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HANDBOOK OF LUNAR SOILS

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INTRODUCTION

The Moon is covered with a complex layer of unconsolidated debris (regolith). Our understanding of the character of this debris and the processes affecting it are dependent on studies of the samples of soil returned by the Apollo and Luna missions. The purpose of this handbook is to serve as a data base for the material properties of lunar soils. It is a resource for present and future sample investigators in selecting soil samples for detailed study, for investigators conducting syntheses studies, and for scientist and engineers designing manufacturing processes utilizing lunar soil. The scope of this handbook is restricted to all non-core samples of soil returned by the Apollo missions.

Tools used for collecting lunar soil

Contingency Sampler: For Apollo 11-15, this was a special grab-sample teflon bag mounted on the end of a collapsible handle. This sample was collected as soon as possible after the first astronaut left the LM as a random surface scoop. This would provide at least one sample of the site if the crew were forced to leave due to an emergency. The first documented sample fulfilled the contingency sample requirement on Apollo 16 and 17, eliminating the need for a contingency sampler.

Scoops: All of the sample scoops carried on the Apollo missions could be attached to an extension handle with a quick-disconnect mount. The "large" scoop (7x12x12 cm) constructed of anodized aluminum was used during Apollo 11, 12, and 14. The "small" scoop (about 6 cm wide and 8 cm deep) was used during Apollo 12. It had a flat bottom that was flanged on both sides and was partially covered on top; it was constructed of anodized aluminum with a steel-alloy inset on the front edge.

An adjustable scoop, with a flat bottom and flanged on the sides with a partial cover on top, was used on Apollo 15, 16, and 17. The 14 cm long, 12 cm wide scoop

was adjustable from 0° (horizontal) to 55° for scooping and to 90° for trenching. The pan and adjusting mechanism were made of stainless steel and the handle of aluminum. It replaced both the scoop and trenching shovel of previous missions.

Trenching tool: An anodized aluminum, folding, trenching tool was used during Apollo 14. It was a simple spade-like tool with the spade measuring 15 cm wide and 20 cm long.

Lunar surface rake: The rake was a basket-like scoop about 30x30x4 cm which consisted of a partially solid aluminum frame holding tines with 1 cm spacings. To collect a sample, the rake was drug through the surface regolith several times, sifting out the fine grained material to leave a collection of small rock samples. Procedures required that a soil sample be collected with each "rake" sample. This was accomplished by tilting the rake to use the solid frame for collecting soil samples. The rake was used on Apollo 15, 16, and 17.

Special environmental sample container (SESC): This was a thin-walled stainless steel container (6 cm diameter and 12 cm long) with a knife-edge machined into the top rim. The lid had a press which forced the knife-edge into an indium-silver alloy gasket. The sealed sample was returned in a vacuum to Earth. SESC's were carried on Apollo 15, 16, and 17.

Lunar roving vehicle (LRV) sample container: The LRV samples consisted of a ring holding 12 numbered teflon bags which could be attached to a tool handle. The tool allowed the crew to collect surface soil samples without dismounting from the LRV. After the sample was removed from the stack, it was sealed by closing, crimping and twisting the aluminum rim around the mouth of the bag. This means of sampling was used only during Apollo 17.

Documented sample bags: Each documented sample bag was a pre-numbered teflon bag with dimensions 19x20 cm. The bags were stored in a dispenser in quantities of 20. The bags had two teflon tabs; one was attached to the dispenser and the other

used to pull the bag open. After sample collection, a thin aluminum rim was crimped to seal the bag. These bags were used during Apollo 15, 16, and 17.

Round documented sample bags: Each teflon bag ("dixie cup") was 8 cm in diameter and 12 cm deep. Twelve bags were carried as a cluster. The bags were sealed in the same manner as the documented sample bags. They were used during Apollo 12-17.

Apollo lunar sample return container (ALSRC): The ALSRC is made of aluminum with exterior dimensions of 47.5x28.75x20 cm. A strap-lash system provides the force necessary to provide a vacuum seal, but not all ALSRC's retained vacuum integrity. Padding for sample protection was provided by a York-mesh liner. These containers were used on all Apollo missions, but not all samples were returned to the Earth in them.

Sample collection procedures

Apollo 11: No special procedures were developed for soil sampling during Apollo 11. The contingency sampler was designed to scoop up rocks and soil without leaving the safety of the LM footpad. During Apollo 11 the commander stepped onto the surface and collected a full bag, scooping several times. A large bulk sample was collected at the end of the sampling period by scooping soil into the ALSRC to fill the void space left between rock samples.

Apollo 12: The contingency sample was collected in the same manner as Apollo 11. Selected soil and rock samples were collected over an area 300 m NW of the LM. As in Mission 11, the void space between rocks was filled with soil in the sample collection bag. Apollo 12 was the first mission to use documented sample bags. after noting the location and documenting some of them with photographs, one astronaut held the bag while the other scooped soil into it. The bag was sealed then dropped into the sample collection bag. All documented samples were returned in the D-ALSRC. Two small vacuum containers (gas analysis sample container and lunar

environment sample container) were filled with soil in the same manner as the documented bags.

Apollo 14: The contingency sample was collected as during the previous missions. Whenever possible, other sampling locations were documented by photography taken cross-sun, down-sun, before and after sampling, and in the panoramas. In several cases the locations are based on transcripts, astronaut identification, and reference to the sample bag number. Samples were collected by scooping, with one astronaut holding the bag while the other filled it.

Apollo 15: Samples collected with the adjustable scoop were "skimmed" (upper 1 cm), "scooped" (upper 1-5 cm) or selected from layers exposed in trench walls. Soil samples collected to accompany rake samples were collected with the solid wall of the rake or with a scoop. Whenever possible, the sample location was photographed before and after sampling and cross- and down-sun. A stereopair was generally taken before collecting the sample. Additional photographs were taken as necessary to document the location. One astronaut held a documented sample bag, identifying the number on it while the other scooped soil into it.

Apollo 16: Collection and documentation of soil samples in documented sample bags was the same as for Apollo 15.

Apollo 17: Collection and documentation of soil samples in documented sample bags and an SESC was the same as for Apollo 15 and 16. The LRV samples were collected on traverses between stations without the LRV. The area to be sampled was located and photographed before reaching it, then sampled. The passenger collected the sample; it was passed to the driver who pulled the full bag out of the stack, identified the number, and then sealed it.

Initial Sample Processing

Apollo 11: The contingency sample was returned with the crew to the Lunar Receiving Laboratory (LRL) and then transfered to the vacuum chamber in the sample lab.

The bulk soil sample was initially processed a vacuum chamber, but was later moved to N_2-filled glove cabinets in the Bio-prep laboratory. Due to the quarantine requirements, negative pressure was maintained in the cabinets and the exterior of the sample containers were sterilized with steam or peracetic acid. The quarantine conditions were maintained at considerable cost to the sample's integrity. The work area was very crowded with equipment, increasing chances for contamination of the samples. Soil samples were used for the monopole experiments, soil mechanics tests, sieving, etc: Aliquots were removed to the physical chemical test lab (PCTL) for chemical and petrographic analysis. Coarser sieve fractions were described and photographed in the Bio-prep laboratory.

Apollo 12: Rock and soil samples were processed in a vacuum (about 10^{-6} torr). The documented and contingency samples and cores were processed in N_2-filled glove cabinets. Fifty gms of core material and 450 gms of rock and soil were designated for biological testing. Most of the bags were opened, given a preliminary description (color, texture, etc.) and aliquots were removed for closer examination. The soils were then placed in stainless steel slip-top cans for storage.

Several of the documented samples were sieved at 1 cm and 1 mm intervals. The coarser fractions (>1 mm) were described surficially during the preliminary examination. Aliquots were transferred to PCTL for chemical and petrographic analyses.

Apollo 14: The Apollo 14 samples were processed in stainless steel, N_2-filled glove cabinets that were held under negative pressure as required by quarantine procedures. The exhaust N_2 was monitored for contamination by H_2, O_2, CO, CO_2, CH_4, and H_2O by gas chromatography.

Soils were described superficially in the lab by looking into open documented sample bags. Each sample was then sieved into >1 cm, 4-10 mm, 2-4 mm, 1-2 mm, and >1 mm fractions. Each fraction was weighed, assigned a sample number, then stored in stainless steel bolt top cans. Aliquots of several soil samples were used by the Preliminary Examination Team for grain size, chemical, and petrographic analyses. The <1 mm aliquots were wet-sieved (with freon) at 500 um, 250 um, 125 um, 62.5 um and 31 um intervals using 3-inch diameter stainless steel sieves. Thin sections were made of the 250-500 um and 125-250 um size fractions.

Apollo 15, 16, and 17: Commencing with Apollo 15, no quarantine was required and the samples were processed in stainless steel glove boxes filled with dry N_2 under positive pressure. The exhaust N_2 was analyzed for contaminants (H_2O, O_2, Ar, H_2, CH_4, Co_2, and CO) by gas chromotography.

The documented bags were opened and observations and photographs were made of the sample. Any rocks >1 cm were removed. One-quarter to one-third of the sample was scooped from the bag, placed in a preweighed container, weighed, and stored as an unsieved reserve sample. In special cases, larger reserves were obtained or the entire sample remained unsieved. the remaining sample was sieved to produce the size fractions <1 mm, 1-2 mm, 2-4 mm, and 4-10 mm. Each fraction was weighed and numbered with its own five-digit sample number. Each coherent piece >10 mm was processed as a rock. The sieve fractions were surficially described.

FORMAT

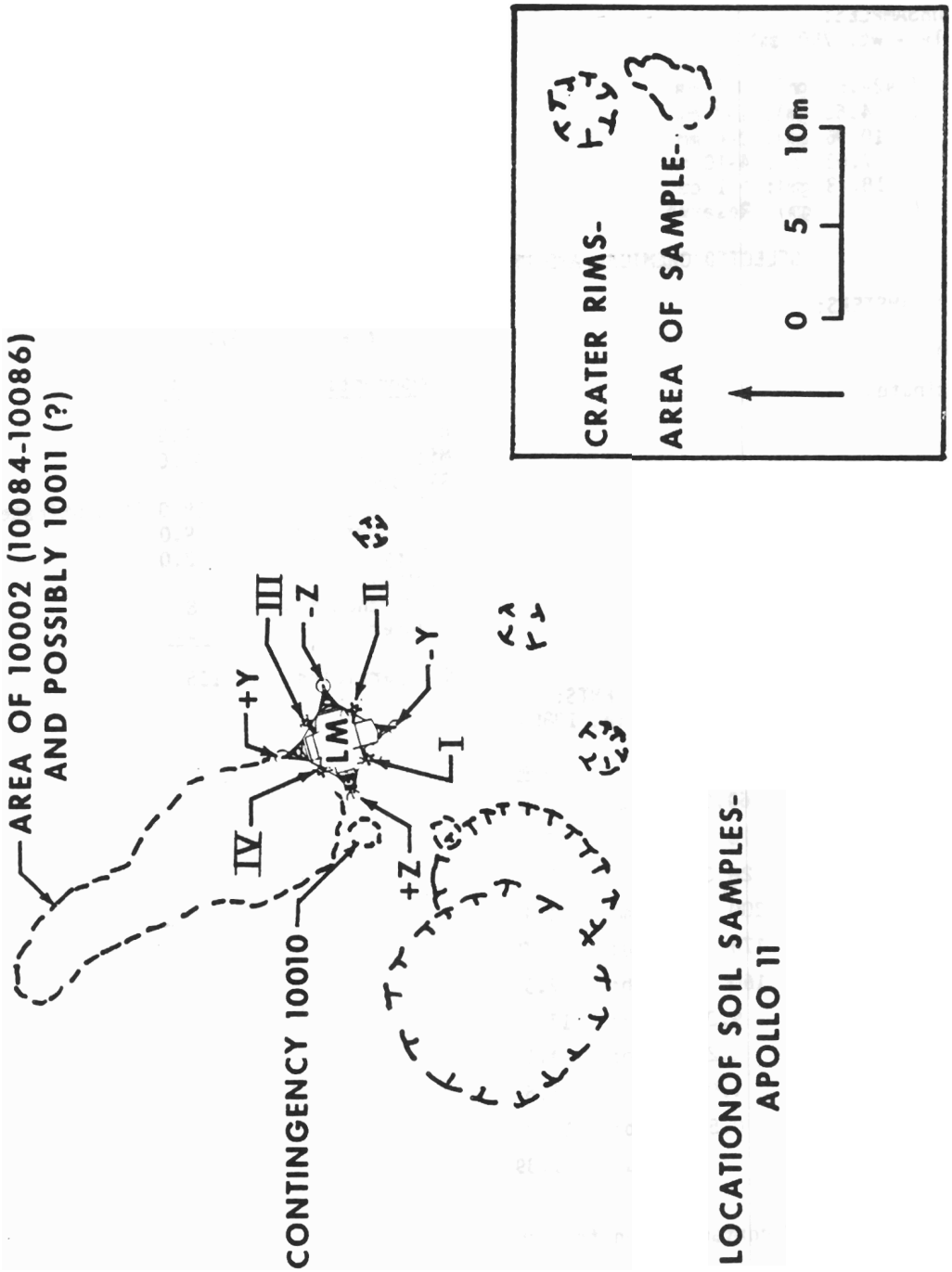
The remainder of this handbook is divided into six sections - one for each of the Apollo missions that returned samples from the Moon. The format of each section is the same. First are given sketch maps showing the locations that the soils were collected. Data sheets and bibliographies then follow for each soil in increasing numerical order of sample number. The bibliographic lists were derived from the compilation at the Lunar and Planetary Institute.

It is the intent of the data sheets to give some basic data about lunar soils. Because of space limitations and because the handbook would become ponderous, the data sheets are not comprehensive in terms of either including all the various types of data or including every analysist's value for a given parameter. Data compiled on the data sheets include sampling location, masses of generic subsamples, maturity parameters (I_s/FeO, grain-size parameters, and agglutinates), chemistry (major and trace elements), and petrography. For references to other types of data, the bibliography can be consulted. Except as noted below, a citation is given for the data compiled in the data sheets.

The values for agglutinates, grain-size paramters, and the FMR maturity index I_s/FeO were obtained from just a few references and thus for clarity the references were not cited on the data sheets. These data were taken from papers by David S. McKay, Elbert A. King, Richard V. Morris, and their co-workers; the specific papers are given in the bibliographies.

Commencing with soils returned from the Apollo 15 mission, almost all soils were sieved into >10, 4-10, 2-4, 1-2 (the "coarse" fines) and 1 mm (the "fine" fines) sieve fractions at the Johnson Space Center. The sieving information is given on the data sheets, and, unless otherwise noted, all physical and chemical properties pertain to the 1 mm sieve fraction.

An examination of this handbook will reveal that there are a significant number of soils for which there is a great deal of information and a significant number of soils for which very little is known. The data sheets are formatted so that individual users can incorporate information as it becomes available. Individual analysists are encouraged to send data appropriate for this handbook to the Planetary Materials Curator (SN2/NASA Johnson Space Center, Houston, TX 77058) for inclusion in subsequent editions.



LOCATIONOF SOIL SAMPLES-
APOLLO 11

SOIL: 10002

LOCATION COMMENTS: Between Quad IV of LM and TV camera. Surface scoops. Redistributed as sample numbers 10084 to 10086.

GENERIC SUBSAMPLES:
(Of 26 only - wt. 750 gm)

1. (424.5 gm): < 1 mm
2. (14.65 gm): 1-2 mm
3. (10.96 gm): 2-4 mm
4. (7.63 gm): 4-10 mm
5. (18.48 gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: Total est. wt. 5629
2. Color: N3 to N4 (med. gray)
3. Bag no.: Bulk sample
4. Container: Teflon bag; vacuum container (ALSRC). Processed in N_2 environment.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO:
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 52 um (<1 mm)
2. M_d: 60 um
3.

PETROGRAPHY: (0.6-3 mm)
(Marvin et al., 1971)

Components	%	
Basalt	22.0	
Microbreccia	40.0	
Glasses		
Cindery	18.0	(Agglutinates)
Homogeneous	9.0	
Ropy	2.0	
Norites,		
Anorthosites	8.0	
Other	1.0	
No. particles	135	

MAJOR ELEMENTS:
(Agrell et al., 1970)

	%
SiO_2 :	42.16
TiO_2 :	7.75
Al_2O_3:	13.60
Cr_2O_3:	0.30
FeO :	15.34
MnO :	0.20
MgO :	7.76
CaO :	11.94
Na_2O :	0.47
K_2O :	0.16
P_2O_5 :	0.05
S :	0.12

TRACE ELEMENTS:
(Laul & Papike, 1980)

	ppm		ppm
Sc:	60.2	La:	15.8
V :	70	Ce:	43
Co:	28.0	Nd:	37
Ni:	200	Sm:	11.4
Ba:	170	Eu:	1.60
Sr:	160	Tb:	2.9
Hf:	9.00	Dy:	17
Ta:	1.25	Ho:	4.1
Th:	1.90	Tm:	1.6
U :	0.5	Yb:	10.0
		Lu:	1.39

Ni values are suspect of contamination from the Rh-plated Ni sieves.

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IN PROCEEDINGS OF THE SECOND LUNAR SCIENCE CONFERENCE
VOL. 1 P. 679-699

SOIL: 10010

LOCATION COMMENTS: Contingency sample from base of ladder, Quad IV, LM.

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: 491.0 gm
2. Color: Med. gray
3. Bag no.: Contingency sample bag
4. Container: Teflon bag; vacuum container (ALSRC).

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 75.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Rhodes & Blanchard, 1981)

	%
SiO_2 :	41.5
TiO_2 :	7.58
Al_2O_3:	13.21
Cr_2O_3:	0.30
FeO :	15.83
MnO :	0.24
MgO :	7.82
CaO :	12.05
Na_2O :	0.44
K_2O :	0.14
P_2O_5 :	0.11
S :	

TRACE ELEMENTS: (Rhodes & Blanchard, 1981)

	ppm		ppm
Sc:	61	La:	14.9
V :	47	Ce:	46
Co:	29	Nd:	
Ni:	197	Sm:	12.1
Ba:	205	Eu:	1.66
Sr:		Tb:	2.5
Hf:	9.7	Dy:	
Ta:	1.6	Ho:	
Th:	1.5	Tm:	
U :		Yb:	9.91
		Lu:	1.46

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SOIL: 10011

LOCATION COMMENTS: Outside Quad IV of the LM.

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: 82.6 gm
2. Color: Gray
3. Bag no.: Doc. sample bag
4. Container: Teflon bag; vacuum container (ALSRC).

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 69.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

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SOIL: 10084

LOCATION COMMENTS:

GENERIC SUBSAMPLES:

1. 10084 (38300. gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: 38,300 gm
2. Color:
3. Bag no.:
4. Container: ALSC No. 1003

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 78.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Laul and Papike, 1980)

	%
SiO_2 :	41.0
TiO_2 :	7.3
Al_2O_3:	12.8
Cr_2O_3:	0.305
FeO :	16.2
MnO :	0.220
MgO :	9.2
CaO :	12.4
Na_2O :	0.38
K_2O :	0.15
P_2O_5 :	
S :	

TRACE ELEMENTS: (Haskins et al., 1970)

	ppm		ppm
Sc:	61.7	La:	16.9
V :		Ce:	47.3
Co:	26.8	Nd:	41
Ni:	200	Sm:	13.66
Ba:	168	Eu:	1.74
Sr:		Tb:	3.03
Hf:		Dy:	21.0
Ta:	1.4	Ho:	4.3-4.6
Th:		Tm:	
U :		Yb:	11.35
		Lu:	1.69

PETROGRAPHY: (90-100 um) (Simon et al., 1981)

Components	%
Lithic Fragments	
Mare Component	
Mare Basalt	24.0
Highland Components	
ANT	0.4
LMB	0.8
Feldsp. Basalt	1.1
RNB/POIK	-
Fused Soil Component	
DMB	7.5
Agglutinate	52.0
Mineral Frag.	
Mafic	4.2
Plagioclase	1.9
Opaque	1.1
Glass Fragments	
Orange/black	2.7
Yellow/green	0.8
Brown	-
Clear	1.3
Miscellaneous	
Devitrified glass	1.8
Others	0.3
Total	99.9
No. of points	625

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SOIL: 10085

LOCATION COMMENTS:

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: 569.0 gm
2. Color:
3. Bag no.:
4. Container: ALSC No. 1003

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO:
2. Agglutinates:

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	
Cr_2O_3:	
FeO :	
MnO :	
MgO :	
CaO :	
Na_2O :	
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS:

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:		Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

SOIL: 10086

LOCATION COMMENTS:

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (0 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 823.0 gm
2. Color:
3. Bag no.:
4. Container: ALSC No. 1003

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO:
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

SOIL: 10087

LOCATION COMMENTS:

GENERIC SUBSAMPLES:

1.	(	gm):	< 1 mm
2.	(	gm):	1-2 mm
3.	(	gm):	2-4 mm
4.	(	gm):	4-10 mm
5.	(	gm):	> 1 cm
6.	(0	gm):	Reserve

MISCELLANEOUS:

1. Collected mass: 17.4 gm
2. Color:
3. Bag no.:
4. Container: ALSC No. 1003

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO:
2. Agglutinates:
3.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

APOLLO 12

EXPLANATION OF SYMBOLS

Crater

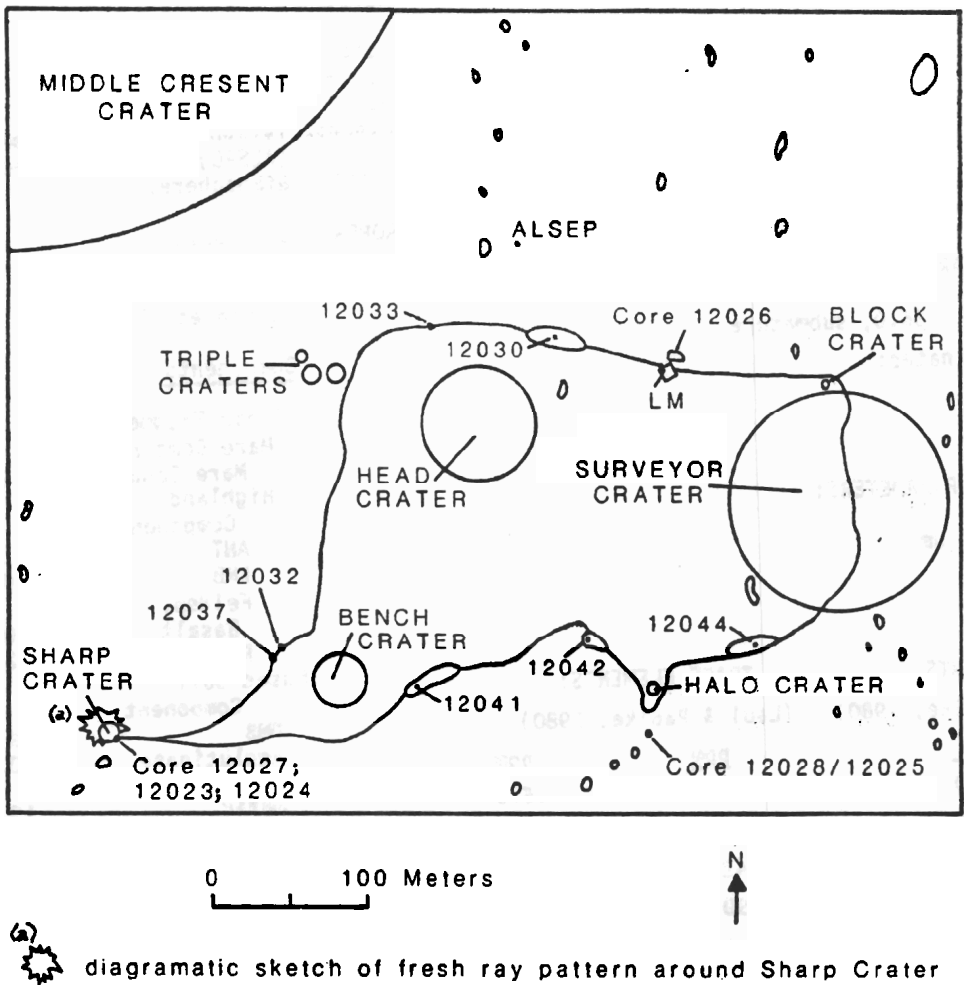
Sample locality

Sample locality. Circle indicates locality not accurately determined. Dot shows best estimate of location.

Large rocks

LM Lunar module

ALSEP Apollo lunar surface experiments package



Apollo 12 Map Showing Sample Collection Sites.
Modified from Apollo 12 Preliminary Science Report.

SOIL: 12001

LOCATION COMMENTS: Sample from traverse between Surveyor and middle of Crescent Craters. Collected along with rocks. (Near LM)

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: 2216 gm
2. Color: Med. gray, with brownish hue
3. Bag no.: Selected sample box
4. Container: Teflon bag; vacuum container (ALSRC). Some handled in N_2 atmosphere.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 56.0, submature
2. Agglutinates:

GRAIN SIZE PARAMETERS:

1. M_z: 60 um
2. M_d:
3.

MAJOR ELEMENTS: (Laul & Papike, 1980)

	%
SiO_2 :	46.0
TiO_2 :	2.8
Al_2O_3:	12.5
Cr_2O_3:	0.410
FeO :	17.2
MnO :	0.220
MgO :	10.4
CaO :	10.9
Na_2O :	0.48
K_2O :	0.26
P_2O_5 :	
S :	

TRACE ELEMENTS: (Laul & Papike, 1980)

	ppm		ppm
Sc:	40.2	La:	35.6
V :	110	Ce:	85
Co:	42.5	Nd:	57
Ni:	190	Sm:	17.3
Ba:	430	Eu:	1.85
Sr:	140	Tb:	3.7
Hf:	11.8	Dy:	22
Ta:	1.50	Ho:	5.0
Th:	5.40	Tm:	1.8
U :	-	Yb:	13.0
		Lu:	1.85

Ni values are suspect of contamination from Rh-plated Ni sieves.

PETROGRAPHY: (90-100 um) (Simon et al., 1981)

Components	%
Lithic Fragments	
Mare Component	
Mare Basalt	12.9
Highland Components	
ANT	1.0
LMB	0.1
Feldsp. Basalt	0.5
RNB/POIK	2.3
Fused Soil Component	
DMB	9.5
Agglutinate	40.1
Mineral Frag.	
Mafic	18.3
Plagioclase	3.9
Opaque	0.2
Glass Fragments	
Orange/black	0.5
Yellow/green	2.8
Brown	1.5
Clear	1.0
Miscellaneous	
Devitrified glass	5.0
Others	0.5
Total	100.1
No. of points	823

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SOIL: 12003

LOCATION COMMENTS: Same as 12001. Is a split and coarser fraction of 12001 (>1 cm fragments). The < 1 cm portion is material from the bottom of the SRC. May contain contamination from York mesh in SRC.

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: Approx. 300.0 gm
2. Color: Gray
3. Bag no.: Loose material in sample box
4. Container: Vacuum container; transferred to N_2 atmosphere.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 57.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 70 um
2. M_d:
3.

PETROGRAPHY: (44-74 um)
(Frondel et al., 1971)

Components	%
Fine grained intergrowth of glass, mineral grains (agglutinates?)	31.2
Pyroxene and olivine	43.6
Feldspar	11.6
Opaques	6.6
Angular glass	4.2
Rounded glass	2.4
Siilica	0.2
No. grains	500.0

MAJOR ELEMENTS:
(Frondel et al., 1971)

	%		ppm		ppm
SiO_2 :	45.9	Sc:		La:	
TiO_2 :	3.6	V :		Ce:	
Al_2O_3:	14.2	Co:		Nd:	
Cr_2O_3:	0.35	Ni:		Sm:	
FeO :	15.4	Ba:		Eu:	
MnO :	0.22	Sr:		Tb:	
MgO :	9.7	Hf:		Dy:	
CaO :	10.4	Ta:		Ho:	
Na_2O :	0.43	Th:		Tm:	
K_2O :	0.24	U :		Yb:	
P_2O_5 :				Lu:	
S :					

TRACE ELEMENTS:

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VOL. 3 P. 2751-2762

SOIL: 12023

LOCATION COMMENTS: Trench site on east rim of Sharp Crater. Bottom of trench; depth 20 cm.

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: 407.9 gm
2. Color:
3. Bag no.: LESC
4. Container: Lunar Environmental Sample Container (LESC); stainless steel vacuum container. Stored in vacuum.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 60.0, mature

2. Agglutinates:

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:* (Woodcock & Pillinger, 1978)

	%
SiO_2 :	
TiO_2 :	2.8
Al_2O_3:	13.9
Cr_2O_3:	
FeO :	15.4
MnO :	10.08
MgO :	
CaO :	11.23
Na_2O :	
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS: (Warren et al., 1978)

	ppm		ppm
Sc:	35.7	La:	33
V :	-	Ce:	88
Co:	42	Nd:	62
Ni:	220.+	Sm:	15.5
Ba:	423	Eu:	1.8
Sr:		Tb:	3.4
Hf:	11.6	Dy:	-
Ta:	1.5	Ho:	
Th:	6.3	Tm:	
U :	1.7+	Yb:	12.4
Cr:	2.58	Lu:	1.74
Mn:	1.58		

* Averaged data sets.
\+ 10-20% uncertainty

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VOL. 2, 2195-2214

SOIL: 12024

LOCATION COMMENTS: Near trench site, east rim of Sharp Crater. Surface sample.

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: 56.5 gm
2. Color:
3. Bag no.: G.A.S.C.
4. Container: G.A.S.C.; vacuum can. Now stored in N_2 atmosphere.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 30.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	
Cr_2O_3:	
FeO :	
MnO :	
MgO :	
CaO :	
Na_2O :	
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS:

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:		Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

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VOL. 2 P. 1757-1772

SOIL: 12029

LOCATION COMMENTS: Surveyor III. Located 35 m from the rim, inside the subdued, 185 m diameter Surveyor Crater.

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: 6.5 gm
2. Color:
3. Bag no.: Surveyor III scoop
4. Container: Soil in the soil mechanics trenching device (scoop) from Surveyor III.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO:
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 100 um
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

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12A, 339-370

SOIL: 12030

LOCATION COMMENTS: Near northeast rim of Head Crater. Collected with two large (4 cm) agglutinate fragments. Exact location not known.

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: 75 gm
2. Color: Med. gray
3. Bag no.: Bag 1-D
4. Container: Teflon bag; in vacuum container (D-ALSRC). Processed in N_2 environ.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 14.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 100 um
2. M_d:
3.

PETROGRAPHY: (.25 to 1 mm)
(McKay et al., 1971)

Components	%
Glazed aggregates (agglutinates)	0.5
Single Crystal	4.0
Glass Fragments	13.0
Igneous Rocks	5.0
Breccia	75.0
Glass Spheres	1.0

MAJOR ELEMENTS: (<37um)
(Frondel et al., 1971)

	%
SiO_2 :	46.6
TiO_2 :	3.6
Al_2O_3:	14.2
Cr_2O_3:	0.35
FeO :	15.4
MnO :	0.22
MgO :	9.70
CaO :	10.40
Na_2O :	0.43
K_2O :	0.24
P_2O_5 :	
S :	

TRACE ELEMENTS:

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:		Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

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SOIL: 12032

LOCATION COMMENTS: Northwest rim of Bench Crater. Surface sample; soil plus several rocks. Underlying material is light gray.

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: 310.5 gm
2. Color: Med. dark gray
3. Bag no.: 4-D
4. Container: Teflon bag; vacuum container (D-ALSRC). Processed in N_2 environment.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 12.0, immature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 219 um
2. M_d: 91 um
3.

PETROGRAPHY: (63-125 um)
(McKay et al, 1971)

Components	%
Agglutinates	29
Pyroxene	15
Olivine	13
Feldspar	17
Glass	23

MAJOR ELEMENTS: (<37um)
(Frondel et al., 1971)

	%
SiO_2 :	46.5
TiO_2 :	2.9
Al_2O_3:	15.2
Cr_2O_3:	0.26
FeO :	14.1
MnO :	0.2
MgO :	9.4
CaO :	10.7
Na_2O :	0.59
K_2O :	0.36
P_2O_5 :	
S :	

TRACE ELEMENTS:
(Schnetzler & Philpotts, 1971)

	ppm		ppm
Sc:		La:	
V :		Ce:	117
Co:		Nd:	73.0
Ni:		Sm:	20.7
Ba:	529	Eu:	2.12
Sr:		Tb:	
Hf:		Dy:	28.0
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	15.2
		Lu:	2.24

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SOIL: 12037

LOCATION COMMENTS: Surface on northwest rim of Bench Crater.

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: 145.0 gm
2. Color: Dark gray
3. Bag no.: 8-D
4. Container: Teflon bag; vacuum container (D-ALSRC). Processed in N_2 atmosphere.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 21.0, immature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 108 um
2. M_d:
3.

PETROGRAPHY: (63-125 um)
(McKay et al, 1971)

Components	%
Agglutinates	27
Pyroxene	45
Olivine	8
Feldspar	12
Glass	9

MAJOR ELEMENTS: (<37um)
(Frondel et al., 1971)

	%
SiO_2 :	44.8
TiO_2 :	3.5
Al_2O_3:	15.1
Cr_2O_3:	0.36
FeO :	14.9
MnO :	0.25
MgO :	10.2
CaO :	10.5
Na_2O :	0.65
K_2O :	0.38
P_2O_5 :	
S :	

TRACE ELEMENTS:
(Wakita et al., 1971)

	ppm		ppm
Sc:		La:	51.3
V :	160	Ce:	136
Co:		Nd:	80
Ni:		Sm:	23.5
Ba:		Eu:	1.96
Sr:		Tb:	4.6
Hf:		Dy:	28.0
Ta:		Ho:	7.9
Th:		Tm:	2.6
U :		Yb:	17.8
		Lu:	2.43

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SOIL: 12041

LOCATION COMMENTS: Between Bench and Halo Craters. Surface sample (closer to east rim of Bench Crater, about 50 m from the rim).

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: 19.3 gm
2. Color:
3. Bag no.: 11-D
4. Container: Teflon bag; vacuum container (D-4_SRC). Processed in N_2 atmosphere.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 63.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 62.0 um
2. M_d:
3.

PETROGRAPHY: (63-125 um)
(McKay et al, 1971)

Components	%
Agglutinates	58
Pyroxene	13
Olivine	2
Feldspar	1
Glass	23

MAJOR ELEMENTS: (<37um)
(Frondel et al., 1971)

	%		ppm		ppm
SiO_2 :	46.8	Sc:		La:	
TiO_2 :	2.7	V :		Ce:	
Al_2O_3:	15.4	Co:		Nd:	
Cr_2O_3:	0.23	Ni:		Sm:	
FeO :	14.2	Ba:		Eu:	
MnO :	0.2	Sr:		Tb:	
MgO :	9.1	Hf:		Dy:	
CaO :	10.9	Ta:		Ho:	
Na_2O :	0.43	Th:		Tm:	
K_2O :	0.25	U :		Yb:	
P_2O_5 :				Lu:	
S :					

TRACE ELEMENTS:

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SOIL: 12042

LOCATION COMMENTS: In "wrinkled texture" area, approximately 20 m north of Halo Crater. Surface sample.

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: 255.0 gm
2. Color: Dark gray (N3)
3. Bag no.: 12-D
4. Container: Teflon bag; vacuum container (D-ALSRC). Processed in N_2 atmosphere.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 61.0, mature
2. Agglutinates:

GRAIN SIZE PARAMETERS:

1. M_z: 88 um
2. M_d:
3.

PETROGRAPHY: (44-74 um)
(Frondel et al., 1971)

Components	%
Fine-grained intergrowth of glass and minerals (agglutinates?)	46.0
Pyroxene and Olivine	34.1
Feldspar	6.3
Opaques	7.7
Angular Glass	4.4
Rounded Glass	0.9
Silica	0.6
No. of Grains	700

MAJOR ELEMENTS:
(Cuttitta et al., 1971)

	%
SiO_2 :	45.7
TiO_2 :	2.71
Al_2O_3:	13.0
Cr_2O_3:	0.39
FeO :	16.2
MnO :	0.24
MgO :	10.4
CaO :	10.6
Na_2O :	0.54
K_2O :	0.25
P_2O_5 :	0.33

TRACE ELEMENTS:
(Haskin et al., 1971)

	ppm		ppm
Sc:		La:	36.8
V :		Ce:	111
Co:		Nd:	79
Ni:		Sm:	19.7
Ba:		Eu:	2.03
Sr:		Tb:	3.87
Hf:		Dy:	25.8
Ta:		Ho:	4.46
Th:		Tm:	
U :		Yb:	13.8
		Lu:	2.09

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SOIL: 12044

LOCATION COMMENTS: South rim of Surveyor Crater. Surface sample.

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: 92.0 gm
2. Color:
3. Bag no.: 14-D
4. Container: Teflon bag; vacuum container (D-ALSRC). Processed in N_2 atmosphere.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 57.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

PETROGRAPHY: (63-125 um)
(McKay et al, 1971)

Components	%
Agglutinates	44
Pyroxene	23
Olivine	3
Feldspar	13
Glass	17

MAJOR ELEMENTS: (<37um)
(Frondel et al., 1971)

	%
SiO_2 :	46.7
TiO_2 :	3.6
Al_2O_3:	14.6
Cr_2O_3:	0.28
FeO :	14.2
MnO :	0.21
MgO :	9.5
CaO :	10.6
Na_2O :	0.43
K_2O :	0.24
P_2O_5 :	
S :	

TRACE ELEMENTS:
(Goles et al., 1971)

	ppm		ppm
Sc:	37.9	La:	33.1
V :		Ce:	94
Co:	45.5	Nd:	63
Ni:		Sm:	16.2
Ba:	380	Eu:	1.69
Sr:		Tb:	3.79
Hf:	12.9	Dy:	
Ta:	1.90	Ho:	4.2
Th:	7.4	Tm:	
U :		Yb:	12.9
Cr:	2590	Lu:	1.81

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SOIL: 12057

LOCATION COMMENTS: Over large area - misc. chips and soil from tools, bags, and rocks stored with vacuum container.

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: 650.0 gm
2. Color:
3. Bag no.: D-ALSRC, bottom
4. Container: Vacuum container (D-ALSRC).

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 40.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 72 um
2. M_d:
3.

PETROGRAPHY: (44-74 um)
(Frondel et al., 1971)

Components	%
Fine-grained intergrowth of glass and minerals (agglutinates?)	41.0
Pyroxene and Olivine	33.2
Feldspar	15.4
Opaques	4.4
Angular Glass	3.6
Rounded Glass	2.0
Silica	0.4
No. of Grains	500

MAJOR ELEMENTS: (<1mm)
(Compston et al., 1971)

	%
SiO_2 :	45.74
TiO_2 :	2.91
Al_2O_3:	12.13
Cr_2O_3:	0.35
FeO :	17.43
MnO :	0.23
MgO :	9.90
CaO :	10.44
Na_2O :	0.45
K_2O :	0.25
P_2O_5 :	0.26
S :	0.07

TRACE ELEMENTS:
(Compston et al., 1971)

	ppm		ppm
Sc:		La:	33
V :	97	Ce:	90
Co:	40	Nd:	
Ni:	158	Sm:	
Ba:	370	Eu:	
Sr:	142.8	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:	5.8	Tm:	
U :	1.2	Yb:	
		Lu:	

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SOIL: 12060

LOCATION COMMENTS: Between the site of Surveyor III (in Surveyor Crater), north to within 30 m of the rim of the crater. All rocks, soil, and Surveyor equipment collected within the crater.

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: 20.7 gm
2. Color: Med. gray (est.)
3. Bag no.: Tote-bag
4. Container: Exposed to air during return from Moon and in the crew reception area. Stored in beta-cloth bag in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 24.0, immature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

PETROGRAPHY: (44-74 um)
(Frondel et al., 1971)

Components	%
Fine-grained intergrowth of glass and minerals (agglutinates?)	29.8
Pyroxene and Olivine	42.4
Feldspar	15.2
Opaques	7.4
Angular Glass	3.4
Rounded Glass	1.4
Silica	0.4
No. of Grains	500

MAJOR ELEMENTS: (<37um)
(Frondel et al., 1971)

	%		ppm		ppm
SiO_2 :	45.3	Sc:		La:	
TiO_2 :	4.2	V :		Ce:	
Al_2O_3:	12.6	Co:		Nd:	
Cr_2O_3:	0.23	Ni:		Sm:	
FeO :	16.9	Ba:		Eu:	
MnO :	0.27	Sr:		Tb:	
MgO :	9.6	Hf:		Dy:	
CaO :	10.5	Ta:		Ho:	
Na_2O :	0.38	Th:		Tm:	
K_2O :	0.20	U :		Yb:	
P_2O_5 :				Lu:	
S :					

TRACE ELEMENTS:

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SOIL: 12070

LOCATION COMMENTS: Collected from rim of a small crater 15 m northwest of the LM. Northwest rim of Surveyor Crater.

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: 1102.0 gm
2. Color:
3. Bag no.: Contingency sample bag
4. Container:

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 47.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 80 um
2. M_d:
3.

PETROGRAPHY: (63-125 um)
(McKay et al, 1971)

Components	%
Agglutinates	45
Pyroxene	23
Olivine	4
Feldspar	7
Glass	22

MAJOR ELEMENTS: (Cuttitta et al., 1971)

	%
SiO_2 :	45.7
TiO_2 :	2.78
Al_2O_3:	13.0
Cr_2O_3:	0.42
FeO :	16.4
MnO :	0.23
MgO :	10.5
CaO :	10.4
Na_2O :	0.48
K_2O :	0.23
P_2O_5 :	0.32
S :	

TRACE ELEMENTS: (Haskin et al., 1971)

	ppm		ppm
Sc:		La:	34.9±.5
V :		Ce:	86.3±1.3
Co:		Nd:	57.0±9
Ni:		Sm:	18.1±.3
Ba:		Eu:	1.79±.04
Sr:		Tb:	3.7±.1
Hf:		Dy:	24.3±.3
Ta:		Ho:	4.90±.05
Th:		Tm:	
U :		Yb:	12.9±.4
		Lu:	1.90±.03

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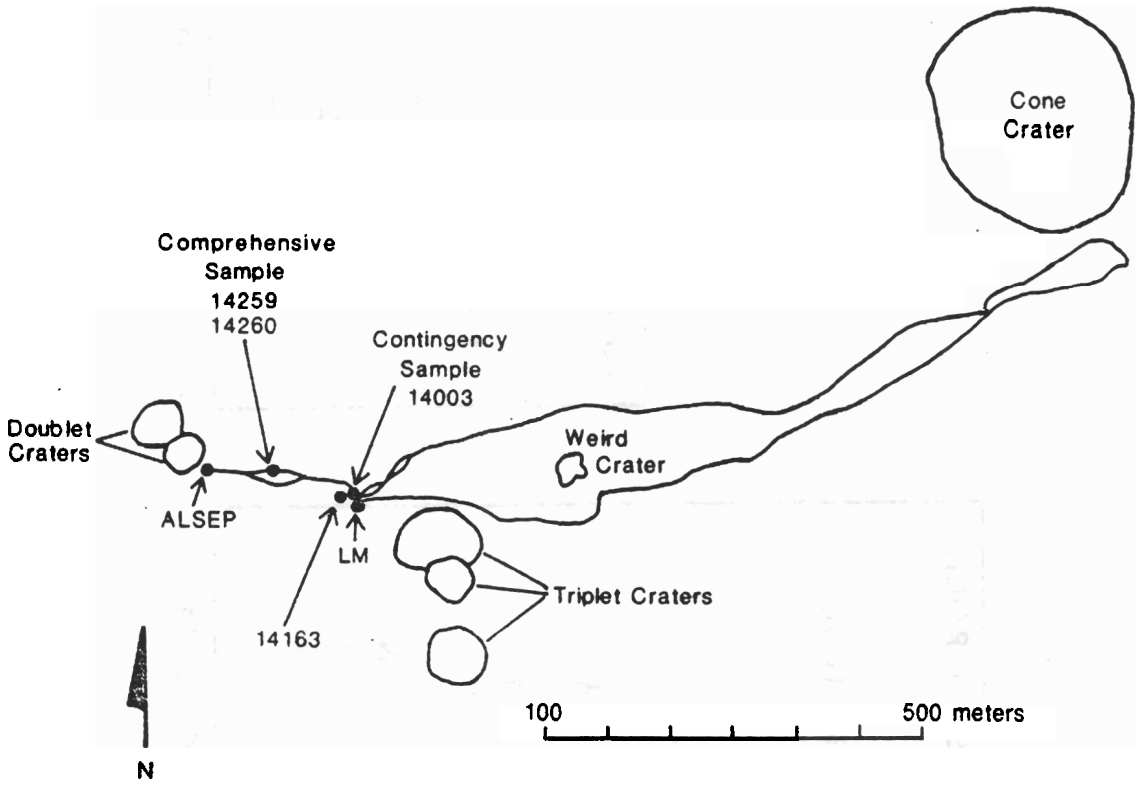
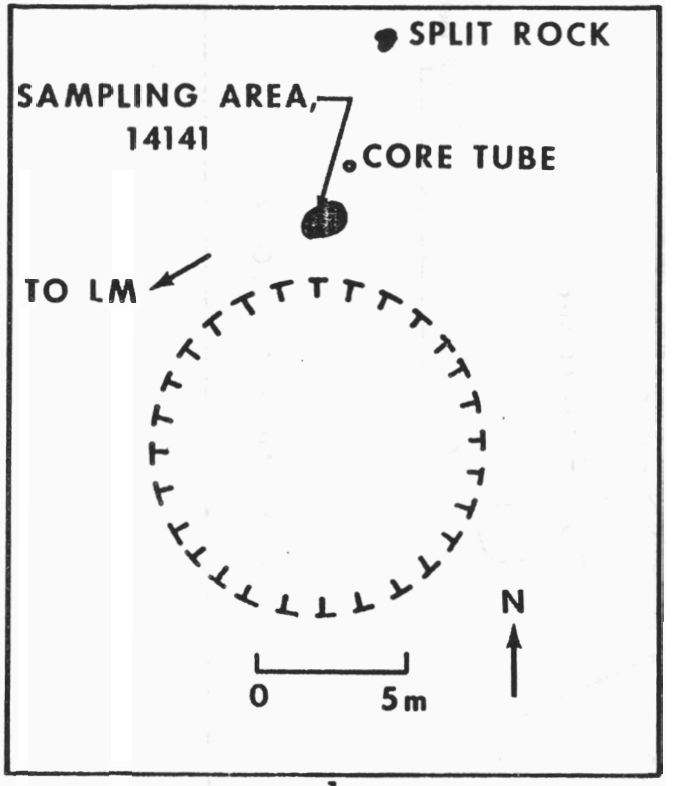
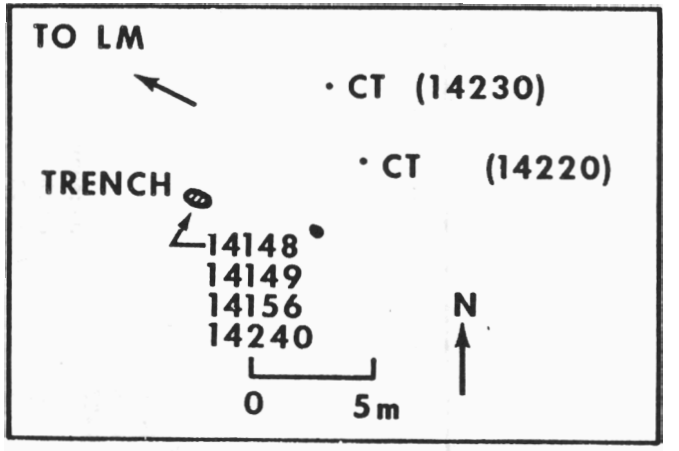


LM, ALSEP AREA, APOLLO 14



STATION C[1], APOLLO 14



STATION G, APOLLO 14

APOLLO 14

EXPLANATION FOR STATION MAPS

Crater

Large rock

LM Lunar module

CT Core tube

SOIL: 14003 (< 1 mm fraction)

LOCATION COMMENTS: Collected near the LM, located about 100 m WNW of North Triplet Crater.

