



NASA

## Blocks or Spines?

The mysterious spires spotted on the face of the moon by Lunar Orbiter 2 have the moon theorists back clawing at each others theories.

- Just house-sized chunks of rock tossed up by meteoric impact, says Dr. Lawrence Rowan, chief astrogeologist with the U.S. Geological Survey team analyzing Orbiter's photos.

- The analysts are "just whistling in the dark," says Dr. John O'Keefe, National Aeronautics and Space Administration lunar authority. The Survey team, he contends, is against any evidence of volcanic activity on the moon at all.

Dr. O'Keefe contends that the spires are like those that thrust up through the floor of volcanic craters on earth, such as Mt. Pelee in the Caribbean.

The Survey specialists say that the lunar spires can't be the result of volcanic ooze, since they don't all appear in craters.

"You don't need craters," counters Dr. O'Keefe. Volcanic spires can just ooze up out of a crack in the ground, "like toothpaste out of a tube."

Dr. O'Keefe points to a 1,000-foot tower of lava that arose out of Pelee's heart in 1902 as the answer to the long shadows photographed by Orbiter.

In 1902, Mt. Pelee erupted. As its viscous lava oozed through a crack in the crater floor, the molten rock slowly piled up to almost twice the height of the Washington Monument, finally falling over of its own weight.

This could, he says, be the same thing.

The long moon shadows belong to "rock blocks," the Survey team coun-

ters, explaining that the pictures were taken early in the lunar morning, with the sun only 11 degrees above the horizon. With the sun's rays shining so obliquely, even a six-foot astronaut would cast a shadow more than 30 feet long.

According to Dr. Rowan, the biggest of the blocks is probably about 60 feet high and 20 or 30 feet wide.

The opposing scientists did agree, however, that the area is "much too rough" for a manned landing site.

No U.S. spacecraft has previously photographed the area where the blocks were found, although similar chunks were seen in some photos from Surveyor 1 and Lunar Orbiter 1. Dr. Rowan says. Orbiter 1 could not have revealed the blocks in such detail even if it had passed over the site, because it carried no high-resolution camera.

The huge blocks were probably hurled into their present location by a meteorite colliding with the moon, Dr. Rowan said in a telephone interview. Another possibility is that they were thrown out of an exploding volcano.

How far can a meteor impact throw rocks? Lunar craters 60 miles across have been observed with rays stretching out more than 10 times that far—equivalent to throwing hundreds of tons of rock from Boston to Richmond, Va. The rays are generally considered to indicate the range of rock scattering.

It is difficult to imagine, Dr. O'Keefe said, that any rock even approaching that size could hurtle that far without shattering on impact.

SOCIOLOGY

## Science Used In Race Case

Science, as well as years of legal precedent, are being cited before the U.S. Supreme Court in Virginia's effort to defend its antimiscegenation law.

The court may decide soon whether it is good science—or well cited.

Virginia's Attorney General Robert Y. Button has warned the Court that if it tries to pursue the scientific basis of laws banning interracial marriage it will find itself "mired in a veritable Serbonian bog of conflicting scientific opinion . . . we only wish to make it clear that our emphasis upon this point was not occasioned by any dearth of scientific material supportive of the wisdom or desirability of the Virginia statutes."

Virginia's brief then quotes Rabbi Albert I. Gordon's "Intermarriage: Interfaith, Interracial, Interethnic" (1964) as the most recent scientific treatise on the matter and quotes Harvard's noted social psychologist, Gordon Allport, as saying the book is the "definitive book on intermarriage."

Although the rabbi opposes intermarriage on sociological and psychological grounds, saying, for example, that children of mixed marriages have a harder time growing up than others, he concedes that there is no biological evidence to support a theory that mixed marriages are harmful or that one race is genetically superior to another.

Prof. Allport, commenting on the use of Rabbi Gordon's book to defend Virginia's law, told Science Service that he does not consider it "convincing or relevant to the case." One could make many more certain predictions than one that racially mixed marriages may be detrimental to society, he said. When the feeble-minded or persons from broken homes or no homes at all marry, the prognosis for failure is much more certain. "Miscegenation laws cannot stand on the slight grounds of a bad outcome," he said.

Virginia, whose law dates to 1691 when the Colonial Assembly passed a resolution for the "suppression of outlying slaves," is one of 17 states that currently prohibit interracial marriage.

The current appeal is the case of *Loving vs. Virginia*; Richard P. Loving, white, and Mildred Jeter Loving, Negro, are challenging the constitutionality of the Virginia statute under which they were convicted of a felony on the grounds that they are married and are not members of the same race.