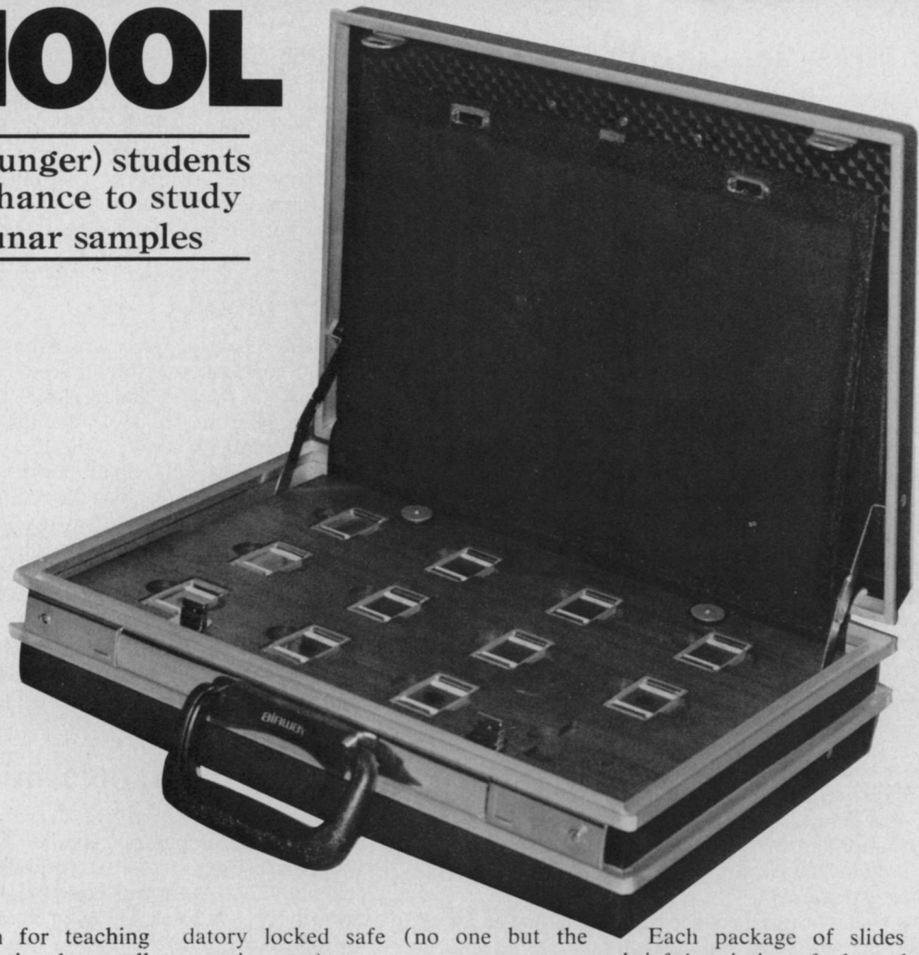
MOON ROCKS GO TO SCHOOL

College (and younger) students at last have a chance to study actual Apollo lunar samples

by Jonathan Eberhart



The educator's search for teaching materials that are inspirational as well as informative is never-ending. But it will be a long time before anyone tops the latest offer from the National Aeronautics and Space Administration: pieces of the moon.

The half-dozen teams of Apollo astronauts who reached the moon brought back 382.88 kilograms (844.1 pounds) of lunar material, and the space agency guards it like, well, pieces of the moon. Less than an ounce has ever been lost, but to officials of the Lunar Curatorial Facility at Johnson Space Center in Houston this represents 21 separate occasions of accident, negligence or theft that cost exactly 24.58215 grams of irreplaceable matter from another world.

Even for the official "principal investigators," therefore, the rules for obtaining, handling, testing, storing and returning even the tiniest samples are strict and no-nonsense, covering every aspect of security from periodic inventory affidavits to the people allowed access to the combination of the mandatory locked safe (no one but the experimenter).

NASA has also been concerned, however, about whether it is getting the most from its precious rocks. Thanks to suggestions from both inside and outside the agency, that concern at last is paying off: Colleges and universities offering courses in the geosciences may now borrow preselected samples of lunar material for as long as several months.

The samples are all in the form of "thin sections"—slices of rock so thin (.03 millimeters) that light can pass through them to show their compositions and structures. Premounted on microscope slides, the samples are being made available in sets of 11 that include three basic rock types: plutonic rocks (igneous rocks from depth), volcanic rocks and breccias (sedimentary or crushed types). There are also examples of lunar soil including ground-up rock with various types and colors of glasses, micrometeoroid bombardment products, deep and shallow melting effects and other phenomena.

Each package of slides includes a brief description of where the particular samples came from, what they are made of and best estimates as to how they were formed. The only equipment needed to study the samples is a standard petrographic microscope, preferably one adaptable to use with polarized light.

The lunar loan program's mentors see it as being for undergraduate and graduate college-level classes; petrography, stratigraphy and such fields usually require a few years of college preparation. But nothing in NASA's guidelines rules out the possibility of participation by a high school with a suitably advanced geosciences program.

James Head of Brown University, who was with NASA in the days when the Apollo rock boxes were first being opened, borrowed a slide set last fall in a sort of test flight of the classroom idea, and used it successfully in an introductory course for non-science majors as well as in upper-level studies. The peak of sheer student involvement and fascination, in fact, was reached

Apollo 12 basalt thin section shows mottled pyroxene, smooth plagioclase.

Faster cooling gave coarser texture to Apollo 15 sample of similar material.

Smooth area is part of 1-cm vessicle—a popped bubble—in Apollo 15 rock.

Sample No. 70017: "This is the rock for the children of all the world."—Eugene Cernan, Apollo 17. Pieces of it were presented to more than 130 foreign countries.

when he took the precious slides to his daughter's elementary school and let the children look through the microscope themselves. "It was unreal," he says. "It really blew my mind." Excitement, questions, chatter—and the next day a series of notes from the class:

"It's hard to believe that the moon rock could be so old and look so new." —Diana K., grade 4.

"My mother said, 'Only a few people ever get to see moon rocks.' I am happy I am one of the people."—Polly F., grade 4.

"The moon rock looked like different color windows on churches in a little town."—Gary G., grade 4.

"It was so beautiful I can't think of a word that really explains it."—Karen C., grade 4.

Such enthusiasm, although so far (officially) only at the college level, is part of NASA's motivation for the whole loan program. Geoscientific training notwithstanding, the "bore-from-within" aspects of bringing the real moon into the classroom to inspire potential space enthusiasts are too valuable to ignore. (*"I'd love to go on the moon, or just in Skylab."*—Amanda P., grade 4.)

The restrictions on potential borrowers are virtually the same as those on scientific investigators, and the applicant must sign a cooperative agreement with NASA that lays them out in detail. Head acknowledges that four months of following the rules is a bit wearing, but, he says, putting the moon in a student's hands renders such inconveniences trivial.

Interested faculty members should contact Dr. Michael Duke, Curator, Code TL, Johnson Space Center, Houston, Texas 77058, for more information. □