

## SPACE

# Rocket Fragments Found

The recovered pieces from Glenn's rocket will help solve important scientific questions about the moon but they also have raised some troublesome legal questions.

► CHUNKS of the rocket that last February boosted Astronaut John H. Glenn Jr. into space fell in South Africa and have yielded important information about the moon.

The pattern of the Glenn rocket fallout reinforces the theory that tektites, black, glassy rocks scattered on the earth's surface, came from the moon, Dr. John O'Keefe, National Aeronautics and Space Administration (NASA) astronomer, told SCIENCE SERVICE in an exclusive interview.

Scientists are divided into two schools of thought as to how tektites formed. Some believe tektites were created when a meteorite slammed into the earth; others think they are objects splattered toward earth when a huge meteorite hurled into the moon's surface.

Dr. O'Keefe said the wide area (850 kilometers) covered by the fallen pieces of Glenn's rocket is similar to that covered by tektites.

Dr. O'Keefe had said several years ago that if debris scattered from an artificial earth satellite should fall to earth in a pat-

tern similar to tektite fields, it would substantiate the theory that tektites came from the moon.

While the Glenn rocket debris has solved an important scientific problem, it has raised thorny legal and technical questions that are troubling the State Department and NASA.

The State Department is concerned with the question of liability and even more importantly the strain on foreign relations if debris from U.S. rockets or satellites landing on foreign soil should damage life or property. NASA engineers and scientists are plotting rocket and satellite pathways which will avoid heavily populated areas.

U.S. rocket debris from a non-orbital launch fell last year on Cuba injuring a cow slightly. What compensation or adjustments, if any, have been made by the U.S. to Cuba have thus far not been made public. The Glenn rocket chunks are the first known to have fallen from orbital flight. The Union of South Africa and the U.S. have exchanged correspondence on this subject.

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paid tribute to the 146 women in NASA as aerospace technicians and 77 women mathematicians and to Dr. Nancy Roman who heads NASA's program of space astronomy.

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## ASTROPHYSICS

## Rings of Saturn Coated With Frost

► SATURN has a frosty beard.

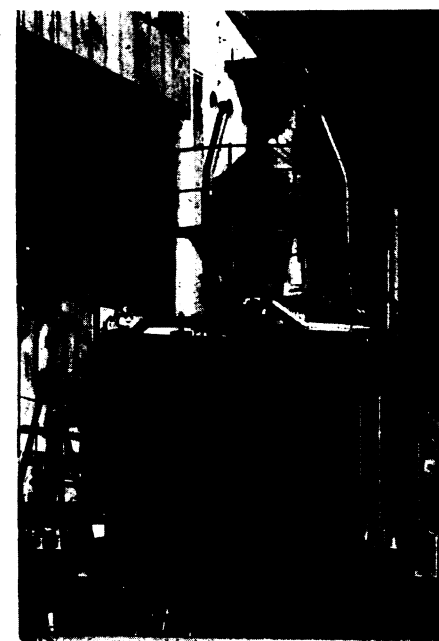
The rings surrounding the planet are coated with small frost crystals.

Dr. V. I. Moroz of the State Astronomical Institute, Moscow, reported that the rings consist of chunks of cosmic material ranging from four inches to more than three feet in diameter.

Using the powerful 50-inch reflecting telescope at the Crimean Astrophysical Observatory and an infrared spectrometer (an instrument for measuring wavelengths), Dr. Moroz noted that the spectrum of Saturn's rings definitely shows that the rings are covered with frost crystals.

Previous studies in the United States have indicated the possibility of frost, but the Russian has confirmed this possibility, reports reaching Washington indicate.

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*KIWI-B—This "cold-flow" reactor has been used to conduct a series of reactor experiments using, for the first time, liquid rather than gaseous hydrogen as propellant. It is identical to a KIWI-B reactor but contains no fissionable material and thus produces no power. The reactor is shown mounted in an upriving position on its test car at the Nuclear Rocket Development Station, Jackass Flats, Nevada. The project is being conducted jointly by the Atomic Energy Commission and the National Aeronautics and Space Administration.*

## SPACE

# Space Women Expensive

► WOMEN ASTRONAUTS would be a waste in space, a luxury the United States space effort cannot afford, a top official of the National Aeronautics and Space Administration (NASA) told members of the House Science and Aeronautics subcommittee.

The present crop of would-be space women do not meet NASA astronaut qualifications and a special program to train them now will slow down the national space program and might prevent the U.S. from getting a man to the moon by 1970, George M. Low, director of spacecraft and flight missions of NASA's office of manned space flight, said.

Flier Jerrie Cobb, a NASA consultant, and Jane B. Hart, pilot wife of Sen. Philip A. Hart (D-Mich.) are among the group of aspiring lady astronauts who base their right to a place in space on physical and psychological tests passed at the Lovelace Foundation in Albuquerque, N. M. This claim was disputed by Astronaut John H. Glenn Jr., who told the subcommittee that passing these tests does not automatically qualify a person as an astronaut, since they are merely examinations to find out "if there is something wrong." "My mother could probably pass the physical exam at Lovelace," he said.

All seven Project Mercury astronauts

had also been given a clean bill of health after taking physical examinations at Lovelace Foundation. However, the Foundation did not detect the heart murmur eventually discovered by Air Force specialists which has grounded Astronaut Donald K. Slayton.

None of the women has had the rigorous tests for severe gravity stress, pressure, heat and acoustical stress given to the Mercury astronauts. The women have volunteered to take those given by the Navy and, indeed, were scheduled to do so. However, the tests were cancelled since they were not part of the NASA man-in-space effort.

Rep. James Fulton (R-Pa.) charged that women were kept out of space by NASA and the astronauts because of "a protective attitude."

This was denied by NASA officials and the astronauts.

"We're protecting the space program," Astronaut Scott Carpenter said. Glenn added that he was not against anyone in space but was for the best qualified.

It was suggested that NASA set up a small parallel program to train women for space flight; but NASA officials said this would set back space efforts and have suggested that in the national interest women should make a sacrifice by keeping out of space flight at this time. The officials