GENERIC SUBSAMPLES:

1. 14003 (947.9 gm): < 1 mm
2. 14002 (42.1 gm): 1-2 mm
3. 14001 (31.8 gm): 2-4 mm
4. 14004 (33.0 gm): 4-10 mm
5. 14006 to 14012 (23.03 gm): > 1 cm
6. (0 gm): Reserve

MISCELLANEOUS:

1.* Collected mass: 1077.83 gm
2. Color:
3. Bag no.: Contingency sample bag
4. Container: Teflon bag within beta-cloth bag. Returned in air. Processed in N_2 environment.

* Parent 14005

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 66.0, mature
2. Agglutinates: 60
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 129 um (< 1 cm); 99 um (< 1 mm)
2. M_d: 139 um
3.

MAJOR ELEMENTS: (Rose et al., 1972)

	%
SiO_2 :	48.08
TiO_2 :	1.77
Al_2O_3:	17.59
Cr_2O_3:	0.26
FeO :	10.45
MnO :	0.14
MgO :	9.27
CaO :	11.12
Na_2O :	0.65
K_2O :	0.54
P_2O_5 :	0.58
S :	

TRACE ELEMENTS: (Rose et al., 1972)

	ppm		ppm
Sc:	27	La:	75
V :	58	Ce:	
Co:	3°8	Nd:	
Ni:	430	Sm:	
Ba:	1000	Eu:	
Sr:	135	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	27
		Lu:	

PETROGRAPHY: (90-150 um) (McKay et al., 1972)

Components	%
Agglutinates	60.3
Breccia	
Metamorphosed	20.5
Vitric	3.0
Pale Green	--
Glass Fragments	
Brown	4.3
Colorless	3.0
Glass Droplets	
Brown	0.3
Colorless	0.3
Ropy Glasses	1.0
Clinopyroxene	2.3
Orthopyroxene	1.3
Plagioclase	2.3
Basalt	1.3
No. of Grains	300

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SOIL: 14141 (< 1 mm fraction)

LOCATION COMMENTS: Station C, near rim of Cone Crater. Surface sample.

GENERIC SUBSAMPLES:

1. 14141 (28.5 gm): < 1 mm
2. 14142 (5.35 gm): 1-2 mm
3. 14143 (6.73 gm): 2-4 mm
4. 14140 (7.43 gm): 4-10 mm
5. (0 gm): > 1 cm
6. (0 gm): Reserve

MISCELLANEOUS:

1.* Collected mass: 56.25 gm
2. Color: Dark gray
3. Bag no.: 9-N
4. Container: Teflon bag; vacuum container (ALSRC). Processed in N_2 atmosphere.

* Parent 14404

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 5.7, immature
2. Agglutinates: 5
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 616 um (< 1 cm); 123 um (< 1 mm)
2. M_d: 758 um

MAJOR ELEMENTS: (Lindstrom et al., 1972)

	%
SiO_2 :	
TiO_2 :	0.98 *
Al_2O_3:	8.75 *
Cr_2O_3:	
FeO :	7.9 *
MnO :	
MgO :	
CaO :	
Na_2O :	
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS: (Lindstrom et al., 1972)

	ppm		ppm
Sc:	21.5	La:	71.4
V :	-	Ce:	200
Co:	31.0	Nd:	104
Ni:		Sm:	34.7
Ba:	900	Eu:	2.82
Sr:		Tb:	7.4
Hf:	25.0	Dy:	
Ta:	5.7	Ho:	
Th:	15.3	Tm:	
U :	-	Yb:	23.8
		Lu:	3.35

* Multiply by appropriate conversion to convert to oxide.

PETROGRAPHY: (90-150 um) (McKay et al., 1972)

Components	%
Agglutinates	5.2
Breccias	
Recrystallized	49.5
Vitric	7.8
Angular Glass	
Brown	7.6
Colorless	2.6
Pale Green	-
Glass Droplets	
Brown	2.0
Colorless	0.2
Pale Green	-
Ropy Glasses	-
Clinopyroxene	8.0
Orthopyroxene	3.8
Plagioclase	7.6
Olivine	0.4
Opaques	0.4
Basalt	4.2
Anorthosite	1.2
Tachylite	7.0
Total Number Grains	500

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SOIL: 14148 (< 1 mm fraction)

LOCATION COMMENTS: Station G, 30 m northeast of North Triplet Crater. Trench surface sample.

GENERIC SUBSAMPLES:

1. 14148 (71.65 gm): < 1 mm
2. 14146 (2.82 gm): 1-2 mm - 14412
3. 14147 (1.67 gm): 2-4 mm
4. 14145 (0.92 gm): 4-10 mm
5. (0 gm): > 1 cm
6. (0 gm): Reserve

MISCELLANEOUS:

1.* Collected mass: 85.59 gm
2. Color:
3. Bag no.: 19-N
4. Container: Teflon bag; vacuum container (ALSRC). Processed in N_2 atmosphere.

* Parent of subsamples is 14412

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 74.0, mature
2. Agglutinates: 50

GRAIN SIZE PARAMETERS:

1. M_z: 77 um (< 1 cm); 60 um (< 1 mm)
2. M_d: 62 um
3.

MAJOR ELEMENTS: (Philpotts et al., 1972)

	%
SiO_2 :	48.5
TiO_2 :	1.71
Al_2O_3:	17.38
Cr_2O_3:	
FeO :	10.55
MnO :	0.13
MgO :	9.66
CaO :	10.40
Na_2O :	0.71
K_2O :	0.53
P_2O_5 :	0.50
S :	0.19

TRACE ELEMENTS: (Lindstrom et al., 1972)

	ppm		ppm
Sc:	21.0	La:	64.3
V :	44	Ce:	176
Co:	34.4	Nd:	98
Ni:		Sm:	31.5
Ba:		Eu:	2.68
Sr:		Tb:	6.6
Hf:	25.7	Dy:	
Ta:	4.7	Ho:	
Th:	13.8	Tm:	
U :	-	Yb:	21.7
		Lu:	3.18

PETROGRAPHY: (90-150 um) (McKay et al., 1972)

Components	%
Agglutinates	50.2
Breccias	
Recrystallized	24.2
Vitric	4.6
Angular Glass	
Brown	6.0
Colorless	2.4
Pale Green	0.8
Glass Droplets	
Brown	1.8
Colorless	-
Pale Green	0.2
Ropy Glasses	0.2
Clinopyroxene	1.8
Orthopyroxene	1.4
Plagioclase	3.0
Olivine	0.8
Opaques	0.4
Basalt	2.0
Anorthosite	-
Tachylite	
Total Number Grains	500

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SOIL: 14149 (< 1 mm fraction)

LOCATION COMMENTS: Station G, 30 m northeast of North Triplet Crater. Trench bottom samples (33 cm below surface).

GENERIC SUBSAMPLES:

1. 14149 (88.15 gm): < 1 mm
2. 14151 (11.70 gm): 1-2 mm
3. 14152 (11.39 gm): 2-4 mm
4. 14150 (11.08 gm): 4-10 mm
5. (0 gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1.* Collected mass: 232.1 gm
2. Color:
3. Bag no.: 20-N
4. Container: Teflon bag; vacuum container (ALSRC). Processed in N_2 atmosphere.

* Parent 14408 contains rock samples 14073 to 14079.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 53.0, mature
2. Agglutinates: 26
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 230 um (< 1 cm); 92 um (< 1 mm)
2. M_d: 583 um
3.

MAJOR ELEMENTS: (Philpotts et al., 1972)

	%
SiO_2 :	48.0
TiO_2 :	1.61
Al_2O_3:	17.45
Cr_2O_3:	0.19
FeO :	9.95
MnO :	0.14
MgO :	9.54
CaO :	10.54
Na_2O :	0.75
K_2O :	0.58
P_2O_5 :	0.48
S :	

TRACE ELEMENTS: (Lindstrom et al., 1972)

	ppm		ppm
Sc:	20.5	La:	65.1
V :	-	Ce:	177
Co:	40.0	Nd:	100
Ni:		Sm:	31.6
Ba:		Eu:	2.76
Sr:		Tb:	6.7
Hf:	23.0	Dy:	
Ta:	4.8	Ho:	
Th:	13.6	Tm:	
U :	-	Yb:	21.7
		Lu:	3.08

PETROGRAPHY: (90-150 um) (McKay et al., 1972)

Components	%
Agglutinates	26.4
Breccias	
Recrystallized	27.0
Vitric	8.2
Angular Glass	
Brown	6.0
Colorless	2.8
Pale Green	-
Glass Droplets	
Brown	1.6
Colorless	2.0
Pale Green	0.4
Ropy Glasses	-
Clinopyroxene	7.4
Orthopyroxene	3.6
Plagioclase	7.8
Olivine	-
Opaques	0.4
Basalt	0.4
Anorthosite	
Tachylite	
Total Number Grains	500

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SOIL: 14156 (< 1 mm fraction)

LOCATION COMMENTS: Station G, 30 m northeast of North Triplet Crater. From the middle of a 33 cm deep trench.

GENERIC SUBSAMPLES:

1. 14156 (138.0 gm): < 1 mm
2. 14154 (5.49 gm): 1-2 mm
3. 14153 (3.91 gm): 2-4 mm
4. 14155 (3.69 gm): 4-10 mm
5.* (gm): > 1 cm
6. 14409 (0.50 gm): Reserve

* 14080 = 1.94 gm; 14081 = 0.84 gm.

MISCELLANEOUS:

1. Collected mass: 162.31 gm
2. Color:
3. Bag no.: 21-N
4. Container: Teflon bag; vacuum container (ALSRC). Processed in N_2 atmosphere.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 68.0, mature
2. Agglutinates: 48
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 70 um (< 1 cm); 64 um (< 1 mm)
2. M_d: 76 um

MAJOR ELEMENTS: (Philpotts et al., 1972)

	%
SiO_2 :	48.1
TiO_2 :	1.71
Al_2O_3:	17.15
Cr_2O_3:	0.19
FeO :	10.55
MnO :	0.14
MgO :	9.55
CaO :	10.16
Na_2O :	0.72
K_2O :	0.53
P_2O_5 :	0.49

TRACE ELEMENTS: (Lindstrom et al., 1972)

	ppm		ppm
Sc:	20.9	La:	65.1
V :	36	Ce:	175
Co:	36.2	Nd:	-
Ni:		Sm:	314
Ba:		Eu:	2.66
Sr:		Tb:	6.6
Hf:	23.2	Dy:	
Ta:	4.8	Ho:	
Th:	13.8	Tm:	
U :	-	Yb:	21.5
		Lu:	3.05

PETROGRAPHY: (90-150 um)
(McKay et al., 1972)

Components	%
Agglutinates	47.7
Breccias	
Recrystallized	23.4
Vitric	-
Angular Glass	
Brown	7.8
Colorless	3.2
Pale Green	0.9
Glass Droplets	
Brown	3.2
Colorless	0.4
Pale Green	1.5
Ropy Glasses	0.2
Clinopyroxene	4.3
Orthopyroxene	1.3
Plagioclase	5.4
Olivine	0.2
Opaques	0.4
Basalt	
Anorthosite	
Tachylite	
Total Number Grains	500

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SOIL: 14163 (< 1 mm fraction)

LOCATION COMMENTS: Collected near LM at end of first EVA. Surface sample, with scoop depths of several cm.

GENERIC SUBSAMPLES:

1.** 14163 (4444.0 gm): < 1 mm
2. 14162 (288.7 gm): 1-2 mm
3. 14161 (197.1 gm): 2-4 mm
4. 14160 (196.5 gm): 4-10 mm
5. (0 gm): > 1 cm
6. (gm): Reserve

* This sample is being investigated for weight discrepancies.
** Sample 14422 (<1mm) was also generated from 14163.

MISCELLANEOUS:

1.* Collected mass: 7776.3
2. Color:
3. Bag no.: Bulk sample (weigh bag 2, No. 1028)
4. Container: Teflon bag; vacuum container (D-ALSRC). Processed in N_2 atmosphere.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 57.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 76 um (< 1 cm); 56 um (< 1 mm)
2. M_d: 65 um
3.

MAJOR ELEMENTS: (Rose et al., 1972)

	%
SiO_2 :	47.97
TiO_2 :	1.77
Al_2O_3:	17.57
Cr_2O_3:	0.26
FeO :	10.41
MnO :	0.14
MgO :	9.18
CaO :	11.15
Na_2O :	0.68
K_2O :	0.58
P_2O_5 :	0.52
S :	

TRACE ELEMENTS: (Rose et al., 1972)

	ppm		ppm
Sc:	25	La:	79
V :	57	Ce:	
Co:	36	Nd:	
Ni:	400	Sm:	
Ba:	1100	Eu:	
Sr:	140	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	28
		Lu:	

PETROGRAPHY: (90-100 um) (Simon et al., 1981)

Components	%
Lithic Fragments	
Mare Component	
Mare Basalt	2.2
Highland Components	
ANT	2.9
LMB	0.3
Feldsp. Basalt	0.6
RNB/POIK	10.9
Fused Soil Component	
DMB	19.3
Agglutinate	45.7
Mineral Frag.	
Mafic	2.6
Plagioclase	5.1
Opaque	
Glass Fragments	
Orange/black	-
Yellow/green	2.9
Brown	-
Clear	1.3
Miscellaneous	
Devitrified glass	6.1
Others	-
Total	99.9
No. of points	311

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SOIL: 14240

LOCATION COMMENTS: Station G, 30 m northeast of North Triplet Crater. Filled with soil from the trench bottom.

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. 14240 (168.0 gm): Reserve
(not sieved)

MISCELLANEOUS:

1. Collected mass: 168.0
2. Color:
3. Bag no.: SESC (2060)
4. Container: Special environment sample container (SESC). Retained in vacuum container (ALSRC).

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 46.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:

MAJOR ELEMENTS:
(Rose et al., 1972)

	%
SiO_2 :	47.77
TiO_2 :	1.67
Al_2O_3:	17.99
Cr_2O_3:	0.23
FeO :	10.02
MnO :	0.14
MgO :	9.47
CaO :	11.25
Na_2O :	0.70
K_2O :	0.54
P_2O_5 :	0.55
S :	

TRACE ELEMENTS:
(Rose et al., 1972)

	ppm		ppm
Sc:	28	La:	67
V :	52	Ce:	
Co:	33	Nd:	
Ni:	320	Sm:	
Ba:	1170	Eu:	
Sr:	390	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	23
		Lu:	

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SOIL: 14259 (< 1 mm fraction)

LOCATION COMMENTS: Location vague. Collected at end of EVA-1, somewhere about 100 to 130 m west of the LM (between the LM and Doublet Crater). Surface sample.

GENERIC SUBSAMPLES:

1.*		(gm):	< 1 mm
2.	14258	(64.33 gm):	1-2 mm
3.	14257	(30.48 gm):	2-4 mm
4.	14256	(13.17 gm):	4-10 mm
5.		(gm):	> 1 cm
6.		(0 gm):	Reserve

* 14259 = 2352.1 gm < 1 mm;
14298 = 116.7 gm.

MISCELLANEOUS:

1. Collected mass: 2576.78 gm
2. Color:
3. Bag no.: Comprehensive sample bag (1007)
4. Container: Teflon bag; vacuum container (ALSRC). Processed in N_2 atmosphere.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 85.0, mature
2. Agglutinates: 52
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 69 um (< 1 cm); 63 um (< 1 mm)
2. M_d: 64 um
3.

MAJOR ELEMENTS:
(Rose et al., 1972)

	%
SiO_2 :	48.16
TiO_2 :	1.73
Al_2O_3:	17.60
Cr_2O_3:	0.26
FeO :	10.41
MnO :	0.14
MgO :	9.26
CaO :	11.25
Na_2O :	0.61
K_2O :	0.51
P_2O_5 :	0.53
S :	

TRACE ELEMENTS:
(Rose et al., 1972)

	ppm		ppm
Sc:	28	La:	77
V :	62	Ce:	
Co:	38	Nd:	
Ni:	440	Sm:	
Ba:	1100	Eu:	
Sr:	150	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	30
		Lu:	

PETROGRAPHY: (90-150 um)
(McKay et al., 1972)

Components	%
Agglutinates	51.7
Breccias	
Recrystallized	20.3
Vitric	5.0
Angular Glass	
Brown	6.7
Colorless	3.3
Pale Green	-
Glass Droplets	
Brown	1.3
Colorless	0.6
Pale Green	0.3
Ropy Glasses	0.6
Clinopyroxene	3.7
Orthopyroxene	0.6
Plagioclase	4.7
Olivine	-
Opaques	-
Basalt	1.0
Anorthosite	-
Tachylite	-
Total Number Grains	300

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SOIL: 14260 (< 1 mm fraction)

LOCATION COMMENTS: Location vague. Somewhere between the LM and a point about 100 m west. Surface sample collected along with 25 rocks and "chips."

GENERIC SUBSAMPLES:

1. 14260 (282.5 gm): < 1 mm
2. 14262 (9.1 gm): 1-2 mm
3. 14261 (8.2 gm): 2-4 mm
4. 14263 (16.2 gm): 4-10 mm
5. (0 gm): > 1 cm
6. (0 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 316.0 gm
2. Color:
3. Bag no.: Comprehensive sample bag (1039)
4. Container: Teflon bag; vacuum container (ALSRC). Processed in N_2 atmosphere.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 72.0, mature
2. Agglutinates:

GRAIN SIZE PARAMETERS:

1. M_z: 117 um (< 1 cm); 86 um (< 1 mm)
2. M_d: 95 um
3.

PETROGRAPHY: (<37 um)
(Finkelman, 1973)

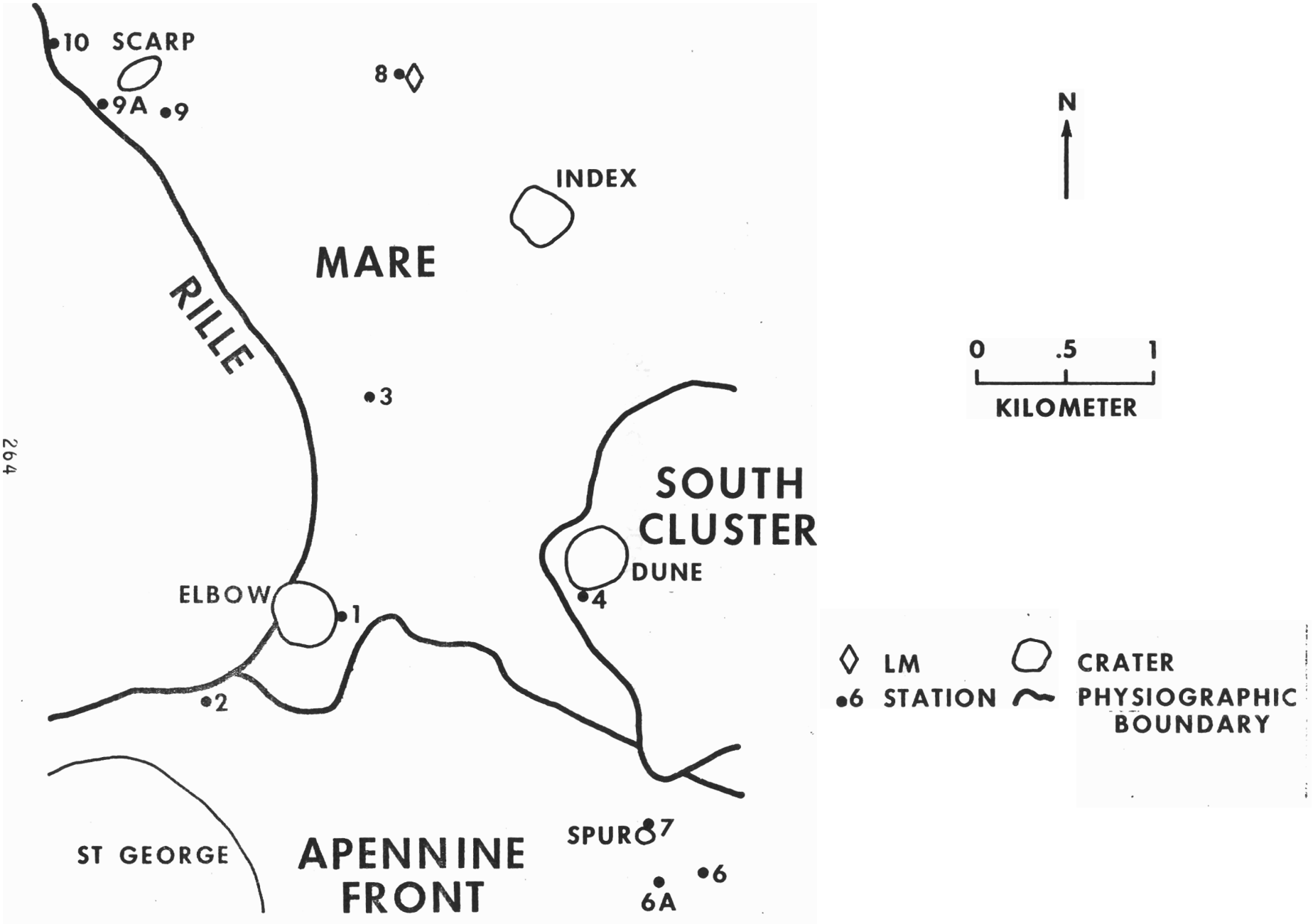
Components	%
Low-Al Glass	32.0
High-Al Glass	6.0
Pyroxene	29.0
Plagioclase	15.5
Olivine	5.5
K-Rich Phases	2.5
Fe-Metal	0.5
Ilmenite	4.0
Misc.	5.0
No. of Grains Counted	262

MAJOR ELEMENTS:
(Rhodes et al., 1976)

	%
SiO_2 :	47.11
TiO_2 :	1.87
Al_2O_3:	16.97
Cr_2O_3:	
FeO :	11.08
MnO :	0.17
MgO :	9.42
CaO :	10.95
Na_2O :	0.68
K_2O :	0.49
P_2O_5 :	0.47
S :	0.12

TRACE ELEMENTS:
(Rhodes et al., 1976)

	ppm		ppm
Sc:	22.8	La:	66.5
V :		Ce:	172
Co:	38.1	Nd:	
Ni:	450	Sm:	28.9
Ba:		Eu:	2.40
Sr:		Tb:	8.3
Hf:	23.8	Dy:	
Ta:	3.8	Ho:	
Th:	12.1	Tm:	
U :		Yb:	21.7
Cr:	1640	Lu:	3.06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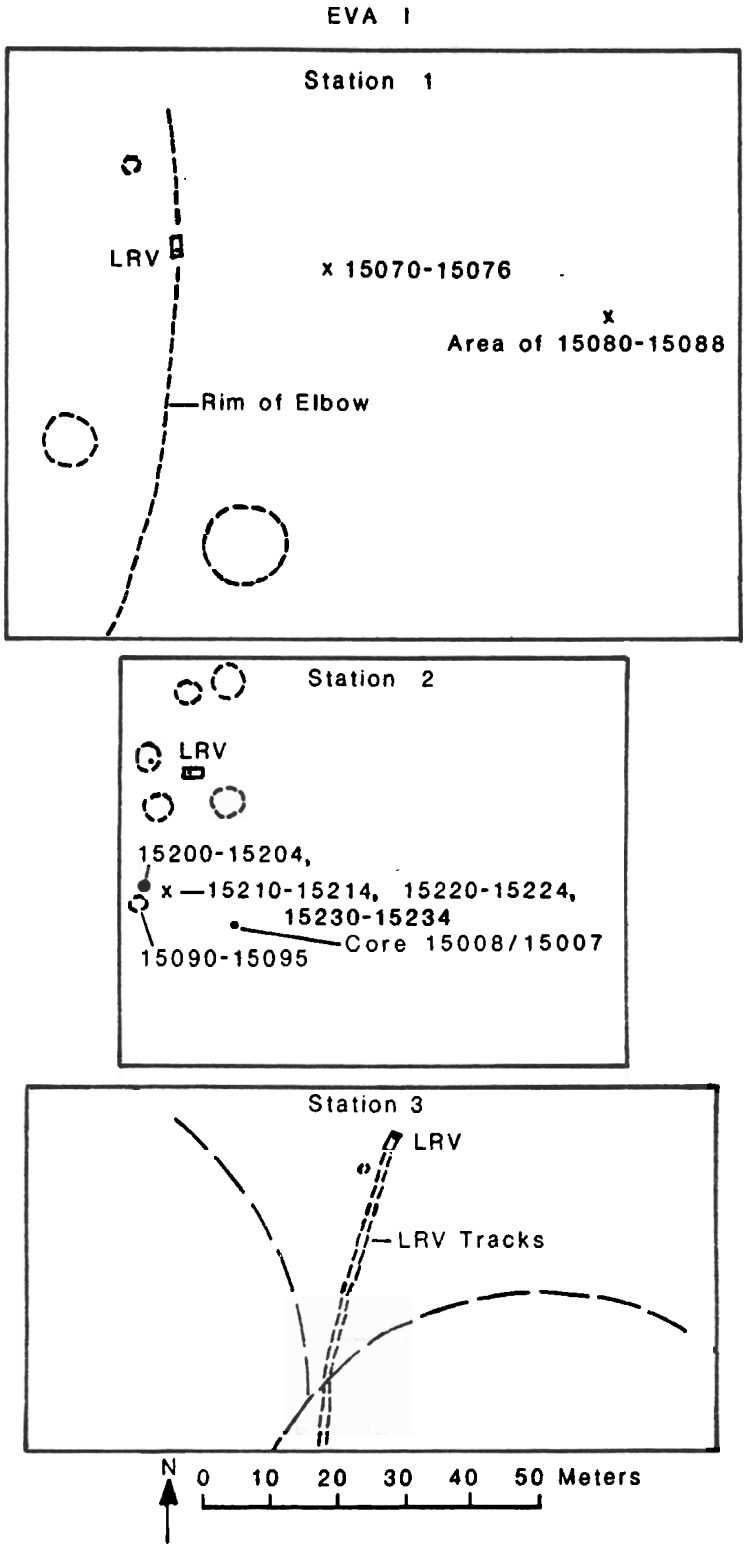
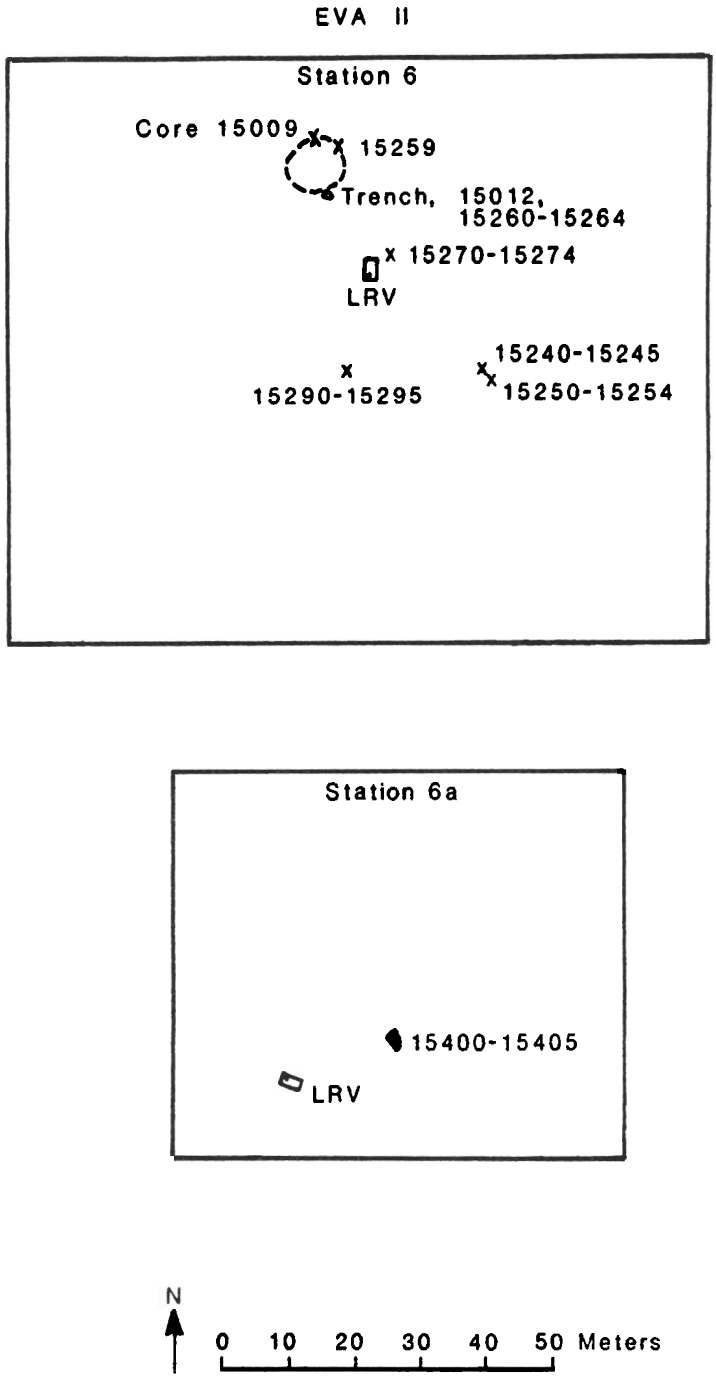
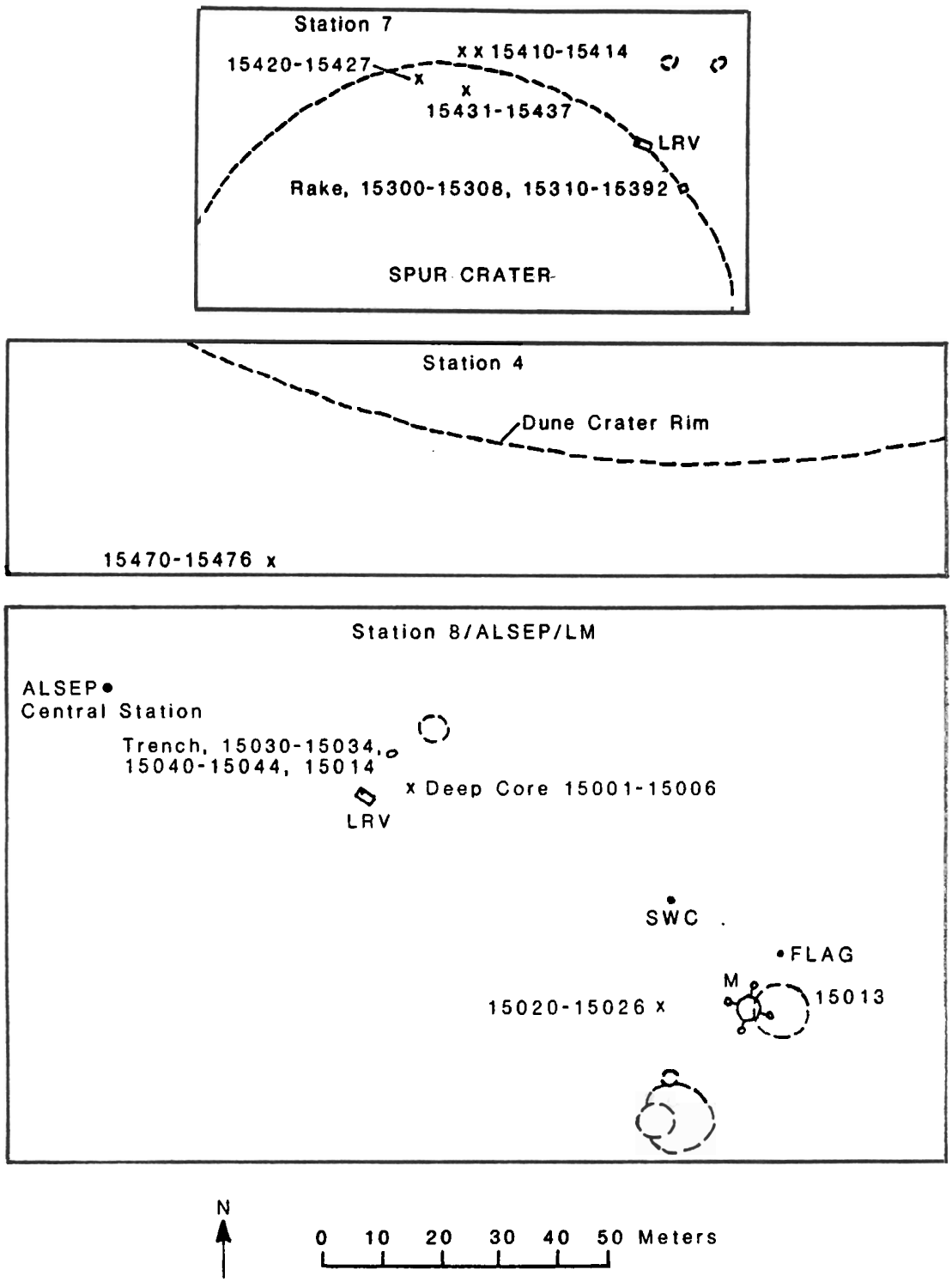
6 STATION
CRATER
PHYSIOGRAPHIC
BOUNDARY



Station 1, 2, & 3 Maps Showing Sample Collection Sites;
Modified from U.S. Geological Survey Interagency Report 36.

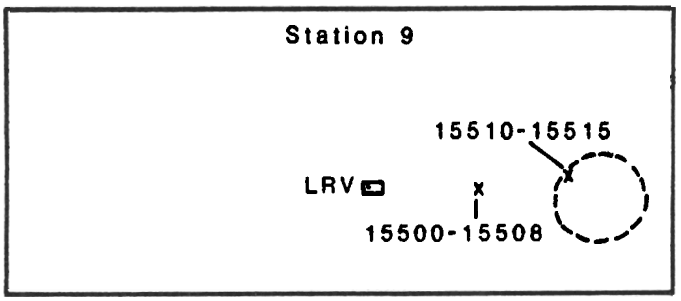


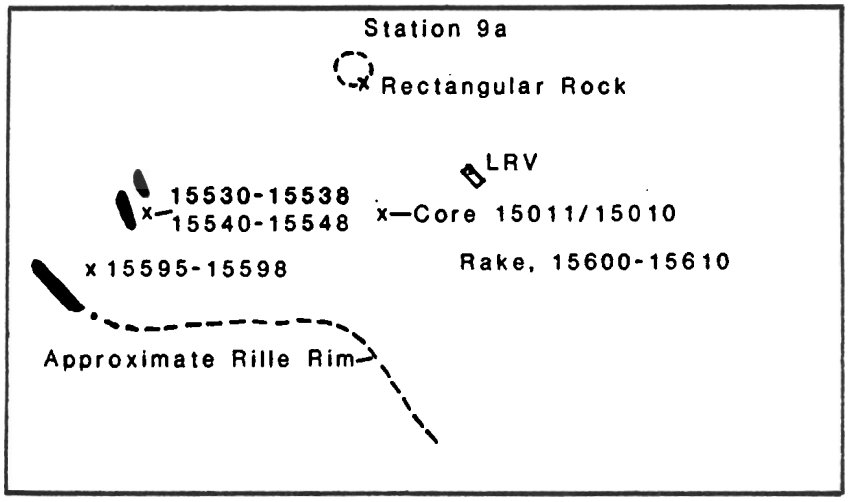
Station 6 & 6a Maps Showing Sample Collection Sites.
Modified from U.S. Geological Survey Interagency Report 36.

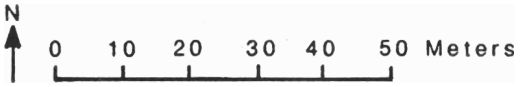


Station 7, 4, & 8/ALSEP/LM Maps Showing Sample Collection Sites.
Modified From U.S. Geological Survey Interagency Report 36.

EVA III







Station 9 & 9a Maps Showing Sample Collection Sites.
Modified From U.S. Geological Survey Interagency Report 36.

SOIL: 15013

LOCATION COMMENTS: Collected at Station 8, ALSEP site, from the bottom of a 35 cm deep trench.

GENERIC SUBSAMPLES:

1.		(	gm): < 1 mm
2.		(	gm): 1-2 mm
3.		(	gm): 2-4 mm
4.		(	gm): 4-10 mm
5.		(	gm): > 1 cm
6.	15013	(296.2	gm): Reserve

MISCELLANEOUS:

1. Collected mass: 296.2 gm
2. Color: Dark gray (field description)
3. Bag no.: SESC (no number)
4. Container: Vacuum container (special environment sample container) returned in sample collection bag 7 (beta-cloth). Processed in vacuum.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 77.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:

MAJOR ELEMENTS:
(Christian et al., 1976)

	%		ppm		ppm
SiO_2 :	46.94	Sc:		La:	
TiO_2 :	1.72	V :		Ce:	
Al_2O_3:	14.46	Co:		Nd:	
Cr_2O_3:	0.35	Ni:		Sm:	
FeO :	14.98	Ba:		Eu:	
MnO :	0.21	Sr:		Tb:	
MgO :	10.35	Hf:		Dy:	
CaO :	10.38	Ta:		Ho:	
Na_2O :	0.44	Th:		Tm:	
K_2O :	0.22	U :		Yb:	
P_2O_5 :	0.22			Lu:	
S :					

TRACE ELEMENTS:

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SOIL: 15014

LOCATION COMMENTS: "Contaminated" sample, collected under the bell of the LM descent engine. Top soil layer (uppermost 1 or 2 cm).

GENERIC SUBSAMPLES:

		(gm):	< 1 mm
		(gm):	1-2 mm
3.		(gm):	2-4 mm
4.		(gm):	4-10 mm
5.		(gm):	> 1 cm
6.	15014	(333.2 gm):	Reserve

MISCELLANEOUS:

1. Collected mass: 333.2 gm
2. Color:
3. Bag no.: SESC 2
4. Container: Vacuum container. Returned in a vacuum box (ALSRC 2). Processed in N_2 environment.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO:
2. Agglutinates:
3.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

SOIL: 15020

LOCATION COMMENTS: Collected 25 m west of the LM. Surface sample.

GENERIC SUBSAMPLES:

1. 15021 (500.2 gm): < 1 mm
2. 15022 (10.0 gm): 1-2 mm
3. 15023 (5.0 gm): 2-4 mm
4. 15024 (3.6 gm): 4-10 mm
5.* (78.4 gm): > 1 cm
6. 15020 (88.7 gm): Reserve

* Two breccia samples (15025 and 15026) not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 607.5 gm (< 1 cm fract.)
2. Color:
3. Bag no.: Contingency bag
4. Container: Teflon bag. Returned in sample collection bag (SCB 4) in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 70.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d: 82.7 um

MAJOR ELEMENTS: (Apollo 15 P.E.T., 1972)

	%
SiO_2	46.56
TiO_2	1.75
Al_2O_3	13.73
Cr_2O_3	
FeO	15.21
MnO	0.20
MgO	10.37
CaO	10.54
Na_2O	0.41
K_2O	0.20
P_2O_5	0.18
S	0.06

TRACE ELEMENTS: (Laul et al., 1972)

	ppm		ppm
Sc:	28	La:	26
V :	114	Ce:	73
Co:	40	Nd:	
Ni:		Sm:	12.9
Ba:	320	Eu:	1.4
Sr:		Tb:	2.3
Hf:	9.9	Dy:	
Ta:	1.2	Ho:	
Th:	4.9	Tm:	
U :	1.5	Yb:	9.5
Zr:	350	Lu:	1.3

PETROGRAPHY: (90-125 um) (Basu et al., 1981)

Components	%
Monomineralic	
Plagioclase	15.0
Pyroxene	3.6
Olivine	9.1
Opaques	2.3
Oxides	
Metal, Sulph.	
Silica Phase	
Crystalline Lithics	8.4
ANT Suite	(0.3)
Anorthosite	0.3
Gabbroic	
Mare Basalt	(4.5)
Oliv.-Bearing	
Oliv.-Free	(2.9)
Microgabbroic	0.3
Porphyritic, Etc.	2.3
Ophitic, Etc.	0.3
Intersertal/ Granular	
Other	1.6
Non-Mare Basalt	(3.6)
Feldspathic	
KREEPy	3.3
Plag-Phyic	0.3
Indeterminate	

Components	%
Breccias	14.9
Vitric	(12.3)
Dark Matrix	11.7
Light Matrix	0.6
Crystalline	(2.6)
Poikilitic	
Melt Matrix	1.0
Other	1.6
Agglutinate	55.5
Glass	6.1
Ropy/ Clast-Laden	2.3
Quench-Crystals (Vitrophyres)	(0.3)
Green Glass	0.3
Other	
Devitrified (Cryptocry.)	0.3
Crystal/ Clast-Free	(3.2)
Green	1.0
Yellow	1.3
Gray, Colorless	0.6
Brown, Black, Etc.	0.3
Miscellaneous	
Total number particles	308

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VOL. 2 P. 1823-1844

SOIL: 15030

LOCATION COMMENTS: Station 8 (ALSEP site). From the bottom of a 30 m deep trench.

GENERIC SUBSAMPLES:

1. 15031 (207.8 gm): < 1 mm
2. 15032 (7.0 gm): 1-2 mm
3. 15033 (6.6 gm): 2-4 mm
4. 15034 (7.0 gm): 4-10 mm
5. (gm): > 1 cm
6. 15030 (75.3 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 303.7 gm
2. Color: Dark gray
3. Bag no.: Doc. bag 252
4. Container: Teflon bag (documented bag), in sample collection bag 5 (beta-cloth). Returned in ALSRC (vacuum container). Did not seal properly so was exposed to air. Processed in N_2 environment.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 68.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d: 69.3 um

MAJOR ELEMENTS: (Laul et al., 1973)

	%
SiO_2 :	
TiO_2 :	1.70
Al_2O_3:	14.1
Cr_2O_3:	0.39
FeO :	
MnO :	0.19
MgO :	12.0
CaO :	10.20
Na_2O :	0.45
K_2O :	0.23
P_2O_5 :	
S :	

TRACE ELEMENTS: (Laul & Schmitt, 1973)

	ppm		ppm
Sc:	28	La:	27
V :	120	Ce:	75
Co:	42	Nd:	
Ni:		Sm:	12.9
Ba:	270	Eu:	1.3
Sr:		Tb:	2.4
Hf:	9.5	Dy:	-
Ta:	1.1	Ho:	
Th:	4.8	Tm:	
U :	1.6	Yb:	8.7
Zr:	320	Lu:	1.3

PETROGRAPHY: (90-125 um)
(Basu et al., 1981)

Components	%
Monomineralic	23.0
Plagioclase	6.1
Pyroxene	13.1
Olivine	2.9
Opaques	(0.6)
Oxides	0.6
Metal, Sulph.	
Silica Phase	0.3
Crystalline Lithics	10.9
ANT Suite	(0.6)
Anorthosite	0.3
Gabbroic	0.3
Mare Basalt	(6.7)
Oliv.-Bearing	0.6
Oliv.-Free	(4.2)
Microgabbroic	
Porphyritic, Etc.	2.9
Ophitic, Etc.	1.0
Intersertal/ Granular	0.3
Other	1.9
Non-Mare Basalt	(2.6)
Feldspathic	
KREEPy	2.6
Plag-Phyic	
Indeterminate	1.0

Components	%
Breccias	15.4
Vitric	(13.8)
Dark Matrix	12.5
Light Matrix	1.3
Crystalline	(1.6)
Poikilitic	0.6
Melt Matrix	
Other	1.0
Agglutinate	42.3
Glass	8.0
Ropy/ Clast-Laden	2.9
Quench- Crystals (Vitrophyres)	(0.3)
Green Glass	
Other	0.3
Devitrified (Cryptocry.)	2.2
Crystal/ Clast-Free	(2.6)
Green	0.3
Yellow	1.0
Gray, Colorless	1.3
Brown, Black, Etc.	
Miscellaneous	0.3
Total number particles	312

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SOIL: 15040

LOCATION COMMENTS: Station 8 (ALSEP site). From the top (near surface) of the trench. Trench is located 12 m southwest of a 5 m diameter crater.

GENERIC SUBSAMPLES:

1. 15041 (269.6 gm): < 1 mm
2. 15042 (5.1 gm): 1-2 mm
3. 15043 (2.8 gm): 2-4 mm
4. 15044 (1.5 gm): 4-10 mm
5. (gm): > 1 cm
6. 15040 (113.4 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 392.4 gm
2. Color: Dark gray
3. Bag no.: Doc. bag 253
4. Container: Teflon bag, in beta-cloth bag 6. Returned in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 94.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d: 65.1 um
3.

