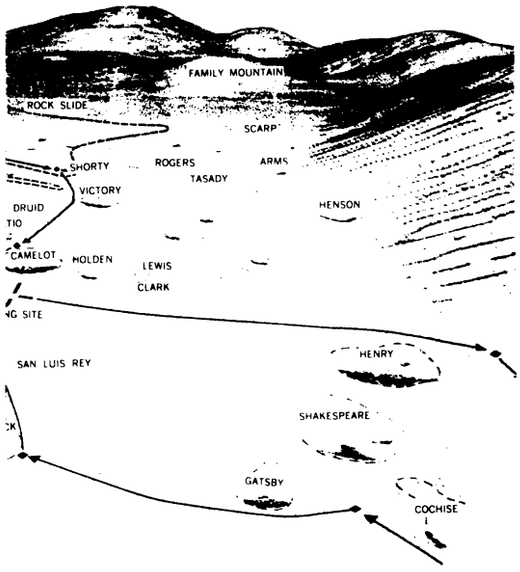

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It also covers floors of nearby craters. "If this isn't pyroclastic deposits (volcanic) it's beyond our earthly experience," says Gast. Schmitt thinks the material could be the youngest ever sampled—one billion to three billion years old. He believes it could be from very deep within the moon—more than 500 kilometers down. The possibility of finding very young material there adjacent to older crustal material was one of the primary reasons for choosing the site (SN: 11/4/72, p. 292). Scattered throughout the region are what look like dark halo craters. They could be vents for volcanic ash. Head and Thomas R. McGetchin of the Massachusetts Institute of Technology did a study of what cinder cones would look like in one-sixth gravity and little atmosphere, and halo craters appear to fit their model.

Robin Brett of MSC speculates that the crew might find fumaroles (deposits from the last stages of volcanism) and xenoliths (rocks formed at high temperatures and pressures) if the models for the region are correct. "You'll know if we do," says Schmitt. (His thesis concerned rocks in Norway formed at high temperatures and pressures.)

Cernan and Schmitt will explore the region during three seven-hour field trips, traveling as far as 7.5 kilometers from the LM in the rover. They will set up a group of geophysical instruments, all but one of which are new to Apollo (SN: 10/21/72, p. 269). The Apollo 15 crew monitored high rates of heat flow, so the Apollo 17 heat flow experiment has top priority. "We must establish if that high reading at Apollo 15 was local or is moon-wide," says David Strangway of MSC." The answer is crucial to unraveling the moon's evolution. □

A geologist goes to the moon

What does Harrison (Jack) Schmitt, scientist-astronaut, Harvard Ph.D., former U.S. Geological Survey astrogeologist and the son of a New Mexico mining geologist, expect from himself and expect to find at Taurus-Littrow? Equally important, what do his fellow astronauts and geologists expect from him?

The answer may be one reason Schmitt became "one of the hardest workers in the office." He is described by various scientists and astronauts as unbelievably self-disciplined and almost Spartan. ("He set a high professional and personal code for himself and lived by it.") Some think he is hard to get to know personally. No one need doubt what he thinks. But although he is outspoken and aggressive about his ideas at NASA, he has assumed a low public profile. "He has probably contributed as much or more than anyone to the science of Apollo," says a California Institute of Technology geologist. "He has been the astronauts' in-house resident geologist," says William R. Muehlberger of the University of Texas and head of field geology for Apollo 17. Ten years ago, for example, Schmitt was working at the USGS astrogeology center at Flagstaff and his main concern even then was, "What were the feasible things for man to do on the moon?" During his seven years at NASA, he has managed to allay the initial skepticism of the pilot-astronauts and also remain the darling of the "guys in the back room." These are the scientists (many of whom Schmitt worked with at Flagstaff) who work closest with the astronauts before and during a moon mission.

"My selection to fly on Apollo was based solely on my training as a geologist," says Schmitt of the difficult decision made to send him on this final Apollo mission in place of Joe Engle (SN: 9/4/71, p. 137). But will he see and discover things on the moon that a pilot with training in geology misses? Schmitt thinks he will since he has been thinking geology for most of his life (he is 37).

But he admits it will be hard. "The lunar surface is a great equalizer," he notes. Unlike doing geological research on earth, he will be able to study the site only once—and then only for three days, not three weeks. The sun's glare, and the bulky spacesuits are obvious problems. And the surface often lacks contrast: A thin layer of dust covers everything, and geological contrasts—both structural and color—are hard to see. "A lot of what an astronaut can see at a site is a function of the site itself," says John Young, commander of Apollo 16. The Apollo 17 site does have some contrasting terrain. "Jack is a real thinker; he will be able to piece it [the geology of the site] together," says Young. However, to do that, says Muehlberger, the crew needs more time at each station to determine which rocks came from what crater and to ascertain the subtle relationships of the one station to the whole site.

NASA

Schmitt (left) and Cernan: "A team."

"I try not to form opinions ahead of time," says Schmitt of what he might see. "Some of the most important things to come out of any exploration is the unexpected, and I want to remain open." He hopes to be able to take a few minutes at each stop to get away from the mechanical duties of filling sample bags and taking pictures "just to think. That's the problem with a hectic timeline—there's no time to think." Schmitt and Cernan both worked closely with the scientists planning their traverse, and Schmitt helped prepare the maps of the site.

How will he and his partner work together on the moon? "I am really proud of the way it has turned out," says Cernan. "Because of our different backgrounds we complement each other. He sees things one way, and I see them another way. We argue. I am not afraid to disagree with Jack. Sometimes I see things he has missed and vice versa. I am just as good a geologist on the moon as he is. If he didn't feel he were just as good an aviator as I am, I would be disappointed."

"Cernan and Schmitt are a real team," says Muehlberger. While Schmitt might not solve all the lunar problems in three days on the moon, he will have a major role in figuring things out when he gets back to earth. "He will look at the site and unconsciously store impressions and relationships that will aid us later."

—Everly Driscoll