

## ASTRONOMY

# Moon's Surface Smooth

► **RADAR MEASUREMENTS** have shown the moon's surface is likely to be 90% smooth.

This is because the lunar surface acts like a mirror, although a slightly warped one, in reflecting radio waves, Dr. G. H. Pettengill of Massachusetts Institute of Technology's Lincoln Laboratory reported to the American Physical Society meeting in Washington, D. C. The surface, he said, also reflects radio waves somewhat like a piece of matted paper.

Dr. Robert Jastrow of the National Aeronautics and Space Administration's Goddard Institute for Space Studies, New York, characterized the lunar surface as "porous, sintered and rust-like." The surface of Venus is much smoother than that of the moon, he said.

This is due, in part at least, to the fact that the atmosphere of Venus is very much heavier than that of the earth and acts like a shield to protect the surface from bombardment and pocking by meteorites.

Dr. Pettengill reported that Venus has a very slow rotation period, taking the same length of time to make one revolution around the sun as it does to rotate once on its axis. Thus the length of a day on Venus is the same as the length of its year.

Venus, therefore, always keeps one side toward the sun. The dark side has a measured temperature of 600 degrees centigrade, or about 1,100 degrees Fahrenheit. This would make "weather" on Venus far different from that on earth, Dr. Jastrow noted.

The atmosphere of Venus consists principally of nitrogen, carbon dioxide and oxygen. The oxygen, however, is not free but bound in molecules.

This picture of Venus makes it "completely inhospitable" for life, Dr. Jastrow said.

Radio waves reflected from Venus have also helped to establish the value for the astronomical unit, the distance from the earth to the sun, more exactly, Dr. Pettengill said. The astronomical unit is 149,597,850 kilometers, plus or minus 400 kilometers. One kilometer is .6214 of a mile.

The main inaccuracies in the astronomical unit are now in the orbits of Venus and the earth around the sun. The Mariner space probe to be launched in the next two or three months will pass within several thousand miles of Venus. Its path will be more accurate because of the improvement in the value of the astronomical unit.

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## SPACE

## Man and Animal to Share Capsule During Orbit

► **THE TWO-MAN** Gemini space capsule may be sent into orbit with a man in one seat, an animal in the other. Biological space experiments, such as deep brain probes or implanted blood sensors, not acceptable for men could be tried on the space animal.

The man could verify the reactions of the animal.

The effects of confinement, weightlessness and immobility for long periods on the living organism could be studied this way, Brig. Gen. Charles H. Roadman told the National Science Fair-International, an annual activity of SCIENCE SERVICE, being held this year in conjunction with the Seattle World's Fair.

Dr. Roadman, aerospace medicine director of manned space flight for the National Aeronautics and Space Administration, told young scientists at a Health Sciences Awards luncheon that the success in manned space flight presents new scientific challenges in the frontiers of space.

He said that perhaps no single event since the non-stop flight of Charles A. Lindbergh more than 35 years ago has so captivated the emotions and imagination of the American people as did the orbital flight of Col. John H. Glenn Jr. on Feb. 20.

Dr. Roadman emphasized that it is possible that the scope of problems in the health sciences from space exploration will far outweigh in significance, for man's welfare, the problems brought about by the physical and even the political sciences.

Eleven awards were given to finalists at the fair in special medical fields by the American Dental Association, the American Medical Association, the American Pharmaceutical Association and the American Veterinary Medical Association.

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## SPACE

## First U.S.-Japan Rocket Probes the Ionosphere

► **THE UNITED STATES** and Japan launched the first joint flight of a scientific sounding rocket from Wallops Island, Va., April 26.

The Nike-Cajun rocket was the first of three planned to probe the ionosphere by using techniques developed independently by the U.S. and Japan.

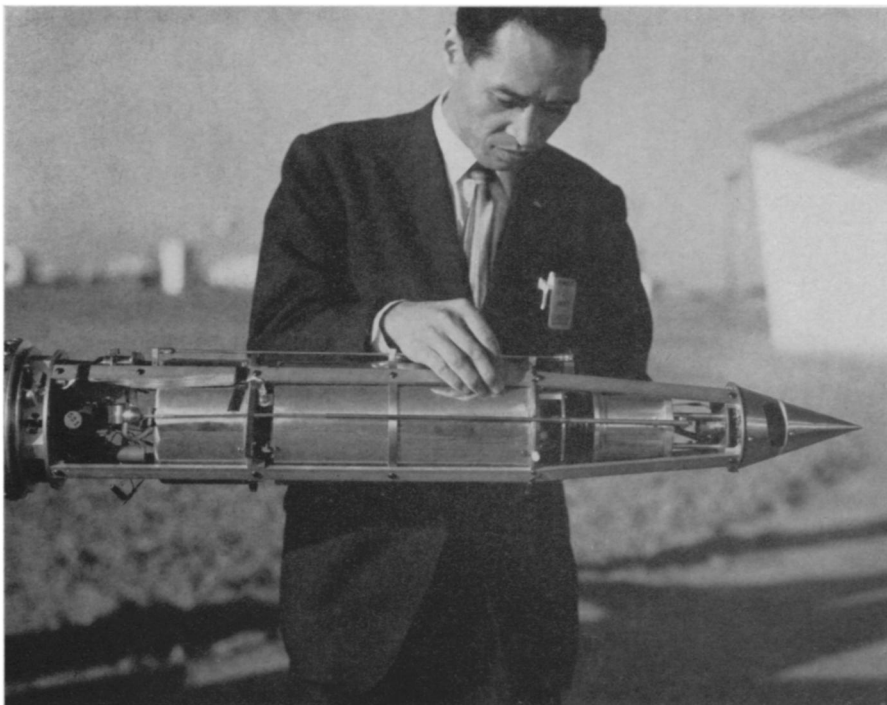
The Japanese experiment, three years in the making, consists of a gold-coated sphere about one-half inch in diameter which is attached to a two-foot boom projecting from the side of the rocket.

The sphere and boom are electrically insulated from the rocket. A variable radio frequency voltage is applied to the equipment. When the frequency passes through the critical point, below which radio signals will be bounced back to earth from the ionosphere, there is a sharp change in current.

In the Japanese experiment, this critical point, of great importance to long distance communications, is measured at a much faster rate than previous devices used.

Using the Japanese method, scientists in the future may be able to measure electron density and temperature simultaneously, and much faster, with only one instrument. The Goddard Space Flight Center, Greenbelt, Md., of the National Aeronautics and Space Administration is responsible for the U.S. experiment.

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**JAPANESE SPACE EXPERIMENT**—Mr. Muraoka of Japan inspects the Japanese experiment sent into space aboard a joint U.S.-Japan space probe. This device, to probe the ionosphere, consists of a gold-coated sphere attached to a two-foot boom.