SPACE

# Nuclear Test Inspection

**If the Soviets can prove that all explosions are detectable from any point on earth, no on-site test inspection will be necessary, Lillian Levy reports.**

➤ THE UNITED STATES will give up its demands for any on-site inspection in a nuclear test-ban treaty with Russia if the Soviets can prove their claim that all explosions can be detected from any point on earth.

If they can demonstrate this capability to the satisfaction of U. S. scientists and are willing to share this knowledge, there will be no need for on-site stations to detect nuclear tests, William C. Foster, U. S. Arms Control and Disarmament Chief, told SCIENCE SERVICE.

U. S. detection systems can identify and pinpoint all atmospheric and underwater nuclear tests of any size, as well as underground blasts well below 19 kilotons. But this is not enough to provide adequate verification that a test-ban treaty was not violated by underground testing, Mr. Foster said.

The Soviets claim they can detect any size blast in any environment. This capability would provide the "adequate assurance" that treaty agreements were not being violated, Mr. Foster said. There is no "adequate assurance," however, that after signing a treaty, it would not be violated, the ACDA head admitted. And a violation would mean a resumption of another round of nuclear tests.

At present there is not sufficient international unity among the nations of the world to assure the violating nation would be penalized, he said.

Present diplomacy is governed by economic considerations which would make it difficult to apply economic sanctions to the delinquent nation. Many nations of the world still are largely guided by a philosophy, "Better dead than in the red." Until this can be modified, international business would go on as usual even though a nuclear test-ban treaty was negotiated and then broken.

In addition, no nuclear test-ban treaty would be meaningful if all nations of the world, including Red China, were not included.

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## 'Moon-Walking Sickness' Likely for Man on Moon

➤ MOON-WALKING sickness (mal de luna), similar to seasickness, is likely to afflict the first space men from earth to tread the lunar surface.

The cause of this moon malady is the difference in gravitational forces on moon and earth. The extent to which astronauts will suffer from it will depend on individual ability, physiologically and psychologically, to adjust to the differences. The moon has one-sixth the gravity of earth.

"For a man used to the greater pull of gravity on earth, a simple stroll on the moon could be a very sickening and jolting experience," Col. John Paul Stapp of the Advanced Studies Group, USAF Aerospace Medical Center, Brooks Air Force Base, said. Until he modified his normal earth stride to the lighter pull of the moon, walking would be like riding a bucking bronco, jumping on a pogo stick or navigating the heavy waves of a turbulent sea in a rowboat.

Col. Stapp, who has pioneered in gravity stress studies, said that anchoring the astronaut with an 800- to 1,000-pound pack might enable him to walk more smoothly on the moon and thus prevent the violent nausea and dizziness that otherwise could result.

While a step down on the lunar surface may bounce an astronaut uncomfortably high, it also will take him farther. The man on the moon will be able to walk six times as fast and as far as he can on earth in the same amount of time.

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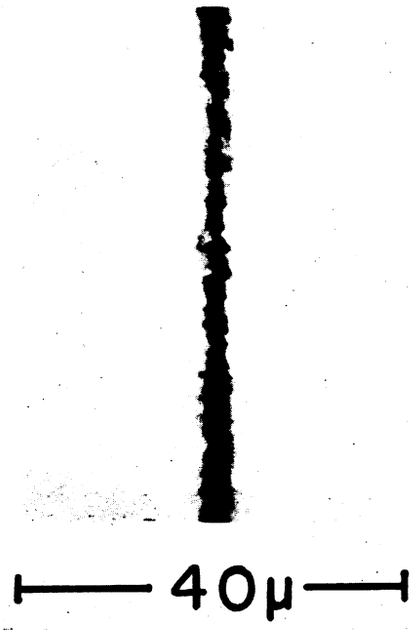


*COSMIC RAY PATH—A microscopic photo shows the trail left by a cosmic ray through the interior of one of the silver chloride crystals developed by Dr. Lawrence M. Slifkin of the University of North Carolina department of physics. The trail has been made visible by a special process. The actual width of the trail shown is no more than one-ten-thousandth of an inch.*

SPACE

## Radar and Space Probes Explore Solar System

➤ A STANFORD UNIVERSITY scientist suggests that radar equipment on the ground and space probes be used together to obtain new information about the sun, moon and planets not available by other means.

When bouncing radar beams off a planet or the moon from earth, many rays are reflected into space and not back to earth. A space probe in the vicinity could measure these rays and send back clues about surface roughness and about composition of the surface. Such information must be in hand before astronauts can make a landing.

Dr. Von R. Eshleman of the University's Radioscience Laboratory told SCIENCE SERVICE that large transmitters on earth now available and small receivers in space probes could give new information about the atmosphere of Venus, mystery planet always shrouded in clouds.

As the probe goes behind the planet and is occulted by it, scientists will be able to tell how dense the atmosphere is by measuring the times at which the different frequencies the probe is sending stop. They can also determine how the density changes with height in the Venus atmosphere and ionosphere.

Dr. Eshleman and his associate, Dr. Owen K. Garriott, have submitted a proposal that these experiments be included on the future Venus probe Mariner-B which will be larger than the Mariner II.

The ground radar-space probe method could give new and better measurements of the sun's atmosphere, or corona, and interplanetary gas originating from the sun, Dr. Eshleman said. He presented his new ideas to a group of Government representatives visiting at Stanford.

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PHYSICS

## New Method Uses Crystal To Detect Cosmic Rays

➤ A NEW METHOD for detecting the cosmic rays that continuously bombard the earth from outer space has been developed.

The technique of using a crystal to catch the tracks of cosmic rays, already showing its worth on earth, will be tried from an earth satellite this fall. Cosmic rays are subatomic particles coming from outer space. They smash into the earth's upper atmosphere at the rate of more than a million billion per second.

The method devised under the direction of Dr. Lawrence M. Slifkin of the University of North Carolina, Chapel Hill, N. C., uses a large crystal of silver chloride, which is chemically similar to the silver bromide of usual photographic emulsions. The silver chloride darkens when hit by a cosmic ray, and the tracks can then be studied to learn more about cosmic rays, particularly the ones of heavy elements that are less frequently seen.

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