ASTRONOMY

Space Target: Moon

Rocket probes can give more accurate knowledge, confirm some theories, produce new ones, and greatly increase present known facts about the moon.

➤ THE MOON, earth's nearest neighbor in space, has long delighted poets and lovers who have cared not so much about its secrets as its beauty.

Now the moon is a target for man's first rocket probe, aimed at taking photographs of its unseen side and gathering information on magnetic fields, temperatures, and micrometeorites and other particles in interplanetary space.

One or more of the five rockets launched in the lunar probe series should yield some of its secrets, giving earthbound scientists a more accurate picture of the moon than they now have.

It is already known that the moon has a diameter of 2,160 miles, somewhat more than one-fourth that of the earth. Its mass is about one-eightieth of the earth's, its density, three-fifths. Its average distance from earth is 238,857 miles, but ranges from 221,463 to 252,710 miles.

The moon's gravity, its attraction for bodies on its surface, is about one-sixth of gravity at the earth's surface. A man who can throw a baseball 400 feet on earth would be able to throw it nearly half a mile on the moon.

The moon rotates on its axis once in exactly the same time as it makes one revolution around the earth. Thus it keeps the same side, except for small oscillations, always turned toward the earth and some 40% has never been seen. The first and later lunar rockets are equipped to take crude black and white pictures of this hidden side.

To demonstrate the moon's motion with respect to the earth, stand in the center of a room and imagine that you represent the earth. Have another person take the part of the moon and stand a few feet away with his left side toward you. As he walks around you in a circle, he keeps his left side always toward you. You (the earth) never see his right side.

When he has returned to the starting point, he has faced in all directions (as in turning on an axis), and he has turned his body completely around.

To show what would happen if the moon did not turn on its axis, have your friend walk around you and face the same wall. You see first his left side, then the back of his head, then his right side and, finally, you get a direct view of his face.

The moon is moving through space at an average rate of 2,287 miles an hour or about 3,350 feet per second. In one hour, it will move a distance slightly greater than the apparent diameter of the moon itself.

Surface temperatures on the moon can vary nearly 500 degrees Fahrenheit. At the center when the moon is full, for instance, the temperature is 248 degrees Fahrenheit, whereas the same area when the moon is new has a tempertaure of about 200 degrees below zero Fahrenheit.

Near the time of the new moon, the rest of the lunar disk is nevertheless visible by a pale light, sunlight reflected from the earth, or earthshine. The combination of a bright sunlit crescent and a pale disk lit by earth-reflected sunlight is known as the "old moon in the new moon's arms."

At the moon's first quarter, half of the illuminated hemisphere is visible, just as it is a week after full moon. Between the new moon and the half-moon, whether waxing or waning, less than half the illuminated portion can be seen. This is known as the crescent phase. When more than half of the moon is illuminated, the phase is called gibbous.

The line separating the dark portion of the disk from the bright portion is called the terminator.

The moon's hidden side, of which man may soon have the first pictures, is not expected to be very much different from the 60% so long studied by both professional and amateur astronomers. The visible lunar surface is known to be rugged and desolate, and the hidden area should be the same, perhaps more so.

The moon is also airless, and where there is no air, there can be no clouds, no weather, no sound. There is, however, scenery in a sense.

Even with a small telescope, the craters and great dark areas that make up the features of "the man in the moon" are visible. The portions of the moon seen from the earth have been thoroughly mapped, the mountain ridges, craters and seas named. There are also rills, rays, cliffs and many other interesting formations.

There are two opposing theories concerning the origin of the moon's rugged surface. One is that the moon has been pelted by numberless meteorites, whose explosions on contact left the surface pitted with craters. There are, on the other hand, arguments for a volcanic origin, hot lava flowing from the moon's interior and then cooling to form craters.

Most astronomers agree, however, that whatever its origin, the lunar surface is now covered with a meteoric dust layer. There are different theories as to how thick this layer of dust is.

The relationship of the earth and its lunar satellite is a close one, much like that of a double planet.

The center of mass of the earth-moon system, the point around which the earth and moon mutually revolve monthly, is only 2,900 miles from the earth's center. It is therefore within the earth.

Science News Letter, August 23, 1958

● RADIO

Saturday, August 30, 1958, 1:30-1:45 p.m., EDT

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio network. Check your local CBS station.

Mr. Davis will give his listeners "A Preview of the Geneva Atoms for Peace Conference."

MEDICINE

Polio Vaccine Can Cause Penicillin Reaction

➤ PENICILLIN-SENSITIVE people can get an allergic reaction from poliomyelitis vaccine shots.

Some manufactured polio vaccines contain traces of penicillin, just enough to cause skin eruptions in persons allergic to the antibiotic, Dr. Murray C. Zimmerman of the University of Southern California School of Medicine reports in *Journal of the American Medical Association* (Aug. 9).

A study of six patients who experienced reactions to polio shots, coupled with their past histories of sensitivity to penicillin, indicates that the minute amount of the antibiotic in many of the vaccines is responsible for the patients' skin eruptions.

Therefore, if a person is known to be penicillin sensitive, either a penicillin-free vaccine should be administered or an injection of penicillinase given before the vaccine shot. The penicillinase injection has no effect upon any of the ingredients of the vaccine except the penicillin.

Since all of the components of the polio vaccine, monkey protein, horse serum, formaldehyde, preservatives and other antibiotics, are potential causes of side reactions, it is essential that the exact cause of the sensitivity be determined accurately, Dr. Zimmerman cautioned.

Science News Letter, August 23, 1958

AGRICULTURE

Sugar Preserves Dairy Cream

➤ CREAM THAT stays dairy-fresh stored at room temperature for as long as six months is one of the results of the U. S. Department of Agriculture's dairy research program.

The new product, USDA scientists have reported, can be whipped, or used in any number of ways requiring sweetened cream. Pale yellow in color, it has a consistency and flavor much like that of sweetened condensed milk, only less sweet.

It is the addition of sugar that preserves the cream since bacteria cannot grow in a concentrated sugar solution. The final product contains 10% more butterfat than regular whipping cream and 22% more than coffee cream.

Dr. Arjen Tamsma and Raymond W. Bell, both USDA scientists, are chiefly responsible for the development of the preservation process which is described as a "simple one that any well-equipped dairy plant can carry out."

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