INTERAGENCY REPORT: ASTROGEOLGY 71

Documentation and environment of the Apollo 17 samples: A preliminary report

by

Apollo Lunar Geology Investigation Team
U.S. Geological Survey

January 21, 1973

Prepared under NASA Contract No. T-5874A

This report is preliminary and has not been edited or reviewed for conformity with U.S. Geological Survey standards and nomenclature.

Prepared by the Geological Survey for the National Aeronautics and Space Administration
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INTRODUCTION

This catalog shows the locations from which samples were collected during the Apollo 17 mission and provides a descriptive geologic context for each sample. It is a working document principally of use to LSPET, LSAPT, and the lunar sample principal investigators.

The information in this report is incomplete, but it is based on the best available data as of January 19, 1973. Sources of information are: air-to-ground transcript, lunar surface television, lunar surface photographs, available LRL "mugshot" photographs of the samples, and frequent discussions with the astronaut crew. The information contained herein does not reflect the more detailed examination that is presently underway in the LRL.

Documentation of some samples at the Apollo 17 site is incomplete. Identification of the rocks on the photographs is tentative in many cases pending examination of the samples under collimated light and accurate determination of lunar orientation. These data will be incorporated in a final report on sample documentation.

There are inconsistencies in format (and even errors), but we believe that the early dissemination of these data is more important than the complete standardization of format which would require detailed editing and substantial delay.

Nearly all of the sizes, distances, slopes, and percentages given are qualitative, visual estimates from photographs. The station maps (the fold-outs in back of the report) were compiled using a perspective grid overlay on the photographs, and thus are more accurate than most other dimensional data in this catalog.
The station descriptions that follow this introduction apply to the general station area (see figure on next page); the environment descriptions under each sample apply to an area a few meters on a side around each sample, and may or may not reflect the surface characteristics of the entire station area.

Some of the LRL numbers (supplied courtesy of Patrick Burler, Assistant Curator, Lunar Receiving Laboratory, NASA-MSC) are still tentative and subject to change as more sample containers are opened. The tentative numbers are indicated by an asterisk after the number.

Photograph numbers throughout the text normally have the following prefix: NASA ASI7- which is deleted for brevity in this report.

LRV SAMPLES

During EVA-2 and EVA-3 samples were scooped from the surface between traverse station stops by the use of a long-handled sample-bag holder (LRV sampler) without the need for the crew to dismount from the LRV. Traverse stops where such samples were taken are shown in the figure on the adjacent page and labeled as LRV-1 to LRV-12. Samples taken with the LRV sampler are limited to soils and rock fragments less than 5 cm in maximum dimension. The samples are all grab samples because of the restricted view of the sample area, but they were selected in the sense that most were preplanned locations determined by range and bearing from the SEP transmitter. The LMP decided where the sample was to be taken specifically and which, if any, rock fragment was most desired. After selecting the site, the LMP photographed the area from the moving LRV. He then orally guided the CDR,
who maneuvered the LRV so that the LMP could sample the selected site. When the LRV had stopped for the sampling, both crew members took a photograph of the area ahead; these photographs locate the sampling site and give stereo coverage of the view ahead of the site. The sample site itself is visible only in the more distant views photographed before sampling. The sampler was also used at a few stations by the LMP while off the LRV. The LRL numbers assigned to the samples taken at LRV sample stops are coded with the next traverse station along the route. Thus samples collected en route to station 4 from station 3 will all have station 4 numbers.
SUMMARY OF THE GEOLOGY AT TRAVERSE STATIONS
AND LRV SAMPLE STOPS

In order to provide a context for the individual sample location
descriptions, a brief description of the geologic characteristics of each
sampling station is included. The stations and LRV sample stops are
described in the sequence in which they occurred on the traverses. The
interpretations in these summaries are tentative and some will almost
certainly be modified after more information on the samples is available.

Station LM/ALSEP/SEP

Station LM/ALSEP/SEP is located in three general areas ranging from
200 m east to 200 m west of the LM and covering approximately 0.5 km². The
station is located near the center of Taurus-Littrow valley in an area where
fine- to coarse-grained subfloor basalts are overlain by a regolith that may
contain or be overlain by dark mantling material.

The valley floor at the station is smooth, locally flat, and only gently
rolling. The abundance of surface rocks is higher than the regional average
for the valley floor and ranges from 2-7 percent at the LM and ALSEP sites
to <1-2 percent at the SEP site. Blocks range up to a maximum of 4 m in
the ALSEP area, and rock burial and filleting in the station area is pro-
nounced on some meter-sized blocks.

Rock types at the station are extremely limited and consist predominantly
of coarse-grained subfloor basalt with local fine-grained variations. Clods
of soil breccia associated with impact events are also present. Rock sample
types collected at the three areas of the station include: LM (1 glass-coated
breccia; 2 coarse-grained basalts; 1 fine-grained basalt); ALSEP (1 soil
breccia; 1 coarse-grained basalt; 1 fine-grained basalt); SEP (37 fine-grained basalts). There is evidence that the fine-grained basalts are more common at the SEP area east of LM site. Other samples include a deep core sample (3.2 m) and a single core tube.

Soils are commonly medium dark gray and more cohesive with depth to a depth of 25-35 cm. The soil consists of layers of different drilling resistance judging from the alternating zones of easy to difficult drilling that were encountered in all holes, with the most resistant zone being at about 2 m. There are no conspicuous surface lineaments in the station area. "Raindrop" texture is common over the area but most pronounced at SEP. Exotic feldspar-rich components from the North and South Massif units do not appear to be abundant in the regolith at the station.

The surface in the station area contains many subtle 20 cm to 2 m craters, the latter probably representing the current steady state limit of crater size. The nearest large craters to the station are Rudolph (80 m diameter), 70 m to the north of ALSEP, and highly subdued Poppy (100 m diameter), 70 m south of the LM site. Most of the observable surface blocks are associated with larger crater ejecta such as Camelot (600 m diameter and ~1 crater diameter to the west).

The samples collected at the station represent varieties of coarse to fine-grained basalts that make up the sub-regolith valley floor. A distinct layer of dark mantle material overlying regolith was recognized neither on photographs from the mission nor by the crew during the mission, suggesting that the upper part of the dark mantle, if it exists as a separate entity, has been gardened into a normal regolith overlying the subfloor basalts. The deep core sample taken at the ALSEP site should provide the best
stratigraphic data on the postulated dark mantle material. However, gardening of dark mantle and normal regolith may have destroyed original dark mantle depositional characteristics.

Station la

Station la is located about 1 km south-southeast of the SEP and about 150 m from the northwest rim of Steno crater. Steno is not visible in any of the station photographs, but its north rim is apparently the blocky area that rises to the south in the photographs. The station is on the subdued ejecta blanket of Steno crater that has been covered by dark mantle.

The station area is gently rolling, a reflection of the influence of the ejecta blanket of Steno crater, a 70 m very subdued crater to the east, and other hummocks that are remnants of older crater forms. The station is characterized by a scattering of rocks that range up to 1/2 to 1 m. Some distant boulders on the rim of Steno range up to several meters. Boulders are concentrated around smaller craters only near the 10 m station crater; other concentrations do not seem to be related to crater rims. Fillets are not well developed; burial of blocks ranges from perched to almost totally buried.

The major sampling areas are a 10 m blocky rim crater and a rake sample from a relatively flat area free of blocks 15 m east of the blocky crater. The sample areas represent the extremes of rock concentrations. Sampling of the 10 m blocky crater yielded only subfloor basalt fragments from the two large boulders that were sampled. Sampling of the intercrater area yielded some subfloor basalt samples plus some fragments that no doubt represent exotic material.
The fine-grained soil seems to be the same gray tone everywhere in the station area. There are no obvious lighter-toned zones, and no concentration of raindrop impressions or lineaments.

Craters in the station area range from several centimeters up to tens of meters. Most are moderately subdued to very subdued. Ejecta is readily apparent only around the 10 m blocky crater that is the prime sampling area.

The fragment samples are important because they are examples of subfloor basalt, derived from the crater floor or possibly reexcavated Steno ejecta. The soil samples are significant as examples of material that probably represents dark mantle.

**LRV-1**

LRV-1 sample stop is located along the route from the LM area to station 2, between Horatio and Bronte craters (see figure at end of introduction). Like the LM area and station 1, the LRV-1 area is in the dark mantle unit shown on pre-mission photogeologic maps; the surface appearance, however, is quite different.

Both the LM area and station 1 are within a cluster of large (0.5 to 0.7 km diameter) craters, and the landscape is characterized by boulders and smaller blocks probably ejected from those craters. The visible younger craters more than a few meters in diameter are also blocky, probably because of reexcavated blocks from the ejecta blankets of the large craters. The block-studded dark mantle of the LM area extends to the vicinity of Horatio crater.
West of Horatio the dark mantle surface appears strikingly smooth; less than one percent of the area is covered by rock fragments, and these are noticeably smaller than those typical of the IM area. Craters more than one meter across are widely separated, and some craters as large as 20 or 30 meters in diameter are block free. Craters with ejected fragments of soil breccia are also present.

This difference in the nature of the crater ejecta and the general block population indicates that the dark mantle west of Horatio, where this sample was obtained, is likely to be less mixed with material derived from the subfloor unit.

The LRV-1 area was selected by the crew on a ray from one of the rare, blocky rimmed craters in this generally block-free area. The crater is 10-15 m in diameter, and the sample was taken from about three-fourths of a crater diameter out from the rim. The rocks are irregular and jagged, but some have rounded tops as if easily eroded. All the blocks from the crater are less than 1 m in diameter with the largest resting on the crater rim. Burial seems insignificant, fillets are not present, and dust is not seen upon the rocks. The soil of the area appears typical of the dark mantle region. Other craters in the area are either block-free or have ejected what seem to be clods of soil breccia. The rock fragment sampled from the crater ejecta is a piece of hard rock, probably subfloor basalt.

**LRV-2**

LRV-2 sample stop was made on the tongue of light mantle about 3.5 km west of the IM. The sample was scooped from the bright rim of a crater. The location of the sampled area in the photographs taken along the traverse route is very tentative.
Rock fragments up to several centimeters across are sparse, but the driving photographs, which were taken downsun, are not adequate to determine the population of rock fragments in detail. The astronauts reported that the population of fragments larger than 1 cm across is less than 1 percent. They also reported a few larger blocks that look like subfloor material but noted that it was difficult to be sure. They reported that the rims of the craters in the light mantle are somewhat brighter than those in the dark mantle, and that the albedo of the surface appeared somewhat brighter looking downsun. Otherwise the surface appears similar to that of the dark mantle.

Craters up to 5 m in diameter are fairly common in the sample area. Most are subdued or have only slightly raised rims. Small cloddy craters are scattered along the traverse route.

The material sampled probably represents light mantle material that was ejected from the crater.

LRV-3

LRV-3 sample stop was made at a site in the dark mantle between the main body of light mantle and a finger of light mantle that lies to the southeast. The area resembles the dark mantle surface at LRV-1 rather than the dark mantle surface at LM and station 1. It appears in the surface photography as an exceptionally smooth-surfaced flat area with a pockmarked appearance caused by widely spaced craters that are nearly free of blocks on their rims; the soil between craters has a "raindrop" appearance. The block population covers less than 1 percent of the area, and all
blocks are less than 1 m across. Clods of soil breccia are present on the rims of a few craters less than 3 m across.

Samples include a rock fragment and a "couple of teaspoons" of soil. The rock is from a cluster of rocks on the surface that are not clearly related to any crater. The rocks in the area all appear similar and resemble subfloor basalt. The soil sample is a scoop of soil from the same area, and can be considered typical of the surface material in a dark mantle area free of large blocks. There is no evidence of the presence of light mantle debris in the area of LRV-3.

Station 2

Station 2 is located at the foot of South Massif where it intersects the southeast margin of Mamsen crater, and near the contact between the light mantle and materials of the South Massif. Rock chips were collected from three boulders, and soil was collected from near and under the boulders, in a small area low on the slopes of the South Massif. A rake sample was collected from the same area and another from an area about 40 m northeast of the base of the massif, in the light mantle.

Rocks visible in the photographs in and around the sampled area vary in size from less than 1 cm across up to boulders more than 2 m across. Rocks are more abundant near the base of the slope than at intermediate elevations or out on the light mantle. Most of the rocks larger than 25 cm are rounded, and smaller rocks range from angular to rounded.

Rocks of all sizes vary from almost totally buried to virtually no burial. Fillets are poorly developed except on the uphill sides of rocks that are on slopes greater than 10°. The downhill sides of such rocks commonly have no fillets.
Except for rocks in the rake sample, the rock samples that were collected from the lower slopes of South Massif were chipped from three boulders, two of which are about 2 m across and the third about 2/3 m across. The boulders are complex crystalline breccias which probably either rolled or were ejected from craters higher on South Massif. Soil was collected from beneath overhangs on the two larger boulders, and the soil beneath the smaller boulder was collected after rolling the boulder. Soil was collected from the fillet of the southernmost boulder, and a rake sample was taken from an area about 5 m east of this boulder. Another rake sample was collected from the light mantle about 50 m north of the break in slope at the base of the South Massif, in an area of sparse rock fragments.

Soil in the sample area is light to medium gray. The surface is saturated by craterlets up to about 5 cm in diameter. The soil appears from bootprints to have a rather low cohesiveness.

Craters 3 to 5 m in diameter are common, but most are either subdued or have only slightly raised rims. No blocky craters are visible in the area of station 2, and there is no evidence that any of the fresher craters penetrate to consolidated rock. A few small, cloddy craters are visible, but none are in the immediate sampling areas.

The crew reported seeing lobes of unconsolidated material extending from the slopes of South Massif onto the light mantle. The lobes are especially prominent on the south wall of Nansen crater and encroach onto the north wall, suggesting downslope mass wasting. Visible lobes do not extend as far as the rake sample area of the light mantle.

The boulders are probably representative of material from high on the slope of South Massif; the fines in the vicinity of the boulders are probably
derived largely from South Massif, but with some contamination from crater ejecta off the light and dark mantles. The rake sample on the light mantle probably contains light mantle and some material ejected off South Massif and from the dark mantle.

Station 2a (LRV-4)

Station 2a is located about 500 m northeast of Nansen crater on the light mantle. It was originally planned as an LRV sample stop, but during the mission it was decided to take a traverse gravimeter reading at this stop. While off the LRV, the crew collected four samples.

Rock fragments up to several centimeters in diameter cover less than one percent of the surface. Many appear to be only slightly buried, and fillets are poorly developed.

The crew described the surface material as blue-gray soil to a depth of about 5-10 cm, and a lighter-colored soil below. The surface is saturated with craters up to 5 cm in diameter.

Larger craters up to about 5 m in diameter are sparse to fairly common. Most of the craters are subdued or have only slightly raised rims. None of the craters have blocky ejecta, but a few appear to be cloddy.

Samples collected include a fragment, probably breccia; a clod which disintegrated to soil by the time it reached the LRV; and a sample of the upper blue-gray material, which may have some contamination by ejecta from the dark mantle. A sample of light material from the bottom of a 15 cm trench was also collected, and it is likely that this is the most representative sample of light mantle fines that was returned by the mission.
Station 3

Station 3 is located on the light mantle near the base of the scarp, approximately 50 m east of the rim of Lara crater. All of the samples except the drive tube were collected from the raised rim of a crater 10 m in diameter. Time at the station was limited and was not sufficient for detailed, systematic documentation of the samples. Some of the individual rock fragments sampled cannot be recognized on pre-sampling photographs, but the locations of all the samples are known with reasonable certainty. The drive tube was taken about 20 m south-southeast of the rim of the 10 m diameter crater.

Rock fragments 1 to 25 cm across are fairly common but cover less than 1 percent of the surface, and several boulders up to 1 m across are visible in the panorama. Most of the rocks are rounded, except for the largest boulders, which are generally angular to subrounded. The largest rocks are generally near craters several meters in diameter. Rock fragments were collected from the rim of a crater 10 m in diameter and include several samples of breccia similar to samples collected at station 2. Fillets are poorly developed, but a few of the rocks are apparently more than one-half buried.

The soil at the surface was described as medium-gray, but light-gray material was kicked up from just below the surface material at the crater rim. A trench 20 cm deep showed that medium-gray surface material about one-half centimeter thick overlies a light-gray layer 3 cm thick, which, in turn, overlies marbled or mottled light and medium-gray material. The soil appears to be loosely compacted and saturated with craterlets up to about 5 cm in diameter.

Craters larger than 4 cm and up to about 2 m in diameter are fairly common. Several of these have fresh cloddy ejecta, but all of the small craters in the immediate vicinity of the sampled area appear to be subdued.
shallow pans. Craters ranging from 2 m up to about 15 m in diameter are also fairly common, and several have raised and somewhat blocky rims. One such crater is the 10-m diameter crater at the sampling site. These craters appear to have penetrated only unconsolidated and somewhat rocky material of the light mantle. Lara crater, 500 m in diameter, and the largest crater in the area is probably covered by light mantle material, as suggested by pre-mission mapping. It is probable that the samples collected are related only to the light mantle and not to materials that were ejected from depth from Lara crater.

**LRV-5**

LRV-5 sample stop is located about 700 m northeast of station 3 in the blocky ejecta of a crater in the light mantle. Rock fragments range from 1 cm to 50 cm in diameter, and cover 15 to 20 percent of the ejecta blanket surface. The fragments are dominantly angular and partially buried. No fillets are visible in the photographs.

The crew commented that the ejecta is much different than they had previously seen around other craters. They also suggested that the crater may penetrate through the light mantle into bedrock. The sample is a fragment of ejecta from this crater and may not be representative of light mantle material.

**LRV-6**

LRV-6 sample stop is located about 1.1 km northeast of station 3, on the light mantle. The sequence of driving photographs suggests that the sample was taken somewhere in the vicinity of two small cloddy craters.
Rock fragments 1-5 cm across are sparse and cover less than 1 percent of the surface. A few boulders 1-2 m across are scattered over the surface. Many of the rocks are either sitting on the surface or only slightly buried. Fillets appear to be poorly developed.

The surface is saturated with craters up to 5 cm across. Craters 5 cm to 2 m across are common and most are shallow subdued pans. Craters 2-10 m across are sparse and are mostly subdued or have slightly raised rims.

The sample collected is soil from the surface of the light mantle; it is probably representative of light mantle fines except for contamination by ejecta from dark mantle materials.

Station 4

Station 4 is located on the south rim crest of Shorty, a 110 m crater near the north edge of the light mantle. Shorty resembles Van Serg crater and is similar to other craters that have been interpreted as young impact craters. The floor is hummocky, with a low central mound and with marginal hummocks that resemble slumps forming discontinuous benches along the lower parts of the crater wall. The rim is distinctly raised and is sharp in orbital views. The dark ejecta blanket is easily distinguished from the reflective surface of the surrounding light mantle, which it overlies. However, the low albedo of the ejecta is similar to that of the dark mantle elsewhere on the plains surface.

The central mound is blocky and extremely jagged, and the hummocks or benches that encircle the floor are also blocky. Although some portions of the walls are blocky, the walls, the rim, and the outer flank of Shorty crater consist largely of dark material that is much finer grained than
the floor. On the crater rim, fragments ranging up to about 15 cm in diameter typically cover less than 3 percent of the surface. Scattered coarser fragments, ranging up to at least 5 m in diameter, are present.

Sampling was carried out in a low place on the rim crest of Shorty just south of a 5 m boulder of fractured basalt. Debris that may have been shed from the boulder lies on the nearby surface, and blocks are abundant on this part of the inner crater wall. All of the rocks examined are basalt. They are commonly intensely fractured and some show irregular knobby surfaces that resemble the surfaces of terrestrial flow breccias. Rocks range from angular to subrounded; some are partially buried; some are filleted, including the upslope sides of a few of the larger boulders on the inner crater wall.

The crater rim and flanks are pitted by scattered, small (up to several meters) craters whose rims range from sharp to subdued. Typically their ejecta are no blockier, except for clods, than the adjacent surfaces.

A trench dug in the rim crest exposed compact reddish soil buried beneath a 1/2 cm thick gray soil layer typical of the general soil surface at the station. The reddish soil occurs in a meter-wide zone that trends parallel to the crater rim crest for about 2 m. Color zoning within the colored soil occurs as 10 cm-wide yellowish bands that form the southwest and northeast margins of the deposit. They are in steep sharp contact with gray soil adjacent to the colored soil, and grade inward to the more reddish soil that makes up the major part of the zone. A drive tube placed in the axial portion of the colored zone bottomed in black fine-grained material that reminded the crew of magnetite. Similar reddish material has been excavated by a small, fresh crater high on the northwest interior wall of Shorty and perhaps also on the rim crest a short distance southeast of the LRV.
Although a volcanic origin has been considered for Shorty crater, no compelling data to support the volcanic hypothesis have been recognized. Most probably Shorty is an impact crater. Its blocky floor may represent the top of the subfloor basalt, which is buried by 10-15 m of poorly consolidated regolith, dark mantle, and light mantle. The predominantly fine-grained wall, rim, and flank materials would then be ejecta derived largely from materials above the subfloor, and the basalt blocks would be ejecta derived from the subfloor. Regardless of its origin the crater is clearly younger than the light mantle.

The origin of the red soil is currently enigmatic. It and the underlying black soil may represent a single clod of ejecta excavated by the Shorty impact from similar materials previously deposited in the target area by impact or volcanism. However, the symmetrical color zonation of the red soil and parallelism of the zone's steep sharp boundaries with both the internal color banding and the axis of the rim crest are improbable features for a clod of ejecta. Perhaps volcanic origin along a fissure at the crater rim crest should be considered.

The 1/2 cm thick gray soil that mantles the red soil unit should be present at the top of the drive tube sample. It could have been formed by either volcanism, impact processes, or regolith formation and deserves special attention in analysis. However, Shorty crater is younger than any widespread dark mantle deposit near station 4.

LRV-7

LRV-7 sample stop is located at the apex of the "V"-shaped Victory crater, very near the contact of dark mantle with the finger of light mantle. The area was mapped as dark mantle near the light mantle contact.
but the presence of light mantle material was not detected by the crew at the sample site. Victory was judged by the crew to be a series of craters with a definite rim, and probably is an impact feature with normal ejecta. The ejecta blanket and the rim appeared to be blanketed by dark mantle, and the surface on the rim looked like it had a "normal block population", although the inner walls of the crater were locally very blocky.

The blocks on the rim near the sample site are all less than one meter in diameter and cover two to three percent of the area. Burial of the rocks seems to be moderate to slight and fillets are only rarely present. The rocks are subangular to rounded, and some have planar sides. The soil appears normal, and LRV tracks in the soil are very sharply defined. Scattered subdued craters 1 to 5 m in diameter are present near the sample site, but none seem to have a direct relation to the sample.

The sample is soil that should be representative of the surface material in the area. This soil sample is probably mostly dark mantle but could contain a considerable amount of soil fragments derived from subfloor basalt.

**LRV-8**

LRV-8 sample stop is located in an area mapped as dark mantle slightly more than one crater diameter from Camelot and Horatio craters. The area can be considered as dark mantle away from the ejecta of the cluster of large craters. The surface appearance is similar to that at LRV-1, 3, and 7 areas, with a fragment coverage of less than 1 percent of the area. The photographs taken from the LRV show that this very low abundance of fragments
continues from Victory to the rim of Camelot. The narrow tongue of light mantle crossed by the traverse is not obvious in the surface photographs and was not noticed by the crew.

The sample collected is a scoop of soil from an inter-crater area. The sample site is within a few meters of a crater one meter in diameter which has abundant rim fragments that appear to be clods of soil breccia. All fragments near the sample site are less than 10 cm across, and the soil in the area appears typical of soils in dark mantle areas. Nearby craters from 1 to 5 m in diameter may be members of two small, overlapping clusters. Several subdued, nearly rimless craters are present, as well as at least 3 craters with distinct ejecta blankets covered with clods. The sample is probably typical of surface material in areas of dark mantle at some distance from contributions from other formations, and thus should be comparable to soil from LRV-3. These two samples are good subjects for study of variation in the dark mantle map unit.

Station 5

Station 5 is located within a block field on the southwest rim of the large (600 m) crater Camelot. The blocks, which are partly buried by dark mantle material, are exposed near and along the low, rounded rim crest of the crater and extend downward into the crater walls where, as in other craters, outcrops are most abundant. Blocks are absent on the crater floor. Outward from the rim crest the block population decreases rapidly within a few meters and the terrain becomes smooth and undulating but pitted by small craters up to several meters across.
Within the block field individual rocks, varying from cobble to boulder-size, are subrounded to subangular, moderately to deeply buried, and cover about 30 percent of the surface. Except for one locality where soil occurs on the surface of a large flat rock, the tops of boulders impressed the crew as having been cleaned by the zap-pitting process. Filleting in this area appears to be minimal.

All of the rocks described by the crew constitute subfloor material having a very uniform appearance. Planar to subplanar concentrations of vesicles, linear arrangements of crystals, and possibly gray zones of finer material cause some variations in rock textures and structures. Descriptions by the crew indicate that the rocks are subophitic pyroxene-bearing basalts with shiny ilmenite platelets in the vugs and vesicles.

The soil-like mantle seems to consist of cohesive particles of uniform small size. A "raindrop" pattern is ubiquitous on the mantle. At Camelot the mantle appears thinner than at the crater Horatio.

Shallow depressions and subdued craters up to several meters in diameter are superposed on the rim and floor of Camelot. These craters are younger than Camelot; however, within the observed block field only one younger crater of moderate size (4-5 m) was noted by the crew.

The composition, textures, and uniform lithology of the ejecta blocks around the crater Camelot indicate that subfloor basalts covered this part of the valley floor to a depth of at least 100 m prior to the formation of the crater. Subsequent to the formation of Camelot, deposits of dark mantle material partly buried rocks around the rim and in the floor of Camelot and partly filled and subdued many younger craters in the area. The samples of basalt from blocks at station 5 should provide a sample of the subfloor unit to a depth of 100 feet.
LRV-9

LRV-9 sample stop is about 1.5 km north of SEP, one-half the distance from LM to station 6, in an area mapped as dark mantle about 2/3 of a crater diameter south of Henry crater. Between the LM/SEP area and a point about 200 m south of LRV-9 the surface is characterized by three to five percent coverage of rock fragments and some large boulders. At LRV-9, the fragment coverage is less than one percent. To the north of LRV-9 the fragment coverage increases as the rim of Henry is approached, but never reaches more than a few percent except near young craters. The sample stop is in the part of the LM to station 6 traverse with the fewest rock fragments. The fragments in the area include some that seem to be blocks excavated by a 10-m crater and some that appear to be blocks and clods excavated by several 1 to 2 m craters. The sparseness of blocks ejected by craters suggests that the blocks were derived from the regolith rather than directly from the subfloor unit. The blocks are angular to subrounded, less than 30 cm across, and slightly to mostly buried. Only a few of the rocks have fillets.

The sample is a soil sample from a small crater with abundant clods of soil breccia on its rim. It should be reasonably representative of surface material in the nearby area of dark mantle. Some mixture of material from the reexcavated ejecta from Henry crater is to be expected. However, the sample should be of considerable value in determining geographic variation in dark mantle material.

LRV-10

LRV-10 sample stop is adjacent to Turning Point rock, 2.8 km north of the SEP. The area was mapped as dark mantle near the gradational contact with North Massif material. The sample site is on a gentle slope above a
moderately distinct break in slope with the valley floor and below an equally distinct break in slope with the North Massif. The material underlying the area between the breaks in slope may be debris from the North Massif.

Turning Point rock rests within a halo of smaller boulders and rock fragments that are probably derived from it. The rocks are rounded, partly buried, and filleted on the upslope side. Turning Point rock probably reached its present position as one large boulder that has since been fragmented.

The sample was taken about 4 m north of Turning Point rock, and it consists of at least three rock fragments and some soil. Most likely the fragments in the sample are derived from Turning Point rock, but they could be debris derived separately from North Massif. Although the soil may contain fine debris from the rock, it most likely is a sample of the soil from North Massif that has moved downslope and banked against the rock.

Station 6

Station 6 is on the south slope of the North Massif, approximately 250 m north of the break in slope between the valley floor and the massif. The area slopes approximately 11° south and is covered by many large blocks and smaller fragments which have come from higher on the North Massif. Twenty meters from the LRV are five large boulders aligned downslope from the end of a single boulder track as if a single boulder broke into five parts. Four were sampled.

The boulder track made by the station 6 boulders can be traced 1/3 of the way up the North Massif. This is the lowest level on the mountain where high concentrations of boulders appear. The sharpness of the boulder track of the station 6 boulders indicates that the boulder may have been in its
present position only a short length of time. The shadowed soil will probably reflect this. One of the boulders has a prominent north overhand, beneath which a shadowed soil was collected along with two soil samples collected outside the shadow. A soil sample was collected from the surface of one of the boulders. A rake sample and a single drive tube were taken within a few meters of the boulders. Two undocumented grab samples were collected probably near the LRV, and another sample was collected downslope from the station area.

Less than 1 percent of the surface in the station 6 area is covered by fragments. There appears to be a bimodal distribution of fragments in the area, though not as striking as the station 7 area. As at station 7, there appear to be relatively few fragments in the 3-15 cm size range. Fragments less than 1/2 m are scattered randomly over the surface, larger ones are generally in clusters. Most blocks are subrounded to rounded. A few angular blocks are scattered over the surface. Fillets are well developed on the upslope side of some of the large boulders. Fillets on blocks less than 20-30 cm are poorly developed or absent.

The medium-gray soil in the station 6 area is moderately firm away from crater rims. The LRV wheels made shallow impressions and threw very little spray, 10 to 15 m away from craters. Close to a 10 m crater in the area, bootprints and LRV wheel penetration were deeper, and spray generated by them was considerably more. The drive tube collected near the LRV was pushed by hand to a depth of 10 cm.

Craters, randomly scattered over the surface, range in size from the limit of resolution to 10 m. Craters larger than 1 m are sparse. The rims are smooth and unblocky, and usually more raised on the downslope side. A few small fresh craters have blocky rims, with the ejecta deposited preferentially downslope.
The cluster of 5 boulders was probably at one time a single boulder. There are at least two major rock types represented: a highly vesicular light-gray breccia, and a darker blue-gray breccia. The lower 3 boulders are highly vesicular, light gray breccias. The contact between the two breccias is in the second boulder from the top. Near the contact are inclusions of blue-gray breccia in the vesicular breccia. The blue-gray breccia is partially recrystallized, and has inclusions of friable breccia. The contact between the inclusions and blue-gray breccia is sharp. If all five boulders were at one time part of the same rock, there are at least four stages of brecciation. The similarity of the station 6 boulders to the station 7 boulder suggests strongly that the North Massif is composed primarily of multi-cycle breccias. Other samples of the North Massif are the rake sample, drive tube, and 3 grab samples, all of which are probably composed primarily of eroded material from the massif with possible minor contribution of subfloor material.

Station 7

Station 7 is located at the base of the North Massif, just above the break in slope between the valley floor and the massif. The slope toward the valley is about 90°. The station is located on North Massif material and the site contains boulders from slopes high on the massif. Several rock chips were collected at the station from such a 3 m boulder of complex, multi-stage breccias. The 3 m breccia boulder is the largest one in the station area, but other large boulders can be seen in the panorama. The large rock appears similar in color and weathering characteristics to the other boulders in the area. Several additional fragments were selected from the regolith surface.
Less than one percent of the surface is covered by blocks. There appears to be a bimodal distribution: fragments from the limit of resolution to 2 or 3 cm are abundant, and blocks 30 cm and larger are common, but there is a scarcity of blocks in the 3 to 30 cm size range. Blocks smaller than 30 cm are scattered randomly over the surface; those larger than 30 cm are in clusters. Most blocks, in all size ranges, are rounded, but a small percentage are angular. One 2-3 m boulder downslope from the sampling area is strikingly more angular than most other rocks. The rocks range from being deeply buried to perched. The sampled boulder overhangs the surface on the east, west, and presumably south sides. A few half-meter boulders in the same area are almost totally buried, and most fragments less than 1 m are at least partially buried. Filleting is well developed on blocks larger than 1/2 m, and poorly developed or absent on smaller blocks. Fillets are restricted to the uphill side of the blocks. One meter-sized boulder has a fillet extending 3/4 the way up the upslope face. The boulder is a vesicular hornfelsic breccia (described by the crew as vesicular anorthosite) in contact with a dense blue-gray breccia. In the dense blue breccia is a 1 1/2 m crushed light-colored inclusion, which is intruded by dikelets of breccia. One sample is a piece of blue-gray breccia in fairly sharp contact with a tan breccia which intrudes it. A large separate sample appears to be similar to the blue-gray breccia in the boulder. Several small chips collected on the surface are probably similar to the boulder, and also representative of North Massif material, although there may be a minor contribution from subfloor basalts.

The medium-gray soil in the station 7 area is relatively firmly compacted. Bootprints and LRV tracks penetrate between 1 and 2 cm. Very little spray was generated from boots or LRV wheels. The soil is quite cohesive (as shown by vertical walls of bootprints and the intact state of tread imprints).
Craters in the station 7 area range from the limit of resolution to 3 or 4 meters in diameter. Craters 1/2 m or less are common. Most craters have somewhat subdued non-blocky rims, and ejecta is not visible. A few small (less than 1/2 m) craters have raised blocky rims. The ejecta around these craters is deposited preferentially downslope. On a meter-diameter crater downslope from the LRV the ejecta is piled against a rock downslope, and forms only a slight raised rim on the uphill side.

The large boulder at station 7 probably originated at least one-third of the way up the North Massif because this is the lowest level on the massif where clusters of boulders appear. The rock types seen in this boulder are similar to those in large boulders at station 6, making the possibility of its being an exotic improbable, and suggesting that samples of the boulders are representative of the massif. These samples indicate that the North Massif is composed of multi-cycle breccias.

LRV-11

LRV-11 sample stop is located between stations 7 and 8 on the southeast rim of SWP crater. Before the mission, the area was mapped as dark mantle blanketing SWP crater. The sample site was chosen by the crew in the ejecta blanket of a fresh crater estimated to be 30 to 40 meters in diameter. The rocks in the sample area are part of the ejecta blanket and were identified by the crew as clods of soil breccia that break easily and are "chewed up" by the LRV wheels. At the rim, and just within the rim, the clods cover as much as 70 percent of the surface and at the sample site cover as much as 50 percent of the surface. The clods are very angular with some rounding of the tops. All are football size or smaller. The soil between the clods is the same
color and probably the same composition as the clods. Within the ejecta blanket of the 30 to 40 meter crater, there are no visible younger craters.

The area surrounding the 30 to 40 meter crater appears typical of dark mantle surfaces that have a rock fragment population of less than one percent. The 30 to 40 meter crater should have penetrated some 6 to 8 meters of the soil (dark mantle?), which is a considerably greater thickness than the soil at station la. Possibly the crater at LRV-II penetrated the same type of material as did Van Serg crater (station 9) and if so, that material is a distinct unit that is not present at station la. However, with our present knowledge, the dark mantle at LRV-II, station 9, and station 1 is considered to be the same material but with a large range in thickness.

The sample taken at LRV-II will be significant in determining the near surface stratigraphy. It is representative of the ejecta blanket of the 30 to 40 meter crater, and its position on the ejecta blanket suggests that it came from a depth of 2 to 4 meters below the surface.

Station 8

Station 8 lies near the base of the Sculptured Hills south of Wessex Cleft and about 4 km northeast of the LM. The terrain is undulating and forms a moderately inclined transition zone between the hills and the valley floor to the southwest; slopes increase noticeably towards the hills within the sample area. Eleven samples were collected, representing two, possibly three, major rock types, and including soils, a rake sample, and a suite of four samples from a trench.

Small cohesive clods and pebble-size coherent rock fragments are common throughout the station area, but larger rocks and boulders are rare. Most of the rocks are subrounded to subangular, are well exposed to partly buried,
have poorly developed fillets, and are only thinly covered by dust. The population of blocks and fragments does not increase greatly around the rims of any craters in the area photographed.

With the exception of one coarse-grained gabbroic boulder, all of the rocks larger than 20 cm which were examined had the appearance of subfloor basalts. The gabbroic rock was estimated by the crew to be made up of about equal amounts of blue-gray plagioclase (possibly maskelynite) and a light yellow-tan mineral, probably orthopyroxene; its average grain size appeared to be about 3-5 mm. The surface of this boulder was coated by glass. Both top and bottom of the boulder were sampled. A white friable rock sampled by the crew in a small pit crater within the wall of a larger crater has probably been highly shocked by at least two episodes of fairly recent cratering.

The soil in this area, at least to the 20-25 cm depth of the trench samples, consists of fine-grained, cohesive particles. It has the dark appearance characteristic of the mantle throughout the valley floor. Surficial directional patterns related to structure were not observed, but many tracks made by the downhill movement of clods of all sizes were noted on the steeper slopes.

No large craters are present in the immediate area; those up to several meters in diameter are common, however, and have a continuum of morphologies from fresh-appearing, topographically sharp features to highly subdued depressions. None of the craters have either prominently raised or blocky rims.

At this stage of our knowledge, probably the most important results obtained from the field observations of the materials at station 8 is the apparent complete dissimilarity in lithology of the rocks on the surface at station 8 compared with those at the base of the massifs. If the gabbroic
rock or the basalts are representative of materials forming the Sculptured Hills, the implications favored as to the composition and origin of the hills will be quite different from the pre-mission interpretation that the hills are Serenitatis basin ejecta. However, only a small number of rocks were available for examination, and these may not be representative. The absence of boulder tracks, together with the glass coating on the gabbroic boulder, suggests that the rocks may be exotic blocks ejected from distant impact craters. It is possible that the rake sample and the sample from the crater wall may provide better clues to the composition and origin of the Sculptured Hills. Dark mantle material in this area is believed to be relatively thin, thus rake and soil samples may contain a mixture of dark mantle, subfloor ejecta, and debris mass wasted from the Sculptured Hills.

Station 9

Station 9 is located on the southeast rim and nearby outer flank of Van Serg crater. The crater, 90 m in diameter, has a blocky central mound about 30 m across, discontinuous benches on the inner walls, and a raised blocky rim with a distinct crest out from which slopes the blocky ejecta blanket. In both orbital and lunar surface photographs, Van Serg resembles other craters that have been interpreted as typical young impact craters. Its ejecta blanket is distinct in lunar surface views because of its blockiness, which is greater than that of the adjacent plains. The ejecta blanket can be recognized, at least in part, in pre-mission orbital photographs as a distinct topographic feature, but it is inseparable from the adjacent plains on the basis of albedo.
Exploration at station 9 was concentrated in two areas: (1) the southeast rim crest of the crater, and (2) the surface of the ejecta blanket about 70 m out from the crater rim to the southeast, where the LRV was parked. In both sample areas the predominant fragment size ranges up to about 30 cm, with a few boulders as large as 1 to 2 m in diameter. At the rim crest fragments larger than 2 cm cover about 10 percent of the surface, but they cover no more than 3 percent of the surface in the sampling area near the LRV.

The predominant rock type at station 9 is soft or friable dark-matrix breccia. White clasts up to about 2 cm in diameter are visible in some rocks on the crater rim, and light-colored clasts possibly as large as 1/2 m in diameter were seen in rocks of the central mound. Some rocks are strikingly slabby. Closely spaced platy fractures occur in some, and a few show distinct alternating dark and light bands. Some frothy glass agglutinate was also sampled. In spite of their apparent softness, the rocks are typically angular. Many are partially buried, but there is little or no development of fillets even on the steep inner walls of Van Serg crater.

Soil at the surface is uniformly fine and gray with no visible linear patterns. The uppermost one or two centimeters is loose and soft, but compacts easily to preserve bootprints. The trench near the LRV exposed about 10 cm of a white or light gray soil unit below a 7 cm upper dark unit.

Craters younger than Van Serg are extremely rare in the station area. A few small (about 1 m) fresh craters are present. A large subdued depression southwest of the LRV may be an old crater now mantled by Van Serg.
ejecta. Frequency and angularity of blocks, paucity of craters, general absence of fillets, and uneroded nature of crater rim and central mound attest to the extreme youth of Van Serg crater. Such crater forms elsewhere have been attributed to impact, and no direct evidence of volcanic origin has been recognized. An impact origin seems likely.

The ejecta, unexpectedly, is dominated by soft dark matrix breccia instead of subfloor basalt. The rocks may be soil breccias, indurated and ejected in the Van Serg impact. If so, a fragmental unit that may be as much as 15 to 20 m thick must overlie the subfloor basalt in the Van Serg area. Development of a regolith this thick in situ is difficult to reconcile with the apparent youth of the valley floor. Hence the Van Serg rocks may represent a young mantle of transported fragmental material or a mature regolith that was developed on the surface of the subfloor basalt and was buried by the dark mantle prior to the Van Serg impact.

Soil samples probably consist of fine-grained Van Serg ejecta. The upper 7 cm of the trench may have been darkened by soil modifying processes, which would also have affected other soil samples and the upper part of the drive tube. Alternatively, the upper 7 cm zone of the trench may represent a young dark mantling unit deposited after the Van Serg event. Deposition of such a young thin unit would account for the similar albedos of the Van Serg ejecta blanket and the general plains surface.

LRV-12

LRV-12 sample stop is located north of Sherlock at about 1/3 of a crater diameter out from the rim in an area mapped as dark mantle.

The samples consist of a fragment of basalt and a separate soil sample. They were collected within a meter of a 1 m boulder and a 1 m crater that has clods of soil breccia.
The rock sample is probably a subfloor basalt derived from a depth of 50-90 m. The soil sample probably is representative of the surface material in the area, which is mapped as dark mantle, although it may contain a small fraction of material derived from the nearby boulder.

Surface photographs show an abundance (5 percent) of rock fragments, including several boulders (1 m across) only the tops of which are visible. The rocks are very likely ejecta of subfloor material from Sherlock crater. Their size suggests that not more than a few meters of dark mantle have been deposited or formed since the Sherlock crater impact. The slightly protruding boulders are smooth and rounded; most of the smaller fragments are rounded, but a few are subangular and have planar sides.

Younger craters have clearly reexcavated a few of the smaller blocks. Very small craters (1 m diameter) with many fragments on their rims are also present and the rim fragments seem to be clods of soil breccia.

The soil in the area appears normal in color and compaction.
SAMPLE DESCRIPTIONS

The sample descriptions are arranged according to ascending LRL numbers. The first digit (7) refers to an Apollo 17 sample, the second to the station number (with 0 = LM/ALSEP/SEP area); thus they are grouped by sequential station number. Within each station, the samples are grouped according to where they occur in the documentation photographs, and therefore can only be placed in a rough ascending order; the applicable illustrations follow immediately after the sample descriptions.

Tables 3 and 4 are page indices by container numbers and by LRL numbers.
SAMPLE: 70001-70009 (deep core)

Station: ALSEP
Location: 180 m at azimuth of 205° from LM.
Rock type: Regolith.

SAMPLE AREA CHARACTERISTICS

Slopes: Flat and level.
Fragment population
Distribution and size range: Immediate area of core disturbed; 2-3 percent block cover in local area.
Color: Light gray to medium dark gray.
Shapes: Irregular; blocky to subrounded.
Fillets: Restricted to larger blocks (1-4 m).
Apparent burial: Restricted to larger blocks (1-4 m).
Dust cover: Low to moderately high.
Fines
Color: Medium gray to dark gray.
Compaction: More coherent below 3-4 cm.
Craters
Distribution and size range: 10 cm to 1 m size common 2-8 m size present.
Shape: Subdued.
Ejecta: Present around a large number of 1 m diameter and larger craters in ALSEP area.

SAMPLE CHARACTERISTICS

Probable origin: Regolith of subfloor basalt and possible dark mantle material.

COMMENTS: Penetration of drill to 3.2 m alternated between easy and difficult, bottom 20 cm very difficult, base material cohesive; fragmental.
a) Post-sampling, looking southeast. (134-20504)

b) During-sampling, looking northeast. TV frame showing CDR starting deep core drill.

SAMPLES 70001-70009 (DEEP CORE)
SAMPLE: 70011 (SESC) Fuel Products Contamination Sample

Station: LM
Location: Beneath LM, near -Z footpad.
Rock type: Soil.

SAMPLE AREA CHARACTERISTICS

Slopes: Flat and level.
Fragment population: Disturbed by LM DPS engine on descent.
Distribution and size range: Very low; maximum 1-2 cm size in documentation photographs.
Color: Light gray.
Shapes: Irregular to subrounded.
Fillets: None.
Apparent burial: None.
Dust cover: Disturbed.

Fines
Color: Light gray.
Compaction: Firmer due to removal of upper 2-3 cm during LM descent.

Craters
Distribution and size range: None in immediate sample site.

SAMPLE CHARACTERISTICS

Color: Light gray to medium dark gray (discolored by DPS burn)
Apparent burial: Taken from 0-3 cm.
Comparison with other soils in area: Unknown.
Probable origin: Fine-grained regolith.
a) Pre-sampling, looking north. (140-21381)

b) Post-sampling, looking south. (143-21929)
SAMPLE: 70012 (L/52)

Station: LM
Location: 0.5 m inside +Y footpad.
Sample type: Drive tube (single)

SAMPLE AREA CHARACTERISTICS

Slopes: Flat and level.
Fragment population
  Distribution and size range: <1-2 percent; limit of resolution
  3-4 cm common; Note: DPS engine swept area of many surface frag­
  ments.
  Color: Light gray.
  Shapes: Angular, irregular to subrounded.
Fines
  Color: Discolored to brownish-gray by DPS.
  Compaction: Top 1 cm or so removed by DPS; appears more compact
  than local surface.
Craters
  Distribution and size range: 10 cm to 30 cm craters common.
  Shape: Normal.
  Ejecta: None.

SAMPLE CHARACTERISTICS

Apparent burial: 0-30 cm sample.

COMMENTS: Both caps loose on arrival at LRL. Considerable material
spilled into BSLSS bag.
Pre-sampling, looking south.
(147-22517)
SAMPLE: 70017* (15) Goodwill Rock

Station: LM
Location: Unknown.
Rock type: Basalt.

SAMPLE AREA CHARACTERISTICS: Unknown.

SAMPLE CHARACTERISTICS

Size: 15 x 13 x 12 cm; 2957 g.
Color: Medium brownish gray.
Shape: Tabular, flat sided to subrounded.
Fillets: Unknown.
Apparent burial: Unknown.
Dust cover: Unknown.
Comparison with other rocks in area: Typical of subfloor basalt.
Probable origin: Subfloor basalt.

COMMENTS: Sample not documented. Probably sampled very near front of LM.
SAMPLE: 70018 (LR-1)

Station: LM
Location: 12 m in front of LM at 11:00, in small 1.5 m crater.
Rock type: Glass-coated breccia.

SAMPLE AREA CHARACTERISTICS

Slopes: 1-3°, slopes in walls of 1.5 m crater; local area of LM flat and level.
Fragment population
  Distribution and size range: 4-5 percent rock cover in crater proper; size ranges from limit of resolution to 60 cm; few intermediate sizes.
  Color: Very white (60 cm block) to very dark glassy fragments.
  Shapes: Subrounded (white boulder) to rough irregular (glassy dark fragments)
  Filllets: None.
  Apparent burial: Large white boulder in crater wall 7/8 buried.
Dust cover: Moderate to high.
Fines
  Color: Medium gray to medium dark gray.
  Compaction: Rather loose in crater walls.
Craters
  Distribution and size range: Area nearly saturated with 5-40 cm craters; 1.5 m crater sampled is largest in immediate area.
  Shape: Subdued.
  Ejecta: The dark and white blocks are associated with sampled crater.

SAMPLE CHARACTERISTICS

Size: 5 x 4 x 3 cm; 52 g.
Color: Dark gray with lighter fragments; partly glass coated.
Shape: Irregular; slightly slabby.
Filllets: None.
Apparent burial: 7/8.
Dust cover: Appears high.
Comparison with other rocks in area: Similar to other larger 20 cm irregular dark rock on east side of crater rim.
Probable origin: Impact event that formed small 1.5 m crater; could have been a secondary.
a) Pre-sampling, looking southwest. LM window photo pre all EVA's. Crater \(41.8 \text{ m.} \) (147-22439)

b) Post-sampling, looking southwest. (143-21975)
SAMPLE: 70019 (LR-5) (469)

Station: LM
Location: ~100 m west of LM in floor of 3 m crater.
Rock type: Glass agglutinate containing several fragments.

SAMPLE AREA CHARACTERISTICS

Slopes: 4-5° in crater walls at sample site.
Fragment population distribution and size range: 70-80 percent cover of 2-8 cm clods of glassy agglutinate.
Color: Dark gray.
Shapes: Irregular to subrounded.
Fillets: None.
Apparent burial: Only slumped material into crater floor.
Dust cover: Unknown.
Fines: Almost none exposed beneath glassy agglutinate fragments in crater floor.
Craters
Distribution and size range: Only crater visible in documentation photos is cloddy crater sampled.
Shape: Subdued.
Ejecta: Sample crater has extremely abundant glassy ejecta.

SAMPLE CHARACTERISTICS

Size: 8 x 4 x 5 cm; 160 g.
Color: Dark gray.
Shape: Lumpy; irregular, coarsely hackly.
Fillets: None.
Apparent burial: None.
Dust cover: None.
Comparison with other rocks in area: Probably typical of debris in crater floor.
Probable origin: Impact breccia cemented by shock melted glass from crater event.
a) Pre-sampling, looking east. 3 m glassy crater showing sample 70019 in floor. (145-22185)

b) Pre-sampling, looking south. Closeup documentation of 70019 in floor of 3 m glassy crater. (145-22188)
SAMPLE: 70035 (LR-3)

Station: LM
Location: From large buried boulder 60 m northeast of LM on rimcrest of 25 m crater.
Rock type: Vesicular basalt; coarse grained.

SAMPLE AREA CHARACTERISTICS

Slopes: About 4-5° slope to north into 25 m shallow depression.
Fragment population: Low for position on rim of large 25 m crater, large 1.5 m boulder only large rock in immediate area of rim.
Craters
Distribution and size range: With available photography, only 25 m crater easily discernible.
Shape: Normal.
Ejecta: Very limited around large crater.

SAMPLE CHARACTERISTICS

Size: 17 x 12 x 7 cm; 5765 g.
Color: Medium brownish gray.
Shape: Subrounded; one flat side; 15 percent vesicles and vugs.
Fillets: None.
Apparent burial: Boulder from which sample was apparently derived is 3/4 buried on the rim crest of a 25 m crater.
Comparison with other rocks in area: Typical of coarse-grained subfloor basalt.
Probable origin: Sampled boulder derived by impact forming adjacent 25 m crater, thus probably derived from 5-6 m depth in subfloor basalt.

COMMENTS: Documented only from a photograph taken at a distance.
a) During-sampling, looking southwest. TV frame showing LMP sampling 70035 behind LM during EVA 1. Sample piece of 2 m buried boulder visible in front of LMP. No closeup documentation.

b) Pre-sampling, looking southwest. Photo taken at EP-3 site showing 70035 location and associated 2 m buried boulder. (143-21937)
SAMPLE: 70075*(108)

Station: LM.
Location: Source unknown.
Rock type: Fine-grained basalt.

SAMPLE AREA CHARACTERISTICS: Unknown.

SAMPLE CHARACTERISTICS
Size: 1/2 x 1 x 1 1/2 cm.
Color: Dark gray.
Shape: Blocky, fractured; non-vesicular.
Fillets: Unknown.
Apparent burial: Unknown.
Dust cover: Unknown.
Comparison with other rocks in area: Similar to 70215 and other dark fine-grained basalts.

COMMENTS: Found floating around in LM after orbital rendezvous.
SAMPLE: 70135-57 (10B)
Station: ALSEP.
Location: "Geophone rock," 180 m from LM at azimuth of 285°.
Rock type: Vesicular basalt, 13 samples from large boulder.

SAMPLE AREA CHARACTERISTICS

Slopes: Sample taken on steep face of "Geophone" boulder, local regolith area flat and level.
Fragment population
Distribution and size range: Local ALSEP area 2-4 percent cover; limit of resolution to 3-4 m.
Color: Light to medium gray.
Shapes: Irregular to subrounded.
Fillets: Predominantly on large boulders.
Apparent burial: Predominantly on large boulders.
Dust cover: Low to moderate; on sample boulder contact of block with fillet. Extremely sharp.
Fines
Color: Medium dark gray.
Compaction: Fairly loose on fillet adjacent to sampled boulder.
Craters
Distribution and size range: In ALSEP area 10 cm to 2-3 m craters common.
Shape: Subdued.
Ejecta: Locally common around 1-3 m craters.

SAMPLE CHARACTERISTICS

Size: 10.5 x 6 x 3.5 cm.
Color: Medium brownish gray.
Shape: Elongate; irregular where broken; semi-rounded on weathered surface.
Fillets: Boulder sampled has moderate fillet with extremely sharp contact.
Dust cover: None.
Comparison with other rocks in area: Typical coarse-grained subfloor basalt.
Probable origin: Possible ejecta of subfloor basalt from Camelot crater.
a) During-sampling. TV frame showing LMP sampling Geophone rock; LEAM in foreground.

b) Post-sampling, looking southwest. Two possible sample areas on Geophone rock taken from TV documentation. Note sharp fillet-boulder contact. (147-22536)
SAMPLE: 70160 (474)

Station: ALSEP
Location: 180 m from LM at an azimuth of 285°.
Rock type: Soil (fillet)

SAMPLE AREA CHARACTERISTICS

Slopes: Slight eastward slope on fillet sampled; generally flat and level local area.

Fragment population

Distribution and size range: Immediate sample area too disturbed; but rock population appears very low; local ALSEP area 2-5% rock cover.
Color: Light gray to medium dark gray.
Shapes: Irregular to subrounded.
Fillets: Present on 0.3-3 m boulders (could be partly mantled)
Apparent burial: None extensive on larger boulders.
Dust cover: Low to unusually high on large boulder at sample site. (Some dirt may have been kicked on boulder.)

Fines

Color: Light gray to medium dark gray; darker when disturbed.
Compaction: Appears low in fillet (deep footprints)

Craters

Distribution and size range: Immediate area of sample too disturbed to see small crater distribution.

SAMPLE CHARACTERISTICS

Size: 315 g.
Color: Medium dark gray.
Comparison with other soils in area: Disturbed but may be lighter.
Probable origin: Trapping of ballistic crater ejecta

COMMENTS: Taken from 0 to 5 cm depth in fillet on east side of large (1.5 m) basalt boulder. Sample includes 1.5 x 1 cm vesicular basalt.
Post-sampling, looking west. 1.5 m boulder with 70160 soil sample in fillet. Note low albedo soil on rock (some may have been kicked). (136-20718)
SAMPLE: 70175 (55Y)

Station: ALSEP
Location: 180 m from LM at 285° azimuth; sample area 5 m south of deep core site (neutron flux hole).
Rock type: Dark matrix breccia.

SAMPLE AREA CHARACTERISTICS

Slopes: Flat and level.
Fragment population:
Distribution and size range: 1% in immediate sample environment; 3-5% in local area.
Color: Light gray to medium gray.
Shape: Sample area not closely documented.
Fillets: Large boulder just to south moderately well filleted.
Apparent burial: Boulder 2-3 m south of sample site 1/2 buried.

Fines:
Color: Light to medium dark gray.
Compaction: Moderate in top 3 cm-4 cm; firmer below.

Craters:
Distribution and size range: Area too disturbed when photographed to determine.
Shape: Area too disturbed when photographed to determine.

Ejecta:
Area too disturbed when photographed to determine.

SAMPLE CHARACTERISTICS

Size: 340 g. 10 x 6 x 6 cm.
Color: Dark gray (dark matrix)
Shape: Irregular; friable; fractured.
Fillets: Unknown
Apparent burial: Unknown.
Dust cover: Unknown.
Comparison with other rocks in area: Appears to be breccia called "exotic-looking rock" by crew.
Probable origin: Soil breccia.
Pre-sampling, looking south.
(134-20505)

SAMPLE 70175
SAMPLE: 70180, 70185 (475)

Station: ALSEP
Location: 180 m from LM at 285° azimuth; 3 m from deep core site (neutron flux hole).
Rock type: Fragment of fine-grained basalt and soil.

SAMPLE AREA CHARACTERISTICS

Slopes: Flat and level.
Fragment population
Distribution and size range: 1 percent in immediate sample area;
3-7 percent immediately north of site.
Color: Light gray to medium dark gray.
Shapes: Irregular to subrounded.
Fillet: None well developed.
Apparent burial: None.
Dust cover: Low to moderate.

Fines
Color: Medium dark gray.
Compaction: Rather loose at sample site on rim of 0.5 m crater.

Craters
Distribution and size range: 10 cm to 50 cm craters in immediate area; up to 8 m in local ALSEP area.
Shape: Subdued.
Ejecta: Abundant just north of sample area.

SAMPLE AREA CHARACTERISTICS: 70185 (basalt)

Size: 8 x 8 x 5 cm.
Color: Dark gray.
Shape: Blocky; subangular; vuggy.
Fillet: Unknown.
Apparent burial: See "Comments." Sample not located in documentation photograph.
Dust cover: Unknown.
Comparison with other rocks in area: Typical of fine-grained variety of subfloor basalts.

COMMENTS: Rock cannot be seen in pre-sample photograph; may have been totally buried.

SAMPLE CHARACTERISTICS: 70180 (soil)

Color: Medium gray to dark gray.
Apparent burial: 0-5 cm depth.
Comparison with other soil in area: Appears typical.
Probable origin: Regolith.
a) Pre-sampling, looking north. 70185 sample area relative to deep core - neutron flux site and 8 m blocky crater. (J36-20720 and J36-20721)

b) During-sampling. TV frames showing LMP collecting 70185 near deep core - neutron flux site.

SAMPLES 70180 AND 70185
SAMPLE: 70215* (LR-14)

Station: Between SEP and LM.
Location: Collected approximately 50 m east northeast of LM.
Rock type: Dense, fine-grained, non-vesicular basalt.

SAMPLE AREA CHARACTERISTICS

Slopes: Flat and level.
Fragment population

Distribution and size range: Extremely low, <1%; ranges in size from limit of resolution up to 3-4 cm; sample unusually large.
Color: Unknown.
Shapes: Unknown.
Fillets: Unknown.
Apparent burial: Unknown.
Dust cover: Unknown.

Fines
Color: Unknown.
Compaction: Unknown.
Craters
Distribution and size range: Crater population appears low from distant view available. 25 m crater just to west of sample site.