MAJOR ELEMENTS: (Laul & Schmitt, 1973)

	%
SiO_2 :	
TiO_2 :	1.70
Al_2O_3:	14.20
Cr_2O_3:	0.36
FeO :	14.30
MnO :	0.187
MgO :	11.00
CaO :	10.60
Na_2O :	0.43
K_2O :	0.21
P_2O_5 :	
S :	

TRACE ELEMENTS: (Laul & Schmitt, 1973)

	ppm		ppm
Sc:	26	La:	26
V :	107	Ce:	68
Co:	41	Nd:	
Ni:		Sm:	12.7
Ba:	250	Eu:	1.3
Sr:		Tb:	2.2
Hf:	9.1	Dy:	-
Ta:	1.1	Ho:	
Th:	4.8	Tm:	
U :	1.6	Yb:	8.1
Zr:	350	Lu:	1.2

PETROGRAPHY: (90-125 um) (Basu et al., 1981)

Components	%
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Pyroxene	18.9
Olivine	4.6
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Oxides	
Metal, Sulph.	
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Glass	7.8
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Quench- Crystals (Vitrophyres)	(0.3)
Green Glass	
Other	0.3
Devitrified (Cryptocry.)	1.3
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Brown, Black, Etc.	1.3
Miscellaneous	
Total number particles	307

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SOIL: 15012

LOCATION COMMENTS: Station 6, Appennine Front. From the bottom of a trench on the rim of a subdued 10 m diameter crater.

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. 15012 (312.2 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 312.2 gm
2. Color:
3. Bag no.: SESC 1
4. Container: Special environment sample container (SESC) vacuum container. Returned in vacuum container (ALSRC 2).

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 66.0, mature
2. Agglutinates:

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Christian et al., 1976)

	%
SiO_2 :	46.77
TiO_2 :	1.46
Al_2O_3:	16.75
Cr_2O_3:	0.30
FeO :	12.40
MnO :	0.17
MgO :	10.35
CaO :	10.95
Na_2O :	0.45
K_2O :	0.21
P_2O_5 :	0.22

TRACE ELEMENTS: (Laul et al., 1972)

	ppm		ppm
Sc:	28	La:	
V :	114	Ce:	
Co:	40	Nd:	
Ni:		Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:	9.9	Dy:	
Ta:		Ho:	
Th:	4.9	Tm:	
U :		Yb:	
		Lu:	

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SOIL: 15070

LOCATION COMMENTS: Station 1, east rim of Elbow Crater. Part of a radial surface sample. Collected 25 m east of the crater rim.

GENERIC SUBSAMPLES:

1. 15071 (100.7 gm): < 1 mm
2. 15072 (3.0 gm): 1-2 mm
3. 15073 (1.4 gm): 2-4 mm
4. 15074 (1.3 gm): 4-10 mm
5.* (1209.8 gm): > 1 cm
6. 15070 (51.3 gm): Reserve

* Two large basalt samples (15075 and 15076) returned in same bag as the soil. Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 157.7 gm
2. Color: Light gray (field description)
3. Bag no.: Doc. bag 157
4. Container: Teflon bag; returned in vacuum (ALSRC No. 1). Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 52.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 100 um (< 1 mm)
2. M_d:
3.

MAJOR ELEMENTS: (Duncan et al., 1975)

	%
SiO_2	46.95
TiO_2	1.60
Al_2O_3	12.70
Cr_2O_3	0.465
FeO	16.29
MnO	0.217
MgO	10.75
CaO	10.49
Na_2O	0.33
K_2O	0.092
P_2O_5	0.130
S	0.070

TRACE ELEMENTS: (Morgan et al., 1972)

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:	46.1	Nd:	
Ni:	170	Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (90-125 um) (Basu et al., 1981)

Components	%
Monomineralic	39.5
Plagioclase	9.3
Pyroxene	23.7
Olivine	4.2
Opaques	(1.3)
Oxides	1.3
Metal, Sulph.	
Silica Phase	1.0
Crystalline Lithics	10.9
ANT Suite	(0.6)
Anorthosite	0.6
Gabbroic	
Mare Basalt	(6.8)
Oliv.-Bearing	1.3
Oliv.-Free	(4.2)
Microgabbroic	1.0
Porphyritic, Etc.	2.2
Ophitic, Etc.	1.0
Intersertal/ Granular	
Other	1.3
Non-Mare Basalt	(1.9)
Feldspathic	
KREEPy	1.9
Plag-Phyic	
Indeterminate	1.6

Components	%
Breccias	8.9
Vitric	(8.3)
Dark Matrix	8.0
Light Matrix	0.3
Crystalline	(0.6)
Poikilitic	0.3
Melt Matrix	
Other	0.3
Agglutinate	34.6
Glass	6.1
Ropy/ Clast-Laden	1.6
Quench- Crystals (Vitrophyres)	(0.3)
Green Glass	
Other	0.3
Devitrified (Cryptocry.)	1.0
Crystal/ Clast-Free	(3.2)
Green	0.6
Yellow	1.0
Gray, Colorless	0.6
Brown, Black, Etc.	1.0
Miscellaneous	
Total number particles	312

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12A, 509-517

SOIL: 15080

LOCATION COMMENTS: Station 1, Apennine Front (Elbow Crater). Surface sample, collected 65 m east of the crater rim.

GENERIC SUBSAMPLES:

1.		(	gm):	< 1 mm
2.		(	gm):	1-2 mm
3.	15083	(1.8	gm):	2-4 mm
4.	15084	(1.1	gm):	4-10 mm
5.*		(695.3	gm):	> 1 cm
6.	15080	(73.5	gm):	Reserve

* Two basalts, two breccias. Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 185.3 gm
2. Color:
3. Bag no.: Doc. bag 158
4. Container: Teflon bag; returned in vacuum (ALSRC No. 1). Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 68.0, mature
2. Agglutinates:
3.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:

MAJOR ELEMENTS: (Wanke et al., 1973)

	%
SiO_2 :	48.13
TiO_2 :	1.501
Al_2O_3:	13.85
Cr_2O_3:	0.44
FeO :	16.21
MnO :	0.2
MgO :	11.14
CaO :	11.19
Na_2O :	0.36
K_2O :	0.15
P_2O_5 :	

TRACE ELEMENTS: (Duncan et al., 1975)

	ppm		ppm
Sc:		La:	
V :	116	Ce:	
Co:	46	Nd:	
Ni:	209	Sm:	
Ba:	185	Eu:	
Sr:	120	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

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SOIL: 15090

LOCATION COMMENTS: Station 2, between St. George Crater and Hadley Rille. Surface soil--fillet (soil stacked against a boulder) uphill from boulder.

GENERIC SUBSAMPLES:

1. 15091 (162.9 gm): < 1 mm
2. 15092 (2.7 gm): 1-2 mm
3. 15093 (0.6 gm): 2-4 mm
4. (gm): 4-10 mm
5.* (25.5 gm): > 1 cm
6. 15090 (39.9 gm): Reserve

* One glass-coated breccia. Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 205.5
2. Color:
3. Bag no.: Doc. bag 159
4. Container: Teflon bag; returned in vacuum (ALSRC No. 1). Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 74.0, mature
2. Agglutinates:

GRAIN SIZE PARAMETERS:

1. M_z: 51 um (< 1 mm)
2. M_d:
3.

MAJOR ELEMENTS: (Carron et al., 1972)

	%
SiO_2 :	46.47
TiO_2 :	1.31
Al_2O_3:	17.47
Cr_2O_3:	0.24
FeO :	11.57
MnO :	0.17
MgO :	10.50
CaO :	11.77
Na_2O :	0.41
K_2O :	0.18
P_2O_5 :	0.16

TRACE ELEMENTS: (Carran et al., 1972)

	ppm		ppm		ppm
Sc:	21	La:	32		
V :	80	Ce:			
Co:	39	Nd:			
Ni:	365	Sm:			
Ba:		Eu:			
Sr:	155	Tb:			
Hf:		Dy:			
Ta:		Ho:			
Th:		Tm:			
U :		Yb:	7.7		
		Lu:			

PETROGRAPHY: (90-125 um) (Basu et al., 1981)

Components	%
Monomineralic	22.1
Plagioclase	12.0
Pyroxene	8.5
Olivine	1.3
Opaques	(0.3)
Oxides	0.3
Metal, Sulph.	
Silica Phase	
Crystalline Lithics	7.8
ANT Suite	(3.5)
Anorthosite	3.2
Gabbroic	0.3
Mare Basalt	(2.4)
Oliv.-Bearing	0.3
Oliv.-Free	(1.8)
Microgabbroic	
Porphyritic, Etc.	0.9
Ophitic, Etc.	0.9
Intersertal/ Granular	
Other	
Non-Mare Basalt	0.3
Feldspathic	(1.6)
KREEPy	1.6
Plag-Phyic	
Indeterminate	0.3

Components	%
Breccias	10.7
Vitric	(9.8)
Dark Matrix	9.2
Light Matrix	0.6
Crystalline	(0.9)
Poikilitic	0.3
Melt Matrix	
Other	0.6
Agglutinate	52.8
Glass	5.9
Ropy/ Clast-Laden	1.3
Quench- Crystals (Vitrophyres)	(0.3)
Green Glass	0.3
Other	
Devitrified (Cryptocry.)	0.9
Crystal/ Clast-Free	(3.4)
Green	2.2
Yellow	0.6
Gray, Colorless	0.6
Brown. Black. Etc.	
Miscellaneous	0.3
Total number particles	316

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SOIL: 15100

LOCATION COMMENTS: Station 2, St. George Crater. Collected between 2-5 m craters along with comprehensive (rake) sample.

GENERIC SUBSAMPLES:

1. 15101 (637.6 gm): < 1 mm
2. 15102 (12.2 gm): 1-2 mm
3. 15103 (4.1 gm): 2-4 mm
4. 15104 (1.5 gm): 4-10 mm
5.* 15105 (5.6 gm): > 1 cm
6. 15100 (281.0 gm): Reserve

* Basalt. Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 936.4 gm
2. Color: Dark gray (field description)
3. Bag no.: Doc. bag 187
4. Container: Teflon bag; returned in vacuum (ALSRC No. 1). Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 70.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 51 um (< 1 mm)
2. M_d: whole sample = 51.7 um
3.

MAJOR ELEMENTS: (Carron et al., 1972)

	%
SiO_2 :	46.29
TiO_2 :	1.31
Al_2O_3:	17.70
Cr_2O_3:	0.22
FeO :	11.53
MnO :	0.16
MgO :	10.55
CaO :	11.54
Na_2O :	0.41
K_2O :	0.19
P_2O_5 :	0.16
S :	

TRACE ELEMENTS: (Cuttitta et al., 1973)

	ppm		ppm
Sc:	21	La:	28
V :	94	Ce:	
Co:	44	Nd:	
Ni:	295	Sm:	
Ba:	350	Eu:	
Sr:	170	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	9.4
		Lu:	

PETROGRAPHY: (125-250 um)
(Heiken and McKay, 1972-unpublished)

Components	%
Agglutinates	42
Microbreccias:	
Recrystallized	3
Vitric	4
Angular Glass	
Brown	7
Gray	2
Colorless Glass	-
Glass Droplets	
Green	8
Brown	-
Clinopyroxene	10
Orthopyroxene	2
Olivine	2
Plagioclase	12
Orthoclase	1
Basalt	
Equi.	2
Halocryst.	-
Ophitic	-
Anorthosite	4
Opaques	-
Total Number Grains	121

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SOIL: 15200

LOCATION COMMENTS: Station 2, St. George Crater. Corner of boulder. Collected along with rock chipped off boulder.

GENERIC SUBSAMPLES:

1. 15201 (18.3 gm): < 1 mm
2. 15202 (0.4 gm): 1-2 mm
3. 15203 (0.2 gm): 2-4 mm
4. 15204 (0.1 gm): 4-10 mm
5.* 15205 (92.0 gm): > 1 cm
6. 15200 (7.7 gm): Reserve

* Glassy breccia. Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 26.7 gm
2. Color:
3. Bag no.: Doc. bag 160
4. Container: Teflon bag; returned in vacuum container (ALSRC #1). Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 68.0, mature
2. Agglutinates:
3.

GRAIN SIZE PARAMETERS:

1. M_z: 56.0 um
2. M_d:
3.

MAJOR ELEMENTS:

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	
Cr_2O_3:	
FeO :	
MnO :	
MgO :	
CaO :	
Na_2O :	
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS:

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:		Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

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SOIL: 15210

LOCATION COMMENTS: Station 2, St. George Crater. Fillet sample.

GENERIC SUBSAMPLES:

1. 15211 (163.5 gm): < 1 mm
2. 15212 (3.6 gm): 1-2 mm
3. 15213 (2.4 gm): 2-4 mm
4. 15214 (0.2 gm): 4-10 mm
5. (gm): > 1 cm
6. 15210 (221.2 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 390.9 gm
2. Color:
3. Bag no.: Doc. bag 180
4. Container: Teflon bag; returned in vacuum container (ALSRC #1). Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 60.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Cuttitta et al., 1973)	%	TRACE ELEMENTS: (Cuttitta et al., 1973)	ppm		ppm
SiO_2 :	46.35	Sc:	22	La:	32
TiO_2 :	1.34	V :	80	Ce:	
Al_2O_3:	17.73	Co:	40	Nd:	
Cr_2O_3:	0.23	Ni:	325	Sm:	
FeO :	11.66	Ba:	315	Eu:	
MnO :	0.16	Sr:	150	Tb:	
MgO :	10.48	Hf:		Dy:	
CaO :	11.68	Ta:		Ho:	
Na_2O :	0.44	Th:		Tm:	
K_2O :	0.19	U :		Yb:	7.7
P_2O_5 :	0.19			Lu:	
S :					

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SOIL: 15220

LOCATION COMMENTS: Station 2, St. George Crater. Undisturbed surface soil (reference sample). Collected approximately one meter from a boulder where fillet sample 15210 was collected.

GENERIC SUBSAMPLES:

1. 15221 (290.0 gm): < 1 mm
2. 15222 (2.4 gm): 1-2 mm
3. 15223 (5.8 gm): 2-4 mm
4. 15224 (7.0 gm): 4-10 mm
5. (gm): > 1 cm
6. 15220 (160.5 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 465.7 gm
2. Color:
3. Bag no.: Doc. bag 181
4. Container: Teflon bag; returned in vacuum container (ALSRC #1). Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 63.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 43 um (< 1 mm)
2. M_d: 53.4 um
3.

MAJOR ELEMENTS: (Carron et al., 1972)

	%
SiO_2	46.56
TiO_2	1.27
Al_2O_3	17.54
Cr_2O_3	0.23
FeO	11.32
MnO	0.15
MgO	10.69
CaO	11.87
Na_2O	0.45
K_2O	0.19
P_2O_5	0.16
S	

TRACE ELEMENTS: (Cuttitta et al., 1973)

	ppm		ppm
Sc:	20	La:	24
V :	84	Ce:	
Co:	44	Nd:	
Ni:	320	Sm:	
Ba:	300	Eu:	
Sr:	160	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	7.2
		Lu:	

PETROGRAPHY: (90-125 um) (Basu et al., 1981)

Components	%
Monomineralic	20.3
Plagioclase	9.5
Pyroxene	7.2
Olivine	3.3
Opaques	(0.3)
Oxides	0.3
Metal, Sulph.	
Silica Phase	
Crystalline Lithics	7.9
ANT Suite	(2.3)
Anorthosite	2.0
Gabbroic	0.3
Mare Basalt	(2.0)
Oliv.-Bearing	0.7
Oliv.-Free	(0.3)
Microgabbroic Porphyritic, Etc.	
Ophitic, Etc.	0.3
Intersertal/ Granular	
Other	1.0
Non-Mare Basalt	(2.3)
Feldspathic KREEPy	2.3
Plag-Phyic	
Indeterminate	1.3

Components	%
Breccias	12.8
Vitric	(2.2)
Dark Matrix	11.5
Light Matrix	0.7
Crystalline	(0.6)
Poikilitic Melt Matrix	0.3
Other	0.3
Agglutinate	50.0
Glass	8.5
Ropy/ Clast-Laden	2.6
Quench- Crystals (Vitrophyres)	0.0
Green Glass	
Other	
Devitrified (Cryptocry.)	0.7
Crystal/ Clast-Free	(5.2)
Green	2.0
Yellow	1.3
Gray, Colorless	1.6
Brown, Black, Etc.	0.3
Miscellaneous	0.3
Total number particles	304

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SOIL: 15230

LOCATION COMMENTS: Station 2, St. George Crater. Soil from under a breccia boulder which was rolled over by the crew.

GENERIC SUBSAMPLES:

1. 15231 (233.9 gm): < 1 mm
2. 15232 (5.2 gm): 1-2 mm
3. 15233 (3.8 gm): 2-4 mm
4. 15234 (1.8 gm): 4-10 mm
5. (gm): > 1 cm
6. 15230 (99.1 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 343.8 gm
2. Color:
3. Bag no.: Doc. bag 182
4. Container: Teflon bag; returned in vacuum container (ALSRC #1). Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 71.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 46 um (< 1 mm)
2. M_d: 42.2 um
3.

MAJOR ELEMENTS: (Carron et al., 1972)

	%
SiO_2 :	46.40
TiO_2 :	1.35
Al_2O_3:	17.14
Cr_2O_3:	0.23
FeO :	11.53
MnO :	0.16
MgO :	10.47
CaO :	11.88
Na_2O :	0.41
K_2O :	0.19
P_2O_5 :	0.15
S :	

TRACE ELEMENTS: (Cuttitta et al., 1973)

	ppm		ppm
Sc:	22	La:	28
V :	82	Ce:	
Co:	42	Nd:	
Ni:	315	Sm:	
Ba:	290	Eu:	
Sr:	155	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	6.8
		Lu:	

PETROGRAPHY: (125-250 um)
(Heiken and McKay, 1972-unpublished)

Components	%
Agglutinates	43
Microbreccias:	
Recrystallized	3
Vitric	8
Angular Glass	
Brown	10
Gray	2
Colorless Glass	2
Glass Droplets	
Green	3
Brown	-
Clinopyroxene	8
Orthopyroxene	3
Olivine	1
Plagioclase	7
Orthoclase	2
Basalt	
Equi.	-
Halocryst.	-
Ophitic	5
Anorthosite	1
Opaques	2

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SOIL: 15240

LOCATION COMMENTS: Station 6, Apennine Front. Floor of a small crater with glass in the center. Sample from center of rim. Crater less than 1 m in diameter.

GENERIC SUBSAMPLES:

1. 15241 (197.4 gm): < 1 mm
2. 15242 (18.9 gm): 1-2 mm
3. 15243 (31.8 gm): 2-4 mm
4. 15244 (32.6 gm): 4-10 mm
5.* 15245 (115.5 gm): > 1 cm
6. 15240 (67.1 gm): Reserve

* 89 pieces of glass coated breccias which may not be representative of the soil. Mass not included in soil total.

MISCELLANEOUS:

1. Collected mass:
2. Color:
3. Bag no.:
4. Container: Teflon bag; returned in sample collection bag 3, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 45.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d: 108 um
3.

MAJOR ELEMENTS:

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	
Cr_2O_3:	
FeO :	
MnO :	
MgO :	
CaO :	
Na_2O :	
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS:
(Palme et al., 1978)

	ppm		ppm
Sc:	24.7	La:	27.2
V :		Ce:	71.8
Co:	39.6	Nd:	45
Ni:	270	Sm:	11.65
Ba:	274	Eu:	1.43
Sr:	140	Tb:	2.43
Hf:	9.34	Dy:	15.6
Ta:	1.25	Ho:	3.56
Th:	3.84	Tm:	1.61
U :	0.96	Yb:	9.23
		Lu:	1.26

PETROGRAPHY: (125-250 um)
(Heiken and McKay, 1972-unpublished)

Components	%
Agglutinates	45
Microbreccias:	
Recrystallized	6
Vitric	1
Angular Glass	
Brown	5
Gray	-
Colorless Glass	1
Glass Droplets	
Green	10
Brown	2
Clinopyroxene	9
Orthopyroxene	3
Olivine	7
Feldspar	9
Orthoclase	
Basalt	
Equi.	2
Halocryst.	-
Ophitic	-
Anorthosite	-
Opaques	
Total Number Grains	100

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SOIL: 15250

LOCATION COMMENTS: Station 6, Apennine Front. Surface soil, from rim of crater where sample 15240 was collected.

GENERIC SUBSAMPLES:

1. 15251 (380.9 gm): < 1 mm
2. 15252 (8.3 gm): 1-2 mm
3. 15253 (4.0 gm): 2-4 mm
4. 15254 (1.2 gm): 4-10 mm
5. (gm): > 1 cm
6. 15250 (207.0 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 601.4 gm
2. Color: Light gray (field description)
3. Bag no.: Doc. bag 164
4. Container: Teflon bag; returned in sample collection bag 3, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 75.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d: 56 um
3.

MAJOR ELEMENTS: (Carron et al., 1972)

	%
SiO_2 :	47.02
TiO_2 :	1.49
Al_2O_3:	16.28
Cr_2O_3:	0.30
FeO :	12.00
MnO :	0.16
MgO :	10.31
CaO :	11.25
Na_2O :	0.54
K_2O :	0.22
P_2O_5 :	0.24
S :	

TRACE ELEMENTS: (Cuttitta et al., 1973)

	ppm		ppm
Sc:	24	La:	40
V :	85	Ce:	
Co:	46	Nd:	
Ni:	405	Sm:	
Ba:	340	Eu:	
Sr:	160	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	11
		Lu:	

PETROGRAPHY: (125-250 um)
(Heiken and McKay, 1972-unpublished)

Components	%
Agglutinates	54.0
Microbreccias:	
Recrystallized	4.0
Vitric	2.5
Angular Glass	
Brown	5.5
Gray	0.5
Colorless Glass	-
Glass Droplets	
Green	9.5
Brown	3.5
Clinopyroxene	9.5
Orthopyroxene	1.5
Olivine	2.0
Feldspar	2.5
Orthoclase	
Basalt	
Equi.	2.5
Halocryst.	0.5
Ophitic	2.0
Anorthosite	-
Opaques	
Total Number Grains	200

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SOIL: 15260

LOCATION COMMENTS: Station 6, Apennine Front. Rim of a subdued, 10 m diameter crater. Soil from bottom of an approximately 10 cm deep trench.

GENERIC SUBSAMPLES:

1. 15261 (416.6 gm): < 1 mm
2. 15262 (9.1 gm): 1-2 mm
3. 15263 (6.7 gm): 2-4 mm
4. 15264 (5.9 gm): 4-10 mm
5. (gm): > 1 cm
6. 15260 (172.2 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 610.5 gm
2. Color:
3. Bag no.: Doc. bag 166
4. Container: Teflon bag; returned in sample collection bag 3, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 77.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 76.5 um
2. M_d: 46.3 um
3.

MAJOR ELEMENTS: (Brunfelt et al., 1972)

	%
SiO_2 :	
TiO_2 :	1.40
Al_2O_3:	16.1
Cr_2O_3:	0.36
FeO :	12.09
MnO :	0.16
MgO :	
CaO :	11.89
Na_2O :	0.45
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS: (Duncan et al., 1975)

	ppm		ppm
Sc:		La:	
V :	81	Ce:	
Co:	42	Nd:	
Ni:	250	Sm:	
Ba:	260	Eu:	
Sr:	136	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (125-250 um)
(Heiken and McKay, 1972-unpublished)

Components	%
Agglutinates	50.5
Microbreccias:	
Recrystallized	7.0
Vitric	1.5
Angular Glass	
Brown	5.0
Gray	-
Colorless Glass	0.5
Glass Droplets	
Green	11.5
Brown	2.0
Clinopyroxene	13.0
Orthopyroxene	1.0
Olivine	2.5
Feldspar	-
Orthoclase	
Basalt	
Equi.	-
Halocryst.	1.0
Ophitic	3.0
Anorthosite	0.5
Pyroxenite	0.5
Total Number Grains	200

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SOIL 15261

SOIL: 15270

LOCATION COMMENTS: Station 6, Apennine Front. "Typical" surface soil, collected near the LRV, about 10 m southeast of a 10 m diameter crater.

GENERIC SUBSAMPLES:

1. 15271 (798.3 gm): < 1 mm
2. 15272 (20.7 gm): 1-2 mm
3. 15273 (13.7 gm): 2-4 mm
4. 15274 (4.4 gm): 4-10 mm
5. (gm): > 1 cm
6. 15270 (319.0 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 1156.1 gm
2. Color:
3. Bag no.: Doc. bag 167
4. Container: Teflon bag, returned in sample collection bag 3, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 63.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 94 um
2. M_d: 70.4 um
3.

MAJOR ELEMENTS: (Apollo 15 P.E.T., 1970)

	%
SiO_2	46.70
TiO_2	1.47
Al_2O_3	16.51
Cr_2O_3	0.38
FeO	12.15
MnO	0.16
MgO	10.55
CaO	11.29
Na_2O	0.43
K_2O	0.21
P_2O_5	0.21
S	0.08

TRACE ELEMENTS: (Duncan et al., 1975)

	ppm		ppm
Sc:		La:	
V :	80	Ce:	
Co:	40	Nd:	
Ni:	231	Sm:	
Ba:	265	Eu:	
Sr:	137	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (90-125 um)
(Basu et al., 1981)

Components	%
Monomineralic	39.5
Plagioclase	9.3
Pyroxene	23.7
Olivine	4.2
Opaques	(1.3)
Oxides	1.3
Metal, Sulph.	
Silica Phase	1.0
Crystalline Lithics	10.9
ANT Suite	(0.6)
Anorthosite	0.6
Gabbroic	
Mare Basalt	(6.8)
Oliv.-Bearing	1.3
Oliv.-Free	(4.2)
Microgabbroic	1.0
Porphyritic, Etc.	2.2
Ophitic, Etc.	1.0
Intersertal/ Granular	
Other	1.3
Non-Mare Basalt	(1.9)
Feldspathic	
KREEPy	1.9
Plag-Phyic	
Indeterminate	1.6

Components	%
Breccias	8.9
Vitric	(8.3)
Dark Matrix	8.0
Light Matrix	0.3
Crystalline	(0.6)
Poikilitic	0.3
Melt Matrix	
Other	0.3
Agglutinate	34.6
Glass 6.1	
Ropy/ Clast-Laden	1.6
Quench- Crystals (Vitrophyres)	(0.3)
Green Glass	
Other	0.3
Devitrified (Cryptocry.)	1.0
Crystal/ Clast-Free	(3.2)
Green	0.6
Yellow	1.0
Gray, Colorless	0.6
Brown, Black, Etc.	1.0
Miscellaneous	
Total number particles	312

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SOIL: 15290

LOCATION COMMENTS: Station 6, Apennine Front. Collected 30 m south of a 10 m diameter crater. Surface sample. Collected with a black and white breccia.

GENERIC SUBSAMPLES:

1. 15291 (169.0 gm): < 1 mm
2. 15292 (5.4 gm): 1-2 mm
3. 15293 (6.7 gm): 2-4 mm
4. 15294 (10.2 gm): 4-10 mm
5.* 15295 (947.3 gm): > 1 cm
6. 15290 (55.0 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 246.3 gm
2. Color:
3. Bag no.: Doc. bag 188
4. Container: Teflon bag; returned in sample collection bag 3, in air. Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 63.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 126.0 um
2. M_d: 85.4 um
3.

MAJOR ELEMENTS: (Carron et al., 1972)

	%
SiO_2 :	47.21
TiO_2 :	1.44
Al_2O_3:	16.40
Cr_2O_3:	0.29
FeO :	11.75
MnO :	0.17
MgO :	10.25
CaO :	11.47
Na_2O :	0.53
K_2O :	0.21
P_2O_5 :	0.25
S :	

TRACE ELEMENTS: (Cuttitta et al., 1973)

	ppm		ppm
Sc:	24	La:	42
V :	103	Ce:	
Co:	46	Nd:	
Ni:	300	Sm:	
Ba:	350	Eu:	
Sr:	160	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	12
		Lu:	

PETROGRAPHY: (125-250 um)
(Heiken and McKay, 1972-unpublished)

Components	%
Agglutinates	16.0
Microbreccias:	
Recrystallized	-
Vitric	32.0
Angular Glass	
Brown	5.0
Gray	-
Colorless Glass	-
Glass Droplets	
Green	3.0
Brown	2.0
Clinopyroxene	12.0
Orthopyroxene	-
Olivine	2.0
Feldspar	12.0
Orthoclase	
Basalt	
Equi.	8.0
Halocryst.	-
Ophitic	-
Anorthosite	4.0
Opaques	
Total Number Grains	150

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SOIL 15291

SOIL: 15300

LOCATION COMMENTS: Station 7, Spur Crater. Soil sample collected to accompany the comprehensive sample.

GENERIC SUBSAMPLES:

1. 15301 (810.2 gm): < 1 mm
2. 15302 (23.2 gm): 1-2 mm
3. 15303 (12.7 gm): 2-4 mm
4. 15304 (7.3 gm): 4-10 mm
5.* (140.1 gm): > 1 cm
6. 15300 (390.7 gm): Reserve

* Not included in total mass of soil.
15305 - aggregate of green glass spherules. 15306 - breccia.
15307 - hollow glass sphere.
15308 - breccia.

MISCELLANEOUS:

1. Collected mass: 1244.1 gm
2. Color:
3. Bag no.: Doc. bag 173
4. Container: Teflon bag; returned in sample collection bag 3, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 48.0, submature
2. Agglutinates:

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d: 73.8 um
3.

MAJOR ELEMENTS: (Apollo 15 P.E.T., 1972)

	%
SiO_2	49.91
TiO_2	1.17
Al_2O_3	14.53
Cr_2O_3	
FeO	14.05
MnO	0.19
MgO	12.12
CaO	10.70
Na_2O	0.35
K_2O	0.16
P_2O_5	0.15
S	0.04

TRACE ELEMENTS: (Duncan et al., 1975)

	ppm		ppm
Sc:		La:	
V :	97	Ce:	
Co:	51	Nd:	
Ni:	234	Sm:	
Ba:	190	Eu:	
Sr:	110	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (90-125 um)
(Basu et al., 1981)

Components	%
Monomineralic	13.7
Plagioclase	5.0
Pyroxene	6.8
Olivine	1.9
Opaques	
Oxides	
Metal, Sulph.	
Silica Phase	0.3
Crystalline Lithics	5.4
ANT Suite	(0.9)
Anorthosite	0.6
Gabbroic	0.6
Mare Basalt	(1.8)
Oliv.-Bearing	0.6
Oliv.-Free	(0.9)
Microgabbroic	0.3
Porphyritic, Etc.	0.6
Ophitic, Etc.	
Intersertal/ Granular	
Other	0.3
Non-Mare Basalt	(1.2)
Feldspathic	
KREEPy	1.2
Plag-Phyic	
Indeterminate	1.5

Components	%
Breccias	9.3
Vitric	(7.1)
Dark Matrix	5.6
Light Matrix	1.5
Crystalline	(2.2)
Poikilitic	0.3
Melt Matrix	
Other	1.9
Agglutinate	40.9
Glass	30.0
Ropy/ Clast-Laden	4.0
Quench- Crystals (Vitrophyres)	(1.2)
Green Glass	1.2
Other	
Devitrified (Cryptocry.)	2.2
Crystal/ Clast-Free	(22.6)
Green	19.5
Yellow	1.2
Gray, Colorless	
Brown, Black, Etc.	1.9
Miscellaneous	
Total number particles	323

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SOIL: 15310

LOCATION COMMENTS: Station 7, Spur Crater. Soil in bag with rake sample. Surface soil, collected over an area appproximately 1 m^2. Rim of 100 m, subdued crater.

GENERIC SUBSAMPLES:

1. 15311 (295.0 gm): < 1 mm
2. 15312 (10.1 gm): 1-2 mm
3. 15313 (9.8 gm): 2-4 mm
4. 15314 (8.4 gm): 4-10 mm
5.* (gm): > 1 cm
6. 15310 (140.6 gm): Reserve

* Rake sample. 78 fragments of breccia, basalt, and glass. Might bias soil sample with flakes of these rocks.

MISCELLANEOUS:

1. Collected mass: 463.9 gm
2. Color:
3. Bag no.: Doc. bag 172
4. Container: Teflon bag; returned in sample collection bag 3, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO:
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d: 83 um
3.

MAJOR ELEMENTS:

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	
Cr_2O_3:	
FeO :	
MnO :	
MgO :	
CaO :	
Na_2O :	
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS:

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:		Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (125-250 um) (Heiken and McKay, 1972, unpublished)

Component	%
Glass Droplets, Clear, Pale Green	46.5
Glass Droplets, Yellow-Brown	4.5
Glass Fragments	1.0
Agglutinates	9.0
Microbreccia	6.0
Clinopyroxene	7.5
Orthopyroxene	2.5
Feldspar	3.0
Basalt	5.5
Anorthosite	--
Clastic Rock	1.0
Glass Fragments	1.5
Microbreccia	9.0
Olivine	1.0
Grains Counted	200

SOIL: 15400

LOCATION COMMENTS: Station 6a, 150 m up slope from the base of the Apennine Front, as determined on the photogeologic map. On a 15 degree slope. Collected with a breccia sample from a fillet.

GENERIC SUBSAMPLES:

1. 15401 (86.4 gm): < 1 mm
2. 15402 (4.8 gm): 1-2 mm
3. 15403 (6.1 gm): 2-4 mm
4. 15404 (7.9 gm): 4-10 mm
5.* 15405 (513.1 gm): > 1 cm
6. 15400 (47.5 gm): Reserve

* Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 152.7 gm
2. Color: Gray, with greenish hue (field description)
3. Bag no.: Doc. bag 168
4. Container: Teflon bag; returned in sample collection bag 6, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 5.6, immature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: .33 (< 1 cm); 61 (< 1 mm)
2. M_d:
3.

MAJOR ELEMENTS: (Taylor et al., 1973)

	%
SiO_2 :	45.35
TiO_2 :	0.40
Al_2O_3:	7.52
Cr_2O_3:	0.44
FeO :	20.1
MnO :	0.22
MgO :	17.08
CaO :	8.42
Na_2O :	0.13
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS: (Masuda et al., 1972)

	ppm		ppm
Sc:		La:	19.40
V :		Ce:	51.0
Co:		Nd:	
Ni:		Sm:	31.91
Ba:		Eu:	1.003
Sr:		Tb:	
Hf:		Dy:	12.50
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	6.41
		Lu:	0.952

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SOIL: 15410

LOCATION COMMENTS: Station 7, north rim of Spur Crater. Surface sample, in "rocky" area on crater rim.

GENERIC SUBSAMPLES:

1. 15411 (103.3 gm): < 1 mm
2. 15412 (7.1 gm): 1-2 mm
3. 15413 (6.7 gm): 2-4 mm
4. 15414 (4.0 gm): 4-10 mm
5.* (1143.3 gm): > 1 cm
6. 15410 (56.2 gm): Reserve

* Three breccia samples (15417 to 15419). Not included in mass of soil.

MISCELLANEOUS:

1. Collected mass: 177.3 gm
2. Color:
3. Bag no.: Doc. bag 194
4. Container: Teflon bag; returned in sample collection bag 3, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 43.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:

MAJOR ELEMENTS: (Willis et al., 1972)

	%
SiO_2 :	46.22
TiO_2 :	1.09
Al_2O_3:	15.08
Cr_2O_3:	0.37
FeO :	13.36
MnO :	0.18
MgO :	11.74
CaO :	10.91
Na_2O :	0.36
K_2O :	0.16
P_2O_5 :	0.17
S :	

TRACE ELEMENTS: (Laul & Schmitt, 1973)

	ppm		ppm
Sc:	23	La:	18
V :	103	Ce:	51
Co:	43	Nd:	
Ni:		Sm:	8.4
Ba:	180	Eu:	1.0
Sr:		Tb:	1.5
Hf:	6.4	Dy:	-
Ta:	0.75	Ho:	
Th:	3.0	Tm:	
U :	0.9	Yb:	5.9
		Lu:	0.90

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SOIL: 15420

LOCATION COMMENTS: Station 7, Spur Crater, on the rim. Friable greenish breccia plus soil from around it.

GENERIC SUBSAMPLES:

1. 15421 (254.7 gm): < 1 mm
2. 15422 (15.9 gm): 1-2 mm
3. 15423 (18.3 gm): 2-4 mm
4. 15424 (19.5 gm): 4-10 mm
5.* 15425 (475.8 gm): > 1 cm
   to 15426
6. (0 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 308.4 gm
2. Color: 5GY 5/1 (greenish brown-gray)
3. Bag no.: Doc. bag 195
4. Container: Teflon bag; returned in sample collection bag 3, in air. Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO:
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 96 um
2. M_d:

MAJOR ELEMENTS: (Apollo 15 P.E.T., 1972)

	%
SiO_2 :	45.18
TiO_2 :	1.14
Al_2O_3:	15.06
Cr_2O_3:	0.40
FeO :	13.72
MnO :	0.18
MgO :	12.14
CaO :	11.11
Na_2O :	0.36
K_2O :	0.11
P_2O_5 :	0.09
S :	

TRACE ELEMENTS: (Taylor et al., 1973)

	ppm		ppm
Sc:	0.07	La:	10.2
V :		Ce:	28.0
Co:		Nd:	15.0
Ni:		Sm:	4.3
Ba:	121	Eu:	0.71
Sr:		Tb:	0.87
Hf:	2.68	Dy:	5.7
Ta:		Ho:	1.39
Th:	1.49	Tm:	0.59
U :		Yb:	3.57
		Lu:	0.55

PETROGRAPHY: (125-250 um) (Heiken and McKay, 1972, unpublished)

Component	%
Glass Droplets, Clear, Pale Green	82.0
Glass Droplets, Yellow-Brown	7.3
Glass Fragments	--
Agglutinates	8.4
Microbreccia	0.3
Clinopyroxene	1.3
Orthopyroxene	0.3
Feldspar	0.7
Basalt	--
Anorthosite	--
Clastic Rock	--
Glass Fragments	--
Microbreccia	--
Olivine	--
Grains Counted	200

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SOIL: 15430

LOCATION COMMENTS: Station 7, 5 m inside the north rim of Spur Crater. Clod and soil collected as a surface sample.

GENERIC SUBSAMPLES:

1. 15431 (475.7 gm): < 1 mm
2. 15432 (39.7 gm): 1-2 mm
3. 15433 (31.2 gm): 2-4 mm
4. 15434 (51.6 gm): 4-10 mm
5.* 15435 (206.8 gm): > 1 cm
6. (0 gm): Reserve

* Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 598.2 gm
2. Color:
3. Bag no.: Doc. bag 170
4. Container: Teflon bag; returned in sample collection bag 5, in vacuum container which did not seal (therefore exposed to air). Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 39.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Rose et al., 1975)

	%
SiO_2 :	46.80
TiO_2 :	1.325
Al_2O_3:	16.35
Cr_2O_3:	0.30
FeO :	11.87
MnO :	0.175
MgO :	10.89
CaO :	11.23
Na_2O :	0.495
K_2O :	0.26
P_2O_5 :	0.24
S :	

TRACE ELEMENTS: (Rose et al., 1975)

	ppm		ppm
Sc:	24.5	La:	33.5
V :	57.5	Ce:	
Co:	42	Nd:	
Ni:	209.5	Sm:	
Ba:	383.5	Eu:	
Sr:	123	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
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		Lu:	

Note: Average of two data sets.

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CHEMICAL COMPOSITION OF ROCKS AND SOILS RETURNED BY THE APOLLO 15, 16, AND 17
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THE APOLLO 15 REGOLITH: CHEMICAL MODELING AND MARE/HIGHLAND MIXING
IN PROCEEDINGS OF THE 12th LUNAR AND PLANETARY SCIENCE CONFERENCE
12A, 509-517

SOIL 15431

SOIL: 15470

LOCATION COMMENTS: Station 4, 30 m south of the rim of 450 m diameter Dune Crater.

GENERIC SUBSAMPLES:

1. 15471 (153.0 gm): < 1 mm
2. 15472 (6.1 gm): 1-2 mm
3. 15473 (4.5 gm): 2-4 mm
4. 15474 (4.7 gm): 4-10 mm
5.* 15475 & 15476 (673.1 gm): > 1 cm
6. 15470 (82.2 gm): Reserve

* Two basalt samples. Mass not included in soil sample.

MISCELLANEOUS:

1. Collected mass: 250.5 gm
2. Color:
3. Bag no.: Doc. bag 203
4. Container: Teflon bag; returned in sample collection bag 5, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 34.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d: 63 um
3.

MAJOR ELEMENTS: (Apollo 15 P.E.T., 1972)

	%
SiO_2	46.10
TiO_2	1.58
Al_2O_3	12.91
Cr_2O_3	0.47
FeO	16.24
MnO	0.21
MgO	11.11
CaO	10.42
Na_2O	0.32
K_2O	0.12
P_2O_5	0.12
S	0.07

TRACE ELEMENTS: (Duncan et al., 1975)

	ppm		ppm		ppm
Sc:		La:			
V :	128	Ce:			
Co:	46	Nd:			
Ni:	179	Sm:			
Ba:	165	Eu:			
Sr:	115	Tb:			
Hf:		Dy:			
Ta:		Ho:			
Th:		Tm:			
U :		Yb:			
		Lu:			

PETROGRAPHY: (90-125 um) (Basu et al., 1981)

Components	%
Monomineralic	32.7
Plagioclase	9.6
Pyroxene	20.8
Olivine	2.0
Opaques	(0.3)
Oxides	0.3
Metal, Sulph.	
Silica Phase	
Crystalline Lithics	12.2
ANT Suite	(2.6)
Anorthosite	2.6
Gabbroic	
Mare Basalt	(7.9)
Oliv.-Bearing	3.0
Oliv.-Free	(2.3)
Microgabbroic	0.3
Porphyritic, Etc.	0.7
Ophitic, Etc.	1.3
Intersertal/ Granular	
Other	2.6
Non-Mare Basalt	
Feldspathic	
KREEPy	
Plag-Phyic	
Indeterminate	1.7

Components	%
Breccias	12.2
Vitric	(9.9)
Dark Matrix	9.2
Light Matrix	0.7
Crystalline	(2.3)
Poikilitic	0.7
Melt Matrix	0.3
Other	1.3
Agglutinate	36.0
Glass	6.6
Ropy/ Clast-Laden	2.3
Quench-Crystals (Vitrophyres)	(1.0)
Green Glass	1.0
Other	
Devitrified (Cryptocry.)	0.3
Crystal/ Clast-Free	(3.0)
Green	1.0
Yellow	0.3
Gray, Colorless	1.0
Brown, Black, Etc.	0.7
Miscellaneous	0.3
Total number particles	303

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VOL. 1 P. 1091-1110

SOIL: 15500

LOCATION COMMENTS: Station 9, Scarp Crater. Surface sample collected 10 m from a 10 m diameter fresh crater. Collected with several breccia samples.

GENERIC SUBSAMPLES:

1. 15501 (103.0 gm): < 1 mm
2. 15502 (4.4 gm): 1-2 mm
3. 15503 (3.8 gm): 2-4 mm
4. 15504 (4.1 gm): 4-10 mm
5.* 15505 (1175.6 gm): > 1 cm
   to 15508
6. 15500 (24.8 gm): Reserve

* Not included in mass of soil sample.

MISCELLANEOUS:

1. Collected mass: 140.1 gm
2. Color:
3. Bag no.: Doc. bag 255
4. Container: Teflon bag; returned in sample collection bag 5, in air (ALSRC did not seal). Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 51.0, submature
2. Agglutinates:

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Apollo 15 P.E.T., 1972)

	%
SiO_2	46.21
TiO_2	1.81
Al_2O_3	12.20
Cr_2O_3	0.49
FeO	16.72
MnO	0.22
MgO	10.80
CaO	10.25
Na_2O	0.37
K_2O	0.16
P_2O_5	0.17
S	0.07

TRACE ELEMENTS: (Duncan et al., 1975)

	ppm		ppm
Sc:		La:	
V :	129	Ce:	
Co:	50	Nd:	
Ni:	224	Sm:	
Ba:	220	Eu:	
Sr:		Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (90-125 um) (Basu et al., 1981)

Components	%
Monomineralic	19.5
Plagioclase	4.5
Pyroxene	12.8
Olivine	2.2
Opaques	(0.0)
Oxides	
Metal, Sulph.	
Silica Phase	
Crystalline Lithics	10.5
ANT Suite	(1.9)
Anorthosite	1.3
Gabbroic	0.6
Mare Basalt	(6.4)
Oliv.-Bearing	2.6
Oliv.-Free	(3.2)
Microgabbroic	0.3
Porphyritic, Etc.	1.0
Ophitic, Etc.	1.9
Intersertal/ Granular	
Other	0.6
Non-Mare Basalt	(1.6)
Feldspathic	
KREEPy	1.6
Plag-Phyic	
Indeterminate	0.6

Components	%
Breccias	15.8
Vitric	(13.5)
Dark Matrix	12.5
Light Matrix	1.0
Crystalline	(2.3)
Poikilitic	1.0
Melt Matrix	1.3
Other	0.3
Agglutinate	42.5
Glass	11.5
Ropy/ Clast-Laden	4.8
Quench- Crystals (Vitrophyres)	(1.6)
Green Glass	1.0
Other	0.6
Devitrified (Cryptocry.)	0.3
Crystal/ Clast-Free	(4.8)
Green	1.9
Yellow	1.6
Gray, Colorless	1.0
Brown, Black, Etc.	0.3
Miscellaneous	0.0
Total number particles	313

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SOIL: 15510

LOCATION COMMENTS: Station 9, rim of Scarp Crater (from fresh 10 m diameter crater). Rim of crater is very soft; boots sink in 10 cm. Collected a clod and soil.

