

Landing a capsule on Mars requires slowing it from thousands of miles an hour to a speed low enough so it will survive impact. A thinner Martian atmosphere means designing a parachute system that will operate at such a low pressure or allowing more weight for retro-rockets to slow the capsule.

The low pressure now found for Mars also affects design of communications equipment and heat shield for a landing capsule. National Aeronautics and Space Administration plans now call for launching in late 1964 a probe that will scan Mars during 1965.

The study of Mars on which the much thinner atmosphere is based was made on the 100-inch telescope of Mt. Wilson Observatory by Dr. Guido Munch of Mt. Wilson and Palomar Observatories, Pasadena, with Dr. Kaplan and Dr. Hyron Spinrad, also of the Jet Propulsion Laboratory.

Their results show the surface pressure for Mars is only 25 millibars, instead of the previously accepted 85 millibars. The observation was made from an unusually clear spectrogram of Mars that revealed a band of carbon dioxide so weak it had not before been detected.

Detection and measurement of this band permitted the first direct determination of the amount of carbon dioxide in the Martian atmosphere without regard to pressure. From this, the lower pressure was calculated.

Planning for landing a capsule on Mars shows that a television camera may be the best instrument for detecting life on that planet and on Venus, Dr. K. L. Coulson of the General Electric Company, Valley Forge, Pa., said.

• Science News Letter, 85:100 Feb. 15, 1964

## New Weather Predicting

► THE TIGHT LIGHT BEAM of a laser, millions of times more powerful than a flashlight beam, will be as important as radar to weather prediction.

Dr. Myron G. H. Ligda of Stanford Research Institute, Menlo Park, Calif., and co-workers have used a laser beam to detect tiny particles in earth's upper atmosphere. Using the laser in such ways will open "a new era in meteorology," he told the American Meteorological Society meeting in Los Angeles.

The system works like radar, sending out

a powerful pulse of energy and receiving the echo bounced back from a distant object. A difference is that the laser shoots out light beams, while radar uses radio waves.

The mystery of mirages could be studied with a laser beam, Dr. Ligda said. Laser light also could be used to detect and track the clear air turbulence that gives high-flying airplanes so much trouble, and to determine the physical characteristics of clouds and fogs as revealed by their light-scattering properties.

The most urgent need, Dr. Ligda says, is for the studies of the nature and density of particles in the upper atmosphere before the region is further polluted by man-made particles.

Rocket launchings inject tons of exhaust gases, liquids and solids into the upper air. They are making it increasingly difficult to identify such natural phenomena as normal atmospheric particles, meteor dust and ionized particles from space. Nuclear explosions also pollute the upper atmosphere. It may already be too late to determine what its original, natural state was.

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## SPACE BIOLOGY

## Automated Evaluation Of Space Performance

► THE KEY to man's performance in space may be an automatic device, developed in the University of California's Space Biology Laboratory, which probes an individual's physiological and psychological responses while recording his brain waves.

Associated in development and application of the automated testing system were Raymond Kado, Dr. W. Ross Adey, Dr. Jack Rhodes, Rod Zweig and Ron MacQuarrie.

Here is how it works:

A series of psychological and physiological tests is programmed on tape. As the subject sits in a reclining chair, a recorded voice instructs him to perform certain tasks, some as simple as closing his eyes. Brilliant lights flash, clicking noises occur and mild vibrations are administered to the skin.

Through it all the subject's responses are recorded on magnetic tape, which will later be analyzed by the computer. Most of the recorded data are brain waves.

The device is a key part of a large, cooperative program to gather baseline data, a sort of library of normal brain responses. More than 200 healthy subjects, largely Air Force and Army officers, will be tested in the project being carried out by the National Aeronautics and Space Administration's Manned Spacecraft Center in Houston, Texas.

Data will be analyzed at UCLA's Brain Research Institute; the Saepetriere Hospital in Paris, France; Baylor University College of Medicine, Houston; and State University of Iowa.

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