

Moon's Image Blackened

The bright, shiny moon, it turns out, is "surprisingly" black, an eminent astronomer said.

The villain is the sun. By bombarding the lunar rocks with atomic particles, it actually causes the rocks to change color. The chemical changes that take place are not definitely known, said Dr. Donald Menzel of the Harvard Observatory, but similar color changes have been produced in laboratories with samples irradiated by atomic reactors.

Dr. Menzel also warned about a danger that the moon faces from man. "We'll contaminate it very badly, biologically, when we land," he told a news conference at the American Association for the Advancement of Science meeting.

From a human standpoint, however, he painted an optimistic picture of the future. If, as seems likely, the moon's rocks contain water of crystallization (water molecules combined with the rock crystals), the possibility of self-supporting manned lunar bases seems much greater, he said.

Such water, which could be easily extracted by melting the rocks in solar stills, would be "the first step to lunar gardens," Dr. Menzel said. Even some types of animals might be able to partially adapt to lunar surroundings, he added. The Army, he said, is presently looking for life forms that can live in near vacuum. They have found several, among which is a kind of sand flea which "tastes something like shrimp."

"I'm looking forward very much to my first meal," Dr. Menzel said.

He told the newsmen that new lunar data was coming in so fast that "I am changing my concept of the moon almost daily."

The most significant finding from photos taken by recent U.S. and Russian mooncraft is strong evidence on the pro side of The Great Volcanism Debate. One of the newest additions is the discovery of straight lines consisting of "dozens or even hundreds" of craters strung out across the lunar surface. The lines are so straight that they "could not possibly have occurred" as a result of impacting meteorites, Dr. Menzel said. They must, therefore, be along the lines of volcanic features.

Only a few of the spacecraft photos have actually been released to the public. Scientists examining them all have found repeated indications of past volcanic activity, such as craters with

peaks rising from the center.

Some of the pictures were so clear, in fact, according to moonphoto analyst Dr. Eugene Shoemaker of the U.S. Geological Survey, that surface grains less than a tenth of an inch across can be not only seen, but counted. Rather than being monotonous, the moon, he said, has a wide range of features that can be seen by astronauts "just walking around."

Even the Lunar Orbiter spacecraft themselves have been providing clues to the moon's secrets. By carefully measuring the high and low spots in the vehicles' orbits, scientists can make almost incredibly small determinations about variations in the moon's gravity below.

For example, reported Dr. William M. Kaula of the University of California at Los Angeles, the differences in the moon's gravity from one area to another are much "milder" than those of earth. This information was obtained by combining data from both Lunar Orbiter and the Soviet Luna 10, and was apparent even despite "the usual inaccuracies of initial results."

For more refined measurements, astronauts will be sent to the moon with a gravity meter, a device that can measure differences in gravity as small as one part in 10 billion. The g-meter is basically a highly sophisticated bathroom scale—a spring and a weight which depresses it a different amount depending on the gravity. Though the weight's weight varies with changes in the lunar mass beneath it, the compressibility of the spring stays the same.

One of the g-meter's big jobs will be to help measure the moon's period of oscillation, actual movements that are caused whenever there is a large seismic disturbance or other impact. Though it is a simple instrument, the meter will be doing a job on the moon that is almost impossible to do for the earth, even with the elaborate equipment available on this planet, according to Dr. Joseph Weber of the University of Maryland. The surface noise level caused by the pounding of earth's oceans and the shifting about of the crust make accurate measurements very difficult.

They are not impossible, however. Earth's oscillation period is about an hour, he said, compared with 15 minutes predicted for the moon. Earth's period has been affected in the past by such upheavals as the recent Chilean and Alaskan earthquakes.

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7 January 1967 / Vol. 91 / SCIENCE NEWS 7