GENERIC SUBSAMPLES:

1. 15511 (193.1 gm): < 1 mm
2. 15512 (4.9 gm): 1-2 mm
3. 15513 (4.4 gm): 2-4 mm
4. 15514 (1.1 gm): 4-10 mm
5.* 15515 (144.7 gm): > 1 cm
6. 15510 (72.3 gm): Reserve

* 48 pieces. Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 275.8 gm
2. Color:
3. Bag no.: Doc. bag 273
4. Container: Teflon bag; returned in sample bag 7, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO:
2. Agglutinates:

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d: 56.4 um

MAJOR ELEMENTS: (Laul and Schmitt, 1973)

	%
SiO_2 :	
TiO_2 :	1.90
Al_2O_3:	12.40
Cr_2O_3:	0.45
FeO :	17.40
MnO :	0.22
MgO :	12.00
CaO :	10.00
Na_2O :	0.37
K_2O :	0.14
P_2O_5 :	
S :	

TRACE ELEMENTS: (Duncan et al., 1975)

	ppm		ppm
Sc:		La:	
V :	131	Ce:	
Co:	47	Nd:	
Ni:	197	Sm:	
Ba:	210	Eu:	
Sr:	115	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (125-250 um)
(Heiken and McKay, 1972, unpublished)

Components	%
Agglutinate	53
Clinopyroxene	19.5
Plagioclase	5.0
Glass Spheres, Green	4.5
Glass Spheres, Colorless	3.0
Basalt, Ophitic	3.5
Basalt, Hyalocrystalline	2.5
Microbreccia, Vitric	4.0
Microbreccia, Recrystallized	1.5
Glass Fragments, Brown	1.5
Basalt, Equigranular	1.0
Anorthosite	--
Glass Droplets	--
Grains Counted	200

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APOLLO 15

EXPLANATION FOR STATION MAPS

x or •	Location of sample containers
	LRV, dot shows TV camera
	Large rocks
	Crater rims
ALSEP	Apollo lunar surface experiments package

SOIL: 15530

LOCATION COMMENTS: Station 9a, along the east rim of Hadley Rille. About 15 m from the rille rim. From between "outcrops," collected with 4 basalt samples. Surface soil.

GENERIC SUBSAMPLES:

1. 15531 (136.0 gm): < 1 mm
2. 15532 (6.3 gm): 1-2 mm
3. 15533 (5.4 gm): 2-4 mm
4. 15534 (6.0 gm): 4-10 mm
5.* 15535 (726.1 gm): > 1 cm
   to 15538
6. 15530 (138.0 gm): Reserve

* Four basalt samples. Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 291.7 gm
2. Color:
3. Bag no.: Doc. bag 275
4. Container: Teflon bag; returned in sample collection bag 7, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 27.0, immature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d: 73.6 um

MAJOR ELEMENTS: (Wanke et al., 1973)

	%
SiO_2 :	46.42
TiO_2 :	2.169
Al_2O_3:	9.86
Cr_2O_3:	0.56
FeO :	20.7
MnO :	0.25
MgO :	11.34
CaO :	9.38
Na_2O :	0.31
K_2O :	0.87
P_2O_5 :	
S :	

TRACE ELEMENTS: (Laul et al., 1972)

	ppm		ppm
Sc:	36	La:	
V :	182	Ce:	
Co:	50	Nd:	
Ni:		Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:	4.4	Dy:	
Ta:		Ho:	
Th:	1.8	Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (90-125 um)
(Basu et al., 1981)

Components	%
Monomineralic	44.6
Plagioclase	8.2
Pyroxene	30.1
Olivine	5.6
Opaques	(0.7)
Oxides	0.7
Metal, Sulph.	
Silica Phase	
Crystalline Lithics	20.7
ANT Suite	(1.0)
Anorthosite	0.3
Gabbroic	0.7
Mare Basalt	(10.5)
Oliv.-Bearing	4.9
Oliv.-Free	(3.6)
Microgabbroic	0.3
Porphyritic, Etc.	2.6
Ophitic, Etc.	0.7
Intersertal/ Granular	
Other	2.0
Non-Mare Basalt	(1.0)
Feldspathic	
KREEPy	1.0
Plag-Phyic	
Indeterminate	8.2

Components	%
Breccias	5.8
Vitric	(5.2)
Dark Matrix	5.2
Light Matrix	
Crystalline	(0.6)
Poikilitic	0.3
Melt Matrix	0.3
Other	
Agglutinate	23.2
Glass	5.2
Ropy/ Clast-Laden	1.6
Quench- Crystals (Vitrophyres)	
Green Glass	
Other	
Devitrified (Cryptocry.)	2.3
Crystal/ Clast-Free	(1.3)
Green	
Yellow	0.3
Gray, Colorless	0.7
Brown, Black, Etc.	0.3
Miscellaneous	0.7
Total number particles	306

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SOIL: 15600

LOCATION COMMENTS: Station 9a, near Hadley Rille. Comprehensive soil to accompany rake sample. Collected 20 m from the rille rim.

GENERIC SUBSAMPLES:

1. 15601 (802.0 gm): < 1 mm
2. 15602 (32.9 gm): 1-2 mm
3. 15603 (25.5 gm): 2-4 mm
4. 15604 (21.5 gm): 4-10 mm
5.* (34.8 gm): > 1 cm
6. (412.0 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 1467.6 gm
2. Color:
3. Bag no.: Doc. bag 283
4. Container: Teflon bag; returned in sample collection bag 7, in air. Processed in N_2.

* Six basalt samples (15605 to 15610).

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 29.0, immature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d: 77 um
3.

MAJOR ELEMENTS: (Apollo 15 P.E.T., 1972)

	%
SiO_2	45.05
TiO_2	1.98
Al_2O_3	10.20
Cr_2O_3	0.56
FeO	19.79
MnO	0.26
MgO	10.89
CaO	9.87
Na_2O	0.29
K_2O	0.10
P_2O_5	0.11
S	0.06

TRACE ELEMENTS: (Brunfelt et al., 1972)

	ppm		ppm
Sc:	35.1	La:	11.3
V :	200	Ce:	29
Co:	48.9	Nd:	
Ni:		Sm:	6.3
Ba:	135	Eu:	1.01
Sr:		Tb:	1.33
Hf:	4.9	Dy:	9.7
Ta:	0.60	Ho:	1.0
Th:	1.52	Tm:	
U :	0.46	Yb:	5.2
Ni:	170	Lu:	0.9
CU:	6.4		

PETROGRAPHY: (90-125 um) (Basu et al., 1980)

Components	%
Monomineralic	39.7
Plagioclase	7.5
Pyroxene	27.2
Olivine	4.3
Opaques	(0.7)
Oxides	0.7
Metal, Sulph.	-
Silica Phase	-
Crystalline Lithics	15.7
ANT Suite	(0.3)
Anorthosite	-
Gabbroic	0.3
Mare Basalt	(8.6)
Oliv.-Bearing	3.6
Oliv.-Free	(2.7)
Microgabbroic	0.7
Porphyritic, Etc.	1.3
Ophitic, Etc.	0.7
Intersertal/ Granular	-
Other	2.3
Non-Mare Basalt	(0.7)
Feldspathic	-
KREEPy	0.7
Plag-Phyic	-
Indeterminate	6.2

Components	%
Breccias	4.9
Vitric	(4.6)
Dark Matrix	4.3
Light Matrix	0.3
Crystalline	(0.3)
Poikilitic	-
Melt Matrix	-
Other	0.3
Agglutinate	32.1
Glass	7.5
Ropy/ Clast-Laden	2.0
Quench-Crystals (Vitrophyres)	(1.6)
Green Glass	0.3
Other	1.3
Devitrified (Cryptocry.)	2.3
Crystal/ Clast-Free	(2.0)
Green	1.0
Yellow	1.0
Gray, Colorless	-
Brown, Black, Etc.	-
Miscellaneous	-
Total number particles	305

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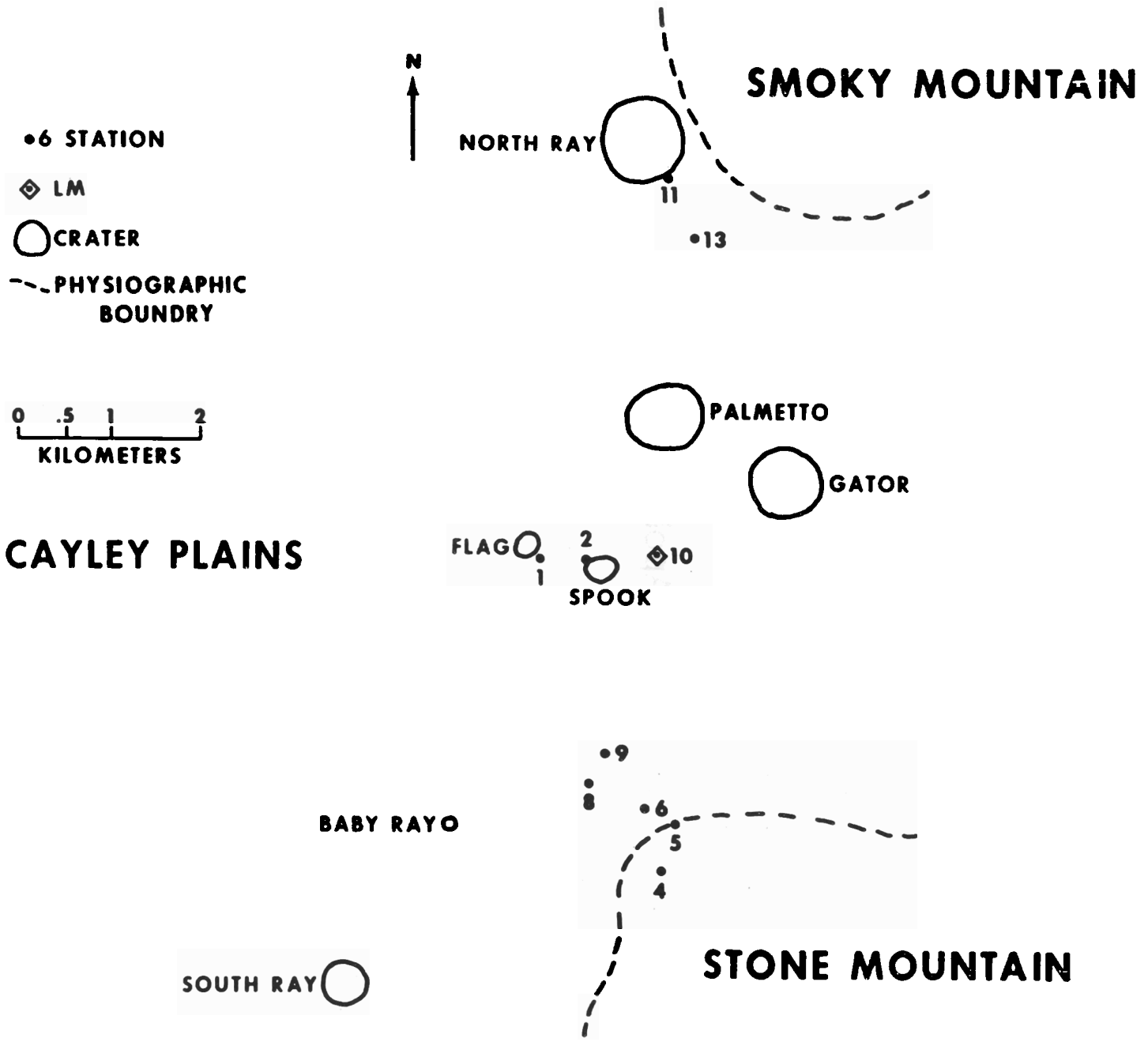
•6 STATION
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CRATER
PHYSIOGRAPHIC BOUNDRY
0 .5 1 2
KILOMETERS
N
SMOKY MOUNTAIN
NORTH RAY
11
•13
PALMETTO
GATOR
CAYLEY PLAINS
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10
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8
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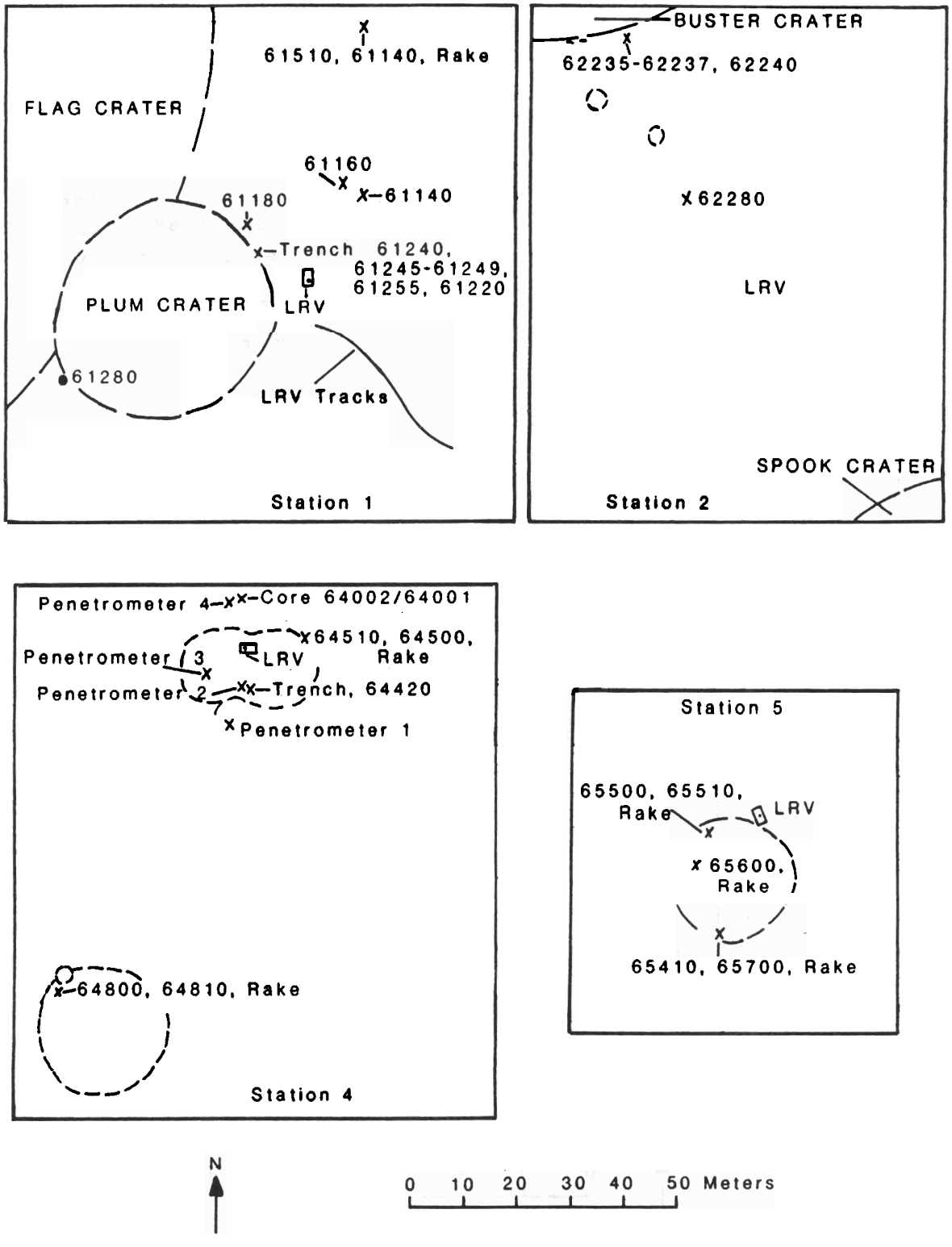
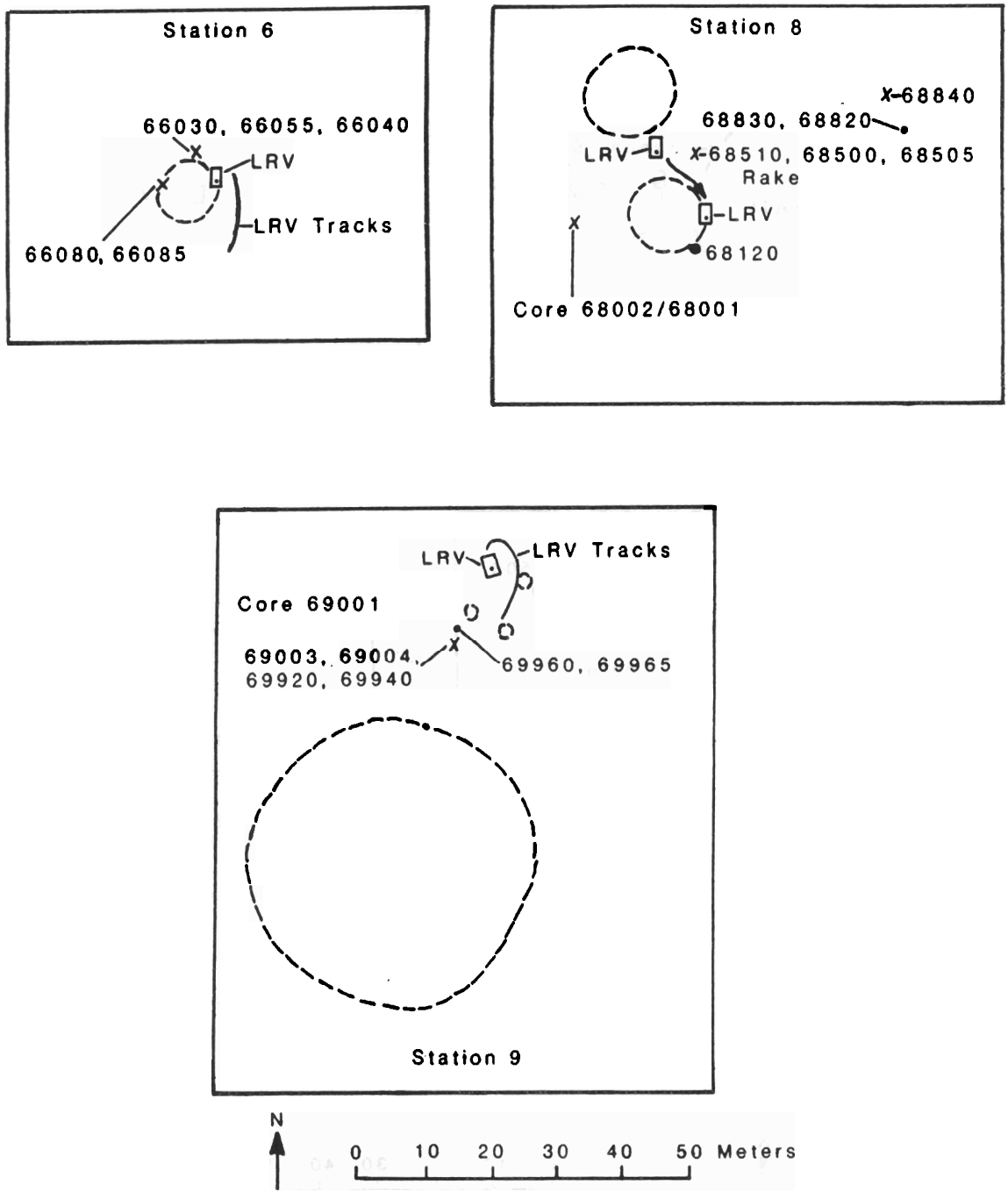
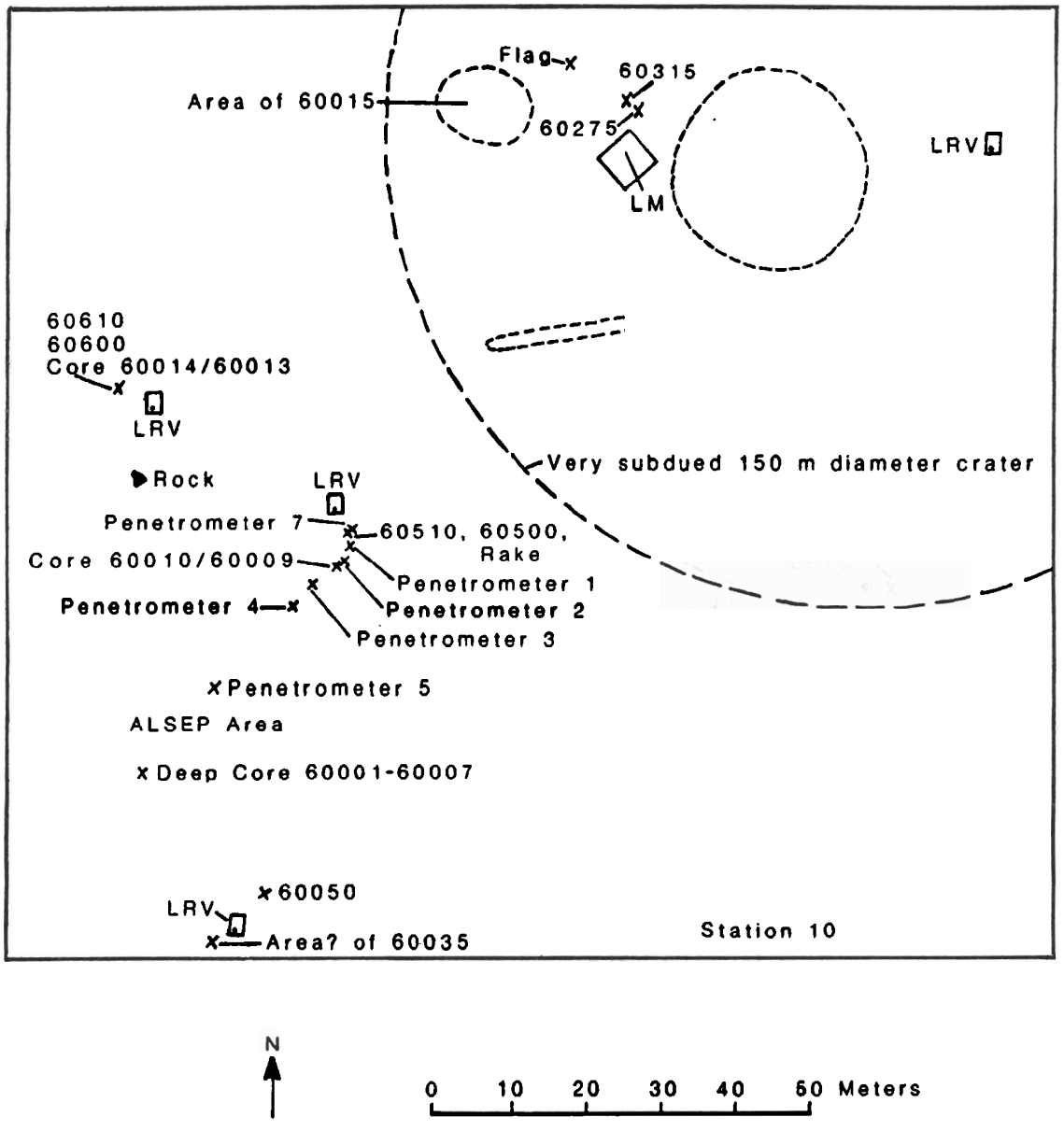
4
BABY RAYO
SOUTH RAY
STONE MOUNTAIN



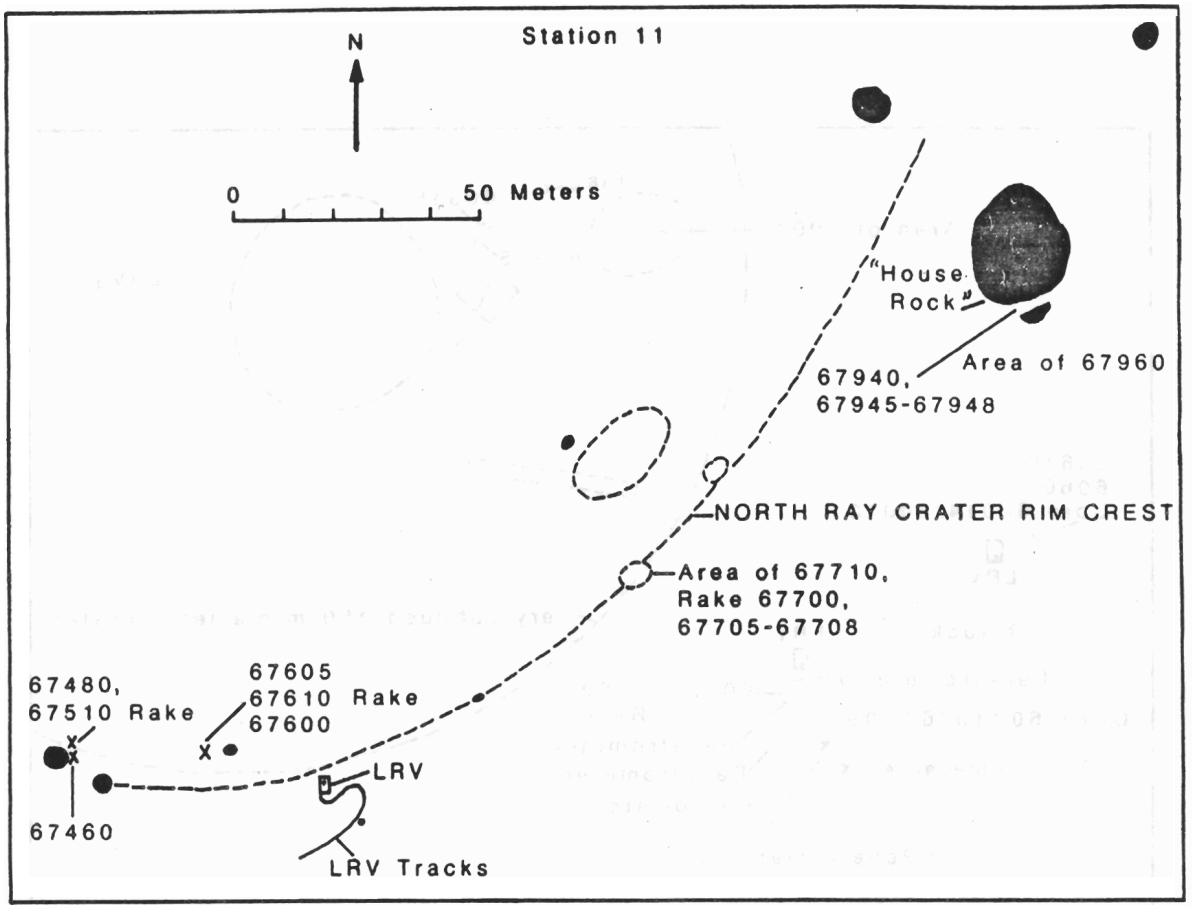
Station 1, 2, 4, & 5 Maps Showing Sample Collection Sites.
Modified from U.S. Geological Survey Interagency Report 51.

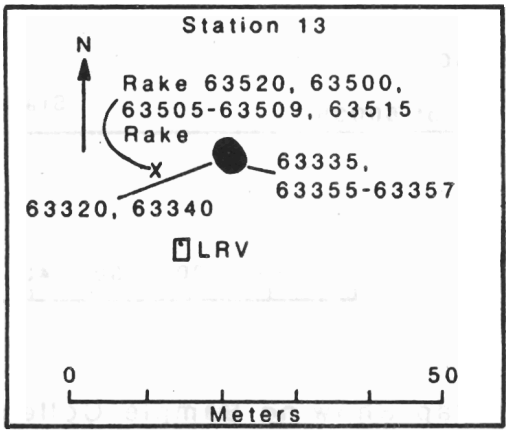


Station 6, 8, & 9 Maps Showing Sample Collection Sites.
Modified from U.S. Geological Survey Interagency Report 51.



Station 10 Map Showing Sample Collection Sites.
Modified from U.S. Geological Survey Interagency Report 51.





Station 11 & 13 Maps Showing Sample Collection Sites.
Modified from U. S. Geological Survey Interagency Report 51.

APOLLO 16

EXPLANATION FOR STATION MAPS

x or •	Location of sample containers
	LRV, dot shows TV camera
	Large rocks
	Crater rims
ALSEP	Apollo lunar surface experiments package

SOIL: 60050

LOCATION COMMENTS: Station 10 - ALSEP 170 m south - southwest of LM and 50 m south-southeast of ALSEP control station. Probably ejecta from a 5 m diameter, subdued crater.

GENERIC SUBSAMPLES:

1. 60051 (195.3 gm): < 1 mm
2. 60052 (11.43 gm): 1-2 mm
3. 60053 (7.41 gm): 2-4 mm
4. 60054 (8.4 gm): 4-10 mm
5.* 60055 to 60059 (57.82 gm): > 1 cm
6. 60050 (3.27 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 225.8 gm
2. Color: 5Y 5/1 (med. olive gray)
3. Bag no.: Doc. bag 355
4. Container: Teflon bag; returned in unsealed vacuum container, in air. Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 57.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 86 um (< 1 mm)
2. M_d:
3.

PETROGRAPHY: (1-2 mm)
(Simkin et al., 1973)

Components	%
Breccia	40
Agglutinate	9
Glassy	6
Plagioclase	20
Anorthosite	13
Basaltic	12

MAJOR ELEMENTS:
(Simkin et al., 1973)

	%
SiO_2 :	44.8
TiO_2 :	0.44
Al_2O_3:	28.5
Cr_2O_3:	
FeO :	4.5
MnO :	0.04
MgO :	5.05
CaO :	16.2
Na_2O :	0.46
K_2O :	0.14
P_2O_5 :	
S :	

TRACE ELEMENTS:
(Korotev, 1982)

	ppm		ppm
Sc:	7.83	La:	10.06
V :	19	Ce:	27.0
Co:	21.3	Nd:	
Ni:	250	Sm:	4.88
Ba:	108	Eu:	1.119
Sr:	165	Tb:	1.04
Hf:	3.89	Dy:	
Ta:	0.526	Ho:	
Th:	1.76	Tm:	
U :	0.46	Yb:	3.42
		Lu:	0.501

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SOIL: 60500

LOCATION COMMENTS: Station 10 - ALSEP - Surface (rake) soil. Approximately 100 m southwest of LM.

GENERIC SUBSAMPLES:

1. 60501 (433.8 gm): < 1 mm
2. 60502 (17.69 gm): 1-2 mm
3. 60503 (9.94 gm): 2-4 mm
4. 60504 (6.63 gm): 4-10 mm
5. (gm): > 1 cm
6. 60500 (234.4 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 702.46 gm
2. Color:
3. Bag no.: Doc. bag 350
4. Container: Teflon bag; returned in sample collection bag 4, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 80.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:

MAJOR ELEMENTS: (Duncan et al., 1973)

	%
SiO_2 :	45.63
TiO_2 :	0.59
Al_2O_3:	27.14
Cr_2O_3:	
FeO :	5.44
MnO :	0.70
MgO :	5.52
CaO :	15.44
Na_2O :	0.40
K_2O :	0.114
P_2O_5 :	0.14
S :	

TRACE ELEMENTS: (Rose et al., 1975)

	ppm		ppm
Sc:	8.8	La:	<10
V :	14	Ce:	
Co:	37	Nd:	
Ni:	720	Sm:	
Ba:	143	Eu:	
Sr:	121	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	4.4
		Lu:	

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CLUES TO PROCESSES OF EARLY LUNAR CRUSTAL EVOLUTION
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VOL. 2 P. 1823-1844

SOIL: 60600

LOCATION COMMENTS: Station 10 - ALSEP. Surface rake soil about 65 m southwest of LM. Lead surface.

GENERIC SUBSAMPLES:

1. 60601 (330.2 gm): < 1 mm
2. 60602 (14.93 gm): 1-2 mm
3. 60603 (8.57 gm): 2-4 mm
4. 60604 (3.94 gm): 4-10 mm
5. (gm): > 1 cm
6. 60600 (182.6 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 540.24 gm
2. Color: N4 (med. dark gray)
3. Bag no.: Doc. bag 348
4. Container: Teflon bag; returned in sample collection bag 4, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 85.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

PETROGRAPHY: (1-2 mm)
(Taylor et al., 1973)

Components	%
Agglutinates	12.2
Anorthosite	13.3
Breccia	23.5
Feldspathic Basalt	5.1
Glass	12.2
Light Colored Breccia	1.0
Poikolitic Rock	22.4
Troc. Spinel	10.2

MAJOR ELEMENTS:
(Apollo 16 P.E.T.)

	%
SiO_2 :	45.35
TiO_2 :	0.60
Al_2O_3:	26.75
Cr_2O_3:	
FeO :	5.49
MnO :	0.07
MgO :	6.27
CaO :	15.46
Na_2O :	0.38
K_2O :	0.11
P_2O_5 :	0.13
S :	0.07

TRACE ELEMENTS:
(Haskins et al., 1973)

	ppm		ppm
Sc:	9.22	La:	12.5
V :		Ce:	32.6
Co:	31.4	Nd:	21.1
Ni:	-	Sm:	3.9
Ba:		Eu:	1.13
Sr:		Tb:	1.22
Hf:	4.6	Dy:	8.02
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	3.99
		Lu:	0.58

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DETERMINATION OF NATURAL AND COSMIC RAY INDUCED RADIONUCLIDES IN APOLLO 16 LUNA SAMPLES
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22NA-26AL STUDIES OF LUNAR REGOLITH
PROCEEDINGS OF THE SIXTH LUNAR SCIENCE CONFERENCE
VOL. 2 P. 1823-1844

SOIL: 61140

LOCATION COMMENTS: Station 1, Plum Crater. Located 35 m northeast of Plum Crater (3/4 crater diameter). Part of radial sample. Surface sample.

GENERIC SUBSAMPLES:

1. 61141 (134.7 gm): < 1 mm
2. 61142 (9.43 gm): 1-2 mm
3. 61143 (5.38 gm): 2-4 mm
4. 61144 (5.71 gm): 4-10 mm
5. (gm): > 1 cm
6. 61140 (74.13 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 229.3 gm
2. Color: 5YR 5/1 (Med. brownish gray)
3. Bag no.: Doc. bag 363
4. Container: Teflon bag; returned in unsealed vacuum container (ALSRC #1), in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 56.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 78 um (< 1 mm)
2. M_d:

MAJOR ELEMENTS: (Rose et al., 1973)

	%
SiO_2 :	45.20
TiO_2 :	0.58
Al_2O_3:	26.40
Cr_2O_3:	0.13
FeO :	5.29
MnO :	0.70
MgO :	6.10
CaO :	15.32
Na_2O :	0.52
K_2O :	0.14
P_2O_5 :	0.12
S :	

TRACE ELEMENTS: (Rose et al., 1973)

	ppm		ppm
Sc:	9.5	La:	-
V :	20	Ce:	
Co:		Nd:	
Ni:	310	Sm:	
Ba:	120	Eu:	
Sr:	165	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	2.6
		Lu:	

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P. 631

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+ SPETTEL,B. + TESCHKE,F.
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22NA-26AL STUDIES OF LUNAR REGOLITH
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SOIL: 61160

LOCATION COMMENTS: Surface sample, collected 20 m northeast of the rim of Plum Crater. Loosely compated, gray soil.

GENERIC SUBSAMPLES:

1. 61161 (90.0 gm): < 1 mm
2. 61162 (5.12 gm): 1-2 mm
3. 61163 (3.6 gm): 2-4 mm
4. 61164 (2.16 gm): 4-10 mm
5. (gm): > 1 cm
6. 61160 (52.79 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 153.67
2. Color: N7 to 5YR 7/1 (light gray to pinkish gray)
3. Bag no.: Doc. bag 356
4. Container: Teflon bag; returned in unsealed vacuum container (ALSRC #1), in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 82.0, mature
2. Agglutinates: 36
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 89 um
2. M_d: 74.3 um

MAJOR ELEMENTS:
(Wanke et al., 1973)

	%
SiO_2 :	44.71
TiO_2 :	0.58
Al_2O_3:	26.26
Cr_2O_3:	0.98
FeO :	5.25
MnO :	0.65
MgO :	6.35
CaO :	16.23
Na_2O :	0.43
K_2O :	0.10
P_2O_5 :	
S :	

TRACE ELEMENTS:
(Korotev, 1981)

	ppm		ppm
Sc:	9.4	La:	11.9
V :		Ce:	32
Co:	22.2	Nd:	
Ni:	305	Sm:	5.6
Ba:		Eu:	1.20
Sr:		Tb:	1.27
Hf:	4.2	Dy:	
Ta:	0.6	Ho:	
Th:	1.8	Tm:	
U :		Yb:	3.9
		Lu:	0.56

PETROGRAPHY: (90-150 um)
(Heiken et al., 1973)

Components	%
Breccias	
Low-Grade Brown	4.7
Low-Grade Colorless	13.6
Med-Grade	15.0
High-Grade	-
Anorthosite	2
Cataclastic Anorthosite	2.7
Agglutinates	37.0
Feldspar	14.7
Orthopyroxene	1.3
Clinopyroxene	1.3
Glass:	
Colorless	-
Brown	3.1
Maskelynite	0.7
Gray Schlieren	0.3
Green	Tr.
Olivine	-
Basalt	0.3
Norite	Tr.
Anorth. Gabbro	0.7
Spinel	-
Total Number Grains	300

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VOL. 2 P. 1823-1844

SOIL: 61180

LOCATION COMMENTS: Surface sample, collected on the northeast rim of Plum Crater, from the rim of a 10 cm diameter crater. Part of a radial sample (second out of the crater rim).

GENERIC SUBSAMPLES:

1. 61181 (156.2 gm): < 1 mm
2. 61182 (9.43 gm): 1-2 mm
3. 61183 (6.23 gm): 2-4 mm
4. 61184 (6.09 gm): 4-10 mm
5. (gm): > 1 cm
6. 61180 (93.4 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 271.35 gm
2. Color: 5Y 5/1 (med. olive gray)
3. Bag no.: Doc. bag 369
4. Container: Teflon bag; returned in unsealed vacuum container (ALSRC #1), in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 82.0, mature
2. Agglutinates: 38
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 94 um (< 1 cm); 64 um (< 1 mm)
2. M_d: 82 um
3.

MAJOR ELEMENTS:
(Taylor et al., 1973)

	%
SiO_2 :	44.60
TiO_2 :	0.66
Al_2O_3:	27.10
Cr_2O_3:	0.12
FeO :	5.47
MnO :	
MgO :	5.78
CaO :	15.56
Na_2O :	0.51
K_2O :	0.25
P_2O_5 :	0.18
S :	

TRACE ELEMENTS:
(Korotev, 1982)

	ppm		ppm
Sc:	9.26	La:	12.43
V :	21	Ce:	33.9
Co:	31.5	Nd:	
Ni:	435	Sm:	5.92
Ba:	139	Eu:	1.185
Sr:	180	Tb:	1.28
Hf:	4.69	Dy:	
Ta:	0.654	Ho:	
Th:	2.09	Tm:	
U :	0.54	Yb:	4.17
		Lu:	0.593

PETROGRAPHY: (90-150 um)
(Heiken et al., 1973)

Components	%
Breccias	
Low-Grade Brown	6.3
Low-Grade Colorless	7.3
Med-Grade	12.0
High-Grade	0.3
Anorthosite	2.0
Cataclastic Anorthosite	2.3
Agglutinates	59.6
Feldspar	5.3
Orthopyroxene	0.6
Clinopyroxene	0.3
Glass:	
Colorless	0.6
Brown	-
Maskelynite	1.6
Gray	
Schlieren	
Green	-
Olivine	-
Basalt	0.6
Norite	-
Anorth. Gabbro	0.9
Spinel	-
Total Number Grains	300

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VOL. 2 P. 1823-1844

SOIL: 61220

LOCATION COMMENTS: Station 1, trench on rim of Plum Crater. Soil from bottom, probably less than 30 cm deep. (The total depth is not certain.) Is lighter in color than surface.

GENERIC SUBSAMPLES:

1. 61221 (61.0 gm): < 1 mm
2. 61222 (6.36 gm): 1-2 mm
3. 61223 (9.61 gm): 2-4 mm
4. 61224 (10.58 gm): 4-10 mm
5.* 61225 (5.05 gm): > 1 cm
   to 61226
6. 61220 (191.6 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 279.15 gm
2. Color: 5Y 6/1 (light olive gray)
3. Bag no.: Doc. bag 357
4. Container: Teflon bag; returned in unsealed vacuum container (ALSRC #1), in air. Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 9.2, immature
2. Agglutinates: 6
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 216 um (< 1 cm); 68 um (< 1 mm)
2. M_d: 234 um
3.

MAJOR ELEMENTS: (Apollo 16 P.E.T., 1973)

	%
SiO_2 :	45.35
TiO_2 :	0.49
Al_2O_3:	28.25
Cr_2O_3:	
FeO :	4.55
MnO :	0.06
MgO :	5.02
CaO :	16.21
Na_2O :	0.42
K_2O :	0.09
P_2O_5 :	0.10
S :	0.06

TRACE ELEMENTS: (Haskin et al., 1973)

	ppm		ppm
Sc:	7.0	La:	9.1
V :		Ce:	22.7
Co:	17.0	Nd:	14.5
Ni:	-	Sm:	4.35
Ba:		Eu:	1.28
Sr:		Tb:	0.90
Hf:	3.0	Dy:	5.76
Ta:		Ho:	1.1
Th:		Tm:	
U :		Yb:	3.01
		Lu:	0.44

PETROGRAPHY: (90-150 um) (Heiken et al., 1973)

Components	%
Breccias	
Low-Grade Brown	5.6
Low-Grade Colorless	10.0
Med-Grade	17.3
High-Grade	1.0
Anorthosite	8.3
Cataclastic Anorthosite	5.3
Agglutinates	6.3
Feldspar	17.0
Orthopyroxene	1.6
Clinopyroxene	3.0
Glass:	
Colorless	10.9
Brown	1.3
Maskelynite	7.6
Gray	
Schlieren	
Green	
Olivine	-
Basalt	0.6
Norite	2.0
Anorth. Gabbro	0.3
Spinel	
Total Number Grains	300

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SOIL: 61240

LOCATION COMMENTS: Top layer from a trench dug on the northeast rim of Plum Crater.

GENERIC SUBSAMPLES:

1. 61241 (247.1 gm): < 1 mm
2. 61242 (17.26 gm): 1-2 mm
3. 61243 (13.8 gm): 2-4 mm
4. 61244 (13.25 gm): 4-10 mm
5.* 61245 (20.8 gm): > 1 cm
   to 61255
6. 61240 (160.8 gm): Reserve

* Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 452.2 gm
2. Color: 5Y 4/1 (olive gray)
3. Bag no.: Doc. bag 352
4. Container: Teflon bag; returned in unsealed vacuum container (ALSRC #1), in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 47.0, submature
2. Agglutinates: 27
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 120 um (< 1 cm); 72 um (< 1 mm)
2. M_d: 119 um

MAJOR ELEMENTS: (Apollo 16 P.E.T., 1973)

	%
SiO_2 :	45.32
TiO_2 :	0.57
Al_2O_3:	27.15
Cr_2O_3:	
FeO :	5.33
MnO :	0.07
MgO :	5.75
CaO :	15.69
Na_2O :	0.55
K_2O :	0.10
P_2O_5 :	0.13
S :	0.07

TRACE ELEMENTS: (Boynton et al., 1976)

	ppm		ppm
Sc:	9.1	La:	11.8
V :	18	Ce:	30
Co:	22.8	Nd:	
Ni:		Sm:	5.0
Ba:	130	Eu:	1.10
Sr:		Tb:	1.1
Hf:	3.3	Dy:	5.6
Ta:	0.4	Ho:	
Th:	1.8	Tm:	
U :	0.55	Yb:	3.8
		Lu:	0.50

PETROGRAPHY: (90-150 um)
(Heiken et al., 1973)

Components	%
Breccias	
Low-Grade Brown	9.2
Low-Grade Colorless	18.3
Med-Grade	10.0
High-Grade	-
Anorthosite	3.0
Cataclastic Anorthosite	2.0
Agglutinates	27.1
Feldspar	12.3
Orthopyroxene	2.0
Clinopyroxene	2.0
Glass:	
Colorless	-
Brown	3.3
Maskelynite	7.6
Gray Schlieren	0.3
Green	-
Olivine	-
Basalt	2.3
Norite	-
Anorth. Gabbro	0.3
Spinel	-
Total Number Grains	300

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SOIL: 61280

LOCATION COMMENTS: Southeast rim of Flag Crater, located in the southwest rim of Plum Crater. Sample of fillet around breccia boulder.

GENERIC SUBSAMPLES:

1. 61281 (169.6 gm): < 1 mm
2. 61282 (10.20 gm): 1-2 mm
3. 61283 (6.74 gm): 2-4 mm
4. 61284 (3.48 gm): 4-10 mm
5. (gm): > 1 cm
6. 61280 (68.49 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 258.5 gm
2. Color: 5Y 5/1 (med. olive gray)
3. Bag no.: Doc. bag 368
4. Container: Teflon bag; returned in unsealed vacuum container (ALSRC #1), in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 69.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Rose et al., 1973)

	%
SiO_2 :	44.65
TiO_2 :	0.54
Al_2O_3:	27.12
Cr_2O_3:	
FeO :	5.07
MnO :	0.6
MgO :	
CaO :	16.00
Na_2O :	0.45
K_2O :	0.13
P_2O_5 :	
S :	

TRACE ELEMENTS: (Rose et al., 1973)

	ppm		ppm
Sc:	11.5	La:	-
V :	27	Ce:	
Co:	26	Nd:	
Ni:	440	Sm:	
Ba:	115	Eu:	
Sr:	135	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	3.3
		Lu:	

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SOIL: 67510

LOCATION COMMENTS: Station 11, on the rim of North Ray Crater. Soil collected with a rake sample, within a few meters of several white breccia boulders, along with samples 67460 and 67480.

GENERIC SUBSAMPLES:

1. 67511 (59.5 gm): < 1 mm
2. 67512 (14.46 gm): 1-2 mm
3. 67513 (19.39 gm): 2-4 mm
4. 67514 (31.03 gm): 4-10 mm
5.* 67515 (260.0 gm): > 1 cm
   to 67576
6. 67510 (9.22 gm): Reserve

* 32 rocks; not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 133.6 gm
2. Color:
3. Bag no.: Doc. bag 420
4. Container: Teflon bag; returned in sample collection bag 6, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 8.8, immature
2. Agglutinates:

GRAIN SIZE PARAMETERS:

1. M_z: Probably too biased by rake sample
2. M_d: collection held in same bag for a
3. dependable analysis.

MAJOR ELEMENTS: (Korotev, 1982)

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	28.6
Cr_2O_3:	
FeO :	4.10
MnO :	
MgO :	4.0
CaO :	15.7
Na_2O :	0.390
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS: (Korotev, 1982)

	ppm		ppm
Sc:	8.18	La:	3.42
V :	<20	Ce:	9.24
Co:	7.18	Nd:	
Ni:	55	Sm:	1.71
Ba:	45	Eu:	0.968
Sr:	155	Tb:	0.39
Hf:	1.24	Dy:	
Ta:	0.192	Ho:	
Th:	0.51	Tm:	
U :	0.158	Yb:	1.34
Cr:	500	Lu:	0.191
Mn:	493		

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SOIL: 61500

LOCATION COMMENTS: Station 1, 20 m east of Flag Crater. Part 2 of a radial sample, about 1/3 crater diameter from Plum Crater. Surface sample.