SAMPLE CHARACTERISTICS

Size: 12 x 15 x 27 cm.
Color: Bluish tint to dark gray.
Shape: Subrounded on unbroken surface.
Fillets: Rock was kicked up prior to sampling.
Apparent burial: Rock was kicked up prior to sampling.
Dust cover: Unknown.
Comparison with other rocks in area: Unusually large and dark, fine-grained basalt.
Probable origin: May have been ejected from 25 m crater just to west.

COMMENTS: Largest rock sampled during mission. Documented only from a photograph taken at a distance.
a) Pre-sampling, looking west. LRV photo showing large dark sample 70215*. Sample kicked up on end by LMP earlier. (143-21926)

b) Post-sampling, looking southwest. Photo taken at EP-3 showing area of previously sampled 70215*. (143-21937)
SAMPLE: 70255* (22E)

Station: SEP
Location: 180 m at 073° azimuth from LM; sample taken 2 m from SEP.
Rock type: Fine-grained basalt.

SAMPLE AREA CHARACTERISTICS

Slopes: Flat and level.
Fragment population
  Distribution and size range: Extremely low. <1%; size up to 15-20 cm; few smaller sizes.
  Color: Light to medium gray.
  Shapes: Blocky to subrounded.
  Fillets: Not well developed.
  Apparent burial: Largest rock in area (20 cm), 1/2 buried.
  Dust cover: Difficult to tell.

Fines
  Color: Light to medium dark gray.
  Compaction: Normal for LM/ALSEP/SEP area; upper 3-4 cm less firm.

Craters
  Distribution and size range: 20 cm - 0.5 m craters present.
  Shape: Subdued.
  Ejecta: None.

SAMPLE CHARACTERISTICS

Size: 6 x 6 x 4 cm.
Color: Dark bluish gray.
Shape: Blocky, equidimensional.
Fillets: Not well developed.
Apparent burial: <1/8 to 1/4.
Dust cover: Low to moderate.

Comparison with other rocks in area: Described by crew as a little finer grained than other basalt fragments in SEP area, looks more angular than average.
Probable origin: Subfloor basalt; possibly ejected from associated 0.5 m crater as regolith fragments.
a) Pre-sampling, looking southwest. Illustration shows location of most likely sample 70250-55 relative to the SEP transmitter. (134-20438)

b) Pre-sampling, looking south. Location of most likely samples 70250-55 2 m south of SEP transmitter. Note location of sample on rim of small crater. No post-sample photo. (135-20535)
SAMPLE: 70275* (23E)

Station: SEP
Location: 180 m from LM at azimuth 073°.
Rock type: Basalt.

SAMPLE AREA CHARACTERISTICS

Slopes: Very flat and level.

Fragment population
Distribution and size range: Abnormally low, <1%; limit of resolution to 4-5 cm.
Color: Light to medium gray, white mottling.
Shapes: Irregular to blocky; semi-rounded.
Fillets: Poorly developed.
Apparent burial: Low.
Dust cover: Moderately high.
Fines: Raindrop texture pronounced.
Color: Light gray to medium dark gray.
Compaction: Slightly higher than normal at station.

Craters
Distribution and size range: 10-20 cm craters common; few larger craters in sample area.
Shape: Subdued.
Ejecta: None associated with a particular crater event.

SAMPLE CHARACTERISTICS

Size: ~6-7 cm longest dimension.
Color: Mottled white; medium gray matrix.
Shape: Subrounded.
Fillets: None.
Apparent burial: Perched.
Dust cover: Low.
Comparison with other rocks in area: Typical in appearance, resembles some Camelot basalts.
Probable origin: Ejected from Camelot.
Pre-sampling, looking north. Rock indicated as 70275* tentative at this time. (135-20540)

SAMPLE 70275*
SAMPLE: 70295* (45Y)

Station: SEP
Location: 180 m from LM at an azimuth of 073° (taken near SEP).
Rock type: Fine grained basalt.

SAMPLE AREA CHARACTERISTICS

Slopes: Flat and level.
Fragment population:
Distribution and size range: SEP area relatively rock free, <1% cover; size from limit of resolution to 20 cm.
Color: Light to medium gray.
Shapes: Blocky, tabular to subrounded.
Fillets: Moderately well developed.
Apparent burial: 1/4 to 1/2 on most 10-20 cm fragments.
Dust cover: Moderate to high for LM/ALSEP/SEP area.

Fines:
Color: Medium dark gray.
Compaction: Soil appears looser than normal in upper 3-4 cm.
Craters:
Distribution and size range: A few scattered 10 cm - 0.5 m craters in SEP area.
Shape: Subdued.
Ejecta: None obvious in immediate SEP area.

SAMPLE CHARACTERISTICS

Size: Unknown.
Color: Unknown.
Shape: Unknown.
Fillets: Unknown.
Apparent burial: Unknown.
Dust cover: Unknown.
Comparison with other rocks in area: Described by the crew as one of the few fine-grained basalt fragments in the SEP area.
Probable origin: Subfloor basalt.

COMMENTS: Sample not documented.
SAMPLES: 71030, 71035-37, 71040, 71055, 71060 (476, 455, 454, 456)

Station: la
Location: From boulder on inner side of southwest rim of 10 m blocky crater and adjacent surface.
Rock type: Fragments of basalt and soil samples.

SAMPLE AREA CHARACTERISTICS

Slopes: Broadly rolling.

Fragment population:
- Distribution and size range: Dominated by ejecta on rim of a 10 m blocky crater; blocks up to 1/2 m long; most fragments on east-north rim; fewer fragments to south and southeast.
- Color: Gray.
- Shapes: Angular blocky pieces.
- Fillets: None very noticeable.
- Apparent burial: Partly buried to perched.
- Dust cover: None visible.

Fines:
- Color: Medium gray.
- Compaction: Fairly compact.

Craters:
- Distribution and size range: One blocky crater 10 m in diameter, plus craters up to 2 m.
- Shape: Mostly subdued, some well defined.
- Ejecta: Not visible.

SAMPLE CHARACTERISTICS: 71030, 71035-37 (disturbed soil and basalt, very fine grained and very vuggy)

Size: 71035 (4 x 5 x 7 cm); 71036 (3 x 4 x 6 cm); 71037 (2 x 2 x 2 cm)
Color: Gray.
Shape: 71035: Slabby, subrounded on exposed surface; 71036 and 71037: Angular.
Fillets: Small fillet on uphill side of boulder.
Apparent burial: Boulder protruding from ejecta.
Dust cover: None visible.
Comparison with other rocks in area: Typical basalt of this station.
Probable origin: Subfloor basalt.

COMMENTS: Collected from the east side of the fracture. Part of the samples may be bounded by the fracture. Soil (71030) was collected with the rock fragments, but its location is not known.
SAMPLE CHARACTERISTICS: 71040 (soil with 6 chips)

Color: Not known.
Apparent burial: 1-2 cm.
Comparison with other soil in area: Not known.
Probable origin: Ejecta from 10 m blocky crater.

COMMENTS: Collected in the shadow of the boulder about 1-2 cm deep; chips (71045-49 and smallest not numbered) are basalts somewhat coarser grained than most from this station.

SAMPLE CHARACTERISTICS: 71055 (basalt, fine grained, very vesicular)

Size: 3 x 10 x 16 cm.
Color: Gray.
Shape: Subrounded on exposed surface.
Dust cover: None visible.
Comparison with other rocks in area: Similar to other basalts at station.
Probable origin: Subfloor basalt.

COMMENTS: Collected from west side of fracture at top of boulder.

SAMPLE CHARACTERISTICS: 71060 (soil with 13 chips)

Size: Largest is 2 x 2 x 4 cm.
Color: Dark gray.
Apparent burial: 5-6 cm.
Comparison with other soil in area: Not known.
Probable origin: Ejecta from 10 m blocky crater.

COMMENTS: Collected in shadow of boulder from about 5-6 cm deep. Chips are of blue-gray rocks and basalts at this station.
a) Pre-sampling, looking northwest. (136-20739)

b) Post-sampling, looking north. (134-20396)

SAMPLES 71030, 71035-37, 71040, 71055 AND 71060
SAMPLES: 71135-36, 71155-57, 71175 (477, 478, 479)

Station: 1a
Location: From a rounded boulder on outer side of southeast rim of 10 m blocky crater and adjacent surface.
Rock type: Fragment of basalt and soil.

SAMPLE AREA CHARACTERISTICS

Slopes: Broadly rolling.
Fragment population
Distribution and size range: Dominated by ejecta on rim of a 10 m blocky crater; blocks up to 1/2 m long; most fragments on east to north rim; fewer fragments to south and southeast.
Color: Gray.
Shapes: Angular blocky pieces.
Fillets: None very noticeable.
Apparent burial: Partly buried to perched.
Dust cover: None visible.

Fines
Color: Medium gray.
Compaction: Fairly compact.

Craters
Distribution and size range: One blocky crater 10 m in diameter, plus craters up to 2 m.
Shape: Mostly subdued, some well defined.
Ejecta: Not visible.

SAMPLE CHARACTERISTICS: 71135-36 (basalt, very fine grained, coarsely vesicular)

Size: 71135 (1.5 x 4 x 5 cm); 71136 (2 x 2 x 5 cm)
Color: Medium gray.
Shape: Angular.
Fillets: None apparent.
Apparent burial: 1/8.
Dust cover: None visible.
Comparison with other rocks in area: Similar to other basalts in this area.
Probable origin: Subfloor basalt.

COMMENTS: Collected from the coarsely vesicular side of the rounded boulder. 71136 looks like it was collected at the contact between the coarsely and finely vesicular sides. These fragments were knocked away from the boulder during hammering and when they were picked up, the associated soil (71130) was collected.
SAMPLE CHARACTERISTICS: 71155 (basalt, very fine grained, finely vesicular) 71156-57 (dark gray, very fine grained)

- **Size:** 2 x 2 x 4 cm and smaller.
- **Color:** Medium gray.
- **Shape:** Angular.
- **Dust cover:** None visible.
- **Comparison with other rocks in area:** Similar to other la basalts.
- **Probable origin:** Subfloor basalt.

**COMMENTS:** Collected from the finely vesicular side of the rounded boulder. This fragment was knocked away from the boulder during hammering and when it was picked up the associated soil (71150) and two other fragments (71156-57) were collected.

SAMPLE CHARACTERISTICS: 71175 (basalt fragment)

- **Size:** 4 x 5 x 6 cm.
- **Color:** Gray.
- **Shape:** Angular.
- **Fillets:** None visible.
- **Apparent burial:** Almost totally buried.
- **Dust cover:** Probably.
- **Comparison with other rocks in area:** Coarser than most la basalts but finer than typical subfloor basalts.
- **Probable origin:** Subfloor basalt.

**COMMENTS:** Collected from next to boulder of two-phase vesicular rock.
a) Pre-sampling, looking northwest. The arrows show where the fragments landed and the areas from which the soils were collected. (136-20741)

b) Post-sampling, looking north. (134-20401)

SAMPLES 71135-36, 71155-57 AND 71175
SAMPLE: 71500*, 05-09*, 71515*, 71525-97* (459, 457, 458)

Station: 1a
Location: 15 m northeast of 10 m blocky rim crater.
Rock type: Kilogram of soil and rake fragments.

SAMPLE AREA CHARACTERISTICS: Same as 71030-71175 except that the area is flat and essentially free of fragments larger than 10 cm.

Fragment population
- Distribution and size range: Up to about 5 cm; very sparse on surface.
- Color: Gray.
- Shapes: Visible fragments are angular.
- Fillets: None visible.
- Apparent burial: Larger fragments seem slightly buried.
- Dust cover: None visible.

Fines
- Color: Gray.
- Compaction: Fairly compact.

Craters
- Distribution and size range: 3 craters 1/2 m diameter in local region.
- Shape: Very subdued.
- Ejecta: None visible.

SAMPLE CHARACTERISTICS: 71500*, 71505*-09*, and 71515* (soil and rocks)

Size: All >1 cm, largest is 2 x 3 x 3 cm.
Color: Deep olive gray soil.
Comparison with other soil in area: Probably similar.
Probable origin: Slightly gardened dark mantle material.

COMMENTS: Scooped from edge of very subdued crater in an area mostly free of surface rocks and small craters.

SAMPLE CHARACTERISTICS: 71525*-97* (38 rake fragments)

Size: Largest is 4 x 5 x 7 cm.
Shape: Angular to tabular.
Apparent burial: Most fragments buried except for those visible at surface.
Dust cover: Some dust on large flat buried rocks just to east of rake area.
Comparison with other rocks in area: Surface is fairly free of blocks compared to other areas.
Probable origin: Subfloor basalt.

COMMENTS: Largest fragment in the sample may be the largest fragment in the pre-sampling photograph and can probably be oriented.
a) Pre-sampling, looking southwest. (136-20742)

b) Post-sampling, looking north. (134-20432)

SAMPLES 71500*, 71505-09*, 71515* AND 71525-97*
SAMPLE: 72135* (25E)

Station: LRV-1
Location: Between Horatio and Bronte craters; from ray at 10-15 m diameter crater in dark mantle.
Rock type: Rock fragment, possibly clod of soil breccia.

SAMPLE AREA CHARACTERISTICS

Slopes: Flat area with subdued craters.

Fragment population
- Distribution and size range: Fragments up to 1 meter arranged in ray.
- Color: All are medium gray.
- Shapes: Irregular and jagged, some with rounded tops; some spherical.
- Fillets: Not present.
- Apparent burial: Mostly resting on surface; a few nearly buried.
- Dust cover: Not apparent.

Fines
- Color: Medium gray.
- Compaction: Perhaps looser than normal.

Craters
- Distribution and size range: Widely scattered 10-30 meter craters; scattered craters 1 m in diameter.
- Shape: Nearby 10-15 m crater has blocky raised rim; other craters look subdued.
- Ejecta: Abundant on rim and ray of nearby 10-15 meter crater.

SAMPLE CHARACTERISTICS: (Rock fragment or clod of soil breccia)

Size: About 4 cm diameter.
- Color: Gray.
- Shape: Unknown.
- Fillets: Unknown.
- Apparent burial: Probably slight.
- Dust cover: Unknown.
- Comparison with other rocks in area: Representative.
- Probable origin: Ejecta from crater.
Pre-sampling, looking northwest. Showing blocky crater and ray that was sampled. (135-20632)

SAMPLE 72135
Pre-sampling, looking northwest. Showing sampled area in detail; actual rock fragment taken is not shown. (135-20625)

SAMPLE 72135*
SAMPLE: 72140* (27E)

Station: LRV-2
Location: Tongue of light mantle.
Rock type: Soil.

SAMPLE AREA CHARACTERISTICS

Slopes: Undulating, regionally about level.

Fragment population:
- Distribution and size range: 1-10 cm fairly common; greater than 10 cm rare.
- Color: Light to medium gray.
- Shapes: Not visible.
- Fillets: Not visible.
- Apparent burial: Not visible.
- Dust cover: Not visible.

Fines:
- Color: Medium gray.
- Compaction: Unknown.

Craters:
- Distribution and size range: Craters up to 1 m not visible in photographs but probably common; craters 1-10 m common; craters larger than 10 m sparse.
- Shape: Subdued or with slightly raised rims.
- Ejecta: Not visible.

SAMPLE CHARACTERISTICS: 72140* (soil?)

Size: Unknown.
Color: Light gray.
Shape: Unknown.
Fillets: Unknown.
Apparent burial: Unknown.
Dust cover: Unknown.

Comparison with other rocks (soil?) in area: Unknown, but astronauts suggested that it is typical material from bright crater rims.

Probable origin: Ejecta from crater, probably light mantle material.

COMMENTS: Sample area very tentatively located. Probably a soil sample.
Pre-sampling, looking east. Sample 72140* probably from light area near rim of crater above and right of TV camera. (135-20642)
SAMPLES: 72150*, 72155*, 72160* (28E, 29E)

Station: LRV-3
Location: Tortilla Flat. Between SEP and station 2.
Rock type: Rock fragment and soil.

SAMPLE AREA CHARACTERISTICS

Slopes: Flat area.
Fragment population
Distribution and size range: Scattered fragments cover less than 1% of area; mostly 2 to 10 cm across.
Color: All are lighter color or higher albedo than soil clods.
Shapes: Rounded, equant.
Fillets: None.
Apparent burial: Very slight to mostly buried.
Dust cover: Not seen except on small fragments that are mostly buried.
Fines: Typical appearing dark mantle area

Craters
Distribution and size range: Scattered craters less than 20 meters across.
Shape: Rims visible on several craters.
Ejecta: No concentration of rock fragments on rims; several craters less than 3 m across have concentrations of soil clods around them.

SAMPLE CHARACTERISTICS

Size: Unknown.
Color: Unknown.
Apparent burial: Scooped from upper few centimeters.
Probable origin: Dark mantle.
During-sampling, looking northwest. Showing levelness of area and scatter of craters. Scarp cutting North Massif in background. Sample taken on right side of LRV while stopped here. (135-20649)

SAMPLES 72150*, 72155*, AND 72160*
SAMPLES: 72215-*, 72235-*, 72220*, 72240*, 72255*, 72260*, 72275* (514, 515, 496, 497, 494, 498, 495)

Station: 2
Location: Boulder on lower slopes of South Massif.
Rock type: Samples from different zones in a foliated blue-gray 2 m boulder (breccia), and adjacent soil.

SAMPLE AREA CHARACTERISTICS

Slopes: 5-10° north.
Fragment population: In strewn boulder field near base of South Massif.
Distribution and size range: Boulders up to 2 m across common in general area; rock fragments up to 25 cm common to abundant in sample area.
Color: Medium gray, mottled.
Shapes: Boulders subrounded to rounded; smaller fragments subangular to rounded.
Fillets: Well developed on uphill sides and poorly developed on downhill sides of most boulders; poorly developed on smaller rocks.
Apparent burial: Boulders 1/8 to 1/2; smaller rocks 1/8 to 1/4.
Dust cover: Slight.

Fines
Color: Medium gray, probably lighter gray below 2-3 cm.
Compaction: Loose.

Craters
Distribution and size range: Up to 10 cm abundant in immediate sample vicinity; up to 5 m common in general area. One 3 m crater with raised rim about 4 m east of boulder.
Shape: Subdued to moderately subdued.
Ejecta: None visible.

SAMPLE CHARACTERISTICS: 72215-*, chipped from 2 m boulder (breccia)

Size: ~20 cm.
Color: Medium gray, mottled.
Shape: Sample rounded, boulder subrounded, irregular, appears highly eroded.
Fillets: Well developed on uphill and adjacent sides, poorly developed on downhill side of boulder.
Apparent burial: Boulder buried 1/3.
Dust cover: Slight, on ledges of boulder.
Comparison with other rocks in area: Boulder appears somewhat more foliated and rougher than most other boulders in area.
Probable origin: Rolled down from higher on South Massif.

COMMENTS: Rock described by crew as "layered or foliated." Samples from three distinct foliation layers--72215-* from "middle" layer--same layer as 72275*. 79
SAMPLE CHARACTERISTICS: 72235-*, chipped from 2 m boulder (breccia)

Size: ~4 cm
Color: Medium gray.
Shape: Sample subrounded; boulder subrounded, irregular, appears highly eroded.
Fillets: Well developed on uphill and adjacent sides, poorly developed on downhill side of boulder.
Apparent burial: Boulder buried about 1/3.
Dust cover: Slight, on ledges of boulder.
Comparison with other rocks in area: Boulder appears somewhat more foliated and rougher than other boulders in area.
Probable origin: Rolled down from higher on South Massif.

COMMENTS: Rock described by astronauts as "layered or foliated."
Samples from three distinct foliation layers--72235-* from "easternmost" layer sampled.

SAMPLE CHARACTERISTICS: 72220*, soil from "fillet up underneath overhang" of 2 m boulder

Color: Probably medium gray.
Fillets: Poorly developed where sampled from under overhang.
Apparent burial: Upper 3 cm of soil.
Comparison with other soil in area: Appears similar to adjacent soil.
Probable origin: Fillet material, mostly South Massif fines.

COMMENTS: Not permanently shadowed because overhang faces east.

SAMPLE CHARACTERISTICS: 72240*, soil sample of fillet on 2 m boulder.

Color: Medium gray.
Fillets: From moderately well developed portion of fillet on boulder.
Apparent burial: Upper 5 cm of soil.
Comparison with other soil in area: Appears typical of fillet material around boulder.
Probable origin: Mostly South Massif fines--shielded by boulder from light and dark mantle material.

COMMENTS: Sample spot not positively identified, but astronauts reported "2/3 m from south side of boulder."
SAMPLE CHARACTERISTICS: 72255*, chipped from 2 m boulder (light matrix breccia)

Size: 5 x 7 x 9 cm and 3 smaller pieces.
Color: Medium gray, mottled.
Shape: Sample subrounded; boulder subrounded, irregular, appears highly eroded, clasts stand out in relief on surface.
Fillet: Well developed on uphill and adjacent sides, poorly developed on downhill side of boulder.
Apparent burial: Boulder buried 1/3.
Dust cover: Slight, on ledges of boulder.
Comparison with other rocks in area: Boulder appears somewhat more foliated and rougher than most other boulders in area.
Probable origin: Higher on South Massif than present location.

COMMENTS: Rock described by crew as "layered or foliated." Samples from three distinct foliation layers--72255* from "westernmost" layer sampled. Broken in four pieces in transit.

SAMPLE CHARACTERISTICS: 72260*, skim sample (soil)

Color: Medium gray.
Fillet: Soil from moderately well developed fillet on boulder.
Apparent burial: Upper 1 cm of soil.
Comparison with other soil in area: Appears typical of fillet material around boulder.
Probable origin: Mostly South Massif fines, shielded by boulder from light and dark mantle material.

COMMENTS: Sample location not positively identified.

SAMPLE CHARACTERISTICS: 72275*, chipped from 2 m boulder (medium gray matrix breccia)

Size: 4 x 15 x 15 x 8 cm, 10 x 8 x 4 cm, and 2 smaller pieces.
Color: Medium gray, mottled.
Shape: Sample rounded; boulder subrounded, irregular, appears highly eroded. Clasts stand out in relief on surface.
Fillet: Well developed on uphill and adjacent sides, poorly developed on downhill side of boulder.
Apparent burial: Boulder buried 1/3.
Dust cover: Slight, on ledges of boulder.
Comparison with other rocks in area: Boulder appears somewhat more foliated and rougher than other boulders in area.
Probable origin: Rolled down from higher on South Massif.

COMMENTS: Rock described by crew as "layered or foliated." Samples from three distinct foliation layers--72275* from "middle" layer--same layer as 72215*. Broken in four pieces in transit.
Post-sampling, looking south. Distance from LRV to farthest rock sampled is about 50 m. (138-21072)

a) Pre-sampling, looking north. (137-20900)

b) Post-sampling, looking northwest. (138-21030)

SAMPLES 72215*, 72235*, 72255*, AND 72275*
Post-sampling, looking northwest.
(138-21039)

SAMPLES 72220*, 72240*, AND 72260*
SAMPLES: 72315*, 72320*, 72335*, 72355, 72375, 72395*, (516, 500, 517, 518, 519, 499)

Station: 2
Location: Boulder on lower slopes of South Massif.
Rock type: Crystalline breccia boulder and shadowed soil.

SAMPLE AREA CHARACTERISTICS

Slopes: 5-10° north.
Fragment population: In strewn boulder field near base of South Massif.
Distribution and size range: Boulders up to 2 m across common in general area; rock fragments up to 25 cm common to abundant in sample area.
Color: Medium gray, mottled.
Shapes: Boulders subrounded to rounded; smaller fragments subangular to rounded.
Fillets: Well developed on uphill sides and poorly developed on downhill sides of most boulders; poorly developed on smaller rocks.
Apparent burial: Boulders 1/8 to 1/2; smaller rocks 1/8 to 1/4.
Dust cover: Slight.

Fines:
Color: Medium gray, probably lighter gray below 2-3 cm.
Compaction: Loose.

Craters:
Distribution and size range: Up to 10 cm abundant in immediate sample vicinity; up to 5 m common in general area.
Shape: Subdued to moderately subdued.
Ejecta: None visible.

SAMPLE CHARACTERISTICS: 72315*, chipped from 2 m boulder (breccia).

Size: 3 cm.
Color: Medium gray.
Shape: Sample rough, irregular; boulder subrounded.
Fillets: Poorly developed on boulder.
Apparent burial: Boulder about 1/4 buried.
Dust cover: Small amount on ledges of boulder; some may have been kicked onto boulder.
Comparison with other rocks in area: Somewhat smoother surface than boulder from which 72255* and others were taken; otherwise looks typical of most other boulders in area.
Probable origin: Rolled down from higher on South Massif.

COMMENTS: Upper part of large "porphyry" clast. Crew reported a flaky fracture pattern different from that of the boulder from which 72255* and others were collected, but a texture that is otherwise similar.
SAMPLE CHARACTERISTICS: 72320*, shadowed soil from about 20 cm under an overhang of 2 m boulder.

Color: Probably medium gray.
Fillets: Appears to be from between boulder fillet and boulder - soil contact.
Apparent burial: Boulder about 1/4 buried.
Comparison with other soil in area: Appears similar; soil around rock appears to have more resolvable rock fragments than that away from rock - since sample from beneath overhang, may not have as many rock fragments as typical soil of fillet.
Probable origin: Soil probably representative of South Massif fines.

COMMENTS: Soil probably does not have as complex an exposure history as that from rake-soil samples in area, because of protection by rock overhang.

SAMPLE CHARACTERISTICS: 72335*, chipped from 2 m boulder (breccia).

Size: Unknown.
Color: Medium gray.
Shape: Unknown for sample; boulder subrounded.
Fillets: Poorly developed on boulder.
Apparent burial: Boulder about 1/4 buried.
Dust cover: Small amount on ledges of boulder; some may have been kicked onto boulder.
Comparison with other rocks in area: Somewhat smoother surface than boulder from which 72255* and others were taken; otherwise looks typical of most boulders in area.
Probable origin: Rolled down from higher on South Massif.

COMMENTS: From base of large "porphyry" clast; attempted to sample across contact so may contain some of the "host." Crew reported a flaky fracture pattern different from that of the boulder from which 72255* and others were collected, but with a texture that is otherwise similar. Exact chip not identified in photographs.
SAMPLE CHARACTERISTICS: 72355, chipped from 2 m boulder (breccia).

Size: 4 x 5 x 10 cm.  
Color: Medium gray.  
Shape: Sample rounded; boulder subrounded.  
Fillets: Poorly developed on boulder.  
Apparent burial: Boulder about 1/4 buried.  
Dust cover: Small amounts on ledges of boulders - appears to be fines in spot above and adjacent to sample.  
Comparison with other rocks in area: Somewhat smoother surface than boulder from which 72255* and others were taken; otherwise looks typical of most other boulders in area.  
Probable origin: Rolled down from higher on South Massif.  

COMMENTS: An almost loose piece of probable host rock from fracture zone in boulder. Crew reported a flaky fracture pattern different from that of the boulder from which 72255* and others were collected, but a texture that is otherwise similar.

SAMPLE CHARACTERISTICS: 72375, chipped from 2 m boulder (breccia).

Size: 3 x 3 x 1 cm.  
Color: Medium gray.  
Shape: Sample rounded; slabby; boulder subrounded.  
Fillets: Poorly developed on boulder.  
Apparent burial: Boulder about 1/4 buried.  
Dust cover: Small amount on ledges of boulder; some may have been kicked onto boulder.  
Comparison with other rocks in area: Somewhat smoother surface than boulder from which 72255* and others taken; otherwise looks typical of most boulders in area.  
Probable origin: Rolled down from higher on South Massif.  

COMMENTS: Probably represents "host" rock. Crew reported a flaky fracture pattern different from that of the boulder from which 72255* and others were collected, but a texture that is otherwise similar.
SAMPLE CHARACTERISTICS: 72395*, chipped from 2 m boulder (breccia).

- **Size:** ~10 cm.
- **Color:** Medium gray with light gray mottling (clasts?).
- **Shape:** Sample subrounded, knobby, somewhat hackly; boulder subrounded.
- **Fillets:** Fillet poorly developed on boulder.
- **Apparent burial:** Boulder about 1/4 buried.
- **Dust cover:** Small amounts on ledges of boulder - some may have been kicked onto boulder.
- **Comparison with other rocks in area:** Somewhat smoother surface than boulder from which 72255* and others were taken; otherwise looks typical of most other boulders in area.
- **Probable origin:** Rolled down from higher on South Massif.

**COMMENTS:** Sample mostly breccia matrix. Crew reported a flaky fracture pattern that differs from that of the boulder from which 72255* and others were collected, but with a texture that is otherwise similar.
a) Pre-sampling, looking northwest. Sample 72335* not identified, but was taken from lower portion of clast. (137-20913)

b) Post-sampling, looking northwest. (138-21041)

SAMPLES 72315*, 72335*, 72355, 72375, AND 72395*
Post-sampling, looking northwest. Soil taken from 20 cm under an east-west overhang. (137-20925)
SAMPLE: 72415-*, 72435-36*, 72440*, 72460* (503, 504, 505, 506)

Station: 2
Location: Boulder on lower slopes of South Massif.
Rock type: Chips from a two-cycle gray matrix breccia and soils.

SAMPLE AREA CHARACTERISTICS

Slope: 5-10° north.
Fragment population: In strewn boulder field near base of South Massif.

Distribution and size range: Boulders up to 2 m across common in general area. Rock fragments up to 25 cm common to abundant in sample area.
Color: Medium gray, mottled.
Shapes: Boulders subrounded to rounded; smaller fragments subangular to rounded.
Fillets: Well developed on uphill sides and poorly developed on downhill sides of most boulders; poorly developed on smaller rocks.
Apparent burial: Boulders 1/8 to 1/2; smaller rocks 1/8 to 1/4.
Dust cover: Slight.

Fines
Color: Medium gray, probably lighter gray below 2-3 cm.
Compaction: Loose.

Craters
Distribution and size range: Up to 10 cm abundant in immediate sample vicinity; up to 5 m common in general area. Boulder near rim of 3 m raised-rim crater.
Shape: Subdued to moderately subdued.
Ejecta: None visible.

SAMPLE CHARACTERISTICS: 72415-* - three chips from light clast in 2/3 m boulder (gray matrix breccia and a little soil)

Size: ~2, 3, and 6 cm.
Color: Light gray.
Shape: Sample probably tabular chips, from rounded boulder.
Fillet: Poorly developed on boulder.
Apparent burial: Boulder buried about 1/8.
Dust cover: Slight, on ledges of boulder.
Comparison with other rocks in area: Appears similar to most other boulders in area.
Probable origin: Rolled from higher on South Massif.

COMMENTS: Some soil from near boulder included--picked up with chips in scoop.
SAMPLE CHARACTERISTICS: 72435-36* - 2 chips of matrix from 2/3 m boulder (gray matrix breccia)

Size: ~1 and 3 cm.
Color: Medium gray.
Shape: Chips subangular, from rounded boulder.
Fillets: Poorly developed on boulder.
Apparent burial: Boulder buried about 1/8.
Dust cover: Slight, on ledges of boulder.
Comparison with other rocks in area: Appears similar to most other boulders in area.
Probable origin: Rolled from higher on South Massif.

COMMENTS: Some soil included--picked up with chips in scoop.

SAMPLE CHARACTERISTICS: 72440* and 72460*, from beneath 2/3 m boulder after it was rolled (soil)

COMMENTS: 72440* upper 4 cm of soil, 72460* skim sample, from under boulder. Too disturbed after rolling to compare well with undisturbed fines, but generally appears similar.
a) Pre-sampling, looking northwest. (138-21049)

b) Post-sampling, looking southwest. (137-20967)

SAMPLES 72415**, 72435-36*, 72440*, AND 72460*

Station: 2
Location: On lower slopes of South Massif.
Rock type: Soil and rake.

SAMPLE AREA CHARACTERISTICS

Slopes: 5-10° north.
Fragment population
  Distribution and size range: Boulders up to 2 m across common in general area, and fragments up to 25 cm common to abundant in general area, but sparse in raked area.
  Color: Medium gray.
  Shapes: Angular to rounded.
  Fillets: Poorly developed.
  Apparent burial: 0 to 1/8.
  Dust cover: Not visible.

Fines
  Color: Medium gray.
  Compaction: Loose.

Craters
  Distribution and size range: Up to 10 cm abundant in immediate sample vicinity; up to 5 cm common in general area.
  Shape: Subdued to moderately subdued.
  Ejecta: None visible.

SAMPLE CHARACTERISTICS: 72500* (soil)

  Color: Medium gray.
  Apparent burial: Upper 4 cm.
  Comparison with other soil in area: Appears typical.
  Probable origin: Fine grained surface material of South Massif, possibly some contamination from light and dark mantle.

SAMPLE CHARACTERISTICS: 72535-39*, 72545-49*, 72555-*  (rake sample)

  Size: Longest is 7 x 6 x 4 cm, next is 4 cm, the remainder considerably smaller.
  Color: Medium gray.
  Shape: Angular to rounded.
  Fillets: Poorly developed.
  Apparent burial: 0 to 1/8.
  Dust cover: Not visible.
  Comparison with other rocks in area: Appear typical of small rock population.
  Probable origin: Probably representative of 1-2 cm size fraction of South Massif surface material; possibly some contamination from light mantle.
a) Pre-sampling, looking northwest. (138-21045)

b) Post-sampling, looking south. (137-20968)

SAMPLES 72500*, 72535-39*, 72545-49*, 72555-*
SAMPLES: 72700*, 72735-38* (508, 507)

Station: 2
Location: In light mantle unit near base of South Massif.
Rock type: Soil and rake.

SAMPLE AREA CHARACTERISTICS

Slopes: Undulating, general slope toward southwest.

Fragment population
   Distribution and size range: Fragments up to 3 cm sparsely distributed in rake area, astronauts reported “most are clods.”
   Color: Light gray.
   Shapes: Irregular; subangular to subrounded.
   Fillets: Poorly developed.
   Apparent burial: 1/8 to 1/4.
   Dust cover: Slight.

Fines
   Color: Light gray at surface, apparently very light gray at depth of about 3 cm.
   Compaction: Loose.

Craters
   Distribution and size range: Up to 10 cm abundant in immediate sample vicinity, up to 5 m common in general area.
   Shape: Subdued to moderately subdued.
   Ejecta: None visible in sample area.

SAMPLE CHARACTERISTICS: 72700* (soil)

Color: Medium gray.
Apparent burial: Sampled from surface down to about 5 cm depth.
Comparison with other soil in area: Appears typical in texture and color.
Probable origin: Mostly surface fines of light mantle; probably some contamination from ejecta of the South Massif and from dark mantle.

SAMPLE CHARACTERISTICS: 72735-38* (rake sample)

Size: 1-4 cm.
Color: Light gray.
Shape: Irregular; subangular to subrounded.
Fillets: Poorly developed.
Apparent burial: 1/8 to 1/4.
Dust cover: Slight.
Comparison with other rocks in area: Appear typical of small rock population in area.
Probable origin: Representative of surface material in 1-4 cm size range of light mantle; some may be ejecta from nearby South Massif.

COMMENTS: Crew reported getting about “four rocks two inches and smaller.”
a) Pre-sampling, looking north. Cannot identify exact area raked in post-sampling photographs, but TV shows that much of area around gnomon was raked. (137-20974 and 137-20975)

b) Post-sampling, looking west. (138-21074)

SAMPLES 72700* AND 72735-38*
SAMPLE: 73002/73001 (U31/L45)

Station: 3
Location: Base of scarp on light mantle.
Rock type: Drive tube.

SAMPLE AREA CHARACTERISTICS

Slopes: 5° to east.
Fragment population
Distribution and size range: 1-10 cm fairly common.
Color: Light to medium gray.
Shapes: Subangular to subrounded.
Fillets: Poorly developed.
Apparent burial: 1/8 to 1/4.
Dust cover: None visible.

Fines
Color: Medium gray at surface, light gray portions in at least some areas in subsurface.
Compaction: Loose.

Craters
Distribution and size range: Up to 1 m diameter common, one ~5 m crater with raised rim about 12 m north of drive tube, one cloddy 2/3 m crater 1.5 m northwest of drive tube.
Shape: Subdued except for 5 m and cloddy craters.
Ejecta: Cloddy ejecta around 2/3 m crater; none other visible.

SAMPLE CHARACTERISTICS: 73002/73001 (drive tube)

Size: Drive tube.
Color: Crew reported "bluish gray in top and bottom."
Shape: Cylindrical.
Comparison with other soil in area: Astronauts reported similar to "that stuff just beneath the surface," at station 2a; surface material where core driven appears typical of soil in area.
Probable origin: Light mantle material, appears undisturbed by recent cratering.
a) Post-sampling, looking east. (138-21168)

b) During-sampling, looking north. (137-20981)
SAMPLES: 73120*, 73135*, 73155*, 73140* (30E, 31E, 32E, 40Y)

Station: 2a
Location: On light mantle.
Rock Type: Soil and rock samples from light mantle.

SAMPLE AREA CHARACTERISTICS

Slopes: Generally level but with local undulations.
Fragment population
  Distribution and size range: 1-5 cm rare to sparse.
  Color: Light gray.
  Shapes: Subangular to rounded.
  Fillets: Poorly developed.
  Apparent burial: 0-1/4
  Dust cover: None visible.
Fines
  Color: Medium gray.
  Compaction: Loose.
Craters
  Distribution and size range: Up to 10 cm common, up to 10 m sparse.
  Shape: Subdued except for 2 m pit-bottomed crater from which 31E collected.
  Ejecta: None visible except for cloddy ejecta of pit-bottomed crater.

SAMPLE CHARACTERISTICS: 73120* (soil)

Color: Medium gray.
Apparent burial: From upper few centimeters.
Comparison with other soil in area: Cannot identify sample spot, but soil appears uniform in area, so probably typical.
Probable origin: Light mantle material, possibly contaminated with material from dark mantle.

SAMPLE CHARACTERISTICS: 73135* (soil breccia)

Size: Unknown.
Color: Blue-gray.
Shape: Unknown.
Fillets: Unknown.
Apparent burial: Unknown; off inner wall of 2 m crater.
Dust cover: Unknown.
Comparison with other rocks in area: Probably similar to other clods in pit-bottomed crater ejecta.
Probable origin: "Instant rock" in pit-bottomed crater, light mantle material.
a) Post-sampling, looking east. (138-21103)

b) Pre-sampling, looking south. (138-21097)

SAMPLES 73120*, 73135*, AND 73140*
SAMPLE CHARACTERISTICS: 73155* (probably breccia)

Size: 5 cm.
Color: Light gray (color first reported as "yellow brown" was caused by reflection from mylar on LRV).
Shape: Rounded.
Fillet: None.
Apparent burial: None.
Dust cover: None visible.
Comparison with other rocks in area: Appears typical.

SAMPLE CHARACTERISTICS: 73140* (soil from bottom of trench, includes a little of the darker surface material)

Color: Light gray.
Apparent burial: From 15 cm below surface.
Comparison with other soil in area: Probably typical of light subsurface soil.
Probable origin: Light mantle material.

COMMENTS: This may be the most representative sample of light mantle fines returned by the mission because of the lack of nearby large craters, distance from South Massif, and dark mantle area, and sample location from below surface, which may be contaminated with South Massif and dark mantle material.
Pre-sampling, looking northwest. Bright spot on surface was identified by crew as a reflection off mylar on LRV.

(138-21098)

SAMPLE 73155*
SAMPLE: 73215-* (S27)

Station: 3
Location: On rim crest of 10 m crater in light mantle.
Rock type: Rock fragments.

SAMPLE AREA CHARACTERISTICS

Slopes: On rim crest, slopes 7° east off raised rim of 10 m crater, and 30° west into crater.

Fragment population
Distribution and size range: 1-10 cm fragments common; 10 cm to 1 m fragments sparse.
Color: Light to medium gray.
Shapes: Angular to rounded.
Fillets: Poorly developed, except well developed on uphill sides of rocks on crater wall.
Apparent burial: 1/8 to 1/4; a few 1/4 to nearly buried.
Dust cover: Slight on nearly buried rocks.

Fines
Color: Medium gray at surface, light gray portions in at least some areas in subsurface.
Compaction: Loose

Craters
Distribution and size range: Up to 1 m common; sample from rim crest of ~10 m crater.
Shape: Subdued except for ~10 m crater which has raised rim.
Ejecta: None specifically visible, but most of material at sample site probably ejected from 10 m crater.

SAMPLE CHARACTERISTICS: 73215-* (rock fragments)

Size: Four fragments ~10 cm; astronauts reported "barely went into bag."
Color: Light or medium gray.
Shape: Probably subrounded.
Fillets: Not visible in photos.
Apparent burial: Probably less than 1/4.
Dust cover: Not visible.
Comparison with other rocks in area: Appear typical.
Probable origin: Ejecta from 10 m crater.

COMMENTS: Pre-sampling photos too far from fragments sampled to see their characteristics in detail.
a) Pre-sampling, looking southwest. (138-21145)

b) Post-sampling, looking northeast. (138-21160)
SAMPLES: 73220*, 73235*, 73240*, 73255*, 73260*, 73275*, 73280*, (520, 524, 521, 525, 522, 526, 523) (73255* not identified in photographs)

Station: 3
Location: On rim of ~10 m crater in light mantle.
Rock type: Trench soil samples and nearby rock fragments.

SAMPLE AREA CHARACTERISTICS

Slopes: 7° east off raised rim of 10 m crater.

Fragment population
- Distribution and size range: 1-10 cm fragments common; 10 cm to 1 m fragments sparse.
- Color: Light to medium gray.
- Shapes: Angular to rounded.
- Fillets: Poorly developed.
- Apparent burial: 1/8 to 1/4; a few 1/4 to nearly buried.
- Dust cover: Slight on nearly buried rocks.

Fines
- Color: Medium gray at surface, light gray portions in at least some areas in subsurface.
- Compaction: Loose.

Craters
- Distribution and size range: Up to 1 m common; samples from rim of ~10 m crater.
- Shape: Subdued except for 10 m crater which has raised rim.
- Ejecta: None specifically visible, but most of material at sample site probably ejected from 10 m crater.

SAMPLE CHARACTERISTICS: 73220* (soil)

Color: Medium gray.
Apparent burial: Upper 1/2 cm of soil.
Comparison with other soil in area: Appears typical of surface material in area.
Probable origin: Ejecta from 10 m crater, probably some contamination from dark mantle.

COMMENTS: Skim sample of medium gray surface layer.

SAMPLE CHARACTERISTICS: 73235* (breccia? fragment)

Size: 10 cm.
Color: Light gray.
Shape: Rounded.
Fillets: Poorly developed.
Apparent burial: 1/4.
Dust cover: None visible.
Comparison with other rocks in area: Appears typical.
Probable origin: Ejected from 10 m crater.

COMMENTS: Not positively identified in photographs.

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SAMPLE CHARACTERISTICS: 73240* (soil)

- Color: Light gray.
- Apparent burial: Upper 5 cm of soil.
- Comparison with other soil in area: Appears typical of light material just under surface that was kicked up in several areas near the trench site.
- Probable origin: Ejecta from 10 m crater.

COMMENTS: Trench sample, containing both the medium gray surface layer and the ~3 cm-thick light gray layer just below the surface.

SAMPLE CHARACTERISTICS: 73255* (breccia)

COMMENTS: Crew reported that 73255* is a blue gray breccia, but sample not identified on pre-sampling photographs.

SAMPLE CHARACTERISTICS: 73260* (soil)

- Color: Medium gray.
- Apparent burial: Material from zone about 5-10 cm below surface.
- Comparison with other soil in area: Appears similar to surface material.
- Probable origin: Ejecta from 10 m crater.

COMMENTS: Trench sample of medium-gray part of "marbled" zone, but may also include material from the small patch of light material visible in the pre-sampling photographs of trench.

SAMPLE CHARACTERISTICS: 73275* (at least two rock fragments appear to have been collected; description is for the only one identified in photographs)

- Size: 5 cm.
- Color: Light gray.
- Shape: Rounded.
- Fillets: None.
- Apparent burial: Not buried.
- Dust cover: None visible.
- Comparison with other rocks in area: Appears typical, but less buried than most.
- Probable origin: Ejecta from 10 m crater.
SAMPLE CHARACTERISTICS: 73280* (soil)

Color: Light gray  
Apparent burial: Material from zone about 5-10 cm below surface.  
Comparison with other soil in area: Appears similar to light gray material just below surface.  
Probable origin: Ejecta from 10 m crater.  

COMMENTS: Trench sample of light gray part of marbled zone.
a) Pre-sampling prior to digging trench, looking south. (138-21143)

b) Post-sampling view of trench wall, looking southwest. (138-21178)

SAMPLES 73220*, 73240*, 73260*, AND 73280*
a) Pre-sampling view of trench wall, looking southwest. (Part of 138-21148)

b) Enlargement of above. Hatched area is very light gray material, remainder is medium gray. (138-21148)

SAMPLES 73220*, 73240*, 73260*, AND 73280*
a) Pre-sampling, looking south. (138-21144)

b) Pre-sampling, looking northwest. Light material exposed by footprints probably correlative with that exposed in upper part of station 3 trench. (138-21147)

SAMPLES 73215*, 73235*, 73255*, AND 73275*
Post-sampling, looking northeast. (138-21165)

SAMPLES 73255* AND 73275*
SAMPLE: 74115* (41Y)

Station: LRV-5
Location: Light mantle between stations 3 and 4.
Rock type: Rocks from unusually blocky 15 m crater.

SAMPLE AREA CHARACTERISTICS

Slopes: Undulating, regionally fairly level.
Fragment population:
- Distribution and size range: Fragments 1-50 cm very abundant, 50 cm to 2 m common.
- Color: Medium gray.
- Shapes: Angular to subangular.
- Fillets: Poorly developed.
- Apparent burial: 1/8 to 1/4.
- Dust cover: Not visible.
Fines:
- Color: Probably light to medium gray.
- Compaction: Unknown.
Craters:
- Distribution and size range: None visible in ejecta; crater sampled about 10 m.
- Shape: Sharp with raised rim.
- Ejecta: Fresh ejecta from 10 m crater covers sample area.

SAMPLE CHARACTERISTICS: 74115* (probably basalt fragments(s))

Size: Unknown.
Color: Light gray.
Shape: Unknown.
Fillets: Unknown.
Apparent burial: Unknown.
Dust cover: Unknown.
Comparison with other rocks in area: Unknown.
Probable origin: Ejecta from 15 m crater; astronauts suggested might be subfloor material; color of soil suggests at least some light mantle material.

COMMENTS: Sample not identified, but from ejecta of blocky crater.
Pre-sampling, looking north. Sample 74115* from blocky ejecta, probably in near field area of picture. (133-20208)

SAMPLE 74115*
SAMPLE: 74120* (42Y)

Station: LRV-6
Location: Light mantle between stations 3 and 4.
Rock type: Soil from light mantle.

SAMPLE AREA CHARACTERISTICS

Slopes: Undulating, regionally fairly level.
Fragment population
Distribution and size range: 1-10 cm probably common; 10 cm to 2 m sparse.
Color: Light gray.
Shapes: Angular to subrounded.
Fillets: Appear poorly developed.
Apparent burial: Appears generally slight.
Ejecta cover: Not visible.

Fines
Color: Light gray.
Compaction: Unknown.

Craters
Distribution and size range: Up to 1 m common to abundant, greater than 1 m sparse.
Shape: Subdued except 2 and 4 m cloddy craters about 7 and 20 m north of LRV photo location are sharp with raised rims.
Ejecta: Visible only around two cloddy craters.

SAMPLE CHARACTERISTICS: 74120* (soil)

Color: Light gray.
Apparent burial: Probably from a few centimeters up to surface.
Comparison with other soil in area: Soil in area looks uniform, so probably representative.
Probable origin: Light mantle material, possibly with some contamination from dark mantle.

COMMENTS: Whether photograph 133-20212 has sample area in near field of view is very tentative.
Pre-sampling, looking north. Sample 74120* is probably in near field of this picture. (133-20212)

SAMPLE 74120*
SAMPLE: 74002/74001, 74220, 74235*, 74240, 74255*, 74260, 74275*
(U35/L44), (509), (12K), (510), (512), (511), (461)

Station: 4
Location: South rim of Shorty crater.
Rock type: Drive tube, soils, and basalt fragments.

SAMPLE AREA CHARACTERISTICS

Slopes: Near low place in crater rim crest; axis of rim crest may slope gently southeast.

Fragment population
Distribution and size range: Fragments up to 15 cm in diameter commonly cover less than 3 percent of the surface. Greater frequencies and larger fragments, including a sampled 5 m boulder, occur locally.

Color: Gray.
Shapes: Smooth blocks to irregularly fractured, knobby blocks with surface fabrics similar to those of terrestrial flow breccias. Rocks range from angular to subrounded.
Fillets: Variable. Commonly absent or poorly developed, but well developed in some cases, especially on the uphill sides of a few of the boulders on the inner wall of Shorty crater.
Apparent burial: Partial burial and no apparent burial both common.
Dust cover: None visible.

Fines
Color: Generally gray except for local orange tinged areas.

Crater
Distribution and size range: Small craters, up to several meters in diameter, are scattered on the rim and flanks of Shorty crater.
Shape: Circular; craters range from sharp to subdued.
 ejecta: Largely clods.

SAMPLE CHARACTERISTICS: 74002/74001 (drive tube)

Color: Top 1/2 cm should be gray soil overlying the red soil. Upper tube contains red soil with fine-grained black soil in lower part. Black soil that reminded crew of magnetite is exposed at top and bottom ends of lower tube.
Comparison with other rocks in area: Unique.
Probable origin: Red, orange, and underlying black soil may be derived from cloud of material excavated by impact, or a volcanic product erupted along crater rim crest.

COMMENTS: Cored material is unusually compact. Contacts of colored soil zone are nearly vertical in trench.
SAMPLE CHARACTERISTICS: 74220 (red to orange soil from trench crossing orange zone).

- **Color:** Red to orange.
- **Apparent burial:** Covered by 1/2 cm gray soil.
- **Comparison with other rocks in area:** Unique local zone; same material sampled in drive tube 74002/74001.
- **Probable origin:** Red, orange, and underlying black soil may be derived from clod of material excavated by impact, or a volcanic product erupted along crater rim crest.

**COMMENTS:** Red soil in trench wall is notable coherent; tends to form chunks. Sample collected 2 to 3 inches down but may include fragments of the overlying 1/2 cm thick gray soil.

SAMPLE CHARACTERISTICS: 74240, 74260 (gray soils) from ends of trench crossing orange zone)

- **Color:** Gray.
- **Probable origin:** May be Shorty crater ejecta.

**COMMENTS:** Gray soils occurring adjacent to the meter-wide band of reddish soil (74240 southwest of the colored soil and 74260 to the northeast). Samples may include fragments of 1/2 cm thick soil recognized as mantling the red zone.

SAMPLE CHARACTERISTICS: 74235* (basalt)

- **Size:** 4 x 4 x 5 cm.
- **Color:** Black.
- **Shape:** Angular.
- **Fillets:** Unknown.
- **Apparent burial:** Unknown.
- **Dust cover:** Unknown.

**Comparison with other rocks in area:** Similar to several other fragments.
**Probable origin:** Ejecta fragment.

**COMMENTS:** Resembled black glass; described by crew as "piece of glass."

SAMPLE CHARACTERISTICS: 74255* (basalt)

- **Size:** Hand specimen from 5 m boulder.
- **Color:** Gray.
- **Shape:** Boulder irregularly fractured, knobby; surface fabric resembles that of terrestrial flow breccia.
- **Fillets:** Boulder partially filleted; abundant angular fragments, probably fallen from boulder, rest on fillet surface.
- **Apparent burial:** Lower part of boulder buried.
- **Dust cover:** None visible.

**Comparison with other rocks in area:** Typical (?)?
**Probable origin:** Subfloor basalt excavated by Shorty impact.

**COMMENTS:** Boulder intensely fractured; looks like finely vesicular version of subfloor basalt.
SAMPLE CHARACTERISTICS: 74275* (basalt)

Size: 5 x 12 x 15 cm.
Color: Gray.
Shape: Fragment from small (about 20 cm) boulder divided by fractures into 3 subparallel tablets.
Fillets: None.
Apparent burial: Base appears buried.
Dust cover: None visible.
Comparison with other rocks in area: Appears typical.
Probable origin: Shorty ejecta.
Pre-sampling, looking northwest. Trench samples (74220, 74240, 74260) approximately located. (137-20990)

SAMPLES 74002/74001, 74220, 74235*, 74240, 74255*, 74260 AND 74275*
SAMPLE: 75110* (43Y)

Station: LRV-7
Location: Apex of Victory - on rim inner slope.
Rock type: Soil.

SAMPLE AREA CHARACTERISTICS

Slopes: Gentle inner slope of crater rim.
Fragment population: Estimated 2 or 3 percent.
Distribution and size range: Maximum size is about 1 meter across; randomly scattered but with a slight concentration on rims of small craters.
Color: Medium gray - lighter than soil breccias that are also present in very small amounts.
Shapes: Subangular blocks, some with planar sides.
Fillets: Generally no fillets, but a few prominent fillets.
Apparent burial: Slight.
Dust cover: Not apparent.

Fines
Color: Medium gray.
Compaction: Normal. Tracks very well preserved, higher albedo; no noticeable spray at low albedo soil to side of tracks.

Craters
Distribution and size range: Scattered (well separated) subdued craters in 1 m to 5 m diameter range.
Shape: Low rims, saucer-shaped.
Ejecta: Mostly fines; few blocks probably re-excavated rather than from bedrock.

SAMPLE CHARACTERISTICS

Size: Unknown.
Color: Gray.
Shape: Unknown
Apparent burial: Scooped from upper few centimeters.
Dust cover: Unknown.
Comparison with other rocks in area: Similar in appearance and representative.
Probable origin: Soil probably mostly dark mantle.
Pre-sampling, looking east. Shows area from which sample came on south rim of Victory crater. (133-20281)

SAMPLE 75110*
SAMPLE: 75120* (44V)

Station: LRV-8.
Location: Between Victory and Horatio in area of dark mantle; between small craters.
Rock type: Soil.

SAMPLE AREA CHARACTERISTICS

Slopes: Flat area with scattered fresh to subdued craters less than 5 m in diameter.
Fragment population: Less than 1% of area covered; local concentrations of clods on crater rims.
Distribution and size range: Very rare blocks 10 to 25 cm. Scattered and on crater rim. Clods <10 cm on rims of fresh craters.
Color: Medium gray.
Shapes: Equant; rounded or subrounded; few with planar sides.
Fillets: Not apparent.
Apparent burial: Slight to moderate.
Dust cover: Not apparent.

Fines
Color: Medium gray.
Compaction: Appears normal.

Craters
Distribution and size range: Scattered 1 m to 5 m in diameter; "raindrops" present.
Shape: Range from subdued saucer-shaped to rimmed crater with clods on rims.
Ejecta: Only clods identified with certainty; one 5 m crater may have few blocks on rim and interior.

SAMPLE CHARACTERISTICS

Color: Medium gray.
Apparent burial: Scooped from upper few centimeters.
Comparison with other soil in area: Appears representative.
Probable origin: Dark mantle relatively free from other ejecta.
Pre-sampling, looking east. (133-20315)

SAMPLE 75120*
SAMPLE: 75015*, 75035* (462, 463)

Station: 5
Location: Southwest rim of Camelot; about 50 m WNW of LRV.
Rock type: Pyroxene-bearing basalts; vesicular, planar textures.

SAMPLE AREA CHARACTERISTICS

Slopes: Undulating; gently inclined downward toward floor of Camelot to north.
Fragment population
Distribution and size range: Up to several meters; covers 30 percent of surface.
Color: Gray, moderate to light?
Shapes: Subround to subangular.
Fillets: Poorly developed.
Apparent burial: Moderate to deep; a few almost completely exposed.
Dust cover: Thin.

Fines
Color: Dark gray; raindrop pattern.
Compaction: Moderate.
Craters
Distribution and size range: Saturated in centimeter size; larger sizes present but not abundant.
Shape: Subdued circular to highly subdued shallow depressions.
Ejecta: 30 percent of surface; from Camelot.

SAMPLE CHARACTERISTICS: 75015*

Size: Chip from a 10 x 15 x 40 cm block.
Color: Gray
Shape: Angular, elongate.
Fillets: None.
Apparent burial: None.
Dust cover: Minor.
Comparison with other rocks in area: Appears to be less rounded and less buried than most.
Probable origin: Subfloor material ejected from Camelot by impact.

COMMENTS: The angularity and complete exposure of the block may indicate a second generation origin from rim or wall materials of Camelot by more recent cratering.

SAMPLE CHARACTERISTICS: 75035*

Size: Chip from block 100 x 50 x 15 cm.
Color: Gray
Shape: Subround; split by fracture 5 cm to 10 cm wide.
Fillets: Poorly developed.
Apparent burial: Less than 1/4 of height.
Dust cover: Thin.
Comparison with other rocks in area: More rounded than most.
Probable origin: Subfloor material ejected from Camelot by impact.

COMMENTS: Chip was taken from a fracture surface that probably formed when the block landed at this point (Camelot event?).

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looking west. Typical blocky rim at Camelot crater showing low-lying, partly buried (and mantled?) rocks and more angular unburied rocks from which 75015* and 75035* were collected. (133-20328)

SAMPLES 75015* AND 75035*
a) Pre-sampling, looking northwest. (145-22138)

b) Post-sampling, looking north. (145-22139)

SAMPLES 75015* AND 75035*
SAMPLE: 75055 (464)

Station: 5
Location: Southwest rim of Camelot; about 5 m west of sample location 463.
Rock type: Vesicular basalt.

SAMPLE AREA CHARACTERISTICS

Slopes: Undulating; gently inclined downward toward floor of Camelot to north.
Fragment population
  Distribution and size range: Up to several meters; cover 30 percent of surface.
  Color: Gray.
  Shapes: Subround to subangular.
  Fillets: Poorly developed.
  Apparent burial: Moderate to deep; a few almost completely exposed.
  Dust cover: Thin.
Fines
  Color: Dark gray.
  Compaction: Moderate.
Craters
  Distribution and size range: Saturated in centimeter size; larger sizes present but not abundant.
  Shape: Subdued circular to highly subdued shallow depressions.
  Ejects: 30 percent of surface; from Camelot.

SAMPLE CHARACTERISTICS

Size: 2 x 12 x 15 cm chip from 1 x 1 x 1.5 m block.
Color: Gray.
Shape: Subangular to subround tetrahedron-shaped block.
Fillets: Small to absent on main block.
Apparent burial: Very little, less than 10 percent.
Dust cover: Thin.
Comparison with other rocks in area: Similar to other larger size blocks.
Probable origin: Subfloor material ejected from Camelot by impact.

