



Republic Aviation

**RE-ENTRY HEAT**—Space vehicles like the one being positioned here, developed by the Republic Aviation Corporation, in the thermal-structures tunnel at the Langley Research Center of the National Aeronautics and Space Administration will be used to test the effects on materials of the intense heat that astronauts will encounter returning from the moon at 25,000 miles an hour.

## GEOPHYSICS

## Tap Volcanic-Like Water

► **VOLCANIC-LIKE** water is believed to have been tapped for the first time in a mile-deep well in California.

The extremely hot water is extraordinarily rich in silver and gold as well as rare metals and salt. Temperatures at the 5,232-foot level are thought to be as high as 700 degrees Fahrenheit, but exactly how high is not known because there is no way to measure them.

Discovery of the volcanic-like water is reported in *Science*, 139:919, 1963. There has been "nothing like it in the world before," Dr. Donald E. White of the U. S. Geological Survey, Menlo Park, Calif., told *SCIENCE SERVICE* by telephone. The well was drilled by Joseph I. O'Neill and associates of O'Neill Geothermal Inc., Midland, Texas.

If the quantity of silver found in the volcanic-like water, 381 ounces per ton, were at the surface and easily available, it would be a "very promising" source of silver, and also of gold, which is 0.11 ounces per ton, Dr. White said.

However, equally as exciting to scientists as the high content of metals is the fact that the volcanic-like water holds clues to some of earth's inner secrets, such as how ores are formed and the cause of volcanic activity.

Dr. White, with Dr. E. T. Anderson of O'Neill Geothermal and Donald K. Grubbs, a University of Virginia student, believe temperatures in the lower part of the drill hole may be so high that young sedimentary rocks are being changed into metamorphic

rocks. Such processes usually occur only at depths below 25,000 feet.

Metamorphic rocks previously studied by scientists have been formed more than ten million years ago.

The unusual volcanic-like water was discovered as part of a plan to tap the earth's heat for energy. An oilman had drilled a wildcat well near Niland, close to the Salton Sea in California's Imperial Valley. Although the well did not produce, temperatures encountered in drilling it were so high that the deep geothermal well was dug four miles to the north.

• *Science News Letter*, 83:182 March 23, 1963

## GEOLOGY

## Two New Beryllium Minerals Found

► **TWO NEW** beryllium-bearing minerals have been identified by the Bureau of Mines. The find was made during an analysis of rock from a Utah mountain and may become an important American source of the valuable metal, the Department of the Interior said.

The new minerals, never reported before, are a berylliferous saponite and a hydrated form of bertrandite and were found in rock samples from Spor Mountain, where beryllium deposits have caused widespread interest since their discovery in 1959.

Beryllium is used today in such important fields as aircraft, missiles, space vehicles, nuclear energy, and many branches of research.

But nearly all the beryllium consumed in this country must be imported, and the Bureau has been investigating potential domestic sources in recent years.

• *Science News Letter*, 83:182 March 23, 1963

## GEOPHYSICS

## Vehicle on Moon May Sink Into Fluffy Stuff

► **THE SURFACE** of the moon may be covered with deep layers of fluffy material into which landing vehicles could sink out of sight.

Dr. Homer E. Newell, director of the office of space sciences of the National Aeronautics and Space Administration, said this is one interpretation to date from NASA's lunar research.

NASA is supporting measurements of simulated lunar surfaces in the laboratory. The experiments are aimed at determining the effect of radiation and fast-moving meteoroids slamming into layers of loose particles.

Research so far has shown that loose particles hit by meteoroids settle down into the moon's rock or mineral surface. This surface becomes exposed to radiation and breaks down into fine particles of dust. The dust coagulates into larger and larger clumps, and is likely to envelop a spacecraft landing on the moon's surface.

One reason that this is likely, according to Dr. Newell, is that observed characteristics of a cement powder have been found to match the reflection characteristics of the lunar surface.

The conclusion is that the surface of the moon is likely to be composed of cement powder that has a cobweb-like structure, Dr. Newell states.

Dr. Newell credited Dr. Thomas Gold, a NASA consultant at Cornell University, Ithaca, N. Y., for "cobweb" interpretation of the lunar surface.

• *Science News Letter*, 83:182 March 23, 1963

## GEOPHYSICS

## Moon Has Had Four Volcanic Activity Periods

► **THE MOON** has had four major periods of volcanic activity, not two as generally accepted, Dr. John W. Salisbury, chief of the Air Force lunar-planetary exploration branch, said in Lafayette, Ind.

The moon's surface features have resulted mainly from the four volcanic explosions, not from the more commonly accepted theory of meteoroids slamming into the moon, Dr. Salisbury told Purdue University engineering students.

The lunar surface is mostly rubble, not dust, he said. The rubble is composed of a mixture of blocks ranging from house-sized to very small fragments, he reported. Dust does exist on the moon's surface but averages less than an inch deep, he believes, except where it collects in fissures or at the bottom of slopes.

Other scientists have suggested the moon may have a surface dust layer at least several feet thick, perhaps deep enough to engulf a rocket landing there.

• *Science News Letter*, 83:182 March 23, 1963