GENERIC SUBSAMPLES:

1. 61501 (466.9 gm): < 1 mm
2. 61502 (27.43 gm): 1-2 mm
3. 61503 (20.8 gm): 2-4 mm
4. 61504 (12.70 gm): 4-10 mm
5.* 61505 (1.65 gm): > 1 cm
6. 61500 (267.8 gm): Reserve

* Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 749.9 gm
2. Color: 5Y 5/2 (olive gray)
3. Bag no.: Doc. bag 354
4. Container: Teflon bag; returned in unsealed vacuum container (ALSRC #1), in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 53.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 84 um (< 1 mm)
2. M_d:
3.

MAJOR ELEMENTS: (Apollo 16 P.E.T., 1973)

	%
SiO_2 :	44.66
TiO_2 :	0.56
Al_2O_3:	26.50
Cr_2O_3:	
FeO :	5.31
MnO :	0.07
MgO :	6.08
CaO :	15.33
Na_2O :	0.41
K_2O :	0.11
P_2O_5 :	0.11
S :	0.08

TRACE ELEMENTS: (Boynton et al., 1975)

	ppm		ppm
Sc:	10.0	La:	12.1
V :		Ce:	36
Co:	35	Nd:	
Ni:		Sm:	-
Ba:	160	Eu:	1.22
Sr:		Tb:	1.2
Hf:	4.3	Dy:	9.1
Ta:	0.56	Ho:	
Th:	2.2	Tm:	
U :		Yb:	4.2
		Lu:	0.69

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VOL. 2 P. 2231-2248

SOIL: 62230

LOCATION COMMENTS: Station 2, southeast rim of Buster Crater. Surface sample, collected with 4 rock samples.

GENERIC SUBSAMPLES:

1. 62231 (86.74 gm): < 1 mm
2. 62232 (6.96 gm): 1-2 mm
3. 62233 (5.32 gm): 2-4 mm
4. 62234 (8.46 gm): 4-10 mm
5. 62235 (440.8 gm): > 1 cm
   to 62238
6. 62230 (4.64 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 112.12 gm
2. Color:
3. Bag no.: Doc. bag 005
4. Container: Teflon bag; returned in unsealed vacuum (ALSRC #1), in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 91.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Korotev, 1982)

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	26.5
Cr_2O_3:	
FeO :	5.60
MnO :	
MgO :	6.4
CaO :	14.5
Na_2O :	0.444
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS: (Korotev, 1982)

	ppm		ppm
Sc:	9.28	La:	11.00
V :	22	Ce:	29.7
Co:	35.3	Nd:	
Ni:	485	Sm:	5.29
Ba:	129	Eu:	1.129
Sr:	165	Tb:	1.13
Hf:	4.17	Dy:	
Ta:	0.527	Ho:	
Th:	1.98	Tm:	
U :	0.48	Yb:	3.70
Cr:	731	Lu:	0.518
Mn:	566		

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VOL. 2 P. 1823-1844

SOIL: 62240

LOCATION COMMENTS: Station 2, southeast rim of Buster Crater. Collected along with 62230. Surface sample.

GENERIC SUBSAMPLES:

1. 62241 (243.4 gm): < 1 mm
2. 62242 (21.74 gm): 1-2 mm
3. 62243 (19.6 gm): 2-4 mm
4. 62244 (16.37 gm): 4-10 mm
5.* 62245 (15.75 gm): > 1 cm
   to 62249
6. 62240 (162.4 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 463.5 gm
2. Color: 5Y 5/1 (med. olive gray)
3. Bag no.: Doc. bag 006
4. Container: Teflon bag; returned in unsealed vacuum container (ALSRC #1), in air. Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 100.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Rose et al., 1973)

	%
SiO_2 :	44.65
TiO_2 :	0.56
Al_2O_3:	27.00
Cr_2O_3:	
FeO :	5.49
MnO :	0.7
MgO :	5.84
CaO :	15.95
Na_2O :	0.44
K_2O :	0.13
P_2O_5 :	0.10
S :	

TRACE ELEMENTS: (Boynton, et al., 1976)

	ppm		ppm
Sc:	9.7	La:	12.0
V :	21	Ce:	32
Co:	25.1	Nd:	
Ni:		Sm:	5.4
Ba:	130	Eu:	1.07
Sr:		Tb:	1.1
Hf:	3.2	Dy:	6.5
Ta:	0.5	Ho:	
Th:	1.9	Tm:	
U :	0.54	Yb:	3.6
		Lu:	0.49

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SOIL: 62280

LOCATION COMMENTS: Station 2, 45 m southeast of the rim of Buster Crater. Surface soil collected within a few meters of a 4 m diameter crater.

GENERIC SUBSAMPLES:

1. 62281 (218.5 gm): < 1 mm
2. 62282 (21.71 gm): 1-2 mm
3. 62283 (13.11 gm): 2-4 mm
4. 62284 (14.3 gm): 4-10 mm
5.* 62285 (11.99 gm): > 1 cm
   to 62289
6. 62280 (143.0 gm): Reserve

* Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 410.6 gm
2. Color: 5Y 6/1 (light olive gray)
3. Bag no.: Doc. bag 011
4. Container: Teflon bag; returned in unsealed vacuum container (ALSRC #1), in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 76.0, mature
2. Agglutinates: 40
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 134 um (< 1 cm); 70 um (< 1 mm)
2. M_d: 125 um
3.

MAJOR ELEMENTS: (Laul and Schmitt, 1973)

	%
SiO_2 :	
TiO_2 :	0.60
Al_2O_3:	26.70
Cr_2O_3:	0.11
FeO :	5.50
MnO :	0.67
MgO :	6.6
CaO :	15.90
Na_2O :	0.47
K_2O :	0.12
P_2O_5 :	
S :	

TRACE ELEMENTS: (Boynton et al., 1976)

	ppm		ppm
Sc:	8.9	La:	10.6
V :	16	Ce:	26
Co:	19.7	Nd:	
Ni:		Sm:	4.6
Ba:	120	Eu:	1.15
Sr:		Tb:	1.00
Hf:	2.8	Dy:	5.4
Ta:	0.4	Ho:	
Th:	1.6	Tm:	
U :	0.55	Yb:	3.3
		Lu:	0.44

PETROGRAPHY: (90-150 um) (Heiken et al., 1973)

Components	%
Breccias	
Low-Grade Brown	7.0
Low-Grade Colorless	11.3
Med-Grade	9.6
High-Grade	-
Anorthosite	2.6
Cataclastic Anorthosite	3.0
Agglutinates	40.0
Feldspar	16.0
Orthopyroxene	0.6
Clinopyroxene	1.6
Glass:	
Colorless	4.3
Brown	0.6
Maskelynite	
Gray Schlieren	1.3
Green	-
Olivine	-
Basalt	0.3
Norite	1.3
Anorth. Gabbro	-
Spinel	-
Total Number Grains	300

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SOIL: 63320

LOCATION COMMENTS: Station 13, under overhang of "shadow rock," a 5 x 4 m breccia boulder. Was collected as a "shadow" soil.

GENERIC SUBSAMPLES:

1. 63321 (25.67 gm): < 1 mm
2. 63322 (2.65 gm): 1-2 mm
3. 63323 (2.02 gm): 2-4 mm
4. 63324 (1.14 gm): 4-10 mm
5. (gm): > 1 cm
6. 63320 (320.0 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 351.5 gm
2. Color:
3. Bag no.: Doc. bag 426
4. Container: Teflon bag; returned in sample collection bag 6, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 47.0, submature
2. Agglutinates: 33
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 153 um (< 1 cm); 87 um (< 1 mm)
2. M_d: 150 um
3.

MAJOR ELEMENTS: (Brunfelt et al., 1973)

	%
SiO_2 :	
TiO_2 :	0.35
Al_2O_3:	28.93
Cr_2O_3:	0.94
FeO :	4.67
MnO :	0.68
MgO :	6.96
CaO :	15.67
Na_2O :	0.57
K_2O :	0.77
P_2O_5 :	
S :	

TRACE ELEMENTS: (Boynton et al., 1976)

	ppm		ppm
Sc:	8.2	La:	9.3
V :	15	Ce:	24
Co:	19.8	Nd:	
Ni:		Sm:	4.1
Ba:	130	Eu:	1.21
Sr:		Tb:	0.78
Hf:	3.3	Dy:	5.9
Ta:	0.5	Ho:	
Th:	1.3	Tm:	
U :	0.44	Yb:	3.1
		Lu:	0.45

PETROGRAPHY: (90-150 um) (Heiken et al., 1973)

Components	%
Breccias	
Low-Grade Brown	4.6
Low-Grade Colorless	14.0
Med-Grade	23.3
High-Grade	0.6
Anorthosite	1.6
Cataclastic Anorthosite	9.6
Agglutinates	32.6
Feldspar	9.6
Orthopyroxene	1.6
Clinopyroxene	1.0
Glass:	
Colorless	4.3
Brown	0.3
Maskelynite	-
Gray Schlieren	-
Green	-
Olivine	-
Basalt	-
Norite	1.6
Anorth. Gabbro	-
Spinel	-
Total Number Grains	300

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SOIL: 63340

LOCATION COMMENTS: Station 13, under overhang of "shadow rock," a 5 x 4 m breccia boulder. Was collected as a "shadow" soil.

GENERIC SUBSAMPLES:

1. 63341 (25.88 gm): < 1 mm
2. 63342 (2.52 gm): 1-2 mm
3. 63343 (2.13 gm): 2-4 mm
4. 63344 (0.96 gm): 4-10 mm
5. (gm): > 1 cm
6. 63340 (149.7 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 181.2 gm
2. Color:
3. Bag no.: Doc. bag 427
4. Container: Teflon bag; returned in sample collection bag 6, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 54.0
2. Agglutinates: 40
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 144 um (< 1 cm); 80 um (< 1 mm)
2. M_d: 130 um

MAJOR ELEMENTS: (Brunfelt et al., 1973)

	%
SiO_2 :	
TiO_2 :	0.60
Al_2O_3:	29.00
Cr_2O_3:	0.95
FeO :	4.53
MnO :	0.67
MgO :	7.30
CaO :	12.45
Na_2O :	0.56
K_2O :	0.15
P_2O_5 :	
S :	

TRACE ELEMENTS: (Krähenbuhl et al., 1973)

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:		Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :	398	Yb:	
		Lu:	

PETROGRAPHY: (90-150 um) (Heiken et al., 1973)

Components	%
Breccias	
Low-Grade Brown	5.3
Low-Grade Colorless	14.9
Med-Grade	14.6
High-Grade	0.7
Anorthosite	2.6
Cataclastic Anorthosite	3.3
Agglutinates	40.0
Feldspar	12.6
Orthopyroxene	0.7
Clinopyroxene	1.0
Glass:	
Colorless	1.3
Brown	0.7
Maskelynite	-
Gray	
Schlieren	-
Green	-
Olivine	-
Basalt	1.7
Norite	0.3
Anorth. Gabbro	-
Spinel	-
Total Number Grains	302

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SOIL: 63500

LOCATION COMMENTS: Station B. "Reference" soil, collected 5 m west, nowthwest of "shadow rock." Rake soil.

GENERIC SUBSAMPLES:

1. 63501 (342.5 gm): < 1 mm
2. 63502 (25.29 gm): 1-2 mm
3. 63503 (14.53 gm): 2-4 mm
4. 63504 (17.34 gm): 4-10 mm
5.* 63505 (19.07 gm): > 1 cm
   to 63515
6. 63500 (201.8 gm): Reserve

* Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 601.5 gm
2. Color: N6 (med. light gray)
3. Bag no.: Doc. bag 346
4. Container: Teflon bag; returned in sample collection bag 4, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 46.0, submature
2. Agglutinates: 10
4.

GRAIN SIZE PARAMETERS:

1. M_z: 110 um (< 1 cm); 71 um (< 1 mm)
2. M_d: 108 um
3.

MAJOR ELEMENTS: (Bansal et al., 1973)

	%
SiO_2 :	45.02
TiO_2 :	0.53
Al_2O_3:	27.72
Cr_2O_3:	
FeO :	4.72
MnO :	0.70
MgO :	5.25
CaO :	15.87
Na_2O :	0.46
K_2O :	0.9
P_2O_5 :	0.10
S :	

TRACE ELEMENTS: (Wanke et al., 1975)

	ppm		ppm
Sc:	7.43	La:	0.99
V :		Ce:	20
Co:	6.19	Nd:	-
Ni:	-	Sm:	0.45
Ba:		Eu:	1.06
Sr:	190	Tb:	0.13
Hf:	0.56	Dy:	0.94
Ta:	0.03	Ho:	
Th:		Tm:	
U :		Yb:	0.68
		Lu:	0.10

PETROGRAPHY: (90-150 um) (Heiken et al., 1973)

Components	%
Breccias	
Low-Grade Brown	7.0
Low-Grade Colorless	16.7
Med-Grade	11.6
High-Grade	1.0
Anorthosite	2.0
Cataclastic Anorthosite	1.0
Agglutinates	44.6
Feldspar	10.3
Orthopyroxene	1.0
Clinopyroxene	1.0
Glass:	
Colorless	1.6
Brown	0.3
Maskelynite	-
Gray	
Schlieren	0.3
Green	-
Olivine	-
Basalt	0.3
Norite	1.3
Anorth. Gabbro	-
Spinel	-
Total Number Grains	300

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SOIL: 64420

LOCATION COMMENTS: Station 4, near Cinco B Crater, on floor of subdued 15 m crater. From the bottom of a 15 cm deep trench.

GENERIC SUBSAMPLES:

1. 64421 (206.9 gm): < 1 mm
2. 64422 (6.17 gm): 1-2 mm
3. 64423 (3.76 gm): 2-4 mm
4. 64424 (2.06 gm): 4-10 mm
5.* 64425 (14.62 gm): > 1 cm
6. 64420 (112.2 gm): Reserve

* Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 331.1 gm
2. Color: 5YR 4/1 (brownish gray)
3. Bag no.: Doc. bag 399
4. Container: Teflon bag; returned in sample collection bag 3, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 83.0, mature
2. Agglutinates: 54
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 78 um (< 1 mm)
2. M_d:
3.

PETROGRAPHY: (53-74 um)
(Butler et al., 1973)

Components	%
Olivine	0.6
Pyroxene	1.1
Plagioclase	13.6
Glass	10.6
Rock Fragments	22.9
Agglutinates	52.6

MAJOR ELEMENTS:
(Apollo 16 P.E.T., 1973)

	%
SiO_2 :	44.88
TiO_2 :	0.55
Al_2O_3:	27.60
Cr_2O_3:	
FeO :	5.03
MnO :	0.06
MgO :	5.35
CaO :	15.81
Na_2O :	0.39
K_2O :	0.10
P_2O_5 :	0.13
S :	0.07

TRACE ELEMENTS:
(Wanke et al., 1973)

	ppm		ppm
Sc:	7.9	La:	12.3
V :		Ce:	35
Co:	25.0	Nd:	-
Ni:		Sm:	5.7
Ba:	115	Eu:	1.14
Sr:		Tb:	1.1
Hf:	4.0	Dy:	6.8
Ta:	0.50	Ho:	1.6
Th:		Tm:	
U :		Yb:	4.0
		Lu:	0.57

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OF THE MOON
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VOL. 3 P. 3601-3618

SOIL: 64810

LOCATION COMMENTS: Station 4b, on the slopes of Stone Mountain. Collected as a rake sample on rim of a 20 m diameter crater.

GENERIC SUBSAMPLES:

1. 64811 (174.7 gm): < 1 mm
2. 64812 (9.53 gm): 1-2 mm
3. 64813 (9.1 gm): 2-4 mm
4. 64814 (5.35 gm): 4-10 mm
5.* 64815 (111.82 gm): > 1 cm
   to 64837
6. 64810 (102.14 gm): Reserve

* Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 300.8 gm
2. Color:
3. Bag no.: Doc. bag 401
4. Container: Teflon bag; returned in sample collection bag 3, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 54.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 40 um (< 1 mm)
2. M_d:
3.

PETROGRAPHY: (53-74 um)
(Butler et al., 1973)

Components	%
Olivine	1.1
Pyroxene	3.2
Plagioclase	23.2
Glass	10.0
Rock Fragments	28.0
Agglutinates	34.3

MAJOR ELEMENTS:
(Simkin et al., 1973)

	%
SiO_2 :	44.6
TiO_2 :	0.49
Al_2O_3:	26.9
Cr_2O_3:	0.11
FeO :	5.59
MnO :	0.40
MgO :	5.50
CaO :	15.5
Na_2O :	0.50
K_2O :	0.19
P_2O_5 :	
S :	

TRACE ELEMENTS:
(Korotev, 1982)

	ppm		ppm
Sc:	9.27	La:	14.21
V :	21	Ce:	38.3
Co:	35.5	Nd:	
Ni:	465	Sm:	6.82
Ba:	159	Eu:	1.185
Sr:	165	Tb:	1.44
Hf:	5.67	Dy:	
Ta:	0.758	Ho:	
Th:	2.68	Tm:	
U :	0.70	Yb:	4.83
		Lu:	0.684

FINKELMAN,R.B. + BAEDECKER,P.A. + CHRISTIAN,R.P. + BERMAN,S. + SCHNEPFE,M.M. + ROSE,H.J.,JR. (1975)
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FIREMAN,E.L. + DAMICO,J. + DEFELICE,J. (1976)
EVIDENCE FOR CARBON-14IN THE SOLAR WIND
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GANAPATHY,R. + MORGAN,J.W. + HIGUCHI,H. + ANDERS,E. + ANDERSON,A.T.,JR. (1974)
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GLASS,B.P. (1976)
MAJOR ELEMENT COMPOSITION OF GLASSES FROM APOLLO 11, 16 AND 17 SOIL SAMPLES
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VOL. 1 P. 679-693

HASKIN,L.A. + HELMKE,P.A. + BLANCHARD,D.P. + JACOBS,J.W. + TELANDER,K.M. (1973)
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LUNAR BASINS AND CRATERS: EVIDENCE FOR SYSTEMATIC COMPOSITIONAL CHANGE OF BOMBARDING POPULATION
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HEYMANN,D. + JORDAN,J.L. + WALKER,A. (1978)
DZICZKANIEC,M. + RAY,J. + PALMA,R.
INERT GAS MEASUREMENTSIN THE APOLLO-16 DRILL
CORE AND AN EVALUATIONOF THE STRATIGRAPHY AND
DEPOSITIONAL HISTORY OF THIS CORE
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JANGHORBANI,M. + MILLER,M.D. + MA,M.-S. + CHYI,L.L. + EHMANN,W.D. (1973)
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EVIDENCE FOR METEORITIC SULFUR IN THE LUNAR REGOLITH
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SOME CONCEPTS AND IS/FEO COMPILATION
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PART I; A MODEL FOR AGGLUTINATE FORMATION AND SOME INDIRECT SUPPORTIVE
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CASE OF THE SIDEROPHILE ELEMENTS
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YOKOYAMA,Y. + REYSS,J.L. + GUICHARD,F. (1975)
22NA-26AL STUDIES OF LUNAR REGOLITH
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SOIL: 64500

LOCATION COMMENTS: Station 4. In the vicinity of Cinco B Crater, near the rim of a subdued 15 m crater. Rake soil sample. Gray surface underlain by white layer.

GENERIC SUBSAMPLES:

1. 64501 (495.7 gm): < 1 mm
2. 64502 (28.38 gm): 1-2 mm
3. 64503 (24.11 gm): 2-4 mm
4. 64504 (24.15 gm): 4-10 mm
5.* 64505 (31.23 gm): > 1 cm
   to 64525
6. 64500 (320.6 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 892.9 gm
2. Color: 5Y 5/1 (med. olive gray)
3. Bag no.: Doc. bag 396
4. Container: Teflon bag; returned in sample collection bag 1, in air. Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 61.0, mature
2. Agglutinates: 52
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 104 um (< 1 cm); 65 um (< 1 mm)
2. M_d: 88 um
3.

MAJOR ELEMENTS: (Haskin et al., 1973)

	%
SiO_2 :	
TiO_2 :	0.53
Al_2O_3:	27.4
Cr_2O_3:	
FeO :	4.16
MnO :	
MgO :	4.27
CaO :	16.6
Na_2O :	0.47
K_2O :	0.11
P_2O_5 :	
S :	

TRACE ELEMENTS: (Haskin et al., 1973)

	ppm		ppm
Sc:	10.4	La:	11.7
V :		Ce:	30.3
Co:	21.0	Nd:	20.3
Ni:	290.0	Sm:	5.48
Ba:		Eu:	1.18
Sr:		Tb:	1.18
Hf:	4.7	Dy:	7.3
Ta:		Ho:	1.5
Th:		Tm:	
U :		Yb:	3.74
		Lu:	0.54

PETROGRAPHY: (90-150 um)
(Heiken et al., 1973)

Components	%
Breccias	
Low-Grade Brown	5.3
Low-Grade Colorless	6.6
Med-Grade	5.6
High-Grade	3.6
Anorthosite	2.0
Cataclastic Anorthosite	1.0
Agglutinates	51.6
Feldspar	20.3
Orthopyroxene	0.3
Clinopyroxene	0.3
Glass:	
Colorless	1.6
Brown	1.0
Maskelynite	-
Gray Schlieren	0.3
Green	-
Olivine	-
Basalt	-
Norite	0.3
Anorth. Gabbro	-
Spinel	-
Total Number Grains	300

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SOIL: 64800

LOCATION COMMENTS: Station 4b, slopes of Stone Mountain. Collected as a surface sample on the rim of a 20 m diameter crater.

GENERIC SUBSAMPLES:

1. 64801 (286.8 gm): < 1 mm
2. 64802 (10.96 gm): 1-2 mm
3. 64803 (8.09 gm): 2-4 mm
4. 64804 (7.89 gm): 4-10 mm
5. (gm): > 1 cm
6. 64800 (166.3 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 480 gm
2. Color: 5YR 4/1 (brownish gray)
3. Bag no.: Doc. bag 400
4. Container: Teflon bag; returned in sample collection bag 3, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 71.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 60 um (< 1 mm)
2. M_d:
3.

PETROGRAPHY: (53-74 um)
(Butler et al., 1973)

Components	%
Olivine	1.4
Pyroxene	1.4
Plagioclase	12.3
Glass	5.9
Rock Fragments	21.7
Agglutinates	57.4

MAJOR ELEMENTS:
(Taylor et al., 1973)

	%
SiO_2 :	44.90
TiO_2 :	0.47
Al_2O_3:	27.70
Cr_2O_3:	0.11
FeO :	5.01
MnO :	
MgO :	5.69
CaO :	15.70
Na_2O :	0.51
K_2O :	0.22
P_2O_5 :	0.16
S :	

TRACE ELEMENTS:
(Taylor et al., 1973)

	ppm		ppm
Sc:	5.6	La:	12.8
V :	28	Ce:	37.1
Co:	27	Nd:	16.7
Ni:		Sm:	4.95
Ba:	175	Eu:	0.99
Sr:		Tb:	1.01
Hf:	3.50	Dy:	6.25
Ta:		Ho:	1.44
Th:	2.17	Tm:	0.66
U :	0.61	Yb:	4.00
		Lu:	0.62

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SOIL: 65500

LOCATION COMMENTS: Station 5, on the inner rim of a 20 m diameter crater. Rake soil. Gray surface with lighter gray immediately below the surface. Friable aggregates (clods) included in sample.

GENERIC SUBSAMPLES:

1. 65501 (150.0 gm): < 1 mm
2. 65502 (9.5 gm): 1-2 mm
3. 65503 (23.24 gm): 2-4 mm
4. 65504 (22.48 gm): 4-10 mm
5. (gm): > 1 cm
6. 65500 (413.0 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 618.2 gm
2. Color:
3. Bag no.: Doc. bag 333
4. Container: Teflon bag; returned in vacuum container (ALSRC 2). Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 38.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 44 um (< 1 mm)
2. M_d:
3.

PETROGRAPHY: (53-74 um)
(Butler et al., 1973)

Components	%
Olivine	1.6
Pyroxene	3.1
Plagioclase	11.0
Glass	8.5
Rock Fragments	42.5
Agglutinates	33.5

MAJOR ELEMENTS:
(Duncan et al., 1973)

	%
SiO_2 :	45.50
TiO_2 :	0.70
Al_2O_3:	26.07
Cr_2O_3:	
FeO :	5.96
MnO :	0.79
MgO :	6.28
CaO :	14.97
Na_2O :	0.44
K_2O :	0.15
P_2O_5 :	0.16
S :	

TRACE ELEMENTS:
(Duncan et al., 1973)

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:	290	Sm:	
Ba:	175	Eu:	
Sr:	162	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

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SOLAR NOBLE GAS SATURATION IN LUNAR REGOLITH MINERALS; DOES IT OCCUR?
LUNAR AND PLANETARY SCIENCE XI, P. 1248-1250

SOIL: 65510

LOCATION COMMENTS: Station 5, on the inner rim of a 20 m diameter crater. Soil collected with rake sample. Surface sample.

GENERIC SUBSAMPLES:

1. 65511 (190.2 gm): < 1 mm
2. 65512 (14.68 gm): 1-2 mm
3. 65513 (20.21 gm): 2-4 mm
4. 65514 (13.98 gm): 4-10 mm
5.* 65515 to 65588 (178.0 gm): > 1 cm
6. 65500 (171.3 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 410.3 gm
2. Color:
3. Bag no.: Doc. bag 332
4. Container: Teflon bag; returned in vacuum container (ALSRC #2). Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 55, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Korotev, 1982)

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	25.3
Cr_2O_3:	
FeO :	5.82
MnO :	
MgO :	6.7
CaO :	14.2
Na_2O :	0.474
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS: (Korotev, 1982)

	ppm		ppm
Sc:	10.59	La:	15.90
V :	24	Ce:	42.7
Co:	26.3	Nd:	
Ni:	370	Sm:	7.56
Ba:	172	Eu:	1.233
Sr:	165	Tb:	1.59
Hf:	6.15	Dy:	
Ta:	0.834	Ho:	
Th:	2.84	Tm:	
U :	0.74	Yb:	5.35
Cr:	847	Lu:	0.751
Mn:	610		

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VOL. 2 P. 1823-1844

SOIL: 65700

LOCATION COMMENTS: Station 5, interior wall of a 20 m diameter crater. Surface soil to accompany rake sample.

GENERIC SUBSAMPLES:

1. 65701 (171.3 gm): < 1 mm
2. 65702 (4.89 gm): 1-2 mm
3. 65703 (1.58 gm): 2-4 mm
4. 65704 (1.39 gm): 4-10 mm
5. (gm): > 1 cm
6. 65700 (92.3 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 271.5 gm
2. Color: 5Y 4/1 (olive gray)
3. Bag no.: Doc. bag 402
4. Container: Teflon bag; returned in sample bag 1, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 106.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 56 um (< 1 mm)
2. M_d:
3.

MAJOR ELEMENTS: (Apollo 16 P.E.T., 1973)

	%
SiO_2 :	45.03
TiO_2 :	0.64
Al_2O_3:	26.47
Cr_2O_3:	
FeO :	5.87
MnO :	0.08
MgO :	6.02
CaO :	15.29
Na_2O :	0.41
K_2O :	0.12
P_2O_5 :	0.13
S :	0.09

TRACE ELEMENTS: (Haskin et al., 1973)

	ppm		ppm
Sc:	10.11	La:	14.7
V :		Ce:	38.3
Co:	31.7	Nd:	25.4
Ni:	510.0	Sm:	7.01
Ba:		Eu:	1.27
Sr:		Tb:	1.46
Hf:	5.4	Dy:	9.6
Ta:		Ho:	-
Th:		Tm:	
U :		Yb:	5.05
		Lu:	0.71

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VOL. 2 P. 1823-1844

SOIL: 65900

LOCATION COMMENTS: Station 5, collected on the interior wall of a 20 m diameter crater, very close to the rim. Surface soil to accompany a rake sample.

GENERIC SUBSAMPLES:

1. 65901 (393.2 gm): < 1 mm
2. 65902 (14.84 gm): 1-2 mm
3. 65903 (11.40 gm): 2-4 mm
4. 65904 (9.51 gm): 4-10 mm
5. (gm): > 1 cm
6. 65900 (233.2 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 662.15 gm
2. Color: 5Y 4/1 (olive gray)
3. Bag no.: Doc. bag 406
4. Container: Teflon bag; returned in sample bag 1, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 99.0, mature
2. Agglutinates:

GRAIN SIZE PARAMETERS:

1. M_z: 71 um (< 1 mm)
2. M_d:
3.

PETROGRAPHY: (53-74 um)
(Butler et al., 1973)

Components	%
Olivine	0.7
Pyroxene	1.8
Plagioclase	10.9
Glass	19.7
Rock Fragments	33.5
Agglutinates	44.4

MAJOR ELEMENTS: (Laul & Schmitt, 1973)

	%
SiO_2 :	
TiO_2 :	0.61
Al_2O_3:	26.5
Cr_2O_3:	0.110
FeO :	5.8
MnO :	0.070
MgO :	6.2
CaO :	15.0
Na_2O :	0.470
K_2O :	0.11
P_2O_5 :	
S :	

TRACE ELEMENTS: (Laul & Schmitt, 1973)

	ppm		ppm
Sc:	11	La:	15.1
V :	25	Ce:	37
Co:	30	Nd:	26
Ni:		Sm:	6.7
Ba:	140	Eu:	1.22
Sr:		Tb:	1.4
Hf:	4.7	Dy:	8.2
Ta:	0.62	Ho:	
Th:	2.5	Tm:	
U :	0.80	Yb:	4.9
		Lu:	0.70

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SOIL: 66030

LOCATION COMMENTS: Station 6, at the base of Stone Mountain. Soil collected with a breccia sample on the rim of a 10 m diameter crater.

GENERIC SUBSAMPLES:

1. 66031 (75.6 gm): < 1 mm
2. 66032 (2.99 gm): 1-2 mm
3. 66033 (2.16 gm): 2-4 mm
4. 66034 (3.36 gm): 4-10 mm
5.* 66035 to 66037 (219.5 gm): > 1 cm
6. 66030 (50.49 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 134.6 gm
2. Color:
3. Bag no.: Doc. bag 407
4. Container: Teflon bag; returned in sample collection bag 1, in air. Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 102.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 95 um (< 1 mm)
2. M_d:
3.

MAJOR ELEMENTS: (Korotev, 1982)

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	26.7
Cr_2O_3:	
FeO :	5.80
MnO :	
MgO :	6.8
CaO :	14.6
Na_2O :	0.440
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS: (Korotev, 1982)

	ppm		ppm
Sc:	9.95	La:	13.65
V :	22	Ce:	36.8
Co:	34.2	Nd:	
Ni:	480	Sm:	6.50
Ba:	144	Eu:	1.192
Sr:	155	Tb:	1.37
Hf:	5.01	Dy:	
Ta:	0.685	Ho:	
Th:	2.49	Tm:	
U :	0.70	Yb:	4.55
Cr:	777	Lu:	0.642
Mn:	582		

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VOL. 2 P. 1823-1844

SOIL: 66040

LOCATION COMMENTS: Station 6, at the base of Stone Mountain. Surface soil collected next to 66030 on the rim of a 10 m diameter crater.

GENERIC SUBSAMPLES:

1. 66041 (357.4 gm): < 1 mm
2. 66042 (19.5 gm): 1-2 mm
3. 66043 (15.5 gm): 2-4 mm
4. 66044 (11.3 gm): 4-10 mm
5. (gm): > 1 cm
6. 66040 (166.5 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 570.2 gm
2. Color: Gray (field description)
3. Bag no.: Doc. bag 338
4. Container: Teflon bag; returned in vacuum container (ALSRC #2). Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 90.0, mature
2. Agglutinates: 39
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 112 um
2. M_d:

PETROGRAPHY: (53-74 um)
(Butler et al., 1973)

Components	%
Olivine	1.9
Pyroxene	3.5
Plagioclase	12.4
Glass	9.0
Rock Fragments	30.4
Agglutinates	42.8

MAJOR ELEMENTS:
(Apollo 16 P.E.T., 1973)

	%
SiO_2 :	45.07
TiO_2 :	0.64
Al_2O_3:	26.39
Cr_2O_3:	
FeO :	6.08
MnO :	0.08
MgO :	6.14
CaO :	15.29
Na_2O :	0.38
K_2O :	0.12
P_2O_5 :	0.15
S :	0.09

TRACE ELEMENTS:
(Rose et al., 1973)

	ppm		ppm
Sc:	10	La:	-
V :	22	Ce:	
Co:	21	Nd:	
Ni:	330	Sm:	
Ba:	120	Eu:	
Sr:	145	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	3.6
		Lu:	

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SOIL: 66080

LOCATION COMMENTS: Station 6, near base of Stone Mountain. Patch of white (light gray) soil or soil aggregate exposed at the surface. Along the west rim of a 10 m diameter crater.

GENERIC SUBSAMPLES:

1. 66081 (177.3 gm): < 1 mm
2. 66082 (9.85 gm): 1-2 mm
3. 66083 (4.53 gm): 2-4 mm
4. 66084 (3.13 gm): 4-10 mm
5.* 66085 (5.69 gm): > 1 cm
   to 66086
6. 66080 (106.1 gm): Reserve

* Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 300.9 gm
2. Color: Light gray (field description)
3. Bag no.: Doc. bag 339
4. Container: Teflon bag; returned in vacuum container (ALSRC #2). Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 80.0, mature
2. Agglutinates: 53
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 76 um
2. M_d:
3.

PETROGRAPHY: (53-74 um)
(Butler et al., 1973)

Components	%
Olivine	1.4
Pyroxene	1.4
Plagioclase	9.7
Glass	4.3
Rock Fragments	28.1
Agglutinates	55.1

MAJOR ELEMENTS:
(Apollo 16 P.E.T., 1973)

	%
SiO_2 :	45.38
TiO_2 :	0.67
Al_2O_3:	26.22
Cr_2O_3:	
FeO :	5.85
MnO :	0.08
MgO :	6.39
CaO :	15.28
Na_2O :	0.39
K_2O :	0.13
P_2O_5 :	0.13
S :	0.09

TRACE ELEMENTS:
(Rose et al., 1973)

	ppm		ppm
Sc:	10	La:	-
V :	19	Ce:	
Co:	21	Nd:	
Ni:	348	Sm:	
Ba:	130	Eu:	
Sr:	210	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	4.2
		Lu:	

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SOIL: 67460

LOCATION COMMENTS: Station 11, on the south rim of North Ray Crater. Soil collected from fillet around white breccia boulders several meters in diameter.

GENERIC SUBSAMPLES:

1. 67461 (222.2 gm): < 1 mm
2. 67462 (17.4 gm): 1-2 mm
3. 67463 (6.24 gm): 2-4 mm
4. 67464 (0.7 gm): 4-10 mm
5. (gm): > 1 cm
6. 67460 (123.7 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 370.24 gm
2. Color: N7 (light gray)
3. Bag no.: Doc. bag 417
4. Container: Teflon bag; returned in sample collection bag 6, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 25.0, immature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Compston et al., 1973)

	%
SiO_2 :	44.77
TiO_2 :	0.37
Al_2O_3:	28.99
Cr_2O_3:	
FeO :	4.35
MnO :	0.07
MgO :	4.20
CaO :	16.85
Na_2O :	0.44
K_2O :	0.06
P_2O_5 :	0.05
S :	

TRACE ELEMENTS: (Boynton et al., 1976)

	ppm		ppm
Sc:	7.8	La:	6.7
V :	17	Ce:	18
Co:	13.0	Nd:	
Ni:		Sm:	3.0
Ba:	90	Eu:	1.10
Sr:		Tb:	0.59
Hf:	1.8	Dy:	3.6
Ta:	0.3	Ho:	
Th:	1.0	Tm:	
U :	-	Yb:	2.1
		Lu:	0.28

PETROGRAPHY: (90-100 um) (Simon et al., 1981)

Components	%
Lithic Fragments	
Mare Component	
Mare Basalt	0.5
Highland Components	
ANT	21.7
LMB	30.7
Feldsp. Basalt	1.6
RNB/POIK	7.9
Fused Soil Component	
DMB	11.1
Agglutinate	8.5
Mineral Frag.	
Mafic	0.5
Plagioclase	12.2
Opaque	1.1
Glass Fragments	
Orange/black	0.5
Yellow/green	-
Brown	-
Clear	-
Miscellaneous	
Devitrified glass	3.4
Others	-
Total	100.1
No. of points	942

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SOIL: 67480

LOCATION COMMENTS: Station 11, on the south rim of North Ray Crater. Reference soil to accompany fillet sample 67460. Collected from the surface, about 1 m from the breccia boulders.

GENERIC SUBSAMPLES:

1. 67481 (132.7 gm): < 1 mm
2. 67482 (14.65 gm): 1-2 mm
3. 67483 (8.37 gm): 2-4 mm
4. 67484 (6.02 gm): 4-10 mm
5.* 67485 to 67495 (gm): > 1 cm
6. (gm): Reserve

MISCELLANEOUS:

1. Collected mass: 248.8 gm
2. Color: N6 to N7 (med. light gray to light gray)
3. Bag no.: Doc. bag 419
4. Container: Teflon bag; returned in sample collection bag 6, in air. Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 31.0, submature
2. Agglutinates: 23
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 178 um (< 1 cm); 110 um (< 1 mm)
2. M_d: 272 um
3.

MAJOR ELEMENTS: (Apollo 16 P.E.T., 1973)

	%
SiO_2 :	44.95
TiO_2 :	0.41
Al_2O_3:	29.01
Cr_2O_3:	
FeO :	4.66
MnO :	0.06
MgO :	4.20
CaO :	16.54
Na_2O :	0.42
K_2O :	0.06
P_2O_5 :	0.13
S :	0.03

TRACE ELEMENTS: (Boynton et al., 1976)

	ppm		ppm
Sc:	7.1	La:	7.3
V :	14	Ce:	18
Co:	14.9	Nd:	
Ni:		Sm:	3.3
Ba:	90	Eu:	1.16
Sr:		Tb:	0.66
Hf:	1.9	Dy:	3.9
Ta:	0.3	Ho:	
Th:	1.1	Tm:	
U :	0.49	Yb:	2.4
		Lu:	0.32

PETROGRAPHY: (90-150 um) (Heiken et al., 1973)

Components	%
Breccias	
Low-Grade Brown	6.3
Low-Grade Colorless	20.3
Med-Grade	20.0
High-Grade	1.0
Anorthosite	2.6
Cataclastic Anorthosite	7.3
Agglutinates	23.0
Feldspar	15.0
Orthopyroxene	0.3
Clinopyroxene	0.6
Glass:	
Colorless	1.3
Brown	1.0
Maskelynite	-
Gray	
Schlieren	-
Green	-
Olivine	0.3
Basalt	-
Norite	0.3
Anorth. Gabbro	-
Spinel	0.3
Total Number Grains	300

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SOIL: 67600

LOCATION COMMENTS: Station 11, south rim of North Ray Crater. Soil to accompany rake sample 67610. Within a few meters of a 1 or 2 m diameter white breccia boulder.

GENERIC SUBSAMPLES:

1. 67601 (161.8 gm): < 1 mm
2. 67602 (13.45 gm): 1-2 mm
3. 67603 (6.16 gm): 2-4 mm
4. 67604 (2.62 gm): 4-10 mm
5.* 67605 (44.52 gm): > 1 cm
6. 67606 (2.17 gm): Reserve

* Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 186.2 gm
2. Color: N6 (med. light gray)
3. Bag no.: Doc. bag 422
4. Container: Teflon bag; returned in sample collection bag 6, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 45.0, submature
2. Agglutinates: 36
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 116 um (< 1 cm); 82 um (< 1 mm)
2. M_d: 110 um
3.

MAJOR ELEMENTS: (Apollo 16 P.E.T., 1973)

	%
SiO_2 :	45.28
TiO_2 :	0.42
Al_2O_3:	28.93
Cr_2O_3:	
FeO :	4.09
MnO :	0.06
MgO :	4.75
CaO :	16.40
Na_2O :	0.44
K_2O :	0.07
P_2O_5 :	0.06
S :	0.04

TRACE ELEMENTS: (Haskin et al., 1973)

	ppm		ppm
Sc:	6.6	La:	6.7
V :		Ce:	16.5
Co:	14.4	Nd:	11.1
Ni:	180.0	Sm:	3.10
Ba:		Eu:	1.29
Sr:		Tb:	0.62
Hf:	1.99	Dy:	4.3
Ta:		Ho:	0.86
Th:		Tm:	
U :		Yb:	2.28
		Lu:	0.33

PETROGRAPHY: (90-150 um) (Heiken et al., 1973)

Components	%
Breccias	
Low-Grade Brown	4.6
Low-Grade Colorless	24.0
Med-Grade	11.3
High-Grade	0.3
Anorthosite	2.3
Cataclastic Anorthosite	1.3
Agglutinates	36.0
Feldspar	14.0
Orthopyroxene	1.3
Clinopyroxene	1.6
Glass:	
Colorless	1.6
Brown	-
Maskelynite	
Gray	
Schlieren	
Green	
Olivine	-
Basalt	0.6
Norite	0.6
Anorth. Gabbro	-
Spinel	
Total Number Grains	300

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SOIL: 67700

LOCATION COMMENTS: Station 11, along the southeast rim of North Ray Crater. Soil collected along with rake sample 67710. Might have been scooped off the top of a very friable white rock. Might not be a typical soil.

GENERIC SUBSAMPLES:

1. 67701 (235.0 gm): < 1 mm
2. 67702 (21.69 gm): 1-2 mm
3. 67703 (13.71 gm): 2-4 mm
4. 67704 (7.47 gm): 4-10 mm
5.* 67705 (11.92 gm): > 1 cm
   to 67708
6. 67700 (142.6 gm): Reserve

* Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 420.5 gm
2. Color: N6 (med. light gray)
3. Bag no.: Doc. bag 388
4. Container: Teflon bag; returned in sample collection bag 4, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 39, submature
2. Agglutinates: 16
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 140 um (< 1 cm); 92 μm (< 1 mm)
2. M_d: 160 um
3.

MAJOR ELEMENTS: (Compston et al., 1973)

	%
SiO_2 :	44.77
TiO_2 :	0.44
Al_2O_3:	28.48
Cr_2O_3:	
FeO :	4.17
MnO :	0.06
MgO :	4.92
CaO :	16.87
Na_2O :	0.52
K_2O :	0.07
P_2O_5 :	0.08
S :	

TRACE ELEMENTS: (Boynton et al., 1976)

	ppm		ppm
Sc:	6.9	La:	7.3
V :	27	Ce:	18
Co:	14.9	Nd:	
Ni:		Sm:	3.3
Ba:	90	Eu:	1.15
Sr:		Tb:	0.66
Hf:	1.9	Dy:	2.4
Ta:	0.3	Ho:	
Th:	1.1	Tm:	
U :	0.49	Yb:	
		Lu:	0.32

PETROGRAPHY: (90-150 um)
(Heiken et al., 1973)

Components	%
Breccias	
Low-Grade Brown	2.3
Low-Grade Colorless	34.0
Med-Grade	7.3
High-Grade	7.0
Anorthosite	3.3
Cataclastic Anorthosite	Tr.
Agglutinates	15.6
Feldspar	21.0
Orthopyroxene	2.0
Clinopyroxene	2.0
Glass:	
Colorless	2.3
Brown	-
Maskelynite	0.6
Gray	
Schlieren	0.3
Green	-
Olivine	0.3
Basalt	-
Norite	2.0
Anorth. Gabbro	-
Spinel	-
Total Number Grains	300

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SOIL: 67710

LOCATION COMMENTS: Station 11, along the southeast rim of North Ray Crater. Soil collected with rake sample (in same bag).

GENERIC SUBSAMPLES:

1. 67711 (205.3 gm): < 1 mm
2. 67712 (34.84 gm): 1-2 mm
3. 67713 (22.45 gm): 2-4 mm
4. 67714 (12.66 gm): 4-10 mm
5.* (gm): > 1 cm
6. 67710 (113.39 gm): Reserve

* Rake sample consisting of 30 rock fragments. See catalog of Apollo 16 rocks for descriptions.

MISCELLANEOUS:

1. Collected mass: 408.6 gm
2. Color:
3. Bag no.: Doc. bag 423
4. Container: Teflon bag; returned in sample collection bag 4, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 2.8, immature
2. Agglutinates: 2
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 166 um (< 1 cm); 71 um (< 1 mm)
2. M_d: 152 um
3.

MAJOR ELEMENTS: (Mason et al., 1973)

	%
SiO_2 :	44.2
TiO_2 :	0.26
Al_2O_3:	29.4
Cr_2O_3:	
FeO :	2.96
MnO :	0.6
MgO :	3.86
CaO :	16.30
Na_2O :	0.73
K_2O :	0.11
P_2O_5 :	
S :	

TRACE ELEMENTS: (Finkelman et al., 1975)

	ppm		ppm
Sc:	5.2	La:	3
V :		Ce:	9
Co:	15.5	Nd:	
Ni:		Sm:	1.3
Ba:		Eu:	1.6
Sr:		Tb:	-
Hf:	.8	Dy:	
Ta:	-	Ho:	
Th:	.4	Tm:	
U :		Yb:	1.1
		Lu:	.18

PETROGRAPHY: (90-150 um) (Heiken et al., 1973)

Components	%
Breccias	
Low-Grade Brown	1.7
Low-Grade Colorless	36.6
Med-Grade	5.3
High-Grade	-
Anorthosite	2.6
Cataclastic Anorthosite	2.0
Agglutinates	1.6
Feldspar	41.0
Orthopyroxene	4.0
Clinopyroxene	1.3
Glass:	
Colorless	2.3
Brown	-
Maskelynite	-
Gray	
Schlieren	
Green	-
Olivine	0.3
Basalt	0.6
Norite	-
Anorth. Gabbro	1.0
Spinel	-
Total Number Grains	300

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SOIL: 67940

LOCATION COMMENTS: Station 11, collected in the "east-west crack" between "House Rock" (24 m long, 20 m wide) and an adjacent 2 m long boulder. Boulder consists of light to dark gray breccia veined with black glass.