COMMENTS: Planar partings, probably along vesicle concentrations.
a) Pre-sampling, looking northwest. Layered or structured rock on rim of Camelot crater from which 75055 was collected. Vesicle pits (dark) and zap pits (white) are well shown. (145-22149)

b) Post-sampling, looking northeast. Geographic setting of 75055 structured rock. (145-22160)

c) Post-sampling, looking north. (145-22153)

SAMPLE 75055
SAMPLE: 75060, 75075, 75080 (465, 466, 467)

Station: 5
Location: Southwest rim of Camelot; about 15-20 m west of sample location 464.
Rock type: Dark mantle material and basalt fragments.

SAMPLE AREA CHARACTERISTICS

Slopes: Undulating.
Fragment population
Distribution and size range: Cobble to boulders up to several meters; cover about 30 percent of surface.
Color: Gray.
Shapes: Subround to subangular.
Fillets: Poorly to moderately developed.
Apparent burial: Moderate to deep; a few almost completely exposed.
Dust cover: Thin; except for sample 75060 location.

Fines
Color: Dark gray.
Compaction: Moderate.

Craters
Distribution and size range: Saturated in centimeter size; larger sizes present but not abundant.
Shape: Subdued circular to highly subdued shallow depressions.
Ejecta: 30 percent of surface; from Camelot.

SAMPLE CHARACTERISTICS: 75060 (mantling soil material from top of boulder)

Color: Dark gray.
Shape: Fills irregular depressions on boulder.
Fillets: Sample extends as fillet onto flat surface of rock.
Apparent burial: 1 cm deep.
Comparison with other rocks in area: Similar to mantle on adjacent ground surface.
Probable origin: Impact ejecta thrown onto rock and/or dark mantle deposit.

COMMENTS: Mantle fills small hollow (1 cm deep) in large flat boulder several meters across; collected from a point 1/2 m from edge of boulder. Soil contains two rock chips (75065-66).
SAMPLE CHARACTERISTICS: 75075 (fragment of basalt)

Size: Block, 4 x 10 x 13 cm.
Color: Gray.
Shape: Subround to subangular equidimensional block.
Fillets: None.
Apparent burial: None.
Dust cover: Thin, if any.
Comparison with other rocks in area: Similar to others.
Probable origin: Subfloor material ejected from Camelot by impact.

COMMENTS: Location as isolated fragment along fracture zone of larger block indicates sample may be dislocated from larger block or secondary ejecta from crater younger than Camelot.

SAMPLE CHARACTERISTICS: 75080 (soil)

Size: Scoop sample; contains 5 chips of basalt (75085-89)
Color: Dark gray.
Apparent burial: Scooped from upper 5 cm.
Comparison with other rocks in area: Similar to other dark mantle.
Probable origin: Fillet derived from subfloor blocks, impact ejecta, and/or dark mantle.

COMMENTS: Soil sample from site on regolith surface a few meters from sample 75060.
a) Pre-sampling, looking west. (133-20337)

b) Pre-sampling, looking southwest. (145-22155)

c) Post-sampling, looking southwest. (145-22157)

SAMPLES 75060, 75075 AND 75080
SAMPLE: 76120 (46Y)
Station: LRV-9
Location: Half way between SEP and station 6.
Rock type: Soil.

SAMPLE AREA CHARACTERISTICS

Slopes: Very gentle; nearby slope increases up to rim of Henry
Fragment population: Very low coverage of surface by fragments (<1%).
Distribution and size range: Blocks 5 cm to 25 cm on rim of
5 m crater in vicinity ~ 5 cm and smaller fragments widely
scattered. Few clod-rimmed craters.
Color: Blocks lighter than clods; may be two shades of blocks.
Shapes: Angular to subrounded blocks and fragments.
Fillets: Very slight development.
Apparent burial: Range from slightly to mostly buried.
Dust cover: Not apparent.

Fines
Color: Medium gray; clods same color as fines.
Compaction: Normal.

Craters
Distribution and size range: Scattered rare 5 m craters,
one in view. Several 1 m craters in view.
Shape: Fresh to eroded rims; very small rimless depressions.
Ejecta: Minor blocks; clods of instant rock on rims of
3 craters.

SAMPLE CHARACTERISTICS

Color: Medium gray.
Apparent burial: Scooped from upper few centimeters.
Comparison with other rocks in area: Appears representative.
Probable origin: Dark mantle, probably with some admixture of
re-excavated ejecta from Henry crater.
Pre-sampling, looking north. (141-21543)
SAMPLES: 76130, 76135-37 (47L)

Station: LRV-10
Location: Turning Point rock between SEP and station 6.
Rock type: Soil and rock fragments.

SAMPLE AREA CHARACTERISTICS

Slopes: Moderate slope (about 10°).
Fragment population: Sparse (~1%) except adjacent to Turning Point rock where sample was taken.
Distribution and size range: 6 m to fines.
Color: Medium gray, same as fines but more reflective.
Shapes: Rounded irregular blocks.
Fillets: Prominent fillets, perhaps mostly on upslope side.
Apparent burial: Many blocks with only top showing.
Dust cover: Some in cracks and on low surfaces.

Fines
Color: Medium gray.
Compaction: The form of one small crater suggests a looser than normal packing; but Rover tracks look normal.

Craters
Distribution and size range: Widely separated in 1 to 5 meter range.
Shape: Low rims with slightly higher albedo.
Ejecta: No blocks; few clods.

SAMPLE CHARACTERISTICS

Size: Small rock fragments and soil.
Color: Medium gray.
Shape: Unknown.
Fillets: Unknown.
Apparent burial: Unknown.
Dust cover: Unknown
Comparison with other rocks in area: Looks representative.
Probable origin: Highland material from North Massif.
Post-sampling, looking south. Sample taken on north side of large boulder and to the left of the LRV tracks.

SAMPLES 76130, 35-37
SAMPLE: 76001 (L48)

Station: 6
Location: 3-4 m southeast of LRV.
Rock type: Drive tube L48 soil

SAMPLE AREA CHARACTERISTICS

Slopes: 11° to the south.
Fragment population:
  Distribution and size range: Limit of resolution to 3-4 cm scattered randomly.
  Color: Gray.
  Shapes: Rounded.
Apparent burial: Generally perched.
Fines
  Color: Medium gray.
  Compaction: Moderately loose.
Craters
  Distribution and size range: Limit of resolution to 30 cm.
  Shape: Round, generally subdued.
Ejecta: A 30 cm crater 1 m north of the sample site has a sparsely blocky rim.

SAMPLE CHARACTERISTICS

Size: Lower drive tube.
Probable origin: Regolith derived from North Massif with minor contribution from subfloor.
a) During-sampling, looking north. Single drive tube locality. (146-22291)

b) Post-sampling, looking north. (146-22295)
SAMPLES: 76015, 76215, 76235-39, 76305-07, 76255, 76275, 76295, 76315* 
(LR-6, 535, 556, 536, 537, 538, 539)

Station: 6
Location: 5 boulders 20 m east of LRV.
Rock type: Extremely vesicular light-gray breccia, with light inclusion in contact with a partially recrystallized blue-gray breccia.

SAMPLE AREA CHARACTERISTICS

Slopes: 11° to the south.
Fragment population
DISTRIBUTION AND SIZE RANGE: Five 2-7 m boulders strung out in a north-south (downhill) direction.
COLOR: Light gray to blue gray.
SHAPES: Irregular, rounded, with a few planar faces.
FILLETS: None visible. Overhangs seen all sides.
APPARENT BURIAL: None.
DUST COVER: Generally none. The uphill boulder has a thick mantling of soil on the uphill face.
COMPARISON WITH OTHER ROCKS IN AREA: Similar in shape and color to other large boulders seen on the North Massif.
PROBABLE ORIGIN: At least 1/3 the way up the North Massif.

Fines:
COLOR: Medium gray, both on the boulder and surrounding soil.
COMPACTION: Moderately loose.

SAMPLE CHARACTERISTICS: 76015, chip from 5th boulder downhill.

Rock type: Vesicular breccia.
Size: 12 x 16 x 19 cm.
COLOR: Light gray.
SHAPE: Irregular, subrounded.
DUST COVER: None visible.
COMPARISON WITH OTHER ROCKS IN AREA: Similar in texture and color to lower 3 boulders, more vesicular and lighter colored than upper 2 boulders.
PROBABLE ORIGIN: Late-stage breccia of a multi-cycle breccia.

COMMENTS: The boulder from which 76015 was taken is similar in color and texture to the 76215 boulder. It has, however, light inclusions not seen in the other boulder.
Sketch map of the station 6 area showing positions of boulders and locations of sampling areas.
SAMPLE CHARACTERISTICS: 76215, spall from 4th boulder downhill.

- **Rock type:** Vesicular breccia.
- **Size:** 6 x 8 x 12 cm.
- **Color:** Light gray.
- **Shape:** Tabular, angular.
- **Dust cover:** None visible.
- **Comparison with other rocks in area:** Similar in color and vesicularity to the lower three boulders.
- **Probable origin:** Late-stage breccia of a multi-cycle breccia.

SAMPLE CHARACTERISTICS: 76235-39, 76305-07, chips from inclusion in boulder farthest upslope.

- **Rock type:** Friable inclusion in blue-gray recrystallized breccia.
- **Size:** Several small fragments.
- **Color:** White.
- **Shape:** Inclusion is circular, fragments are rounded.
- **Dust cover:** None visible.
- **Comparison with other rocks in area:** Appears similar in color and shape to other inclusions in the boulder.
- **Probable origin:** An older breccia incorporated by the partially melted blue-gray breccia early in the history of the multi-cycle breccia.

SAMPLE CHARACTERISTICS: 76255, chip of inclusion from boulder farthest upslope.

- **Rock type:** Inclusion in the blue-gray breccia.
- **Size:** 6 x 7 x 10 cm.
- **Color:** White on fresh surface, reddish brown on weathered surface.
- **Shape:** Rounded.
- **Dust cover:** None visible.
- **Comparison with other rocks in area:** Fresh surface looks like other inclusions in the rock. Weathered surface is reddish brown rather than white.
- **Probable origin:** Older breccia incorporated in blue-gray breccia early in the history of the multi-cycle breccia.

SAMPLE CHARACTERISTICS: 76275, chip from boulder farthest upslope.

- **Rock type:** Partially recrystallized breccia.
- **Size:** Approximately 5 cm.
- **Color:** Predominantly blue gray.
- **Shape:** Irregular, rounded.
- **Dust cover:** None visible.
- **Comparison with other rocks in area:** Typical of the breccia in the 2 boulders highest on the slope.
- **Probable origin:** Intermediate stage breccia of multi-cycle breccia.
SAMPLE CHARACTERISTICS: 76295, chip from boulder farthest upslope

Rock type: Partially recrystallized breccia.
Size: 4 x 6 x 8 cm.
Color: Blue gray.
Shape: Irregular, rounded.
Dust cover: None visible.
Comparison with other rocks in area: Typical of blue-gray breccia in the 2 boulders highest on the slope.
Probable origin: Intermediate stage breccia of multi-cycle breccia.

SAMPLE CHARACTERISTICS: 76315*, Inclusion in vesicular "anorthositic gabbro" near contact in 2nd boulder downslope.

Rock type: Breccia inclusion.
Size: 5-10 cm.
Color: Blue gray.
Shape: Rounded.
Dust cover: None visible.
Comparison with other rocks in area: Similar to other inclusions in the light gray breccia and to blue-gray breccia across the contact.
Probable origin: Small piece of blue-gray breccia included in vesicular light gray breccia.
Post-sampling, looking southwest. Boulders 4 and 5; downhill is to left. (140-21414, 16, 18, 28, 29, 32, 33)

SAMPLES 76015, 76215 AND 76240
a) Pre-sampling, looking southwest. Boulders 4 and 5 (left) showing location of 76015. (140-21411)

b) Pre-sampling (76215), post-sampling (76015), looking northwest. Boulders 4 and 5 showing sampling areas. (141-21607)

SAMPLES 76015 AND 76215
a) Pre-sampling, looking southwest. Area on boulder 4 from which the spall was derived. (140-21421)

b) Pre-sampling, looking south. Spall on surface showing probable sample area (76215). (140-21410)
a) Pre-sampling, closeup. Boulder 1 samples. (140-21445)

b) Pre-sampling, closeup. Boulder 1 samples. (140-21449)

SAMPLES 76235-39, 76255 AND 76305-07
a) Pre-sampling, looking north. Boulder 1 showing main sampling area. (140-21443)

b) Pre-sampling, looking northwest. Boulder 1 showing main sampling area. Boulder 4 in left background. (141-21609)

SAMPLES 76235-39, 76255, 76275, 76295 AND 76305-07
a) Post-sampling, looking west. Boulder 1 samples. (140-21456)

b) Post-sampling, looking west. Boulder 1 sample. (140-21455)

SAMPLES 76235-39, 76255, 76275, 76295 AND 76305-07
a) Pre-sampling, looking northwest. Boulder 2 sample near contact between the blue-gray breccia (right) and vesicular breccia (left). The contact could not be delineated with present level of examination of photography. (140-21437)

b) Post-sampling, looking northwest. Closeup view of sampled area. (141-21619)
SAMPLE: 76320* (557)

Station: 6
Location: On flat face of Boulder 1.
Rock type: Soil.

SAMPLE AREA CHARACTERISTICS

Slopes: Approximately 10° north.
Fragment population:
  Distribution and size range: From the limit of resolution to 5 cm.
  Color: Medium gray.
  Shapes: Irregular, rounded.
  Fillets: None visible.
  Apparent burial: Perched to partially buried.
Dust cover: Moderate.

Fines
  Color: Medium gray.
  Compaction: Loose.
Craters
  Distribution and size range: A few 5-10 cm craters.
  Shape: Round.
  Ejecta: None visible.

SAMPLE CHARACTERISTICS

Color: Medium gray.
Comparison with other soils in area: Similar in color to other soil in station area.
Probable origin: Derived from fines upslope, transported by an impact.
a) Pre-sampling, looking west. These photographs give the context of the samples. They were taken around a 90° corner of the rock, therefore the mosaic matches only in the lower near portion. (140-21460, 66, 67, 71, 72, 75)

b) Post-sampling, looking northwest. Boulder 1 sample. (140-21487)

SAMPLES 76235-39, 76255, 76275, 76295, 76305-07 AND 76320*
SAMPLE: 76035-37 (4BY)

Station: 6
Location: Downslope from LRV.
Rock type: Blue-gray breccia

SAMPLE AREA CHARACTERISTICS

Slopes: 11° to the south.
Fragment population: A 1/3 m boulder.
Color: Blue gray.
Shapes: Unknown.
Fillets: Unknown.
Apparent burial: Unknown.
Dust cover: Unknown.
Craters: Boulder is sitting in its own small crater.

SAMPLE CHARACTERISTICS

Size: 5 x 5 x 12 cm.
Color: Blue gray.
Shape: Irregular, angular.
Dust cover: Unknown.
Comparison with other rocks in area: Similar in color to other fragments in station area.
Probable origin: May be ejecta from a crater higher up on the North Massif.
Pre-sampling, looking south. (140-21500)

SAMPLES 76035-37 AND 76320*
SAMPLE: 76055* (LR-7)

Station: 6
Location: South side of LRV.
Rock type: Tan-gray breccia

SAMPLE AREA CHARACTERISTICS

Slopes: 11° to the south.

Fragment population:
Distribution and size range: Limit of resolution to 5 cm, scattered randomly.
Color: Medium gray.
Shapes: Rounded.
Apparent burial: Generally perched, some partially buried.
Dust cover: Moderate on small fragments.

Fines:
Color: Medium gray.
Compaction: Moderately loose.

Craters:
Distribution and size range: Limit of resolution to 30 cm.
Shape: Round, subdued.
Ejecta: Generally none visible. One fresh 30 cm crater has few small blocks in rim.

SAMPLE CHARACTERISTICS

Size: 18 x 20 x 25 cm.
Color: Tan-gray
Shape: Irregular, rounded.
Fillets: Unknown.
Apparent burial: Unknown.
Dust cover: Unknown.
Comparison with other rocks in area: Unknown.
Probable origin: Erosion of larger blocks on North Massif.
Pre-sampling, looking southeast. (141-21598)

SAMPLES 76055* AND 76335*
SAMPLE: 76335* (568)

Station: 6
Location: South slope of North Massif.
Rock type: Friable chalky white rocks.

SAMPLE AREA CHARACTERISTICS

Slopes: 11° to the south.
Fragment population:
  Distribution and size range: Limit of resolution to 5-10 cm-
  Color: Medium gray.
  Shapes: Rounded.
Fines:
  Color: Medium gray.
  Compaction: Moderately loose.
Craters
  Distribution and size range: Limit of resolution to 30 or 40 cm-
  Shape: Subdued.
  Ejecta: None visible.

SAMPLE CHARACTERISTICS

Size: Several small fragments.
Color: White.
Shape: Rounded when collected.
Fillets: Unknown.
Apparent burial: Unknown.
Dust cover: Unknown.
Comparison with other rocks in area: Not typical of most small
fragments in the area.
Probable origin: A crushed clast from a breccia boulder.
SAMPLE: 76220* (534)

Station: 6
Location: Soil from boulder track on the North Massif.
Rock type: Soil.

SAMPLE AREA CHARACTERISTICS

Slopes: 11° to the south.

Fragment population:
- Distribution and size range: From the limit of resolution to a few centimeters scattered randomly in the track.
- Color: Medium gray.
- Shapes: Generally subangular, few are rounded.
- Fillets: None visible.
- Apparent burial: Generally perched, some partially buried.
- Dust cover: Unknown.

Fines
- Color: Medium gray.
- Compaction: Moderately loose.
- Craters: Large somewhat elongate depressions, with low smooth sides, closely spaced along the boulder track.

SAMPLE CHARACTERISTICS

Color: Medium gray.
- Comparison with other soil in area: Appears typical of soil in the station area.
- Probable origin: From erosion of North Massif material, possibly contains a minor contribution from subfloor.

COMMENTS: Not separately documented, see station 6 pan for general area where collected.
SAMPLES: 76240, 76260, 76280 (312, 313, 472)

Station: 6
Location: South slope of the North Massif.
Rock type: Soils.

SAMPLE AREA CHARACTERISTICS

Slopes: 11° to the south.
Fragment population:
Distribution and size range: From the limit of resolution to 6 cm, scattered randomly. 1-2 cm fragments common, larger ones sparse.
Color: Medium gray.
Shapes: Generally irregular, subangular
Fillets: None visible.
Apparent burial: Generally partially buried.
Dust cover: Most fragments have moderate dust cover.
Finest:
Color: Medium gray.
Compaction: Loose.

SAMPLE CHARACTERISTICS: 76240 (shadowed soil)

Color: Unknown.
Shape: Probably a 4-5 cm deep scoop.
Comparison with other soil in area: Unknown.
Probable origin: Locally derived regolith formed before the boulder was emplaced. Consists of North Massif material and probably minor amounts of subfloor material.

COMMENTS: 76240 was collected 1/2 m beyond the north overhang of a 5 x 4 x 3 m boulder. Soil contains two rock chips 76245-46.

SAMPLE CHARACTERISTICS: 76260, 76280 (soil)

Color: Medium gray.
Comparison with other soil in area: Appears similar in color and texture to soil in surrounding area.
Probable origin: Regolith derived from North Massif and probably minor amounts of subfloor material.

COMMENTS: 76260 is a 2 cm skim and 76280 is a 5 cm scoop - both outside the limit of overhang. Bag 313 also contained a rock chip, 76265.
a) During-sampling, looking east. Television view showing collection of 76240 (permanent shadow) in east-west split between boulders 3 and 4. (surface television photograph)

b) Pre-sampling, looking southeast. East-west split and permanently shadowed samples. (141-21605)

SAMPLES 76240, 76240 AND 76280
Post-sampling, looking southwest (141-21606)

SAMPLES 76260 AND 76280
SAMPLES: 76535-*, 76500 (558, 559)

Station: 6
Location: On the ejecta blanket of a 10 m crater.
Rock type: Rake, soil.

SAMPLE AREA CHARACTERISTICS

Slopes: 11° to the south.
Fragment population:
  Distribution and size range: 1 cm to 10 cm fragments scattered randomly over the surface.
  Color: Medium to light gray.
  Shapes: Rounded.
  Fillets: None visible.
  Apparent burial: Mostly perched.
  Dust cover: Larger fragments clean, smaller ones dust covered.
Fines:
  Color: Medium gray.
  Compaction: Moderately loose.
Craters:
  Distribution and size range: Limit of resolution to 30 cm.
  A 10 m crater is about 5 m northwest of the rake site.
Shape: Round, subdued.
Ejecta: None visible.

SAMPLE CHARACTERISTICS: 76535-*, rake

Size: Several small (1-2 cm) fragments, one
Color: Medium to light gray.
Shape: Rounded.
Fillets: None visible.
Apparent burial: Mostly perched
Dust cover: On smaller fragments.
Comparison with other rocks in area: Typical of small fragments in the station area.
Probable origin: Erosion of North Massif materials. Possibly minor contribution from subfloor.

COMMENTS: One fragment was reported to be similar to the light gray inclusion in the large boulders.

SAMPLE CHARACTERISTICS: 76500, soil

Color: Medium gray.
Comparison with other soils in area: Typical of soil in the station area.
Probable origin: Derived from North Massif; possibly minor contribution from subfloor.

COMMENTS: Soil contains 2 rock chips (76505-06).

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a) Pre-sampling, looking north. (141-21622)

b) Post-sampling, looking north. (141-21625)

SAMPLES 76500 AND 76535-
SAMPLE: 77017*; 77515-* (541; 540, 542)

Station: 7
Location: Base of North Massif.
Rock type: Rock fragments.

SAMPLE AREA CHARACTERISTICS

Slopes: 9.5° to the south.
Fragment population:
Distribution and size range: From the limit of resolution to 10 or 15 cm, scattered randomly over the surface.
Color: Medium gray.
Shapes: Rounded.
Fillets: Poorly developed on larger fragments, absent on smaller fragments.
Apparent burial: Generally partially buried. Both deeply buried and perched fragments also seen.
Dust cover: None visible except on smaller fragments.

Fines
Color: Medium gray.
Compaction: Moderately firm.

Craters
Distribution and size range: From the limit of resolution to 1 m, randomly distributed.
Shape: Generally subdued, unblocky rims, few sharp, fresh craters.
Ejecta: Blocky ejecta on fresh craters, deposited preferentially downslope.

SAMPLE CHARACTERISTICS: 77017* (10-15 cm rock fragment)

Color: Medium to dark gray.
Shape: Rounded?
Fillets: Unknown.
Apparent burial: Probably 1/3 buried.
Dust cover: Unknown.
Comparison with other rocks in area: Lithology unknown.
Probable origin: Derived from North Massif by mass wasting.

SAMPLE CHARACTERISTICS: 77515-* (rock fragments collected from surface)

Size: Small fragments (probably less than 5 cm)
Color: Medium to dark gray?
Shape: Rounded?
Fillets: Unknown.
Apparent burial: Unknown.
Dust cover: Unknown.
Comparison with other rocks in area: Probably typical of most small fragments in the area.
Probable origin: Derived from North Massif by mass wasting; may include subfloor material.
a) During-sampling, looking southwest. (surface television photograph)

b) Pre-sampling, looking southwest. (surface television photograph)

SAMPLES 70017* AND 77515*
SAMPLE: 77035* (LR-10)

Station: 7
Location: South slope of North Massif. 3-4 m south of LRV.
Rock type: Intermediate gray vesicular breccia.

SAMPLE AREA CHARACTERISTICS

Slopes: 9.5° to the south.
Fragment population
Distribution and size range: From the limit of resolution to 10 or 15 cm, scattered randomly over the surface.
Color: Medium gray.
Shapes: Rounded.
Fillets: Poorly developed on larger fragments, absent on smaller fragments.
Apparent burial: Generally partially buried. Both deeply buried and perched fragments also seen.
Dust cover: None visible except on smaller fragments.

Fines
Color: Medium gray.
Compaction: Moderately firm.

Craters
Distribution and size range: From the limit of resolution to 1 m, randomly distributed.
Shape: Generally subdued, unblocky rims, few sharp, fresh craters.
Ejecta: Blocky ejecta on fresh craters, deposited preferentially downslope.

SAMPLE CHARACTERISTICS

Size: 15 x 18 x 20 cm.
Color: Gray.
Shape: Irregular, rounded.
Fillets: Unknown.
Apparent burial: 50 percent.
Dust cover: Unknown.

Comparison with other rocks in area: Same general rock type as 77115, mixture of blue-gray and lighter gray breccia.
Probable origin: From erosion of larger blocks on North Massif.
During-sampling, looking southwest.
(surface television photograph)

SAMPLE 77035*
SAMPLE: 77075*, 77095*, 77115, 77135 (543, 544, 561, 562)

Station: 7
Location: Base of North Massif
Rock type: Rock fragments of blue-gray breccia and medium gray vesicular hornfelsic breccia (described as anorthositic gabbro) from a single large boulder.

SAMPLE AREA CHARACTERISTICS

- Slopes: 9.5° to the south, gently undulating.
- Fragment population: Samples are from one boulder.
  - Size: 3 x 2 x 2 m.
  - Color: Blue-gray to light gray.
  - Shape: Irregular, rounded.
  - Fillet: Small fillet on the uphill side. Boulder has overhangs on other sides.
  - Apparent burial: None.
  - Dust cover: Restricted to the lower 5-10 cm on the uphill face.

SAMPLE CHARACTERISTICS: 77075* (chips from 1 1/2 m crushed inclusion in the blue-gray breccia).
  - Size: Several small chips.
  - Color: Light gray.
  - Shape: Rounded.
  - Dust cover: None visible.
  - Comparison with other rocks in area: Part of a 1 1/2 m inclusion that runs almost the entire height of the boulder.
  - Probable origin: On older breccia that has been crushed and intruded by the blue-gray breccia.

SAMPLE CHARACTERISTICS: 77095* (chip from blue-gray dikelet which intrudes the 1 1/2 m inclusion)
  - Size: Approximately 3 x 8 cm.
  - Color: Blue-gray.
  - Shape: Rounded.
  - Dust cover: None visible.
  - Comparison with other rocks in area: Several other small dikelets in the boulder. 77095* represents the largest visible dikelet.
  - Probable origin: Partial melting and injection of blue-gray breccia during incorporation of the large inclusion.

COMMENTS: Dikelets seen in the 1 1/2 m inclusion are continuous with the partially recrystallized blue-gray breccia which encloses it.
Post-sampling, looking southwest. (146-22352)
Inset: Pre-sampling, looking south. (146-22305)
SAMPLES 77075*, 77095*, 77115 AND 77135
SAMPLES 77075*, 77095*, 77115 AND 77135
a) Pre-sampling, looking south. (146-22326)

b) Pre-sampling, looking south. (146-22303)

SAMPLES 77075*, 77095* AND 77115
SAMPLE CHARACTERISTICS: 77115 (4 x 5 x 6 cm chip of partially recrystallized blue-gray dense breccia in contact with lighter breccia)

Color: Blue-gray.
Shape: Rounded.
Dust cover: None visible.
Comparison with other rocks in area: Similar to other blue-gray breccia on both sides of the large inclusion.
Probable origin: A breccia that has been partially melted and enclosed older breccias. It in turn has been incorporated by a later intrusion of hornfelsed breccia.

SAMPLE CHARACTERISTICS: 77135 (4 x 8 x 11 cm chip of vesicular, hornfelsic breccia, described by the crew as anorthositic gabbro)

Color: Light gray.
Shape: Rounded.
Dust cover: None visible.
Comparison with other rocks in area: More vesicular and lighter colored than breccia on other side of rock. More vesicular and coherent than 1 1/2 m inclusion in the breccia.
Probable origin: Intrusion of hornfelsed breccia which incorporated the blue-gray breccia.
a) Pre-sampling, looking south. (146-22299)

b) Pre-sampling (77135), Post-sampling (77115), looking south. (146-22334)

SAMPLES 77115 AND 77135
SAMPLE: 78120 (50Y)

Station: LPV-11
Location: Rim of SWP crater between stations 7 and 8.
Rock type: Soil

SAMPLE AREA CHARACTERISTICS

Slopes: Gentle slopes on rim of SWP crater.
Fragment population: 50 to 70 percent of surface.
  Distribution and size range: Blocks on rim, inner walls and ejecta blanket of 30-40 m crater. Fragments average about 10 cm with a maximum of 0.5 m.
Color: All medium gray.
Shape: Angular with rounded tops.
Fillets: Rare small fillet visible.
Apparent burial: Slight to mostly buried.
Dust cover: Possible thin cover on some rocks; not certain.

FINE
Color: Medium gray, same as fragments.

CRATERS
Distribution and size range: Sample from blanket of 30-40 m crater. No younger craters in area.
Shape: Raised rim, distinct break in slope between rim and blanket.
Ejecta: Very abundant, clods cover 50 to 70% at rim and blanket.

SAMPLE CHARACTERISTICS

Color: Medium gray.
Apparent burial: Scooped from upper few centimeters.
Comparison with other rocks in area: Representative of ejecta blanket of 30-40 meter crater.
Probable origin: Ejected from depth of 2-4 meters in regolith. Either dark mantle or distinct unit that is also present at Van Serg crater.

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During-sampling, looking northeast. Showing ejecta blanket of crater and crater rim. Sample taken to right side of LRV here. (142-21695)
SAMPLE: 78135 (563)

Station: 8
Location: About 4 km northeast of LM, at base of Sculptured Hills south of Wessex Cleft. About 20 m north of LRV.

Rock type: Basalt.

SAMPLE AREA CHARACTERISTICS

Slopes: Moderately steep to southwest (downslope).

Fragment population
Distribution and size range: Scattered pebbles, a few cobble-size rocks and one boulder; sample collected from site adjacent to boulder.
Color: Gray.
Shapes: Subrounded to subangular.
Fillets: Poorly developed.
Apparent burial: Minor to moderate.
Dust cover: Thin.

Fines
Color: Dark gray to gray.
Compaction: Moderate.

Craters
Distribution and size range: Saturated with small (1 cm) 'craters; meter-size craters and larger present but not abundant.
Shape: Circular outlines, subdued; no prominent rims.
Ejecta: Sparse.

SAMPLE CHARACTERISTICS

Size: 6 x 5 x 3 cm.
Color: Gray.
Shape: Subrounded.
Fillets: Minor.
Apparent burial: Minor, less than 10 percent.
Dust cover: Thin.

Comparison with other rocks in area: Larger than most; lithology apparently similar to most rocks except for sample 78235-38 and 78155.

Probable origin: Subfloor material as ejecta from unknown source crater.

COMMENTS: Absence of boulder tracks and apparent composition suggests sampled block did not originate from Sculptured Hills.
a) Pre-sampling, looking north. (146-22365)

b) Post-sampling, looking northeast. (146-22368)

SAMPLE 78135
SAMPLE: 78155 (567)

Station: 8
Location: About 4 km northeast of LM, at base of Sculptured Hills south of Wessex Cleft. About 10-15 m northwest of LRV.
Rock type: White friable rock.

SAMPLE AREA CHARACTERISTICS

Slopes: Steep within wall of 15 m crater.

Fragment population
- Distribution and size range: Abundant chips and clods up to several centimeters.
- Color: White to light gray?
- Shapes: Subrounded to angular.
- Fillets: Poorly developed.
- Apparent burial: Minor.
- Dust cover: Thin to absent.

Fines
- Color: White and light gray?
- Compaction: Moderate.

Craters
- Distribution and size range: Saturated with small (1 cm) craters; larger craters present but not abundant.
- Shape: Circular outlines, subdued; no prominent rims.
- Ejecta: Sparse.

SAMPLE CHARACTERISTICS

Size: Many friable pieces up to several centimeters.
Color: White.
Shape: Sample from small (1 m) pit crater in wall of larger (15 m) crater.
Fillets: None visible.
Apparent burial: None.
Dust cover: Probably thin.

Comparison with other rocks in area: Contrasts in color to most other rocks in sample area.

Probable origin: Impact shocked rock from Sculptured Hills and/or subfloor materials.

COMMENTS: Materials in sample probably shocked by two episodes of fairly recent cratering.
a) During-sampling, looking southwest. Station 8 setting taken from inside 15 m crater. (146-22400-22402)

b) Pre-sampling, looking west. (142-21711)
SAMPLE: 78235-38, 78255-56, 78220* (564, 546, 545)

Station: 8  
Location: About 4 km northeast of LM, at base of Sculptured Hills south of Wessex Cleft. About 50 m northeast of LAV.  
Rock type: Rock fragments from top and bottom of glass coated gabbroic boulder and underlying soil.

SAMPLE AREA CHARACTERISTICS

Slopes: Moderately steep to southwest (downslope).

Fragment population

Distribution and size range: Scattered pebbles, clods, and small rocks; one boulder 2/3 m in diameter.

Color: Gray and bluish gray.

Shapes: Subrounded to subangular.

Apparent burial: Minor to moderate.

Dust cover: Thin.

Rines

Color: Dark gray to gray.

Compaction: Moderate.

Craters

Distribution and size range: Saturated with small (1 cm) craters; craters up to several meters diameter present but not abundant.

Shape: Circular outlines, subdued; no prominent rims.

Ejecta: Sparse.

SAMPLE CHARACTERISTICS: 78235-38 (coarse-grained gabbroic rock fragments) from original top of 2/3 m boulder.

Size: Largest piece is 5.5 x 5.0 x 4.0 cm.

Color: Bluish gray.

Shape: Subrounded.

Fillets: None.

Apparent burial: Minimal.

Dust cover: Thin.

Comparison with other rocks in area: Boulder larger than most in area. LMP estimated composition 50 percent plagioclase and 50 percent orthopyroxene; contrasts to the more abundant basalt rocks in area.

Probable origin: From Sculptured Hills or as ejecta from unknown source crater. Prominent striations suggest shock history for boulder.

COMMENTS: Glass coating and absence of boulder tracks suggests alternate origin as crater ejecta.
a) Pre-sampling, looking southwest. Top of rolled boulder at station 8 prominently striated. (146-22370)

b) Post-sampling, looking southwest. Surface of boulder heavily covered by soil kicked up and from hammering. Scoop points to location of last fragment collected. (146-22371)
SAMPLE CHARACTERISTICS: 78255-56 (glass coated chips of coarse-grained gabbroic rock from original base of 2/3 m boulder).

Size: Both are 3.5 x 3.0 x 1.5 cm.
Color: Bluish gray.
Shape: Subrounded.
Fillets: None.
Apparent burial: Minor.
Dust cover: Thin.
Comparison with other rocks in area: Boulder larger than most in area. EMP estimated composition 50 percent plagioclase and 50 percent orthopyroxene; contrasts to the more abundant basalt rocks in area.
Probable origin: From Sculptured Hills or as ejecta from unknown source crater. Prominent striations on top of boulder suggest shock history.

COMMENTS: Glass coating and absence of boulder tracks suggest origin as crater ejecta.

SAMPLE CHARACTERISTICS: 78220* (soil from beneath 2/3 m gabbroic boulder)

Color: Dark gray.
Apparent burial: From surface layer beneath boulder.
Comparison with other soil in area: Unknown.
Probable origin: Same as dark mantle at other stations. May include fraction derived from Sculptured Hills.

COMMENTS: Numerous downslope tracks made by small clods and lighter gray color of crater walls indicate that dark mantle is thinner in this locality and/or more mixed with material mass wasted from Sculptured Hills.
Post-sampling, looking northeast. Samples collected by scoop from locations, after hammered from original bottom of rolled boulder at station 8. (146-22374 and 146-22398)

SAMPLES 78255-56
a) Pre-sampling, looking north. Boulder at station 8, before rolling. (142-21658)

b) Post-sampling, looking east. Soil from beneath rolled boulder at station 8. (142-21704)

SAMPLES 78220*, 78235-38 AND 78255-56
SAMPLE: 78420, 78440, 78460*, 78480 (548, 551, 550, 549)

Station: 8
Location: About 4 km northeast of LM, at base of Sculptured Hills
south of Wessex Cleft; 30 m east of LRV.
Rock type: Soil samples from trench.

SAMPLE AREA CHARACTERISTICS

Slopes: Moderate, southwest (downslope)
Fragment population
Distribution and size range: A few pebbles and clods up to
several centimeters.
Color: Gray.
Shapes: Subrounded to subangular.
Fillets: None visible.
Apparent burial: Minor to moderate.
Dust cover: Thin.

Fines
Color: Gray.
Compaction: Moderate.
Craters
Distribution and size range: Saturated with small (1 cm)
craters; larger craters present but not common.
Shape: Subdued, circular, no prominent rims.
Ejecta: Sparse.

SAMPLE CHARACTERISTICS: 78420 (soil from base of trench)

Size: Scoop sample.
Color: Gray.
Apparent burial: Lower 10 cm of 25 cm deep trench.
Comparison with other soil in area: Unknown.
Probable origin: Mixture of dark mantle and material mass wasted
from Sculptured Hills.

COMMENTS: Lower 5 cm of zone sampled described as slightly coarser
than samples from higher in trench.

SAMPLE CHARACTERISTICS: 78440 (soil from walls of trench above
sample 78420)

Size: Scoop.
Color: Gray.
Apparent burial: Scooped from walls of trench at a depth of about
6 to 15 cm.
Comparison with other soil in area: Unknown.
Probable origin: Mixture of dark mantle and material mass wasted
from Sculptured Hills.
a) Pre-sampling, looking northwest. Location of trench area at station 8. (142-21719)

b) Pre-sampling, looking north. Undisturbed soil at trench location. (142-21718)

c) Post-sampling, looking north. Positions of skim sample (78480) and deeper soils at station 8 trench. (142-21724)

SAMPLES 78420, 78440, 78460* AND 78480
SAMPLE CHARACTERISTICS: 78460* (soil from wall of trench 5 cm below skim sample)

Size: Scoop.
Color: Gray.
Apparent burial: Scooped from wall of trench at a depth of 1-6 cm.
Comparison with other rocks in area: Probably similar to other soil samples.
Probable origin: Mixture of dark mantle and material mass wasted from Sculptured Hills.

SAMPLE CHARACTERISTICS: 78480 (soil--skim sample at top of trench)

Size: Skim sample.
Color: Gray.
Apparent burial: Skimmed from upper 1/2 to 1 cm at edge of trench.
Comparison with other rocks in area: Probably similar to other soil samples.
Probable origin: Mixture of dark mantle and material mass wasted from Sculptured Hills.
SAMPLE: 78535-*, 78500, 78505-09, 78515-18 (565; 566)

Station: 8
Location: About 4 km northeast of LM, at base of Sculptured Hills south of Wessex Cleft. About 10-15 m northwest of LRV.
Rock type: Rake and soil samples.

SAMPLE AREA CHARACTERISTICS

Slopes: Moderate, southwest (downslope).
Fragment population
- Distribution and size range: Scattered pebbles, clods, and small rocks.
- Color: Gray.
- Shapes: Subrounded to subangular.
- Fillets: Poorly developed.
- Apparent burial: Minor to moderate.
- Dust cover: Thin.

Fines
- Color: Dark gray to gray.
- Compaction: Moderate.

Craters
- Distribution and size range: Saturated with small (1 cm) craters; craters up to several meters diameter present but not common.
- Shape: Circular outlines, subdued; no prominent rims.
- Ejecta: Sparse.

SAMPLE CHARACTERISTICS: 78535-* (rake sample)

Size: Largest of about 10 rocks is 7 x 5 x 4 cm.
Color: Dark gray and gray?
Shape: Unknown.
Apparent burial: Raked from upper few centimeters.
Probable origin: Probably a mixture of dark mantle, and subfloor materials and debris mass wasted from Sculptured Hills.

SAMPLE CHARACTERISTICS: 78500 (soil sample)

Size: Mostly <1 cm, contains 8 fragments >1 cm (78505-09, 78515-18)
Color: Dark gray and gray?
Shape: Unknown.
Apparent burial: Scooped from upper few centimeters.
Comparison with other soil in area: Unknown.
Probable origin: Probably a mixture of dark mantle and subfloor materials and debris mass wasted from Sculptured Hills.
a) Pre-sampling, looking northwest. Area of the rake/soil sample at station 8. (142-21706)

b) Post-sampling, looking west. Rake sample area at station 8. (142-21709)

c) Post-sampling, looking northeast. Disturbed area after collection of rake/soil at station 8. (142-21712)

SAMPLES 78535-*, 78500, 78505-09 AND 78515-18
SAMPLE: 79002*/79001* (37/50), 79215*, 79220, 79240, 79260, (486), (483), (484), (485).

Station: 9
Location: Southeast flank of Van Serg crater ejecta blanket near LRV.
Rock type: Drive tube, rock, and soil samples from trench.

SAMPLE AREA CHARACTERISTICS

Slopes: Gentle slope to southeast away from Van Serg crater.

Fragment population

Distribution and size range: Fragments from 2 to 20 cm cover less than 3 percent of the surface. Larger fragments are scarce in the immediate area. 
Color: Gray.
Shapes: Angular, subangular.
Fillets: Generally none.
Apparent burial: Some rocks partly buried.
Dust cover: None evident.

Fines

Color: Gray
Compaction: Upper portion loose, readily compacted to show bootprints.

Craters

Distribution and size range: Two fresh 1 m craters in immediate area.
Ejecta: Similar to local surface or slightly blockier.

SAMPLE CHARACTERISTICS: 79002*/79001* (drive tube)

Size: Double drive tube.
Probable origin: Ejecta from Van Serg crater; may include dark mantle unit in upper part.

SAMPLE CHARACTERISTICS: 79215* (rock)

Size: 5 x 15 cm as seen in surface photograph.
Color: Gray (described by crew as light-colored).
Shape: Tabular(?).
Fillets: None.
Apparent burial: None.
Dust cover: None.
Comparison with other rocks in area: Typical.
Probable origin: Van Serg ejecta fragment.

COMMENTS: Not specifically documented; tentatively identified in photograph by crew.
During-sampling, looking north. (143-21837)
(Inset 142-21827)

SAMPLES 79002*/79001*, 79215*, 79220, 79240 AND 79260
SAMPLE CHARACTERISTICS: 79220, 79240, 79260 (soil samples from trench)

Color: 79220, 79240, from uppermost 7 cm are gray; 79260, from lowest 10 cm is light gray or white.
Probable origin: Ejecta from Van Serg crater; upper 7 cm (79220, 79240) may be dark mantle material.

COMMENTS: Trench: 79220, approximate depth 0-2 cm
79240, approximate depth 2-7 cm
79260, approximate depth 7-17 cm
SAMPLE: 79035* (LR-13)

Station: 9
Location: Southeast flank of Van Serg crater ejecta blanket near LRV.
Rock type: Breccia.

SAMPLE AREA CHARACTERISTICS

Slopes: Gentle slope to southeast away from Van Serg crater.

Fragment population:
Distribution and size range: Specific ample locality unknown.
In general area close to LRV fragments ranging from 2 to 30 cm in diameter cover 1 to 3 percent of the surface. Larger fragments are scarce.
Color: Gray.
Shapes: Angular; some tabular boulders.
Fillets: Generally none.
Apparent burial: All degrees of burial occur.
Dust cover: Not visible.

Fines:
Color: Gray
Compaction: Soft upper surface readily disturbed and compacted by boots.

Craters:
Distribution and size range: Craters scarce; 2 fresh 1 m craters occur near LRV on its north and east sides.

SAMPLE CHARACTERISTICS

Size: 3 pieces: 7 x 10 x 14 cm; 3 x 4 x 5 cm; 3 x 6 x 9 cm.
Color: Dark gray.
Shape: Subrounded.
Comparison with other rocks in area: Typical.
Probable origin: Fragment of Van Serg crater ejecta.

COMMENTS: Sample not documented. Collected close to LRV, possibly immediately to south (behind) or west (left) of LRV. Broken into 3 pieces in transit.
Pre-sampling, looking north. Sample 79035 undocumented. Sample area probably behind or to left of LRV. \((143-21\#27)\)

SAMPLE 79035*
SAMPLE: 79115, 79120, 79135, 79510 (568), (569), (480=LR-12), (570)

Station: 9
Location: Southeast rim of Van Serg crater.
Rock type: Fragments of a breccia boulder and nearby soil.

SAMPLE AREA CHARACTERISTICS

Slopes: Van Serg rim crest; no significant slope.

Fragment population

Distribution and size range: Fragments ranging from about 2 to 30 cm cover approximately 10 percent of the surface of this part of the Van Serg rim. Maximum boulder size is about 1.5 m.

Color: Mostly gray with scattered white inclusions up to about 2 cm in diameter. Some boulders show distinct color banding.

Shapes: Commonly angular, irregular. Some boulders are slabby or have closely spaced platy fractures.

Fillets: Generally insignificant.

Apparent burial: Most boulders appear partly buried.

Dust cover: None visible; small inclusions visible in some boulders; large (1/2 m) inclusions seen by crew in boulders on crater floor; however, crew noted more dust on these rocks than at other localities.

Fines

Color: Gray, similar to rocks.

Compaction: Upper portion loose, readily compacted to show bootprints.

Craters

Distribution and size range: Craters negligible on Van Serg rim.

SAMPLE CHARACTERISTICS: 79115 and 79135 (fragments from a single breccia boulder)

Size: 79115 is an 8 cm long fragment from the corner of the boulder; 79135, about 15 cm long, is from the boulder interior adjacent to 79115. Boulder is approximately 80 cm long and 40 cm high.

Color: Dark gray with scattered white inclusions up to 2 cm diameter.

Shape: Irregular, angular, closely spaced platy fractures.

Fillets: None.

Apparent burial: None; sides overhang soil surface.

Dust cover: None visible; crew reported obscuring dust on rock faces.

Comparison with other rocks in area: Typical of most other rocks on this portion of Van Serg rim.

Probable origin: Ejecta from Van Serg crater.

COMMENTS: Rests on east rim of small crater (formed by its own impact?)
Pre-sampling, looking west. (142-21791)

SAMPLES 79115, 79120 AND 79135
a) Pre-sampling, looking north. (146-22414)

b) Post-sampling, looking north. (146-22415)

SAMPLES 79115, 79120, 79135 AND 79510
SAMPLE CHARACTERISTICS: 79120, 79510 (soil)

Probable origin: Van Bogaert ejecta or possibly dark mantle material (see 79220, 79240, 79260); may have been modified by gardening since its emplacement.

COMMENTS: 79120 is soil collected adjacent to the boulder to a depth of 3 cm. 79510 is soil and chips collected about 2/3 m east of boulder.
SAMPLE: 79155 (571)

Station: 9
Location: Southeast rim of Van Serg crater
Rock type: Basalt, glass coated.

SAMPLE AREA CHARACTERISTICS

Slopes: Van Serg rim crest; no significant slope.

Fragment population:
Distribution and size range: Fragments ranging from about 2 to 30 cm cover approximately 10 percent of the surface of this part of the Van Serg rim. Maximum boulder size is about 1.5 cm.
Color: Mostly gray with scattered white inclusions up to about 2 cm in diameter. Some boulders show distinct color banding.
Shapes: Commonly angular, irregular. Some boulders are slabby or have closely spaced platy fractures.
Fillets: Generally insignificant.
Apparent burial: Most boulders appear partly buried.
Dust cover: None visible; small inclusions visible in some boulders; large (1/2 m) inclusions seen by crew in boulders on crater floor; however, crew noted more dust on these rocks than at other localities.

Fines:
Color: Gray, similar to rocks.
Compaction: Upper portion loose, readily compacted to show bootprints.

Craters:
Distribution and size range: Craters negligible on Van Serg rim.

SAMPLE CHARACTERISTICS

Size: Baseball size.
Color: Light brownish gray.
Shape: Subrounded, subspherical.

Comparison with other rocks in area: Basalt, in contrast to apparently more typical breccia.

Probable origin: Fragment of subfloor basalt--either excavated by Van Serg impact or deposited on Van Serg rim by ejection from a younger impact elsewhere.

COMMENTS: Sample not photographically documented. Located about 2 m left (southwest) of previous (79115, 79120, 79135, 79150) sample area.
SAMPLE: 79160* (52Y)

Station: 9
Location: Southeast rim of Van Serg crater.
Rock type: Soil.

SAMPLE AREA CHARACTERISTICS

Slopes: Van Serg rim crest; no significant slope.
Fragment population
Distribution and size range: Fragments ranging from about 2 to 30 cm cover approximately 10 percent of the surface of this part of the Van Serg rim. Maximum boulder size is about 1.5 m.
Color: Mostly gray with scattered white inclusions up to about 2 cm in diameter. Some boulders show distinct color banding.
Shapes: Commonly angular, irregular. Some boulders are slabby or have closely spaced platy fractures.
Fillets: Generally insignificant.
Apparent burial: Most boulders appear partly buried.
Dust cover: None visible; small inclusions visible in some boulders; large (1/2 m) inclusions seen by crew in boulders on crater floor; however, crew noted more dust on these rocks than at other localities.
Fines
Color: Gray, similar to rocks.
Compaction: Upper portion loose, readily compacted to show bootprints.
Craters
Distribution and size range: Craters negligible on Van Serg rim.

SAMPLE CHARACTERISTICS:

Probable origin: Van Serg ejecta or possibly dark mantle material (see 79220, 79240, 79260); may have been modified by "gardening" since Van Serg event.
Pre-sampling, looking southeast.

(142-21825)

SAMPLE 78160*
Station: 9
Location: Southeast rim of Van Serg crater.
Rock type: Glass agglutinate and breccia.

SAMPLE AREA CHARACTERISTICS

Slopes: Van Serg rim crest; no significant slope.

Fragment population
- Distribution and size range: Fragments ranging from about 2 to 30 cm cover approximately 10 percent of the surface of this part of the Van Serg rim. Maximum boulder size is about 1.5 m.
- Color: Mostly gray with scattered white inclusions up to about 2 cm in diameter. Some boulders show distinct color banding.
- Shapes: Commonly angular, irregular. Some boulders are slabby or have closely spaced platy fractures.
- Fillets: Generally insignificant.
- Apparent burial: Most boulders appear partly buried.
- Dust cover: None visible; small inclusions visible in some boulders; large (1/2 m) inclusions seen by crew in boulders on crater floor; however, crew noted more dust on these rocks than at other localities.

Fines
- Color: Gray, similar to rocks.
- Compaction: Upper portion loose, readily compacted to show bootprints.

Craters
- Distribution and size range: Craters negligible on Van Serg rim.

SAMPLE CHARACTERISTICS: 79175* (glass agglutinate)

Size: 15 x 7 x 5 cm.
Color: Gray.
Shape: Irregular, angular, clinker-like, frothy.
Fillets: None.
Apparent burial: Appears to rest on surface.
Dust cover: None visible in photographs.
Comparison with other rocks in area: Similar clinker-looking fragments are scattered nearby, but predominant rock type in area is breccia.
Probable origin: Van Serg crater ejecta; molten at time of ejection.
a) Pre-sampling, looking northwest. (142-21795)

b) Pre-sampling, looking south. (146-22421)

c) Post-sampling, looking south. (146-22422)

SAMPLES 79175* AND 79195*
SAMPLE CHARACTERISTICS: 79195* (breccia fragment)

Size: 10 cm chip from edge of 30 x 15 x 10 cm boulder.
Color: Gray.
Shape: Subangular.
Fillets: None.
Apparent burial: None.
Dust cover: None visible in photographs.
Comparison with other rocks in area: Typical.
Probable origin: Ejecta from Van Serg crater.
SAMPLES: 70315, 70320 (54Y, 53Y)

Station: LRV-12
Location: Near Sherlock crater between station 9 and LM.
Rock type: Rock fragments and soil.

SAMPLE AREA CHARACTERISTICS

Slopes: Gentle to flat.
Fragment population: Abundant; about 5 percent of area covered.
Color: Medium gray; most are slightly lighter than soil clods.
Shapes: Mostly blocky to rounded blocky, rare rough, irregular.
Fines: Present on larger blocks.
Apparent burial: Large blocks mostly buried; smaller fragments perched to slightly buried.
Dust cover: Present on large blocks.

Fines
Color: Medium gray.
Compaction: Normal.
Craters
Distribution and size range: Widely separated, less than 5 m diameter, nearest to sample are 1 meter size. Only 1/3 crater diameter from rim of Sherlock.
Shape: Subdued rim, shallow, except for 3 nearby 1 m size.
Ejecta: Only in nearby 1 m size craters that have rim and blanket of clods.

SAMPLE CHARACTERISTICS: 70315 (basalt)

Size: About 5 cm.
Color: Medium gray.
Shape: Angular equant.
Fines: None.
Apparent burial: Slight.
Dust cover: Not noted.
Comparison with other rocks in area: Representative of subfloor basalt in area.
Probable origin: Subfloor basalt probably ejected from a depth of 50-90 meters from Sherlock crater.

SAMPLE CHARACTERISTICS: 70320 (soil)

Color: Medium gray.
Apparent burial: Scooped from upper few centimeters.
Comparison with other soil in area: Representative soil from dark mantle.
Pre-sampling, looking southwest. Shows probable sampling area. (143-21893)

SAMPLES 70315 AND 70320
Table 1. Contents of containers. Listed in order of opening in LRL processing lines.

<table>
<thead>
<tr>
<th>SCB-2</th>
<th>SCB-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>(opened in NNPL 12/21/72)</td>
<td>(opened in NNPL 12/22/72)</td>
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<tr>
<td>Container</td>
<td>LRL decade number</td>
</tr>
<tr>
<td>number¹</td>
<td>number²</td>
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<tr>
<td>LR-3</td>
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<tr>
<td>10E</td>
<td>70130</td>
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<td>Residue</td>
<td>70030</td>
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²
Table 1. Continued.

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<th>SRC-2 SCB-5</th>
<th>SRC-1 SCB-1</th>
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<tr>
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<td>DB 509</td>
<td>74220</td>
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<tr>
<td>DB 511</td>
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<td>DB 467</td>
<td>75080</td>
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<tr>
<td>DB 464</td>
<td>75050</td>
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<tr>
<td>DT^5^ U35/L44</td>
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</tr>
<tr>
<td>DT U31</td>
<td>73001</td>
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<tr>
<td>DT L46 (CSVC)^6</td>
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</tr>
<tr>
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</tr>
<tr>
<td>Residue</td>
<td>74010</td>
</tr>
<tr>
<td>DB 466</td>
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<tr>
<td>Residue</td>
<td>74010</td>
</tr>
<tr>
<td>Residue</td>
<td>74010</td>
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</tbody>
</table>

^c^ SESC = Source Specific Enriched Seal Canister

^5^ DT U35/L44 = Disposal Test Unit 35/44

^6^ DT L46 (CSVC) = Disposal Test Unit L46 (Commercial SealVault Canister)

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<table>
<thead>
<tr>
<th>Container number</th>
<th>LRL decade number</th>
<th>Container number</th>
<th>LRL decade number</th>
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### Table 1. Continued.

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<th>Container number</th>
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<tr>
<td>Residue</td>
<td>73010</td>
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</tbody>
</table>

1 Sequence of samples is order of unpacking.
2 Except for loose rocks and special containers, only the LRL decade number is given. For a complete list of LRL sample numbers in documented bags as of this date, see Table 4.
3 Loose rock.
4 Documented bag.
5 Drive tube.
6 Core sample vacuum container.
7 Special environmental sample container.
8 Contents of DB 458 and 457 combined in the LRL.
Table 2. Cross-reference of lunar samples with locations, photographs, Apollo-Elapsed-Time, and excerpts from the air-to-ground transcript.

EXPLANATION OF ITEMS:

Sample number. Samples are referred to by both lunar container numbers and their equivalent LRL numbers, in sequence by the time of their collection during the three EVA traverses. LRL numbers are assigned by the Curator, Lunar Receiving Laboratory. The numbers used in this table are the actual or projected* numbers applied to samples contained in different documented bags, as of January 15, 1973. * indicates proposed number for the accompanying documented bag not yet opened or not in the inventory listing as of January 15, 1973.

Weight. Weights are those shown on the LRL inventory as of January 15, 1973. Weights in parentheses refer to an entire sample that was undivided as of the date of listing.

Sample type. This column is used to identify samples or for explanatory comments.

Lunar surface photographs. Documentary lunar surface photographs are listed by film magazine and NASA photograph number, i.e. 138-21143. A NASA prefix of AS17- to all photographs has been omitted for brevity. Explanatory acronyms following photograph numbers are as follows:

XSB, XSA, XSD refer to cross-sun photographs taken before, after, or during collection of samples.

DS refers to a down-sun photograph, and LOC refers to "locator."

Apollo-elapsed-time (AET). This is the true mission elapsed time, shown in days: hours: minutes: seconds (e.g. 05 22 53 49). Times are taken from the Apollo 17 Technical Air-to-Ground Voice Transcription (MSC-07629) prepared by the Test Division, Apollo Spacecraft Program Office, NASA, Houston, Texas. Because a time was not given for every statement in the transcript, we have added a plus (+) to the preceding AET for each subsequent statement having no AET assigned.

Crew comments. These are excerpts from the Technical Air-to-Ground Voice Transcription, selected for geologically descriptive content with specific or general reference to samples.

