

# Are Any Astronauts Experienced?

by Jonathan Eberhart

Thanks to special handrails, tethers, sticky handgrips and gold-plated footholds, Gemini 12 astronaut Edwin Aldrin came up with a successful spacewalk and the Gemini program was able to go out in a blaze of glory.

His 5½ hours of spacewalks and space stands last week almost doubled the total time of astronauts exposed to space.

Yet his experience may have been all too short. According to a former Mercury consultant, in fact, all 16 Gemini astronauts would have made better candidates for moon landings if they had been fewer in number and longer on space experience.

"Astronauts can relay their experiences to each other, but that cannot substitute for the actual experience," said Dr. Lawrence Lamb, a pioneering space cardiologist now at Baylor University College of Medicine, Houston.

Dr. Lamb's analysis is in direct contrast to the official National Aeronautics and Space Administration policy.

Astronaut Edwin (Buzz) Aldrin's first space stand was all the practice he needed for his subsequent spacewalk, says a NASA manned spaceflight official who declined to be named.

"The next time he stood up," said the official, "he was an experienced astronaut."

Dr. Lamb, whom the NASA

manned space flight official calls a "first rate cardiologist," disagrees.

"It's like going off a diving board," he said. The first time it is difficult, but experience makes it easier and makes the diver better.

No astronaut has been in space more than twice. Only the pilots of Gemini 9, 10, 11 and 12 (Thomas Stafford, John Young, Charles Conrad and James Lovell) had previously been in space aboard Gemini spacecraft. Three others (Virgil "Gus" Grissom, Gordon Cooper and Walter Schirra) had one Mercury flight each.

The number of three-man Apollo practice flights leading up to the moon landing has not been decided yet, but NASA has declared that "a minimum of nine astronauts will take part in the first three."

There has been some recent crew and schedule shuffling in the Apollo office, but of the six men now in the prime and backup crews of the first manned flight, three have had no space experience whatsoever. The two pilots (Grissom and Schirra) will be the first men to face a third stint in space, but both date from Mercury days and Schirra, at 43, is the oldest astronaut in service. The sixth man, Edward White, has 66 orbits and a 21-minute spacewalk from Gemini 4.

"Of course, there are trade-offs,"

says NASA. This means that instead of a few astronauts with many space flights behind them, NASA would rather have as many crewmen available as possible, even if only with limited experience.

Some of the Soviet Union's experience tends to support NASA's preference.

Aerospace physicians around the world were "very concerned" when the second Soviet cosmonaut, Gherman Titov, showed strong symptoms of disorientation and loss of balance, said Dr. William Helvey, manager of biotechnology for Lockheed Missiles and Space Co. As a result, later cosmonauts were selected with particular attention paid to vestibular problems related to balance.

The long lapse since the last Soviet manned cosmonaut went into space may indicate that the Russian manned space program was slowed down by biomedical problems related to "the Titov lesson," said Dr. Helvey. Yet there have been enough U.S. astronauts in the Mercury and Gemini programs to indicate that Titov's problems probably were not general ones.

Indications are that disorientation in space is an easy thing for trained pilots to get used to, Dr. Helvey added, but it does definitely improve with experience.

SPACE

## Lunar Facts Still Scant

Three rangers, a Surveyor and two Orbiters have all been sent from the U.S. in 27 months to peer at the moon. But the theories still fly thick and fast (see SN, 11/12/66, p. 420). Each new photo or piece of data is cited by several scientists as "proving" their opposing theories.

Has nothing actually been learned? Yes, says NASA lunar specialist Dr. John O'Keefe. In fact, a great deal.

In the first place, though it has long been known that the moon is porous, it took the pictures from Surveyor 1 to show that it was granular, rather than pumice-like. It is "a network of space with grains in it, rather than a network of rock with space in it," Dr. O'Keefe said.

Volcanic activity was also found to have played an early part in the life of the moon. This was faintly indicated by the Ranger 7 and Ranger 8 photos, but on Ranger 9 it "came through loud and clear." Further information from Lunar Orbiter 1 helped prove that this was true for a "major portion" of the moon's surface and was not just a spot occurrence.

A particular joy was the discovery, courtesy of Surveyor, that the bearing strength of the surface was about five pounds per square inch, reassuring proof that astronauts landing there will not fall through. "We couldn't have had it better," said Dr. O'Keefe happily. "It was just about the softness you would have chosen if you'd had your 'druthers'—about like a pole-vault pit."

Other information from the U.S. space armada was less clear-cut—depending upon whose side you are on.

"I would say that Lunar Orbiter definitely strengthened the case for acid volcanism," declared Dr. O'Keefe; "but," he added resignedly, "that's very controversial." A number of scientists are on his side, but there is opposition including, among others, Nobel Prize-winner Dr. Harold Urey.

Acid volcanism essentially means a volcano-less volcano. "Most people think that a volcano is a nice little mountain with a hole in the top," Dr. O'Keefe said. Acid volcanism has no mountain at all, just a hot, very thick liquid oozing through a crack in the

ground, often piling up to form huge domes before it hardens.

Another idea somewhat damaged by Lunar Orbiter was that the lunar surface was "spongy." "Poor Tom Gold's idea" was practically disposed of, said Dr. O'Keefe, referring to the noted Cornell expert who has theorized that the moon is covered with a thick layer of dust loosely formed into airy "fairy castles." However, Dr. Gold has since conceded that the dust is probably packed down by now anyway.

In looking over the 30,000-odd photos from the various spacecraft, a number of scientists have shown "a tendency to see lunar ash flows" in the maria, or seas, Dr. O'Keefe said. But the maria seem too flat for that. What the pictures may actually show, he says, is "fluidized dust," a peculiar phenomenon in which dust is floated around and leveled out by gases escaping from cooling volcanic rock beneath. Though the moon dust has long since settled, its ripples and movements when heated would have appeared almost fluid-like (see Lunar: What's to Come, p. 444).