GENERIC SUBSAMPLES:

1. 67941 (105.9 gm): < 1 mm
2. 67942 (12.23 gm): 1-2 mm
3. 67943 (9.36 gm): 2-4 mm
4. 67944 (8.59 gm): 4-10 mm
5.* 67945 to 67957 (187.8 gm): > 1 cm
6. 67940 (27.22 gm): Reserve

* Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 163.3 gm
2. Color: N6 (med. light gray)
3. Bag no.: Doc. bag 390
4. Container: Teflon bag; returned in sample collection bag 4, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 29.0, immature
2. Agglutinates: 12
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 202 um (< 1 cm); 97 um (< 1 mm)
2. M_d:
3.

MAJOR ELEMENTS: (Rose et al., 1975)

	%
SiO_2 :	45.75
TiO_2 :	0.54
Al_2O_3:	26.18
Cr_2O_3:	0.09
FeO :	4.73
MnO :	0.06
MgO :	6.48
CaO :	15.56
Na_2O :	0.53
K_2O :	0.14
P_2O_5 :	0.10
S :	

TRACE ELEMENTS: (Finkelman et al., 1975)

	ppm		ppm
Sc:	8.2	La:	11
V :		Ce:	28
Co:	16.3	Nd:	
Ni:		Sm:	5.7
Ba:		Eu:	1.3
Sr:		Tb:	1.3
Hf:	3.5	Dy:	
Ta:	.5	Ho:	
Th:	1.7	Tm:	
U :		Yb:	3.9
		Lu:	.58

PETROGRAPHY: (90-150 um) (Heiken et al., 1973)

Components	%
Breccias	
Low-Grade Brown	2.3
Low-Grade Colorless	42.3
Med-Grade	8.6
High-Grade	-
Anorthosite	1.6
Cataclastic Anorthosite	1.0
Agglutinates	12.0
Feldspar	13.3
Orthopyroxene	3.0
Clinopyroxene	1.6
Glass:	
Colorless	4.0
Brown	0.6
Maskelynite	-
Gray	0.6
Schlieren	
Green	-
Olivine	-
Basalt	8.3
Norite	-
Anorth. Gabbro	0.3
Spinel	-
Total Number Grains	300

SOIL: 67960

LOCATION COMMENTS: Station 11, southeast rim of North Ray Crater. Is a "reference" soil collected within 10 meters of "House Rock" to accompany soil sample 67940.

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. 67960 (12.11 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 12.11
2. Color:
3. Bag no.: Doc. bag 391
4. Container: Teflon bag; returned in sample collection bag 4, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 20.0, immature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Korotev, 1982)

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	
Cr_2O_3:	
FeO :	4.56
MnO :	
MgO :	
CaO :	16.1
Na_2O :	0.527
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS: (Korotev, 1982)

	ppm		ppm
Sc:	7.76	La:	10.14
V :		Ce:	27.6
Co:	16.2	Nd:	
Ni:	215	Sm:	4.77
Ba:	127	Eu:	1.238
Sr:	175	Tb:	1.04
Hf:	3.77	Dy:	
Ta:	0.532	Ho:	
Th:	1.88	Tm:	
U :	0.51	Yb:	3.53
Cr:	624	Lu:	0.519

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SOIL: 68120

LOCATION COMMENTS: Station 8. Fillet soil, collected around the base of a 1 m breccia boulder.

GENERIC SUBSAMPLES:

1. 68121 (141.9 gm): < 1 mm
2. 68122 (10.92 gm): 1-2 mm
3. 68123 (7.36 gm): 2-4 mm
4. 68124 (8.65 gm): 4-10 mm
5. (gm): > 1 cm
6. 68120 (90.49 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 259.3 gm
2. Color:
3. Bag no.: Doc. bag 374
4. Container: Teflon bag; returned in vacuum container (ALSRC #2). Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 61.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Woodcock & Pillinger, 1978)

	%
SiO_2 :	
TiO_2 :	0.6
Al_2O_3:	27.6
Cr_2O_3:	
FeO :	5.2
MnO :	
MgO :	6.0
CaO :	17.5
Na_2O :	
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS: (Fruchter et al., 1974)

	ppm		ppm
Sc:	9.8	La:	13.1
V :		Ce:	33.0
Co:	30.0	Nd:	25
Ni:		Sm:	6.6
Ba:	140	Eu:	1.3
Sr:		Tb:	1.3
Hf:	4.4	Dy:	
Ta:	0.5	Ho:	
Th:	2.5	Tm:	
U :		Yb:	4.5
		Lu:	0.7

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SOIL: 68500

LOCATION COMMENTS: Station 8, located halfway between two 15 m diameter craters. Soil collected along with rake sample.

GENERIC SUBSAMPLES:

1. 68501 (521.1 gm): < 1 mm
2. 68502 (37.8 gm): 1-2 mm
3. 68503 (25.10 gm): 2-4 mm
4. 68504 (17.27 gm): 4-10 mm
5.* 68505 (1.3 gm): > 1 cm
6. 68500 (304.5 gm): Reserve

* Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 905.8 gm
2. Color: N6 (med. light gray)
3. Bag no.: Doc. bag 412
4. Container: Teflon bag; returned in sample collection bag 3, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 85.0, mature
2. Agglutinates: 39
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 106 um (< 1 cm); 68 um (< 1 mm)
2. M_d: 87 um
3.

MAJOR ELEMENTS: (Bansal et al., 1973)

	%
SiO_2 :	45.18
TiO_2 :	0.58
Al_2O_3:	26.65
Cr_2O_3:	
FeO :	5.48
MnO :	0.07
MgO :	6.28
CaO :	15.35
Na_2O :	0.47
K_2O :	0.11
P_2O_5 :	0.12
S :	0.08

TRACE ELEMENTS: (Korotev, 1981)

	ppm		ppm
Sc:	9.2	La:	13.6
V :		Ce:	35.5
Co:	34.7	Nd:	
Ni:	560	Sm:	6.2
Ba:		Eu:	1.20
Sr:		Tb:	1.28
Hf:	4.5	Dy:	
Ta:	0.8	Ho:	
Th:	2.4	Tm:	
U :		Yb:	4.4
		Lu:	0.62

PETROGRAPHY: (90-150 um) (Heiken et al., 1973)

Components	%
Breccias	
Low-Grade Brown	3.6
Low-Grade Colorless	29.3
Med-Grade	5.6
High-Grade	-
Anorthosite	0.3
Cataclastic Anorthosite	1.6
Agglutinates	38.6
Feldspar	12.3
Orthopyroxene	0.6
Clinopyroxene	1.0
Glass:	
Colorless	4.0
Brown	0.6
Maskelynite	0.3
Gray	
Schlieren	-
Green	-
Olivine	-
Basalt	0.3
Norite	-
Anorth. Gabbro	0.6
Spinel	-
Total Number Grains	300

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VOL. 2 P. 1823-1844

SOIL: 68820

LOCATION COMMENTS: Station 8, 35 m east of a 15 m diameter crater. Surface soil collected adjacent to a 1 m diameter breccia boulder. Possible "fillet."

GENERIC SUBSAMPLES:

1. 68821 (123.9 gm): < 1 mm
2. 68822 (7.35 gm): 1-2 mm
3. 68823 (3.52 gm): 2-4 mm
4. 68824 (1.5 gm): 4-10 mm
5. 68825 (8.66 gm): > 1 cm
6. 68820 (83.73 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 220 gm
2. Color: 5Y 4/1 (olive gray)
3. Bag no.: Doc. bag 375
4. Container: Teflon bag; returned in sample collection bag 1, in air.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 84.0, mature
2. Agglutinates: 52.0
3.

GRAIN SIZE PARAMETERS:

1. M_z: 112 um
2. M_d:
3.

MAJOR ELEMENTS: (Simkin et al., 1973)

	%
SiO_2 :	44.5
TiO_2 :	0.5
Al_2O_3:	26.2
Cr_2O_3:	
FeO :	5.4
MnO :	0.12
MgO :	6.13
CaO :	15.3
Na_2O :	0.48
K_2O :	0.16
P_2O_5 :	
S :	

TRACE ELEMENTS: (Fruchter et al., 1974)

	ppm		ppm
Sc:	9.8	La:	13.3
V :		Ce:	33.2
Co:	28.5	Nd:	26
Ni:		Sm:	6.7
Ba:	160	Eu:	1.2
Sr:		Tb:	1.2
Hf:	4.4	Dy:	
Ta:	0.5	Ho:	
Th:	2.5	Tm:	
U :		Yb:	4.9
		Lu:	0.7

PETROGRAPHY: (63-125 um)
(Apollo 16 P.E.T., 1972)

Components	%
Agglutinates	52
Colorless Glass	
Fragments	2
Droplets	1
Brown Glass	
Fragments	-
Droplets	Tr.
Orthopyroxene	2
Clinopyroxene	-
Plagioclase	15
Breccias:	
Metaigneous	21
Vitric	1
Anorthosite	6
Basalt	-
Olivine	-
Ilmenite	-
K Feldspar	-
Total Number Grains	100

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VOL. 2 P. 1823-1844

SOIL: 68840

LOCATION COMMENTS: Station 8, approximately 35 m east of a 15 m diameter crater. Surface soil, collected about 6 m north of a 1 m boulder and the "fillet" soil 68820.

GENERIC SUBSAMPLES:

1. 68841 (266.6 gm): < 1 mm
2. 68842 (14.36 gm): 1-2 mm
3. 68843 (8.89 gm): 2-4 mm
4. 68844 (5.01 gm): 4-10 mm
5.* 68845 (11.45 gm): > 1 cm
   to 68848
6. 68840 (154.46 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 449.32 gm
2. Color: N4-N5 (med. dark gray to med. gray)
3. Bag no.: Doc. bag 344
4. Container: Teflon bag; returned in sample collection bag 1, in air. Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 70.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 96 um
2. M_d:
3.

PETROGRAPHY: (62.5 to 125 um)
(Apollo 16 P.E.T., 1973)

Components	%
Agglutinates	80
Colorless Glass Fragments	2
Colorless Glass Droplets	--
Brown Glass Fragments	2
Brown Glass Droplets	--
Orthopyroxene	--
Clinopyroxene	3
Plagioclase	7
Metamorphosed Breccia	6
Vitric Breccia	Trace
Anorthositic	--
Basalt	Trace
Olivine	--
Ilmenite	
Potassium Feldspar(?)	--

MAJOR ELEMENTS:
(Apollo 16 P.E.T., 1973)

	%
SiO_2 :	45.08
TiO_2 :	0.59
Al_2O_3:	26.49
Cr_2O_3:	
FeO :	5.65
MnO :	0.07
MgO :	6.27
CaO :	15.30
Na_2O :	0.41
K_2O :	0.11
P_2O_5 :	0.12
S :	0.08

TRACE ELEMENTS:
(Rose et al., 1975)

	ppm		ppm
Sc:	9.2	La:	14
V :	14	Ce:	
Co:	34	Nd:	
Ni:	680	Sm:	
Ba:	120	Eu:	
Sr:	113	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	3.8
		Lu:	

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PROCEEDINGS OF THE SIXTH LUNAR SCIENCE CONFERENCE
VOL. 2 P. 1823-1844

SOIL: 69920

LOCATION COMMENTS: Station 9, 15 km north of a 40 m diameter crater. Collected in shadow of a 0.5 m diameter boulder as part of the surface sample collection. Is the "skim" soil (upper 1 cm).

GENERIC SUBSAMPLES:

1. 69921 (57.0 gm): < 1 mm
2. 69922 (2.8 gm): 1-2 mm
3. 69923 (1.7 gm): 2-4 mm
4. 69924 (1.3 gm): 4-10 mm
5. (gm): > 1 cm
6. 69920 (0.71 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 59.8 gm
2. Color: 5Y 5/1 (med. olive gray)
3. Bag no.: Doc. bag 376
4. Container: Teflon bag; returned in sample collection bag 3, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 90.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Rose et al., 1973)

	%
SiO_2 :	45.20
TiO_2 :	0.59
Al_2O_3:	26.20
Cr_2O_3:	0.14
FeO :	5.54
MnO :	0.07
MgO :	6.35
CaO :	15.35
Na_2O :	0.53
K_2O :	0.14
P_2O_5 :	0.12
S :	

TRACE ELEMENTS: (Rose et al., 1973)

	ppm		ppm
Sc:	10	La:	-
V :	19	Ce:	
Co:	21	Nd:	
Ni:	348	Sm:	
Ba:	130	Eu:	
Sr:	210	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	3.6
		Lu:	

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PROCEEDINGS OF THE SIXTH LUNAR SCIENCE CONFERENCE
VOL. 2 P. 1823-1844

SOIL: 69940

LOCATION COMMENTS: Station 9, 15 km north of a 40 m diameter crater. Collected along with skim soil 69920 in the shadow of a 0.5 m boulder. Part of surface sample collection. This sample is the "scoop soil" from several cm into the surface.

GENERIC SUBSAMPLES:

1. 69941 (254.1 gm): < 1 mm
2. 69942 (11.85 gm): 1-2 mm
3. 69943 (8.07 gm): 2-4 mm
4. 69944 (4.47 gm): 4-10 mm
5.* 69945 (6.88 gm): > 1 cm
6. 69940 (149.4 gm): Reserve

* Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 428.5 gm
2. Color: N5 to 5YR 2/1 (med. gray to brownish black)
3. Bag no.: Doc. bag 377
4. Container: Teflon bag; returned in sample collection bag 3, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 85.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 62.5 um (< 1 mm)
2. M_d:
3.

MAJOR ELEMENTS: (Rose et al., 1973)

	%
SiO_2 :	44.67
TiO_2 :	0.63
Al_2O_3:	26.30
Cr_2O_3:	0.13
FeO :	5.76
MnO :	0.07
MgO :	6.35
CaO :	15.57
Na_2O :	0.42
K_2O :	0.14
P_2O_5 :	0.12
S :	

TRACE ELEMENTS: (Haskin et al., 1973)

	ppm		ppm
Sc:	10.0	La:	14.2
V :		Ce:	37.0
Co:	32.1	Nd:	24.0
Ni:	470.0	Sm:	6.8
Ba:		Eu:	1.28
Sr:		Tb:	1.41
Hf:	5.3	Dy:	9.0
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	4.81
		Lu:	0.68

PETROGRAPHY: (63-125 um) (Apollo 16 P.E.T., 1972)

Components	%
Agglutinates	64
Colorless Glass	
Fragments	4
Droplets	-
Brown Glass	
Fragments	6
Droplets	-
Orthopyroxene	1
Clinopyroxene	1
Plagioclase	7
Breccias:	
Metaigneous	7
Vitric	7
Anorthosite	2
Basalt	1
Olivine	-
Ilmenite	-
K Feldspar	-
Total Number Grains	100

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SOIL 69941

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22NA-26AL STUDIES OF LUNAR REGOLITH
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SOIL: 69960

LOCATION COMMENTS: Station 9. Soil collected under a 0.5 m boulder after it had been rolled over. Part of "surface sample" suite of samples.

GENERIC SUBSAMPLES:

1. 69961 (307.9 gm): < 1 mm
2. 69962 (13.93 gm): 1-2 mm
3. 69963 (9.93 gm): 2-4 mm
4. 69964 (4.8 gm): 4-10 mm
5.* 69965 (1.11 gm): > 1 cm
6. 69960 (131.0 gm): Reserve

* Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 507.6 gm
2. Color: N4 to 5YR (med. dark gray to brownish black)
3. Bag no.: Doc. bag 379
4. Container: Teflon bag; returned in sample collection bag 3, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 92.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 68 um (<1 mm)
2. M_d:
3.

MAJOR ELEMENTS: (Rose et al., 1973)

	%
SiO_2 :	44.76
TiO_2 :	0.60
Al_2O_3:	26.35
Cr_2O_3:	0.13
FeO :	5.76
MnO :	0.07
MgO :	6.33
CaO :	15.55
Na_2O :	0.41
K_2O :	0.14
P_2O_5 :	0.12
S :	

TRACE ELEMENTS: (Rose et al., 1973)

	ppm		ppm
Sc:	11.8	La:	-
V :	29	Ce:	
Co:	47	Nd:	
Ni:	600	Sm:	
Ba:	140	Eu:	
Sr:	135	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	3.7
		Lu:	

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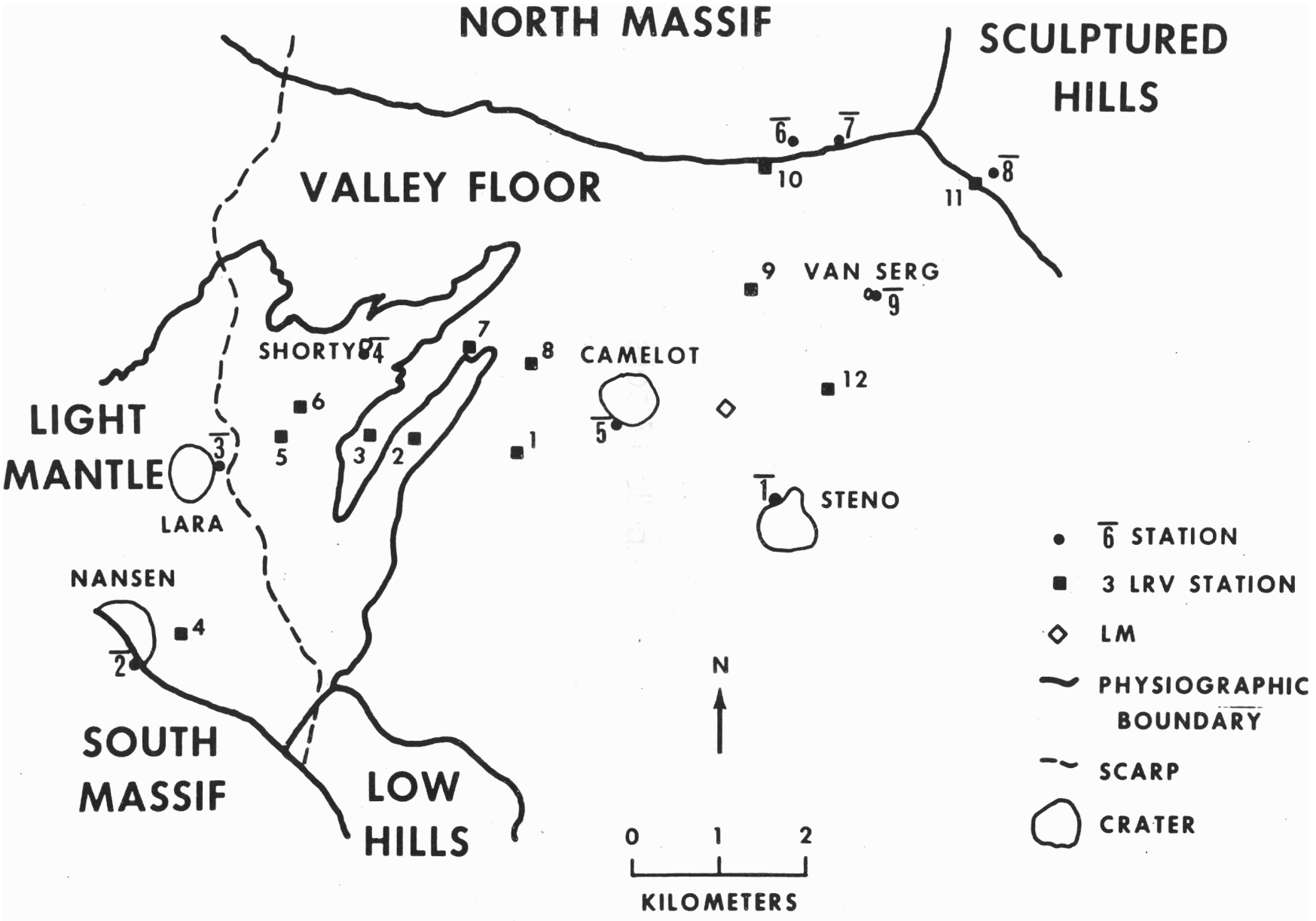
SOIL 69961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VALLEY FLOOR
VAN SERG
SHORTY
CAMELOT
LIGHT MANTLE
LARA
STENO
NANSEN
SOUTH MASSIF
LOW HILLS
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KILOMETERS
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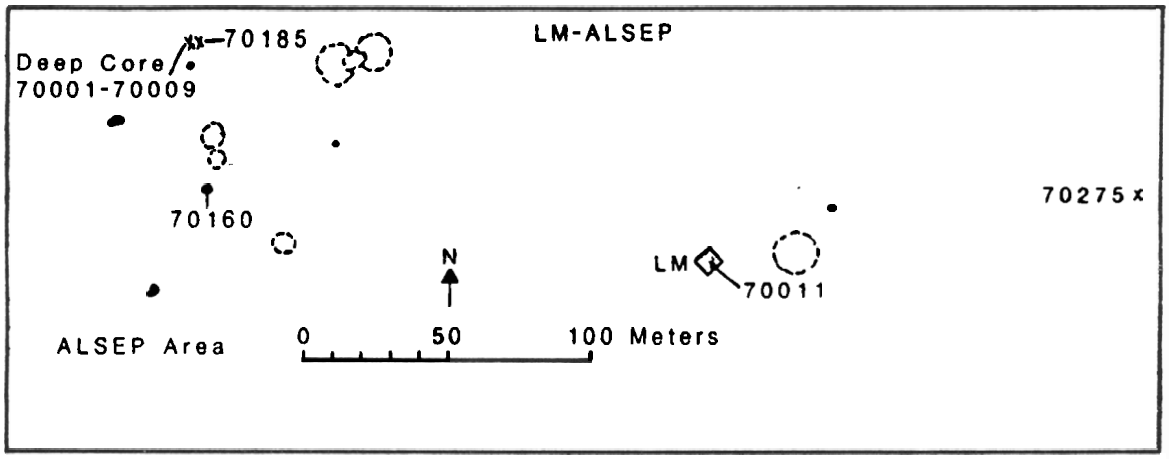
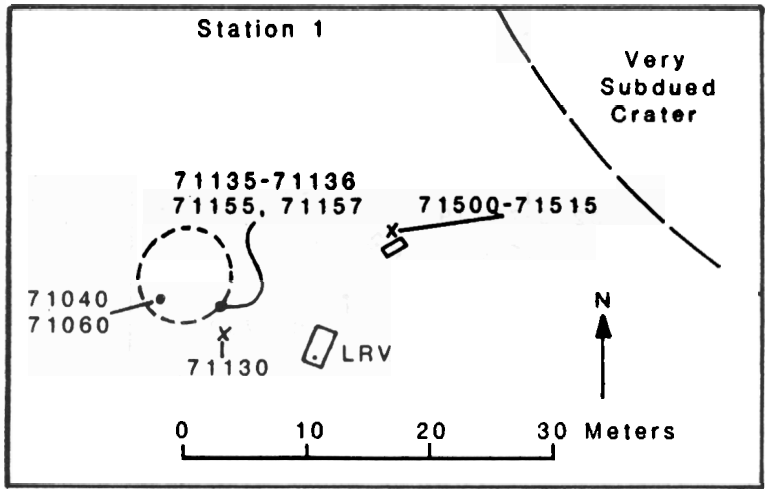
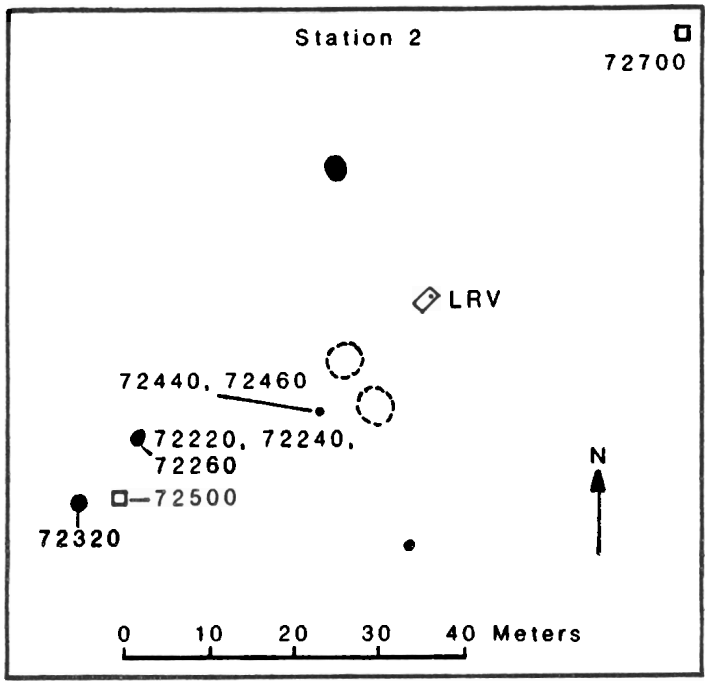
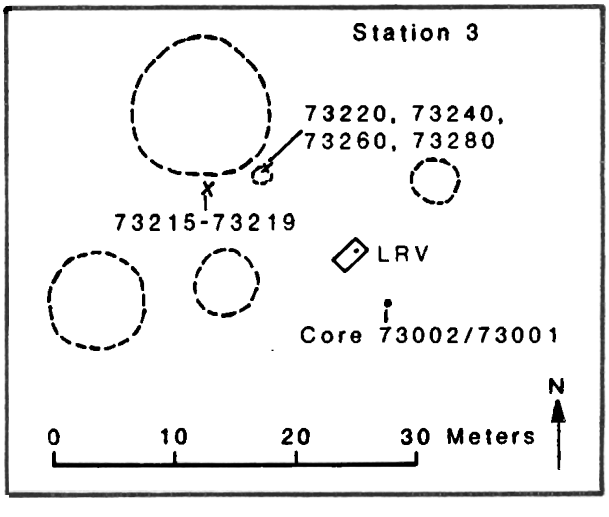
3 LRV STATION
LM
PHYSIOGRAPHIC BOUNDARY
SCARP
CRATER



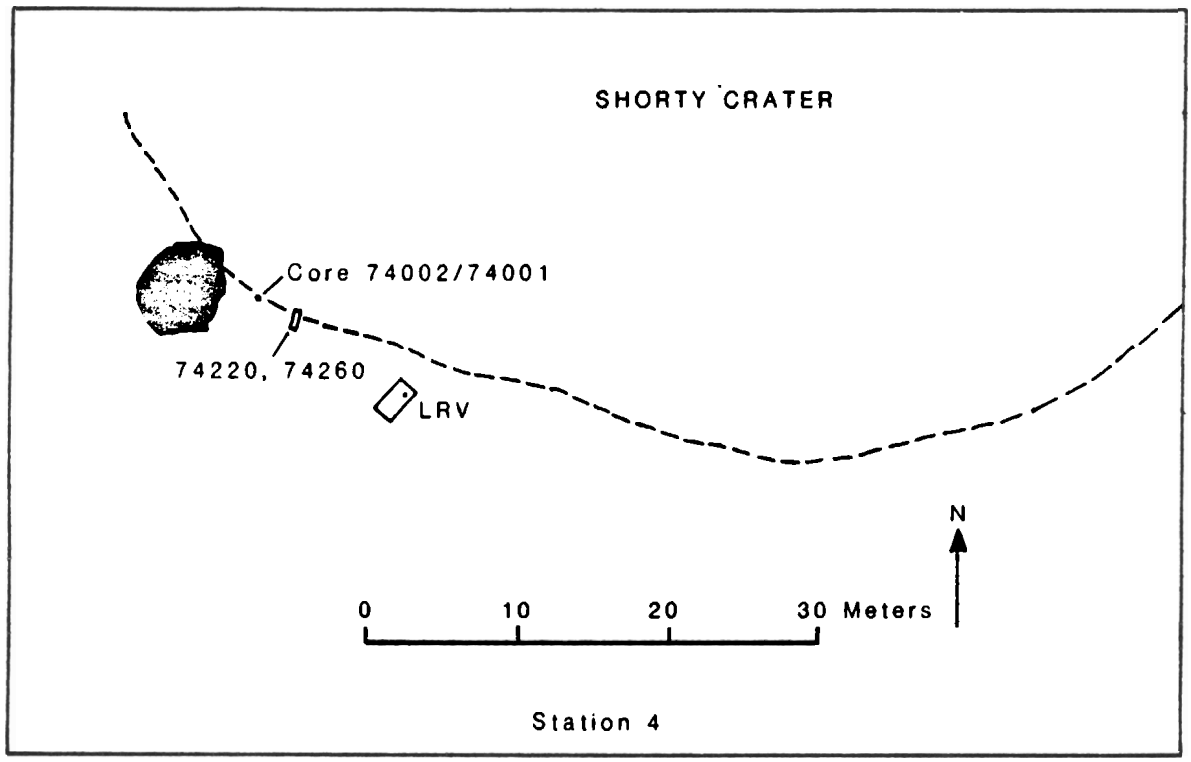


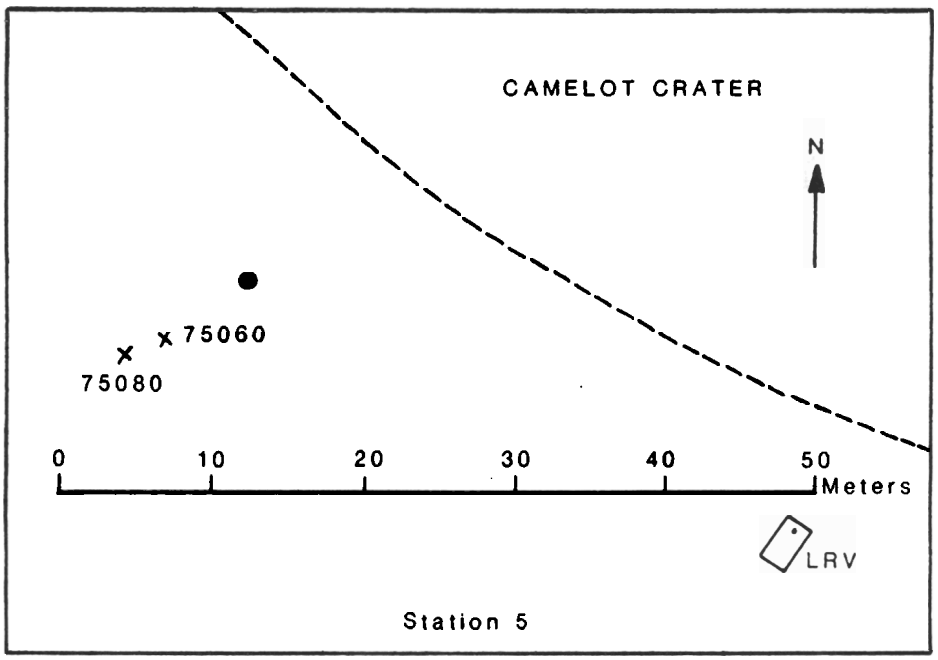
Station 1 & LM-ALSEP Maps Showing Sample Collection Sites.
Modified from U. S. Geological Survey Interagency Report 71.



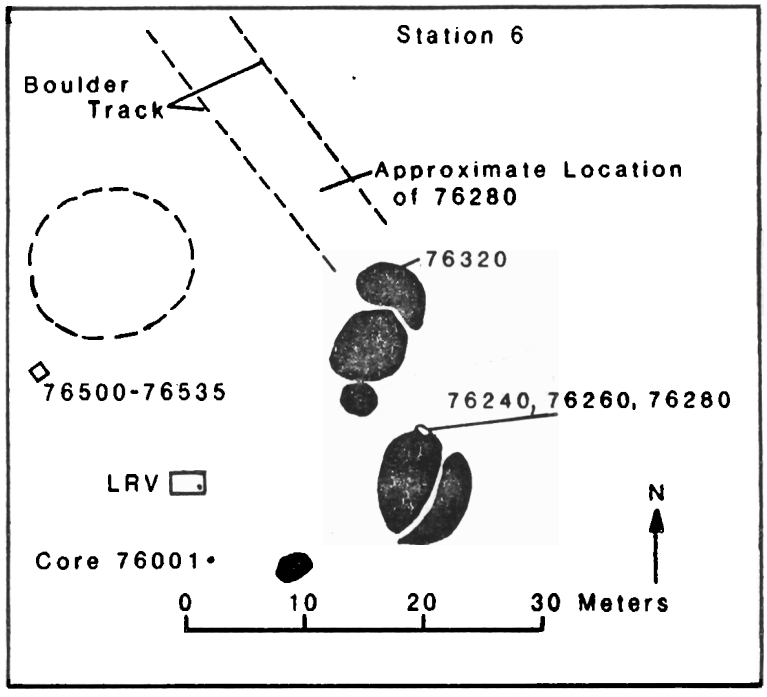


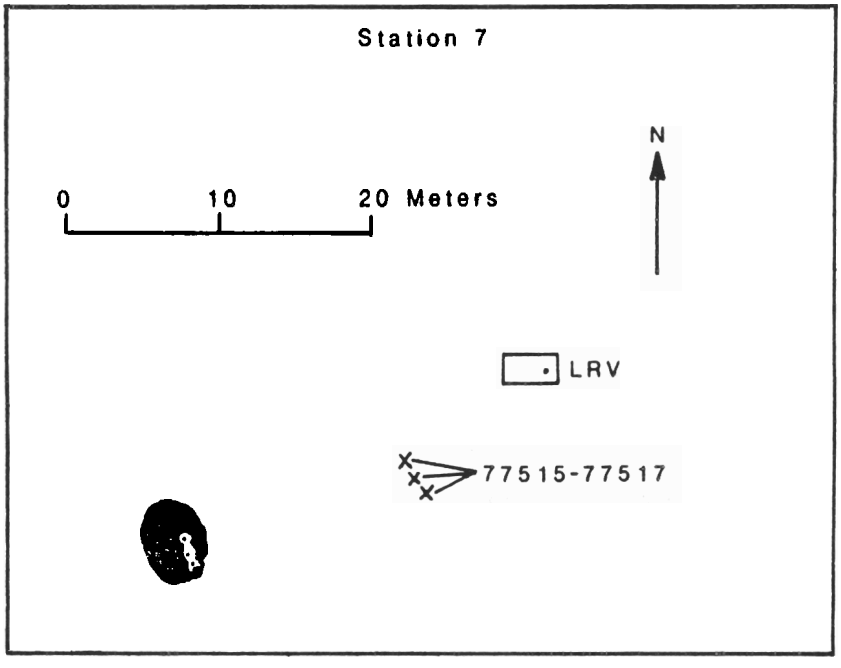
Station 2 & 3 Maps Showing Sample Collection Sites.
Modified from U. S. Geological Survey Interagency Report 71.



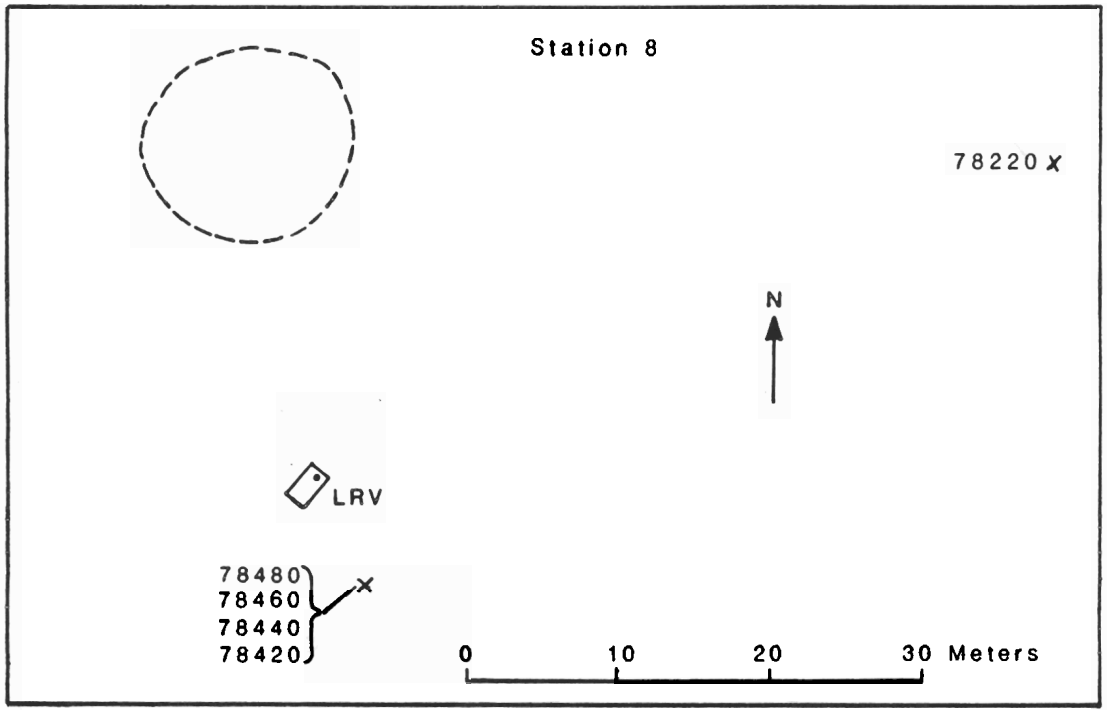


Station 4 & 5 Maps Showing Sample Collection Sites.
Modified from U. S. Geological Survey Interagency Report 71.

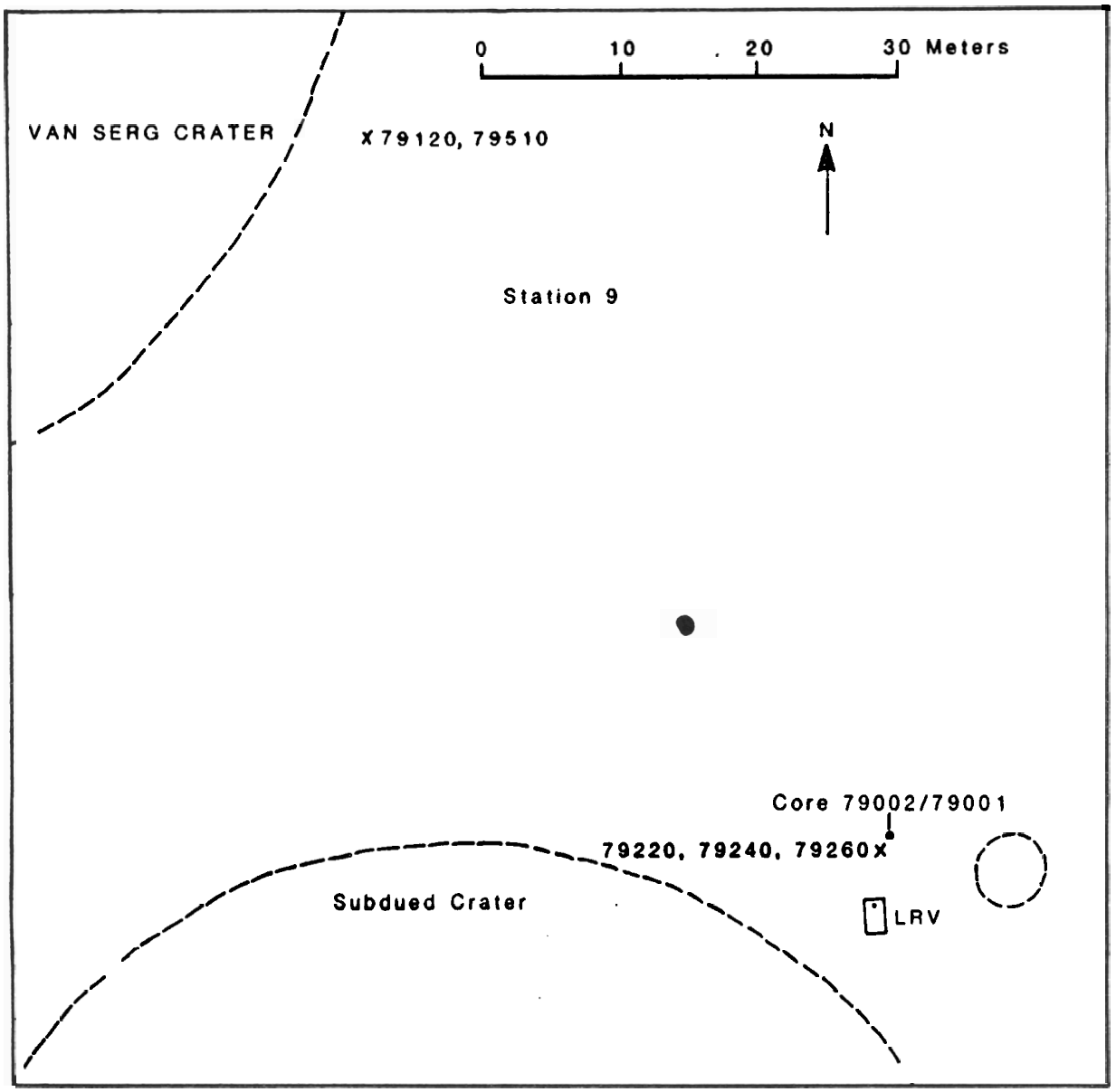




Station 6 & 7 Maps Showing Sample Collection Sites.
Modified from U. S. Geological Survey Interagency Report 71.



Station 8 Map Showing Sample Collection Sites.
Modified from U. S. Geological Survey Interagency Report 71.



Station 9 Map Showing Sample Collection Sites.
Modified from U. S. Geological Survey Interagency Report 71

APOLLO 17

EXPLANATION FOR STATION MAPS

x or •	Location of sample containers
	LRV, dot shows TV camera
	Large rocks
	Crater rims
ALSEP	Apollo lunar surface experiments package
	Rake and soil sample location

SOIL: 70011

LOCATION COMMENTS: The fuel products contamination sample was collected under the LM, near the Z footpad. Surface sample, collected from 0-3 cm depth.

GENERIC SUBSAMPLES:

1.		(gm):	< 1 mm
2.		(gm):	1-2 mm
3.		(gm):	2-4 mm
4.		(gm):	4-10 mm
5.		(gm):	> 1 cm
6.	70011	(440.7 gm):	Reserve

MISCELLANEOUS:

1. Collected mass: 440.7
2. Color: Med. dark gray (field description)
3. Bag no.: SESC
4. Container: Collected in a vacuum container on the lunar surface. Vacuum container was returned in sample collection bag 5.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 54.0, submature
2. Agglutinates: 37
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Rose et al., 1974)

	%
SiO_2 :	41.03
TiO_2 :	8.30
Al_2O_3:	11.98
Cr_2O_3:	0.41
FeO :	16.24
MnO :	0.23
MgO :	10.08
CaO :	11.08
Na_2O :	0.31
K_2O :	0.08
P_2O_5 :	0.10
S :	

TRACE ELEMENTS: (Wänke et al., 1974)

	ppm		ppm
Sc:	53.1	La:	8.03
V :		Ce:	23.5
Co:	31.6	Nd:	
Ni:		Sm:	8.0
Ba:	102	Eu:	1.67
Sr:		Tb:	1.9
Hf:	6.5	Dy:	12.5
Ta:	1.2	Ho:	2.8
Th:		Tm:	
U :	0.24	Yb:	7.04
		Lu:	1.02

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SOIL: 70160

LOCATION COMMENTS: Fillet near the ALSEP central station. Collected at base of a 1.5 m diameter basalt boulder from depth of 0 to 5 cm.

GENERIC SUBSAMPLES:

1. 70161 (197.7 gm): < 1 mm
2. 70162 (5.14 gm): 1-2 mm
3. 70163 (3.43 gm): 2-4 mm
4. 70164 (1.66 gm): 4-10 mm
5.* 70165 (2.143 gm): > 1 cm
6. 70160 (106.1 gm): Reserve

* Not included in mass of soil.

MISCELLANEOUS:

1. Collected mass: 316.173
2. Color: Brownish gray (5YR 4/1)
3. Bag no.: Doc. bag 474
4. Container: Returned in sample collection bag 1, in vacuum container (SRC-1). Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO:
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 65.6 um
2. M_d: 61.6 um
3.

MAJOR ELEMENTS: (Apollo 17 P.E.T., 1973)

	%
SiO_2 :	40.34
TiO_2 :	8.99
Al_2O_3:	11.60
Cr_2O_3:	0.46
FeO :	17.01
MnO :	0.23
MgO :	9.79
CaO :	10.98
Na_2O :	0.32
K_2O :	0.08
P_2O_5 :	0.08
S :	0.12

TRACE ELEMENTS: (Rhodes et al., 1974)

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:	161	Sm:	
Ba:		Eu:	
Sr:	168	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	34.0
Basalt, Equi. }	15.0
Basalt, Vario. }	
Breccia:	
Low-Grade-Brown	5.0
Low-Grade-Colorless	-
Med-High Grade	2.0
Anorthosite	-
Cataclastic Anorthosite	-
Norite	-
Gabbro	-
Plagioclase	9.0
Clinopyroxene	21.6
Orthopyroxene	-
Olivine	0.3
Ilmenite	5.0
Glass:	
Orange	2.0
"Black"	5.2
Colorless	0.3
Brown	0.6
Gray, "Ropy"	-
Other	-
Total Number Grains	300

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SOIL: 70180

LOCATION COMMENTS: Located 3 m from deep drill core, near the ALSEP. Surface sample (0-5 cm depth).

GENERIC SUBSAMPLES:

1. 70181 (157.1 gm): < 1 mm
2. 70182 (4.63 gm): 1-2 mm
3. 70183 (3.12 gm): 2-4 mm
4. 70184 (1.68 gm): 4-10 mm
5.* 70185 (466.6 gm): > 1 cm
6. 70180 (93.25 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 259.78
2. Color: Dark olive gray (5Y 3/1)
3. Bag no.: Doc. bag 475
4. Container: Returned in sample container bag 1, in vacuum. Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 47.0, submature
2. Agglutinates: 56
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 67 um (< 1 cm); 58 um (< 1 mm)
2. M_d: 59 um
3.