Note. Soil samples that end with digit 1, shown as 1 mm fines, are <1 mm. Rocks, chips or fragments, with LRL numbers ending in digits 5-9, are >1 cm.
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ELAPSED TIMES, AND EXCERPTS FROM THE AIR-TO-GROUND TRANSCRIPT

SAMPLE  WEIGHT  SAMPLE TYPE  LUNAR-SURFACE  ALT  CREW COMMENTS
NUMBER (G)  PHOTOGRAPHS

EVA 1 - STATION: LM

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>04 18 34 09</td>
<td>CDR  WE DIDN'T HAVE AN AWFUL LOT OF DUST ON LANDING - BUT I CAN DIG MY FOOT IN 6 OR 10 INCHES, AND I KNOW WE'RE AT LEAST THAT THICK. THERE'S A SMALL LITTLE 1-METER CRATER RIGHT IN FRONT OF US WITH A WHOLE MESS OF GLASS RIGHT IN THE MIDDLE. THAT'S RIGHT IN FRONT OF THE FURA, AS A MATTER OF FACT, RIGHT WHERE I WANT TO PARK THE ROVER.</td>
</tr>
<tr>
<td>04 18 36 39</td>
<td>CDR  ALL THESE LITTLE CRATERS HAVE GOT GLASS IN THE BOTTOM OF THEM. HERE'S ANOTHER ONE.</td>
</tr>
<tr>
<td>04 18 36+</td>
<td>LMP  THERE'S VERY CLEAR SLEEPING OF THE SURFACE BY THE DESCENT FLOPES OUT ABOUT 15 METERS.</td>
</tr>
<tr>
<td>04 18 37+</td>
<td>LMP  THE SURFACE IS MODERATELY COHESIVE, WHICH HOLD A PRETTY GOOD FOOTPRINT - VERY FINE GRAIN. GENE'S LOOKS VERY MUCH LIKE PREVIOUS SOILS.</td>
</tr>
<tr>
<td>04 18 52+</td>
<td>LMP  A GLASS BOTTOM CRATER WITH A LITTLE BENCH. LOOKS LIKE ONE OF THE FLAGSTAFF EXPLOSION CRATERS EXCEPT TO THE GLASS IN IT. RIGHT OUT AT 12 O'CLOCK. THAT'S THE ONE I WAS TALKING ABOUT, ABOUT HAVING A BRIGHT HALO.</td>
</tr>
<tr>
<td>04 18 55+</td>
<td>CDR  THERE'S A PIECE OF GLASS I PICKED UP. I'M GOING TO SET IT RIGHT ON THE FLOOR OF THE ROVER.</td>
</tr>
<tr>
<td>04 18 59+</td>
<td>CDR  I PUT A LITTLE PIECE OF GLASS I PICKED UP RIGHT BY THE ROVER. HERE.</td>
</tr>
<tr>
<td>04 18 59+</td>
<td>CDR  JUST A LITTLE PIECE. I'M GOING TO LEAVE IT RIGHT BEHIND YOUR FOOTSTOOL. IT JUST SPARKLED AT ME I HAD TO PICK IT UP.</td>
</tr>
<tr>
<td>05 00 36+</td>
<td>LMP  OK. GENE, WHERE'S THAT - YOU WANT TO PUT THAT LITTLE ROCK?</td>
</tr>
<tr>
<td>05 00 36+</td>
<td>CDR  YES, IS IT THERE?</td>
</tr>
<tr>
<td>05 00 36+</td>
<td>LMP  WELL, WHAT DID YOU DO WITH IT?</td>
</tr>
<tr>
<td>05 00 36+</td>
<td>CDR  IT WAS ON THE FLOOR ON MY SIDE.</td>
</tr>
<tr>
<td>05 00 36+</td>
<td>LMP  YOUR SIDE?</td>
</tr>
<tr>
<td>05 00 36+</td>
<td>CDR  THE ROCK THAT GENE PICKED UP - EARLY - RIGHT AT THE START, IS IN A CORE TUBE SLOT IN THE SRC 1.</td>
</tr>
</tbody>
</table>

70018 51.58 GLASS FRAGMENT
At the Sacrifice of Fly

Houston, The Basic Drill-Carved Rocks

Type in the Area Looks Very Much Like the Cristobalite Gabbros of the Six Million Year Old Basalt Suite. The Coarse-Grained Clinopyroxene Plagioclase Rocks...

Houston, I’ve Seen an Awful Lot of Rocks, as I Worked Here. They Look Just Like Those Pyroxene Gabbros That I Mentioned. The Pyroxene’s Iridescence in the Bright Sun. The Grain Size Mean is 2 Millimeters with Max Maybe Up at 3 or 4, and it Looks Like Predominantly a Pyroxene Plagioclase Rock - Clinopyroxene, but I Haven’t Looked at It Real Closely.

Proposed Rock Sample

Just Behind the LM in That Fairly Fresh Crater, I Picked Up an Example of the Kind of Gabbro I Was Talking About. And I’ll Stick It in the Big Bag, Except the Big Bag Has Disappeared.

Just Behind the LM in that Fairly Fresh Crater, I Picked Up an Example of the Kind of Gabbro I Was Talking About. And I’ll Stick It in the Big Bag, Except the Big Bag Has Disappeared.

Drilling Heat Flow Holes

And Geno, You’re Leaning Pretty Heavy Forward on That Drill. She’s Going in Like She’s in Some Pretty Dead Stuff, and Then I Hit Some Rock Here.

It Sounds to Me Like She’s Chipping Away Through Rock. May Be Just a Little Longer Drilling Hole Than It Was at the Cape.

Bob, She’s Going in - But Not Without a Little Bit of Resistance.

Every Once in a While, She Breaks Through a Soft Spot.

It’s Obvious That I’m Going Through Some Pretty Tough Stuff, Consolidated Material, Like Rock Fragments, and Then It Breaks Through; and Then It Jumps for About 3 or 4 Inches and Then I Hit Some More Fragments.

Bob, I Occasionally Hit Stuff and It Spits This Whole Drill Back at Me. Knocks It Back About a Half an Inch or So, and Then It Will Bite Through It.

My General Impression is That There is an Awful Lot of Fragments I’m Busting Up Down There.

That Last 6 Inches, I Really Came Into Something Hard; but It’s Down All the Way.
COOS- REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ELAPSED TIMES, AND EXCERPTS FROM THE AIR-TO-GROUND TRANSCRIPT

SAMPLE WEIGHT SAMPLE TYPE LUNAR-SURFACE PHOTOGRAPHS ART CREW COMMENTS
NUMBER (G) LOCATION

EVA 1 - STATION: ALSEP

70001 [BIT] 29.78 DEEP CORE 136-20720 XBA 04 21 38+ CDR OK, I'M GOING TO GO BEHIND A ROCK OVER THERE IN THAT DEPRESSION. BOB, YOU WANT THE CORE IN A DEPRESSION, RIGHT?
04 21 38+ CC THAT'S AFFIRMATIVE, GENO.

70002 207.8
70003 244.07
70004 238.8
70005 240.7
70006 234.2
70007 179.4
70008 261.0
70009 143.3
(TOP)

04 21 42+ CDR IT'S A SHALLOW ONE. IF I GO OVER THERE, I'LL NOT BE SHIELDED, JACK.
04 21 42+ LMP NO, THAT'S GOOD. GET IN THE MIDDLE. GET IT IN THAT PLACE.

04 21 42+ LMP IT'S ONLY ABOUT A 4-INCH DEPRESSION.

04 22 03 14 CDR BOB, WOULD YOU SETTLE FOR ABOUT 8 INCHES OUT OF THE GROUND? IT'S ABOUT AS LOW AS I CAN GET.
04 22 03+ CDR I'M WITHIN AN INCH OF THE WHITE STRIPES.
04 22 03+ CDR AN INCH OF THE WHITE STRIPES, BOB.
04 22 03+ LMP I WAS ABLE TO PULL THE CORE OUT WITH THE DRILL, ABOUT 3 INCHES, AND IT'S ALL JACKING MATERIAL FROM THERE OUT.

04 22 03+ CDR I'M GOING TO PUT IT RIGHT IN THE MIDDLE OF THAT. GET IT IN THAT PLACE.
04 22 07 43 LMP WHERE DO YOU WANT THE FOCUS ON THE PARASOL TO BE?

04 22 07+ CDR ABOUT 15 FEET?
04 22 07+ CDR THAT'S STRANGE, THAT PLUG WAS TOO SMALL FOR THE CORE.

04 22 07+ CDR I KNEW THAT PLUG WAS TWO-THIRDS OF THE WAY DOWN THE RAMMER, AND IT HIT SOLID PAYDIRT.
04 22 07+ CDR I'LL PUT A CAP ON IT FOR YOU, TOO.

04 22 11+ CDR THAT'S CAP ALPHA THAT'S ON THE CORE.

04 22 11+ CDR MAN, IT DIDN'T FEEL LIKE THIS STUFF WAS THAT HARD.
04 22 11+ CDR SEE IF I CAN GET IT OUT. I MAY BE JACKING THE TREASURY DOWN INTO THE SURFACE.

04 22 15+ CDR COME ON BABY, I'M GOING TO GET THIS THING OUT, NOW THAT I GOT IT.
04 22 15+ CDR I HOPE THIS CORE IS APPRECIATED.
04 22 15+ CDR MAN, I DON'T KNOW WHAT IT IS.
04 22 15+ LMP I WAS AFRAID THAT WOULD HAPPEN - WITH ALL THOSE ROCKS.

04 22 15+ CDR YES, BUT IT DIDN'T GO IN THAT HARD.
CDR: I've got a delicate core in my hand, and I'm trying
to get some core care in the core. You'd be glad
to know it's full, Bob, and never I'm the only
cut to try the bottom end right now. I'm going to
tell you, it looks like what I'm walking on, but
it's certainly not a puppy. It's obviously very
conservative. The bottom of the core is not smooth.
It's a very jagged, and fragmental-like.

CDR: The core is filled to within an eighth or
certainly less than a quarter of an inch from
the bit.

CDR: It's got Bravo on and the plug has been discarded.

CDR: Charlie is opposite Alpha, that was the first
3-section.

CDR: I can't see what it is — I think Delta and Echo
is the 2-section core. Delta being adjacent to
the first section of 3.

CDR: The last one is Foxtrot, and it's on tight.

CDR: Okay, Bob, I'm breaking down the core at the tail
end of the rover, here.

CC: Okay, congratulations.

CDR: Well, don't do it yet, I haven't gotten it broken
down yet, but I got it out of the ground with a
little help.

CDR: Okay, first piece of three sections - Bob, it's
full.

CC: Okay, beautiful.

CDR: And I have to tell you which end I'm taking it
from. I don't remember which end I've got here.

CC: That's all right, since we got the Cap and Alpha on
cap end and Bravo on the other end — Bravo.

CDR: Man! There's a cap that's going to be tough to get
on. I put that on with a hammer. Oh boy.

CDR: Hey, Bob, Cap Charlie is opposite Alpha, that was
the first 3-section.

CDR: Okay, Bob — I can't see what it is — I think Delta
and Echo is the — the 2-section core. Delta being
adjacent to the first section of 3.

CC: Roger, Capt. Gene.

CDR: Okay, baby, just go on there — nice. The last —
the last one is Foxtrot. And it's on tight.

CDR: Bob, did I give you the last cap?

CC: They're okay, Gene. We don't really need it — the
way they're broken down, there's no problem. The
323 stands out and the Bravo on the bit end —
there's no problem there.
04 21 02+ LMP AS I WAS SAYING, BOB, ALL THESE BIG BLOCKS THAT
I'VE LOOKED AT LOOK LIKE THE GABBRIC ROCK THAT
I WAS TALKING ABOUT - POSSIBLY UPWARDS OF 50­
PERCENT PLAGIOCLASE RATHER THAN 30 LIKE THE HARE -
BUT AN INTERMEDIATE GABBRIC OF SOME KIND. AND ONE
BIG BLOCK THERE HAD VERY SHARPLY DEFINED - PARALLEL
PARTING PLANES. I THINK THERE IS A FOLIATION OF
MINERALS THAT PARALLEL THAT PARTING, BUT I'LL
HAVE TO CHECK IT OUT.

04 21 06+ LMP THOSE PARTING PLANES GO THROUGH THE WHOLE BOULDER
ON THE ORDER OF AT LEAST 3 METERS LONG IN OUTCROP.

04 22 24+ LMP BAG 10 ECHO IS A SAMPLE OF A VERY LARGE BOULDER
THAT'S JUST BEYOND GEOPHONE 3. JUST WEST - JUST
SOUTH.

04 22 31+ LMP I’VE SEEN HERE AND OVER AT THE BIG ROCK - THE GROBIC
ROCK - THAT THE LAYERING OR THE FOLLATION
OR THE PARTING, EVER I'VE SEEN IT, IS THE RESULT OF
VARIATIONS IN VESICLE CONCENTRATIONS. THE SAMPLE
TO ECHO IS A SAMPLE OF THE MORE COARSELY VESICULAR
ROCK. I COULD NOT GET ONE OF THE FINER - MORE
FINELY OR NONVESICULAR FRAGMENTS. BUT I GOT
PICTURES OF IT.

04 22 31+ CC CAN YOU SEE ANY EVIDENCE OF SOIL ON TOP OF SOME OF
THOSE MEDIUM-SIZED BOULDERS?

04 22 31+ LMP THERE'S SOIL. A LITTLE BIT OF DUST IN SOME OF THE
HOLES. NOT THERE'S NOT ENOUGH TO SAMPLE AT THIS
POINT. I MAY FIND SOME LATER.

04 22 31+ LMP VESICLE WALLS DO NOT SEEM TO BE AS SHINY. MOST OF
THEM SEEM TO HAVE JUST IN THEM.

04 22 31+ LMP THE VESICLES ARE NOT CLEARLY SPHERICAL - THEY'RE
SPHERICAL BUT THEY HAVE FAIRLY ROUGH OUTLINES.

04 22 44 LMP RIGHT NOW, 10 ECHO IS IN MY SUIT POCKET, I HOPE.
BAG 474 136-20718 OSA 04 22 35+ LMP BAG 174 - 474, 474, SOIL NEXT TO THIS BIG ROCK, IT'S THE FILLET. I CAN'T GET A CLUE OF THE ROCK.
CC COFT; 174, FILLET BEHIND THE BIG ROCK AND, JACK, WILL YOU COMING BACK HERE TO THE ROVER, WHY DON'T YOU GET ONE MORE ROVER SAMPLE IN THE VICINITY OF THE DEEP DRILL, UNTIL YOU AND GENE GET READY TO TAKE ON THE CORE STRIPS. ...

BAG 475

LMP OKAY, YOU WANT ME TO GET A - YOU WANT TO BREAK THAT RESERVE FINES 136-20720 LOC AND I'LL GO GET THIS ANAL, GENE.
CC I'LL - I'LL BREAK THIS JACK; NO SWEAT.
LMP GENE HAS PRETTY WELL CHEWED UP THE GROUND. I HELPED HIM. DO YOU WANT ME TO GET A LITTLE MANNY AWAY FROM IT?
CC STAND BY. I DON'T THINK WE'RE INTERESTED IN A SURFACE SAMPLE IN THE LAST YOU GET LITTLE BY I THINK, IT'S JUST A SITE - JUST A SURFACE SAMPLE, STAND BY 1.
CC ANYTHING THERE IN THE DIRT, JACK. IT DOESN'T HAVE TO BE A SKIN SAMPLE OF ANY SORT.

04 22 35+ LMP THERE'S A MIXTURE OF SOIL AND A ROCK IN 475, THE SOIL CAME FROM ABOUT 0 TO 5 CENTIMETERS, AND IT'S ABOUT 3 METERS FROM THE HOLE.

04 22 35+ LMP IT'S ABOUT 3 METERS FROM THE HOLE. I GOT STEREO BEFORE AT 11 FEET ONE AFTER AT 11 FEET.

BAG 478 70160 315.6 FILL ET SOIL 136-20718 OSA 04 22 35+ LMP BAG 174 - 474, 474, SOIL FROM NEXT TO THIS BIG ROCK, IT'S THE FILLET. I CAN'T GET A CLUE OF THE ROCK.
CC COFT; 174, FILLET BEHIND THE BIG ROCK AND, JACK, WILL YOU COMING BACK HERE TO THE ROVER, WHY DON'T YOU GET ONE MORE ROVER SAMPLE IN THE VICINITY OF THE DEEP DRILL, UNTIL YOU AND GENE GET READY TO TAKE ON THE CORE STRIPS. ...

BAG 475 70180 93.2 RESERVE FINES 136-20720 LOC 1 157.1 1 MM FINES 136-20721 RSA 2 4.63 1-2 3 3.12 2-4 4 1.69 4-10 70185 466.6 ROCK

LMP OKAY, YOU WANT ME TO GET A - YOU WANT TO BREAK THAT RESERVE FINES 136-20720 LOC AND I'LL GO GET THIS ANAL, GENE.
CC I'LL - I'LL BREAK THIS JACK; NO SWEAT.
LMP GENE HAS PRETTY WELL CHEWED UP THE GROUND. I HELPED HIM. DO YOU WANT ME TO GET A LITTLE MANNY AWAY FROM IT?
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BAG 478

LMP WE'RE ABOUT 15 METERS FROM A 20-METER BLOCKY RIMMED CRATER. IT'S ABOUT 3 TO 4 METERS DEEP. ALL THE BLOCKS ON THE RIM LOOK LIKE THE PYroxene, Plagioclase GABBRO - THE VESELAR ROCKS SEEN AT THE LH, AT LEAST ALL THAT I'VE SEEN SO FAR.

04 23 25+ LMP WE'RE ABOUT 15 METERS FROM A 20-METER BLOCKY RIMMED CRATER. IT'S ABOUT 3 TO 4 METERS DEEP. ALL THE BLOCKS ON THE RIM LOOK LIKE THE PYroxene, Plagioclase GABBRO - THE VESELAR ROCKS SEEN AT THE LH, AT LEAST ALL THAT I'VE SEEN SO FAR.

04 23 25+ LMP I'LL CHECK THE BLOCKS ON THE RIM TO SEE IF IT'S A 20-METER BLOCKY RIMMED CRATER.

04 23 27 01 LMP IT'S TO THE NORTHWEST OF THE ROVER.

04 23 27+ LMP THE VESELAR POPULATION VARIES FROM ABOUT A MILLIMETER TO 1 CENTIMETER. IT FORMS ABOUT 15 PERCENT OF THE ROCK - 15 TO 15. AND I'VE GIVEN YOU GRAIN SIZE FOR THE ROCKS NEAR THE LH AND THAT GOES WELL FOR THIS ONE.

04 23 27+ LMP THERE IS - THE PARTING THAT I MENTIONED, STILL OF SOMEWHAT UNKNOWN ORIGIN, AND WE'LL TRY AND GET A SAMPLE ALONG A PARTING PLANE. IT'S CLEARLY EVIDENT IN ONE OF THE BIGGER BLOCKS.
BAG 476 71030 (313.4) CHIPS OF VESICULAR
1 134-20394 XSB BASED AND SOIL
2 134-20395 XSB BASED AND SOIL
3 136-20739 XSB BASED AND SOIL
4 136-20740 LOC BASED AND SOIL

EVA 1 - STATION: 1A

CDR OK, YOU GOT ONE PICKED OUT?

LMP YES, LET'S HIT THIS - SEE IF WE CAN WORK ON THAT ONE, IT'S AT THE EDGE, BUT WE CAN CHIP AT THE PARTING PLANES, AND THAT'S ONE OF THE THINGS THAT'S COME UP THAT I THINK IS OF INTEREST THAT WE'VE GOT TO FIGURE OUT WHY THEY HAVE THAT BASED AND SOIL.

CDR BOY, THAT ROCK IS ONE OF THE MORE VESICULAR ONES I'VE SEEN AROUND.

LMP - - THAT'S THE DOWN-SUN. OK, RIGHT INTO THE SOUTH.

LMP RIGHT AT THAT OVERLAPPING FRACTURE, HUH?

CDR YES.

LMP LET ME GET WHERE I CAN MIGHTY IT THE ROCK.

CDR I'M GOING TO TRY AND GET IT RIGHT UP ON TOP IS WHERE I'D LIKE TO -

LMP IF YOU HIT IT ON THE RIGHT SIDE, IT'LL GO THIS WAY, MAYBE. THERE YOU GO.

CDR PIECE RIGHT THERE.

LMP THAT'S THE DOWN-SUN. OK, RIGHT INTO THE SUN.

CDR RIGHT AT THAT OVERLAPPING FRACTURE, HUH?

CDR YES.

LMP LET ME GET WHERE I CAN MIGHTY IT THE ROCK.

CDR I'M GOING TO TRY AND GET IT RIGHT UP ON TOP IS WHERE I'D LIKE TO -

LMP IF YOU HIT IT ON THE RIGHT SIDE, IT'LL GO THIS WAY, MAYBE. THERE YOU GO.

CDR PIECE RIGHT THERE.

LMP I CAN GET ANOTHER ONE, TOO. TRY ANOTHER ONE; DON'T LOSE THAT ONE.

CDR LET ME GET THAT ONE FOR YOU.

LMP I CAN GET IT.

CDR GOT IT? WHOOPS. CAN YOU KEEP IT IN SIGHT HERE FOR A MINUTE? IS THAT IT?

CDR IT'S COMING.

LMP YES, GO AHEAD. TRY HITTING - THOSE YOU GO. CAN YOU USE THE OTHER END AGAINST THE RIGHT SIDE OF THE ROCK?

CDR IT'S COMING.

LMP THAT'S ALL RIGHT.

CDR I'LL GET THAT ONE, WAIT A MINUTE.

LMP BE CAREFUL DOWN IN THERE.

CDR THE WHOLE THING IS GOING TO FRACTURE OFF HERE, IN A MINUTE.

CDR IT'S TRYING TO FALL.

LMP DON'T WEAR YOUR HAIR OUT. THAT'S GOOD GENE.

CDR WAIT A MINUTE. LET ME GIVE ONE MORE WHACK. THE WHOLE THING IS - NO, THAT'S TOO TIGHT. LET ME GET THAT OTHER PIECE -
04 23 32 21 LMP BAG 476 IS THE ROCK SAMPLE WITH A LITTLE BIT OF THE SOIL NEAR IT - WITH A CHIP OFF THE ROCK, WATCH IT, GENE.

04 23 32+ CDR HERE'S YOUR OTHER CHIP. IF I GO DOWN THERE, THAT THING IS ABOUT 15 FEET DEEP.

04 23 32+ LMP RIGHT. GOT IT.

04 23 32+ LMP NOW, DO YOU THINK YOU CAN CHIP OFF THE OTHER SIDE OF THAT PLANE, UP ON THE EIGHT?

04 23 32+ CDR YES.

04 23 32+ LMP THEN WE'LL GET THE SOIL, AND MAYBE JUST A SMALL ROCK, ONE NONCHIPPED.

04 23 32+ LMP IT'S FROM THE SOUTHEAST SIDE OF THE PARTING PLANE.

RAG 454
71050  4.0 RESIDUE FINES   SAME AS
71055  669.6 BASALT   BAG 476

04 23 32+ CDR THERE IT IS - A WHOLE BIG SLAB, RIGHT THERE.

04 23 32+ CDR OR, LOOK AT THOSE DARK MINERALS IN THERE. ARE THOSE DARK BLACK?

04 23 32+ LMP YES, THEY MAY BE ILMENITE OR FRESH PYROXENE. WE'LL LOOK AT IT. GIVES THE IMPRESSION OF PYROXENE.

04 23 32+ CDR OK, YOU WANT MY BAG? I TELL YOU, IF YOU WORK ON ANY KIND OF SLOPE, LIKE THIS LITTLE CRATER - OK, IT'S GOING TO LEAVE IT OPEN FOR A MINUTE.

04 23 32+ CDR WHILE WE GET THAT ONE.

04 23 32+ LMP YOU'RE GOING TO HAVE TO USE YOUR TONGS ON THAT ONE, I THINK.

04 23 32+ LMP I GOT IT.

04 23 32+ CDR HERE'S A BIG ONE. GET HIM THE BAG NUMBER, TOO.

04 23 34 27 LMP BAG 454. OK, AND THE FLASHES ARE FROM INSIDE OF VESICULAR RECRYSTALLIZED VESICLES. THEY LOOK LIKE PYROXENE FLASHES. THEY COULD BE ILMENITE.

04 23 34+ CDR I'LL GET MY AFTER PICTURE.

04 23 34+ LMP AND LET ME GET IN THERE AND GET SOME SOIL.

04 23 34+ CDR OK, LET'S GET IT FIRST.

04 23 34+ LMP FROM THE NORTH SIDE. THE BAG TORE AROUND THAT; IT'S PRETTY JAGGED ROCK, BUT I THINK IT'LL HOLD.

04 23 34+ LMP IT'S IN GENE'S SAMPLE COLLECTION BAG...

RAG 455
71040  (283.0) SOIL   SAME AS
71040  (584.2) SOIL   BAG 476

04 23 35 53 CDR THAT'S BAG 456, BOB.

04 23 35+ CDR TURN AROUND AND LET ME HELP YOU GET THESE IN YOUR BAG.

04 23 35+ LMP YES, LET'S - GET YOUR AFTER -
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ELAPSED TIMES, AND EXCERPTS FROM THE AIR-TO-GROUND TRANSCRIPT

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<td>BAG 477</td>
<td>134-20397 XSB</td>
<td>VESICULAR</td>
<td>04 23 35+ CDR</td>
<td>HEY, LOOK AT THIS ROCK, WHERE THE VESICULARITY CHANGES FROM A HUMDOCKY VESICULARITY TO A VERY FINE VESICULAR. LOOK AT THIS. LET ME TRY AND CRACK; SEE THAT? THE CHANGE?</td>
</tr>
<tr>
<td>71130 (205.8)</td>
<td>134-20393 XSB</td>
<td>BASALT CHIPS</td>
<td>04 23 35+ CDR</td>
<td>YES, THAT'S WHAT I'VE AFTER; THAT'S IT.</td>
</tr>
<tr>
<td>6</td>
<td>134-20741 SE</td>
<td>BASALT CHIPS</td>
<td>04 23 35+ CDR</td>
<td>LET'S SEE IF I CAN'T CRACK THE CORNER AND GET THAT CONTACT.</td>
</tr>
<tr>
<td></td>
<td>134-20400 LOC</td>
<td></td>
<td>04 23 35+ CDR</td>
<td>GET, IF YOU CAN REACH DOWN THERE.</td>
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04 23 35+ LMP | YES. AND GET A PIECE OF BOTH - THINK YOU CAN GET IT? |
04 23 35+ CC | DO YOU GUYS SEE ANY 2-METER BOULDERS AROUND THERE? |
04 23 35+ LMP | WE JUST SAMPLED ONE. |
04 23 35+ LMP | WE'RE NOT SURE WHERE WE ARE. WE'RE NOT SURE WHERE WE ARE. GENE, CAN YOU GET DOWN INTO THAT? NEED SOME HELP? |
04 23 35+ CDR | YES, JUST - GIVE ME THE SHOVEL TO HOLD MYSELF WITH. |

04 23 38 59 CDR | OKAY, THIS IS A SAMPLE OF THE MORE COARSELY VESICULAR ROCK. |
04 23 39+ LMP | YOU GOT IT IN YOUR HAND? |
04 23 39+ CDR | OK, I GOT BOTH OF THESE. I THINK, ACTUALLY, WE GOT A SAMPLE OF BOTH SIDES; BUT I WOULDN'T BET ON IT. |
04 23 39+ LMP | OK, I JUST GOT A CHUKE OF THAT SIDE. |
04 23 39+ CDR | OK, I GOT BOTH OF THESE. |
04 23 39+ LMP | SEE THAT ROCK RIGHT OVER THERE ON THE LITTLE MOUND, JUST PROJECING OUT OF THE EDGE OF IT? |
04 23 39+ LMP | THERE YOU GO; YOU JUST ABOUT TOUCHED IT. RIGHT THERE, THAT PIECE.
Cdr: OK, let's get these in a bag here.

Lmp: Well, I'll get that piece; and that's the samples from either side of the contact anyway. Can you get a bag --

Cdr: They're pretty small.

Lmp: Give me a hammer, and get a bag and I'll --

Cdr: I got these in my hand I want to put there.

Lmp: Bag 477 is the -- coarsely vesicular rock.

Cdr: Are two of these there? I hope two of them fell in.

Lmp: No, I only got one.

Cdr: Oh; here's that other one. It bag to fall right here.

Lmp: How you're full of dirt in the scoop; you just covered it up.

Cdr: Got it; I got it.

Lmp: Here, put it is here with the gift. That's good.

Cdr: A little dirt never hurt anybody.

Lmp: Yes, I think you got it.

Lmp: OK; I'm going to take a closeup stereo on that contact.

Lmp: In bag 478 is the chip from the more finely vesicular rock. Both of them are coarse. It's a small chip; but it'll tell the story, I think.

Cdr: I'll go ahead and get a closeup stereo --

Lmp: Get a closeup, and I'll get the rake. I'll get started on the rake.

Cdr: I'll get it.

Lmp: As you come back.

Lmp: I can bag it for you, Geno.

Cdr: That's all right. I want to get this closeup here.

Lmp: In bag 478 is the chip from the more finely vesicular rock. Both of them are coarse. It's a small chip; but it'll tell the story, I think.

Cdr: I'll go ahead and get a closeup stereo --

Lmp: Get a closeup, and I'll get the rake. I'll get started on the rake.

Cdr: I'll get it.

Lmp: As you come back.

Lmp: I can bag it for you, Geno.

Cdr: That's all right. I want to get this closeup here.

Lmp: OK; I've moved about 5 to 6 meters northeast of the rover. And -- as soon as Geno gets here with the crown --

Lmp: I've got a sample that was laying next to that boulder. I did not get an after picture of it, but as I was taking my closeup pictures, it -- is on my side of the boulder just 4 or 5 inches, covered with the dark mantle.

Cdr: I think we probably disturbed that one. It'll probably show up in the before.

Lmp: That's in bag 479.
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ELAPSED TIMES, AND EXCERPTS FROM THE AIR-TO-GROUND TRANSCRIPT

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EVA 1 = STATION: 1A

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BAG 457 & 458

71520* (2267.3) RAKE FRAGMENTS  04 23 43+ LMP LET'S RAKE RIGHT OUT THERE.

1 134-20403- LMP WHAT AREA ARE YOU GOING TO RAKE?

2 134-20407 SEB 04 23 43+ LMP AHEAD OF THE Gnomon AND TO YOUR LEFT, THERE.

OR 23 43+ CC I ALSO GATHERED THAT MOST OF THE ROCKS LOOK PRETTY SUCH THE SAME.

3 136-20762 LOC 04 23 43+ LMP THAT'S WHAT I SAID.

4 136-20763 DS 04 23 43+ CREW YES, EXCEPT A CHANGE IN VESICULARITY --

71525* 04 23 46+ LMP I'M ONLY PENETRATING ABOUT, AT THE MOST, 3 CENTIMETERS INTO THIS AREA WITH THE RAKE. I'VE PICKED UP A VERY GOOD SAMPLE OF BOULDERS BUT MOST OF THEM WERE IN THAT DISTANCE OF THE SURFACE AND PROJECTING OUT OF IT.

71535* 04 23 46+ CREW A COUPLE OF MORE JACK. OK, COMING AT YOU. BOB, THE PAN IS COMPLETE.

71545* 04 23 46+ LMP OK, THAT'S GOOD. THAT'S GOOD. OK.

71555* 04 23 46+ CREW OK, IN BAG 458 IS THE REST OF THE RAKE SAMPLE. THEY'RE ALL FRAGMENTS.
ALL THE FRAGMENTS, OF COURSE ARE COMPLETELY COVERED WITH - THE MANTLE; AND THEY ARE SLIGHTLY - OK, MAYBE 20 PERCENT VESICULAR. I JUST TOOK A GLANCE AT THEM. BUT, FOR THE MOST PART, THEY APPEAR TO BE HIGGED AND SUBMORPHOLOGICAL FRAGMENTS.

I JUST TOOK A GLANCE AT THEM. BUT, FOR THE MOST PART, THEY APPEAR TO BE ROUNDED AND SUBMORPHOLOGICAL FRAGMENTS.

HEY, I GOT A FOOTBALL-SIZE ROCK OF THIS COARSLY VESICULAR GABBRO. IT'S OFF A LARGE 3- TO 4-METER BURIED BOULDER NORTHWEST OF THE LR ABOUT 30 METERS. UNDOCUMENTED, IT'S ROUGHLY TABULAR - 15 BY 25 CENTIMETERS AND ABOUT 5 TO 7 CENTIMETERS THICK. ONE FACE IS VERY FLAT; LOOKS LIKE IT WAS OFF OF A PARTING PLANE, WHICH WERE IN THAT ROCK. OK, AND IF IT FITS IN THE SRC WITH ALL THE OTHER SAMPLES, YOU MIGHT PUT IT THERE BECAUSE THE SRC'S GOING TO BE KIND OF EMPTY.

WELL, IT WAS PRETTY BIG. IT'S IN THE BIG BAG NOW.
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ELAPSED TIMES,
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05 05 24+ LMP JOE, I JUST TOOK A QUICK LOOK WITH THE HAND LENS AT THAT LARGE ROCK I BROUGHT IN, AND I DON'T THINK THERE'S MUCH MORE THAN 10 PERCENT PLAGIOCLASE. I'LL GO BACK - COULD BE SOME OF A STANDARD BASALT OR GABBO. IT HAS A FAIR PROPORTION OF ILMENITE IN IT, I BELIEVE. THERE'S A BRIGHT PLATELETS - IN THE VUGS OR VESICLES - OF ILMENITE. HOW IT COULD BE THAT THE GLASS - IF THE SOIL IS VERY GLASSY, THAT IT'S DEVELOPED THE DARKER COLOR FROM THE CONTRIBUTION OF THE BASIC MINERALS THROUGH THE GLASS, PARTICULARLY THE IRON AND THE TITANIUM.

05 05 24+ LMP ALL IT MEANS IS THAT WE DON'T YET KNOW THE ORIGIN OF THE DARK HANTEL.

05 05 29+ LMP I MENTIONED WHEN I SAMPLED IT, IT HAD ONE VERY... PLANAR SURFACE, AND LOOKING AT IT MORE CLOSELY, IT LOOKS LIKE ONE OF THOSE PARTING PLANS THAT I TALKED ABOUT EARLIER IN THE EVA.

05 15 46 26 LMP BOB, I THINK, BASED ON WHAT I SAW YESTERDAY, THAT THE CHANCES ARE PRETTY GOOD THAT ALL THE BIG BLOCKS OUT HERE IN THE DARK HANTEL AREA WILL BE PRETTY MUCH THE GABBROS. BY THE WAY, I LOOKED AT THAT WITH A HAND LENS LAST NIGHT, AND I DON'T KNOW THAT YOU GOT THE REPORT, AND I'M BACK TO SAYING THAT IT'S PROBABLY CLOSER TO 30 - 40 PERCENT PLAGIOCLASE. IT'S A GOOD GABBRO, A FINAL PYROXENE GABBRO, AND IT APPARENTLY HAS A FAIR AMOUNT OF ILMENITE IN IT. THERE'S SOME BRIGHT SHINY FLAKES WITHIN THE VUGS AND SOME DARK MINERALS IN THE MATRIX THAT ARE PROBABLY ILMENITE, AND ONE OTHER ADDITIONAL POSSIBILITY THEN, IS THAT THE DARK GLASS - DARKER THAN USUAL, BECAUSE OF THE IRON AND THE TITANIUM IN THE ROCK ITSELF.
EVA 1
SAMPLE STORAGE

05 00 36+ CC LET'S PUT ALL THE STUFF IN THAT BAG, JACK - BOTH THE STUFF THAT'S IN YOURS AND THE STUFF THAT'S IN GENE'S.

05 00 36+ LMP OK... - TWO SAMPLES FROM UNDER THE LMP'S SEAT.

05 00 36+ LMP I'VE GOT TO PUT YOUR - THOSE SAMPLES IN THE SRC, IN YOUR BAG; AND WE'LL SAVE THIS ONE, I GUESS.

05 00 36+ CDR OK, YOU'RE FILLING WHICH BAG.

05 00 36+ LMP PUTTING THEM IN THE BAG THAT GOES INTO THE SRC - THAT'S SRC 1.

05 00 36+ CDR OK; LET'S SEE, OFF LOAD LM - ... - CORE CAP DISPENSE TOOLS. OKAY, AS SOON AS YOU GET THAT, I'LL TAKE THAT SRC 1 FROM YOU, AND I'LL CLOSE THE SRC 1.

05 00 36+ CDR I GATHER YOU DIDN'T HAVE ANY ROVER SAMPLES TODAY, DID YOU, JACK?

05 00 36+ LMP NO, I HAVE ONE SAMPLE BAG IN MY POCKET THAT HAS A ROCK IN IT.

05 00 36+ LMP OK, GENE, WHERE'S THAT - YOU WANT TO PUT THAT LITTLE ROCK?

05 00 36+ CDR YES, IS IT THERE?

05 00 36+ LMP WELL, WHAT DID YOU DO WITH IT?

05 00 36+ CDR IT WAS ON THE FLOOR ON MY SIDE.

05 00 36+ LMP YOUR SIDE?

05 00 36+ CDR THERE IT IS; LET ME GET IT.

05 00 36+ LMP WE CAN PUT THAT IN ONE OF THE CORE TUBE SLOTS HERE.

05 00 43+ LMP THE ROCK THAT GENE PICKED UP - EARLY - RIGHT AT THE START, IS IN A CORE TUBE SLOT IN THE SRC 1.

05 00 43+ LMP THAT'S ALMOST FULL OF SAMPLES, AND I THINK THAT BIG ROCK PROBABLY WOULDN'T FIT IN THERE.

05 00 43+ CC OH, THEN WE'LL PUT THAT IN THE BIG BAG.

05 00 43+ LMP IT'S IN THE BIG BAG.

05 00 43+ CC GIVE ME YOUR CONSIDERATION ON THAT QUESTION OF BRINGING BACK THE BIG BAG INTO THE CABIN.

05 00 47+ LMP I'D LIKE TO DO THAT - LOOK AT THAT ROCK WITH A HAND LENS.

05 00 47+ CC DO YOU THINK IT'LL GO IN THE SRC NUMBER 2?

05 00 47+ LMP WHAT WOULD - THE ROCK?

05 00 47+ CC YES, THAT'S RIGHT.

05 00 47+ LMP WELL, IT'LL GO IN THERE. IT'S NOT THAT BIG.

05 00 47+ CC WHY DON'T YOU PUT IT IN SRC 2 AND LEAVE THAT IN, INSTEAD. LEAVE SRC OUT; AND THEN WE'LL JUST LEAVE SRC 2 IN FOREVER.

05 00 47+ LMP OK.
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EVA 1 - STATION: LM

05 00 56+ CC SCB 2 FOR THE BIG ROCK THERE, JACK.
05 00 56+ LMF I GOT IT. THAT'S A BIG ROCK. LMF,(70035).
LMF OKAY, THERE SHOULD BE ANOTHER ONE IN THERE. IS
There? FEEL IT, SQUEEZE IT, HIT IT.
LMF ... THE BOX, SEE IF THERE'S ANY IN THERE.
LMF ... OK.
LMF WELL, LET'S LEAVE IT. LET'S GET OUT. HERE,
PICK IT UP. WE'LL GET IT OUT.
LMF HOLD THE TOP.

05 01 00 39 LMF SHAKE IT. WELL, I THOUGHT THERE WAS ONE IN THERE.
LMF I DON'T THINK THERE'S ANYTHING IN THERE.
LMF I THOUGHT I PUT ONE IN THERE. (LR?2)
LMF OK.
LMF WELL, I GUESS NOT. IF I DID, IT'S GOTTEN OUT.
LMF OR, GET AWAY.

05 01 01+ LMF CAN YOU GET THE CORE STEM BAG?
LMF YES, I'LL GET IT FOR YOU.
LMF OR, YOU GOT A CORE STEM BAG?
LMF YES, LET HE GIVE IT ONE ZAP WITH THE BRUSH.
LMF OK. I DIDN'T MEAN TO DROP THAT, BUT I DID.

LMF OK, CORE STEM BAG, SRC 2 (SCB 2) ... SRC 1 IS IN SRC 1. ... IT'S THERE. BIG BAG IS NOT
REQUARED. OK, ANY MORE ROCK UP THERE? IF NOT, WHO DID?

05 02 35 LMF JOE, BAG - COLLECTION BAG 2 IS 16. (POUNDS)
LMF THANK YOU.
LMF AND THE SRC IS 32 POUNDS.

END OF EVA 1

EVA 2 - STATION: SEP

05 18 44 LMF I HAD TO RELEARN HOW TO DOCUMENT SAMPLES, BOB. I
JUST HAVE. THE FIRST PART OF MY ROLL WILL HAVE
A LOT OF RANDOM EXPOSURES AND FOCUSES.
LMF AND WHILE I'M WAITING FOR GENE, GETTING A
ROCK - IT LOOKS A LITTLE FINE GRAINED I
THE OTHERS WE'VE SEEN, IN THE LRV SAHPLER,
ALONG WITH SOME SOIL, AND THAT'S IN BAG 22E.
IT HAS THE STERO DOCUMENTATION AND A LOCATOR
TO THE LL, AND IT'S ABOUT 2 METERS FROM THE SEP.

BAG 22E BASEALT, WITH
70250* SOIL
70255* LOC

135-20533-
135-20537 XS
135-20538 LOC

05 18 44 LMF AND WHILE I'M WAITING FOR GENE, GETTING A
ROCK - IT LOOKS A LITTLE FINE GRAINED THAN
THE OTHERS WE'VE SEEN, IN THE LRV SAHPLER,
ALONG WITH SOME SOIL, AND THAT'S IN BAG 22E.
IT HAS THE STERO DOCUMENTATION AND A LOCATOR
TO THE LL, AND IT'S ABOUT 2 METERS FROM THE SEP.
BMG 23E  
ROCK  
135-20539 XSB  
05 18 48 24  
LMP  
23 EOG, IF THAT FOLLOWED IN SEQUENCE, IS ANOTHER ROCK NEAR THE SEP DOCUMENTED IN THE SAME WAY.

70270*  
135-20540 XSB  
LOC

GEOLoGIC  
DESCRIPTION  
FROM EVA 1, BEARING  
ON THE ABOVE  
SAMPLES.

04 23 03+  
LMP  
EVERYTHING I'VE SEEN SO FAR INDICATES THAT THE SO-CALLED SUBFLOOR BOULDERS, IF WE HAVE GOTTEN THAT DEEP, ARE THIS GABBRO. I'LL OBTAIN HERE AT THE SEP SITE, AND THE LARGE BLOCKS ARE STILL THE FLAMMOCpLAE PYROXENE - -

70275*  
135-20541 LOC

GEOLoGIC  
DESCRIPTION  
ON THE ABOVE  
SAMPLES.

04 23 06+  
LMP  
THE ZAP PITs ARE NICE WHITE HALOS, ALTHOUGH, FOR THE MOST PART, THE ROCK'S TOO COARSE TO SHOW THEM VERY WELL, SOME OF THE LARGER ONES HAVE WHITE HALOS. WE MAY NOT BE DOWN TO THE SUBFLOOR, BUT - IT'S HARD TO SAY.

04 23 06+  
LMP  
I DID SEE A DENSE GRAY ROCK THAT'S DIFFERENT THAN THE OTHERS ON HY TRAVERSE OUT HERE. WE'LL TRY TO FIND SOME OF THAT, TOO.

EVA 2 - TRAVERSE, STATION LM - STATION 2

GEOLoGIC  
DESCRIPTION  
05 18 59+  
LMP  
LET'S GO TO HOLE-IN-THE-WALL.

DURING TRAVERSE

05 18 59+  
LMP  
## Cross-reference of Lunar Samples with Locations, Photographs, Apollo-Elapsed Times, and Logsheets from the Astronauts' Ground Transcript

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<tr>
<th>Sample Weight</th>
<th>Sample Type</th>
<th>Lunar-Surface Number</th>
<th>Art</th>
<th>Cross-References</th>
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</thead>
<tbody>
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<td></td>
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<td>05 19 02+ LMP</td>
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<td>NOW THAT LITTLE CRATER IN THE ELECTA OF CAMELOT, AT LEAST THE RIM OF CAMELOT, DID NOT BRING UP BLOCKS ON THE RIM. IT MAY HAVE BEEN AN OLD DEPRESSION. BOB, THERE IS EXTREMELY BLOCKY AREA. I THINK STATION 5 WAS OVER THERE WHERE THAT BLOCK AREA IS. THE LIGHT-COLORED AREAS ON THE PHOTOS ARE ESSENTIALLY BLOCKY. THEY'RE PROBABLY 30 PERCENT BLOCKS. MANY OF THEM ARE IN THE 2- TO 3- TO 4-METER SIZE RANGE. ALL OF THEM LOOK LIGHT COLORED, LOOK LIKE THE GABROS WE SAMPLED, FROM A DISTANCE. THEY HAVE LIGHT-HALO ZAP PITS ON THEM. I SEE ONLY OCCASIONAL GRANERY VARIETIES, WHICH I BELIEVE ARE THE NONVESICULAR ONES LIKE WE ALSO SAMPLED.</td>
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<td>05 19 02+ LMP</td>
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<tr>
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<td></td>
<td></td>
<td>BUT THE LIGHT-COLORED GABROS ARE DOMINANT.</td>
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<td>05 19 02+ LMP</td>
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<td>NOW THE SURFACE OF CAMELOT IS MANTLED - OR THE RIM - IS MANTLED WITH THE SAME DARK-GRAY MATERIAL, AND IT HAS THE SAME SURFACE TEXTURE - A VERY FINE RAINDROP PATTERN. THE SATURATION CRATER SIZE DOES NOT LOOK BIGGER THAN A HALF A METER, IF THAT.</td>
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<td>05 19 05 30 CDR</td>
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<td>05 19 05 30 CDR</td>
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<td>05 19 05 30 CDR</td>
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<tr>
<td></td>
<td></td>
<td>081, 1.6, AND 1.4. WE'RE SOUTH OF THE CENTER OF CAMELOT.</td>
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<td>05 19 05 52 CDR</td>
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<td>WE CAN DEFINITELY SEE THE LIGHT MANTLE AS IT COMES OUT OVER THE VALLEY HERE, AND WE'RE LOOKING AT HOLE-IN-THE-WALL, ALTHOUGH IT'S STILL TOO SUBTLE. WE'RE LOOKING RIGHT AT LARA, AS A MATTER OF FACT.</td>
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<td>05 19 05 55 LMP</td>
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<td></td>
<td>YES, THERE'S LARA, VERY CLEAR, AND HOLE-IN-THE-WALL, YOU CAN SEE IT.</td>
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<td>05 19 07+ LMP</td>
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<td></td>
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<td></td>
<td>THE SCARP LOOKS VERY SMOOTH FROM HERE - NO OBVIOUS OUTCROPS AT THIS TIME. DON'T SEE TO BE PENETRATING TO ANY BEDROCK IN THE AREA WE'RE TRAVELING NOW, JUST TO THE SOUTHEAST OF HORATIO. HORATIO HAS A BLOCKY WALL; HOWEVER, THE UPPER SEVERAL TENS OF METERS, PROBABLY, OF RIM LOOK AS IF IT'S EITHER MANTLED OR COVERED OF - THE LIGHT-GRAY REGOLITH MATERIAL WE'VE BEEN DRIVING ON. THE BLOCKS DO NOT CORR TO THE RIM OF HORATIO.</td>
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<td>05 19 07+ LMP</td>
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<td>HORATIO HAS QUITE A DIFFERENT APPEARANCE THAN CAMELOT. IT IS - AND THAT'S THE MAIN ONE - THE ZIZ - THE BLOCKS DO NOT GET TO THE RIM.</td>
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<td>05 19 07+ LMP</td>
</tr>
</tbody>
</table>
CDR: WE'RE ON THE SOUTHERN RIM; 678, 2.3, AND 2.0.
CDR: ACTUALLY, WE'RE ON THE RIM CREST. WE'RE 100 METERS SOUTH OF THE BREAK IN SLOPE INTO THE CRATER.
CDR: IT'S AN UNDULATING, BLOCKY TRAVERSE TERRAIN IN THERE, JACK.
CDR: THESE LITTLE CRATERS MAKE IT BUMPY; BUT, OTHER THAN THAT, IT'S REALLY SMOOTH SAILING.
CDR: THIS IS WHAT I SORT OF EXPECTED DARK MANTLE TO LOOK LIKE, RATHER THAN WHAT WE LANDED ON. NOT MORE THAN 1 PERCENT OF THE SURFACE, AND THAT PERCENTAGE CONTINUES RIGHT OVER THE RIM CREST OF HORATIO DOWN ONTO THE WALL UNTIL YOU HIT THE BIG BLOCKS.
CDR: THE SURFACE IS NOT CHANGING. WE SEE NO CRATERS THAT SEEM TO PENETRATE INTO BEDROCK OUT HERE - THAT'S WITH BLOCKY RIM, AND THAT'S QUITE A CONTRAST TO THE AREA WE SAMPLED AT STATION 1A YESTERDAY. I CANNOT SEE IN MY FIELD OF VIEW ANY BLOCKY-RIM CRATERS. THERE ARE LIGHT CRATERS WITH FRAGMENTAL WALLS AND RIMS, BUT IT LOOKS LIKE INSTANT ROCK RATHER THAN THE SUBFLOOR MATERIAL.
CDR: BOB, WE'VE SEEN CRATERS AS MUCH AS - 20 METERS, MAYBE 30 METERS IN DIAMETER WITHOUT BLOCKY RIM.
CDR: THE RIM BLOCK POPULATION IS NOT MUCH DIFFERENT THAN THE AVERAGE FOR THE TERRAIN IN HERE.
CDR: IF WE CAN'T RECOGNIZE A CHANGE IN THAT ALBEDO WHEN WE GET ONTO THAT WHITE MANTLE, I'M GOING TO BE SURPRISED.
CDR: THE LIGHT MANTLE IS JUST WHAT GENE HAS SAID. THERE ARE SOME VERY BRIGHT CRATERS IN IT - THEY STAND OUT, BRIGHT-BORDERED CRATERS SCATTERED OVER IT, THAT - SEEM TO BE QUITE A BIT BRIGHTER THAN ANYTHING WE HAVE OUT HERE ON THE DARK MANTLE. SEE THOSE BLOCKS OVER THERE? THAT'S THE FIRST DIFFERENT COLORED BLOCKS I'VE SEEN; THEY'RE SORT OF GRAY LOOKING.
CDR: WHERE ARE YOU LOOKING?
CDR: OVER TO THE RIGHT A LITTLE BIT.
CDR: DARKER GRAY, A LITTLE BIT.
### Cross-Reference of Lunar Samples with Locations, Photographs, Apollo-Elapsed Times, and Excerpts from the Air-to-Ground Transcript

<table>
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<tr>
<th>Sample</th>
<th>Weight (g)</th>
<th>Sample Type</th>
<th>Lunar-Surface Photographs</th>
<th>Crew Contents</th>
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</thead>
<tbody>
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</tbody>
</table>

**EVA 2 - Traverse, LM - Station 2**

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**LMV Sample-1**

<table>
<thead>
<tr>
<th>Bag 26E</th>
<th>135-20624-</th>
<th>135-20627</th>
<th>137-20895</th>
<th>LMV</th>
</tr>
</thead>
</table>

05 19 13 41 LMP: There's a crater with a big hags of block in the bottom. It looks like it might be a secondary fragment from somewhere.

05 19 13+ CDR: Do you want to get a photo as we go by?

05 19 13+ LMP: Yes, can you swing a little bit to the right?

05 19 13+ CDR: Yes.

05 19 13+ LMP: Do we have time for an LMV sample?

05 19 14 03 CC: If you can do it quickly.

05 19 14+ LMP: Swing a little bit to the right now.

05 19 14+ CDR: Right up across that little ray.

05 19 14+ LMP: Oh, Gene, that's a pretty big rock in there.

05 19 14+ CDR: It's got quite a bit of dirt in it.

05 19 14+ LMP: This is a block from a linear-strewn field of very irregular and jagged rocks that are southwest of a crater that's 10 to 15 meters in diameter. It looks like the material that may have formed the crater, and you can look at some of the pictures and make up your own decision.

05 19 16 02 CDR: OK, Gene, bob. We're on our way.

---

05 19 16+ LMP: The blocks I see still seem to be the gabbro, except for that one sample we took, which I hope was what I thought it was.

05 19 16+ CDR: Gee, it's blocky here.

05 19 16+ CDR: Oh, that's a big crater. We got to get around here.

05 19 17 50 LMP: That must be Bronce.

05 19 17+ CDR: My gosh, is that big.

05 19 17+ LMP: That's bigger than I expected.

---

05 19 17+ LMP: -- Blocks, greater than the normal gabbro we've seen, that have very large, egg-sized vesicles in them.

---
GEOLOGIC DESCRIPTION
DURING TRAVERSE

05 19 19+ LFP AND IT LOOKS LIKE BROWN HAS FURTHERED THE GLASS
HANTEL IS HERE. IT GOT THE SUNFLOW, BUT THERE'S
NOT AN AWFUL LOT OF GLASS ABOUT THE ELL - THERE
ARE JUST SOME SMALL ONES - COMPARED TO THAT WE
SAW AN HOUR AGO.

05 19 19+ LFP - WHAT WE SAW ABOUT HORIZON OR IN THE WALLS OF
HORIZON AND AROUND CARLOT. NOTHING, ALSO, LIKE WE
SAY YESTERDAY AT STATION 1, OK, THAT CHARACTER-
ISTIC LITTLE Dimple IN THE BOTTOM OF THE
CRATERS IS STILL WITH US, AND IT'S INVARIABLY
GLASS-LINED IN THE FRESH ONES.

05 19 19+ LFP NOW, THAT'S NOT A COMPLETE LINING, THERE SENS
TO BE GLASS AGGLOMERATES, IF YOU WILL - THAT'S
HOLDING THE FRAGMENTS IN THE BOTTOM OF THE CRATER
TOGETHER. THERE'S ONE ON THE SIDE OF AN OLDER
CRATER, WE'RE BACK INTO ABOUT A 1-PERCENT COVERAGE.
I SUSPECT THAT THE REASON OUR BLOCK POPULATION
WENT UP THERE WAS BECAUSE OF BROWN.

05 19 19+ CDR AN AWFUL LOT OF THESE SMALL GLASS-LINED LITTLE
CRATERS AROUND.

05 19 19+ CDR I THINK THE WHITE HANTEL IS STARTING RIGHT OVER
THERE. SEE ON YOUR RIGHT?
05 19 19+ LFP YES, THAT'S THE FIRST -

05 19 23 27 CDR THAT'S THE WHITE HANTEL WE'RE COMING UP ON
RIGHT UP HERE.
05 19 23+ CDR SEE THAT ON YOUR RIGHT?
05 19 23+ LFP YES.
05 19 23+ CDR THAT'S IT, THERE'S NOT GOING TO BE THAT MUCH
DIFFERENCE.
05 19 23+ CDR SEE, NOW YOU CAN LOOK WHERE WE'RE GOING TO
COME UP ON THE WHITE HANTEL. IT'S DUSTED
WITH THAT LIGHT - LOOK AT IT.
05 19 23+ CDR WE'RE ONLY 100 METERS FROM THE LIGHT
HANTEL.

05 19 23+ LFP YES. THERE CERTAINLY IS A CHANGE IN THE GENERAL
ALBEDO, PARTICULARLY IN THE CRATERS. THE CRATERS
ARE MUCH BRIGHTER IN THEIR WALLS THAN WE'VE SEEN
BEFORE.

05 19 23+ LFP ALTHOUGH THERE STILL IS A BROWN - A LIGHT GRAY
DUSTING OVER THE TOP OF IT IN HERE, BUT IT'S
CLEARLY DIFFERENT - NO QUESTION ABOUT THAT.

05 19 23+ CDR YOU CAN'T SEE THE CONTACT AS YOU CROSS IT BUT WE
KNOW WE'RE COMING INTO SOMETHING LIGHTER - YOU
CAN - OBVIOUSLY SEE IT.

05 19 23+ LFP YES. WE OUGHT TO TAP WAVE THE END OF ONE OF THESE
CRATERS WHEN WE GET OUR LWP SAMPLE, BECAUSE THAT'S
WHAT'S DISTINCTLY LIGHTER.
**CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-LANDED TIMES, AND EXCERPTS FROM THE AUDIO-CASS

<table>
<thead>
<tr>
<th>SAMPLE TYPE</th>
<th>LUNAR-SURFACE LOCATION</th>
<th>DATE</th>
<th>CREW CONVERSATION</th>
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</thead>
<tbody>
<tr>
<td>LRV SAMPLE-2</td>
<td>LIGHT HANTELLE</td>
<td>135-20641</td>
<td>05 19 24+</td>
</tr>
<tr>
<td>LRV SAMPLE-2</td>
<td>BAG 27E SOIL</td>
<td>135-20643</td>
<td>05 19 24+</td>
</tr>
<tr>
<td>LRV SAMPLE-2</td>
<td></td>
<td>137-20896</td>
<td>05 19 25+</td>
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<td>05 19 26+</td>
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<td>LRV SAMPLE-2</td>
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<td>05 19 27+</td>
</tr>
<tr>
<td>LRV SAMPLE-2</td>
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<td>05 19 27+</td>
</tr>
</tbody>
</table>
05 19 27+ LHP YEA, THERE' RE A FEW BLOCKS. THEY STILL LOOK LIKE THE GABBRO, THOUGH, HARD TO TELL.
05 19 27+ CDR HELL, A COUPLE OF THEH LOOKED TO BE LIKE THEY HAD SOME VERY LIGHT *** CRYSTALS IN THEM. SEE THAT?
05 19 27+ LHP I'M AFRAID THOSE ARE SAP PITS.
05 19 27+ CDR THEY COULD BE.
05 19 27+ LHP I GOT - I THINK I'VE BEEN FOOL ED BY THAT, TOO, AND THAT'S WHY I IDENTIFIED THE PLCASCIJAS HERE.
05 19 29 14 CDR WE'RE GETTING A LITTLE MORE BLOCKS IN HERE. OF COURSE, WE'RE APPROACHING THE DARK MANTLE AGAIN. NOW, YOU CAN SEE THE DIFFERENCE. YOU GO TO LOOK HARD FOR IT, BUT, YOU SEE THOSE CRATERS OUT IN THERE ARE NOT WHITE ANYMORE.
05 19 30+ CC WE WANT (AN LVP SAMPLE) - AS SOON AS YOU GET INTO THE DARK MANTLE - WE'RE ESTIMATING IT'S SOMETHING LIKE 4.3, 4.4, 4.5, SOMEWHERE IN THAT VICINITY.
05 19 30+ LHP I GOT THE ROCK, AND THERE'S SOME DIRT IN THERE. WHY I' D BETTER GET A LITTLE MORE DIRT.
05 19 30+ CDR COUPLE TEAPOSSFUL. THIRTY-EIGHT ECHO, BOY.
05 19 32+ CDR AND THAT'S PROBABLY A ROCK FRAGMENT. JACK'S GETTING A SOIL FRAGMENT - SOIL SAMPLE WITH IT.
05 19 33+ CC WE ARE ROLLING.