MAJOR ELEMENTS: (Apollo 17 P.E.T., 1973)

	%
SiO_2 :	40.87
TiO_2 :	8.11
Al_2O_3:	12.30
Cr_2O_3:	0.44
FeO :	16.37
MnO :	0.24
MgO :	9.82
CaO :	11.05
Na_2O :	0.35
K_2O :	0.08
P_2O_5 :	0.06
S :	0.11

TRACE ELEMENTS: (Rhodes et al., 1974)

	ppm		ppm
Sc:		La:	8.09
V :		Ce:	24.8
Co:		Nd:	-
Ni:	191	Sm:	8.05
Ba:	98.3	Eu:	1.66
Sr:	170	Tb:	
Hf:		Dy:	13.2
Ta:		Ho:	
Th:	-	Tm:	
U :	0.28	Yb:	7.02
		Lu:	

PETROGRAPHY: (Heiken and McKay, 1974)

Components	%
Agglutinates	56.0
Basalt, Equi.)	14.0
Basalt, Vario.)	
Breccia:	
Low-Grade-Brown	4.6
Low-Grade-Colorless	0.3
Med-High Grade	2.6
Anorthosite	-
Cataclastic Anorthosite	0.3
Norite	
Gabbro	-
Plagioclase	4.3
Clinopyroxene	10.3
Orthopyroxene	0.3
Olivine	-
Ilmenite	2.3
Glass:	
Orange	3.0
"Black"	0.6
Colorless	0.3
Brown	0.6
Gray, "Ropy"	
Other	
Total Number Grains	300

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VOL. 2, 1959-1968

SOIL: 70250

LOCATION COMMENTS: Collected near the SEP, 180 m at 073° azimuth from LM. Surface sample.

GENERIC SUBSAMPLES:

1. 70251 (31.98 gm): < 1 mm
2. 70252 (0.90 gm): 1-2 mm
3. 70253 (0.87 gm): 2-4 mm
4. 70254 (1.14 gm): 4-10 mm
5. 70256 (2.16 gm): > 1 cm
6. 70250 (16.55 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 62.04 gm
2. Color: Med. gray (N5)
3. Bag no.: Doc. bag 22E
4. Container: Returned in sample collection bag B, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 43.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

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ORIGINS AND SIZE DISTRIBUTION OF METALLIC IRON PARTICLES
IN THE LUNAR REGOLITH
IN PROCEEDINGS OF THE 11TH LUNAR AND PLANETARY SCIENCE CONFERENCE
VOL. 2, 1697-1712

SOIL:70270

LOCATION COMMENTS: Documented rock and soil LRV sample collected near SEP. Very cohesive soil. Very flat, level regolith surface.

GENERIC SUBSAMPLES:

1. 70271 (116.1 gm): < 1 mm
2. 70272 (2.97 gm): 1-2 mm
3. 70273 (1.46 gm): 2-4 mm
4. 70274 (2.33 gm): 4-10 mm
5.* 70275 (171.4 gm): > 1 cm
6. 70270 (70.46 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 193.32 gm
2. Color: Dark olive gray (5Y 3/1)
3. Bag no.: Doc. bag 23E
4. Container: Return in sample collection bag 8, in air. Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 56.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

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SOIL: 70311

LOCATION COMMENTS: LRV sample collected between Station 9 and LM. Rock plus soil. Relatively flat regolith surface. Scooped from upper few centimeters. Station is LRV 12.

GENERIC SUBSAMPLES:

1. 70311 (106.5 gm): < 1 mm
2. 70312 (4.2 gm): 1-2 mm
3. 70313 (3.21 gm): 2-4 mm
4. 70314 (5.25 gm): 4-10 mm
5.* 70315 (148.6 gm): > 1 cm
6. 70310 (6.82 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 119.16 gm
2. Color: Med. dark gray (N4)
3. Bag no.: Doc. bag 54Y
4. Container: Returned in sample collection bag 5, in air. Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 39.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	
Cr_2O_3:	
FeO :	
MnO :	
MgO :	
CaO :	
Na_2O :	
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS:

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:		Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

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SOIL: 70320

LOCATION COMMENTS: Surface sample at Sherlock Crater, Station LRV 12. LRV is located between Station 9 and LM. Scooped from upper few centimeters. Cohesive soil.

GENERIC SUBSAMPLES:

1. 70321 (141.6 gm): < 1 mm
2. 70322 (5.42 gm): 1-2 mm
3. 70323 (4.10 gm): 2-4 mm
4. 70324 (4.0 gm): 4-10 mm
5. (gm): > 1 cm
6. 70320 (78.24 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 233.36 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 53Y
4. Container: Returned in sample collection bag 5, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 42.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

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PROCEEDINGS OF THE SIXTH LUNAR SCIENCE CONFERENCE
VOL. 2 P. 1823-1844

SOIL: 71040

LOCATION COMMENTS: Station 1A, near "Tombstone" rock. Surface soil (0-2 cm depth). Collected in shadow of the boulder.

GENERIC SUBSAMPLES:

	71041	(137.8 gm):	< 1 mm
	71042	(7.21 gm):	1-2 mm
	71043	(6.19 gm):	2-4 mm
	71044	(12.84 gm):	4-10 mm
5.*	71045 to 71049	(23.617 gm):	> 1 cm
6.	71040	(94.89 gm):	Reserve

* 71075 also derived from this split.

MISCELLANEOUS:

1. Collected mass: 282.547 gm
2. Color: Dark olive gray (5Y 3/1)
3. Bag no.: Doc. bag 455
4. Container: Returned in sample collection bag 1, in sample return container 1, in vacuum. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 29.0, immature
2. Agglutinates: 27.0
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 114 um (< 1 cm); 56 um (< 1 mm)
2. M_d: 75.4 um
3.

MAJOR ELEMENTS: (Apollo 17 P.E.T., 1973)

	%
SiO_2 :	39.74
TiO_2 :	9.57
Al_2O_3:	10.80
Cr_2O_3:	0.47
FeO :	17.73
MnO :	0.24
MgO :	9.72
CaO :	10.72
Na_2O :	0.35
K_2O :	0.08
P_2O_5 :	0.07
S :	0.13

TRACE ELEMENTS: (Rhodes et al., 1974)

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:	117	Sm:	
Ba:		Eu:	
Sr:	165	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (90-150 um) (Heiken and McKay, 1974)

Components	%
Agglutinates	27.4
Basalt, Equi.)	12.7
Basalt, Vario.)	1.0
Breccia:	
Low-Grade-Brown	1.0
Low-Grade-Colorless	1.0
Med-High Grade	2.5
Anorthosite	-
Cataclastic Anorthosite	1.0
Norite	-
Gabbro	
Plagioclase	12.2
Clinopyroxene	17.3
Orthopyroxene	-
Olivine	0.5
Ilmenite	5.6
Glass:	
Orange	3.6
"Black"	8.1
Colorless	2.0
Brown	4.1
Gray, "Ropy"	-
Other	-
Total Number Grains	197

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22NA-26AL STUDIES OF LUNAR REGOLITH
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VOL. 2 P. 1823-1844

SOIL: 71060

LOCATION COMMENTS: Near "Tombstone Rock," Station 1A. Collected in the shadow of the boulder at a depth of 5-6 cm.

GENERIC SUBSAMPLES:

1. 71061 (229.2 gm): < 1 mm
2. 71062 (20.74 gm): 1-2 mm
3. 71063 (22.79 gm): 2-4 mm
4. 71064 (34.35 gm): 4-10 mm
5.* 71065 (78.235 gm): > 1 cm
   to 71069
6. 71060 (199.4 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 584.715 gm
2. Color: Med. dark gray to brownish gray
3. Bag no.: Doc. bag 456
4. Container: Returned in sample collection bag 1, in sample return container 1, in vacuum. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 14.0, immature
2. **Agglutinates: 27.0**
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 114 um (< 1 cm); 56 um (< 1 mm)
2. M_d: 107.3 um
3.

MAJOR ELEMENTS: (Apollo 17 P.E.T., 1973)

	%
SiO_2 :	40.09
TiO_2 :	9.32
Al_2O_3:	10.70
Cr_2O_3:	0.49
FeO :	17.85
MnO :	0.24
MgO :	9.92
CaO :	10.59
Na_2O :	0.36
K_2O :	0.08
P_2O_5 :	0.07
S :	0.13

TRACE ELEMENTS: (Korotev, 1976)

	ppm		ppm
Sc:	70.3	La:	
V :		Ce:	
Co:	26.3	Nd:	
Ni:	<50	Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:	7.4	Dy:	
Ta:	1.6	Ho:	
Th:	0.6	Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	9.3
Basalt, Equi.)	19.6
Basalt, Vario.)	
Breccia:	
Low-Grade-Brown	3.6
Low-Grade-Colorless	0.6
Med-High Grade	1.6
Anorthosite	0.3
Cataclastic Anorthosite	-
Norite	-
Gabbro	-
Plagioclase	17.3
Clinopyroxene	21.0
Orthopyroxene	-
Olivine	-
Ilmenite	4.6
Glass:	
Orange	6.3
"Black"	9.6
Colorless	1.3
Brown	4.6
Gray, "Ropy"	-
Other	-
Total Number Grains	300

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VOL. 2 P. 1823-1844

SOIL: 71130

LOCATION COMMENTS: Station 1A. Soil collected with 2 basalt chips near a 0.5 m diameter basalt boulder. The boulder is located on the southeast rim of a 10 m blocky crater.

GENERIC SUBSAMPLES:

1. 71131 (86.4 gm): < 1 mm
2. 71132 (3.99 gm): 1-2 mm
3. 71133 (3.22 gm): 2-4 mm
4. 71134 (0.91 gm): 4-10 mm
5.* 71135 (62.24 gm): > 1 cm
   to 71136
6. 71130 (49.51 gm): Reserve

* Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 144.03 gm
2. Color: Olive gray to olive black (5Y 2/1 - 5Y 4/1)
3. Bag no.: Doc. bag 477
4. Container: Returned in sample collection bag 1, in sample return container 1, in vacuum. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 33.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:

MAJOR ELEMENTS:

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	
Cr_2O_3:	
FeO :	
MnO :	
MgO :	
CaO :	
Na_2O :	
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS:
(Eldridge et al., 1974)

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:		Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:	0.67	Tm:	
U :	0.23	Yb:	
K :	625	Lu:	

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SOIL: 71150

LOCATION COMMENTS: Station 1A. Surface soil scooped up with a basalt fragment near a 0.5 m diameter basalt boulder.

GENERIC SUBSAMPLES:

1. 71151 (57.6 gm): < 1 mm
2. 71152 (2.60 gm): 1-2 mm
3. 71153 (2.36 gm): 2-4 mm
4. 71154 (1.37 gm): 4-10 mm
5.* 71155 to 71157 (26.15 gm): > 1 cm
6. 71150 (1.565 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 70.816 gm
2. Color: Dark olive gray (5Y 3/1)
3. Bag no.: Doc. bag 478
4. Container: Returned in sample collection bag 1, in sample return container 1, in vacuum. Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 34.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	
Cr_2O_3:	
FeO :	
MnO :	
MgO :	
CaO :	
Na_2O :	
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS:

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:		Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

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VOL. 2, 1697-1712

SOIL: 71500

LOCATION COMMENTS: Station 1. Surface sample collected 15 m northeast of a 10 m diameter blocky crater. Collected with the rake sample (71520-71597).

GENERIC SUBSAMPLES:

1. 71501 (600.9 gm): < 1 mm
2. 71502 (22.68 gm): 1-2 mm
3. 71503 (17.58 gm): 2-4 mm
4. 71504 (13.13 gm): 4-10 mm
5.* 71505 (52.27 gm): > 1 cm
   to 71509
6. 71500 (359.5 gm): Reserve

* 71515 also derived from this split.

MISCELLANEOUS:

1. Collected mass: 1066.06 gm
2. Color: Olive gray to olive black (5Y 4/1 - 5Y 2/1)
3. Bag no.: Doc. bag 459
4. Container: Returned in sample collection bag 1, in sample return container 1, in vacuum. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 35.0, submature
2. Agglutinates: 35.0
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 83 um (< 1 cm); 65 um (< 1 mm)
2. M_d: 69.3 um
3.

MAJOR ELEMENTS:
(Apollo 17 P.E.T., 1973)

	%
SiO_2 :	39.82
TiO_2 :	9.52
Al_2O_3:	11.13
Cr_2O_3:	0.46
FeO :	17.41
MnO :	0.25
MgO :	9.51
CaO :	10.85
Na_2O :	0.32
K_2O :	0.07
P_2O_5 :	0.06
S :	0.12

TRACE ELEMENTS:
(Korotev, 1976)

	ppm		ppm
Sc:	73.0	La:	
V :		Ce:	
Co:	33.1	Nd:	
Ni:	<90	Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:	7.1	Dy:	
Ta:	1.9	Ho:	
Th:	0.4	Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	35.0
Basalt, Equi.)	24.6
Basalt, Vario.)	
Breccia:	
Low-Grade-Brown	2.3
Low-Grade-Colorless	0.6
Med-High Grade	2.3
Anorthosite	-
Cataclastic Anorthosite	-
Norite	-
Gabbro	-
Plagioclase	5.0
Clinopyroxene	17.3
Orthopyroxene	0.6
Olivine	-
Ilmenite	8.0
Glass:	
Orange	1.3
"Black"	1.3
Colorless	0.6
Brown	0.3
Gray, "Ropy"	-
Other	
Total Number Grains	300

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SOIL: 72130

LOCATION COMMENTS: LRV 1 sample. Surface scoop collected with large rock sample (72135) between Horatio and Bronte Craters. From a ray emanating from a 10-15 m diameter crater.

GENERIC SUBSAMPLES:

1. 72131 (107.9 gm): < 1 mm
2. 72132 (8.53 gm): 1-2 mm
3. 72133 (10.95 gm): 2-4 mm
4. 72134 (13.18 gm): 4-10 mm
5.* 72135 (336.9 gm): > 1 cm
6. 72130 (79.91 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 220.47 gm
2. Color: Dark olive gray (5Y 3/1)
3. Bag no.: Doc. bag 26E
4. Container: Returned in sample collection bag 8, in air. Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 60.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

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SOIL: 72140

LOCATION COMMENTS: LRV 2, between Stations 1 and 2 on the "prong" or very faint extension of the white mantle. Surface sample of a very cohesive soil. Ground surface is patterned, "raindrop" texture.

GENERIC SUBSAMPLES:

1. 72141 (225.9 gm): < 1 mm
2. 72142 (5.32 gm): 1-2 mm
3. 72143 (1.88 gm): 2-4 mm
4. 72144 (2.73 gm): 4-10 mm
5. 72145 (1.25 gm): > 1 cm
6. 72140 (115.0 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 352.08 gm
2. Color: Dark olive gray (5Y 3/1)
3. Bag no.: Doc. bag 27E
4. Container: Returned in sample collection bag 6, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 81.0, mature
2. Agglutinates: 51.0
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 57 um (< 1 cm); 50 um (< 1 mm)
2. M_d: 47.4 um
3.

MAJOR ELEMENTS: (Rhodes et al., 1974)

	%
SiO_2 :	43.11
TiO_2 :	4.37
Al_2O_3:	16.10
Cr_2O_3:	0.37
FeO :	13.45
MnO :	0.19
MgO :	10.25
CaO :	11.83
Na_2O :	0.40
K_2O :	0.12
P_2O_5 :	0.10
S :	0.09

TRACE ELEMENTS: (Rhodes et al., 1974)

	ppm		ppm
Sc:		La:	10.2
V :		Ce:	28.1
Co:		Nd:	20.7
Ni:	271	Sm:	6.70
Ba:		Eu:	1.35
Sr:	156	Tb:	
Hf:		Dy:	9.82
Ta:		Ho:	
Th:	-	Tm:	
U :	-	Yb:	5.28
		Lu:	-

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	5.0
Basalt, Equi.)	6.6
Basalt, Vario.)	0.6
Breccia:	
Low-Grade-Brown	4.0
Low-Grade-Colorless	4.0
Med-High Grade	1.6
Anorthosite	-
Cataclastic Anorthosite	1.3
Norite	0.3
Gabbro	0.3
Plagioclase	9.0
Clinopyroxene	7.0
Orthopyroxene	
Olivine	-
Ilmenite	0.6
Glass:	
Orange	1.3
"Black"	5.0
Colorless	1.6
Brown	3.9
Gray, "Ropy"	1.3
Other	
Total Number Grains	300

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SOIL: 72150

LOCATION COMMENTS: LRV 3 sample was collected 4.3 km east of the LM, on the way to Station 2 in "dark mantled" material between extensions of the light mantle. Collected with a rock (72155).

GENERIC SUBSAMPLES:

1.		(gm):	< 1 mm
2.		(gm):	1-2 mm
3.		(gm):	2-4 mm
4.		(gm):	4-10 mm
5.*	72155	(238.5 gm):	> 1 cm
6.	72150	(53.29 gm):	Reserve

MISCELLANEOUS:

1. Collected mass: 53.29 gm
2. Color: Dark brownish gray (5YR 3/1)
3. Bag no.: Doc. bag 28E
4. Container: Returned in sample collection bag 6, in air. Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 82.0, mature
2. Agglutinates: 53
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	
Cr_2O_3:	
FeO :	
MnO :	
MgO :	
CaO :	
Na_2O :	
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS: (Korotev, 1976)

	ppm		ppm
Sc:	44.1	La:	
V :		Ce:	
Co:	38.8	Nd:	
Ni:	265	Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:	5.2	Dy:	
Ta:	1.1	Ho:	
Th:	1.3	Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (90-150 um) (Heiken and McKay, 1974)

Components	%
Agglutinates	52.6
Basalt, Equi.	8.3
Basalt, Vario.	1.3
Breccia:	
Low-Grade-Brown	5.3
Low-Grade-Colorless	1.6
Med-High Grade	4.0
Anorthosite	
Cataclastic Anorthosite	0.3
Norite	-
Gabbro	-
Plagioclase	5.3
Clinopyroxene	5.3
Orthopyroxene	
Olivine	-
Ilmenite	0.6
Glass:	
Orange	3.9
"Black"	5.3
Colorless	1.3
Brown	2.8
Gray, "Ropy"	0.6
Other	0.3
Total Number Grains	300

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SOIL: 72160

LOCATION COMMENTS: LRV 3, between SEP and Station 2. From "typical dark-mantled" area. Surface sample.

GENERIC SUBSAMPLES:

1. 72161 (162.5 gm): < 1 mm
2. 72162 (4.018 gm): 1-2 mm
3. 72163 (2.538 gm): 2-4 mm
4. 72164 (0.946 gm): 4-10 mm
5. (gm): > 1 cm
6. 72160 (80.0 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 250.002 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 29E
4. Container: Returned in sample collection bag 8, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 87.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 69 um
2. M_d:
3.

PETROGRAPHY: (90-124 um)
(Basu et al., 1974)

Components	%
Plagioclase	3.8
Pyroxenes, etc.	2.4
Rocks (basalt?)	2.4
Breccia:	
Vitric, Dark	34.5
Vitric, Light	15.4
Recrystallized	2.0
Glass:	
Spherules	1.0
Irregular	7.5
Agglutinates	31.1

MAJOR ELEMENTS:
(Rhodes et al., 1974)

	%
SiO_2 :	42.12
TiO_2 :	5.21
Al_2O_3:	14.22
Cr_2O_3:	0.42
FeO :	14.86
MnO :	0.22
MgO :	10.54
CaO :	11.17
Na_2O :	0.41
K_2O :	0.11
P_2O_5 :	0.08
S :	0.08

TRACE ELEMENTS:
(Rhodes et al., 1974)

	ppm		ppm
Sc:		La:	9.71
V :		Ce:	27.0
Co:		Nd:	-
Ni:	273	Sm:	6.94
Ba:		Eu:	1.42
Sr:	150	Tb:	
Hf:		Dy:	10.4
Ta:		Ho:	
Th:	-	Tm:	
U :	0.41	Yb:	5.51
		Lu:	-

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SOIL: 72220

LOCATION COMMENTS: Station 2, uphill from base of South Massif. This soil was collected from a fillet developed under an overhang of a 2 m diameter breccia boulder. Not permanently shadowed; an east-facing overhang. Surface soil (0-2 cm).

GENERIC SUBSAMPLES:

1. 72221 (225.8 gm): < 1 mm
2. 72222 (11.13 gm): 1-2 mm
3. 72223 (7.92 gm): 2-4 mm
4. 72224 (7.51 gm): 4-10 mm
5. (gm): > 1 cm
6. 72220 (136.2 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 388.56 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 496
4. Container: Returned in sample collection bag 8, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 58.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	
Cr_2O_3:	
FeO :	
MnO :	
MgO :	
CaO :	
Na_2O :	
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS:
(Keith et al., 1974)

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:		Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:	$3.6 \pm .4$	Tm:	
U :	$.89 \pm .03$	Yb:	
		Lu:	

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SOIL: 72240

LOCATION COMMENTS: Station 2, lower slopes of the South Massif. Sample of a fillet from the base of a 2 m diameter boulder (within 1 m of the base).

GENERIC SUBSAMPLES:

1. 72241 (186.0 gm): < 1 mm
2. 72242 (11.20 gm): 1-2 mm
3. 72243 (7.93 gm): 2-4 mm
4. 72244 (3.99 gm): 4-10 mm
5. (gm): > 1 cm
6. 72240 (113.3 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 322.42 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 497
4. Container: Returned in sample collection bag 8, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 64.0, mature
2. Agglutinates:

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	
Cr_2O_3:	
FeO :	
MnO :	
MgO :	
CaO :	
Na_2O :	
K_2O :	0.144
P_2O_5 :	
S :	

TRACE ELEMENTS:
(Keith et al., 1974)

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:		Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:	3.6±.5	Tm:	
U :	.94±.03	Yb:	
		Lu:	

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SOIL: 72260

LOCATION COMMENTS: Station 2, located on the lower slopes near the base of the South Massif. Skim sample (upper 1 cm) of a fillet near a 2 m diameter boulder.

GENERIC SUBSAMPLES:

1. 72261 (161.9 gm): < 1 mm
2. 72262 (7.70 gm): 1-2 mm
3. 72263 (4.4 gm): 2-4 mm
4. 72264 (4.4 gm): 4-10 mm
5. (gm): > 1 cm
6. 72260 (100.60 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 279.0 gm
2. Color: Med. gray (field description)
3. Bag no.: Doc. bag 498
4. Container: Returned in sample collection bag 8, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 59.0, submature
2. Agglutinates:
3.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

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SOIL: 72320

LOCATION COMMENTS: Station 2, near base of South Massif. "Shadowed" soil collected about 20 cm under the east-west overhang of a 2 m diameter boulder.

GENERIC SUBSAMPLES:

1. 72321 (77.3 gm): < 1 mm
2. 72322 (1.38 gm): 1-2 mm
3. 72323 (0.50 gm): 2-4 mm
4. 72324 (0.96 gm): 4-10 mm
5. (gm): > 1 cm
6. 72320 (26.17 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 106.31 gm
2. Color: Med. gray (N5)
3. Bag no.: Doc. bag 500
4. Container: Returned in sample collection bag 8, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 73.0, mature
2. Agglutinates: 45.0

GRAIN SIZE PARAMETERS:

1. M_z: 53 um (< 1 cm); 47 um (< 1 mm)
2. M_d:
3.

MAJOR ELEMENTS: (Rhodes et al., 1974)

	%
SiO_2 :	44.91
TiO_2 :	1.56
Al_2O_3:	20.57
Cr_2O_3:	
FeO :	8.65
MnO :	0.13
MgO :	9.84
CaO :	12.82
Na_2O :	0.47
K_2O :	0.16
P_2O_5 :	0.15
S :	0.06

TRACE ELEMENTS: (Laul et al., 1974)

	ppm		ppm
Sc:	18	La:	17.1
V :	50	Ce:	45
Co:	30	Nd:	30
Ni:	250	Sm:	8.3
Ba:	190	Eu:	1.31
Sr:	155	Tb:	1.7
Hf:	6.2	Dy:	11
Ta:	0.84	Ho:	
Th:	2.9	Tm:	
U :	1.0	Yb:	6.1
Zr:	200	Lu:	0.85
Ir:	10		
Au:	5		

PETROGRAPHY: (90-150 um) (Heiken and McKay, 1974)

Components	%
Agglutinates	45.3
Basalt, Equi.	2.3
Basalt, Vario.	0.7
Breccia:	
Low-Grade-Brown	5.3
Low-Grade-Colorless	7.3
Med-High Grade	15.6
Anorthosite	0.7
Cataclastic Anorthosite	1.7
Norite	2.0
Gabbro	-
Plagioclase	9.3
Clinopyroxene	2.7
Orthopyroxene	0.3
Olivine	0.3
Ilmenite	Tr.
Glass:	
Orange	Tr.
"Black"	1.3
Colorless	1.0
Brown	2.0
Gray, "Ropy"	0.7
Other	-
Total Number Grains	300

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SOIL: 72430

LOCATION COMMENTS: Station 2, at base of South Massif. Soil was scooped up when a blue-gray breccia sample chipped from a boulder was picked up.

GENERIC SUBSAMPLES:

1. 72431 (72.00 gm): < 1 mm
2. 72432 (3.62 gm): 1-2 mm
3. 72433 (2.33 gm): 2-4 mm
4. 72434 (1.47 gm): 4-10 mm
5.* 72435 (160.6 gm): > 1 cm
6. 72430 (1.45 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 79.42 gm
2. Color: Med. olive gray (5Y 5/1)
3. Bag no.: Doc. bag 504
4. Container: Returned in sample collection bag 8, in air. Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 63.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

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SOIL: 72440

LOCATION COMMENTS: Station 2, near base of South Massif. Upper 4 cm of soil collected from under a 2-3 m diameter breccia boulder which was rolled over by the crew.

GENERIC SUBSAMPLES:

1. 72441 (267.3 gm): < 1 mm
2. 72442 (10.60 gm): 1-2 mm
3. 72443 (7.98 gm): 2-4 mm
4. 72444 (2.91 gm): 4-10 mm
5. (gm): > 1 cm
6. 72440 (161.6 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 450.39 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 505
4. Container: Returned in sample collection bag 8, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 68.0, mature
2. Agglutinates: 42
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 65 um (< 1 cm); 53 um (< 1 mm)
2. M_d: 50.8 um

MAJOR ELEMENTS:
(Rhodes et al., 1974)

	%
SiO_2 :	45.03
TiO_2 :	1.55
Al_2O_3:	20.51
Cr_2O_3:	0.22
FeO :	8.85
MnO :	0.13
MgO :	9.89
CaO :	12.83
Na_2O :	0.46
K_2O :	0.17
P_2O_5 :	0.17
S :	0.07

TRACE ELEMENTS:
(Laul et al., 1974)

	ppm		ppm
Sc:	18	La:	17.8
V :	50	Ce:	46
Co:	30	Nd:	30
Ni:	270	Sm:	8.3
Ba:	190	Eu:	1.31
Sr:	150	Tb:	1.7
Hf:	6.1	Dy:	10
Ta:	0.86	Ho:	
Th:	2.8	Tm:	
U :	1.0	Yb:	6.0
Zr:	200	Lu:	0.86
Ir:	9		
Au:	4		

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	41.7
Basalt, Equi.	1.3
Basalt, Vario.	1.3
Breccia:	
Low-Grade-Brown	9.3
Low-Grade-Colorless	6.3
Med-High Grade	19.3
Anorthosite	1.0
Cataclastic Anorthosite	1.3
Norite	0.7
Gabbro	-
Plagioclase	6.7
Clinopyroxene	3.0
Orthopyroxene	3.3
Olivine	0.7
Ilmenite	0.3
Glass:	
Orange	0.3
"Black"	0.3
Colorless	1.3
Brown	1.0
Gray, "Ropy"	0.3
Other	-
Total Number Grains	300

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SOIL: 72460

LOCATION COMMENTS: Station 2, near base of South Massif. Skim sample (upper 1 cm) of soil collected under a 2-3 m diameter breccia boulder rolled over by the crew.

GENERIC SUBSAMPLES:

1. 72461 (113.7 gm): < 1 mm
2. 72462 (5.14 gm): 1-2 mm
3. 72463 (3.90 gm): 2-4 mm
4. 72464 (1.76 gm): 4-10 mm
5. (gm): > 1 cm
6. 72460 (0.51 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 125.01 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 506
4. Container: Returned in sample collection bag 8, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 71.0, mature
2. Agglutinates: 43
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 80 um (< 1 cm); 61 um (< 1 mm)
2. M_d: 59 um
3.

MAJOR ELEMENTS: (Rhodes et al., 1974)

	%
SiO_2 :	44.48
TiO_2 :	1.50
Al_2O_3:	20.87
Cr_2O_3:	0.21
FeO :	8.58
MnO :	0.12
MgO :	9.69
CaO :	12.97
Na_2O :	0.47
K_2O :	0.17
P_2O_5 :	0.16
S :	0.06

TRACE ELEMENTS: (Laul et al.. 1974)

	ppm		ppm
Sc:	18	La:	17.6
V :	50	Ce:	45
Co:	30	Nd:	28
Ni:	230	Sm:	8.2
Ba:	190	Eu:	1.32
Sr:	145	Tb:	1.6
Hf:	6.0	Dy:	10
Ta:	0.80	Ho:	
Th:	2.8	Tm:	
U :	1.0	Yb:	6.0
Zr:	180	Lu:	0.86
Ir:	12		
Au:	5		

PETROGRAPHY: (90-150 um) (Heiken and McKay, 1974)

Components	%
Agglutinates	43.0
Basalt, Equi.	2.7
Basalt, Vario.	0.3
Breccia:	
Low-Grade-Brown	8.3
Low-Grade-Colorless	5.7
Med-High Grade	15.3
Anorthosite	2.0
Cataclastic Anorthosite	1.3
Norite	0.3
Gabbro	-
Plagioclase	11.0
Clinopyroxene	3.0
Orthopyroxene	3.0
Olivine	0.3
Ilmenite	0.6
Glass:	
Orange	0.7
"Black"	1.0
Colorless	1.0
Brown	1.3
Gray, "Ropy"	-
Other	-
Total Number Grains	300

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SOIL: 72500

LOCATION COMMENTS: Station 2, near base of South Massif. Surface soil to accompany rake sample (72530-72559). Sampled to a depth of 4 cm.

GENERIC SUBSAMPLES:

1. 72501 (687.2 gm): < 1 mm
2. 72502 (24.13 gm): 1-2 mm
3. 72503 (12.94 gm): 2-4 mm
4. 72504 (7.96 gm): 4-10 mm
5. 72505 (3.09 gm): > 1 cm
6. 72500 (325.5 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 1060.82
2. Color: Dark olive gray (5Y 3/1)
3. Bag no.: Doc. bag 502
4. Container: Returned in sample collection bag 8, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 81.0, mature
2. Agglutinates: 48
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 67 um (< 1 cm); 57 um (< 1 mm)
2. M_d:
3.

MAJOR ELEMENTS: (Apollo 17 P.E.T., 1973)

	%
SiO_2 :	45.12
TiO_2 :	1.56
Al_2O_3:	20.64
Cr_2O_3:	0.23
FeO :	8.77
MnO :	0.11
MgO :	10.08
CaO :	12.86
Na_2O :	0.40
K_2O :	0.16
P_2O_5 :	0.13
S :	0.09

TRACE ELEMENTS: (Laul et al., 1974)

	ppm		ppm
Sc:	18	La:	18.0
V :	45	Ce:	47
Co:	31	Nd:	30
Ni:	250	Sm:	8.2
Ba:	190	Eu:	1.33
Sr:	145	Tb:	1.7
Hf:	6.1	Dy:	11
Ta:	0.84	Ho:	
Th:	2.9	Tm:	
U :	1.0	Yb:	6.0
Zr:	220	Lu:	0.87
Ir:	8		
Au:	4		

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	48.0
Basalt, Equi.	3.3
Basalt, Vario.	-
Breccia:	
Low-Grade-Brown	8.3
Low-Grade-Colorless	8.7
Med-High Grade	12.6
Anorthosite	0.7
Cataclastic Anorthosite	1.7
Norite	0.3
Gabbro	-
Plagioclase	6.3
Clinopyroxene	3.3
Orthopyroxene	2.0
Olivine	0.7
Ilmenite	0.3
Glass:	
Orange	1.0
"Black"	1.0
Colorless	0.7
Brown	0.7
Gray, "Ropy"	-
Other	0.3
Total Number Grains	300

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SOIL: 72700

LOCATION COMMENTS: Station 2, at base of South Massif. Slightly upslope from Nansen Crater. Soil was collected to accompany rake sample (72730-72738). Surface sample collected from as deep as 5 cm.

GENERIC SUBSAMPLES:

1. 72701 (557.3 gm): < 1 mm
2. 72702 (17.7 gm): 1-2 mm
3. 72703 (8.05 gm): 2-4 mm
4. 72704 (4.76 gm): 4-10 mm
5. 72705 (2.39 gm): > 1 cm
6. 72700 (295.2 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 885.40 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 508
4. Container: Returned in sample collection bag 8, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 61.0, mature
2. Agglutinates: 43

GRAIN SIZE PARAMETERS:

1. M_z: 62 um (< 1 cm); 54 um (< 1 mm)
2. M_d: 53.7 um
3.

MAJOR ELEMENTS: (Apollo 17 P.E.T., 1973)

	%
SiO_2 :	44.87
TiO_2 :	1.52
Al_2O_3:	20.60
Cr_2O_3:	0.23
FeO :	8.65
MnO :	0.12
MgO :	9.97
CaO :	12.80
Na_2O :	0.40
K_2O :	0.16
P_2O_5 :	0.15
S :	0.07

TRACE ELEMENTS: (Rhodes et al., 1974)

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:	280.5	Sm:	
Ba:		Eu:	
Sr:	154	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	43.6
Basalt, Equi.	1.7
Basalt, Vario.	-
Breccia:	
Low-Grade-Brown	12.6
Low-Grade-Colorless	9.7
Med-High Grade	11.7
Anorthosite	1.3
Cataclastic Anorthosite	1.0
Norite	0.3
Gabbro	
Plagioclase	7.7
Clinopyroxene	3.0
Orthopyroxene	0.7
Olivine	1.7
Ilmenite	
Glass:	
Orange	1.0
"Black"	1.7
Colorless	0.7
Brown	1.3
Gray, "Ropy"	
Other	
Total Number Grains	300

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SOIL: 73120

LOCATION COMMENTS: Station 2A (LRV-4), about 750 m NNE of Station 2 and the base of the South Massif on the "light mantle." Surface soil collected from the upper few centimeters.

GENERIC SUBSAMPLES:

1. 73121 (179.70 gm): < 1 mm
2. 73122 (5.25 gm): 1-2 mm
3. 73123 (2.03 gm): 2-4 mm
4. 73124 (0.50 gm): 4-10 mm
5. (gm): > 1 cm
6. 73120 (100.2 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 287.68 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 30E
4. Container: Returned in sample collection bag 6, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 78, mature
2. Agglutinates: 42
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 64 um (< 1 cm); 58 um (< 1 mm)
2. M_d:
3.

MAJOR ELEMENTS: (Rose et al., 1974)

	%
SiO_2 :	45.56
TiO_2 :	1.39
Al_2O_3:	21.23
Cr_2O_3:	0.26
FeO :	8.45
MnO :	0.11
MgO :	9.73
CaO :	12.82
Na_2O :	0.39
K_2O :	0.17
P_2O_5 :	0.15
S :	

TRACE ELEMENTS: (Laul et al., 1974)

	ppm		ppm
Sc:	17	La:	15.6
V :	50	Ce:	39
Co:	31	Nd:	27
Ni:	280	Sm:	7.2
Ba:	150	Eu:	1.20
Sr:		Tb:	1.4
Hf:	5.0	Dy:	10
Ta:	0.78	Ho:	
Th:	2.4	Tm:	
U :	0.7	Yb:	5.3
Zr:	200	Lu:	0.77
Ir:	11		
Au:	3		

PETROGRAPHY: (90-150 um) (Heiken and McKay, 1974)

Components	%
Agglutinates	41.7
Basalt, Equi.	-
Basalt, Vario.	-
Breccia:	
Low-Grade-Brown	8.7
Low-Grade-Colorless	7.7
Med-High Grade	15.6
Anorthosite	0.3
Cataclastic Anorthosite	1.0
Norite	0.3
Gabbro	-
Plagioclase	8.3
Clinopyroxene	4.3
Orthopyroxene	2.3
Olivine	1.0
Ilmenite	2.0
Glass:	
Orange	1.7
"Black"	0.7
Colorless	2.3
Brown	2.0
Gray, "Ropy"	-
Other	-
Total Number Grains	300

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SOIL: 73130

LOCATION COMMENTS: Station 2A, located 750 m NNE of the base of South Massif on "light mantle." Collected as "soil breccia" or friable aggregate in the bottom of a 3 m diameter blocky crater. Apparently it didn't survive transport back to earth as a rock.

GENERIC SUBSAMPLES:

1. 73131 (132.3 gm): < 1 mm
2. 73132 (10.38 gm): 1-2 mm
3. 73133 (8.58 gm): 2-4 mm
4. 73134 (9.61 gm): 4-10 mm
5. (gm): > 1 cm
6. 73130 (77.20 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 238.07 gm
2. Color: Med. light gray (N6)
3. Bag no.: Doc. bag 31E
4. Container: Returned in sample collection bag 8, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 16.0, immature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (LSPET, 1973)	%	TRACE ELEMENTS: (LSPET, 1973)	ppm		ppm
SiO_2 :		Sc:	*15	La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:	*119	Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:	2.24	Tm:	
K_2O :	0.1397	U :	.63	Yb:	
P_2O_5 :				Lu:	
S :					

*dpm/kg

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SOIL: 73140

LOCATION COMMENTS: Station 2A, 750 m NNE of the base of South Massif. Light colored soil collected 15 cm below the regolith surface.

GENERIC SUBSAMPLES:

1. 73141 (191.4 gm): < 1 mm
2. 73142 (11.69 gm): 1-2 mm
3. 73143 (7.89 gm): 2-4 mm
4. 73144 (4.47 gm): 4-10 mm
5.* 73145 (8.61 gm): > 1 cm
   to 73146
6. 73140 (121.6 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 345.61 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 40Y
4. Container: Returned in sample collection bag 6, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 48.0, submature
2. Agglutinates: 32
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 74.8 um
2. M_d: 62.5 um
3.

MAJOR ELEMENTS:
(Rose et al., 1974)

	%
SiO_2 :	45.35
TiO_2 :	1.26
Al_2O_3:	21.56
Cr_2O_3:	0.24
FeO :	8.02
MnO :	0.11
MgO :	10.28
CaO :	12.91
Na_2O :	0.38
K_2O :	0.14
P_2O_5 :	0.12
S :	

TRACE ELEMENTS:
(Laul et al., 1974)

	ppm		ppm
Sc:	17	La:	15.5
V :	45	Ce:	38
Co:	30	Nd:	25
Ni:	240	Sm:	7.2
Ba:	160	Eu:	1.15
Sr:		Tb:	1.4
Hf:	4.9	Dy:	9.0
Ta:	0.75	Ho:	
Th:	2.1	Tm:	
U :	0.7	Yb:	5.1
Zr:	220	Lu:	0.75

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	32.0
Basalt, Equi.	2.6
Basalt, Vario.	
Breccia:	
Low-Grade-Brown	18.3
Low-Grade-Colorless	4.9
Med-High Grade	15.3
Anorthosite	0.3
Cataclastic Anorthosite	2.0
Norite	0.3
Gabbro	-
Plagioclase	14.0
Clinopyroxene	4.2
Orthopyroxene	1.0
Olivine	1.0
Ilmenite	0.7
Glass:	
Orange	Tr.
"Black"	0.6
Colorless	0.6
Brown	1.6
Gray, "Ropy"	-
Other	0.3
Total Number Grains	306

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SOIL: 73150

LOCATION COMMENTS: Station 2A, 750 m NNE of the base of South Massif. Soil collected with blue-gray breccia (73155). Surface sample.

GENERIC SUBSAMPLES:

1. 73151 (101.2 gm): < 1 mm
2. 73152 (3.57 gm): 1-2 mm
3. 73153 (1.31 gm): 2-4 mm
4. 73154 (0.31 gm): 4-10 mm
5.* 73155 (79.3 gm): > 1 cm
   to 73156
6. 73150 (52.56 gm): Reserve

* 73155 not included in total mass of sample; 73156 (3.15 gm) included in total mass of sample.

MISCELLANEOUS:

1. Collected mass: 162.1 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 32E
4. Container: Returned in sample collection bag 6, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 68.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	
Cr_2O_3:	
FeO :	
MnO :	
MgO :	
CaO :	
Na_2O :	
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS:

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:		Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

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SOIL: 73210

LOCATION COMMENTS: Station 3, on the "light mantle," on the rim of a 10 m diameter crater. Collected with 4 rocks (73125-73128, 1402.67 gm).

GENERIC SUBSAMPLES:

1. 73211 (51.95 gm): < 1 mm
2. 73212 (3.47 gm): 1-2 mm
3. 73213 (2.80 gm): 2-4 mm
4. 73214 (2.47 gm): 4-10 mm
5. 73215 (2.88 gm): > 1 cm
6. 73210 (37.57 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 101.14 gm
2. Color: Med. light gray (N5)
3. Bag no.: Doc. bag 527
4. Container: Returned in sample collection bag 6, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 39.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

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SOIL: 73220

LOCATION COMMENTS: Station 3, on the "light mantle." Skim sample (depth of about 1 cm) of the upper light gray soil. Part of the trench sequence.

GENERIC SUBSAMPLES:

1. 73221 (48.11 gm): < 1 mm
2. 73222 (2.71 gm): 1-2 mm
3. 73223 (2.61 gm): 2-4 mm
4. 73224 (1.65 gm): 4-10 mm
5. 73225 (3.66 gm): > 1 cm
6. 73220 (20.8 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 79.54 gm
2. Color: Med. olive gray (5Y 5/1)
3. Bag no.: Doc. bag 520
4. Container: Returned in sample collection bag 6, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 43.0, submature
2. Agglutinates: 26

GRAIN SIZE PARAMETERS:

1. M_z: 95 um (< 1 cm); 64 um (< 1 mm)
2. M_d: 68.4 um
3.

MAJOR ELEMENTS:
(Rose et al., 1974)

	%
SiO_2 :	45.20
TiO_2 :	1.86
Al_2O_3:	21.03
Cr_2O_3:	0.27
FeO :	8.85
MnO :	0.11
MgO :	8.97
CaO :	12.86
Na_2O :	0.41
K_2O :	0.16
P_2O_5 :	0.15
S :	

TRACE ELEMENTS:
(Rose et al., 1974)

	ppm		ppm
Sc:	15	La:	<10
V :	40	Ce:	
Co:	49	Nd:	
Ni:	250	Sm:	
Ba:	190	Eu:	
Sr:	146	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	4.6
		Lu:	

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	26.3
Basalt, Equi.)	3.0
Basalt, Vario.)	
Breccia:	
Low-Grade-Brown	18.3
Low-Grade-Colorless	10.3
Med-High Grade	18.0
Anorthosite	0.3
Cataclastic Anorthosite	0.3
Norite	-
Gabbro	-
Plagioclase	11.3
Clinopyroxene	8.0
Orthopyroxene	Tr.
Olivine	1.3
Ilmenite	0.3
Glass:	
Orange	-
"Black"	2.6
Colorless	0.3
Brown	0.6
Gray, "Ropy"	-
Other	
Total Number Grains	300

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SOIL: 73220

LOCATION COMMENTS: Station 3, on the "light mantle." Skim sample (depth of about 1 cm) of the upper light gray soil. Part of the trench sequence.

GENERIC SUBSAMPLES:

1. 73221 (48.11 gm): < 1 mm
2. 73222 (2.71 gm): 1-2 mm
3. 73223 (2.61 gm): 2-4 mm
4. 73224 (1.65 gm): 4-10 mm
5. 73225 (3.66 gm): > 1 cm
6. 73220 (20.8 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 79.54 gm
2. Color: Med. olive gray (5Y 5/1)
3. Bag no.: Doc. bag 520
4. Container: Returned in sample collection bag 6, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 43.0, submature
2. Agglutinates: 26

GRAIN SIZE PARAMETERS:

1. M_z: 95 um (< 1 cm); 64 um (< 1 mm)
2. M_d: 68.4 um
3.

MAJOR ELEMENTS:
(Rose et al., 1974)

	%
SiO_2 :	45.20
TiO_2 :	1.86
Al_2O_3:	21.03
Cr_2O_3:	0.27
FeO :	8.85
MnO :	0.11
MgO :	8.97
CaO :	12.86
Na_2O :	0.41
K_2O :	0.16
P_2O_5 :	0.15
S :	

TRACE ELEMENTS:
(Rose et al., 1974)

	ppm		ppm
Sc:	15	La:	<10
V :	40	Ce:	
Co:	49	Nd:	
Ni:	250	Sm:	
Ba:	190	Eu:	
Sr:	146	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	4.6
		Lu:	

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	26.3
Basalt, Equi.)	3.0
Basalt, Vario.)	
Breccia:	
Low-Grade-Brown	18.3
Low-Grade-Colorless	10.3
Med-High Grade	18.0
Anorthosite	0.3
Cataclastic Anorthosite	0.3
Norite	-
Gabbro	-
Plagioclase	11.3
Clinopyroxene	8.0
Orthopyroxene	Tr.
Olivine	1.3
Ilmenite	0.3
Glass:	
Orange	-
"Black"	2.6
Colorless	0.3
Brown	0.6
Gray, "Ropy"	-
Other	
Total Number Grains	300

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SOIL: 73240

LOCATION COMMENTS: Station 3, on the "light mantle." Upper 5 cm of the trench sample sequence. Typical of "light" material a few centimeters below the regolith surface.

GENERIC SUBSAMPLES:

1. 73241 (192.7 gm): < 1 mm
2. 73242 (14.94 gm): 1-2 mm
3. 73243 (14.38 gm): 2-4 mm
4. 73244 (22.25 gm): 4-10 mm
5. 73245 (1.6 gm): > 1 cm
6. 73240 (117.7 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 360.57 gm
2. Color: Light med. gray (N5 to N6)
3. Bag no.: Doc. bag 521
4. Container: Returned in sample collection bag 6, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 18.0, immature
2. Agglutinates: 8
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 127 um (< 1 cm); 51 um (< 1 mm)
2. M_d: 78 um
3.