GEOLOGIC DESCRIPTION DURING TRAVERSE

05 19 33+ LHP OK, WE'RE BACK DOWN IN OUR OLD FRIEND, THE DARK MANTLE. AND I THINK THE ZERO PHASE POINT IS NOT AS BRIGHT AS IT WAS. PASSING A SMALL CRATER, BUT THE BLOCK POPULATION IS STILL WAY DOWN THERE IN ABOUT 1 PERCENT.
05 19 36+ LHP THE CRATERS AT ABOUT 10 TO 15 METERS IN DIAMETER SEEM TO HAVE SOMEWHAT MORE BLOCKY MATERIAL IN THEIR RIMS, BUT THEY'RE NOT CLEARLY BLOCKY RIM CRATERS. AND HERE'S ONE THAT'S PROBABLY 50 METERS ACROSS THAT HAS A FAIR NUMBER OF BLOCKS IN THE BOTTOM. LOOKS LIKE IT MIGHT HAVE JUST ABOUT GOTTEN DOWN TO WHERE THE GABBRO STARTS TO BE ABUNDANT AGAIN.
05 19 37 58 CDR OK 082, 5.6, AND 4.9.
05 19 37+ CC COPY 4.9 ON THE RANGE.
05 19 37+ LHP WE'RE NOT IN LIGHT MANTLE, I DON'T THINK. MAYBE WE ARE.
05 19 37+ CDR I THINK WE ARE, JACK.
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-CLASSED TIMES, AND EXCERPTS FROM THE AIR-TO-GROUND TRANSCRIPT

<table>
<thead>
<tr>
<th>SAMPLE WEIGHT</th>
<th>SAMPLE TYPE</th>
<th>LUNAR-SURFACE</th>
<th>NET</th>
<th>CREW COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>05 19 37+</td>
<td>LMP</td>
<td>1 GIF WE ARE. GOSH, I WAS GOING TO SAY THE CRATERS ARE WHITE THEN THEY HAVE BEEN. SO, WE'RE BACK IN IT. -- EVEN THE PHASE POINT'S BRIGHTER TOO.</td>
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<td>05 19 37+</td>
<td>CDR</td>
<td>2 I THINK THAT PLACE WHERE WE HAD THOSE SMALL, BLOODY CRATERS WAS IN THE DARK HAMPTLE. THEY'RE NOT EXCITED HERE IN THE LIGHTER STUFF.</td>
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<tr>
<td>05 19 39+</td>
<td>LMP</td>
<td>THE ROCK FRAGMENTS STILL LOOK LIKE SOLAR. THE CRATERS TEND TO HAVE WHITE WALLS AND WHITE RIMS, WHICH THEY DON'T HAVE IN THE DARK HAMPTLE AREA. THE BLOCK POPULATION IS WAY DOWN, 1 PERCENT OR LESS. HOWEVER, THE BIGGER CRATERS DO HAVE SOME BLOCKS; BUT NOWHERE DOES THAT POPULATION GET ABOVE ABOUT 5 PERCENT. AND THAT'S ON THE WALLS AND THE RIMS OF THE CRATERS, SAY BIGGER THAN 15 METERS. THERE'S ONE PROBABLY 20 METERS IN DIAMETER THAT HAS SOME BLOCKS ON IT.</td>
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<tr>
<td>05 19 41+</td>
<td>LMP</td>
<td>LOOK AT THAT CRATER! THAT PIT -- THAT CENTRAL PIT GOES DOWN ABOUT HALF THE DEPTHS OF THE CRATER, AND THE CRATER IS A FRESH 3-METER CRATER. IT ALMOST WAS A CYLINDRICAL PIT.</td>
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<tr>
<td>05 19 44 17</td>
<td>LMP</td>
<td>WE MADE A TURN TO THE SOUTH A LITTLE BIT AT 081 AND 5.7.</td>
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<tr>
<td>05 19 44 47</td>
<td>CDR</td>
<td>I'M STARTING UP THE SCARP AT 081, 6.4, AND 5.7.</td>
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<tr>
<td>05 19 44+</td>
<td>LMP</td>
<td>THIS IS THE FIRST TONGUE OF THE SCARP. WHATEVER MAKES UP THE LIGHT HAMPTLE IS -- AT LEAST, THE INSTANT ROCK THAT IT FORMS IS MUCH LIGHTER THAN ANYTHING WE SEE. THOSE FRAGMENTS PROBABLY ARE 10 PERCENT LIGHTER THAN ANY FRAGMENTS WE SEE ON THE DARK HAMPTLE, AND THAT'S AROUND THE FRESH CRATERS, BUT IT IS NOT BLOODY.</td>
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<tr>
<td>05 19 46+</td>
<td>LMP</td>
<td>THERE ARE NOT ANY BLOCKS BIG ENOUGH TO REALLY MAKE A STATEMENT ABOUT WHAT THE ROCK IS. BUT IT REALLY DOESN'T LOOK LIKE SOLAR ANYMORE.</td>
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<tr>
<td>05 19 48 49</td>
<td>LMP</td>
<td>BOB, IT LOOKS LIKE MAYBE THE LARGE FRAGMENTS IN HERE ARE STILL CRYSTALLISING. THEY HAVE WHITE ZAP PITS ON THEM. BUT THEY DO NOT YET REALLY RESemble THE GABBRO.</td>
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</table>
Jack, there was nothing (Station 2) with respect to those tracks up there?

Well, they never really had any good tracks pinned down. You'll be able to see Unisen, I think soon as you get over this hill.

Head towards that track area there. There are a lot of soldier tracks coming down from the blue-gray rocks. We'll see whether or not we're going to get to those tracks at Unisen, or we might have to look over to the track and see if we can find the soldier that made them.

But there's no question where those tracks come from.

Looking up on the South Hassif, we've got real good views of the block-strewn fields. There seem to be two dominant colorations of the rock. The light-colored ones, very light tan and to white; and then there are the blue-gray rocks. There's one major outcrop of blue gray about a sixth of the way down the slope, the center of the field of view we have; and it looks very much like similar blue-gray rocks right at the crest, the highest point from our vantage point.

I have the impression that there is a dipping zone of blue-gray outcrops or block concentrations up there on the Hassif that trends from the high point just beneath the Earth - cross-slope - and the apparent dip is - oh, I don't know, 10 or 15 degrees to the east. It looks like those outcrops may match up along that trend.
### Cross-Reference of Lunar Samples with Locations, Photographs, Apollo-EPA, LSP, TIS, and Excerpts from the Air-to-Ground Transcript

**Sample Weight** | **Sample Type** | **Lunar-Surface** | **ALT** | **Crew Comments**
--- | --- | --- | --- | ---
EVA 2 - Traverse, LH - Station 2

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<thead>
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<th>Time</th>
<th>LC/CDR/ULP/AMP</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>05 19 52+</td>
<td>LWP</td>
<td>I think the ones (tracks) from the big outcrop of blue-gray rock, though, are the ones going into Nansen.</td>
</tr>
<tr>
<td>05 19 53 29</td>
<td>CDR</td>
<td>In best guess - 077, 7.7, 6.6 - is that we're coming up on the northern side of Nansen.</td>
</tr>
<tr>
<td>05 19 53+</td>
<td>CDR</td>
<td>OK, there's Nansen over there, isn't?</td>
</tr>
<tr>
<td>05 19 53+</td>
<td>LWP</td>
<td>I think you're right. It's got to be it. I think we're into a breccia population now. I think the blocks in the light mantle are largely breccias. They're divided in their characteristics. Their white parts do not seem to be nearly as apparent. They tend to be chalky when they get hit. At least, in the large craters, the walls are chalky looking. Oh, yes, we've got boulders in Station 2.</td>
</tr>
<tr>
<td>05 19 53+</td>
<td>LWP</td>
<td>We're very clearly going downhill now, into the trough area that surrounds the Massif - or between the Mantle and the Massif. But the trough is much greater in extent than just Nansen scale. It's probably a kilometer wide. I never realized that it was so much of a depression in here.</td>
</tr>
<tr>
<td>05 19 56 35</td>
<td>CDR</td>
<td>074, 8.2, 6.9.</td>
</tr>
<tr>
<td>05 19 56+</td>
<td>LWP</td>
<td>There's a good-sized block, sort of blue-gray.</td>
</tr>
<tr>
<td>05 19 56+</td>
<td>CDR</td>
<td>Some of that stuff is untripped - or buried in the Massif material. Some of it just seems to be laying on it, of course.</td>
</tr>
<tr>
<td>05 19 56+</td>
<td>LWP</td>
<td>Yes, well, I think it has to do with how long it's been there. You'll tend to get the downslope movements forming upward fillets, and that's what lot of it looks like.</td>
</tr>
</tbody>
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**EVA 2 - Station 2**

**Geologic Descriptions**

<table>
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<th>Time</th>
<th>LC/CDR/ULP/AMP</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>05 20 01+</td>
<td>LWP</td>
<td>I think just about anywhere near the big blocks -- would be a good Station 2.</td>
</tr>
<tr>
<td>05 20 01+</td>
<td>CDR</td>
<td>That's where I'm going to put it.</td>
</tr>
<tr>
<td>05 20 01+</td>
<td>CDR</td>
<td>Boy, you're looking right into Nansen.</td>
</tr>
<tr>
<td>05 20 01+</td>
<td>LWP</td>
<td>Yes, we're right where we wanted to be for Station 2. It looks like a great place. Big blocks. It looks like quite a bit of variety from here. Different colors, anyway. Grays and lighter colored tans.</td>
</tr>
</tbody>
</table>
05 20 09+ LHP THE NUMBER OF BLOCKS PLANTED ON THE HAP ARE NOT NEARLY ENOUGH. IF THE GREATER THAN 1-METER RANGE, THERE ARE MANY HUNGRY BLOCKS ON THE HAP FLANK OF NARISH AND UP ALONG STATION 2, WHERE WE ARE. THERE ARE ONLY ONE OR TWO BLOCKS ON THE LIGHT RANGE SIZE OF NARISH. IT LOOKS AS IF THE MATERIAL IN THE BOTTOM OF NARISH IS OVER-RIDING THE LIGHT HAP FLANKS OF THE SOUTH WALL. THAT'S JUST AN IMRESSION. THEY'RE SLIGHTLY LIGHTER ALBEDO THAN THE NORTH WALL OF NARISH.

05 20 09+ LHP I SUGGEST THAT WE DO OUR RAKING FAIRLY CLOSE TO THE METER TO GET THE - SOME OF THE GENERAL POPULATION OF TALUS MATERIAL COMING OFF THE FLANK.

05 20 12+ LHP THE BLUE-GRAY ROCKS ARE BRECCIAS. THEY'RE MULTILITHIC, GRAY MATRIX - MATRIX BRECCIAS, I GUESS. THERE ARE FRAGMENTS IN THEM, BUT IT DOESN'T LOOK LIKE SOME ABOUT 10 OR 15 PERCENT FRAGMENTS. SOME OF THE LIGHT-COLORED FRAGMENTS DUS TO HAVE VERY FINE-GRAINED DARK HALOS AROUND THEM. THE ZAP PITS DO NOT HAVE WHITE HALOS, SO I SUSPECT THEY ARE NOT CRYSTALLINE. THEY MIGHT BE GLASS - THEY MIGHT BE THE VITRIC OR GLASSY BRECCIAS. AT LEAST, THE ONE BIG ROCK WE HAVE HERE.

05 20 12+ LHP THERE'S A ROUGH, VERY ROUGH, FOLIATION IN THEM - IT'S SHOWN BY THE ELONGATE KNOBS ON THE SURFACE. IT LOOKS LIKE A FRACTURE FOLIATION OF SOME KIND.

05 20 12+ CDR JACK, THAT ROCK HAS ALMOST GOT TO HAVE COME DOWN, DON'T YOU THINK?

05 20 12+ LHP OH, NO QUESTION ABOUT IT. I'LL BET YOU IT'S THE SAME AS THE BLUE-GRAY ROCKS WE SEE UP HIGHER. HERE'S SOME MORE BLUE-GRAY ONES OVER HERE.

05 20 12+ CDR LOOK AT THE SIZE OF SOME OF THESE LIGHT FRAGMENTS IN HERE.

05 20 12+ LHP IT LOOKS LIKE THEY'RE MULTILITHIC MATRIX BRECCIAS. THESE ARE LIGHT-COLORED FRAGMENTS, AND THEY MAY BE CRYSTALLINE.

05 20 12+ LHP THEY ARE. THEY'RE VERY LIGHT COLORED; THEY LOOK LIKE THE SHATTERED ANORTHOSITES. THEY HAVE WHITE HALOS - I THINK THAT'S WHAT THESE FRAGMENTS ARE.
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ELAPSED TIMES, AND EXCERPTS FROM THE AIR-TO-GROUND TRANSCRIPT

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<thead>
<tr>
<th>SAMPLE</th>
<th>WEIGHT</th>
<th>SAMPLE TYPE</th>
<th>LOCATION</th>
<th>AET</th>
<th>CREW COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAG 514</td>
<td>72114*</td>
<td>CHIP FROM BRECCIA</td>
<td>137-20990 XEB</td>
<td>05 20 12+</td>
<td>CDR JACK, LET'S GET A PIECE OF THIS ONE RIGHT HERE.</td>
</tr>
<tr>
<td>72115**</td>
<td>BOULDER</td>
<td>137-20901 XEB</td>
<td>05 20 12+</td>
<td>CDR SUGGEST ONE HERE.</td>
<td></td>
</tr>
<tr>
<td>137-20902-**</td>
<td>05 20 12+</td>
<td>CDR I' M GOING TO TAKE THAT LITTLE KNOB OFF UP THERE.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>137-20909 XSA</td>
<td>05 20 12+</td>
<td>CDR - - YOU CAN WORK THAT BLOCK OVER. WE CAN GET SEVERAL EXAMPLES. WE OUGHT TO SAMPLE ACROSS THAT LAYERING, ACTUALLY - THAT FOLIATION.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>138-21036 DSA</td>
<td>05 20 15+</td>
<td>LWP - - I TAKE BACK WHAT I SAID ABOUT NO HALOS. THERE ARE LIGHT - NOT VERY SHARPLY LIGHT - BUT LIGHT HALOS AROUND ZAP PITS IN THE MATRIX. THE MATRIX GLASS IS DARK, AND IT SEEMS TO HAVE A GREENER CAST; BUT IT'S VERY DARK.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>138-21037 DSA</td>
<td>05 20 15+</td>
<td>CDR OH, LOOK AT THAT BLUE.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05 20 15+</td>
<td>LWP</td>
<td>CDR LOOK AT THE WHITE FRAGMENTS IN THERE.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05 20 15+</td>
<td>LWP</td>
<td>CDR HAN, THERE'S SOME BOULDER ROLLING ROCKS HERE, JACK.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05 20 15+</td>
<td>LWP</td>
<td>CDR CRAY, DON'T WRECK THE FILLET. THERE'S AN OVERHANG WE'VE GOT TO GET INTO.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05 20 16 53 LWP</td>
<td>514 IS THIS - OK, I'LL TAKE IT BACK. ON THE FRESH SURFACE, THESE LOOK LIKE FRAGMENT BRECCIAS. ALTHOUGH THE FRAGMENT SIZE IS FAIRLY SMALL, THERE ARE DARK GRAY FRAGMENTS AND THE LIGHT FRAGMENTS WE TALKED ABOUT. THE GRAY ONES ARE VERY FINE GRAINED AND DENSE, ALTHOUGH I SEE FLASHES THAT INDICATE THEY MAY BE CRYSTALLINE. THE LIGHT-COLORED FRAGMENTS ARE AS I DESCRIBED EARLIER, I THINK.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05 20 16+</td>
<td>CC</td>
<td>COPY THAT.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05 20 16+</td>
<td>LWP 514.</td>
<td></td>
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</tr>
</tbody>
</table>

EVA 2 - MISSION COORDINATOR 2
BAG 515
72230*
CHIP FROM BAG 514
BRECCIA BOULDER
05 20 16+ LWP OR, I'M -- STAND UP. GENE'S OUT A ROCK TO GO.
THAT'S FIRM UP HERE?
05 20 16+ CUR THAT'S A LITTLE HIGHER. SEE THAT SHELF UP THERE?
05 20 16+ LWP THE FIRST ROCK WAS FROM ABOUT A -- 514 AS
FROM A NEVER ABOVE THE BASE OF THE ROCKS; 515 IS
FROM ABOUT A LEVEL AND A HALF.
05 20 18 05 LWP CAN YOU GET SOME ON EITHER SIDE OF THOSE TWO GOM?
05 20 18+ CUR YES.
05 20 18+ LWP THAT'S A NORTH/SOUTH OVERHANG
05 20 18+ CUR YES, THAT ONE?
05 20 18+ LWP YES, YOU'RE FACING RIGHT INTO THE EAST.
05 20 18+ CUR YES, I DON'T KNOW IF I CAN GET A PIECE BACK HERE
OR NOT.

BAG 494
72250*
CHIP FROM BAG 514
BRECCIA BOULDER
05 20 18+ LWP HOW ABOUT RIGHT WHERE YOU ...
05 20 18+ CUR RIGHT HERE? I CAN GET THAT.
05 20 18+ LWP YES, THAT'S GOOD.
05 20 18+ LWP, BEAUTIFUL, HIT THE GOMIN.
05 20 18+ LWP IT SHOULDN'T MOVE. IT JUST TOUCH IT. THIS IT?
05 20 18+ CUR YES, THAT'S IT RIGHT THERE.
05 20 18+ LWP 494 IS FROM A HALF A METER ABOVE THE BASE OF THE
ROCK.

BAG 495(LR-4)
72270*
LARGE FRAGMENT BAG 514
OF BRECCIA
05 20 18+ LWP AND THESE ARE SAMPLES FROM ACROSS THE LAYERING
OR THE POLLUTION.
05 20 18+ LWP WHAT DO YOU THINK? CAN YOU GET THAT -- CAN YOU GET
THAT ONE UP THERE?
05 20 18+ CUR YES, I MIGHT EITHER GET THAT OR THIS OTHER PIECE
UP HERE.
05 20 18+ LWP WELL, DON'T TAKE ANY CHANCES.
05 20 18+ CUR YES, I'M NOT GOING TO, HOW ABOUT THIS ONE? HERE'S
A WHOLE BIG PIECE.
05 20 18+ LWP OR, THAT'S A GOOD -- GOOD REPRESENTATIVE FRAGMENT.
CAN YOU GET IT?
05 20 18+ CUR I CAN'T REACH YOU WITHOUT MY CAMERA HITTING.
05 20 20 LWP THAT'S A FOOTBALL-SIZE FRAGMENT, OR, THIS NEXT
SAMPLE - CAN YOU GET A BAG OUT, AND WE'LL TRY TO
PUT IT AROUND IT, AROUND THE END, IT'S HIGHLY
VARIALE. THIS IS A LIGHT-HEAVY BRECCIA;
WHEREAS THE OTHER THREE FRAGMENTS WERE
DARK-HEAVY OR DARN-GRAND BRECCIA.
THE BIG ROCK IS A LIGHT-HEAVY
BRECCIA WITH DARN FRAGMENTS, AND IT'S THE ONE THAT
HAS THE HALOS AMONG THE LIGHT FRAGMENTS. AND
THAT'S IN 495, DARNLY. IT'S NOT EVEN IN IT.
495 IS WRAPPED AROUND IT.
<table>
<thead>
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<td>EVA 2 - STATION: 2</td>
<td></td>
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<tr>
<td>05 20 20 50</td>
<td>CDR</td>
<td>IT'S NOT GOING TO STAY.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>05 20 20+</td>
<td>CDR</td>
<td>IT'S A FOOTBALL-SIZE FRAGMENTAL ROCK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>05 20 20+</td>
<td>LHP</td>
<td>WHY DON'T YOU JUST STUFF IT. SEE IF YOU CAN STUFF IT IN THERE WITH THE BAG DOWN - -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>05 20 20+</td>
<td>CDR</td>
<td>WE'LL BE ABLE TO IDENTIFY IT WHEN WE GET - -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>05 20 20+</td>
<td>CC</td>
<td>00 YOU GUYS SEE ANY TRACKS COMING DOWN TO THESE BOULDERS? DO YOU ANY FEELING THAT YOU CAN PLACE THESE THAT WAY?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>05 20 20+</td>
<td>LMP</td>
<td>UNFORTUNATELY, NO. THE MAIN TRACKS ARE OUT INTO HABERD, AND I DON'T THINK WE CAN GET OVER THERE.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>05 20 20+</td>
<td>LHP</td>
<td>COMING UP I WAS LOOKING, AND THERE ARE NO OBVIOUS TRACKS COMING DOWN HERE.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>05 20 20+</td>
<td>LHP</td>
<td>THE GNOMON HAS MOVED A LITTLE BETWEEN THE SAMPLES.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>05 20 22+</td>
<td>LMP</td>
<td>I GOT FLIGHT LINE ON THE NORTH/SOUTH TREND; GENE GOT EAST/WEST.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAG 496</td>
<td>FILLET SOIL</td>
<td>SAME AS 05 20 22+</td>
<td>CDR</td>
<td>YOU GOING TO GET THAT SAMPLE UNDER THERE?</td>
</tr>
<tr>
<td>72220*</td>
<td>FROM UNDERNEATH OVERHANG</td>
<td>BAG 514</td>
<td>05 20 22+</td>
<td>CDR</td>
</tr>
<tr>
<td>72220*</td>
<td>OVERHANG</td>
<td></td>
<td>05 20 22+</td>
<td>LMP</td>
</tr>
<tr>
<td>BAG 496</td>
<td>OVERHANG</td>
<td></td>
<td>05 20 22+</td>
<td>LHP</td>
</tr>
<tr>
<td>05 20 22</td>
<td>CDR</td>
<td>AND IT'S BAG 496.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
BAG 497 05 20 22+ LIIP NO 1. LET IT GET OUT AS IT COMES OUT FROM THE OVERHANGING A LITTLE BIT.

BAG 514 05 20 22+ CC YOU THINK THAT'S PERMISSIBLE SHADOW?

05 20 22+ CDR NO. IT'S FACTING EASY.

05 20 22+ LIIP AND A SAMPLE DOWN TO A DEPTH OF ABOUT 5 CENTIMETERS, ABOUT TWO-THIRDS OF A METER FROM THE - BOULDER - THE SOUTH SIDE - IS BAG 497.

05 20 22+ CC OK. I GOT TO TAKE A SETOF PICTURES AFTER THAT, BY THE WAY. SHOW WHERE THEY ARE.

05 20 22+ LIIP I CAN PIECE THEM INTO IN FLIGHT LINE STEREO.

05 20 22+ CDR THEY WERE IN BOTH OF THE BEFORE PICTURES ON THOSE ROCKS.

05 20 22+ LIIP OK, BOB. I SAW IT. I DIDN'T GIVE IT TO YOU; BUT I THINK - WELL THE NEXT BAG I TAKE OUT, YOU CAN CHECK THE NUM - WELL, WAIT A MINUTE, I'LL DO IT FOR YOU.

05 20 22+ CDR NO. THAT'S OK. I SUSPECT IT'S 498.

05 20 22+ LIIP I'M ALMOST POSITIVE IT WAS 498.

BAG 498 05 20 22+ LIIP LOOKING AT THE BLOCKS DIRECTLY DOWN-SUN, THE LIGHT GRAY, OR THE GRAY-MATRIX BRECCIAS SEEM TO BE FRAGMENTS, OR SCHLIEREN ANYWAY, WITHIN THE WHITE-MATRIX BRECCIAS.

05 20 22+ CC AND I GOT A COUPLE PICTURES DOWN-SUN TO SHOW THAT TEXTURE.

05 20 26 13 LIIP LOOKING AT THE BLOCKS DIRECTLY DOWN-SUN, THE LIGHT GRAY, OR THE GRAY-MATRIX BRECCIAS SEEM TO BE FRAGMENTS, OR SCHLIEREN ANYWAY, WITHIN THE WHITE-MATRIX BRECCIAS.

05 20 26+ LIIP AND I GOT A COUPLE PICTURES DOWN-SUN TO SHOW THAT TEXTURE.

05 20 22+ CC OK, AND ONE THING WE'D LIKE TO DO IS TO SAMPLE A VARIETY OF BLOCKS, IN TERMS OF LOOKING AT DIFFERENCES IN THE BLOCKS - FROM BLOCK TO BLOCK.

05 20 22+ LIIP OK, BOB. I SAW IT. I DIDN'T GIVE IT TO YOU; BUT I THINK - WELL THE NEXT BAG I TAKE OUT, YOU CAN CHECK THE NUM - WELL, WAIT A MINUTE, I'LL DO IT FOR YOU.

05 20 22+ CDR NO. THAT'S OK. I SUSPECT IT'S 498.

05 20 22+ LIIP I'M ALMOST POSITIVE IT WAS 498.

LMP ROGER. WE'RE GOING TO DO THAT. WE'RE GOING TO GET A GRAY - I MEAN A LIGHTER-COLORED BLOCK, NOT.

05 20 22+ CC ARE YOU GOING UP THERE?

05 20 22+ CDR YES.

05 20 22+ GEOLoGIC DESCRIPTION CC OK; AND IF YOU'RE GOING UP THE MANSIF, WHY DON'T WE TRY AND GET THE RAKE SAMPLER UP THERE NOW WHEN YOU FINISH THESE ROCKS.

05 20 22+ CDR OK, JACK - JACK, DON'T COME UP HERE UNLESS YOU BRING THE RAKE. IT'S A LONG TRIP. SO SOME COMING UP HERE TWICE. I CAN GO GET THIS SAMPLE, I'LL GET THE RAKE, IF I WERE YOU. DON'T WALK BACK UP TWICE.

05 20 22+ LIIP WELL, I DON'T - I'M NOT SURE THEY'RE GOING TO GAIN ANYTHING BY COMING UP TO THE TOP.

- -
<table>
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</table>

CC: OK, AS LONG AS IT'S ABOVE THE BREAK OF THE SLOPE, JACK, WE DON'T HAVE TO GET VERY FAR UP THE SLOPE.

LMP: THAT'S RIGHT.

05 20 28+ CDR: I'M AT ANOTHER BOULDER UP THE SLOPE HERE. IT LOOKS QUITE SIMILAR TO THE ONE WE JUST SAMPLED, EXCEPT THERE IS A LOT OF FLAKE FRACTURES ON IT, NON-UNIFORM, NON-DIRECTIONAL, BUT DIFFERENT, AT LEAST FROM THAT OTHER ROCK, IN TERMS OF THE FRACTURE PATTERN. THE TEXTURE LOOKS TO BE QUITE SIMILAR....

05 20 28+ CDR: THIS OUGHT TO COVER MY SAMPLES I TAKE OFF OF THAT THING.

05 20 28+ LMP: ON THESE RARE SAMPLES, THERE IS JUST NO POINT IN CARRYING A RAKE ALL THE WAY UP HERE. BECAUSE ALL WE NEED WAS A BREAK IN THE SLOPE; THAT'S RIGHT.

05 20 28+ CDR: I'M GOING TO GET A STEREO WHILE I'M AT IT.

05 20 28+ CDR: YES. WELL, IT LOOKS LIKE THE SAME TEXTURE, BUT IT'S NOT THAT FLAKY FRACTURE PATTERN ALL OVER IT. I'M GOING TO GET A STEREO WHILE I'M AT IT.

05 20 28+ CC: AS LONG AS YOU'RE ABOVE THE BREAK IN THE SLOPE; THAT'S RIGHT.

05 20 28+ LMP: BECAUSE ALL WE NEEDED WAS A BREAK IN THE SLOPE.

05 20 28+ CC: AS LONG AS YOU'RE ABOVE THE BREAK IN THE SLOPE; THAT'S RIGHT.

05 20 28+ LMP: WE WANT TO GET AWAY FROM THAT BIG ROCK BECAUSE IT'S PROBABLY SEDIMENT. ANY, THAT'S A DIFFERENT ROCK, GEOL.

05 20 28+ CDR: THIS OUGHT TO COVER MY SAMPLES I TAKE OFF OF THAT THING.
<table>
<thead>
<tr>
<th>Time</th>
<th>CDR</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>05 20 28+</td>
<td>LHP</td>
<td>THIS IS A CRYSTALLINE ROCK, HOUSTON. IT'S GUT NICK WITH HALO AROUND THE ZAP FIELD. THE ZAPS ARE NOT - DENSE BLACK GLASS, BUT A VERY DARK GREENISH-GRAY.</td>
</tr>
<tr>
<td>05 20 28+</td>
<td>CUR</td>
<td>ARE THOSE HALOS OR FRAGMENTS?</td>
</tr>
<tr>
<td>05 20 28+</td>
<td>LHP</td>
<td>NO, THEY'RE HALOS. WELL, THEY ARE FRAGMENTS, I THINK. ALSO, IT'S FAIRLY CRYSTALLINE, BUT IT IS HETEROGENEOUS. MATTER OF FACT THERE'S A BIG FRAGMENT OF A PORPHYRY CAUGHT UP IN THIS THING, I THINK.</td>
</tr>
<tr>
<td>05 20 31+</td>
<td>LHP</td>
<td>AND THERE'S A CHUNK THERE WE CAN GET. THAT'S A BIG FRAGMENT WITHIN THIS CRYSTALLINE ROCK -- INCLUSION.</td>
</tr>
<tr>
<td>05 20 31+</td>
<td>CDR</td>
<td>TAKE A PICTURE OF THAT AND THEN, YOUR LOCATOR, I'LL GET IT.</td>
</tr>
<tr>
<td>05 20 31+</td>
<td>LHP</td>
<td>GO AHEAD, I'VE GOT IT.</td>
</tr>
<tr>
<td>05 20 31+</td>
<td>LMP</td>
<td>GOT IT?</td>
</tr>
<tr>
<td>05 20 31+</td>
<td>CDR</td>
<td>YES, I'VE GOT IT.</td>
</tr>
<tr>
<td></td>
<td>BAG 516</td>
<td>CHI FROM AN</td>
</tr>
<tr>
<td>72310*</td>
<td>137-20912*</td>
<td>137-20916</td>
</tr>
<tr>
<td>72315*</td>
<td>BRECCIA</td>
<td>BOULDER</td>
</tr>
<tr>
<td>138-21039</td>
<td>LOC</td>
<td>138-21040-</td>
</tr>
<tr>
<td>138-21042</td>
<td>XSA</td>
<td></td>
</tr>
<tr>
<td>05 20 31+</td>
<td>LHP</td>
<td>IT'S A RELATIVELY AIGULAR INCLUSION ABOUT A HALF A METER IN SIZE, AND IT'S A SQUARE CROSS SECTION. WELL, IT'S IRREGULAR, BUT GENERALLY SQUARE CROSS SECTION. IT'S IN BAG 516, AND IT LOOKS LIKE A - WELL IT'S A HIGH FELDSPAR ROCK. IT MAY BE AN ANORTHOSITIC GABBRO, BUT IT DOES LOOK LIKE A PORPHYRY.</td>
</tr>
<tr>
<td>05 20 31+</td>
<td>CDR</td>
<td>THERE'S A BIG CHUNK WHERE I'VE GOT - I CAN'T GET IT OUT, THOUGH; IT'S BURIED IN A ROCK - HALF OF AN INCH ELOGATED - I CAN'T SEE WHETHER THEY ARE COLORLESS OR NOT, BUT THEY ARE DEFINITELY REFLECTIVE CRYSTALS. ...</td>
</tr>
<tr>
<td>05 20 31+</td>
<td>CDR</td>
<td>AND THEN IN THE BIG ROCK, YOU'VE GOT MASSIVE THINGS LIKE THIS BIG FRAGMENT HERE - THAT'S 5 INCHES ACROSS.</td>
</tr>
<tr>
<td>05 20 31+</td>
<td>LHP</td>
<td>THAT MAY BE A SPALL POINT, GENE, THAT'S A LIGHTER COLOR, IN GENERAL, BECAUSE OF A ZAP OR SOMETHING.</td>
</tr>
<tr>
<td>05 20 31+</td>
<td>CDR</td>
<td>LET ME GET SOME MORE SAMPLES OF IT.</td>
</tr>
<tr>
<td>05 20 31+</td>
<td>LHP</td>
<td>YES, WE NEED TO GET SOME OF THE HOST ROCK HERE.</td>
</tr>
<tr>
<td>05 20 31+</td>
<td>CDR</td>
<td>WE'LL GET A PIECE HERE.</td>
</tr>
<tr>
<td>05 20 31+</td>
<td>LHP</td>
<td>YOU'RE STILL SAMPLING THE ONE WE JUST GOT. SO WE'LL GET ANOTHER ONE.</td>
</tr>
<tr>
<td>BAG 517</td>
<td>72330*</td>
<td>ROCK CHIP</td>
</tr>
<tr>
<td>72335*</td>
<td>FROM BRECCIA</td>
<td>BAG 516</td>
</tr>
<tr>
<td>05 20 33 42</td>
<td>LMP</td>
<td>THE SAME KIND - OR THE CONTACT OF THAT ROCK LOOKS LIKE IT MIGHT BE FINE GRANDED - BUT IT'S ABOUT THE SAME - IN 517. THAT'S THE CONTACT IN THE INCLUSION SIDE OF THE CONTACT. KEEP GOING AFTER THE OTHER ONE, GENE, I'LL GET THIS IN YOUR BAG.</td>
</tr>
</tbody>
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<tbody>
<tr>
<td>BAG 518</td>
<td>1.70</td>
<td>CHIP OF BRECCIA</td>
<td>SAME AS BAG 516</td>
<td>THE HOST ROCK FOR THE INCLUSION, WHICH APPEARS TO BE ALSO CRYSTALLINE BUT MAY BE A RECRYSTALLIZED ROCK OF SOME KIND — METAMORPHIC — ALSO LOOKS LIKE IT’S HIGH PLagioclase — HIGH Feldspar, ANYWAY, THAT’S IN BAG 518 — AND THAT WAS A LOOSE FRAG — FAIRLY LOOSE BUT IN PLACE FRAGMENT ALONG THE FRACTURE ZONE.</td>
</tr>
<tr>
<td>72350</td>
<td>36.8</td>
<td>BOULDER</td>
<td>BAG 516</td>
<td>I’M GOING TO TRY TO GET THE REST OF IT UP THERE.</td>
</tr>
<tr>
<td>BAG 519</td>
<td>0.02</td>
<td>RESIDUE</td>
<td>SAME AS</td>
<td>THIS IS A MEDIUM-GRAINED ANOMORPHIC GABBRO, AND IT LOOKS LIKE IT HAS SOME PASTEL-GREEN OLIVINE CRYSTALS IN IT. DID YOU GET IT?</td>
</tr>
<tr>
<td>72370*</td>
<td>10.16</td>
<td>ROCK, BRECCIA</td>
<td>(HOST ROCK)</td>
<td>I CAN’T GET ANY MORE OF IT, JACK, UP THERE.</td>
</tr>
<tr>
<td>72375</td>
<td>0.02</td>
<td>RESIDUE</td>
<td>SAME AS</td>
<td>OK, AND THAT SMALL CHIP OF THAT IS IN 519. IT’S THE SAME HOST — ROCK, MUCH LIKE THE PREVIOUS SAMPLE.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ANOTHER CHUNK OF THE HOST —</td>
</tr>
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<td>IT’S IN THERE. I HAVEN’T CLOSED YOUR BAG YET, AND WE’VE GOT TO GET ONE SOIL SAMPLE UP THE HILL HERE.</td>
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</table>
I'll get the soil from around that thing.

Both rocks look like they might be in the anorthositic class of rocks. It's just that one has the appearance of being a finer grained matrix, looks like a porphyry in the boulder, I've got a stereo - I'll just continue my stereo around here. Hey, Jack, you can get way under there, and I know you could get soil. I don't know how long it's been shadowed, but it's been shadowed as long as this rock's been here.

I'll do that.

I've got a stereo of this one.

I've already got it.

Well, I'm getting it from this way, and they like that. Did he kick any dirt in under there?

I don't think so. Go way down in there. Let me get a couple of after pictures, yes, we want to get two sides of these rocks, and you can see their structure.

I took that stereo.

I got under an east-west overhang about 20 centimeters - way back - quite a way back, it goes even farther, but that's about as far as I can push back there now.

That's in bag 500.

And, Bob, I took an after picture of where Jack just got that soil sample under the rock from; and I'm on 50.
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-FLIGHTED TIMES, AND EXCEPTS FROM THE AIR-TO-GROUND TRANSCRIPT

<table>
<thead>
<tr>
<th>SAMPLE NUMBER (G)</th>
<th>WEIGHT (G)</th>
<th>SAMPLE TYPE</th>
<th>LUNAR-SURFACE PHOTOGRAPHS</th>
<th>CREW COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVA 2 - STATION: 2</td>
<td>72530*</td>
<td>RAKE</td>
<td>139-21034-</td>
<td>LMP BOB, MY DOWN-SUN PICTURES ON THE RAKE WERE TAKEN AT F/S.</td>
</tr>
<tr>
<td></td>
<td>72531*</td>
<td>RAKE</td>
<td>139-21046 XEB</td>
<td>CDR I’LL BE RIGHT DOWN THERE TO BAG THAT RAKE FOR YOU.</td>
</tr>
<tr>
<td></td>
<td>72565*</td>
<td>FRAGMENTS</td>
<td>137-20982 NCA</td>
<td>LMP NOT MANY SMALL WALNUT-SIZED FRAGMENTS IN HERE.</td>
</tr>
<tr>
<td></td>
<td>72555*</td>
<td></td>
<td></td>
<td>CDR COTTEN ABOUT SEVEN OR EIGHT.</td>
</tr>
<tr>
<td></td>
<td>72500*</td>
<td>SOIL</td>
<td>SAME AS BAG 501</td>
<td>LMP I’LL USE MY SCOOP FOR THAT.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>CDR 502, BOB, WILL BE THE KILOGRAM.</td>
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<td>05 20 40+ CDR 501, BOB, WILL BE THE KILOGRAM.</td>
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<td>05 20 45+ LMF AND THAT’S SAMPLE DOWN TO ABOUT 4 CENTIMETERS.</td>
</tr>
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<td>05 20 46+ LMF OH, THAT’S A BIG BAG FULL.</td>
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<td>05 20 46+ LMF GET AN AFTER, GENE.</td>
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<td>05 20 46+ CDR YES, GOT IT.</td>
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<td></td>
<td>05 20 46+ CDR JACK GOT THE BEFORE ON THE RAKE AND I GOT THE AFTER.</td>
</tr>
</tbody>
</table>
CT: YOU WANT A ROCK AND A LIGHT HALOPE PEBB?  
C" YOU WANT A ROCK AND A LIGHT HALOPE? YOU KNOW AN 
MEAN DOWN THAT BY THE MOUTH --- JUST ON AND -- 
CT: --- DUGALED SAMPLE TUFFS --- UP ON THE 
SIDES OF THE MOUTH, BEFORE YOU WENT DOWN THE 
FLAT-TOP LIGHT MIDDLE AREA BY THE MOUTH. JUST 
DO THE OTHER SAMPLING.  
CT: WE --- WE WILL.  
05 20 46+  
CDR: UFFH AXE TWO ROCKS SIDE BY SIDE, A HUPE OR TWO 
IN GRAZY, AND ONE IS THE ANTHROPOCENE CATAPE; IF 
I CAN USE THE TERM; AND THE OTHER IS THAT TWO- 
CYCLE BRECIA.  
CDR: MAN, THAT'S THE WAY TO COME DOWN. 
LMP: JUST DON'T STEP YOUR TOE.  
CDR: YES, THAT'S THE WAY TO COME DOWN. 
LMP: RY, GENT, SET UP RIGHT THERE. LET'S GET THAT 
BIG CLAST.  
05 20 46+  
CDR: THERE ARE THREE CLASTS, ANYWAY - OR THREE FRACTURES IN THERE. I WANT TO GET 
NEAT.  
LMP: THE CLAST.  
CDR: YES.  
LMP: BIG WHITE CLAST IN THE GRAY-MATRIX BRECIA, 
CDR: PRETTY HARD, ISN'T IT? THAT BOULDER'S GOING 
TO ROLL.  
05 20 46+  
LMP: MAN, THAT IS HARD. THERE'S THE SAME CLAST 
OVER THERE.  
05 20 46+  
CDR: THAT CLAST IS SOFT.  
05 20 46+  
LMP: CAN YOU USE YOUR -- YOUR BLADE EDGE?  
05 20 46+  
CDR: YES, LET ME GET THAT LITTLE PIECE. ANYWAY, TO 
STEEP WITH, GET IT. THERE'S TWO MORE PIECES.  
05 20 46+  
LMP: BEFORE WE COVER THEM UP, LET'S GET THEM.  
05 20 46+  
CDR: I OOF TO GET A SAMPLE OF THAT MOTHER (HOST) ROCK.  
05 20 46+  
LMP: WANT TO TRY TO HIT THAT ONE MORE TIME. I THINK 
WE HAVE ANOTHER ONE COMING THERE. THERE'S 
ANOTHER LITTLE ONE.  
05 20 46+  
LMP: THAT LOOKS ALMOST LIKE A RHYOLITE FROM HERE. I 
DON'T BELIEVE IT, THOUGH.  
05 20 50 16  
LMP: THIS IS A FINN-DRAINED BUT CRYSSTALLE WHITE 
CLAST -- IN THE GRAY BRECIA; AND IT'S MIXED WITH 
SOIL. WE HAD TO PICK UP A LITTLE SOIL.  503.  
05 20 50+  
LMP: THERE ARE THREE CLASTS, ANYWAY -- OR THREE FRAGMENTS 
THAT WE OOF OFF.  
05 20 50+  
LMP: OK, BOB. THAT WHITE-COLORED INCLUSION WE 
SAMPLED LOOKS LIKE A STRANGE --  
05 20 54+  
LMP: THAT WHITE CLAST -- I LOOKED AT IT, AND IT HAS A 
LIGHT PASTEL-GREEN -- FAIRLY ROUNDED CRYSTALS IN 
A FINN-DRAINED WHITE TO LIGHT PINKISH-TAN MATRIX, 
AND YOU CAN FIGURE THAT ONE OUT. LOOKS LIKE 
OLIVINE AND SOMETHING.  
05 20 54+  
CDR: WE -- WE WILL.
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-FLIGHTED TIMES, AND EXCERPTS FROM THE AIR-TO-GROUND TRANSCRIPT

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<th>JET CREW CONTENTS</th>
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<tr>
<td>BAG 504</td>
<td>2 CHIPS OF HOST ROCK FOR BAG 503 CLASTS</td>
<td>72430*</td>
<td>SAME AS</td>
<td>CDR CHIPS. LET ME GET A PIECE OF THE ROCK IT'S IN, AND I'M GOING TO TAKE A CLOSEUP SHOT OF THAT.</td>
</tr>
<tr>
<td>BAG 505</td>
<td>SOIL</td>
<td>72440*</td>
<td>SAME AS</td>
<td>CDR LOOK OUT, JACK.</td>
</tr>
<tr>
<td>BAG 506</td>
<td>SOIL</td>
<td>72440*</td>
<td>SAME AS</td>
<td>CDR BOB, THIS BIG WHITE CLAST - I'M NOT SURE THERE AIN'T SOME SMALLER ONES IN SOME OF THOSE OTHER BIG BOULDERS. THAT'S JUST AN INTUITIVE GUESS.</td>
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EXCERPTS FROM THE AIR-TO-GROUND TRANSCRIPT

- "I'm going to take a closeup shot of that."
- "That's the old boulder-rolling trick."
- "Get the soil from right underneath the rock - down to about 4 centimeters - in 505. And I'll try to skim it here a little, too. Get the upper centimeter."
- "Bob, this big white clast - I'm not sure there aren't some smaller ones in some of those other big boulders. That's just an intuitive guess."
- "Oh, there are."
- "But we never saw any as obviously big, as gross as this one. Such as this particular boulder I photographed, I had three of them other than the one we sampled. And that's 505 and 506, in that order."
BAG 507 RAKE FRAGMENTS

CC 05, WE'D LIKE YOU GUYS TO GET GOING ON THE RAKE.

IMP, I'M GOING TO HAVE TO MOW OUT HERE. I WANT, CC CK, WE

I D LIKE YOU GUYS TO GET GOING ON THE RAKE. IMP

IMP, I'M GOING TO HAVE TO MOW OUT HERE. CC CK, WE

I D LIKE YOU GUYS TO GET GOING ON THE RAKE. IMP

IMP, I'M GOING TO HAVE TO MOW OUT HERE. IMP

...

BAG 508

CC GET THE SOIL.

IMP, GET THE SOIL, THEY CALL IT.

IMP, GET THE SOIL, THEY CALL IT.

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<th>EVA 2 – TRAVERSE, STATION 2 – STATION 2A</th>
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**Sample Type**

<table>
<thead>
<tr>
<th>Sample Weight (g)</th>
<th>Sample Type</th>
<th>Lower-Subface</th>
<th>Alt</th>
<th>Crew Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMP 05 21 07+</td>
<td>IMP</td>
<td>THESE TWO MAJOR KINDS OF ROCKS THAT WE SAMPLED THERE – IT WAS ABOUT THE TWO VARIETIES WE SAW IN THE AREA. IT'S A LIGHT EXTRACTION I REALIZE, BUT THEY COULD HAVE BEEN IN COLOR, AND I BELIEVE IN TEXTURE, THE BLUE-GREY ROCKS AND THE LIGHT TAN ROCKS UP ON THE MASSIF. SO I FEEL HIGHLY CONFIDENT THAT WE SAMPLED AT LEAST THE TWO MAJOR UNITS VISIBLE FROM A DISTANCE IN THE SOUTH MASSIF.</td>
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<tr>
<td>CC 05 21 09+</td>
<td>CC ROVER SAMPLE – USED TO BE AT 073 AND 0.3 – HALFWAY OUT TO HOPE-IN-THE-WALL. WE'RE NOW GOING TO HAVE THAT ROVER SAMPLE STOP AT 078 AND 0.5. THEY SHOULD BE ALONG YOUR TRACKS – WE'RE GOING – TO GET A GRAVIMETER READING AT THAT LOCATION.</td>
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<tr>
<td>LMP 05 21 11 10</td>
<td>LMP – LOOKING AT THE LIGHT MANTLE, NO MORE COMMENTS EXCEPT THAT IF YOU GET SALTED AND JUST LOOKING, THERE CERTAINLY ARE FEW FRAGMENTS THAN WE SAW AT STATION 2. THE MAIN THING THAT WE CAN TELL ABOUT THE LIGHT MANTLE AND WHEN WE'RE ON IT, OF COURSE, IS THE LIGHT-COLORED CRATERS. THE費SERE CRATERS ALL APPEAR TO BE LIGHT COLORED. AS THEY GET OLDER, THE ALBEDO GOES DOWN AND POTENTIALLY HAVE BEEN COATS WITH MATERIAL FROM THE DARK MANTLE OR FROM OTHER SITES. EITHER THAT OR IT'S JUST THE LUNAR PATINATION THAT WE'RE ALL FAMILIAR WITH.</td>
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<tr>
<td>LMP 05 21 11+</td>
<td>LMP NOSE OF THE CRATERS OUT HERE IN THE LIGHT MANTLE APPEAR TO SHOW – THEY'VE GOT NEW BEDROCK. ALMOST ALL OF THEM ARE INSTANT ROCK CRATERS.</td>
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<tr>
<td>EVA 2 – STATION 2A</td>
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**Crew Comments**

- IMP 05 21 07+ I'M STOPPING HERE.
- IMP 05 21 12+ AND THE POWER … SHOULD BE FAIRLY FLAT FOR THE GRAVIMETER.
- CC AND, JACK, I PRESUME YOU'RE GETTING SOME ROVER SAMPLES HERE OFF THE POWER.

<table>
<thead>
<tr>
<th>BAG 30E</th>
<th>SOIL</th>
<th>05 21 15+</th>
<th>LMP</th>
<th>BAG 30 EASY, INSTANT ROCK CUT OF A 3-PETER PIT BOTTOM CRATER.</th>
</tr>
</thead>
<tbody>
<tr>
<td>73120*</td>
<td></td>
<td>05 21 15+</td>
<td>CC</td>
<td>A CHUCK OF YELLOW-COLORED ROCK THAT APPEARS TO BE A FEW SPOTS BEHIND IT, PROBABLY INDICATING A REFLECTION FROM WHICH IT CAME.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>05 21 15+</td>
<td>LMP</td>
<td>I'M LOVING IT. I CAN GET YOU SOME INSTANT ROCK CUT OF A 3-PETER PIT BOTTOM CRATER.</td>
</tr>
<tr>
<td>BAG 31E</td>
<td>ROCK</td>
<td>05 21 17+</td>
<td>LMP</td>
<td>A CHUCK OF YELLOW-BROWN ROCK THAT APPARENTLY HAS SEVERAL SPOTS BEHIND IT, PROBABLY INDICATING A REFLECTION FROM WHICH IT CAME.</td>
</tr>
<tr>
<td>73130*</td>
<td>138-21096 XEB</td>
<td>05 21 17+</td>
<td>LMP</td>
<td>THAT IS A REFLECTION. THAT REALLY FOULED ME. A REFLECTION OFF THE MYLAR. CRASSY, WELL, WHAT THE HECK, I'LL SAMPLER IT ANYWAY.</td>
</tr>
<tr>
<td>73135*</td>
<td>138-21097 XEB</td>
<td>05 21 17+</td>
<td>LMP</td>
<td>A CHUNK OF YELLOW-BROWN ROCK THAT APPARENTLY HAS SEVERAL SPOTS BEHIND IT, PROBABLY INDICATING A REFLECTION FROM WHICH IT CAME.</td>
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<td>05 21 17+</td>
<td>LMP</td>
<td>I'M LOVING IT. I CAN GET YOU SOME INSTANT ROCK CUT OF A 3-PETER PIT BOTTOM CRATER.</td>
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<tr>
<td>BAG 32E</td>
<td>ROCK</td>
<td>05 21 17+</td>
<td>LMP</td>
<td>A CHUNK OF YELLOW-BROWN ROCK THAT APPEARS TO BE A FEW SPOTS BEHIND IT, PROBABLY INDICATING A REFLECTION FROM WHICH IT CAME.</td>
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<tr>
<td>73150*</td>
<td>138-21098 XEB</td>
<td>05 21 17+</td>
<td>LMP</td>
<td>THAT IS A REFLECTION. THAT REALLY FOULED ME. A REFLECTION OFF THE MYLAR. CRASSY, WELL, WHAT THE HECK, I'LL SAMPLER IT ANYWAY.</td>
</tr>
<tr>
<td>73155*</td>
<td>138-21099 XEB</td>
<td>05 21 17+</td>
<td>LMP</td>
<td>A CHUNK OF YELLOW-BROWN ROCK THAT APPEARS TO BE A FEW SPOTS BEHIND IT, PROBABLY INDICATING A REFLECTION FROM WHICH IT CAME.</td>
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<td></td>
<td>05 21 17+</td>
<td>LMP</td>
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<td>05 21 21+</td>
<td>CDR</td>
<td>ABOUT 2 INCHES BELOW THE SURFACE HERE, YOU RAN INTO THAT BLUE-GRAY MATERIAL DOWN THERE AND IT'S IN LITTLE CLODS, AND IT BREAKS APART IN YOUR HANDS.</td>
</tr>
<tr>
<td>BAG 40Y</td>
<td>SOIL</td>
<td>05 21 21+</td>
<td>CDR</td>
<td>DID YOU GET SOME OF THAT IN YOUR ROVER SAMPLE?</td>
</tr>
<tr>
<td>73140*</td>
<td></td>
<td>05 21 21+</td>
<td>LMP</td>
<td>NO, BUT I GOT IT OUT OF THAT INSTANT ROCK CUT.</td>
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<td></td>
<td></td>
<td>05 21 21+</td>
<td>CDR</td>
<td>LET'S GRAB A QUICK ROVER SAMPLE AND WE'LL TAKE OFF.</td>
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<td></td>
<td></td>
<td>05 21 23 06</td>
<td>CDR</td>
<td>YES, WELL YOU KNOW, WE HAVEN'T BEEN TRENCHING A LOT WE SHOULD DO, WE WOULD HAVE - -</td>
</tr>
<tr>
<td></td>
<td></td>
<td>05 21 23 06</td>
<td>LMP</td>
<td>BUT, REALLY THOSE TRENCHES - THOSE CRATERS ARE GIVING US THE SAME INFORMATION. THAT THERE'S A LIGHT-COLORED MATERIAL UNDERNEATH.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>05 21 23 06</td>
<td>CC</td>
<td>OK, OK, WE'RE READY FOR YOU GUYS TO MOV ON AND WE'D LIKE TO ELIMINATE THE ROVER SAMPLE AT NOON-IN-THE-WALL.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>05 21 23 06</td>
<td>CDR</td>
<td>OK, BOY, WE'RE GETTING ON NOW.</td>
</tr>
<tr>
<td>BAG 40Y</td>
<td>SOIL</td>
<td>05 21 23+</td>
<td>LMP</td>
<td>FORTY YANKER.</td>
</tr>
<tr>
<td>73140*</td>
<td>SAME AS BAG 32E</td>
<td>05 21 23+</td>
<td>LMP</td>
<td>THAT'S LIGHT-COLORED SOIL FROM A DEPTH OF ABOUT 10 CENTIMETERS, BUT MOSTLY LIGHT-COLORED SOIL FROM A DEPTH OF ABOUT 15 CENTIMETERS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>05 21 23+</td>
<td>LMP</td>
<td>IT LOOKS LIKE THE LIGHT MANTLE IN HERE IS COVERED WITH DIRT TO A DEPTH OF ABOUT 5 TO 10 CENTIMETERS.</td>
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<td>05 21 17+</td>
<td>LMP</td>
<td>THAT IS A REFLECTION. THAT REALLY FOULED ME. A REFLECTION OFF THE MYLAR. CRASSY, WELL, WHAT THE HECK, I'LL SAMPLER IT ANYWAY.</td>
</tr>
<tr>
<td>73135*</td>
<td>138-21097 XEB</td>
<td>05 21 17+</td>
<td>LMP</td>
<td>A CHUNK OF YELLOW-BROWN ROCK THAT APPEARS TO BE A FEW SPOTS BEHIND IT, PROBABLY INDICATING A REFLECTION FROM WHICH IT CAME.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>05 21 17+</td>
<td>LMP</td>
<td>I'M LOVING IT. I CAN GET YOU SOME INSTANT ROCK CUT OF A 3-PETER PIT BOTTOM CRATER.</td>
</tr>
<tr>
<td>BAG 32E</td>
<td>ROCK</td>
<td>05 21 17+</td>
<td>LMP</td>
<td>A CHUNK OF YELLOW-BROWN ROCK THAT APPEARS TO BE A FEW SPOTS BEHIND IT, PROBABLY INDICATING A REFLECTION FROM WHICH IT CAME.</td>
</tr>
<tr>
<td>73150*</td>
<td>138-21098 XEB</td>
<td>05 21 17+</td>
<td>LMP</td>
<td>THAT IS A REFLECTION. THAT REALLY FOULED ME. A REFLECTION OFF THE MYLAR. CRASSY, WELL, WHAT THE HECK, I'LL SAMPLER IT ANYWAY.</td>
</tr>
<tr>
<td>73155*</td>
<td>138-21099 XEB</td>
<td>05 21 17+</td>
<td>LMP</td>
<td>A CHUNK OF YELLOW-BROWN ROCK THAT APPEARS TO BE A FEW SPOTS BEHIND IT, PROBABLY INDICATING A REFLECTION FROM WHICH IT CAME.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>05 21 17+</td>
<td>LMP</td>
<td>THAT IS A REFLECTION. THAT REALLY FOULED ME. A REFLECTION OFF THE MYLAR. CRASSY, WELL, WHAT THE HECK, I'LL SAMPLER IT ANYWAY.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>05 21 21+</td>
<td>CDR</td>
<td>ABOUT 2 INCHES BELOW THE SURFACE HERE, YOU RAN INTO THAT BLUE-GRAY MATERIAL DOWN THERE AND IT'S IN LITTLE CLODS, AND IT BREAKS APART IN YOUR HANDS.</td>
</tr>
<tr>
<td>BAG 40Y</td>
<td>SOIL</td>
<td>05 21 21+</td>
<td>CDR</td>
<td>DID YOU GET SOME OF THAT IN YOUR ROVER SAMPLE?</td>
</tr>
<tr>
<td>73140*</td>
<td></td>
<td>05 21 21+</td>
<td>LMP</td>
<td>NO, BUT I GOT IT OUT OF THAT INSTANT ROCK CUT.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>05 21 21+</td>
<td>CDR</td>
<td>LET'S GRAB A QUICK ROVER SAMPLE AND WE'LL TAKE OFF.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>05 21 23 06</td>
<td>CDR</td>
<td>YES, WELL YOU KNOW, WE HAVEN'T BEEN TRENCHING A LOT WE SHOULD DO, WE WOULD HAVE - -</td>
</tr>
<tr>
<td></td>
<td></td>
<td>05 21 23 06</td>
<td>LMP</td>
<td>BUT, REALLY THOSE TRENCHES - THOSE CRATERS ARE GIVING US THE SAME INFORMATION. THAT THERE'S A LIGHT-COLORED MATERIAL UNDERNEATH.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>05 21 23 06</td>
<td>CC</td>
<td>OK, OK, WE'RE READY FOR YOU GUYS TO MOV ON AND WE'D LIKE TO ELIMINATE THE ROVER SAMPLE AT NOON-IN-THE-WALL.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>05 21 23 06</td>
<td>CDR</td>
<td>OK, BOY, WE'RE GETTING ON NOW.</td>
</tr>
<tr>
<td>BAG 40Y</td>
<td>SOIL</td>
<td>05 21 23+</td>
<td>LMP</td>
<td>FORTY YANKER.</td>
</tr>
<tr>
<td>73140*</td>
<td>SAME AS BAG 32E</td>
<td>05 21 23+</td>
<td>LMP</td>
<td>THAT'S LIGHT-COLORED SOIL FROM A DEPTH OF ABOUT 10 CENTIMETERS, BUT MOSTLY LIGHT-COLORED SOIL FROM A DEPTH OF ABOUT 15 CENTIMETERS.</td>
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<tr>
<td></td>
<td></td>
<td>05 21 23+</td>
<td>LMP</td>
<td>IT LOOKS LIKE THE LIGHT MANTLE IN HERE IS COVERED WITH DIRT TO A DEPTH OF ABOUT 5 TO 10 CENTIMETERS.</td>
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### Cross-Reference of Lunar Samples with Locations, Photographs, Apollo-12 Collected Times

#### Sample Weight

<table>
<thead>
<tr>
<th>Number</th>
<th>(g)</th>
<th>Sample Type</th>
<th>Lunar Surface</th>
<th>Aft</th>
<th>Crew Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVA 1 - STATION 2A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05 21 23+</td>
<td>CDP</td>
<td>WE'RE ROLLING.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>05 21 25 08</td>
<td>CC</td>
<td>OK, THEN THAT.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>05 21 26 25</td>
<td>LMP</td>
<td>I THINK WE HAVE A GOOD SAMPLE OF ONLY PARTIALLY COMMUNICATED LIGHT MANTLE IN THIS LAST ROVER SAMPLE THAT CAME ACCIDENTALLY DISCOVERED WAS RIGHT UNDER OUR FEET. IT'S ALMOST CERTAINLY THE LIGHT-COLORED MATERIAL THAT WE'VE BEEN TALKING ABOUT IN THE WALLS OF THE CRATER, AND, AS A MATTER OF FACT, THAT INSTANT ROCK SAMPLE I TOOK WAS LIGHT-COLORED AND PROBABLY REPRESENTS THE SAME STUFF, INTEGRATED SLIGHTLY.</td>
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<tr>
<td>05 21 26+</td>
<td>CDR</td>
<td>LIGHT-COLORED MANTLE HAS THAT BLUISH TINT THAT YOU SAW IN THOSE ROCKS.</td>
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<tr>
<td>EVA 2 - TRAVERSE, STATION 2A - STATION 3</td>
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<tr>
<td>05 21 26+</td>
<td>LMP</td>
<td>I HAVE A FEELING THAT WHATEVER DARKENS THE - COB, THERE'S A BEAUTIFUL LITTLE GLASS-LINED CRATER, BIGHT BOTTOM CRATER - WHATEVER DARKENS THE LIGHT MANTLE IS NOT A ONE-TIME ONLY MANTLING OF DARKER MATERIAL. IT'S SOMETHING THAT HAPPENS OVER A PERIOD OF TIME, CONTINUALLY, BECAUSE CRATERS OF ALL SIZES AND APPARENT DEGRADATION ARE DARKENED AND THERE ARE LIGHTER CRATERS THAT ARE LIGHT TO VARYING DEGREES, THERE SEEM TO BE A CONTINUUM OF ALBEDO CHANGE.</td>
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<tr>
<td>05 21 33+</td>
<td>LMP</td>
<td>THE LIGHT MANTLE IS A UNIFORM SURFACE AND I THINK YOU'VE HEARD JUST ABOUT EVERYTHING WE'VE HAD TO SAY SO FAR.</td>
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<tr>
<td>05 21 33+</td>
<td>LMP</td>
<td>THE FRAGMENT POPULATION HASN'T CHANGED, NOR HAS THE CRATER POPULATION, AS NEAR AS I CAN TELL.</td>
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</table>
05 21 35+ LMF HERE'S A NICE SHARP LITTLE HOLE; LOOK AT THAT. THE TEXTURE OF THE LIGHT MANTLE - SURFACE TEXTURE - IS REALLY VERY DIFFERENT ON THE SCARP, ON THE PLANE, OR ACTUALLY TO THE EAST OF THE SCARP. FRAGMENTS POPULATION, CRATER POPULATION, EVERYTHING LOOKING ABOUT THE SAME. IF THERE IS SUCH A THING AS A LIGHT MANTLE, IT SEEMS TO BE UNIFORM ACROSS THE SCARP.

05 21 40+ CDR THAT WAS AT 087/6.0. I THINK THAT'S PROBABLY ABOUT RIGHT. WHY DON'T WE STOP HERE?

05 21 43+ CDR WE'VE GOT SOME BOULDERS OVER HERE THAT ARE IN THE LIGHT MANTLE.

05 21 43+ CDR WE CAN SEE A LITTLE BIT DOWN INTO LARA, TOO.

05 21 43+ CDR WE'LL PARK RIGHT OUT HERE AND WE CAN WORK THOSE BLOCKS RIGHT BEHIND US.

05 21 43+ CDR I'M LOOKING FOR A LEVEL SPOT, BUT MY GOSH, THERE'S NOT VERY MANY.

05 21 43+ CDR 087 AND 12.6, 6.0.

ARRIVE STATION 3

EVA 2 - STATION 3

05 21 46+ CDR 087 AND 12.6, 6.0.

05 21 46+ CDR LOOKS LIKE A REALLY GOOD LOCATION TO SAMPLE THE RIM MATERIALS OF THIS CRATER.

05 21 46+ LMF BOB, I'M AT THE SOUTH, LET'S SAY THE EAST-SOUTH-EAST RIM OF A - O, 30-METER CRATER IN THE LIGHT MANTLE, OF COURSE, UP ON THE SCARP AND MAYBE 300 - 300 METERS FROM THE RIM OF LARA IN THE SOUTHWEST DIRECTION.

05 21 46+ CDR ... THERE'S ONLY ABOUT A HALF A CENTIMETER OF GRAY COVER OVER VERY WHITE MATERIAL THAT FORMS THE RIM.
### CROSS-REFERENCE OF LUNAR SAMPLE WITH LOCATION, PHOTOGRAPH, POLLO-SLAPPED TIME, AND COMMENTS FROM THE AIR-TO-GROUND TRANSCRIPT

<table>
<thead>
<tr>
<th>SAMPLER NUMBER</th>
<th>WEIGHT (G)</th>
<th>SAMPLE TYPE</th>
<th>LIGHT-SURFACE PHOTOGRAPH</th>
<th>JPT</th>
<th>CREW COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAG 520</td>
<td>TRENCH SOIL</td>
<td>SAME AS BAG 520</td>
<td>05 21 51+</td>
<td>LMP</td>
<td>I DUG A TRENCH IN THE SIDE OF THIS CRATER. I'VE GOT DOWN-GO PICTURES OF IT. THERE IS ENOUGH MARELLING OF LIGHT AND DARK SOIL OR FINE GRAINED MATERIAL. IT LOOKS AS IF THERE'S A UNIFORM, ABOUT 3-CENTIMETER LAYER OF LIGHT MATERIAL OVER THAT MARELLING LIGHT AND DARK. ON THE VERY TOP SURFACE, THERE'S A HALF CENTIMETER OF LIGHT GRAY, AND WHEN I SAY DARK, I MEAN A MEDIUM GRAY. I'M GOING TO SWAP SAMPLING THE SOILS, AND THEN I'LL GET YOU THE FRAGMENTS.</td>
</tr>
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<td>7320*</td>
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</table>

| BAG 521        | TRENCH SOIL | SAME AS BAG 520 | 05 21 56 36 | LMP | THE UPPER 5 CENTIMETER - 3 CENTIMETERS MIXED WITH THAT UPPER HALF CENTIMETER, IS IN THE NEXT SAMPLE. |
| 73240*         |             |              | 05 21 57+   | LMP | BAG 521 IS THE SAMPLE BAG. |

| BAG 522        | TRENCH SOIL | SAME AS BAG 520 | 05 21 58 29 | LMP | THE NEXT SAMPLE IS MOSTLY THE MEDIUM GRAY FRACTION OF THE MARELLING. IT'S MIXED, though. |
| 73260*         |             |              | 05 21 59 19 | LMP | THAT'S IN BAG 522. |

| BAG 523        | TRENCH SOIL | SAME AS BAG 520 | 05 22 00+ | LMP | THE WHITE FRACTION IN THE MARELLING TONE IN 523. |
| 73280*         |             |              |           |     |                                                   |

| BAG 524        | SOIL       | SAME AS BAG 520 | 05 22 00+ | LMP | 524 IS WHAT I THINK IS A BLUE-GRAY ROCK PROBABLY EFFUSIVE. IT'S COVERED BY A LITTLE DUST |
| 73230*         |            |               | 05 22 00+ | LMP | FEW JUST OFF THE RIP OF THIS LITTLE CRATER. |
| 73235*         | ROCK       |               | 05 22 00+ | CC  | IT'S A BLUE-GRAY ROCK, IT'S NOT PART OF THE TRENCH, RIGHT? YOU FINISH WITH THE TRENCH? |
|                |            |               | 05 22 00+ | LST | YES. |

| EVA 3 = STATION: 3 |

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EVA 3 = STATION: 3
WHAT I KNOW IS BLUISH-GRAY BRECCIA IS NOT IT. AND YON JUST S COOP INC UP IT. IT'S LIGHT-COLORED ROCKS, THOUGH.

BOB, I FORGOT TO GIVE YOU THE CORE NUMBERS, BUT I WILL. OK. AND DON'T FORGET TO PUT YOUR LITTLE NOTE IN THE LONG CAN THERE. OH, I'LL GET THE NOTE IN THERE. NOBODY WILL EVER KNOW.

WHEN I BROKE THE CORES APART, THERE'S JUST A LOT OF DRIFTCLODS AND THE BOTTOM CORE'S FULL; BUT ABOUT AN INCH AND A HALF OF THE CORE JUST ZERO TO-1/4---1/2---ITSELF RIGHT OUT.

OH, WE CRY THAT, I GUESS WE STILL JUST COVER IT, AND SEE WHAT WE PUT. MIGHT JUST AGAIN TRYING CONTRACTING IT AFTER THAT'S THROUGH, AFTER YOU'RE DONE WITH THE LOWER CORP.

YOU'VE GOT TWO-THIRDS OF A CORP AFTER I PANCED IT DOWN A LITTLE BIT.
CROSS-SECTION OF LAVA SAMPLES WITH LOCATION, DESCRIPTION, SAMPLE-PLATED TYPES, AND SYSTEMATIC OF THE SAMPLES INCLUDED.

<table>
<thead>
<tr>
<th>SAMPLE NUMBER</th>
<th>WEIGHT</th>
<th>SAMPLE TYPE</th>
<th>LAVA-SURFACE</th>
<th>PET</th>
<th>CBM CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAG 527</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>73215**</td>
<td></td>
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</tr>
</tbody>
</table>

SMAPLE WEIGHT

- SMAPLE TYPE - SURFACE - CONTACT

- CBM CONTENTS

EVA 2 - TRAVERSE, STATION 3 - STATION 4

05 22 26 OK. GOING TO SHORTY.
05 22 26+ CDR OK.
05 22 26+ LTP ON OUR WAY.

05 22 27+ CDR JUST DRIVE BY THIS BIG ROCK. WANT TO LOOK AT IT.
05 22 27+ LTP LOOKS LIKE ONE OF THE Gray BRECCIAS.
05 22 27+ LTP BIG 3- TO 4-METER BLOCK OUT HERE ALL BY ITSELF ON THE LIGHTWATTLE. I GOT SOME PICTURES. IT WAS AT 18/2.6.
05 22 27+ LTP AND IT LOOKED LIKE A Gray BRECCIA. I'M NOT SURE THOUGH, ALL I COULD SEE WAS THE SURFACE TEXTURE, AND IT HAD THE NODULAR OR ELONGATE NODULAR TEXTURE THAT THOSE BRECCIAS HAD UP ON THE SOUTH PASSIF.

05 22 29+ LTP AS FAR AS ANY OF THE THINGS WE TALKED ABOUT TRYING TO CAP AT THE SURFACE, DYNAMICS OR A VARIATION OF THE LIGHTWATTLE, I THINK YOU'VE HEARD IT ALL. THERE ISN'T MUCH TO SAY ABOUT THE DYNAMICS RIGHT NOW. I HAVE A FEELING THAT THE SURFACES ARE OLD ENOUGH THAT ALL THOSE KINDS OF DETAIL RELATIONSHIPS HAVE BEEN OBSCURED. FILLETING IS JUST ABOUT THE SAME ALL OVER HERE, IT VARIES, BUT THERE ARE NO SYSTMATICS THAT I'VE SEEN.
LRV SAMPLE #5

137-20963 LRV 05 22 29+ LMP YES, THAT'S WHAT THEY CALL A PIT CRATER. CAN YOU SWING A LITTLE BIT AND LET ME GET THAT FRAGMENT CRATER? SEE THAT ONE ON YOUR LEFT THERE?

133-20208 LRV

05 22 29+ CDR GET YOUR PICTURES?

05 22 31 04 LMP YES, I GOT THEM.

05 22 31+ CDR WE'RE AT 094/5.3 FOR A QUICK ROUTE SAMPLE OF A VERY, VERY FRAGILE CRATER. THE EJECTA IS ABOUT 50-PERCENT SMALL ANGULAR FRAGMENTS, MUCH DIFFERENT THAN WE HAVE SEEN BEFORE IN TERMS OF THE TYPE OF PATTERNS.

05 22 31 35 LMP OK, AND THAT'S IN BAG 41 YANKEE.

05 22 31 40 CDR AND WE'RE ON OUR WAY.

05 22 32 17 LMP I COULDN'T TELL WHETHER THAT WAS JUST - IT LOOKED LIKE THAT MIGHT HAVE BEEN A CRATER THAT HAD GOTTEN TO BEDROCK. THERE MAY HAVE BEEN A HIGH POINT, OR LET'S SAY A THIN POINT IN THE LIGHT ROUTE, AND IT GOT DOWN TO BEDROCK. BUT I CAN'T - IT'S THE MOST BLOCKY-RIMMED CRATER WE'VE BEEN FOR A LONG TIME.

05 22 32+ LMP IT WAS ABOUT 15 METERS IN DIAMETER.

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LRV SAMPLE #6

194-21020 LRV 05 22 34 08 CC OK, AND 17, THE WORD FROM THE BACKROOM IS - WITH THAT LAST ROVER SAMPLE YOU GOT, WE'D LIKE TO GO STRAIGHT TO STATION 4 - AND WE WON'T GET THE ONE HERE AT 094 AND 5.3 - 5.1,...

05 22 34+ LMP I THOUGHT THE PURPOSE WAS TO SAMPLE THE LIGHT MANTLE?

05 22 34+ LMP WE DIDN'T SAMPLE LIGHT MANTLE AT THAT LAST ONE.

05 22 34+ CC - - I AGREE. I TALKED TO THEM ABOUT THAT, BUT THEY ARE SO ANXIOUS TO GET TO STATION 4, I GUESS THEY DON'T WANT TO DO IT.

05 22 34+ LMP WELL, HOW ABOUT IT, GENE? A LITTLE REAL TIME -

05 22 34+ CDR I THINK WE GOT TO, RIGHT HERE.

05 22 34+ CDR 094, 5.1. YOU GOT YOUR PICTURE?

05 22 34+ LMP YES.

05 22 34+ LMP WE'LL GET THE SAMPLE - ANYWAY.

05 22 35 58 CDR OK, 094, 5.1.

05 22 35 02 CDR SAMPLE IS IN 42 YANKEE.

05 22 35 13 CDR AND WE ARE ROLLING.

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CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLO-FLAPPED TIMES, AND EXCERPTS FROM THE AIR-TO-CRISIS TRANSCRIPT

| SAMPLE WEIGHT | SAMPLE TYPE | LUNAR-SURFACE | PHOT| PHOT| PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | PHOTOGRAPHS | 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We've got a large boulder of very intensely fractured rock, right on the rim. Right near the house, it looks like a finely vesicular version of our clinopyroxene gabbro. It's obviously crystalline and has generally that same appearance. There is, in one spot, some inclusions of a darker gray rock also intensely fractured. The fracture system, I think, will show up well in the flight-line stereo.

Where are the reflections? I've been fooled once. There's orange soil!

It's all over! Orange!

I stirred it up with my feet.

Hey, it is! I can see it from here!

It's orange!

Wait a minute, let me put my visor up. It's still orange!

Sure it is! Crazy! Orange! I've got to dig a trench, Houston.

It's almost the same color as the LMP decal on my camera.

That is orange, Jack!

It's trench time. You can see this in your color television, I'll bet you.

Jack, that is really orange. It's been oxidized.

It looks just like an oxidized desert soil, that's exactly right.

That orange is along a line along the rim crest - circumferential?

Yes, if there ever was something that looked like a fumarole action, this is it.

I've trenches across the trend of the yellow - or the orange, there is light gray material on either side.
### CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-TAPPED TIMES, AND EXCERPTS FROM THE AIR-TO-GROUND TRANSCRIPT

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<thead>
<tr>
<th>SAMPLE NUMBER</th>
<th>WEIGHT</th>
<th>SAMPLE TYPE</th>
<th>LOCATION REFERENCE</th>
<th>AIT (PPO)</th>
<th>CREW COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAG 509</td>
<td>74220</td>
<td>ORANGE SOIL</td>
<td>137-20984 XSA</td>
<td>05 22 51+</td>
<td>CDR LET'S START SAMPLING THAT TRENCH.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>137-20985 XSA</td>
<td>05 22 51+</td>
<td>CDR TRICKY, RIGHT, AND IT'S ON BOTH SIDES.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>137-20986 XSA</td>
<td>05 22 51+</td>
<td>CDR BEFORE YOU DISTILL, LET ME JUST GET A FEW SAMPLES OF CLOSE UPS OF THAT.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>137-20987 XSA</td>
<td>05 22 51+</td>
<td>CDR YES, CAN YOU GET A DOWN-SUN? I THINK YOUR COLOR WILL BE BEST DOWN-SUN.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>137-20988 XSA</td>
<td>05 22 51+</td>
<td>CDR IT'S QUITE - IT'S INDURATED.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>137-20989 XSA</td>
<td>05 22 51+</td>
<td>CDR BAG 509 HAS GOTTEN THE - THE ORANGE MATERIAL FROM, OH, ABOUT 2 TO 3 INCHES DOWN.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>137-20990 XSA</td>
<td>05 22 51+</td>
<td>CDR IT'S QUITE - IT'S INDURATED.</td>
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<td></td>
<td></td>
<td></td>
<td>05 22 53 49 CDR</td>
<td>05 22 51+</td>
<td>CDR BAG 509 HAS GOTTEN THE - THE ORANGE MATERIAL FROM, OH, ABOUT 2 TO 3 INCHES DOWN.</td>
</tr>
<tr>
<td>BAG 510</td>
<td>74240</td>
<td>GRAY SOIL</td>
<td>SAME AS BAG 509</td>
<td>05 22 51+</td>
<td>CDR IT'S QUITE - IT'S INDURATED.</td>
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<tr>
<td></td>
<td>1040.0</td>
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<td>05 22 51+</td>
<td>CDR IT'S QUITE - IT'S INDURATED.</td>
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Bag 511
74260 (525.0) GRAY SOIL E same as bag 509

05 22 54+ LPfp "just to be sure, why don't we sample this side of it, too?"
05 22 55+ cdr 511 has the gray from the other side of the orange band; and the other side happens to be the crater side.
05 22 55+ LMP "that's right, yes?"
05 22 55+ cdr o.k., i'm going to see if this does or don't here:
05 22 55+ LPfp "as a tour?"
05 22 55+ cdr it looks like it's ellipsoidal area if my footprints are any indication.
05 22 55+ LMP "we'd like to get the double core here."
05 22 55+ cdr did you want it in the orange?
05 22 55+ LMP "no, that's affm.
05 22 55+ LMP "well, it's a vertical stratigraphy. do you want to go sideways a little with it? or you just want to get it as deep as you can, huh?"

05 22 56 52 LMP "let's go as deep as we can in the orange."

------------------------------------------------------------------------
U35/L44 DOUBLE DRIVE 74260/395.0 TUBE INTO 74001 1097.0 ORANGE SOIL ZONE

05 22 57+ LMP "the upper portion of the core is going to be a little bit disturbed, because we've walked around the area so much."
05 22 57 15 cdr "the bottom will be 44, and the top will be 35."
05 22 59+ cdr was the gray mantle over the top of this, or was this showing all the way through to the surface."
05 22 59+ LMP "no, it was over the top. it was about a half a centimeter over the top."
05 22 59+ cdr he's getting about 3 centimeters a whack."
05 22 59+ cdr "very good."
05 22 59+ cdr "i'll tell you, it's a lot harder going in than that double core was back there. it's pretty hard."
05 22 59+ LMP "it acts like it's inherently cohesive. it breaks up in angular fragments."
05 22 59+ LMP "an essential portion of the zone actually has a crimson hue, or red hue. outside of that it's orange. and outside of that, it's gray."
05 22 59+ cdr "ok, let me hit some more. ready?"
05 22 59+ cdr "here he's still getting a centimeter a whack. poor guy. i better get a locator."
05 23 01 05 cdr "the only thing i question is our ability to get it out. man, that's really hit bottom."
05 23 01 57 cdr "full slowly, slowly so i can cap it all right. let's get a cap."

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<table>
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<tr>
<th>Sample Number</th>
<th>Sample Type</th>
<th>Location-Surface</th>
<th>Alt. Loc.</th>
<th>Crew Comments</th>
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<tbody>
<tr>
<td>74230*</td>
<td>Fine Grained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>74231*</td>
<td>Basalt</td>
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**EVA 2 - STATION 4**

05 23 01+ CDR: **EVERY CORE IS RED! THE BOTTOM ONE'S BLACK — BLACK AND ORANGE, AND THE TOP ONE'S GRAY AND BROWN!**

05 23 01+ LMP: **THE FACT IS, THE BOTTOM OF THE CORE IS VERY BLACK COMPARED TO ANYTHING WE'VE SEEN.**

05 23 01+ CDR: **WE MUST HAVE GONE THROUGH THE RED SOIL BECAUSE IT'S FILLED, BUT IT'S FILLED WITH A BLACK MATERIAL.**

05 23 01+ LMP: **THAT MIGHT BE MAGNETITE.**

05 23 01+ CDR: **YES, BOY, IT IS BLACK AND IS IT CONTRASTED TO THAT ORANGE STUFF. VERY BLACK, WELL, NOT VERY BLACK. IT'S A GOOD DARK GRAY. VERY DARK BLUSHY THING.**

05 23 03+ CDR: **THE BOTTOM OF THE UPPER CORE IS ALSO DARK.**

05 23 03+ CDR: **AND, LIKE YOU EXPECT, THE TOP OF THE BOTTOM CORE IS DARK, TOO.**

05 23 03+ LMP: **IF I EVER SAW A CLASSIC ALTERATION HALO AROUND A VOLCANIC CRATER, THIS IS IT. IT'S ELLIPTICAL, IT APPEARS TO BE ZONED. THERE'S ONE SAMPLE WE DIDN'T GET. WE DIDN'T GET THE MORE YELLOWY STUFF, WE GOT THE CENTER POSITION.**

**BAG 12E**

05 22 57+ CDR: **WHAT IS THAT RIGHT THERE?**

05 22 57+ LMP: **OH, IT'S A PIECE OF GLASS, PROBABLY.**

05 22 57+ CDR: **BOY, IT SURE IS.**

05 22 57+ CDR: **I'VE GOT A LITTLE PIECE OF GLASS IN MY POCKET.**

05 22 57+ CDR: **THERE WAS A LITTLE PIECE OF BLACK GLASS.**

05 22 57+ CDR: **THERE'S A LOT OF LITTLE PIECES — NOT A LOT — BUT ENOUGH THAT I'VE SEEN FIVE OR SIX OF THEM. LITTLE PIECES OF OBSIDIAN-LIKE GLASS. I GOT ONE IN MY POCKET. URBAGED. UNDOCUMENTED.**

---
06 02 32+ CDR I just got a rock out of my pocket. Then we were as shorty, fumbling around, trying to get everything done. I said there was a piece of very shiny black glass-like-looking material that reminded me of obsidian. Well, it's not. It looks like a very fine-grained gray rock. Not, it's a fractured piece and I've picked up fractures of about three or four vesicle faces on it. The vesicle faces are very shiny and that's what reflected and caught my eye. I picked it up shorty, undocumented, halfway between the rover and where we were sampling that orange stuff, and it will be in bag 12 echo.

06 22 32+ CDR We'll put it in SCB-B. 06 02 33+ LMP This rock looks very much like 1202B. It's a fine-grained, very coarsely vesicular gray rock—probably basaltic.

06 02 33+ LMP The vesicles, if I may project the size of them, probably were up to 4 or 5 centimeters in diameter. They're irregular in shape, but they're clearly vesicles and it looks like they are lined with either glass or very fine-grained crystals. They're very shiny.

06 02 05 23 03 42 CC We'd like to get a quick sample of the basalt up there on the rim, and Gene's stereo pan, and then press on.

05 23 03 02 CC We'd like to get a quick sample of the basalt up there on the rim, and Gene's stereo pan, and then press on.

05 23 03+ LMP OK, Bob, I'll get a sample. I'll sample it by hand, but it'll be documented, and I'll get it in a bag in a minute since I don't have any.

05 23 06 10 LMP Basalt is in bag 512.

05 23 08 37 CDR From where I am, about 100 meters around the west side of the rim of this crater, the mantle on the inside of the rim runs from this gray material we've been sampling in here to a very dark gray material. And there's a lot of stuff that goes down radially down into the pit of the crater.

05 23 08+ CER I got to take a couple of more pictures at that contact stuff over there. I know you can't see it from where you are, Jack, but I guess we got to leave. Otherwise it would be nice to sample that dark stuff up on top.

05 23 11+ LMP Bag 461 has another sample of basalt that I picked up right back where we dug the trench.

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Bag 512
74280*
74255*
BASALT

Bag 461
74270*
74275*
BASALT
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-PIPED TIMES,
AND EXCERPTS FROM THE AIR-TO-GOUND TRANSCRIPT

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<tr>
<td></td>
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<td>GEOLOGIC DESCRIPTIONS OF GHOSTY CRATER</td>
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<tr>
<td>05 23 11+</td>
<td>CDR</td>
<td>AS YOU LOOK AT THE INNER RIM - AS IT GOES DOWN TO THE RIGHT - YOU SEE A LOT OF BOULDERS - A LOT OF ROCKS THAT ARE PROTRUDING OUT, WHERE THAT ROCK PATTERN THINS OUT, JUST BEYOND THAT IS AN ORANGE - A VISIBLE ORANGE RADIAL PATTERN, AND THEN BEYOND THAT IS A DEFINITE CHANGE IN ALBEDO WHERE YOU GET THE GRAY MATERIAL, AND A DEFINITE CHANGE IN THE NUMBER OF ROCKS ON THE FLOOR.</td>
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</tr>
<tr>
<td>05 23 12+</td>
<td>CDR</td>
<td>THAT PARTICULAR RIM MATERIAL THERE CONTINUES AROUND TO THE DUE NORTH, AND THEN THERE'S A DRAMATIC CHANGE AGAIN WHERE YOU SEE THE INNER RIM COMPLETELY TERRACED WITH THIS BOULDER FILL.</td>
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</table>

LEAVING STATION 4

| 05 23 16+     | LMP         | OK, WE'RE Moving, HOUSTON. |
| 05 23 16+     | LMP         | SO YOU SAW A RADIAL ORANGE, HUH? |
| 05 23 16+     | CDR         | YES, IT WAS RADIAL, JACK. YOU COULD SEE IT VERY - IT'LL BE IN THE PICTURES. |
| 05 23 16+     | LMP         | THAT WAS ON THE INSIDE OF THE CRATER? |
| 05 23 16+     | CDR         | ON THE INSIDE RIM OF THE CRATER. |
| 05 23 16+     | LMP         | YES, THAT'S WHERE THE SURFACE ... KEEPS SLUMPING OFF SO IT'S EXPOSED, PROBABLY. |
| 05 23 16+     | LMP         | I DIDN'T HAVE TIME TO REALLY THINK AT THAT STATION BUT - IF I HADN'T SEEN THAT ALTERATION, AND ALL I'D SEEN - IS THE FRACTURED BLOCK ON THE RIM, - WHICH LOOKED LIKE THE STUFF IN THE BOTTOM - I MIGHT HAVE SAID IT WAS JUST ANOTHER IMPACT. BUT HAVING ALL THE COLOR CHANGES AND EVERYTHING, I THINK WE MIGHT HAVE TO CONSIDER THAT IT COULD BE A VOLCANIC VENT. |

EVA 2 - TRAVERSE, STATION 4 - STATION 5

| 05 23 23+     | CDR         | THAT'S VICTORY; LOOK AT IT GO TO THE LEFT AND LOOK AT IT GO TO THE RIGHT. THAT'S VICTORY; WE'RE RIGHT ON THE RIDGE. |
05 23 23+ CDR 106, 3,2
05 23 27+ CDR ORJ'Y, LFT' S GET A NICE ROVER SAMPL HERE.
05 23 27+ LMP LOOK AT THE LIGHT MANTLE OVER THERE.
05 23 27+ CDR YOU CAN SURE SEE IT NOW, CAN'T YOU NOW?
05 23 27+ LMP YES.
05 23 27+ CDR LET'S GET OUR ROVER SAMPLE.
05 23 29 01 CDR AND THE ROVER SAMPLE WILL BE FROM THE SAME
    LOCALITY. IT'S JUST A COUPLE OF METERS FROM
    THE CRATER.
05 23 29+ LMP YES. I HOPE I DIDN'T PUT TOO MUCH SOIL IN
    THERE FOR YOU.
05 23 29+ CDR BAG 43 YANKEE.

LNV SAMPLE #7
BAG 43V
75110* SOIL 133-20280 LNV

GEOLOGIC DESCRIPTION
05 23 31 20 CDR OF; WE ARE ROLLING, BY THE WAY, AND WE'RE AT
    106 AND -- WELL, WE'RE STILL 3,1.
05 23 31+ LMP IN THE RIM ITSELF THOUGH, VICTORY IS NOT BLOCKY.
    THERE IS SOME INCREASE IN FRAGMENT SIZE, BUT
    THAT SEEMS TO BE THE RESULT OF SOME CRATERS IN
    THE RIM THAT HAVE GOTTEN BELOW THE DFBRIS THAT'S
    CUTTING IT. I'D SAY THAT VICTORY'S SOMEWHAT LIKE
    HORIZON IN THAT IT HAS BLOCKY INNER WALLS BUT
    ESSENTIALLY A NORMAL BLOCK POPULATION ON THE RIM.
05 23 31+ LMP I THINK THAT THERE'S QUITE A VARIABILITY IN THE
    THICKNESS OF THE DARK MANTLE IN HERE. I DIDN'T
    NOTICE US CROSSING THAT ONE TONGUE OF LIGHT MANTLE.
05 23 31+ LMP OH, I THINK SO. I DON'T KNOW WHAT
    DARK MANTLE EXISTS. THESE CRATERS
    BIG NOT TO HAVE THROWN UP BLOCKS.
05 23 31+ LMP OR, WE ARE ROLLING, BY THE WAY. AND WE'RE AT
    106 AND -- WELL, WE'RE STILL 3,1.
05 23 31+ LMP AND I THINK YOU PROBABLY HAVE BOTH.

LNV SAMPLE #8
BAG 44V
75120* SOIL 133-20316 LNV 133-20317 LNV

05 23 31+ CDR OH; WE ARE ROLLING, BY THE WAY, AND WE'RE AT
    106 AND -- WELL, WE'RE STILL 3,1.
05 23 31+ LMP I THINK THAT THERE'S QUITE A VARIABILITY IN THE
    THICKNESS OF THE DARK MANTLE IN HERE. I DIDN'T
    NOTICE US CROSSING THAT ONE TONGUE OF LIGHT MANTLE.
05 23 31+ LMP OH, I THINK SO. I DON'T KNOW WHAT
    DARK MANTLE EXISTS. THESE CRATERS
    BIG NOT TO HAVE THROWN UP BLOCKS.
05 23 31+ LMP OR, WE ARE ROLLING, BY THE WAY. AND WE'RE AT
    106 AND -- WELL, WE'RE STILL 3,1.
05 23 31+ LMP AND I THINK YOU PROBABLY HAVE BOTH.
05 23 31+ LMP OK. RIGHT OUT IN THAT LITTLE INTER-CRATER AREA,
    RIGHT OUT IN THERE IS GOOD. IF YOU LET ME GUIDE
    YOU A LITTLE, I MIGHT GET A ROCK SMAPLE.
05 23 35+ CDR OH, PICK A POINT.
05 23 35+ LMP WHY? HOW WE'LL GIVE IT A TRY.
05 23 35+ CDR 103, 2.5.
05 23 36 27 LMP THE SOIL IS IN 44 YANKEE.
05 23 36+ LMP THAT BLOCK'S TOO BIG. I CAN'T GET IT.
05 23 37 04 LMP 123'S THE LMP FRAME.
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<tr>
<td>GEOLOGIC DESCRIPTIONS DURING TRAVERSE</td>
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<tr>
<td>05 23 40 40 LMP</td>
<td>BOB, THE FRAGMENT POPULATION - WE'RE AT 099, 2.0 - IS STILL ABOUT THE 1-PERCENT CATEGORY OF - AND IT'S HARD TO TELL. GOING INTO THE 99, WHAT KIND OF BLOCK YOU'RE DEALING WITH. BUT MY THESIS IS - WELL, MORE THAN A GUESS - MOST OF THEM LOOK LIKE THEY'RE SLIGHTLY VELELULAR. AND, IN THAT REGARD, RESPECT THE CARRIAGE.</td>
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<tr>
<td>05 23 40+ LMP</td>
<td>NOW THERE IS SOMETHING - THERE'S A CLASS OF BOULDERS THAT IS FLAT TOPPED AND FAIRLY WELL BONDED THAT IS JUST ABOUT COMPLETELY BONDED. NOT MORE THAN 5 CENTIMETERS OF IT PROJECTS ABOVE THE SURFACE. WE'VE SEEN THOSE OFF AND ON, BOTH ONS.</td>
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<tr>
<td>05 23 40+ LMP</td>
<td>AND THEY SEEM TO BE QUITE DISTANCE. AT LEAST YOU NOTICE THEM. NOW, WHETHER IT'S JUST A COMINATION OF THE MANTLE. I DON'T KNOW. BUT MOST OTHER BOULDERS - THE BIG ONES SEEM TO BE - PROJECT ABOVE THE SURFACE MORE THAN JUST THAT 5 OR 10 CENTIMETERS.</td>
<td></td>
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</tr>
<tr>
<td>05 23 42+ CDR</td>
<td>YES, I REMEMBER. YES, THAT'S IT, BOB. WE'RE COMING RIGHT UP AT STATION 5, RIGHT AT IT.</td>
<td></td>
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<tr>
<td>ARRIVE STATION 5</td>
<td></td>
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<tr>
<td>05 23 42+ CDR</td>
<td>TALK ABOUT A BLOCK FIELD!</td>
<td></td>
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<tr>
<td>05 23 42+ LMP</td>
<td>I THINK MY GUESS OF 30 PERCENT WAS REASONABLY GOOD BEFORE.</td>
<td></td>
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<tr>
<td>05 23 45 15 CDR</td>
<td>WE'RE STOPPED. 086 AND 1.4.</td>
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</tbody>
</table>
05 23 50+ LMP I have the impression that these blocks are buried up here. The mantle does exist, even on Camelot. There are a few blocks that look like they're living more on the surface, you can attribute those to craters that have disrupted the block field.

05 23 50+ LMP The big ones seem to be projecting out of the mantle.

05 23 50+ CC Do you see any such mantle — on top of them.

05 23 50+ LMP No, I don't. What's there seems to be what could have been knocked up there.

05 23 50+ LMP But I don't have the impression of drooping, so much as I have just of burial. And I have a feeling that the zap-pitting process just has cleared these boulders off — of anything that may have been on top of them, in excess of what's around them, right now.

05 23 50+ CDR We want to get an around-the-corner picture of one of those big ones, too. See if we can get the structure of it. Okay, you get your picture?

05 23 50+ LMP Yes.

05 23 55+ LMP 462 is Gene's fairly freshly fractured rock.

05 23 57+ LMP 463 is another one right here.

05 23 57+ CDR Here's a piece right here.

05 23 58+ LMP That looks like our old friend, the gabbro, all right.

05 23 58+ LMP 462 is Gene's fairly freshly fractured rock.

05 23 58+ CDR Yes, we'll get it.

05 23 58+ LMP 463 is another one right here.

05 23 58+ CDR Yes, we'll get it.

05 23 58+ LMP Get the afterp. of it.

05 23 58+ CDR Cut it.

05 23 58+ CDR What did you have picked out?

05 23 58+ LMP This is here with the layering in it.

05 23 58+ LMP I'll get a — a flight line photo.

05 23 58+ LMP Why don't you get a flight line —

05 23 58+ CDR I'm going to get that from here.
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ECLIPSED TIMES, AND EXCERPTS FROM THE AIR-TO-GROUND TRANSCRIPT

<table>
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<tr>
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<th>EVA 2 - STATION</th>
<th>CRFM COMMENTS</th>
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<td>5</td>
<td></td>
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</table>

05 23 54+ LMP OK, I'LL GO PERPENDICULAR TO YOU MORE OR LESS.
05 23 54+ CDR SO, THAT ONE RIGHT BEHIND YOU IS JUST VESICULAR,
BY STEEPNESS, TO A HIGH DEGREE - LIKE THREE TIMES AS MUCH.

06 00 01 17 LMP OK, I OBT THE DOWN-SUN.
06 00 01+ CDR MAN, THAT'S A HARD HOON.
06 00 01+ LMP HOW ABOUT THE CHEEK DOWN THERE, GENE?
06 00 01+ CDR I DON'T THINK THAT'LL COME OFF VERY EASY.
06 00 02 10 CDR BY GOLLY, YOUR GEOLOGY TRAINING DID COME IN HANDY.

06 00 02 36 CDR 446. MOST ALL CO IN THERE BUT --

06 00 02+ LMP THAT'S ALL RIGHT, YOU CAN WRAP IT AROUND IT.
06 00 02+ CDR NO, I'LL GET IT, BABE. IT'S IN THERE.

06 00 02+ CDR THESE ROCKS HERE HAVE A MUCH GREATER DENSITY
OF THE WHITE MINERALS IN THEM, OR CRYSTALS,
THAN I'VE EVER SEEN BEFORE, JACK. WHERE DID
WE SEE THESE KIND BEFORE?

06 00 02+ LMP WELL, WHEN I LOOKED AT THEM RIGHT AT FIRST, THAT'S
WHAT I THOUGHT - BUT I THINK THAT THE SAP PITS ARE
MAKING THE WHITE STAND OUT MORE. THEY'RE FOOLING
YOU A LITTLE BIT.

06 00 02+ LMP BECAUSE WHEN I LOOKED AT IT WITH THE HAND LENS,
IT LOOKED LIKE A FAIRLY NORMAL GABBRO - LIKE
SOME OF THOSE THAT HAVE CRYSTALLIZED WITH
THE PARE BASALT.

06 00 02+ LMP WHERE ARE YOU?
06 00 02+ CDR 75060 0.53 RESIDUE FINES 133-20337 DS
06 00 02+ LMP BUT IT LOOKS TO ME LIKE IT'S SOIL THAT'S BEEN
THROWN UP THERE RATHER THAN - THIS ROCK IS ABOUT
2 METERS IN DIAMETER BUT IT'S ONE OF THE FLAT
SURFACED ROCKS. IT ONLY STANDS ABOUT - BUT THE
POST - ONE-THIRD OF A METER HIGH.

06 00 02+ LMP I'M BACK OVER HERE. WHAT I WANT IS A SAMPLE OF
THIS SOIL OFF ONE OF THESE ROCKS.
06 00 02+ CDR 75065 1.26 ROCK CHIP 1 CH
06 00 02+ LMP BUT WE CAN GET UP ABOUT A METER FROM THE SOIL/ROCK
INTERFACE AND GET SOIL OFF THE ROCK, I THINK.

06 00 04 56 CDR 445 IS THAT BAG NUMBER.
06 00 04+ LMP CH, THIS IS SOIL FROM A HALF A METER IN. IT'S
ABOUT 15 CENTIMETERS DEEP AND A HALF A CM IN.
| BAG 466 | 75070 | 7.26 RESIDUE FINES | SAME AS | 06 00 04+ | CDR | LET'S TAKE THAT CHIP THAT'S LAYING ON TOP WITH THE NEXT SCOOP. |
| 75075 | 1008.0 CHIP FROM TOP OF BASALT BOULDER | BAG 465 | 06 00 05 13 | CDR | PICK THAT OTHER ONE UP AND I'LL BEAT IT QUICK. |
| 75076 | 75075 1008.0 CHIP FROM TOP OF BASALT BOULDER | 06 00 05+ | CDR | THAT'S THE SOIL FROM ON TOP THE ROCK, AND WE'RE TAKING A PIECE OF THE ROCK ITSELF, WHICH LOOKS PRETTY MUCH LIKE THE OTHER ONE. IT MIGHT BE A LITTLE BIT MORE VESICULAR. |
| 75077 | 06 00 06+ | CC | THAT'LL BE IN 466, RIGHT? |

---

| BAG 467 | SOIL | 75080 | 524.2 RESERVE FINES | SAME AS | 06 00 06+ | LMP | OR, THE SOIL CAME FROM A HALF A METER IN FRONT OF THE BOULDER. LET ME GET OVER HERE AND TRY TO GET ONE BAG OF SOIL THAT'S AWAY FROM THE BOULDER. |
| 1 | 932.4 1MM FINES | BAG 465 | 06 00 06+ | CDR | I'M GOING TO GET MY AFTER WHILE I'M HERE. |
| 2 | 38.32 2-4MM | 06 00 06+ | CDR | WE'D LIKE TO GET THE KILOGRAM OF SOIL SAMPLE, TOO. |
| 3 | 30.88 2-4MM | 06 00 06+ | CC | WHERE BETWEEN THE BOULDERS - AS OPEN AS YOU CAN. |
| 4 | 23.31 4-10MM | 06 00 06+ | CDR | LET'S DO IT RIGHT HERE. |
| 5 | 23.31 4-10MM | 06 00 06+ | CDR | THIS WILL BE A MATCHED PAIR WITH OUR SOIL SAMPLE, TOO. |
| 6 | 2.32 ROCK CHIP 1CM | 06 00 07 32 | CDR | BAG 467 IS WHERE YOUR KILOGRAM IS COMING FROM. |
| 7 | 2.32 ROCK CHIP 1CM | 06 00 07+ | CDR | ANOTHER SCOPFUL. |
| 8 | 2.32 ROCK CHIP 1CM | 06 00 07+ | CDR | I'M SAMPLING DOWN TO ABOUT 5 CENTIMETERS. |
| 9 | 1.72 ROCK CHIP 1CM | 06 00 08 15 | CDR | THAT'S THE KILOGRAM. |
| 10 | 1.72 ROCK CHIP 1CM | 06 00 08+ | LMP | WE SAMPLED ABOUT 3 METERS SOUTHWEST OF THE CHROMIUM THAT WAS SET UP FOR THE TOP OF BOULDER SOIL SAMPLE. SO IT'S A MATCHED PAIR, REALLY, IN THAT REGARD. |

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**EVA 2 - TRAVERSE, STATION 5 - ALSEP - LM**

| 06 00 15+ | LMP | I GUESS MY IMPRESSION AND IT'S PURELY PURE INTERPRETATION RIGHT AT THIS STAGE - THAT CAPETOL IS WANTED BY WHATEVER HAS FORMED THE DARK MANTLE. |
| 06 00 15+ | LMP | IT DOES NOT SEEM TO BE WANTED TO THE DEGREE THAT HORATIO IS. |
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ELAPSED TYPES, AND EXTRACTS FROM THE AIR-TO-GROUND TRANSCRIPT

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<tbody>
<tr>
<td>BAG 469 (LR-5)</td>
<td>159.9</td>
<td>GLASS FROM SMALL CRATER</td>
<td>145-22165 LOC</td>
<td>CDR: DID WE EVER GET ANY GLASS OUT OF THE BOTTOM OF THOSE CRATERS?</td>
</tr>
<tr>
<td>70019</td>
<td>20+</td>
<td>GLASS FROM SMALL CRATER</td>
<td>145-22165 XSB</td>
<td>LMP: NO, WE HAVEN'T, WE'VE GOT TO TRY TO DO THAT BEFORE WE LEAVE.</td>
</tr>
<tr>
<td>70019</td>
<td>20+</td>
<td>GLASS FROM SMALL CRATER</td>
<td>145-22191 XSA</td>
<td>CDR: I DOCUMENTED IT BY SHOOTING THE LM ACROSS THE CRATER AT INFINITY AND THEN SHOOTING THE CRATER WITH STEREO AT 11 FEET AND IN THAT CROSS-SUN PAIR AT 7 FEET AND THEN I SAMPLED IT.</td>
</tr>
<tr>
<td>70019</td>
<td>20+</td>
<td>GLASS FROM SMALL CRATER</td>
<td>145-22191 XSA</td>
<td>LMP: THEN I TOOK A CROSS-SUN PAIR AT 7 FEET.</td>
</tr>
<tr>
<td>70019</td>
<td>20+</td>
<td>GLASS FROM SMALL CRATER</td>
<td>145-22191 XSA</td>
<td>CDR: IT'S VERY FRAGILE, AND I DOUBLED BAGGED IT. I DON'T KNOW WHETHER WE CAN KEEP IT OR NOT.</td>
</tr>
<tr>
<td>70019</td>
<td>20+</td>
<td>GLASS FROM SMALL CRATER</td>
<td>145-22191 XSA</td>
<td>LMP: WHILE YOU'RE THINKING, I'LL PUT IT ON MY FLOOR PAN.</td>
</tr>
<tr>
<td>70019</td>
<td>20+</td>
<td>GLASS FROM SMALL CRATER</td>
<td>145-22191 XSA</td>
<td>CDR: AS YOU LOOK AT THOSE LITTLE SPARKLES IN THE SOIL WE'RE WALKING ON AND THEY CHANGE COLORS ON YOU - - - GREENS AND PURPLES, IRRIDESCENT. IRRIDESCENT SPARKLES.</td>
</tr>
<tr>
<td>70019</td>
<td>20+</td>
<td>GLASS FROM SMALL CRATER</td>
<td>145-22191 XSA</td>
<td>LMP: JIM, IT PROBABLY WOULD PROTECT THE GLASS A BIT</td>
</tr>
</tbody>
</table>
EVA 2 - STATION: LM

SAMPLE STOWAGE

06 00 42+ CC OK, GUYS. WE'VE GOING TO PUT STUFF IN LOOSE, BECAUSE THEY'D LIKE TO SEGREGATE STUFF IN THE FOLLOWING WAY. LIKE TO PUT THE LONG CAN AND FOUR CORE TUBES IN THE SRC, THEY'D LIKE TO GET THE LONG CAN AND THREE CORE TUBES IN THE SRC NUMBER 1, AND THEN WE'D LIKE TO GET ALL THE SCB-4 SAMPLES IN THE SAME SRC.

06 00 44+ CC DO YOU REMEMBER WHERE THE THREE TRENCH SOIL SAMPLES - WHICH BAG THOSE WERE PUT IN - FROM STATION 47?

06 00 44+ CDR I'M THE ONLY ONE WHO HAD BAGS, SO I BAGGED THEM AND PUT THEM IN WHATEVER BAG JACK HAD.

06 00 44+ CC OK, THEN THAT'LL BE SCB-4, SO WE'D LIKE THOSE IN SCB-4, AND THOSE ARE THE ONES THAT WILL GO IN THE ROCK BOX.

06 00 50+ CDR THAT OUGHT TO MAKE ONE FULL BAG. THESE ARE BIG ROCKS SO THEY'LL COME OUT EASY. WHERE'S THAT BIG, BIG ROCK WE GOT? THAT'S IN ONE OF THOSE BAGS, TOO. PICKED UP A BIG ROCK - HERE LET ME SEE IF I CAN'T DUMP IT.

06 02 36+ CDR SRC IS 41.5. BAG 6 IS 24, BAG 8 IS 35.(lbs.)

EVA 3 - TRAVERSE - SEP - LM - STATION: 6

BAG 45Y FINE-GRAINED 06 17 36 31
70295 BASELT 06 17 36+ LMP B.O.B, 70295 YANKEE IS A SAMPLE FROM NEAR THE SEP. I THINK. ONE OF THE FEW AROUND HERE. THAT'S WHY I PICKED IT UP.

06 17 39+ CC AND WE'RE READY FOR YOU GUYS TO ROLL.

06 17 40+ CDR WE'RE STARTING B.O.B.

06 17 42 36 CDR MARK IT.

06 17 42+ CDR WE CAN'T GO TOO FAR IN THIS HEADING. WE'VE GOT A BIG HOLE UP HERE.

06 17 42+ CDR LIKE A BIG ONE.
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-FLA{PSED TIMES, AND EXCERPTS FROM THE AIR-TO-GROUND TRANSCRIPT

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<tbody>
<tr>
<td>EVA 3 - TRAVERSE, SEP - LM - STATION 6</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>06 17 46 12 LMP</td>
<td>70215* (LR-14)</td>
<td>FINE-GRAINED BASALT * WILL BE STORED</td>
<td>LUNAR-SURFACE</td>
<td>photos</td>
<td>CREW COMMENTS</td>
</tr>
<tr>
<td>06 17 46 39 LMP</td>
<td>70215* (LR-14)</td>
<td>FINE-GRAINED BASALT * WILL BE STORED</td>
<td>LUNAR-SURFACE</td>
<td>photos</td>
<td>CREW COMMENTS</td>
</tr>
<tr>
<td>06 17 48 39 LMP</td>
<td>188/0.4</td>
<td>FINE-GRAINED BASALT * WILL BE STORED</td>
<td>LUNAR-SURFACE</td>
<td>photos</td>
<td>CREW COMMENTS</td>
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06 17 44 59 LMP THE MAJOR BOULDER STILL LOOK LIKE THE PYROXENE GABBARO. SURFACE TEXTURE HAS NOT CHANGED. THERE IS A GRANULE POPULATION, NOW THAT I LOOK AT IT MORE CLEVERLY, WITH THE SHADOWS. BUT I HAVE A FEELING THAT MOST OF THOSE ARE - THEY LOOK LIKE THEY'RE JUST VERY SMALL CLODS. THAT SHOULD SHOW UP IN SOME OF THE BULK SAMPLES WE'VE TAKEN. IT IS REMARKABLE TO ME - ONLY A SMALL NUMBER OF FINE-GRANED RICH ROCKS. THERE'S ONE AT ABOUT HALFAY BETWEEN THE LMP AND THE LM THAT I'D LIKE TO PICK UP. IT'S A LONG TIME SINCE I HAD A GOOD DISC. I MAY HAVE SAMPLED ONE IN 52 YANKEE THERE. GEOLOGIC DESCRIPTIONS DURING TRAVERSE

06 17 46+ CDR I TELL YOU, GOING IS A LITTLE BIT ROUGH; THERE'S A POPULATION OF BOULDERS AS JACK SAID - AN ARMFUL OF SMALL CRATTERS. YES, I WAS JUST GOING TO ADD THAT THE FREQUENCY OF CRATTERS IN THE 15-METER SIZE RANGE IS QUITE A BIT HIGHER THAN WE WERE USED TO YESTERDAY. OOPS, THERE'S ONE. LOOKING UP AT THE NORTH MASSIF, WE SEE SCATTERED, STREWN FIELD OF BOULDERS, THAT GENERALLY SEEM TO BE 3-4 TIMES OR LESS, FROM A LINE OF LARGE BOULDERS, WHICH MIGHT INDICATE SOME STRUCTURE. AND TIME LINES ARE SUBTLY HORIZONTAL ACROSS THE FACE THAT WE'RE LOOKING AT. THE BOUFLER TRACKS ARE IRREGULAR IN SHAPE, OBVIOUSLY DOWNHILL, BUT YOU'LL SEE IN THE PICTURES THAT THEY ARE CURVED IN PLACES BUT THEY'RE ALL - THAT I SEE - TEND TO BE AGGREGATES OF LITTLE CRATTERS - WHERE THE BOUFLER WAS OBVIOUSLY TUMBING AND BOUNCING A LITTLE BIT. WE'RE OUT IN POPULATION OF FRAGMENTS NOW IN THE IMMEDIATE AREA AT 1. - IS THAT 188? 06 17 49 52 CDR 188/0.4 06 17 49+ LMP IT'S GENERALLY ABOUT 1 PERCENT BETWEEN CRATTERS, BUT AT THE CRATTER SIM, IT'S UP TO ABOUT 5 PERCENT.

06 17 52+ CDR: YES, I SURE DO NOW.
06 17 52+ LMP: IT LOOKS LIKE IT GOES, RATHER THAN PERPENDICULAR CONTOURS, IT PROBABLY IS CROSSING THEM IN A FAIRLY STRAIGHT LINE ON AN ANGLE OF 60 DEGREES, MAYBE.
06 17 52+ CDR: BACK TO THE EAST.

LMP: OK. HERE WE ARE 1.5 AND 185.
06 17 52+ CDR: OK, HERE WE ARE 1.5 AND 185.
06 17 52+ LMP: OK, IS THIS A ROVER SAMPLE?
06 17 52+ CDR: A ROVER SAMPLE.
06 17 52+ LMP: -- SEE THAT LITTLE PIT RIGHT OVER THERE ... JUST SOUTHWEST OF HENRY. ON THE RIM.
06 17 52+ CDR: HENRY LOOKS MUCH LIKE HORATIO DID. HAS BOULDERS ON ITS INNER WALL - NOT AS MANY. THEY LOOK LIGHT COLORED - A LIGHT ALBEDO GABBROIC APPEARANCE. THERE MAY BE SOME RIGHT DOWN THERE, THOUGH, THAT ARE FINER GRAINED; THEY LOOK A LITTLE GRAYER.
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ELOPSED TIMES, AND EXCERPTS FROM THE AIR-TO-GROUND TRANSCRIPT

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06 17 59+ LWP BUT AS I WAS SAYING, RIGHT JUST LOOKS LIKE SOME-
WHAT MORE MOTTLED ROMANTIC. |

06 17 59+ CDR I'M HEADED NORTHWEST NOW - TO GET AROUND THE
WESTERN Rim OF HENRY. |

06 17 59+ LWP AND ON THAT WEST Rim, WE'VE GOT ABOUT 10 PERCENT
BOULDER COVER. |

06 17 59+ LWP BY BOULDER, I GENERALLY MEAN FRAGMENT,
BOB, IN THIS CASE. WHEN I SAY 10 PERCENT, I'M
LOOKING AT STUFF GREATER THAN ABOUT A CENTIMETER
IN DIAMETER. I'LL TRY TO SAY FRAGMENT FROM NOW ON
AND BE MORE PRECISE. OK. HERE'S A LITTLE AREA
WHERE THERE'S - THIS PART OF HENRY - THIS IS THE ONE
PART OF THE RIM OF HENRY I SEE THAT HAS FAIRLY
LARGE FRAGMENTS, OR BOULDERS, ON THEM UP TO 2
OR 3 METERS. BUT, AGAIN, THEY ALL APPEAR TO BE
BURIED. THERE ARE VERY FEW, EXCEPT SMALL ONES,
SITTING OUT ON THE SURFACE. |

06 18 00 32 CDR AND, YOU KNOW, THE FRAGMENT POPULATION OUT HERE
ONLY GOES OUT TO MAYBE 200 METERS, I EXPECT. |

06 18 00+ LMP OK. NOW THIS CONCENTRATION OF BOULDERS IS
BECAUSE OF A 50-METER CRATER IN THE RIM OF HENRY. |

06 18 02 09 LMP THE BOULDER CONCENTRATIONS IN THE WALL OF
HENRY HAVE THEIR UPHILL STANCE AT ABOUT - I WOULD
CROSS AN AVERAGE OF 30 METERS DOWN FROM THE RIM
CREST. THE RIM CREST OF HENRY IS NOT VERY WELL
DEFINED, BUT IT'S THERE. AND FROM THAT INITIATION
OF BOULDERS, THEY STREAM DOWN THE SLOPE TO THE BREAK
IN SLOPE DOWN AT THE FLOOR. STILL NO OBVIOUS CHANGE
IN THE DARK MANTLE, AS WE'RE JUST TO THE EAST OF
LOCKS NOW. THERE'S A 30-METER CRATER, FAIRLY SUB-
DUEO BUT STILL QUITE DEEP - SUBDUED RIM. AGAIN IT
LOOKS AS IF IT WERE MOTTLED; THAT HAS NO SIGNIFICANT
INCREASE IN BLOCKS ON ITS RIM. THAT CRATER, IN ANY
OTHER PLACE, WOULD HAVE BEEN A VERY BLOCKY-RIM
CRATER. ITS NARROW 30 METERS BY 5 METERS DEEP. HAH,
THAT IS A BIG BOULDER THERE. TURNING POINT ROCK IS
A SPLIT ROCK - LOOKS LIKE A NORTHWEST-SOUTHEAST
OVERHANG, WITH ANOTHER BOULDER JUST THIS SIDE OF IT -
JUST TO THE SOUTH OF THAT OVERHANG. IT'S A PYRAMID
SHAPE IN CROSS SECTION - TRIANGULAR SHAPE IN CROSS
SECTION. AND IT LOOKS LIKE IT IS PRETTY WELL
FRACITURED, ALTHOUGH NOT FELTWISLEY LIKE THE BOULDER
AT SHOOP WAS. |
CDR  OK, JACK, I KNOW I CAN GET UP TO STATION 6.

LMP  YES, NOW, BOB, STATION 6 ROCK - ONE OF THEM - IS FROM THAT BOULDER TRACK THAT RUNS OBLIQUELY ACROSS THE CONTOUR.

CDR  OK. THINK I CAN GET UP TO STATION 6.

LMP  AND THE PICTURES OUGHT TO PIN DOWN AT LEAST THE END OF THE BOULDER TRACK PRETTY WELL.

CDR  BOY, THIS IS A BIG ROCK, JACK, WHEN?

CDR  WE'RE AT TURNING POINT ROCK. I DON'T KNOW IF IT'S HANDED ON TOP, BUT IT'S CERTAINLY FILLETED. THERE'S A LOT OF THE DARK MANTLE UP AND ON SOME OF THE SHALLOWER SLOPES OF THE BOULDER. AND IT'S ON A LITTLE HOUND ITSELF, AS IF MUCH OF IT HAD BEEN COVERED UP.

LMP  YES, IT LOOKS LIKE A BRECCIA FROM HERE.

CDR  CAN YOU GET A SAMPLE OF IT RIGHT HERE? YOU SEE THESE LITTLE CHIPS?

LMP  YES, I PROBABLY CAN.

CDR  OK, BOB, IT LOOKS - IT'S VERY COARSELY VESICULAR, BUT AT FIRST GlANCE, IT DID NOT LOOK LIKE THE PYROXENE GABBRO - ALTHOUGH THE ROCK - THAT ROCK DOES. IT LOOKS LIKE IT MIGHT BE FRAGMENTAL, ALTHOUGH I'M SUSPICIOUS THAT I'M LOOKING AT ZAP PITS. - -

LMP  BOB, MY GUESS IS, RIGHT NOW, IS THAT TURNING POINT ROCK IS A BIG PIECE OF SUNFLOWER GABBAR.

CDR  WHAT LOOKS LIKE FRAGMENTS IS JUST BIG SPALLS OF WHERE THE ZAP PITS HAVE CLEANED OFF THE ROCK.
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<td></td>
</tr>
<tr>
<td>06 18 08+ LWP</td>
<td>OR, WE'RE IN A REGION WHERE THE GENERAL FRAGMENT POPULATION IS NO DIFFERENT. WE'RE UP OFF THE BREAK IN SLOPE, ALTHOUGH YOU WOULDN'T NOTICE IT - BUT WE ARE QUITE A WAY UP, BUT THE FRAGMENT POPULATION IS NOT MUCH DIFFERENT THAN THAT ON THE PLAINS. THE BIG DIFFERENCE IS THAT THERE ARE THESE SCATTERED BLOCKS THAT ARE FROM A METER TO PROBABLY 10 METERS - NO, RETURN IN DIAMETER. HARD TO SAY, MAYBE 8.</td>
</tr>
<tr>
<td>06 18 08+ LWP</td>
<td>I DIDN'T REALIZE YOU WERE THAT FAR UPSLOPE.</td>
</tr>
<tr>
<td>06 18 08+ LWP</td>
<td>OH, I FEEL Fine. - UNTIL I LOOKED DOWN THERE AND SAW THE SLOPE WE'RE ON.</td>
</tr>
<tr>
<td>06 18 08+ LWP</td>
<td>AND I CAN'T SEE ANY OBVIOUS CHANGE IN ALBEDO, LIKE WE COULD SEE WITH THE LIGHT SLOPE YESTERDAY.</td>
</tr>
<tr>
<td>06 18 11+ CDR</td>
<td>OK, WE'RE PARKED GOING ON 107.</td>
</tr>
<tr>
<td>06 18 11+ LWP</td>
<td>YOU PARKED ON A SLOPE, TOO.</td>
</tr>
<tr>
<td>06 18 11+ CDR</td>
<td>THERE'S NO LEVEL SPOT TO PARK, HERE, THOUGH.</td>
</tr>
<tr>
<td>06 18 11+ CDR</td>
<td>OK; 192, 3.8, 3.1.</td>
</tr>
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ARRIVE STATION 6

<table>
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<tr>
<th>GEOLGIC DESCRIPTION</th>
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<tr>
<td>EVA 3 - STATION: 6</td>
</tr>
<tr>
<td>06 18 11+ LWP</td>
</tr>
<tr>
<td>06 18 11+ CDR</td>
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<tr>
<td>06 18 11+ LWP</td>
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</table>
06 18 11+ LMP BOB, IT LOOKS LIKE THE GLASS IS FAIRLY LIGHT COLORED. IT'S NOT WHITE. WELL NO - IT'S BLACK.
IT'S ALORHOSITIC GABBRO, RATHER THAN GABBROIC ALORHOSITE, I THINK. YES, THAT'S BLACK GLASS IN THE PIT.

06 18 11+ LMP BOB, SOME OF THE VESICLES ARE FLATTENED. ALL OF THEM ARE FLATTENED. THERE'S A STRONG FOLIATION OF VESICLES IN THE ROCK. MOST OF THEM ARE FLATTENED, AND THEY ARE UP TO 15 OR 20 CENTETERS IN DIAMETER AND ABOUT 5 TO 6 CENTIMETERS THICK - OR WIDE.

06 18 15+ LMP NOW, THAT FOLIATION I MENTIONED DOES NOT GO ALL THE WAY THROUGH THE ROCK. THERE ARE VARIATIONS IN TEXTURE. ONE ZONE WAS STRONGLY FOLIATED. THERE'S ANOTHER - IT ALWAYS LOOKS LIKE A LARGE - IT IS - A LARGE INCLUSION OF NONVESICULAR ROCK WITHIN THE VESICULAR ROCK. THERE MAY BE SOME AUTOFLATION INVOLVED IN THE FORMATION OF THIS THING. IT REALLY LOOKS MINERALOGICALLY LIKE THE LIGHT-COLORED SAMPLES FROM THE SOUTH MASSIF. BUT I TELL YOU, THAT'S ONLY BECAUSE IT'S LIGHT COLORED, AND I CAN'T GIVE YOU ANYMORE THAN THAT RIGHT NOW, UNTIL WE GET A FRESH SURFACE.

06 18 21+ LMP HEY, I'M STANDING ON A BOULDER TRACK. HOW DOES THAT MAKE YOU FEEL?

06 18 21+ CDR THAT MAKES ME FEEL LIKE I'M COMING OVER TO DO SOME SAMPLING.

06 18 21+ LMP LET'S GET THE BOULDER AND THEN GET IN THAT EASTWEST SPLIT. I GOT AN UNDOCUMENTED SAMPLE FROM THE MIDDLE OF THE BOULDER TRACK.

06 18 21+ CDR OK. GO AHEAD.

06 18 21+ LMP IT'S BAG 534.

BAG 534

06 18 21+ LMP BAG 534: SOIL FROM BOULDER TRACK.

76220* BAG 312

06 18 21+ LMP YES, LET'S SAMPLE IN THE SPLIT FIRST SO THAT WE DON'T GET IT TOO MESSY UP. AND THEN WE CAN SAMPLE SOME OF THIS STUFF. WE WANT THIS OVERHANG OVER HERE, GINO - THE NORTH FACING ONE.

76245 BAG 534

06 18 21+ CDR LET HE GET THE GROWN DOWN -

06 18 21+ LMP SET IT DOWN JUST OUTSIDE THE SHADOW THERE. RIGHT THERE. THAT'S GOOD. THERE'S STILL SOME GOOD CLEAN GROUND THERE.
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ELAPSED TIMES, AND EXCERPTS FROM THE AIR-TO-GROUND TRANSCRIPT

<table>
<thead>
<tr>
<th>SAMPLE NUMBER</th>
<th>WEIGHT (G)</th>
<th>SAMPLE TYPE</th>
<th>LUNAR-SURFACE PHOTOGRAPHS</th>
<th>ALT</th>
<th>CREW COMMENTS</th>
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<tr>
<td>LVA 3 - STATION: 6</td>
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</tbody>
</table>

06 18 21+ LMP OK, YOU GOT A BAG?
06 18 21+ LMP IT’S GOING TO GET THE SHADOWED MATERIAL.
06 18 21+ CDR IT’S IN BAG 312, BOB.
06 18 21+ LMP IT’S FROM - I THINK YOU SAW WHERE I GOT IT. IT’S ABOUT A HALF A METER BACK OF THE LIMIT OF THE OVERHANG.

RAG 313
76260 96.6 REGOLITE FINES SAME AS 06 18 26+ LMP ... OKAY, 312. AND THE SOIL OUTSIDE THE OVERHANG WILL BE NEXT.
06 18 26+ BAG 313 06 18 26+ CDR BAG 313.
1 170.71 1-2 MM FINE BAG 312 06 18 26+ CDR BAG 313.
2 8.55 1-2 MM
3 6.57 2-4 MM
4 8.76 4-10 MM
76265 1.75 ROCK CHIP 1 CM

RAG 472
76280 (447.1) REFERENCE SOIL SAME AS 06 18 26+ LMP AND THE SECOND ONE IS FROM 2 CENTIMETERS DOWN TO ABOUT 1.
06 18 26+ BAG 472 ON THAT.
1
2
3

06 18 26+ CDR HOW WE NEED BOULDER STUFF.

LOOSE ROCK #6
76015 2810.0 LARGE ROCK, BRECCIA
140-21407 WEB 140-21410 XEB
140-21411 XEB 140-21412 LOC
140-21413 XEB 06 18 26+ CDR I’LL GET A LOCATOR FROM HERE.
06 18 26+ CDR JUST THROW IT IN MY BAG. IT’S BROKEN, BUT IT’S IN PLACE. THAT’S A NICE, BIG PIECE, TOO.

06 18 26+ CDR WE OUGHT TO BRING A BIG PIECE OF THAT HOME. THAT’S OBVIOUS.
06 18 26+ CDR I’LL GET A LOCATOR FROM HERE.
06 18 26+ CDR HOW ABOUT THIS ONE UP HERE? TAKE YOUR PICTURE.
06 18 26+ CDR I THINK WE CAN JUST LIFT THAT OFF. SEE THAT?
06 18 26+ LMP HERE’S THE PIECE THAT FELL OFF. HERE’S THE PIECE THAT WAS KNOCKED OFF UP THERE.
06 18 26+ LMP HE’S THE PIECE THAT FELL OFF. HERE’S THE PIECE THAT WAS KNOCKED OFF UP THERE.
06 18 26+ CDR WE OUGHT TO BRING A BIG PIECE OF THAT HOME. THAT’S OBVIOUS.
06 18 26+ CDR I’LL GET A LOCATOR FROM HERE.
06 18 26+ LMP HOW ABOUT THIS ONE UP HERE? TAKE YOUR PICTURE.
06 18 26+ CDR I THINK WE CAN JUST LIFT THAT OFF. SEE THAT?
06 18 26+ CDR WE OUGHT TO BRING A BIG PIECE OF THAT HOME. THAT’S OBVIOUS.
06 18 26+ LMP HERE’S THE PIECE THAT FELL OFF. HERE’S THE PIECE THAT WAS KNOCKED OFF UP THERE.
06 18 26+ CDR WE OUGHT TO BRING A BIG PIECE OF THAT HOME. THAT’S OBVIOUS.
06 18 26+ LMP HOW ABOUT THIS ONE UP HERE? TAKE YOUR PICTURE.
06 18 26+ CDR I THINK WE CAN JUST LIFT THAT OFF. SEE THAT?
06 18 26+ CDR WE OUGHT TO BRING A BIG PIECE OF THAT HOME. THAT’S OBVIOUS.
06 18 26+ LMP HERE’S THE PIECE THAT FELL OFF. HERE’S THE PIECE THAT WAS KNOCKED OFF UP THERE.
06 18 26+ CDR WE OUGHT TO BRING A BIG PIECE OF THAT HOME. THAT’S OBVIOUS.
06 18 26+ LMP HOW ABOUT THIS ONE UP HERE? TAKE YOUR PICTURE.
06 18 26+ CDR I THINK WE CAN JUST LIFT THAT OFF. SEE THAT?
06 18 26+ CDR WE OUGHT TO BRING A BIG PIECE OF THAT HOME. THAT’S OBVIOUS.
06 18 26+ LMP HERE’S THE PIECE THAT FELL OFF. HERE’S THE PIECE THAT WAS KNOCKED OFF UP THERE.
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06 18 26+ LMP HERE’S THE PIECE THAT FELL OFF. HERE’S THE PIECE THAT WAS KNOCKED OFF UP THERE.
06 18 26+ CDR WE OUGHT TO BRING A BIG PIECE OF THAT HOME. THAT’S OBVIOUS.
06 18 26+ LMP HOW ABOUT THIS ONE UP HERE? TAKE YOUR PICTURE.
06 18 26+ CDR I THINK WE CAN JUST LIFT THAT OFF. SEE THAT?
06 18 26+ CDR WE OUGHT TO BRING A BIG PIECE OF THAT HOME. THAT’S OBVIOUS.
06 18 26+ LMP HERE’S THE PIECE THAT FELL OFF. HERE’S THE PIECE THAT WAS KNOCKED OFF UP THERE.
06 18 26+ CDR WE OUGHT TO BRING A BIG PIECE OF THAT HOME. THAT’S OBVIOUS.

CDR: I THINK WE OUGHT TO PICK UP A PIECE OF THAT SPALL THERE BY THE GNO-MON. I CAN BREAK IT OFF.

LMP: OK, A PIECE OF THAT SPALLED ROCK THAT WAS SITTING BY THE GNO-MON - WATCH OUT GNOMON. HOW ABOUT THAT?

CDR: YOU OUGHT TO PICK UP. IT'S A FINE GRAINED VESICULAR ROCK THAN -

LMP: ONE OF THE LIGHT-COLORED INCLUSIONS LOOK LIKE -

CDR: YOU CAN REACH IT?

LMP: ONE OF THE LIGHT-COLORED INCLUSIONS LOOK LIKE.

CDR: THE HOST ROCK HAS DARK ENOUGH ZAP PITS THAT IT'S PROBABLY GABBRIC ANORTHOSITE - LET ME GET MY TERMS STRAIGHT. THE HOST ROCK HAS DARK ENOUGH ZAP PITS THAT IT'S PROBABLY GABBROIC ANORTHOSITE, IF I DIDN'T SAY THAT. SOME OF THE LIGHT-COLORED INCLUSIONS HAVE SLIGHTLY LIGHTER COLORED GLASS, AND THEY MAY BE THE GABBROIC ANORTHOSITE.

LMP: WHAT IT IS, I THINK - IT'S A BIG BLUE-GRAY ROCK. ITSELF IS CRYSTALLINE, I BELIEVE. THE INCLUSIONS ARE MUCH MORE SHARPLY DEFINED, AND IT'S NON-VESICULAR. AND IT'S INCLUDED, OR AT LEAST IT'S IN CONTACT WITH THE VERY VESICULAR ANNEIVED GABBRO.

CDR: WE OUGHT TO GET SOME OF THAT LIGHT-COLORED STUFF IN THERE, ALONG WITH THE BLUE-GRAY. 

LMP: BUT, YOU CAN REACH IT?

CDR: BUT, YOU CAN REACH IT?
<table>
<thead>
<tr>
<th>SAMPLE</th>
<th>WEIGHT</th>
<th>SAMPLE TYPE</th>
<th>LUNAR-SURFACE</th>
<th>AUT</th>
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<tr>
<td>number</td>
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<td>EVA 3 - STATION: 6</td>
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<tr>
<td>06 18 35+</td>
<td>LWP YOU WANT ME TO GET MY SCOOP UNDER THERE? PROBABLY WON'T FALL OUT.</td>
<td></td>
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<tr>
<td>06 18 35+</td>
<td>CDR OK, GET AN INNOCENCE OF THESE PIECES AS WE CAN. I DON'T KNOW HOW MANY ARE GOING TO COME OUT.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>06 18 38+</td>
<td>CDR THIS WHOLE THING WILL COME OUT HERE IN A MINUTE.</td>
<td></td>
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</tr>
<tr>
<td>06 18 38+</td>
<td>LWP I'LL WATCH IT. I'LL WATCH IT. I'LL WATCH IT. IT'LL WATCH IT.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>06 18 38+</td>
<td>CDR MOVE YOUR ARM UP OR DOWN. OK, I GOT IT IN CASE WE DON'T GET ANOTHER ONE.</td>
<td></td>
<td></td>
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<tr>
<td>06 18 38+</td>
<td>CDR OK, WE'RE GETTING GOOD AS THAT.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 18 38+</td>
<td>LWP WHY DON'T WE GET A BAG OUT. LET ME PUT THESE IN A BAG.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 18 38+</td>
<td>CDR THAT'S WHY I'M GETTING UP HERE SO I CAN JUST GET MY BALANCE. BOB, 536 IS ONE OF THE LIGHT-COLORED INCLUSIONS IN THE BLUE-GRAY ROCK.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 18 38+</td>
<td>LWP IT'S CHIPS.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>06 18 38+</td>
<td>LWP I THINK WE LOST THAT OTHER ONE. THAT'S GOOD ENOUGH.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>06 18 38+</td>
<td>CDR I GOT IT; I KNOW WHERE IT IS.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 18 38+</td>
<td>LWP THAT'S ALL RIGHT. IT'S NOT A LOT OF SAMPLE, BUT IT'S REPRESENTATIVE. I THINK IT LOOKS A LOT LIKE THAT ROCKY SUCK I SAMPLED YESTERDAY, DOESN'T IT?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>06 18 39+</td>
<td>CDR YES, IT'S PRETTY EASY TO BREATHE; IT'S REALLY NOT VERY COHERENT AT ALL.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>BAG 536</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>76250</td>
<td>4.63</td>
<td>RESIDUE FINES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>76255</td>
<td>.06 .55</td>
<td>BRECCIA INCLUSION</td>
<td></td>
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</tbody>
</table>

YOU WANTED NOT FALL OUT. OK. GET AS INNOCENCE OF THESE PIECES AS WE CAN. I DON'T KNOW HOW MANY ARE GOING TO COME OUT. THIS WHOLE THING WILL COME OUT HERE IN A MINUTE. I'LL WATCH IT. I'LL WATCH IT. I'LL WATCH IT. I'LL WATCH IT. MOVE YOUR ARM UP OR DOWN. OK, I GOT IT IN CASE WE DON'T GET ANOTHER ONE. OK, WE'RE GETTING GOOD AS THAT. WHY DON'T WE GET A BAG OUT. LET ME PUT THESE IN A BAG. THAT'S WHY I'M GETTING UP HERE SO I CAN JUST GET MY BALANCE. BOB, 536 IS ONE OF THE LIGHT-COLORED INCLUSIONS IN THE BLUE-GRAY ROCK. IT'S CHIPS. I THINK WE LOST THAT OTHER ONE. THAT'S GOOD ENOUGH. I GOT IT; I KNOW WHERE IT IS. THAT'S ALL RIGHT. IT'S NOT A LOT OF SAMPLE, BUT IT'S REPRESENTATIVE. I THINK IT LOOKS A LOT LIKE THAT ROCKY SUCK I SAMPLED YESTERDAY, DOESN'T IT? YES, IT'S PRETTY EASY TO BREATHE; IT'S REALLY NOT VERY COHERENT AT ALL.
CDR: OK. WE HAVE ANOTHER INCLUSION THAT, ON THE SURFACE, HAS A MURKEY REDDISH-BROWN TEXTURE. INTERIOR LOOKS PRETTY MUCH THE SAME; IT'S A VERY LIGHT GRAY.

CDR: THIS LOOKS LIKE A PIECE OF BRECCIA. LOOKS LIKE A FRAGMENT BRECCIA THAT GOT CAUGHT UP IN THIS THING.

CDR: DID I GIVE THEM A NUMBER ON THAT? - NO.

CDR: IT'S 536.

---

BAG 537

76270 0.46 RESIDUE 141-21609 XSB
76275 55.93 CHIPS OF BLUE-GRAV 141-21610 LOC
76276 0.96 HOST ROCK 141-21615 XSB
76277 21.44 XS
76278 21.45 XS
76279 21.46 XS
76280 21.47 XS
76281 21.48 XS
76282 21.49 XS
76283 21.50 XS
76284 21.51 XS
76285 21.52 XS
76286 21.53 XS
76287 21.54 XS
76288 21.55 XS
76289 21.56 XS
76290 9.65 RESIDUE FINES 141-21610 LOC
76291 26.7 BAG 538

CDR: OK. LET'S GO GET THE HOST ROCK HERE.

CDR: HOW ABOUT THAT PIECE?

CDR: IT'S 536.

---

CDR: OK. LET'S GO GET THE HOST ROCK HERE.

CDR: HOW ABOUT THAT PIECE?

CDR: IT'S 536.

---

BAG 538

76290 9.65 RESIDUE FINES 141-21609 XSB
76291 26.7 BAG 538

CDR: PICK THE ROCK UP WHILE YOU'RE THERE. IT'S RIGHT AT YOUR HAND.

LMP: I WILL.

LMP: AND 538 IS ANOTHER SAMPLE OF THAT MATERIAL - A LITTLE DUSTIER.

LMP: THAT'S THE BLUE-GRAV, SO IF THE INCLUSIONS IN IT LOOK MORE THE BLUE-GRAV, YOU LOOKED AT IT, IT LOOKS LIKE A --
CRoss-reference of Lunar Samples with Locations, Photographs, Apollo-25-cased Times, and Experiments from the C.I.R.-to-Ground Transcript

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<th>Sample Type</th>
<th>Lunar-Surface ALT</th>
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<td>EV 1 - Station 6</td>
<td>18 46+</td>
<td>Sample Weigh...</td>
<td>Photographic L...</td>
<td>LIKE A PAR...</td>
</tr>
<tr>
<td>06 18 46+</td>
<td>LSP</td>
<td>BOB, IT LOOKS TO BE LIKE THERE ARE INCLUSIONS OF BLUE-GRAY IN THE GABBRO - IN THE ANORTHOSITTIC GABBRO.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 18 46+</td>
<td>CDR</td>
<td>ARE YOU SAYING YOU THINK - YOU THINK THIS WHOLE BIG BLUE-GRAY THING IS AN INCLUSION?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 18 46+</td>
<td>LSP</td>
<td>YES, SIR, AND THERE'S SOME LITTLE ONES OVER HERE.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 18 46+</td>
<td>CDR</td>
<td>BUT THEN WITHIN THE BLUE-GRAY, WE'VE GOT ALL THESE OTHER FRAGMENTS.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 18 46+</td>
<td>LSP</td>
<td>WELL, THAT'S RIGHT, IT'S JUST SEVERAL GENERATIONS OF ACTIVITY; AND IT LOOKS LIKE THE GABBRO TOUGHS, PICKED UP THE FRAGMENTAL BRECCIA AS INCLUSION. BOB, IT REALLY LOOKS THAT WAY RIGHT NOW.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 18 46+</td>
<td>CDR</td>
<td>... HERE'S A BIG WHITE CLAST, THERE'S ONE ON TOP ABOUT A FOOT AND A HALF ACROSS, AND HERE'S ONE - MUST BE 3 FEET ACROSS - 3 FEET. AND THAT'S IN THE BLUE-GRAY.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bag 557</td>
<td>18 46+</td>
<td>CDR</td>
<td>HEY, BOB, THERE'S A LOT OF HAMMERING ON A VERY SHALLOW SLOPE OF A FRACTURE HERE ON ONE OF THE UPLAND ROCKS. I WOULD ASSUME IT'S JUST PART OF THE TALUS PICKED UP AS IT'S ROLLED DOWN, BUT IF IT'S WORTH SAMPLING, YOU MIGHT THINK ABOUT IT.</td>
<td></td>
</tr>
<tr>
<td>76320*</td>
<td>Soil from top of boulders</td>
<td>18 46+</td>
<td>CC</td>
<td>OK, GENE, IF YOU CAN GET THAT FAIRLY READILY, WHY DON'T YOU - YOU CAN PERHAPS JUST SCAP IT UP WITH THE BAG.</td>
</tr>
<tr>
<td>06 18 46+</td>
<td>CDR</td>
<td>THAT'S EXACTLY WHAT I CAN DO.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 18 46+</td>
<td>CC</td>
<td>IF YOU CAN GET UP TO THE ROCK THERE.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 18 46+</td>
<td>CDR</td>
<td>AND IT WILL BE IN MY FLIGHT LINE STEREO, AND IT'S GOING TO BE BAG 557. AND I'LL TAKE AN AFTER AND SHOW YOU WHERE IT CAME FROM.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
I BAG 539
76310* INCLUSIONS
76315* INCLUSIONS ALSO IN BRECCIA

BAG 557
140-21435-
140-21439 JEB
141-21616-
141-21620 XSA

WELL, BOB, I THINK I'VE DONE THE BEST I CAN. I WOULD - I'D SAY THAT THEY'RE PRETTY CLEARLY INCLUSIONS OF BLUE-GRAY IN THE AMORPHOUSITIC GRABO HERE NEAR THE CONTACT.

OK, BOB, I DIDN'T THINK I COULD DO IT BUT I GOT A SAMPLE OF THE INCLUSION. AND IT'S IN BAG 539.

AND IT'S BLUE-GRAY WITH LIGHT COLORED INCLUSIONS IN IT.

BUT THE WHOLE THING SEEMS TO BE PRETTY WELL ALTERED, OR METAMORPHOSED - COMPARED TO THE MAJOR ROCK WE SAMPLED - TO THE OTHER BLUE-GRAY ROCK.

I THINK THAT INCLUSION WILL GIVE YOU AN EXAMPLE OF WHAT THIS THING - WHAT THE AMORPHOUSITIC GRABO DID TO THE BLUE-GRAY BRECIA.

BOB, THAT BLUE-GRAY BRECIA NEAR THE CONTACT WITH THE AMORPHOUSITIC GRABO DOES GET SOME VESICLES IN IT. I THINK THEY'LL SHOW UP IN GENE'S PICTURES.

BAG 558
76330* (428.3) BAKE FRAGMENTS
76335*...
141-21621-
141-21622 JEB
141-21623 JEB
141-21624 JEB
141-21625-
141-21627 JEB

TELL YOU WHAT, GENE, I COULD GO DOWN THERE AND STAMP A BAG, AND YOU COULD COME DOWN THERE.

COR. OK. I DON'T THINK YOU SHOULD TRY AND WALK BACK UP, JACK. LET ME GET A PAN FROM RIGHT HERE WHERE I GOT THIS SAMPLE.

I JUST RAN OUT OF FILM AT 160, AND I'M ABOUT TWO PICTURES SHORT OF THE PAN, AND THEY'RE UPSIDE-DOWN. I THINK I CAN COVER MOST OF THAT WITH THE 500.

STARTING TO BAKE.

WOULDN'T IT BE EASIER TO BAKE DOWNSILL.

IT WOULDN'T, BUT THE STUFF WOULDN'T STAY IN.
### Cross-Reference of Lunar Samples with Locations, Photographs, Apollo-Ejected Tapes, and Excerpts from the Air-to-Ground Transcript

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<th>Note</th>
<th>Contents</th>
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<tbody>
<tr>
<td>3115.21</td>
<td>Soil</td>
<td>Same as 06</td>
<td>06 18 57+</td>
<td>LMP - WE'RE NOT REALLY SUPPOSED TO BE SELECTIVE ABOUT BAKING.</td>
</tr>
<tr>
<td>630.70</td>
<td>Reserve Fine</td>
<td>Bag 558 (Rake)</td>
<td>06 18 57+</td>
<td>CDR - WELL, YOU'RE NOT; YOU'RE JUST COVERING THE AREA.</td>
</tr>
<tr>
<td>22.76</td>
<td>1-2 mm</td>
<td>Bag 558</td>
<td>06 10 57+</td>
<td>LMP - THAT'S WHY I SET UP THERE.</td>
</tr>
<tr>
<td>10.09</td>
<td>2-4 mm</td>
<td>Bag 558</td>
<td>06 18 57+</td>
<td>CDR - A SELECTIVE SAMPLE IS BETTER THAN NO SAMPLE AT ALL. LET ME PUT SOME IN THERE.</td>
</tr>
<tr>
<td>10.72</td>
<td>4-10 cm</td>
<td>Bag 558</td>
<td>06 18 57+</td>
<td>CDR - OK. THERE'S ONE A COUPLE OF INCHES. MOST OF THEM ARE AN INCH OR SO SMALLER. THEY'RE ANGULAR TO SUBROUNDED FRAGMENTS. SOME OF THOSE LOOK LIKE INCLUSIONS. AS A MATTER OF FACT, THE ONES THAT ARE BROKEN OPEN LOOK LIKE SOME OF THE LIGHT-COLORED INCLUSIONS WE SAW IN THE BIG BOULDER. THE OTHERS ARE TOO DUST COVERED TO SAY ANYTHING ABOUT.</td>
</tr>
<tr>
<td>4.69</td>
<td>Rock Fragment</td>
<td>CH</td>
<td>06 18 57+</td>
<td>CDR - A COUPLE OF THEM LOOK FAIRLY COARSELY CRYSTALLINE.</td>
</tr>
<tr>
<td>2.81</td>
<td>Rock Fragment</td>
<td>CH</td>
<td>06 18 57+</td>
<td>LMP - OK. PUT THESE IN THERE.</td>
</tr>
<tr>
<td>06 18 57+</td>
<td>CDR - BIG DEAL. NOW WE SIGNED UP WITH THREE MORE.</td>
<td></td>
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<tr>
<td>345.24</td>
<td>Soil</td>
<td>Same as 06</td>
<td>06 18 57+</td>
<td>CDR - THEY WANT THE SOIL HERE.</td>
</tr>
<tr>
<td>1</td>
<td>1 mm Fine</td>
<td>Bag 558 (Rake)</td>
<td>06 18 57+</td>
<td>LMP - OK. YOU WANT TO PUT THAT IN?</td>
</tr>
<tr>
<td>2</td>
<td>1-2 mm</td>
<td>Bag 558</td>
<td>06 18 59+</td>
<td>CDR - YES, I'D BETTER PUT IT IN BEFORE I - OK. LET'S TD SP, WE THE SOIL.</td>
</tr>
<tr>
<td>4</td>
<td>4-10 cm</td>
<td>Bag 558</td>
<td>06 18 57+</td>
<td>CDR - LITTLE MORE, LITTLE MORE, LITTLE MORE.</td>
</tr>
<tr>
<td>2</td>
<td>Rock Fragment</td>
<td>CH</td>
<td>06 18 59+</td>
<td>CDR - OK, BOB. I'LL GET THE CORE AND LET JACK GET THE 500. 559 IS THE KILOGRAM OF SOIL. ...</td>
</tr>
<tr>
<td>6</td>
<td>Rock Fragment</td>
<td>CH</td>
<td>06 18 59+</td>
<td>CDR - OK, BOB. I'LL GET THE CORE AND LET JACK GET THE 500. 559 IS THE KILOGRAM OF SOIL. ...</td>
</tr>
</tbody>
</table>

### Cross-Reference of Lunar Samples with Locations, Photographs, Apollo-Ejected Tapes, and Excerpts from the Air-to-Ground Transcript

<table>
<thead>
<tr>
<th>Sample Weight (g)</th>
<th>Sample Type</th>
<th>Lunar-Surface Photography</th>
<th>Note</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>146-22293-</td>
<td>Drive Tube</td>
<td>Soil</td>
<td>06 19 01+</td>
<td>CC - WE HAVE THREE LOWERS AND TWO UPPIES, SO LET'S JUST AS SOON USE THE EXTRA LOWER HERE IN THE SINGLE CORE. THAT WOULD GIVE US TWO UPPIES AND TWO LOWERS LEFT -- FOR DOUBLES.</td>
</tr>
<tr>
<td>146-22294-</td>
<td>Loc</td>
<td>Soil</td>
<td>06 19 01+</td>
<td>LMP - OK. THERE SHOULD BE A LOWER IN THERE, BOBO.</td>
</tr>
<tr>
<td>146-22295-</td>
<td>Rake</td>
<td>Soil</td>
<td>06 19 01+</td>
<td>CDR - YES, BOB. ANY SPECIAL PLACE YOU WANT THAT JUST OUT HERE ON THE SLOPE? ...</td>
</tr>
</tbody>
</table>
OK. MY CAMERA IS CLEAN. MAGAZINE FRONT IS 004 ABOUT FRAME 2, AND I CYCLED THROUGH IT, AND I'VE GOT THE CORE ALL SET, AND I'M GOING TO GO GET IT, BOB. AND I DIDN'T HEAR WHERE YOU SAID TO PUT IT, BOB.

06 19 09+ CC ANYWHERE.
06 19 09+ CDR OK, BOB, YOU'RE EASY.
06 19 09+ CDR ANYWHERE. NOT THE BOTTOM OF A SMALL CRATER, HUH?
06 19 09+ CC ANY PLACE. AND DID YOU GET YOUR CAMERA DUSTED?
06 19 09+ CDR YES. I GOT IT ALL DUSTED AND THE MAC'S CHANGED.
06 19 09+ CDR IT'S CORE #8.
06 19 08 06 CDR I'LL EVEN GET YOU A PICTURE OF IT.
06 19 08+ CDR THAT CORE WENT IN VERY EASY, BOB. I PUSHED IT IN ABOUT A QUARTER OF THE WAY, AND ABOUT ANOTHER FIVE OR SIX WHACKS, AND IT'S IN ALL THE WAY.

I DIDN'T HEAR WHERE YOU SAID TO PUT IT, BOB. ANYWHERE. NOT THE BOTTOM OF A SMALL CRATER, HUH?

06 19 08+ CDR ANYWHERE. NOT THE BOTTOM OF A SMALL CRATER, HUH?
06 19 11+ CDR OK. I'LL NEED YOUR RAWGER, SO IF YOU'LL JUST TURN RIGHT.
06 19 11+ CDR GOOD TIMING. PINS OUT; CORE TUBE IS SAFE. IN FULL.
06 19 11+ LMP OK. DID YOU GIVE THEM THE NUMBER?
06 19 11+ CDR YES, THEY GOT THE NUMBER.
06 19 11+ CDR UNDER THE LMP'S SEAT.

LOOSE ROCK #7 76055* LARGE ROCK

06 19 12+ CDR ... I SURE WANT TO GET ONE OR TWO OF THOSE NICE ONES BAG WHILE YOU'RE OVER THERE.
06 19 12+ LMP OPEN THE GATE, AND I'LL BRING ONE.
06 19 12+ CDR GUESS WHAT ISN'T OPENING AGAIN. SHOULD, THOUGH.
06 19 12+ CDR IT'S ALL SET RIGHT.
06 19 12+ CC YOU COULD PUT THEM UNDER JACK'S SEAT IF IT'S EASIER.
06 19 12+ LMP BIG BAG OPEN?
06 19 12+ CDR YES, IT'S ALL OPEN. ALL SET.
06 19 12+ LMP HERE, LET ME GET THIS BIG ONE. I'M ABOUT READY TO DUMP IT. IT LOOKS LIKE A GABBRO.
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ELAPSED TIMES, AND EXCERPTS FROM THE AIR-TO-GROUND TRANSCRIPT

<table>
<thead>
<tr>
<th>SAMPLE NUMBER</th>
<th>WEIGHT (G)</th>
<th>SAMPLE TYPE</th>
<th>LUNAR-SURFACE PHOTOGRAPHS</th>
<th>CREW CONSENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAG 560</td>
<td>76330*</td>
<td>WHITE ROCK</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>76335*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

06 19 12+ LHP GET ME A - I NEED A NORMAL SAMPLE BAG FOR ONE HERE. IT'S PRETTY FRAGILE.
06 19 12+ CDR THERE'S SAMPLE BAG 560.
06 19 12+ LHP AND 560 HAS AN UNDOCUMENTED EXCEPT BY THE PANS - VERY WHITE - LOOKS LIKE A CRUSHED AREOSITITE. IT LOOKS LIKE - SOME OF THE EXCLUSIONS IN THE GRAY BRECCIA = GRAY AND RECRYSTALLIZED BRECCIA.
06 19 16 30 CDR WAIT A MINUTE. LET ME GET THIS OUT OF THE WAY. OK. CLOSE IT. YES. THAT'S GOT IT.

06 19 17 10 CDR OK. WE'RE MOVING - SORT OF.

06 19 17+ CDR I CAN DRIVE, JACK.
06 19 17+ LHP WHY DON'T YOU HEAVE DOWN AND GET - SO YOU'RE NOT... YOU CAN GET ON -
06 19 17+ CDR YOU CAN GO DOWNHILL VERY EASY.
06 19 17+ LHP YES.
06 19 17+ LHP WHY DON'T YOU JUST GO DOWN THERE.
06 19 17+ CDR -- I'LL CARRY THE ROVER SAMPLES... ...

06 19 17+ LHP OK. I'LL HEAD DOWN TO THAT SIDE HILL OVER TO THOSE BOULDERS RIGHT OVER THERE AND THEN SEE IF THAT'S ANY CHANGE.
06 19 17+ CDR OK. YOU MIGHT, IF YOU GET ANOTHER SAMPLE - A LARGE SAMPLE, YOU MIGHT GRAB IT, AND WE'LL THROW IT IN THE FOOTPAN HERE AND I'LL SEE IF I CAN FIND A LEVEL SPOT TO -
06 19 18 14 LHP I SORT OF OUGHT TO HAVE MY SCOOP, TOO.
06 19 18+ CDR -- HELP YOU GET ON. NO DON'T TAKE TOO MUCH; JUST TAKE THAT. THAT'S ALL YOU NEED.
06 19 18+ LHP HOW ABOUT LETTING ME HAVE YOUR HAMMER, THEN?
BAG 48Y/49Y 06 19 22+ CDR OK, BOB, I JUST CAME DOHSLOPE: READING 193/3.1
- JUST ABOUT 100 METERS TO PICK UP JACK.
06 19 22+ LWP OK, BAG 48 Y/49 Y HAS A SAMPLE OF ABOUT A HALF-
ONE-THIRD-METER BOULDER THAT WAS LIVING IT - THAT'S
SETTING RIGHT DOWN IN A LITTLE CRATER OF IT'S
OWN.

76030 16.06 RESERVE FISHES
1 102.6 7 UP MILES
2 5.71 1-2 MILES
3 4.58 2-4 MILES
4 2.01 4-10 MILES
6 3.95 ROCK FRAGMENT 1 CM
7 2.52 ROCK FRAGMENT 1 CM

EVA 3 - TRAVERSE, STATION 6 TO 7

06 19 25 36 CDR WE'VE ROLLING, BOB.
- - -
06 19 26+ CDR WE JUST BE ABOUT 200 METERS UP THE SLOPE, LOOKING
AT THAT LITTLE VALLEY DOWN THERE, JACK. AM I
RIGHT?
06 19 26+ LWP YES, I THINK YOU'RE RIGHT. THE PATTERN ON THE
SLOPE REALLY DOESN'T LOOK MUCH DIFFERENT THAN ON
THE LIGHT HANDEL. HABIT OF FACT, IT LOOKS
VERY MUCH LIKE LIGHT HANDEL, EXCEPT FOR THESE
LARGE BLOCKS THAT ARE IN IT.

06 19 27+ LWP THAT LOOKS LIKE A PRETTY GOOD FILE TO WORK ON.
- - -
06 19 27+ CC THIS IS GOING TO BE A VERY SHORT STATION.
PROBABLY NOT MORE THAN 10 OR 15 MINUTES. BUT
JUST TO GRAB A MAXIMUM VARIETY OF HAND SAMPLES
WITH A MINIMUM AMOUNT OF DOCUMENTATION AND A
MINIMUM AMOUNT OF TIME.

06 19 27+ CDR WE CAN DO A PAN, AND PICK UP A LOT OF THOSE
SMALL ONES, JACK.

ARRIVE STATION 7 06 19 29 05 CDR I'M AT 200/3.3.

EVA 3 - STATION: 7

06 19 29 05 CDR I'M AT 200/3.3.

06 19 29 05 CDR I'M AT 200/3.3.

BAG 540 146-22299 XSB 06 19 29+ LWP THERE IS ANOTHER ONE OF OUR BLUE-GRAV BRECCIAS,
77510* 146-22299 XSB I THINK, OVER THERE; RECRYSTALLIZED BRECCIAS WITH
77515** 146-22300 XSB SOME OF THAT CRUSHED ANORTHOSITE IN IT. I THINK
SELECTED ROCK SAMPLES 146-22306 XSB RIGHT IN HERE I'M GOING TO TAKE THE PAN.
146-22322 XSB - - -
146-22336 XSA 06 19 30 23 LWP I'LL GOING TO TAKE THE PAN AT 11 FEET SO YOU
146-22337 XSA CAN SEE THE FRAGMENTS THAT WE ARE GOING TO
146-22338 XSA PICK UP HERE. THEN WE CAN TAKE ANOTHER ONE AT -
FOR LOCATION WORK.
06 19 33 09 LWP 540 IS THE FIRST BAG OF SELECTED SAMPLES.
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ELAPSED TIMES, AND EXCERPTS FROM THE AIR-TO-GROUND TRANSCRIPT

<table>
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<tr>
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<th>LUNAR-SURFACE PHOTOS</th>
<th>CREW COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAG 541 (LB-9)</td>
<td>77017*</td>
<td>ROCK</td>
<td>06 19 33+ CDR YES, WE'LL WRAP IT A LITTLE BIT... IT WILL FIT.</td>
<td>06 19 33+ CDR HERE, PUT THAT ONE IN THERE.</td>
</tr>
<tr>
<td>BAG 543</td>
<td>77070*</td>
<td>SELECTED ROCKS</td>
<td>06 19 34+ CDR I WISH I COULD BREAK A SAMPLE RIGHT OFF. HERE'S ANOTHER ONE. IT IS A Dikelet. THERE'S THREE OR FOUR OF THEM.</td>
<td>06 19 33+ CDR I WOULDN'T BE ABSOLUTELY POSITIVE, BUT IT SURE LOOKS LIKE I SEE A Dikelet IN HERE THAT'S IN THE INCLUSION, AND I'M GOING TO GET A CLOSEUP STEREO OF IT. I'D CALL IT A Dikelet, IF YOU PINCHED ME DOWN.</td>
</tr>
</tbody>
</table>

BAG 542

<table>
<thead>
<tr>
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<th>CREW COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAG 543</td>
<td>77075*</td>
<td>SELECTED ROCKS</td>
<td>06 19 34+ CDR THAT'S ONE OF THE BLUE-GRAY ROCKS, AND IT'S GOT A LIGHT-COLORED FRAGMENT THAT RUNS THE FULL CHIPS FROM NEAR 146-22300 HEIGHT OF IT, ABOUT A METER AND A HALF THICK. AND THEN IT'S GOT THE GRAY OR BLUE-GRAY ROCK ON THE OTHER SIDE. AS A MATTER OF FACT - LET ME LOOK AT IT CLOSELY. IT'S A FRAGMENT IN IT ALL RIGHT.</td>
<td>06 19 33+ CDR THAT'S ONE OF THE BLUE-GRAY ROCKS, AND IT'S GOT A LIGHT-COLORED FRAGMENT THAT RUNS THE FULL CHIPS FROM NEAR 146-22300 HEIGHT OF IT, ABOUT A METER AND A HALF THICK. AND THEN IT'S GOT THE GRAY OR BLUE-GRAY ROCK ON THE OTHER SIDE. AS A MATTER OF FACT - LET ME LOOK AT IT CLOSELY. IT'S A FRAGMENT IN IT ALL RIGHT.</td>
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</table>

BAG 542

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<td>06 19 33+ CDR THAT'S ONE OF THE BLUE-GRAY ROCKS, AND IT'S GOT A LIGHT-COLORED FRAGMENT THAT RUNS THE FULL CHIPS FROM NEAR 146-22300 HEIGHT OF IT, ABOUT A METER AND A HALF THICK. AND THEN IT'S GOT THE GRAY OR BLUE-GRAY ROCK ON THE OTHER SIDE. AS A MATTER OF FACT - LET ME LOOK AT IT CLOSELY. IT'S A FRAGMENT IN IT ALL RIGHT.</td>
</tr>
</tbody>
</table>
CDR: WELL, MAYBE IT ISN'T A DIKELET. MAYBE IT'S JUST A SCREE COVERING, A TLOM COVERING.

CDR: I GOT A ROCK, BOB. IT'S FRACTURED, PREVIOUSLY AROUND THE DIKE. IT'S IN SEVERAL PIECES, BUT WE'RE GOING TO PUT IT ALL IN ONE BAG.

CDR: LET HE GET THIS WHOLE THING IN A BAG.

CDR: I CAN GET IT RIGHT HERE.

CDR: NOW, CAN YOU GET THAT DIKE THERE? PIECE OF IT?

CDR: THERE'S A PRESERVED CONTACT BETWEEN THE DIKE AND THE WHITE MATERIAL.

CDR: WHY DON'T WE GET THIS BIG PIECE OF DIKE NOW?

CDR: THAT'S WHAT I WANTED.

CDR: SEE IF YOU CAN GET - WHOA! I DON'T HIT IT AGAIN.

CDR: NOW, THERE'S SOME GOOD CONTACT. THAT'LL DO IT.

CDR: THERE'S BEEN SOME PARTIAL MELTING AT SOME TIME.

CDR: THERE'S SOME REGULAR PICTURES ON THIS SET.

CDR: LET HE FINISH THE STEROUDAROUND THE CORNER HERE.
### CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ELAPSED TIMES, AND EXCEPTIONS FROM THE AIR-TO-GROUND TRANSCRIPT

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<tr>
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<th>SAMPLE TYPE</th>
<th>LUNAR-SURFACE PHOTOGRAPHS</th>
<th>CREW COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bag 562</td>
<td>0.42</td>
<td>Basalt Fines</td>
<td>146-22296 XEB</td>
<td>Hey, over here on this side, it looks like the vesicular anorthositic gabbro.</td>
</tr>
<tr>
<td>77130</td>
<td></td>
<td>Anorthositic Gabbro</td>
<td>146-22299 XEB 146-22300 XSB</td>
<td>OK, there's that one. The vesicular anorthositic gabbro is in 5 - what is it? 62.</td>
</tr>
<tr>
<td>77135</td>
<td>337.4</td>
<td>Anorthositic Gabbro</td>
<td>146-22305 XSB 146-22331- 146-22335 XEB 146-22336- 146-22338 XSB</td>
<td></td>
</tr>
</tbody>
</table>

**EVA 3 - STATION 7 TO STATION 8**

#### GEOLOGIC DESCRIPTIONS DURING TRAVERSE

<table>
<thead>
<tr>
<th>TIME</th>
<th>CREW</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>06 19 43</td>
<td>CDR</td>
<td>Here's a football-size rock that was 50 percent burned.</td>
</tr>
<tr>
<td>06 19 43</td>
<td></td>
<td>That one looked like a piece of the gray rock, I think.</td>
</tr>
<tr>
<td>06 19 52</td>
<td>CDR</td>
<td>We're still about 100 meters, I think, from where the break in slope is - with the flux. But we're away from the block population except for two great big blocks out ahead of us, this side of the SWP crater. But the average population is down to the 1 percent or less, again.</td>
</tr>
<tr>
<td>06 19 52</td>
<td>CDR</td>
<td>That average population really never changed up in here. Just the big blocks were around. I saw some little -</td>
</tr>
<tr>
<td>06 19 52</td>
<td>CDR</td>
<td>Half-meter to one-third-meter, glass-lined, pit-bottom craters.</td>
</tr>
</tbody>
</table>
THERE'S ANOTHER ONE OF THOSE DEEP CRATERS THAT'S NOT - THAT DOESN'T HAVE A BLOCKY RIM.

THAT'S ONE OF THE MORE STRIKING CHARACTERISTICS OF THE HILLS. ARE THESE CRATERS THAT LOOK, AS FAR AS THE DIAMETER-TO-DEPTH RATIO IS CONCERNED, LIKE THEY OUGHT TO BE FAIRLY YOUNG, BUT THERE'S NO BLOCKS ON THE RIM, AND THEY SEEM TO HAVE THIS SMOOTHED APPEARANCE, JUST LIKE SOME OF THE LARGE CRATERS.

YOU CAN SAMPLE SECONDARY CRATERS, AND THEY TEND TO HAVE BLOCKS EITHER IN THEM OR ON ONE RIM, SUGGESTING THAT YOU COULD TELL DIRECTIONS IF YOU PUT YOUR HIND TO IT. DIRECTIONS OF WHERE THE SECONDARIES CAME FROM. THESE ARE SMALL ONES.

HERE'S SWP, JACK. IT'S COMING RIGHT UP, AND I'LL GO ALONG THE SOUTHERN RIM.

THAT'S SWP, ALL RIGHT. SWP'S A BIGGER HOLE THAN I THOUGHT IT WAS.

SWP EVEN HAS SOME BLOCKS IN THE WALL.

YES, BUT THE EASTERN AND SOUTHEASTERN RIM OF SWP ARE JUST CONTINUOUS WITH THE SLOPES OF THE SCULPTURED HILLS.

---

**LVF SAMPLE # 11**

<table>
<thead>
<tr>
<th>BAG</th>
<th>50Y</th>
<th>SOIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>78120</td>
<td>75.78</td>
<td>RESERVE FINES</td>
</tr>
<tr>
<td></td>
<td>121.6</td>
<td>1 MM FINES</td>
</tr>
<tr>
<td>2</td>
<td>4.43</td>
<td>1-2 MM</td>
</tr>
<tr>
<td>3</td>
<td>2.48</td>
<td>2-4 MM</td>
</tr>
<tr>
<td>6</td>
<td>5.64</td>
<td>6-10 MM</td>
</tr>
</tbody>
</table>

---

GO BY THAT LITTLE DARK CRATER OVER THERE. THERE'S A VERY BLOCKY-RIM SMALL CRATER THAT'S A DARK-RIMMED CRATER INSTEAD OF A BRIGHT RIM LIKE WE SEEN SOMEWHERE THAT LOOKED FRESH. IT PARTLY MAY BE THE ANGLE AT WHICH WE'RE APPROACHING IT.

THERE'S A HIGHLY FRAGMENTAL, SMALL CRATER ABOUT 30 OR 40 METERS ACROSS, RIGHT ON THE SOUTHEASTERN RIM OF SWP. AND MOST OF THE FRAGMENTS ARE FOOTBALL SIZE AND SMALLER, AND THEY'RE VERY ANGULAR.

TURNS OUT THAT THEY'LL BREAK. THEY'RE CLOSED.

I GUESS THAT'S GOING TO BE ABOUT 75 PERCENT COVERED ON THE INSIDE OF THE RIM WITH THESE THINGS.

IT'S ALL INSTANT ROCK, BUT THE CRATER RIM LOOKS DARK COMPARED TO OTHER FRESH CRATERS LIKE THIS THAT WE'VE SEEN.

SWP FRAME IS 26.

WE'RE ROLLING.
CERTAINLY AREN'T MANY ROCKS. IT'S CERTAINLY NOT LIKE THE OLD NORTH AND SOUTH HASSIFS. YES, THERE'S ONE BIG ROCK OVER THERE.

I THINK WE'RE STARTING TO SEE BLOCKS. THAT ONE IS SO UNUSUAL -

WE CAN GET THE OTHER SMALLER POPULATION AROUND IT. I'M WORRIED ABOUT THAT ONE BEING EXOTIC TO THE SCULPTURED HILLS.

YES, IT DOESN'T LOOK LIKE IT ROLLED -

BUT I DON'T SEE ANY OTHERS, DO YOU?

WELL, THERE'S SOME SMALL ONES UP IN THERE. OFF TO ABOUT THE 2 O'CLOCK POSITION. BUT I THINK THAT'S ALL. WE'RE GOING TO HAVE TO BE SATISFIED WITH SMALL ONES. BIG ONES DON'T GET DOWN. THERE'S SOME BIG ONES WAY UP ON THE SLOPE.

WE'RE AT 227/2.5.

I WOULD RECOMMEND THAT WE TRY TO GET UP TO SOME OF THOSE. I DON'T KNOW WHETHER WE CAN OR NOT.

BOB, WE'RE DIRECTLY DOWNHILL, AND THAT IS FROM THE HIGHEST POINT THAT I COULD SEE UP ON THIS FIRST SCULPTURED HILL.

BOB, I'M PARKED AT 026; BEARING 226; DISTANCE, 6.6; RANGE, 4.0.

THE FIRST BLOCK I LOOKED AT HERE LOOKS LIKE SUBFLOOR GABBRO.
I

LWP, I'm going to go up and look at this big rock. Why don't you set up and sample any one of those other big ones? They're all the same. Let the one near the boulder, and I'll go up and try to get this big one down there.

LWP It's the only one left to look at, but right now we're dealing with subfloor material, I think.

LWP, this one here is tough as a rock. Why don't you set up and sample any one of these other big ones. They're all the same. Like the one here the Rover. And I'll go up and try to get this big one down here.

LWP, I thought you might be able to break it up.

LWP There's no corner on it.

LWP, 543 is the sample.

LWP What about some of these little fragments that seem to be sitting here on the surface?

LWP Yes, we're supposed to rake here. We'll get those with the rake.

LWP That one up there, by the way, is sitting on the surface. These others are dismembered.

LWP Yes, that's why I want to look at it.

CC A reminder, 17. We'd like to have you leaving here in 30 minutes to make up some of the time we spent at stations 6 and 7, a little extra. And we'd also remind you that we'd like a rake soil sample here, too. That may be the only way we try and pick up some stuff other than subfloor if that, indeed, has come down from the top of the sculptured hills.

LWP This rock is a big chunk of shattered, but still visible, bluish-gray anorthosite. It's glass-coated, and it actually looks like it's vesicular. I'm going to roll it downhill so we can work on it. Well, I'll document it first.

BAG 545 Bag 545 will be soil from under that anorthosite boulder. The only thing that bothers me about that boulder being subfloor -- I mean sculptured hills is that it's glass-coated.

LWP It may have been thrown in here by an impact.
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-RETURNED TWEES,
AND EXCERPTS FROM THE AIR-TO-GROUND TRANSCRIPT

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<th>ALT</th>
<th>CREW COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAG 564</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>78230</td>
<td>82.98</td>
<td>142-21698 XSB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>122.70</td>
<td>142-21699 XSB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2.46</td>
<td>142-21700 XSB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1.7</td>
<td>142-21701 XSB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 4             | 0.72        | 146-22370 XSB            | 06 20 17+ LWP | I got it documented up in place. I think that’s
|               |             |                          |     |               |
| 78235         | 129.11      | 142-21701 XSB            |     |               |
| 6             | 93.06       | 142-21702 XSB            |     |               |
| 7             | 57.58       | 146-22371 XSB            |     |               |
| 8             |             |                          |     |               |

| NUMBER (G) | PHOTOGRAPHS | EVA 3 - STATION 19 | 06 20 17+ LWP | I got it documented up in place. I think that’s
|-------------|-------------|-------------------|-------------|------------------------------------------------|
|             |             |                    | 06 20 17+ CDR | WELL, let me get a piece of that size since it
|             |             |                    |             | was undersampled. Then we’ll roll it over and get
|             |             |                    |             | a piece of the other size.
|             |             |                    | 06 20 17+ LWP | OKAY, YES. LET’S DO IT AGAIN. EXCEPT I GOT DUST
|             |             |                    |             | ALL OVER IT.
|             |             |                    | 06 20 18 57 LWP | THE ALBEDO - THE DOWN-SUN PICTURE’S NOT GOING TO
|             |             |                    |             | MEAN MUCH. LET ME GET THIS SAMPLE IN YOUR BAG.
|             |             |                    |             | I THINK WE OUGHT TO CHANGE YOUR BAG BECAUSE THE
|             |             |                    |             | STUFF’S GOING TO START FLYING OUT.
|             |             |                    |             |BLOCK IS ALL OVER IT.
|             |             |                    |             |IT’S STAINED BY THE GLASS COATING.
|             |             |                    |             |I’M NOT SURE. LET’S GET THREE PIECES
|             |             |                    |             |LAYING AROUND. LET’S GET THOSE BEFORE WE LOSE
|             |             |                    |             |THEM.
|             |             |                    |             |THERE. I THINK I’LL GET ONE MORE SNAP OFF THERE. I
|             |             |                    |             |DON’T WANT TO SEAL THIS. LET ME GET ANOTHER
|             |             |                    |             |SNAP OFF THERE. I CAN GET IT.
|             |             |                    |             |SURE THAT’S THE BOTTOM, HUH?
|             |             |                    |             |YES, I’M PRETTY SURE. LET’S TURN IT OVER. I
|             |             |                    |             |THINK I’M RECOGNIZING THE TOP, ALTHOUGH IT’S NOT
|             |             |                    |             |JUST ALL OVER IT NOW.
|             |             |                    |             |I THINK I’LL GET ONE MORE SNAP OFF THERE. I
|             |             |                    |             |DON’T WANT TO SEAL THIS. LET ME GET ANOTHER
|             |             |                    |             |SNAP OFF THERE. I CAN GET IT.
|             |             |                    |             |SURE THAT’S THE BOTTOM, HUH?
|             |             |                    |             |YES, I’M PRETTY SURE. LET’S TURN IT OVER. I
|             |             |                    |             |THINK I’M RECOGNIZING THE TOP, ALTHOUGH IT’S NOT
|             |             |                    |             |JUST ALL OVER IT NOW.
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|             |             |                    |             |DON’T WANT TO SEAL THIS. LET ME GET ANOTHER
|             |             |                    |             |SNAP OFF THERE. I CAN GET IT.
|             |             |                    |             |SURE THAT’S THE BOTTOM, HUH?
|             |             |                    |             |YES, I’M PRETTY SURE. LET’S TURN IT OVER. I
|             |             |                    |             |THINK I’M RECOGNIZING THE TOP, ALTHOUGH IT’S NOT
|             |             |                    |             |JUST ALL OVER IT NOW.
06 20 22 30 LMP THIS IS PROBABLY A 50-50 MIXTURE OF WHAT LOOKS LIKE KELPITE OR AT LEAST BLUE-GREY PLAGIOCLASE, AND A VEN - LET'S SAY LIGHT YELLOW-TAN MINERAL, PROBABLY OXYHORSPHENE. IT'S FAIRLY COARSELY CRYSTALLINE.

06 20 22+ CC WHEN YOU GET THE CHIPS WITH THAT ROCK, WE'D LIKE TO GET THE TOP SAMPLE, PLEASE, AND THAT'S PROBABLY JUST AS WELL DONE BY THE ROVER AS ANYPLACE ELSE.

06 20 23 29 CC IF YOU DON'T WANT ANOTHER SAMPLE, THEN WE CAN GO.

06 20 23+ LMP IF YOU DON'T WANT ANOTHER SAMPLE, THEN WE CAN GO.

06 20 24+ CC LET ME GET A PIECE OF THIS GLASS.

06 20 24+ LMP THERE IT IS. LET ME TRY TO GET THEM. PUT THEM IN THE SAC.

06 20 24+ CC A PIECE OF THE GLASS FROM IT, BOB, IS 546. (BOTTOM)

06 20 24+ CC WITH A LITTLE OF THE LOCAL SOIL.

06 20 23+ LMP BY COARSELY CRYSTALLINE, PROBABLY, THE AVERAGE OR NATURAL CRYSTAL SIZE WILL TURN OUT TO BE ABOUT 3 OR 4 MILLIMETRES , A LITTLE MORE OR LESS.

06 20 24+ CCR IT'S NOT GONNA ROLL DOWN THAT HILL UNLESS WE GET IT ON FALL.

06 20 24+ LMP IT'S NOT GONNA ROLL DOWN THAT HILL UNLESS WE GET IT ON FALL.

06 20 24+ CCR IT'S NOT GONNA ROLL DOWN THAT HILL UNLESS WE GET IT ON FALL.

06 20 24+ CCR IT'S NOT GONNA ROLL DOWN THAT HILL UNLESS WE GET IT ON FALL.

06 20 24+ CCR IT'S NOT GONNA ROLL DOWN THAT HILL UNLESS WE GET IT ON FALL.

06 20 24+ CC THE INFORMATION IS THE ONCE THAT WAS UP. WELL, I'M NOT SURE NOW. IT'S ON A LOT MORE DUST ON IT.

06 20 24+ CCR IT'S NOT GONNA ROLL DOWN THAT HILL UNLESS WE GET IT ON FALL.

06 20 24+ CCR IT'S NOT GONNA ROLL DOWN THAT HILL UNLESS WE GET IT ON FALL.

06 20 24+ CCR IT'S NOT GONNA ROLL DOWN THAT HILL UNLESS WE GET IT ON FALL.

06 20 24+ CCR IT'S ON ALL SIDES.

06 20 24+ CC IT'S GONNA ROLL DOWN THAT HILL UNLESS WE GET IT ON FALL.

06 20 24+ CCR IT'S ON ALL SIDES.

06 20 24+ CCR IT'S ON ALL SIDES.

06 20 24+ CCR IT'S ON ALL SIDES.

06 20 24+ CCR IT'S ON ALL SIDES.
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLO-ELAPSED TIMES, AND EXCERPTS FROM THE AIR-TO-GROUND TRANSCRIPT

<table>
<thead>
<tr>
<th>SAMPLE NUMBER</th>
<th>WEIGHT (G)</th>
<th>SAMPLE TYPE</th>
<th>LUNAR-SURFACE PHOTOGRAPHS</th>
<th>CREW COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVA 3 - STATION: 8</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>BAG 565</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>78530* (1445.0) RAKE FRAGMENTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>78535-*</td>
<td></td>
<td></td>
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<tr>
<td>06 20 26+</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>CDR</td>
<td>WE'LL RAKE.</td>
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<tr>
<td>06 20 26+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CC</td>
<td>THEY SUGGEST THE CRATER RUN IF POSSIBLE.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>142-21706 XSB</td>
<td>06 20 26+</td>
<td></td>
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</tr>
<tr>
<td>CDR</td>
<td>PROBABLY OVER THERE NEAR THE ROVER.</td>
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<tr>
<td>142-21707 XSB</td>
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<tr>
<td>142-21708 XSB</td>
<td></td>
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<tr>
<td>146-22399 XSB</td>
<td>06 20 33 55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDR</td>
<td>THERE'S NOT MUCH IN HERE WORTH - MAN, THERE'S JUST NOTHING. THIS HAS BEEN TOTALLY MANTLED WITH TALUS, WELL, IT IS, BECAUSE THAT DOWNHILL PATTERN GOES RIGHT DOWN THE SLOPE OF THIS CRATER, AND, ACTUALLY, IT GOES UPSLOPE OF THE CRATER. THIS MAY BE ON A RAY SOMEWHERE, BECAUSE IT GOES RIGHT DOWNHILL - THIS LITTLE ROTTY BOULDER TRAIL PATTERN GOES RIGHT UP THE SLOPE.</td>
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<tr>
<td>146-22400 XSB</td>
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<td>142-21712-</td>
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<tr>
<td>142-21716 XS</td>
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<tr>
<td>142-2403 ESB</td>
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<tr>
<td>146-22403 ESB</td>
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<tr>
<td>142-21709 DSB</td>
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<td>142-21710 DSB</td>
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<tr>
<td>142-21711 DSB</td>
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<tr>
<td>146-22402 LOC</td>
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<tr>
<td>06 20 33+</td>
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<td></td>
</tr>
<tr>
<td>LMP</td>
<td>WANT YOUR CRANE OVER THERE?</td>
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<tr>
<td>06 20 33+</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>CDR</td>
<td>NO, I'LL JUST TAKE IT TO IT. LET ME KNOW WHEN YOU'RE READY FOR A BAG.</td>
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<tr>
<td>06 20 33+</td>
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<td></td>
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</tr>
<tr>
<td>LMP</td>
<td>WELL, I'M ABOUT READY.</td>
<td></td>
<td></td>
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<tr>
<td>06 20 32 17</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>LMP</td>
<td>I RAKED ABOUT A 2-METER SQUARE AREA - AND DOWN TO 4 OR 5 CENTIMETERS FOR THESE, PRETTY GOOD POPULATION. THEY ALL GOING TO GO IN?</td>
<td></td>
<td></td>
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<tr>
<td>06 20 32+</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>CDR</td>
<td>THEY'RE ALL IN; - 565.</td>
<td></td>
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<tr>
<td>06 20 55+</td>
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<tr>
<td>LMP</td>
<td>I THINK YOUR RAKE SAMPLE HERE AT THE SCULPTURED HILLS IS GOING TO HAVE TO TELL A TALE COMBINED WITH THE OBSERVATION THAT MOST OF THE BLOCKS WE SAW WERE, LIKE GENE SAMPLED, LOOKED LIKE SURFICIAL GABBRO. IT'S CONCEIVABLE THAT THE SCULPTURED HILLS COULD BE THE SAME KIND OF MATERIAL. I THINK IT'S FAIRLY CLEAR THAT THE BOULDER POPULATION DOES NOT RESemble THE MASSIF POPULATION AT ALL.</td>
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</tbody>
</table>
BAG 566  
79500 351.53 RESERVE FINES  1 PM FINES  58
1 748.7 1 PM FINES  58
2 87.38 4-10 MM
4 9.36 4-10 MM
79505 526.30 ROCK 1 CM
6 55.98 ROCK 1 CM
7 23.32 ROCK 1 CM
8 19.67 ROCK 1 CM
9 8.68 ROCK 1 CM
79515 4.38 ROCK 1 CM
6 3.10 ROCK 1 CM
7 1.22 ROCK 1 CM
8 0.88 ROCK 1 CM

BAG 567  
78150 0.15 RESIDUE FINES  58
78155 401.32 ROCK  58

BAG 548  
78420 97.94 RESERVE FINES  142-21717 XSB
1 186.18 1 MM FINES  142-21718 XSB
2 4.16 4-10 MM  142-21720-  142-21719 XSB
3 2.41 4-10 MM  142-21725 XSB
4 1.91 4-10 MM  142-21719 XSB

CDR WHY DON'T YOU GO BACK AND DIG A TRENCH AT THE
MOVER?
CDR DID YOU GET A TRENCH AT THE MOVER - -
CDR - - WE JUST SCOOP THIS OUT. I'LL GET THE SAMPLE
HERE THAT I CAME FROM NOW AND - -
CDR WHY DON'T YOU GET YOUR AFTER PICTURE OVER THERE
AND GO DOWN AND GET THAT TRENCH.
CDR BOY, ALMOST PURE WHITE AND VERY FRIABLE, OH, BOY,
IS IT! PURE WHITE. RIGHT OUT OF A SMALL LITTLE
FIT CRATER ON THE SIDE OF THIS CRATER I JUST
WALKED IN, HOUSTON. AND IT'S PURE WHITE, VERY
FRIABLE. I GOT ONE BIG PIECE AND SEVERAL SMALL
IN 567.

CDR YES, THEY WERE ALSO IN MY DOCUMENTED SAMPLE NEXT,
TOOL.

CDR OKAY, WHERE DO YOU WANT THIS TRENCH? ON THE
SIDE OF THIS CRATER?
CDR I'LL DROP MY GNOMON.
CDR - - I DON'T KNOW, I WAS JUST THINKING ABOUT THAT,
I THINK WE WANT TO GET OUT IN THE LITTLE CRATER
AREA TO SEE IF THERE'S ANY STRATIGRAPHY
TO WHATSOEVER THE VALUE IS.
CDR OKAY, J ACK, I'M GOING TO LEAVE THE COMMUNICATION AHEAD.
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-CLASSED TEXTS, AND EXTRACTS FROM THE AIR-TO-GROUND TRANSCRIPT

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<tr>
<td>NUMBER (G)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 20 33+</td>
<td>LMP</td>
<td>I HAVE DIG - HAVE GOTTEN A WALL, NOW IN ONE PLACE THAT'S STANDING ABOUT 25 CENTIMETERS HIGH, AND IT SHOWS NO APPARENT CHANGE IN THE TEXTURE OF THE SOIL TO THAT DEPTH; EXCEPT POSSIBLY AT THE LOWER 5 CENTIMETERS, THERE'S SOME ZONES THAT MIGHT BE SLIGHTLY MORE GRANULAR. PARTICLE SIZE MAY BE UP A LITTLE BIT.</td>
<td></td>
</tr>
<tr>
<td>06 20 38+</td>
<td>LMP</td>
<td>OKAY - THE BOTTOM 10 CENTIMETERS ---</td>
<td></td>
</tr>
<tr>
<td>06 20 42 30</td>
<td>CDR</td>
<td>THE BOTTOM IS IN 548, IT'S VERY CLODDY. LOOKS VERY MUCH LIKE THE SURFACE WE'RE STANDING ON EXCEPT IT CLODS UP QUITE A BIT MORE. CAN YOU TELL THEM ANYTHING FROM THE TRENCH ITSELF?</td>
<td></td>
</tr>
<tr>
<td>06 20 42+</td>
<td>LMP</td>
<td>I TALKED TO THEM A LITTLE BIT ABOUT IT.</td>
<td></td>
</tr>
<tr>
<td>06 20 42+</td>
<td>CDR</td>
<td>OK, IT SURE HOLDS A NICE WALL, THOUGH.</td>
<td></td>
</tr>
</tbody>
</table>

BAG 549 TRENCH SOIL SAME AS 06 20 42+ LMP SKIM SAMPLE OF THE UPPER HALF CENTIMETER. THAT'S IN BAG 549.

BAG 550 TRENCH SOIL SAME AS 06 20 43 45 CDR THAT'S IN BAG 549.

BAG 551 (252.4) TRENCH SOIL SAME AS 06 20 45 05 CDR AND THAT LAST BAG WAS 551.
06 20 16+ CDR BAG NUMBER 8 IS ABSOLUTELY FULL - AND IT'S
UNDER JACK'S SEAT.
06 20 49+ LMP 5W-5 IS ON THE LMP.
06 20 49+ LMP THERE IS NOTHING ON THE GATT.
06 20 49+ CDR I'LL PUT ONE MORE BAG ON THE GATT.
06 20 49+ CDR I'M GOING TO THROW THE BAG IN THE BIG BAG BACK THERE... "...
06 20 49+ LMP A LOCAL OKE, YOU MEAN?
06 20 49+ CDR YES.
06 20 49+ CDR WELL, LET ME LEAVE IT UNDER YOUR SEAT.
06 20 49+ LMP CAN I PUT A BAG AROUND IT?
06 20 49+ CDR NO, IT'S GOT A BAG AROUND IT - IT'S ALL
BAGGED.

LEAVE STATION 8

---

GEOLIC DESCRIPTION DURING TRAVERSE

06 21 00+ CDR WE'RE BACK INTO THE MANTLED AREA POPULATION OF
FRAGMENTS IS STILL 1 PERCENT OR SO. THE
CRATER OFF TO OUR LEFT, WHICH IS AT 227 AND 3.3
- IS A FAIRLY GOOD-SIZED DEPRESSION, BUT IT'S
COMPLETELY MANTLED. THERE'S NO BLOCKS SHOWING
IN THE WALL AT ALL.
- - -
06 21 03+ LMP - - LOOKING AT THE WESTERN WALL OF COCHISE, I
CAN SEE A CONTACT WITHIN THE SUNFLOWER BETWEEN
ALBENDO UNITS, ONE OF WHICH IS A LIGHT TAN-RAY
AND THE OTHER IS A LIGHT BLUE-GRAY. MAY
REFLECT THE TWO KINDS OF SUNFLOWER GABBRO WE'VE
ALREADY SAMPLED. VEISICULAR AND NONVEISCULAR,
AND THAT CONTACT THAT LOOKED LIKE IT WAS DIPPING
- APPARENT DIP IN THE WALL - WAS TO THE NORTH.
AND THE WEST WALL DIPPING TO THE NORTH ABOUT 20
DEGREES.
06 21 03+ CDR THE BLUE-GRAY'S ON TOP.
06 21 03+ CDR I TOOK A PICTURE OF IT. WE'RE AT 228/3.0, AND
WE'RE HEADING SOUTH AND NOT QUITE ON THE EAST
RIM.
- - -
06 21 05+ LMP COCHISE IS MUCH LIKE HORATIO AND - ACTUALLY,
MORE LIKE CAMELOT, ALTHOUGH NOT AS BLOCKY IN THE WALLS,
IN GENERAL, IN THAT IT HAS BLOCKY WALLS BUT A
MANTLED RIM. AGAIN, ALL THE BLOCKS I SEE IN HERE
ARE BIG ONES, AND BLOCKS DOWN TO ABOUT 20 CENTI-
METERS ARE SUBANGULAR, IN GENERAL, AND APPEAR TO
HAVE THE APPEARANCE OF THE SUNFLOWER GABBRO, ALTHOUGH
MOST OF THE SMALLER ROCKS DO NOT APPEAR TO BE
HIGHLY VEISICULAR.
- - -
CROSS-REFERENCE OF LUNAR SAMPLE WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ELAPSED TIMES, 
AND EXPLANATIONS FROM "IT ISN'T CROSS" TRANSCRIPT

<table>
<thead>
<tr>
<th>SAMPLE NUMBER</th>
<th>WEIGHT (G)</th>
<th>SAMPLE TYPE</th>
<th>LUNAR SURFACE</th>
<th>JST</th>
<th>CREW COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVA 3 - TRAVERSE, STATION 8 - STATION 9</td>
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<table>
<thead>
<tr>
<th>TIME</th>
<th>EVENT</th>
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</thead>
<tbody>
<tr>
<td>06 21 09+</td>
<td>LMP - OUR BLOCK POPULATION HERE NOW ON THE SOUTH</td>
</tr>
<tr>
<td>06 21 09+</td>
<td>LMP - FIM OF COOKIES AND UP AHEAD OF US LOOKS LIKE</td>
</tr>
<tr>
<td>06 21 09+</td>
<td>LMP - IT'S UP TO 5 PERCENT, AND IT ALL LOOKS LIKE</td>
</tr>
<tr>
<td>06 21 09+</td>
<td>LMP - SUBFLOOR - LIMIT TO THE SUBFLOOR ( shelter) - OR</td>
</tr>
<tr>
<td>06 21 09+</td>
<td>LMP - GRAY, YOU DON'T SEE MUCH BLUE-GRAY; NOT</td>
</tr>
<tr>
<td>06 21 09+</td>
<td>LMP - CUT ON HERE.</td>
</tr>
<tr>
<td>06 21 09+</td>
<td>LMP - THERE'S A RECENT HIT.</td>
</tr>
<tr>
<td>06 21 09+</td>
<td>LMP - THERE'S A FRESHER LOOKING ROCK HERE.</td>
</tr>
<tr>
<td>06 21 09+</td>
<td>LMP - WE'RE STILL PRIMARILY IN AN EXTREME BLOCK</td>
</tr>
<tr>
<td>06 21 09+</td>
<td>LMP - FIELD HERE NOW. IT'S UP TO 20 PERCENT</td>
</tr>
<tr>
<td>06 21 09+</td>
<td>LMP - COVER OF FRAGMENTS MOSTLY THE SUBFLOOR. SOFT</td>
</tr>
<tr>
<td>06 21 09+</td>
<td>LMP - OF IT LOOKS QUITE HIGHLY SHATTERED. I JUST</td>
</tr>
<tr>
<td>06 21 09+</td>
<td>LMP - SAW ONE PIECE THAT LOOKED LIKE A WHITE</td>
</tr>
<tr>
<td>06 21 09+</td>
<td>LMP - AMORPHOUSIC ROCK.</td>
</tr>
<tr>
<td>06 21 09+</td>
<td>LMP - THERE ARE SOME GRAYISH ROCKS THAT ARE -</td>
</tr>
<tr>
<td>06 21 09+</td>
<td>LMP - CURVING UP HERE. I TURN TO THE RIGHT</td>
</tr>
<tr>
<td>06 21 09+</td>
<td>LMP - AND PARK RIGHT HERE.</td>
</tr>
<tr>
<td>06 21 10+</td>
<td>LMP - THAT HAVE SOMEWHAT OF A SWIRL TEXTURE.</td>
</tr>
<tr>
<td>06 21 13+</td>
<td>CUR - WE'RE AT 230/2.2.</td>
</tr>
<tr>
<td>06 21 13+</td>
<td>CC - COFF YOU PARENT.</td>
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ARRIVE STATION 9

<table>
<thead>
<tr>
<th>TIME</th>
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<tbody>
<tr>
<td>06 21 13+</td>
<td>LMP - VAN BOSTAN LOOKS LIKE A BLOCKY RIM FRESH IMPACT</td>
</tr>
<tr>
<td>06 21 13+</td>
<td>CUR - CRAWF RIGHT NOW.</td>
</tr>
<tr>
<td>06 21 13+</td>
<td>CC - HOW ABOUT SCUFFING YOUR FEET AND SEEING IF</td>
</tr>
<tr>
<td>06 21 13+</td>
<td>LMP - IT LOOKS ORANGE UNDERNEATH?</td>
</tr>
<tr>
<td>06 21 13+</td>
<td>LMP - SLIGHT DIFFERENCES - DON'T WORRY.</td>
</tr>
</tbody>
</table>

EVA 3 - STATION: 9
GEOLOGIC DESCRIPTION

06 21 20+ LMP WE'RE GOING TO GO UP THERE AND LOOK AT THE WALLS, AND THE FLOOR, AND THE MANTLE OBJECTIVE HERE REALLY IS IMPATIENT BECAUSE THE BLOCKY EJECTA AROUND THE CRATER COVERS - WELL, IT LOOKS LIKE IT EXTENDS SEVERAL HUNDRED METERS OUT FROM THE RIM - SAY A COUPLE OF HUNDRED METERS.

06 21 20+ LHP BUT THE FIRST THING WE DO IS GO UP TO THE CRATER, I THINK THE MANTLE OBJECTIVE HERE IS MANTLE DUST MATERIAL BECAUSE THE BLOCKY EJECTA AROUND THE CRATER COVERS - WELL, IT LOOKS LIKE IT EXTENDS SEVERAL HUNDRED METERS OUT FROM THE RIM - SAY A COUPLE OF HUNDRED METERS.

06 21 20+ LMP WE'RE PRETTY CLOSE TO THE RIM.

06 21 20+ LMP I'LL GO UP ON THE RIM, GENE, AND SEE WHAT WE'VE GOT.

06 21 22+ CDR LET'S GET GRABS BEFORE YOU GUYS LEAVE.

06 21 22+ LMP I'M GETTING IT RIGHT NOW.

06 21 22+ LMP SURE LOOK LIKE SHOCKED ROCKS TO ME.

06 21 22+ CDR LOT OF GLASS SPLATTERED ON SOME OF THESE, JACK.

06 21 22+ LMP YES.

06 21 22+ LMP WE MIGHT EVEN FIND SOME SHATTER COVERS.

06 21 22+ CDR WELL, I'LL SAY ONE THING FOR OLD VAN SERG, IT'S BLOCKY.

06 21 23+ LMP THIS IS AT LEAST A LARGE BLOCKY RIM CRATER, BUT EVEN IT HAS THE MANTLE DUST MATERIAL COVERING THE RIM, PARTIALLY BURIED ROCKS, AND IT'S DOWN ON THE FLOOR, AS NEAR AS I CAN TELL, AND ON THE WALLS. THE CRATER ITSELF HAS A CENTRAL MOUND OF BLOCKS THAT'S PROBABLY 50 METERS IN DIAMETER - THAT'S A LITTLE BIG - 50 METERS IN DIAMETER. MANY OF THE BLOCKS ARE - - - IMPERSONAL SHATTERED IN THAT AREA, AS THE ONES THAT ARE ON THE WALLS. I DON'T SEE ANY SIGN OF ORGANIZATION OF THE BLOCKS IN THE WALLS RIGHT NOW.

06 21 23+ LMP THERE'S A POSSIBILITY THAT ON THE WEST WALL, THERE'S AN INDICATION THAT THERE'S SLIGHTLY DARKER CRAY ROCKS STARTING ABOUT HALFWAY DOWN THE CRATER, AND THAT LEVEL IS COINCIDENT WITH WHAT APPEARS TO BE A BENCH ON THE NORTHWEST WALL. AND THAT BENCH - HINTS OF THAT BENCH - IT'S NOT CONTINUOUS, BUT HINTS OF IT ARE AROUND ON THE NORTH WALL AND, I THINK, RIGHT BELOW US - YES, ON THE SOUTHEAST WALL. THE ROCKS ARE PRETTY BADLY BROKEN IN MANY CASES, AND - WELL, I HAVEN'T SEEN ANY REAL GLASS YET, WE'LL START LOOKING AT THEM A LITTLE MORE CAREFULLY.

06 21 23+ CDR THAT LOOKS LIKE A BRECIA RIGHT THERE IN FRONT OF US.

06 21 23+ LMP THERE'S SOME INTERESTING PATTERNS ON THE WALL.
<table>
<thead>
<tr>
<th>SAMPLE</th>
<th>WEIGHT</th>
<th>SAMPLE TYPE</th>
<th>LOCATION-SURFACE</th>
<th>NOT</th>
<th>CREW COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>06 21 28+</td>
<td>LMP</td>
<td>THERE'S VARIATION IN THE CENTRAL MOUND, AND HOW THAT WE'VE LOOKED AT THIS ONE, BUT NOW IT LOOKS LIKE IT'S COMPOSED OF GRAY FRAGMENT BRECCIA, MUCH LIKE WHAT WE'VE JUMPED, AND AGAIN IT'S MIGHT BE RELATED TO THE PROJECTILE. NOW, WE'RE OUT TO SEE IF THERE'S SUBLIMINAL UP HERE, OR WHETHER WE'RE DEALING WITH ANOTHER UNIT SOMEWHERE.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 21 28+</td>
<td>LMP</td>
<td>THERE'S POKE DUST ON THESE ROCKS. IT'S HARDER TO SEE A FRESH SURFACE. THEY'RE NOT AS CLEAN,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 21 28+</td>
<td>CDR</td>
<td>EVEN THE FLOOR OF THE CRATER IS NAMIBIA DOWN THERE.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 21 32 14</td>
<td>LMP</td>
<td>A LOT OF THESE ROCKS ARE UP HERE, PARTICULARLY THE MORE FRAGMENTED ONES. BUT EVEN SOME THAT Arent - ARE A GRAY MATRIX FRAGMENT BRECCIA, AND IT LOOKS LIKE - REALLY, THE FRAGMENTS ARE QUITE FINE. THERE ARE NO - ON THE BON ANYWAY, WE HAVEN'T SEEN ANY LARGE FRAGMENTS. THE LARGEST I'VE SEEN IS ABOUT 2 CM IN DIAMETER, BUT DOWN IN THE WOODS YOU CAN SEE SOME FRAGMENTS THAT ARE PROBABLY HALF A METER IN DIAMETER.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 07+</td>
<td>LMP</td>
<td>YES, YOU KNOW, I DON'T THINK THERE'S ANY SUBLIME UP HERE, THE ROCKS ARE SO DUST COVERED THAT IT'S HARD TO BE SURE, BUT NO ROCK I PICKED UP LOOKED LIMP OR SUBLIME.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| BAG 568 | 79 115 | 64.20 | RESERVE FINES | 146-22413 XEB | 06 21 23+ | LMP | OK, GENE'S Tearing APART ONE OF THE | |
| 79 115 | 346.29 | PRECIPICATE FRAGMENT | FROM CORNER OF BLOCK | 146-22415- | 06 25 3+ | LMP | VERY INTENSELY FRAGMENTED ROCKS, AND IT COMES OFF IN SMALL PICES. LET'S GET THIS FOR, BECAUSE THIS WILL BE THE BEST ORIENTED ONE FOR DOCUMENTATION, PLUS MAY NOT DON'T YOU GIVE THAT ONE YOU'VE GOTTEN INSIDE THERE? | |
| 142-21791 DSB | | | | | | | YES, I AM. | |
| 142-21792+ | LOC | 06 21 23+ | CDR | YES; I AM. | |
| 142-21794 LOC | 06 21 27+ | CDR | BAG 568 IS A FRAGMENT FROM THE SURFACE. | | | |
| 06 21 27+ | LMP | THAT'S A CORNER, I THINK, OFF THE BLOCK THAT GENE DOCUMENTED HERE. | | | |
| 06 21 27+ | CDR | YES; IT IS. | | | |
BAG 480 (LR-12) SAME
THE BLOCK.
79135 3.99 RESIDUE FINES BAG 568
79120 SAME AS
79130 2283.0 BRECCIA FRAGMENT WITH FRAGMENTS OF RESIDUE FINES BAG 568
WITH FRAGMENTS OF THE BLOCK.
06 21 27+ CDR GET IT WITH THE REAL EASY. HERE'S A WHOLE BIG - WE OUGHT TO TAKE THAT JUST AS IS.
06 21 27+ CDR PUT A BAG AROUND ONE END IF WE CAN, HERE THE OTHER END IS SMALLER.
06 21 27+ CDR THAT'S A BRECCIA, TOO.
06 21 27+ CDR SEE THE WHITE FRAGMENTS IN THERE?
06 21 27+ CDR IT'S A LOT OF VERY SMALL -
06 21 27+ LMP IT LOOKS LIKE THIS BIG ONE OVER HERE. YOU KNOW, IT MIGHT BE THAT THESE MIGHT BE PIECES OF THE PROJECTILE. I DON'T KNOW. BECAUSE IT DOESN'T LOOK LIKE IT'S NOT SUBFLOOR.
06 21 27+ CDR THAT?
06 21 27+ LMP WELL, THAT'S WRAPPED IN - IF YOU PUT IT END DOWN, IT MAY STAY IN THE BAG.
06 21 27+ CDR I Doubted IT.
06 21 28 45 CDR IT'S 480, AND IT'S A RELATIVELY TABULAR SHAPED, AND IT'S ABOUT - 10 INCHES LONG.
06 21 28+ LMP AND IT'S HIGHLY FRIABLE. IT BREAKS APART.
06 21 28+ CDR OH, NOT SO MUCH.
06 21 28+ LMP IN SMALL CHIPS. WELL, YOU DID IT WITH YOUR HANDS THERE. I CALL THAT BEING FRIABLE, COMPARED TO WHAT WE'VE SEEN ANYWAY.
06 21 28+ CDR THIS PARTICULAR ROCK WE'VE SAMPLED HAS TABULAR FRACTURES, AND IN ONE-HALF OF THE ROCK, THEY ARE DEFINITELY ORIENTED.

BAG 569 SOIL SAME AS
79120 (376.8) BAG 568
06 21 28+ CDR OK, AND LET ME GET AN AFTER OF THAT.
06 21 28+ LMP LET ME GET A SOIL RIM OVER HERE. OK.
06 21 28+ CDR OK, AND LET ME GET AN AFTER OF THAT.
06 21 28+ LMP LET ME GET A SOIL RIM OVER HERE. OK.
06 21 28+ CDR OK, AND LET ME GET AN AFTER OF THAT.
06 21 28+ LMP AND THE SOIL AND CHIPS - ABOUT TWO-THIRDS OF A METER FROM THE BOULDER - - ARE IN BAG 570.
06 21 28+ CDR I DON'T SEE ANY ORANGE MATERIAL EITHER.
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ELOPSED TIMES, AND EXCERPTS FROM THE AIR-TO-GOUND TRANSCRIPT

<table>
<thead>
<tr>
<th>SAMPLE NUMBER</th>
<th>WEIGHT (G)</th>
<th>SAMPLE TYPE</th>
<th>LUNAR-SURFACE LOCATION</th>
<th>AIR-LOPSED TIME</th>
<th>CRM COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAG 571</td>
<td>5.63</td>
<td>RESIDUE FINES</td>
<td></td>
<td>06 21 31 51</td>
<td>CCR YES, I THINK IT IS GLASS. AT LEAST IT'S GLASS COVERED. I'M NOT AT UNDOCUMENTED SAMPLE. IT'S ABOUT 2 METERS LEFT OF WHERE WE JUST SAMPLED. IT'S A GLASS-COVRDED BASEBALL-SIZE ROCK IN 571.</td>
</tr>
<tr>
<td>79155</td>
<td>318.81</td>
<td>UNDOCUMENTED GLASS-COVERED ROCK</td>
<td></td>
<td>06 21 32 16</td>
<td>LFP A LOT OF THESE BLOCKS UP HERE, PARTICULARLY THE MORE FRACUTURED ONES, BUT EVEN SOME THAT AREN'T, ARE A CRAY藝術 FRAGMENT BRECCIA, AND IT LOOKS LIKE - REALLY, THE FRAGMENTS ARE QUTE FINELY, AND THEY ARE, ON THE RIM ANYWAY, WE HAVEN'T SEEN ANY LARGE FRAGMENTS. THE LARGEST I'VE SEEN IS ABOUT 2 CENTIMETERS. BUT DOWN IN THE MOUND YOU CAN SEE SOME FRAGMENTS THAT ARE PROBABLY HALF A METER IN DIAMETER.</td>
</tr>
</tbody>
</table>

CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ELOPSED TIMES, AND EXCERPTS FROM THE AIR-TO-GOUND TRANSCRIPT
I'm not sure that is. It may be breccia. Everything is covered with dust here, and it's hard to tell the types. Most the rocks we're seeing are breccias. Make sure that glass is in your stereo.

It's the glass - looks like a glass agglutinate. It's a frothy - glass agglutinate is going to be in bag 481.

And it looks almost like a cowpie - type of bomb.

Although it's not flattened. It's an aggregate of glass - or it's a pile of about four fragments, much like the one we're sampling.

And it looks like it's in place from the day it was born.

OK. Can you tell us anything about the cowpie at Van Seg. Was that a clast in the breccia?

It was an aggregate of irregular - looked like agglutinated glass in fragments just sitting on the rim of Van Seg. And the reason I said I thought it was in place or had fallen there and crystallized there, is that these were four or five similar fragments arranged in a small coherent area. Not making that very clear. I don't think, but it looks as if it hit and broke apart upon hitting a little bit but didn't really splatter or break apart in any significant manner.

There are similar things - tell you what it looks like. If anybody's walked up the rim of Kilauea Iki in the ash out there, and on top of the ash, these are bombs that were fairly clearly molten when they hit, and they had just enough spring to break when they hit, but the individual pieces didn't move very far at all, and you can see that pattern on Kilauea Iki. And it was the same kind of thing, except that there was no directional aspect of it here.

And that's not to say it's volcanic glass. That's just the kind of pattern it was.
<table>
<thead>
<tr>
<th>Sample Type</th>
<th>Lunar-Surface Photographs</th>
<th>Event Time</th>
<th>Crew Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bag 482</td>
<td>Blue-gray</td>
<td>06 21 37+</td>
<td>CDR: A piece of that rock right behind it.</td>
</tr>
<tr>
<td>79150</td>
<td>Same as Bag 481</td>
<td>06 21 37+</td>
<td>CDR: Yes. I'm going to turn around. Just not going to be able to get that one in the bag.</td>
</tr>
<tr>
<td>79195</td>
<td>Breccia</td>
<td>06 21 37+</td>
<td>CDR: My sample's in - 482 is a rock, but it doesn't look like sunfloor. It looks like the blue-gray material we've been seeing - the breccia-type material.</td>
</tr>
<tr>
<td>Bag 52Y</td>
<td>Soil sample</td>
<td>06 21 37+</td>
<td>LMP: I don't think there's any difference.</td>
</tr>
<tr>
<td>79160</td>
<td>On rim of</td>
<td>06 21 37+</td>
<td>LMP: I don't think there's any difference.</td>
</tr>
<tr>
<td>79165</td>
<td>On rim of</td>
<td>06 21 37+</td>
<td>CDR: Let it in.</td>
</tr>
</tbody>
</table>

---

Crew Comments:

- APIECE OF THAT ROCK RIGHT BEHIND IT. YES. I'M GOING TO TURN AROUND. JUST NOT GOING TO BE ABLE TO GET THAT ONE IN THE BAG, I DON'T THINK. MY SAMPLE'S IN - 482 IS A ROCK, BUT IT DOESN'T LOOK LIKE SUNFLOW. IT LOOKS LIKE THE BLUE-GREY MATRIAL WE'VE BEEN SEEING - THE BRECCIA-TYPE MATRIAL.
- LMP: I DON'T THINK THERE'S ANY DIFFERENCE.
- CDR: Let it in.
- LMP: I DON'T THINK THERE'S ANY DIFFERENCE.
- CDR: I WANT A SCOOP OUT OF HERE, THOUGH, JACK.
- CDR: Let it in. THIS ISN'T GOING TO BE AN IDEAL RADIAL SAMPLE - BUT IT WILL HAVE TO DO.
- LMP: OKAY, RAG 52 YANKEE IS AT THE RIM CREST
- LMP: OKAY, RAG 52 YANKEE IS AT THE RIM CREST
- CDR: JUST GET IT THERE AND TAKE YOUR SAMPLE. WE'LL GET IT.
- LMP: I'LL TAKE THE SAMPLES GOING BACK.
- CC: WE'VE LICKED YOU TO PRESS ON. WE'LL ABOPT THE RADIAL SAMPLE.
<table>
<thead>
<tr>
<th>BAG</th>
<th>TRENCH SOIL</th>
<th>RESERVE FINES</th>
<th>XSA</th>
<th>LMP</th>
<th>CDR</th>
</tr>
</thead>
</table>
| 483 | 12.40       | 142-21027     | 06 21 47+ | I think that's a smart move. I don't think the current sampling order is affecting our search.
|     | 79220       | 142-21028     | 06 21 47+ | Jack, you ought to get a scoop of that dirt.
| 1   | 152.66      | 142-21028     | 06 21 47+ | Well, there's one scoop --
| 2   | 7.42        | 142-21028     | 06 21 47+ | Let's look at the subsurface.
| 3   | 6.74        | 142-21028     | 06 21 47+ | It's white.
| 4   | 6.73        | 142-21028     | 06 21 47+ | Well, I wanted to make sure we got some of these small glass balls.
| 5   | 5.57        | 142-21028     | 06 21 47+ | Yes, we'll get a scoop of it.
| 6   | 11.57       | 142-21028     | 06 21 47+ | I'm going to tell you what I think.
| 7   | 2.50        | 142-21028     | 06 21 47+ | I thought the reserve fines were going to tell you much more.

<table>
<thead>
<tr>
<th>BAG</th>
<th>TRENCH SOIL</th>
<th>SAME AS</th>
<th>LMP</th>
<th>CDR</th>
</tr>
</thead>
</table>
| 484 | 330.9       | 483, 488 | 06 21 51+ | Come here, Gene. Quickly. We can't leave this.
| 79260| (330.9)     |         | 06 21 51+ | This may be the youngest mantle over -- whatever was --
| 1   | 187.75      | 142-21028 | 06 21 51+ | was thrown out of the craters.
| 2   | 11.74       | 142-21028 | 06 21 51+ | That's what Jack's done here. He dug a trench in the
| 3   | 11.86       | 142-21028 | 06 21 51+ | southwest-northeast direction, and he discovered
| 4   | 15.95       | 142-21028 | 06 21 51+ | about 3 inches below -- 4 inches below the
| 5   | 6.60        | 142-21028 | 06 21 51+ | surface -- a very light-gray material.
| 6   | 2.60        | 142-21028 | 06 21 51+ | I'm trying to get the upper portion there.

<table>
<thead>
<tr>
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<th>TRENCH SOIL</th>
<th>SAME AS</th>
<th>LMP</th>
<th>CDR</th>
</tr>
</thead>
</table>
| 485 | 142.93      | 483, 488 | 06 21 51+ | The first 2 centimeters, bag 483. The next 5 --
|     | 79260       |         | 06 21 51+ | in 484.
| 1   | 187.75      | 142-21028 | 06 21 51+ | OK.
| 2   | 11.74       | 142-21028 | 06 21 51+ | We got quite a bit.
| 3   | 11.86       | 142-21028 | 06 21 51+ | OK. What did I say 483, 484? OK.
| 4   | 15.95       | 142-21028 | 06 21 52+ | OK. The third sample is in 485.
| 5   | 6.60        | 142-21028 | 06 21 52+ | A possibility here is that this upper 6 inches
| 6   | 2.60        | 142-21028 | 06 21 52+ | of gray material in here is the latest mantle
| 79265|             |         | 06 21 52+ | in the area and the light-colored debris may
|     |             |         | 06 21 52+ | be what's left over from the impact. |
CROSS-REFERENCE OF LUPAC SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ELAPSED TIMES, AND EXCERPTS FROM THE EVA-GROUND TRANSCRIPT

<table>
<thead>
<tr>
<th>SAMPLE NUMBER</th>
<th>SAMPLE TYPE</th>
<th>LUNAR-SURFACE PHOTOGRAPH</th>
<th>NET</th>
<th>CREW COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVA 3 - STATION 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.T. 37/50</td>
<td>DOUBLE DRIVE</td>
<td>163-21936 LOC</td>
<td>06 21 55+ CC</td>
<td>WE'VE HAD A CHANGE OF HEART HERE AGAIN, AS USUAL. AND WE'RE GOING TO DROP STATION 15 NOW THAT WE'VE SURPRISED YOU SO MUCH, AND WE'RE GOING TO GET A DOUBLE CORE HERE, AND WE'D LIKE TO GET SOME FOOTBALL-SIZE ROCKS WHILE YOU'RE DOING THAT. AND THEN WE'RE GOING TO LEAVE HERE AND GO BACK TO THE TD.</td>
</tr>
<tr>
<td>79001*</td>
<td>TRENCH</td>
<td>163-21838 LOC</td>
<td>06 21 55+ LMP</td>
<td>YOU DON'T WANT A DOUBLE CORE HERE, I DON'T THINK WE CAN DO IT, BOB, IT'S TOO ROCKY.</td>
</tr>
<tr>
<td>06 21 55+ CDR</td>
<td>YOU DON'T THINK WE'LL GET THROUGH THAT STUFF YOU JUST TRENCHED?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 21 55+ LMP</td>
<td>WELL, I'M AFRAID THERE ARE ROCKS ALL THROUGH IT.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 21 55+ CDR</td>
<td>LET'S TRY IT.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 21 55+ CDR</td>
<td>I'VE GOT IT STARTED.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 21 57+ CDR</td>
<td>THE LOWER IS 50; THE UPPER IS 37.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 21 57+ LMP</td>
<td>WHY DON'T YOU PUT IT UP - WELL - YOU PUT THE SCRUM AWAY, PUT IT NEAR THAT TRENCH. AT LEAST THERE IS SOME DOCUMENTATION THERE,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 21 59+ CDR</td>
<td>THE FIRST CORE WAS EASY; THE SECOND ONE A LITTLE TOUGHER; AND THEN IT GOT TOUGH DOWN AT THE END.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 21 59+ LMP</td>
<td>THERE, I'M GETTING A PICTURE OF YOU, OKAY.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 21 59+ LMP</td>
<td>I GOT IT.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 21 59+ CDR</td>
<td>CORE LIFTER WANTS TO SLIDE OUT. IT'S FULL, NO ROCKS IN IT. IT LOOKS LIKE JUST THE SAME STUFF WE'VE BEEN TRAVELING THROUGH.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 21 59+ CC</td>
<td>JACK. I THINK YOU BETTER HELP GENE WITH RECOVERING THAT CORE.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 01+ CDR</td>
<td>IT'S VERY LOOSE SOIL, JUST ANY LITTLE MOVEMENT AND YOU'LL LOSE SOME OF IT.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 01+ CDR</td>
<td>THE TOP RAMPED DOWN - OH, ALMOST HALF WAY WITHOUT ANY EFFORT.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 03 14+ CDR</td>
<td>THE BOTTOM RAMPED DOWN ABOUT AN INCH.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
06 22 03+ I'M AND WE WANT TO GET A LARGE BLOCK.
06 22 03+ CDR NO, I'M JUST A COUPLE OF THEM. I'VE GOT ONE.
06 22 04+ I'M GOT A BIG ROCK THERE, TOO!
06 22 04+ I'M THE FIRST THAT MAKES ME IS THAT IT'S NO
06 22 04+ SURFING IN THE AREA.
06 22 04+ CDR I GOT ONE HERE.
06 22 07+ CDR, THERE'S A BIG ONE RIGHT THERE IN MY FLOOR
06 22 07+ PAN, THAT'S WHAT I DID LAST TIME.

06 22 47+ LMP YOU'VE GOT ANOTHER BIG ROCK OVER HERE FROM THE -
06 22 47+ CDR IT'S IN MY FOOTPAK.
06 22 47+ LMP THAT'S FROM STATION 1, RIGHT?
06 22 47+ CDR YEAH.
06 22 47+ CDR THAT'S WHAT I TOLD THEM, STATION 9, I GOT A
06 22 47+ LMP GEN'S FOOTBALL-SIZED ROCK LOOKS LIKE IT MIGHT
06 22 47+ CDR FOOTBALL-SIZED ROCK LOOKS LIKE IT MIGHT
06 22 47+ CDR BE GLASS COATED, AND IT MIGHT EVEN HAVE A
06 22 47+ LMP I DON'T KNOW WHAT YOU'RE FOCUSING ON --
06 22 47+ LMP -- BUT HERF'S HIS ROCK. (SHOWS ON TV)

BAG 486 IS A LIGHT-COLORED ROCK TAKEN ABOUT 3
METERS TO THE RIGHT OF THE ROVER. ...

06 22 05+ LMP BAG 486 IS A LIGHT-COLORED ROCK TAKEN ABOUT 3
METERS TO THE RIGHT OF THE ROVER. ...

06 22 09+ CDR WELL, I'M TRYING TO GET OUT OF THE BLOCK FIELD
HERE, THEN I'LL TRY TO HEAD TO THE SOUTH.
06 22 09+ LMP THAT MUST BE GATHERED OVER THERE.
06 22 09+ CDR IT'S NOT UNLIKE GATHERED ROCK, THOUGH. HEY, YOU KNOW
06 22 09+ CDR THAT ROCK LOOKS LIKE MANTLE.
06 22 09+ LMP -- INTO MANTLE, BECAUSE IT LOOKS LIKE THE MANTLE
STREAMS OVER THE EIGHT FROM THE SOUTH.
06 22 09+ CDR IF IT, HERE'S A COUPLE FRAGMENTS IN SPOTS --
06 22 09+ CDR EYES, HERE'S A COUPLE FRAGMENTS IN SPOTS --
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ELAPSED TIMES, AND EXcerPTS FROM THE AIR-TO-GROUND TRANSCRIPT

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<th>LUNAR-SURFACE PHOTOGRAPHS</th>
<th>AFT</th>
<th>CREW COMMENTS</th>
</tr>
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<tbody>
<tr>
<td>06 22 09+</td>
<td>LMP</td>
<td>FROM THE NORTHWEST. CAN YOU GET THAT?</td>
<td>CDR</td>
<td>YES.</td>
</tr>
<tr>
<td>06 22 09+</td>
<td>LMP</td>
<td>FROM THE SOUTHWEST.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 11+</td>
<td>CDR</td>
<td>WE'RE 2/3/2.1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 11+</td>
<td>LMP</td>
<td>WHAT I'M LOOKING AT IS THE NORTHWEST PORTION OF GATSBY, WHERE THERE'S A VERY CONCENTRATED BLOCK FIELD ON THE INNER WALL, EXCEPT WHERE THERE ARE, ON THE SOUTHWEST, THREE STREAMS AND ON THE NORTHWEST AND NORTH A CONTINUOUS STREAM, IF YOU WILL, OR BAND, RADIAL BAND, OF MANTLE THAT APPEARS TO BE BURYING THAT FIELD, OVERLYING AND MANTLING THE FIELD.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 11+</td>
<td>LMP</td>
<td>I'M MORE AND MORE CONVINCED THERE'S A MANTLE. ONE POSSIBILITY, I GUESS, IS THAT, IF IT'S A PYROCLASTIC MANTLE, THAT IN THE LUNAR VACUUM ENVIRONMENT AND WITH WHATEVER VOLATILES WE FALLING WITH, THE STUFF BECOMES EXTREMELY FINE UPON VESICULATION. WE MAY HAVE BEEN ON IT SHOULD THE TIME AND NOT KNOWN IT - AS FAR AS RECOGNIZING IT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 11+</td>
<td>CDR</td>
<td>AS SOON AS WE COME THROUGH THIS DRAW, HOW SMOOTH OR FREE OF ANY DEBRIS OR BOULDERS IT IS ON THE OTHER SIDE OF THE UPSLOPE.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 11+</td>
<td>LMP</td>
<td>I GUESS SHERLOCK'S GOING TO BE RIGHT OVER THE TOP OVER HERE. I SAW IT WHEN WE WERE ON THAT OTHER RIDGE.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 15+</td>
<td>CDR</td>
<td>I'M AT 24/4/1.7.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 15+</td>
<td>LMP</td>
<td>ABOUT 200 METERS BACK, WE CROSSED BACK INTO OUR STANDARD MANTLE SURFACE OF ABOUT 1-PERCENT FRACTURE COVERAGE.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 15+</td>
<td>CDR</td>
<td>I CAN SEE THE LM, AND THERE'S SHERLOCK, WHERE THOSE BLOCKS ARE.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 15+</td>
<td>LMP</td>
<td>YES, THAT'S THE BLOCK FIELD, THE SHERLOCK BLOCK FIELD, THAT'S RIGHT, THAT IS A BLOCK FIELD.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 15+</td>
<td>CDR</td>
<td>SOME BIG ONE THERE.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 15+</td>
<td>CDR</td>
<td>OLD STATION 10.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 15+</td>
<td>LMP</td>
<td>I'LL TRY TO GET A READING ON WHAT IT IS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
YES. VESICULAR SUBFLOOR. VESICLES ARE ABOUT L CENTIMETER MAXIMUM SIZE. THEY LOOK LIKE THEY'RE PROBABLY EVENLY SORTED. AND THE ROCK ITSELF SEEMS TO BE MASSIVE.

WE'RE BACK INTO ABOUT A 5-PERCENT ROCK COVER AT THE EDGE OF THE SHERLOC BLOCK FIELD.

THAT'S SHERLOC OVER THAT RIM OVER THERE.

THAT ONE'S GOT THE Mantle BLOWING UP ON IT, IN IT'S FRACTURES AND EVERYTHING.

THAT'S THE BEST EXAMPLE OF THAT, I THINK.

EVERYTHING IN HERE SO FAR IS THE TAN-GRAY SUBFLOOR GABBRO THAT I'VE SEEN. OH, THERE'S ONE OVER THERE THAT'S A BLUE-GRAY. BUT BLUE-GRAY IS NOT ABUNDANT.

THAT'S SOIL. I CAN'T SEE TO GET A ROCK.

I CAN'T SEE THE LITTLE BIT OVER THERE.

THE ROCK FRAGMENTS, THAT'S 53 YANKEE. OK. THE ROCK FRAGMENTS, THAT'S 54 YANKEE. YOU GOT A ROCK RIGHT IN FRONT OF YOU DON'T YOU?
CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, JPL/ASDF PAPERS, AND FINDINGS FROM THE AIR-TO-GROUND TRANSCRIPT

<table>
<thead>
<tr>
<th>SAMPLE NUMBER</th>
<th>SAMPLE TYPE</th>
<th>LUNAR-SURFACE DESCRIPTION</th>
<th>AFT</th>
<th>CREW COMMENTS</th>
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<tbody>
<tr>
<td>06 22 21+</td>
<td>LMP</td>
<td>LOOKS LIKE SOME IF OUR GRAY VARIETY OF SUBFLOOR UP HERE - AROUND THE RIM OF THAT LITTLE CRATER. YOU KNOW, I'M STARTING TO THINK THAT MAYBE THE GRAY RELATIVELY NONVISCULAR SUBFLOOR MAY BE DEEPER. ACTUALLY, THOUGH, LET'S SET - THAT COULD HAVE BEEN EVAPORATION, I DON'T KNOW. TAKE THAT BACK. THERE'S JUST NOT MUCH OF IT AROUND HERE, ALTHOUGH WE SAW A LOT OF IT IN THE WALL OF COHESION.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 23+</td>
<td>LMP</td>
<td>P'LL BET THAT'S SAN LUIS REY. AROUND THE EAST SIDE OF IT - MARINER AND SAN LUIS REY. THEY'RE SHALLOW - FILLED WITH ROCKS.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 23 36</td>
<td>CDR</td>
<td>WE'RE AT 250/0.9.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 23+</td>
<td>LMP</td>
<td>BOY, I CERTAINLY DON'T SEE MUCH VARIETY OTHER THAN GRAY AND THE TAN SUBFLOOR VARIETY. TIPPE'S OLD CHALLENGER.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 24 25</td>
<td>LMP</td>
<td>BOY, WE'RE MOVING IN AND OUT OF AREAS OF 1-PERCENT TO 5- TO 10-PERCENT BLOCKINESS. AND WHERE IT GETS BLOCKY - NOT ONLY IS IT MORE BLOCKY, BUT WE SEEM TO HAVE MORE OF THE MEDIUM-SIZED CRATERS IN THE RANGE OF 20- TO 50-METER DIAMETER CRATERS. THAT MAY BE MARINER RIGHT THERE.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 26+</td>
<td>CDR</td>
<td>THIS IS THE SAN LUIS REY COMPLEX BECAUSE SEE HOW ELONGATED IT IS?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06 22 26+</td>
<td>LMP</td>
<td>YES.</td>
<td></td>
<td></td>
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</tbody>
</table>

06 22 22 - TRAVERSE, STATION 9 - LP
06 22 27+ CDR: "WE'VE AT 244/0.4.
06 22 27+ LMP: "BOB, I MAY HAVE SAID EARLY ON UP THERE AT VTN
SEEING THAT I SAW SUBFLOOR, BUT WE NEVER DID
SAMPLE ANY THAT I KNOW OF. AND THE DUST WAS
THICK ENOUGH THAT I'M JUST NOT SURE. BRECCIAS
WERE THE MOST OBVIOUS THING THERE.

06 22 27+ LMP: "IT MIGHT HAVE BEEN A WINDOW IN THE PLAINS HERE,
OF SOME KIND. BUT - IT'S STRANGE TO SEE IT
THERE, WITH SO MUCH SUBFLOOR ALL AROUND IT THAT
WE SAW.

06 22 30+ LMP: "IT MIGHT HAVE BEEN A WINDOW IN THE PLAINS HERE,
OF SOME KIND. BUT - IT'S STRANGE TO SEE IT
THERE, WITH SO MUCH SUBFLOOR ALL AROUND IT THAT
WE SAW.

06 22 30+ CDR: "IT MIGHT HAVE BEEN A WINDOW IN THE PLAINS HERE,
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THERE, WITH SO MUCH SUBFLOOR ALL AROUND IT THAT
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### CROSS-REFERENCE OF LUNAR SAMPLES WITH LOCATIONS, PHOTOGRAPHS, APOLLO-ELAPSED TIMES, AND EXCERPTS FROM THE AIR-TO-GROUND TRANSCRIPT

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<th>SAMPLE TYPE</th>
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<th>CREW COMMENTS</th>
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<td>SAMPLE NUMBER (G)</td>
<td>PHOTOGRAPHS</td>
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**EVA 3 - STATION: LM**

**SAMPLE: SESC 70011**
- **Sample Weight**: 44.7 SOIL
- **Sample Type**: CONTAMINATED
- **Location**: 70017 "GOODWILL" UN DOCUMENTED

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<th><strong>COMMENTS</strong></th>
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<tr>
<td>06 22 41+</td>
<td>CC</td>
<td>LET'S PUT THE SESC SOMEPLACE WHERE IT'S ACCESSIBLE TO GET THAT CONTAMINATED SAMPLE.</td>
</tr>
<tr>
<td>06 22 41+</td>
<td>CDR</td>
<td>LET'S GET IT NOW. WE CAN GET THE BAG CLEANED UP WE CAN PUT IT IN BAG 5.</td>
</tr>
<tr>
<td>06 22 41+</td>
<td>CDR</td>
<td>GET YOUR SCOOP. LET'S GET IT OVER WITH.</td>
</tr>
<tr>
<td>06 22 41+</td>
<td>LMP</td>
<td>IF I DON'T HAVE A SCOOP, I DON'T EVEN HAVE A BAG.</td>
</tr>
<tr>
<td>06 22 41+</td>
<td>CDR</td>
<td>USE YOUR ROVER SAMPLER.</td>
</tr>
<tr>
<td>06 22 41+</td>
<td>CDR</td>
<td>THEY BOTH FELL OFF WHEN THAT THING (PALLETT) OPENED.</td>
</tr>
<tr>
<td>06 22 44+</td>
<td>CDR</td>
<td>WE'RE GOING TO GET THIS SESC NOW.</td>
</tr>
<tr>
<td>06 22 44+</td>
<td>LMP</td>
<td>YOU WANT IT IN FRONT OF THE MINDS-1 FOOTPAD?</td>
</tr>
<tr>
<td>06 22 44+</td>
<td>CC</td>
<td>ROOF, SORT OF UNDERNEATH WHERE YOU PROBABLY HAD THE - - SOLAR SIDE OF THE COSMIC RAY EXPERIMENT THERE, BETWEEN THE FOOTPAD AND THE ESFP DOORS THERE.</td>
</tr>
<tr>
<td>06 22 45+</td>
<td>CDR</td>
<td>OK. HERE WE GO. JACK. HERE'S ONE HERF.</td>
</tr>
<tr>
<td>06 22 46+</td>
<td>LMP</td>
<td>OK, THIS IS A SPECIAL HERF.</td>
</tr>
<tr>
<td>06 22 46+</td>
<td>CDR</td>
<td>LET ME PASS THE FARAH. GOOD JOB.</td>
</tr>
<tr>
<td>06 23 03+</td>
<td>LMP</td>
<td>I'M ON FRAME 96, AND THE SHORT CAN SAMPLE - CONTAMINATED SAMPLE IS DOCUMENTED BY TWO OR THREE PRIOR TO THAT, AND THE BEFORE IS THE COSMIC RAY PICTURES.</td>
</tr>
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**SAMPLE: LR-15 70017**
- **Sample Weight**: 97.9 ROCK
- **Sample Type**: "GOODWILL"

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<th><strong>COMMENTS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>06 23 02+</td>
<td>CDR</td>
<td>OK. HERE WE GO, JACK. HERE'S ONE HERF.</td>
</tr>
<tr>
<td>06 23 02+</td>
<td>LMP</td>
<td>YES. LET ME GET IT, SO YOU WON'T GET IT TOO DIRT.</td>
</tr>
<tr>
<td>06 23 02+</td>
<td>CDR</td>
<td>I'LL PUT IT RIGHT OVER HERE AGAINST THAT BACKGROUND.</td>
</tr>
<tr>
<td>06 23 03+</td>
<td>CDR</td>
<td>JACK HAS PICKED UP A VERY SIGNIFICANT ROCK, TYPICAL OF WHAT WE HAVE HERE IN THE VALLEY OF TAURUS-LITTROW. IT'S A ROCK COMPOSED OF MANY FRAGMENTS, OF MANY TYPES AND MANY SHAPES.</td>
</tr>
</tbody>
</table>
BAG 55Y  134-20503- 06  23 44+ LMP  55 YARDST IS AN EXOTIC-LOOKING ROCK I FOUND.
ABOUT 5 METERS SOUTH OF THE NEUTRON FLUX HOLE.
IT'S ANOTHER GRAY - POSSIBLY GRAY BASALT. IT'S
JUST THAT THERE AIN'T MANY OF THEM AROUND HERE,
AND SO I PICKED IT UP.

----------------------------------------------------------------------------------------------------------------------------------

D.T. 52  485.0  SOIL  UNDOCUMENTED  06  23  49+ LMP  IS IT HEAVY. SOMETHING IN THAT CORE TUBE YOU PUT
IN THERE?

06  23  49+ LMP  TUBE 52. HAS ABOUT THREE-QUARTERS OF A CAFE -
HAND PUSHED - HALF A METER INSIDE THE PLUS-Y FOOTPAD.

----------------------------------------------------------------------------------------------------------------------------------

(BAG 1SE)  UNDOCUMENTED  07  00  37  42 LMP  SAMPLE 15 ECHO HAS A BUNCH OF DUST AND THAT
GRADUALLY ACCUMULATED IN MY POCKET.

07  00  56  33 CBR  BAG 7 IS 32, BAG 4 IS 31.5, BAG 5 IS 21, THE
BIG BAG IS 71, THE ISA IS 21. (LBS.)

EVA 3 SAMPLE STOWAGE
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<td>(bit) (top)</td>
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<td>73002/73001 (CSVC)</td>
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<td>74002/74001</td>
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<td>23E</td>
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1(A) Two and three digit numbers indicate documented bags.
(B) Two digit numbers followed by letters E or Y are round "Dixie cups" with wire rims designed for sampling from the Rover.
(C) SESC, is the Special Environmental Sample Container, that contains soil from the LM, contaminated by the descent engine.
(D) LR, represents a loose rock or a loosely bagged large rock. A total of 15 were numbered from real-time comments by the crew. Three of these were apparently not returned as samples.

2Sample numbers are assigned by the Curator, Lunar Receiving Laboratory. The numbers used in this table are the actual or projected* numbers applied to samples contained in different documented bags, as of January 15, 1973. *indicates proposed number for the accompanying documented bag, not yet opened or not on the inventory listing as of January 15, 1973.
Table 3. Sample index by container (continued)

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<td>Sample of glass or glass coated rock.</td>
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### Table 4. Sample index by LRL numbers

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Table 4. Sample index by LRL numbers (continued)

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1Sample numbers are assigned by the Curator, Lunar Receiving Laboratory. The numbers used in this table are the actual or projected\* numbers applied to samples contained in different documented bags, as of January 15, 1973. *indicates proposed number for the accompanying documented bag, not yet opened or not on the inventory listing as of January 15, 1973.

2(A) Two and three digit numbers indicate documented bags.
(B) Two digit numbers followed by letters E or Y are round "Dixie cups" with wire rims designed for sampling from the Rover.
(C) SECC, is the Special Environmetal Sample Container, that contains soil from the LM, contaminated by the descent engine.
(D) LR, represents a loose rock or a loosely bagged large rock. A total of 15 were numbered from real-time comments by the crew. Three of these were apparently not returned as samples.

3 S = Sample taken primarily for soil.
R = Sample taken primarily for rock.
G = Sample of glass or glass coated rock.
K = Sample of rake fragments.
SK = Sample of soil taken with rake.
1. Pan south of LM (137-20866 to 20893)

Sample number assigned by Lunar Receiving Laboratory.
* Tentative sample number
H Sample location
T00187 Sample location uncertain
O Rock and soil sample location
DT 73001/ T3001 Drive tube, upper/lower tube number
C/S ALSEP Central Station
G/M Geophone Module
EP6 Explosive Package Number 6
Geo-2 Geophone Number 2
HFE Heat Flow Experiment
LEAM Lunar Ejecta and Meteorites Experiment
LM Lunar Module
LSM Lunar Surface Gravimeter Experiment
LSP Lunar Seismic Profiling Experiment
MW6 60 mn Hasselblad panorama
RTG Radiisotope Thermolectric Generator
SEP Surface Electrical Properties Experiment Transmitter
LVF Lunar Roving Vehicle, dot shows front of vehicle
• Boulder - letters refer to large blocks on maps and pans
○ Crater

2. Planimetric map of the LM/ALSEP/SEP area

2a. Explanation
3. Pan northwest of central station (136-20863 to 20710)

4. SEP partial pan (134-20437 to 20446)
4. SEP partial pan (134-20437 to 20446)
5. Planimetric map of station 1A.
5. Station 1a east pan (134-20408 to 20431)

6. Planimetric map of station 1a.

7. Station 1a west pan (136-20744 to 20776)
9. Planimetric map of station 2
8. **Station 2 northeast pan (138-21053 to 21073)**

9. **Planimetric map of station 2**

10. **Station 2 southwest pan (137-20926 to 20956)**
12. Planimetric map of station 3
11. Station 2a LRV pan (138-21100 to 21108)

12. Planimetric map of station 3

13. Station 3 pan (138-21150 to 21177)
15. Planimetric map of station 4
14. Station 4 west pan (133-20229 to 20256)

15. Planimetric map of station 4
17. Planimetric map of station 5
16. Station 5 east pan (133-20339 to 20361)

17. Planimetric map of station 5

18. Station 5 west pan (145-22159 to 22183)
19. Station 6 south pan (141-21575 to 21603)

20. Planimetric map of station 6
22. Station 7 north pan (146-22339 to 22363)

23. Planimetric map of station 7

24. Planimetric map of station 8

25. Station 8 west pan (142-21726 to 21745)
26. Station 9 west pan (142-21790 to 21824)

27. Planimetric map of station 9