MAJOR ELEMENTS:
(Rose et al., 1974)

	%
SiO_2 :	44.55
TiO_2 :	1.73
Al_2O_3:	20.20
Cr_2O_3:	0.25
FeO :	8.45
MnO :	0.11
MgO :	11.11
CaO :	12.90
Na_2O :	0.46
K_2O :	0.16
P_2O_5 :	0.15
S :	

TRACE ELEMENTS:
(Rose et al., 1974)

	ppm		ppm
Sc:	15	La:	<10
V :	46	Ce:	
Co:	37	Nd:	
Ni:	320	Sm:	
Ba:	160	Eu:	
Sr:	127	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	4.6
		Lu:	

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	8.4
Basalt, Equi.	1.0
Basalt, Vario.	-
Breccia:	
Low-Grade-Brown	35.8
Low-Grade-Colorless	0.3
Med-High Grade	25.4
Anorthosite	0.3
Cataclastic Anorthosite	2.7
Norite	-
Gabbro	-
Plagioclase	11.4
Clinopyroxene	3.3
Orthopyroxene	2.0
Olivine	0.7
Ilmenite	
Glass:	
Orange	0.3
"Black"	5.7
Colorless	1.0
Brown	-
Gray, "Ropy"	1.0
Other	-
Total Number Grains	299

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SOIL: 73260

LOCATION COMMENTS: Station 3, on the "light mantle." Medium gray portion of a "marbled zone" about 5-10 cm below the surface. In a sequence of trench samples.

GENERIC SUBSAMPLES:

1. 73261 (194.8 gm): < 1 mm
2. 73262 (12.01 gm): 1-2 mm
3. 73263 (9.47 gm): 2-4 mm
4. 73264 (6.45 gm): 4-10 mm
5. (gm): > 1 cm
6. 73260 (103.5 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 326.23 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 522
4. Container: Returned in sample collection bag 6, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 45.0, submature
2. Agglutinates: 34
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 87 um (< 1 cm); 56 um (< 1 mm)
2. M_d: 56 um
3.

MAJOR ELEMENTS:
(Rose et al., 1974)

	%
SiO_2 :	44.71
TiO_2 :	1.90
Al_2O_3:	19.69
Cr_2O_3:	0.24
FeO :	8.86
MnO :	0.11
MgO :	10.95
CaO :	12.90
Na_2O :	0.40
K_2O :	0.16
P_2O_5 :	0.14
S :	

TRACE ELEMENTS:
(Rose et al., 1974)

	ppm		ppm
Sc:	17	La:	<10
V :	46	Ce:	
Co:	46	Nd:	
Ni:	450	Sm:	
Ba:	160	Eu:	
Sr:	127	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	5.6
		Lu:	

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	34.3
Basalt, Equi.)	2.0
Basalt, Vario.)	
Breccia:	
Low-Grade-Brown	18.7
Low-Grade-Colorless	4.7
Med-High Grade	15.7
Anorthosite	0.3
Cataclastic Anorthosite	1.6
Norite	-
Gabbro	-
Plagioclase	9.7
Clinopyroxene	7.0
Orthopyroxene	
Olivine	-
Ilmenite	0.6
Glass:	
Orange	1.7
"Black"	0.6
Colorless	0.6
Brown	1.3
Gray, "Ropy"	1.0
Other	
Total Number Grains	300

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SOIL: 73280

LOCATION COMMENTS: Station 3, on the "light mantle" deposits. Light gray fraction of "marbled zone" about 5-10 cm below the regolith surface. Collected as part of the trench sample sequence.

GENERIC SUBSAMPLES:

1. 73281 (95.75 gm): < 1 mm
2. 73282 (5.38 gm): 1-2 mm
3. 73283 (4.74 gm): 2-4 mm
4. 73284 (7.14 gm): 4-10 mm
5. 73285 (2.58 gm): > 1 cm
6. 73280 (53.54 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 169.13 gm
2. Color: Med. gray (N5)
3. Bag no.: Doc. bag 523
4. Container: Returned in sample collection bag 6, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 34.0, submature
2. Agglutinates: 25
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 90 um (< 1 cm); 49 um (< 1 mm)
2. M_d: 61.6 um
3.

MAJOR ELEMENTS:
(Rose et al., 1974)

	%
SiO_2 :	45.31
TiO_2 :	1.76
Al_2O_3:	20.23
Cr_2O_3:	0.27
FeO :	8.82
MnO :	0.11
MgO :	9.95
CaO :	12.91
Na_2O :	0.41
K_2O :	0.16
P_2O_5 :	0.14
S :	

TRACE ELEMENTS:
(Rose et al., 1974)

	ppm		ppm
Sc:	15	La:	<10
V :	42	Ce:	
Co:	46	Nd:	
Ni:	380	Sm:	
Ba:	160	Eu:	
Sr:	117	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	4.8
		Lu:	

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	24.6
Basalt, Equi.)	3.7
Basalt, Vario.)	
Breccia:	
Low-Grade-Brown	23.7
Low-Grade-Colorless	2.3
Med-High Grade	20.6
Anorthosite	0.3
Cataclastic Anorthosite	1.6
Norite	-
Gabbro	-
Plagioclase	9.3
Clinopyroxene	0.3
Orthopyroxene	Tr.
Olivine	0.3
Ilmenite	1.3
Glass:	
Orange	1.3
"Black"	0.3
Colorless	0.6
Brown	2.0
Gray, "Ropy"	0.3
Other	-
Total Number Grains	300

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SOIL: 74110

LOCATION COMMENTS: LRV-5, between Station 3 and 4. Collected with a very friable breccia, so is probably not a representative soil sample. Breccia fell apart in transit so is not included in the "soil." Surface sample.

GENERIC SUBSAMPLES:

1. 74111 (116.8 gm): < 1 mm
2. 74112 (11.12 gm): 1-2 mm
3. 74113 (12.11 gm): 2-4 mm
4. 74114 (13.26 gm): 4-10 mm
5.* 74115 (37.11 gm): > 1 cm
   to 74119
6. 74110 (92.12 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 282.52 gm
2. Color: Light olive gray (5Y 6/1)
3. Bag no.: Doc. bag 41Y
4. Container: Returned in sample collection bag 8, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 31.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

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SOIL: 74120

LOCATION COMMENTS: LRV-6, between Stations 3 and 4. Surface sample from upper few centimeters of regolith. "Light mantle" material.

GENERIC SUBSAMPLES:

1. 74121 (252.0 gm): < 1 mm
2. 74122 (6.65 gm): 1-2 mm
3. 74123 (2.73 gm): 2-4 mm
4. 74124 (0.39 gm): 4-10 mm
5. (gm): > 1 cm
6. 74120 (124.1 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 385.87 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 42Y
4. Container: Returned in sample collection bag 8.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 88.0, mature
2. Agglutinates: 52
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 54 um (< 1 cm); 49 um (< 1 mm)
2. M_d: 44.0 um
3.

MAJOR ELEMENTS: (Duncan et al., 1974)

	%
SiO_2 :	44.51
TiO_2 :	2.56
Al_2O_3:	19.36
Cr_2O_3:	0.269
FeO :	10.24
MnO :	0.132
MgO :	9.93
CaO :	12.44
Na_2O :	0.40
K_2O :	0.134
P_2O_5 :	0.136
S :	0.083

TRACE ELEMENTS: (Philpotts et al., 1974)

	ppm		ppm
Sc:		La:	
V :		Ce:	39.0
Co:		Nd:	25.6
Ni:		Sm:	7.55
Ba:	167	Eu:	1.33
Sr:	150	Tb:	
Hf:		Dy:	10.4
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	5.79
		Lu:	0.895

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	51.7
Basalt, Equi.	2.0
Basalt, Vario.	-
Breccia:	
Low-Grade-Brown	7.0
Low-Grade-Colorless	5.7
Med-High Grade	12.0
Anorthosite	0.7
Cataclastic Anorthosite	0.7
Norite	0.7
Gabbro	-
Plagioclase	7.3
Clinopyroxene	3.7
Orthopyroxene	1.0
Olivine	0.3
Ilmenite	0.7
Glass:	
Orange	0.3
"Black"	2.3
Colorless	1.7
Brown	1.8
Gray, "Ropy"	-
Other	0.3
Total Number Grains	300

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SOIL: 74220

LOCATION COMMENTS: Station 4, on the rim of 120 m diameter Shorty Crater. From 0.8 m wide band of orange hue, bordered by light gray soil and underlain by a black clastic deposit. From a 6-8 cm deep trench. 74220 has been interpreted by several investigators as a friable clastic rock and not as a soil.

GENERIC SUBSAMPLES:

1. 74221 (7.77 gm): < 1 mm
2. 74222 (0.08 gm): 1-2 mm
3. 74223 (0.17 gm): 2-4 mm
4. 74224 (0.98 gm): 4-10 mm
5. (gm): > 1 cm
6. 74220 (1171.0 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 1180 gm
2. Color: Moderate to pale brown (5Y 4/4)
3. Bag no.: Doc. bag 509
4. Container:

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 1.0, immature
2. Agglutinates: 2
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 41 um (< 1 mm)
2. M_d: 38 um
3.

MAJOR ELEMENTS:
(Rhodes et al., 1972)

	%
SiO_2 :	38.57
TiO_2 :	8.81
Al_2O_3:	6.32
Cr_2O_3:	0.75
FeO :	22.04
MnO :	0.30
MgO :	14.44
CaO :	7.68
Na_2O :	0.36
K_2O :	0.09
P_2O_5 :	0.04
S :	0.07

TRACE ELEMENTS:
(Rhodes et al., 1972)

	ppm		ppm
Sc:		La:	6.25
V :		Ce:	19.0
Co:		Nd:	17.8
Ni:	83	Sm:	6.53
Ba:	76.4	Eu:	1.80
Sr:	209	Tb:	
Hf:		Dy:	9.40
Ta:		Ho:	
Th:	-	Tm:	
U :	0.16	Yb:	4.43
		Lu:	0.61

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	% ,6	% ,82
Agglutinates	1.2	2.7
Basalt, Equi.)	1.6	2.0
Basalt, Vario.)		
Breccia:		
Low-Grade-Brown	0.3	-
Low-Grade-Colorless	-	1.3
Med-High Grade	-	-
Anorthosite	-	-
Cataclastic Anorthosite	-	-
Norite	-	-
Gabbro	-	-
Plagioclase	-	1.0
Clinopyroxene	0.3	0.3
Orthopyroxene	-	-
Olivine	-	-
Ilmenite	-	0.3
Glass:		
Orange	66.3	83.6
"Black"	29.3	6.7
Colorless	0.3	-
Brown	-	1.3
Gray, "Ropy"	-	0.7
Other	-	-
Total Number Grains	300	300

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VOL. 2 P. 1823-1844

SOIL: 74240

LOCATION COMMENTS: Station 4, on the rim of Shorty Crater. Gray soil bordering a 1 m wide band of orange soil on the southern edge of a 5-8 cm deep trench.

GENERIC SUBSAMPLES:

1. 74241 (307.3 gm): < 1 mm
2. 74242 (22.50 gm): 1-2 mm
3. 74243 (27.67 gm): 2-4 mm
4. 74244 (21.95 gm): 4-10 mm
5.* 74245 (116.658 gm): > 1 cm
6. 74240 (544.9 gm): Reserve

* Samples 74245 to 74249 and 74285 to 74287 derived from this split.

MISCELLANEOUS:

1. Collected mass: 1039.978 gm
2. Color: Gray to med. gray (N5.5 to 5YR 5/1)
3. Bag no.: Doc. bag 510
4. Container: Returned in sample container 2, in vacuum. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 5.1, immature
2. Agglutinates: 8
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 130 um (< 1 cm); 56 um (< 1 mm)
2. M_d: 86 um
3.

MAJOR ELEMENTS:
(Apollo 17 P.E.T, 1974)

	%
SiO_2 :	40.78
TiO_2 :	8.61
Al_2O_3:	12.54
Cr_2O_3:	0.41
FeO :	15.84
MnO :	0.24
MgO :	9.15
CaO :	11.36
Na_2O :	0.38
K_2O :	0.12
P_2O_5 :	0.09
S :	0.14

TRACE ELEMENTS:
(Rhodes et al., 1974)

	ppm		ppm
Sc:		La:	9.95
V :		Ce:	28.8
Co:		Nd:	24.0
Ni:	80	Sm:	8.55
Ba:	112	Eu:	1.60
Sr:	163	Tb:	
Hf:		Dy:	13.7
Ta:		Ho:	
Th:	-	Tm:	
U :	0.37	Yb:	7.45
		Lu:	-

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	8.0
Basalt, Equi.)	30.0
Basalt, Vario.)	
Breccia:	
Low-Grade-Brown	1.6
Low-Grade-Colorless	13.3
Med-High Grade	2.0
Anorthosite	-
Cataclastic Anorthosite	0.6
Norite	
Gabbro	-
Plagioclase	4.6
Clinopyroxene	11.3
Orthopyroxene	-
Olivine	-
Ilmenite	1.3
Glass:	
Orange	4.0
"Black"	-
Colorless	4.6
Brown	3.6
Gray, "Ropy"	14.3
Other	0.3
Total Number Grains	300

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SOLAR NOBLE GAS SATURATION IN LUNAR REGOLITH MINERALS; DOES IT OCCUR?
LUNAR AND PLANETARY SCIENCE XI, P. 1248-1250

SOIL: 74260

LOCATION COMMENTS: Station 4, on the rim of 120 m diameter Shorty Crater. Gray soil bordering a 1 m wide band of orange soil on the northern edge of a 5-8 cm deep trench.

GENERIC SUBSAMPLES:

1. 74261 (12.44 gm): < 1 mm
2. 74262 (0.75 gm): 1-2 mm
3. 74263 (0.57 gm): 2-4 mm
4. 74264 (1.74 gm): 4-10 mm
5. (gm): > 1 cm
6. 74260 (511.20 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 526.7 gm
2. Color: Light brownish gray (5YR 6/1)
3. Bag no.: Doc. bag 511
4. Container: Returned in sample container 2, in vacuum. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 5.0, immature
2. Agglutinates: 8
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 127 um (< 1 cm); 56 um (< 1 mm)
2. M_d: 88.0 um
3.

MAJOR ELEMENTS:
(Apollo 17 P.E.T., 1973)

	%
SiO_2 :	41.22
TiO_2 :	7.68
Al_2O_3:	13.25
Cr_2O_3:	0.41
FeO :	15.31
MnO :	0.23
MgO :	9.47
CaO :	11.37
Na_2O :	0.38
K_2O :	0.12
P_2O_5 :	0.09
S :	0.12

TRACE ELEMENTS:
(Korotev, 1976)

	ppm		ppm
Sc:	56.3	La:	
V :		Ce:	
Co:	49.2	Nd:	
Ni:	160	Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:	6.7	Dy:	
Ta:	1.1	Ho:	
Th:	0.7	Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	7.7
Basalt, Equi.)	23.7
Basalt, Vario.)	
Breccia:	
Low-Grade-Brown	7.4
Low-Grade-Colorless	5.4
Med-High Grade	3.3
Anorthosite	-
Cataclastic Anorthosite	-
Norite	-
Gabbro	-
Plagioclase	2.7
Clinopyroxene	13.7
Orthopyroxene	-
Olivine	0.3
Ilmenite	2.3
Glass:	
Orange	7.7
"Black"	2.0
Colorless	3.7
Brown	1.7
Gray, "Ropy"	18.1
Other	0.3
Total Number Grains	300

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SOIL: 75060

LOCATION COMMENTS: Station 5, on the southwest rim of Camelot Crater. Collected from irregular, 1 cm deep depression on a 3 m wide boulder. Collected 1-2 m from boulder edge. "Skim" sample (1 cm deep).

GENERIC SUBSAMPLES:

1. 75061 (157.9 gm): < 1 mm
2. 75062 (8.52 gm): 1-2 mm
3. 75063 (6.28 gm): 2-4 mm
4. 75064 (11.63 gm): 4-10 mm
5.* 75065 (2.243 gm): > 1 cm
   to 75066
6. 75060 (0.527 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 186.523 gm
2. Color: Brownish gray (5YR 4/1)
3. Bag no.: Doc. bag 465
4. Container: Returned in sample container 2, in vacuum. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 33.0, submature
2. Agglutinates: 24
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 128 um (< 1 cm); 81 um (< 1 mm)
2. M_d: 110.3 um
3.

MAJOR ELEMENTS: (Rhodes et al., 1974)

	%
SiO_2 :	39.32
TiO_2 :	10.31
Al_2O_3:	10.42
Cr_2O_3:	0.48
FeO :	18.19
MnO :	0.25
MgO :	9.53
CaO :	10.72
Na_2O :	0.33
K_2O :	0.08
P_2O_5 :	0.06
S :	0.13

TRACE ELEMENTS: (Rhodes et al., 1974)

	ppm		ppm
Sc:		La:	7.07
V :		Ce:	23.6
Co:		Nd:	23.1
Ni:	115	Sm:	9.09
Ba:	89.5	Eu:	1.77
Sr:	166	Tb:	
Hf:		Dy:	15.5
Ta:		Ho:	
Th:	-	Tm:	
U :	0.21	Yb:	8.36
		Lu:	-

PETROGRAPHY: (90-150 um) (Heiken and McKay, 1974)

Components	%
Agglutinates	24.0
Basalt, Equi.)	26.6
Basalt, Vario.)	
Breccia:	
Low-Grade-Brown	2.6
Low-Grade-Colorless	2.0
Med-High Grade	0.3
Anorthosite	-
Cataclastic Anorthosite	
Norite	
Gabbro	-
Plagioclase	4.6
Clinopyroxene	29.6
Orthopyroxene	-
Olivine	0.3
Ilmenite	5.3
Glass:	
Orange	1.0
"Black"	-
Colorless	1.6
Brown	1.6
Gray, "Ropy"	-
Other	-
Total Number Grains	299

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SOIL: 75080

LOCATION COMMENTS: Station 5, on the sourthwest rim of Camelot Crater. Collected as a surface sample (upper 5 cm), less than 1 mm from the basalt boulder where 75060 was collected.

GENERIC SUBSAMPLES:

1. 75081 (932.4 gm): < 1 mm
2. 75082 (38.92 gm): 1-2 mm
3. 75083 (30.88 gm): 2-4 mm
4. 75084 (23.31 gm): 4-10 mm
5.* 75085 (12.652 gm): > 1 cm
   to 75089
6. 75080 (524.2 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 1562.362 gm
2. Color: Dark gray (N3)
3. Bag no.: Doc. bag 467
4. Container: Returned in sample container 2, in vacuum. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 40.0, submature
2. Agglutinates: 35
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 87 um (< 1 cm); 67 um (< 1 mm)
2. M_d: 73.3 um
3.

MAJOR ELEMENTS: (Apollo 17 P.E.T., 1974)

	%
SiO_2 :	40.27
TiO_2 :	9.41
Al_2O_3:	11.31
Cr_2O_3:	0.46
FeO :	17.20
MnO :	0.25
MgO :	9.59
CaO :	10.97
Na_2O :	0.33
K_2O :	0.08
P_2O_5 :	0.07
S :	0.12

TRACE ELEMENTS: (Laul et al, 1974)

	ppm		ppm
Sc:	61	La:	7.2
V :	100	Ce:	30
Co:	27	Nd:	25
Ni:	100	Sm:	7.6
Ba:	100	Eu:	1.70
Sr:	160	Tb:	2.0
Hf:	7.0	Dy:	12
Ta:	1.3	Ho:	
Th:	0.6	Tm:	
U :	-	Yb:	7.3
Zr:	230	Lu:	1.0
Ir:	5		
Au:	3		

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	35.3
Basalt, Equi.	15.7
Basalt, Vario.	4.0
Breccia:	
Low-Grade-Brown	0.7
Low-Grade-Colorless	0.7
Med-High Grade	2.0
Anorthosite	0.3
Cataclastic Anorthosite	-
Norite	-
Gabbro	-
Plagioclase	9.0
Clinopyroxene	20.3
Orthopyroxene	-
Olivine	0.7
Ilmenite	5.7
Glass:	
Orange	0.7
"Black"	3.0
Colorless	1.3
Brown	0.6
Gray, "Ropy"	-
Other	
Total Number Grains	300

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SOIL: 75110

LOCATION COMMENTS: LRV-7 sample, from the apex of Victory Crater, on inner slope of crater rim. Scooped from upper few centimeters of regolith.

GENERIC SUBSAMPLES:

1. 75111 (235.0 gm): < 1 mm
2. 75112 (10.20 gm): 1-2 mm
3. 75113 (6.76 gm): 2-4 mm
4. 75114 (6.87 gm): 4-10 mm
5. 75115 (2.60 gm): > 1 cm
6. 75110 (122.5 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 383.93 gm
2. Color: Dark olive gray (5Y 3/1)
3. Bag no.: Doc. bag 43Y
4. Container: Returned in sample collection bag 8, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 54.0, submature
2. Agglutinates: 52
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	
Cr_2O_3:	
FeO :	
MnO :	
MgO :	
CaO :	
Na_2O :	
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS:

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:		Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	52.2
Basalt, Equi.	5.6
Basalt, Vario.	2.7
Breccia:	
Low-Grade-Brown	2.3
Low-Grade-Colorless	-
Med-High Grade	5.6
Anorthosite	-
Cataclastic Anorthosite	0.7
Norite	
Gabbro	-
Plagioclase	2.0
Clinopyroxene	8.3
Orthopyroxene	
Olivine	-
Ilmenite	0.7
Glass:	
Orange	5.0
"Black"	11.6
Colorless	1.0
Brown	1.0
Gray, "Ropy"	1.0
Other	0.3
Total Number Grains	300

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VOL. 2, 2287-2298

SOIL: 75120

LOCATION COMMENTS: LRV-8, between Victory and Horatio Craters, in an area of "dark mantle." Surface sample scooped from upper few centimeters of regolith.

GENERIC SUBSAMPLES:

1. 75121 (240.3 gm): < 1 mm
2. 75122 (5.20 gm): 1-2 mm
3. 75123 (2.147 gm): 2-4 mm
4. 75124 (0.956 gm): 4-10 mm
5. (gm): > 1 cm
6. 75120 (126.6 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 375.211 gm
2. Color: Dark olive gray (5Y 3/1)
3. Bag no.: Doc. bag 44Y
4. Container: Returned in sample collection bag 8, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 67.0, mature
2. Agglutinates: 63
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	
Cr_2O_3:	
FeO :	
MnO :	
MgO :	
CaO :	
Na_2O :	
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS:

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:		Sm:	
Ba:		Eu:	
Sr:		Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	63.0
Basalt, Equi.	5.7
Basalt, Vario.	2.3
Breccia:	
Low-Grade-Brown	2.0
Low-Grade-Colorless	0.3
Med-High Grade	3.7
Anorthosite	-
Cataclastic Anorthosite	-
Norite	-
Gabbro	-
Plagioclase	4.0
Clinopyroxene	8.7
Orthopyroxene	
Olivine	-
Ilmenite	0.7
Glass:	
Orange	3.0
"Black"	3.7
Colorless	1.7
Brown	1.0
Gray, "Ropy"	-
Other	0.3
Total Number Grains	301

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P. 665-667

SOIL: 76030

LOCATION COMMENTS: Station 6, approximately 25 m from the large cluster of boulders. Collected as a surface sample along with several breccias and a basalt (placed in separate bags).

GENERIC SUBSAMPLES:

1. 76031 (152.6 gm): < 1 mm
2. 76032 (5.71 gm): 1-2 mm
3. 76033 (4.58 gm): 2-4 mm
4. 76034 (2.01 gm): 4-10 mm
5. (gm): > 1 cm
6. 76030 (16.06 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 180.96 gm
2. Color:
3. Bag no.: Doc. bag 48Y
4. Container: Returned in sample collection bag 5, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 64.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

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IN THE LUNAR REGOLITH
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VOL. 2, 1697-1712

SOIL: 72140

LOCATION COMMENTS: LRV 2, between Stations 1 and 2 on the "prong" or very faint extension of the white mantle. Surface sample of a very cohesive soil. Ground surface is patterned, "raindrop" texture.

GENERIC SUBSAMPLES:

1. 72141 (225.9 gm): < 1 mm
2. 72142 (5.32 gm): 1-2 mm
3. 72143 (1.88 gm): 2-4 mm
4. 72144 (2.73 gm): 4-10 mm
5. 72145 (1.25 gm): > 1 cm
6. 72140 (115.0 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 352.08 gm
2. Color: Dark olive gray (5Y 3/1)
3. Bag no.: Doc. bag 27E
4. Container: Returned in sample collection bag 6, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 81.0, mature
2. Agglutinates: 51.0
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 57 um (< 1 cm); 50 um (< 1 mm)
2. M_d: 47.4 um
3.

MAJOR ELEMENTS: (Rhodes et al., 1974)

	%
SiO_2 :	43.11
TiO_2 :	4.37
Al_2O_3:	16.10
Cr_2O_3:	0.37
FeO :	13.45
MnO :	0.19
MgO :	10.25
CaO :	11.83
Na_2O :	0.40
K_2O :	0.12
P_2O_5 :	0.10
S :	0.09

TRACE ELEMENTS: (Rhodes et al., 1974)

	ppm		ppm
Sc:		La:	10.2
V :		Ce:	28.1
Co:		Nd:	20.7
Ni:	271	Sm:	6.70
Ba:		Eu:	1.35
Sr:	156	Tb:	
Hf:		Dy:	9.82
Ta:		Ho:	
Th:	-	Tm:	
U :	-	Yb:	5.28
		Lu:	-

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	5.0
Basalt, Equi.)	6.6
Basalt, Vario.)	0.6
Breccia:	
Low-Grade-Brown	4.0
Low-Grade-Colorless	4.0
Med-High Grade	1.6
Anorthosite	-
Cataclastic Anorthosite	1.3
Norite	0.3
Gabbro	0.3
Plagioclase	9.0
Clinopyroxene	7.0
Orthopyroxene	
Olivine	-
Ilmenite	0.6
Glass:	
Orange	1.3
"Black"	5.0
Colorless	1.6
Brown	3.9
Gray, "Ropy"	1.3
Other	
Total Number Grains	300

SOIL: 76120

LOCATION COMMENTS: LRV sample collected halfway between SEP and Station 6. Surface sample scooped from the upper few centimeters. Collected from the "dark mantle."

GENERIC SUBSAMPLES:

1. 76121 (188.1 gm): < 1 mm
2. 76122 (4.72 gm): 1-2 mm
3. 76123 (2.49 gm): 2-4 mm
4. 76124 (1.61 gm): 4-10 mm
5. (gm): > 1 cm
6. 76120 (107.0 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 303.92 gm
2. Color: Dark olive gray (5Y 3/1)
3. Bag no.: Doc. bag 46Y
4. Container: Returned in sample collection bag 5, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 71.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

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SOIL: 76130

LOCATION COMMENTS: LRV-10, at the turning point between the SEP and Station 6. Surface sample of soil plus 3 rocks.

GENERIC SUBSAMPLES:

1. 76131 (146.1 gm): < 1 mm
2. 76132 (6.79 gm): 1-2 mm
3. 76133 (5.21 gm): 2-4 mm
4. 76134 (3.10 gm): 4-10 mm
5.* 76135 to 76137 (222.56 gm): > 1 cm
6. 76130 (19.57 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 180.77 gm
2. Color: Med. gray (field description)
3. Bag no.: Doc. bag 47Y
4. Container: Returned in sample collection bag 5, in air. Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 70.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

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IN THE LUNAR REGOLITH
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VOL. 2, 1697-1712

SOIL: 76220

LOCATION COMMENTS: Station 6, at the base of North Massif. Collected in the boulder track about 10 m upslope from the boulder cluster. Surface sample.

GENERIC SUBSAMPLES:

1. 76221 (390.4 gm): < 1 mm
2. 76222 (13.65 gm): 1-2 mm
3. 76223 (8.26 gm): 2-4 mm
4. 76224 (3.83 gm): 4-10 mm
5. (gm): > 1 cm
6. 76220 (196.7 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 612.84 gm
2. Color: Med. olive gray
3. Bag no.: Doc. bag 534
4. Container: Returned in sample collection bag 7, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 66.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

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IN PROCEEDINGS OF THE 11TH LUNAR AND PLANETARY SCIENCE CONFERENCE
VOL. 2, 1697-1712

SOIL: 76240

LOCATION COMMENTS: Station 6, at the base of North Massif. "Shadowed" soil, collected 1-2 m beyond the overhang of a 5 x 4 x 3 m boulder. Scooped from a depth of 4-5 cm.

GENERIC SUBSAMPLES:

1. 76241 (21.14 gm): < 1 mm
2. 76242 (1.20 gm): 1-2 mm
3. 76243 (1.23 gm): 2-4 mm
4. 76244 (1.53 gm): 4-10 mm
5.* 76245 (14.74 gm): > 1 cm
   to 76246
6. 76240 (450.7 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 490.54 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 312
4. Container: Returned in sample collection bag 4, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 56.0, submature
2. Agglutinates: 48
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 100 um (< 1 cm); 53 um (< 1 mm)
2. M_d: 64 um
3.

MAJOR ELEMENTS: (Rhodes et al., 1974)

	%
SiO_2 :	43.2
TiO_2 :	3.31
Al_2O_3:	17.85
Cr_2O_3:	
FeO :	10.92
MnO :	0.16
MgO :	11.05
CaO :	11.97
Na_2O :	0.43
K_2O :	0.12
P_2O_5 :	0.09
S :	0.07

TRACE ELEMENTS: (Baedecker et al., 1974)

	ppm		ppm
Sc:	31	La:	
V :		Ce:	34
Co:	37	Nd:	
Ni:		Sm:	
Ba:		Eu:	1.6
Sr:		Tb:	1.8
Hf:	6.7	Dy:	
Ta:	0.88	Ho:	
Th:	2.7	Tm:	
U :		Yb:	4.8
		Lu:	

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	48.0
Basalt, Equi.	2.3
Basalt, Vario.	1.0
Breccia:	
Low-Grade-Brown	4.7
Low-Grade-Colorless	2.7
Med-High Grade	12.3
Anorthosite	0.3
Cataclastic Anorthosite	1.3
Norite	-
Gabbro	-
Plagioclase	12.0
Clinopyroxene	5.0
Orthopyroxene	2.0
Olivine	1.3
Ilmenite	2.0
Glass:	
Orange	0.7
"Black"	2.3
Colorless	0.7
Brown	1.3
Gray, "Ropy"	-
Other	-
Total Number Grains	300

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SOIL: 76260

LOCATION COMMENTS: Station 6, at the base of North Massif. "Skim" sample (to depth of 2 cm) collected outside the limit (about 1 m) of the boulder overhang where sample 76240 was collected.

GENERIC SUBSAMPLES:

1. 76261 (170.7 gm): < 1 mm
2. 76262 (8.55 gm): 1-2 mm
3. 76263 (6.57 gm): 2-4 mm
4. 76264 (8.76 gm): 4-10 mm
5. 76265 (1.75 gm): > 1 cm
6. 76260 (96.6 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 292.93 gm
2. Color: Very dark gray (5Y 3/1)
3. Bag no.: Doc. bag 313
4. Container: Returned in sample collection bag 4, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 58.0, submature
2. Agglutinates: 45
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 87 um (< 1 cm); 58 um (< 1 mm)
2. M_d:
3.

MAJOR ELEMENTS: (Rhodes et al., 1974)

	%
SiO_2 :	43.64
TiO_2 :	3.38
Al_2O_3:	17.96
Cr_2O_3:	0.28
FeO :	10.93
MnO :	0.16
MgO :	10.75
CaO :	12.11
Na_2O :	0.43
K_2O :	0.12
P_2O_5 :	0.11
S :	0.07

TRACE ELEMENTS: (Baedecker et al., 1974)

	ppm		ppm
Sc:	30	La:	
V :		Ce:	-
Co:	32	Nd:	
Ni:		Sm:	
Ba:		Eu:	1.5
Sr:		Tb:	-
Hf:	5.6	Dy:	
Ta:	-	Ho:	
Th:	-	Tm:	
U :		Yb:	-
		Lu:	

PETROGRAPHY: (90-150 um) (Heiken and McKay, 1974)

Components	%
Agglutinates	45.3
Basalt, Equi.	3.3
Basalt, Vario.	1.0
Breccia:	
Low-Grade-Brown	2.3
Low-Grade-Colorless	3.3
Med-High Grade	12.6
Anorthosite	1.0
Cataclastic Anorthosite	-
Norite	0.3
Gabbro	-
Plagioclase	10.3
Clinopyroxene	9.3
Orthopyroxene	3.3
Olivine	0.7
Ilmenite	1.0
Glass:	
Orange	0.7
"Black"	1.3
Colorless	2.0
Brown	1.9
Gray, "Ropy"	-
Other	-
Total Number Grains	300

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SOIL: 76220

LOCATION COMMENTS: Station 6, at the base of North Massif. Collected in the boulder track about 10 m upslope from the boulder cluster. Surface sample.

GENERIC SUBSAMPLES:

1. 76221 (390.4 gm): < 1 mm
2. 76222 (13.65 gm): 1-2 mm
3. 76223 (8.26 gm): 2-4 mm
4. 76224 (3.83 gm): 4-10 mm
5. (gm): > 1 cm
6. 76220 (196.7 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 612.84 gm
2. Color: Med. olive gray
3. Bag no.: Doc. bag 534
4. Container: Returned in sample collection bag 7, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 66.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

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SOIL: 76280

LOCATION COMMENTS: Station 6, at the base of North Massif. "Scoop" sample collected to a depth of 5 cm below the "skim" sample 76260. Located about 1 m outside the boulder overhang where sample 76240 was collected.

GENERIC SUBSAMPLES:

1. 76281 (251.8 gm): < 1 mm
2. 76282 (14.27 gm): 1-2 mm
3. 76283 (12.71 gm): 2-4 mm
4. 76284 (10.69 gm): 4-10 mm
5.* 76285 (3.912 gm): > 1 cm
   to 76286
6. 76280 (153.0 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 446.382 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 472
4. Container: Returned in sample collection bag 4, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 45.0, submature
2. Agglutinates: 45
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 86 um (< 1 cm); 53 um (< 1 mm)
2. M_d: 70.8 um
3.

MAJOR ELEMENTS:
(Rhodes et al., 1974)

	%
SiO_2 :	43.56
TiO_2 :	3.83
Al_2O_3:	17.80
Cr_2O_3:	0.29
FeO :	11.26
MnO :	0.16
MgO :	10.55
CaO :	12.18
Na_2O :	0.43
K_2O :	0.11
P_2O_5 :	0.09
S :	0.07

TRACE ELEMENTS:
(Rhodes et al., 1974)

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:	169	Sm:	
Ba:		Eu:	
Sr:	150	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	45.3
Basalt, Equi.	5.0
Basalt, Vario.	1.7
Breccia:	
Low-Grade-Brown	5.3
Low-Grade-Colorless	0.7
Med-High Grade	10.3
Anorthosite	1.0
Cataclastic Anorthosite	0.3
Norite	-
Gabbro	-
Plagioclase	10.7
Clinopyroxene	6.3
Orthopyroxene	4.7
Olivine	-
Ilmenite	1.3
Glass:	
Orange	1.3
"Black"	3.7
Colorless	1.7
Brown	-
Gray, "Ropy"	0.3
Other	0.3
Total Number Grains	300

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SOIL: 76320

LOCATION COMMENTS: Station 6, at the base of North Massif. Sample of soil on a flat section of the north end of boulder #1 of the boulder cluster.

GENERIC SUBSAMPLES:

1. 76321 (502.7 gm): < 1 mm
2. 76322 (23.10 gm): 1-2 mm
3. 76323 (15.84 gm): 2-4 mm
4. 76324 (11.8 gm): 4-10 mm
5. (gm): > 1 cm
6. 76320 (260.3 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 813.74 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 557
4. Container: Returned in sample collection bag 7, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 93.0, mature
2. **Agglutinates: 39**
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 69 um (< 1 cm); 53 um (< 1 mm)
2. M_d: 57.8 um
3.

MAJOR ELEMENTS: (Rhodes et al., 1974)

	%
SiO_2 :	44.08
TiO_2 :	3.00
Al_2O_3:	18.41
Cr_2O_3:	0.26
FeO :	10.53
MnO :	0.15
MgO :	10.82
CaO :	12.23
Na_2O :	0.46
K_2O :	0.13
P_2O_5 :	0.09
S :	0.07

TRACE ELEMENTS: (Rhodes et al., 1974)

	ppm		ppm
Sc:		La:	
V :		Ce:	
Co:		Nd:	
Ni:	210	Sm:	
Ba:		Eu:	
Sr:	151	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	39.1
Basalt, Equi.	2.7
Basalt, Vario.	-
Breccia:	
Low-Grade-Brown	4.3
Low-Grade-Colorless	-
Med-High Grade	14.4
Anorthosite	-
Cataclastic Anorthosite	1.0
Norite	-
Gabbro	-
Plagioclase	15.7
Clinopyroxene	6.7
Orthopyroxene	5.7
Olivine	-
Ilmenite	0.3
Glass:	
Orange	1.3
"Black"	2.3
Colorless	2.3
Brown	4.0
Gray, "Ropy"	-
Other	-
Total Number Grains	299

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SOIL: 76500

LOCATION COMMENTS: Station 6, at base of the North Massif. Surface sample collected 25 m west of the boulder cluster near a 10 m diameter crater. Collected as a soil to accompany rake sample (76530 to 76577).

GENERIC SUBSAMPLES:

1. 76501 (630.7 gm): < 1 mm
2. 76502 (22.76 gm): 1-2 mm
3. 76503 (10.09 gm): 2-4 mm
4. 76504 (10.72 gm): 4-10 mm
5.* 76505 (7.5 gm): > 1 cm
   to 76506
6. 76500 (345.2 gm): Reserve

* Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 1019.47 gm
2. Color:
3. Bag no.: Doc. bag 559
4. Container:

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 58.0, submature
2. Agglutinates: 47
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 67 um (< 1 cm); 51 um (< 1 mm)
2. M_d: 53.7 um
3.

MAJOR ELEMENTS: (Apollo 17 P.E.T., 1973)

	%
SiO_2 :	43.41
TiO_2 :	3.15
Al_2O_3:	18.63
Cr_2O_3:	0.26
FeO :	10.32
MnO :	0.14
MgO :	11.08
CaO :	12.28
Na_2O :	0.35
K_2O :	0.10
P_2O_5 :	0.08
S :	

TRACE ELEMENTS: (Rhodes et al., 1974)

	ppm		ppm
Sc:		La:	8.95
V :		Ce:	24.3
Co:		Nd:	17.4
Ni:	203	Sm:	5.55
Ba:		Eu:	1.25
Sr:	151	Tb:	
Hf:		Dy:	8.18
Ta:		Ho:	
Th:	-	Tm:	
U :	0.44	Yb:	4.53
		Lu:	-

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	47.2
Basalt, Equi.)	1.7
Basalt, Vario.)	
Breccia:	
Low-Grade-Brown	3.8
Low-Grade-Colorless	-
Med-High Grade	8.3
Anorthosite	-
Cataclastic Anorthosite	1.4
Norite	
Gabbro	
Plagioclase	17.2
Clinopyroxene	7.6
Orthopyroxene	7.9
Olivine	0.7
Ilmenite	1.7
Glass:	
Orange	0.7
"Black"	0.3
Colorless	1.4
Brown	
Gray, "Ropy"	
Other	
Total Number Grains	290

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SOIL: 77510

LOCATION COMMENTS: Station 7, at the base of North Massif. Collected as a surface sample with 5 rocks (77515 to 77519, total 556.8 gm) 18 m east of the boulder sampled at Station 7.

GENERIC SUBSAMPLES:

1. 77511 (118.1 gm): < 1 mm
2. 77512 (2.45 gm): 1-2 mm
3. 77513 (1.19 gm): 2-4 mm
4. 77514 (1.24 gm): 4-10 mm
5.* 77515 to 77517 (556.8 gm): > 1 cm
6. 77510 (77.57 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 202.81 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 540
4. Container: Returned in sample collection bag 7, in air. Processed in N_2.

* Not included in total mass of soil.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 80.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: TRACE ELEMENTS: (Rhodes et al., 1974)

%		ppm		ppm
SiO_2 :	Sc:		La:	
TiO_2 :	V :		Ce:	
Al_2O_3:	Co:		Nd:	
Cr_2O_3:	Ni:	231	Sm:	
FeO :	Ba:		Eu:	
MnO :	Sr:	153	Tb:	
MgO :	Hf:		Dy:	
CaO :	Ta:		Ho:	
Na_2O :	Th:		Tm:	
K_2O :	U :		Yb:	
P_2O_5 :			Lu:	
S :				

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SOIL: 77530

LOCATION COMMENTS: Station 7, at the base of North Massif. Collected with "selected rocks" (6 rocks, 77535 to 77539 and 77545, total 1121.1 gm, consisting of 2 coarse-grained basalts, 2 green-gray breccias, 1 light-gray breccia, and 1 tan-gray breccia).

GENERIC SUBSAMPLES:

1. 77531 (126.6 gm): < 1 mm
2. 77532 (3.13 gm): 1-2 mm
3. 77533 (2.51 gm): 2-4 mm
4. 77534 (4.46 gm): 4-10 mm
5. (gm): > 1 cm
6. 77530 (82.76 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 219.46 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 542
4. Container: Returned in sample collection bag 7, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 79.0, mature
2. Agglutinates: 54
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 63 um (< 1 cm); 49 um (< 1 mm)
2. M_d: 48 um
3.

MAJOR ELEMENTS:
(Rhodes et al., 1974)

	%
SiO_2 :	43.07
TiO_2 :	3.91
Al_2O_3:	17.16
Cr_2O_3:	0.31
FeO :	11.70
MnO :	0.17
MgO :	10.19
CaO :	11.93
Na_2O :	0.44
K_2O :	0.11
P_2O_5 :	0.08
S :	0.08

TRACE ELEMENTS:
(Rhodes et al., 1974)

	ppm		ppm
Sc:		La:	9.96
V :		Ce:	26.7
Co:		Nd:	19.4
Ni:		Sm:	6.47
Ba:	123	Eu:	1.35
Sr:	155	Tb:	
Hf:		Dy:	9.55
Ta:		Ho:	
Th:	-	Tm:	
U :	-	Yb:	5.26
		Lu:	-

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	54.0
Basalt, Equi.	4.0
Basalt, Vario.	0.7
Breccia:	
Low-Grade-Brown	5.6
Low-Grade-Colorless	2.3
Med-High Grade	9.7
Anorthosite	0.7
Cataclastic Anorthosite	1.0
Norite	-
Gabbro	-
Plagioclase	9.3
Clinopyroxene	3.3
Orthopyroxene	1.0
Olivine	0.7
Ilmenite	1.3
Glass:	
Orange	0.3
"Black"	3.3
Colorless	0.3
Brown	2.0
Gray, "Ropy"	-
Other	-
Total Number Grains	300

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SOIL: 78120

LOCATION COMMENTS: LRV-11, on the rim of Slup Crater between Stations 7 and 8. Crew picked up several fragmented aggregates (clods) but none were visible in the returned sample; most probably disaggregated and mixed in transit. Scooped from upper few centimeters.

GENERIC SUBSAMPLES:

1. 78121 (121.6 gm): < 1 mm
2. 78122 (4.43 gm): 1-2 mm
3. 78123 (2.49 gm): 2-4 mm
4. 78124 (5.64 gm): 4-10 mm
5. (gm): > 1 cm
6. 78120 (75.78 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 209.94 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 50Y
4. Container: Returned in sample collection bag 5, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 68.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:

	%
SiO_2 :	
TiO_2 :	
Al_2O_3:	
Cr_2O_3:	
FeO :	
MnO :	
MgO :	
CaO :	
Na_2O :	
K_2O :	
P_2O_5 :	
S :	

TRACE ELEMENTS:
(Phillpotts et al., 1974)

	ppm		ppm
Sc:		La:	
V :		Ce:	25.2
Co:		Nd:	19.2
Ni:		Sm:	6.26
Ba:	113	Eu:	1.39
Sr:	154	Tb:	
Hf:		Dy:	9.84
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	5.27
		Lu:	0.830

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VOL. 2 P. 1255-1268

SOIL: 78220

LOCATION COMMENTS: Station 8, at base of Sculptured Hills, south of Wessex Cleft. 78220 was collected from the regolith surface under a 2-3 m diameter norite boulder rolled over by the crew.

GENERIC SUBSAMPLES:

1. 78221 (227.1 gm): < 1 mm
2. 78222 (5.21 gm): 1-2 mm
3. 78223 (2.69 gm): 2-4 mm
4. 78224 (1.48 gm): 4-10 mm
5. (gm): > 1 cm
6. 78220 (108.3 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 344.78 gm
2. Color: Dark olive gray (5Y 3/1)
3. Bag no.: Doc. bag 545
4. Container: Returned in sample collection bag 7, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 93.0, mature
2. Agglutinates: 57

GRAIN SIZE PARAMETERS:

1. M_z: 50 um (< 1 cm); 45 um (< 1 mm)
2. M_d: 40 um
3.

MAJOR ELEMENTS: (Duncan et al., 1974)

	%
SiO_2 :	43.67
TiO_2 :	3.84
Al_2O_3:	17.13
Cr_2O_3:	0.320
FeO :	11.68
MnO :	0.157
MgO :	10.55
CaO :	11.79
Na_2O :	0.37
K_2O :	0.092
P_2O_5 :	0.080
S :	0.088

TRACE ELEMENTS: (Duncan et al., 1974)

	ppm		ppm
Sc:		La:	
V :	68	Ce:	
Co:	34	Nd:	
Ni:	221	Sm:	
Ba:	109	Eu:	
Sr:	147	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	
		Lu:	

PETROGRAPHY: (90-150 um) (Heiken and McKay, 1974)

Components	%
Agglutinates	57.0
Basalt, Equi.	1.0
Basalt, Vario.	
Breccia:	
Low-Grade-Brown	6.3
Low-Grade-Colorless	-
Med-High Grade	7.0
Anorthosite	1.3
Cataclastic Anorthosite	
Norite	-
Gabbro	0.3
Plagioclase	5.0
Clinopyroxene	8.9
Orthopyroxene	3.6
Olivine	1.7
Ilmenite	1.0
Glass:	
Orange	0.7
"Black"	3.0
Colorless	1.3
Brown	2.0
Gray, "Ropy"	
Other	
Total Number Grains	302

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SOIL: 78230

LOCATION COMMENTS: Station 8, at the base of Sculptured Hills, south of Wessex Cleft. This soil was collected with 3 rock samples (78235 to 78238, coarse-grained norites; total mass of 349.64 gm).

GENERIC SUBSAMPLES:

1. 78231 (122.7 gm): < 1 mm
2. 78232 (2.68 gm): 1-2 mm
3. 78233 (1.42 gm): 2-4 mm
4. 78234 (0.72 gm): 4-10 mm
5. (gm): > 1 cm
6. 78230 (82.98 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 210.5 gm
2. Color: Dark gray (field description)
3. Bag no.: Doc. bag 564
4. Container: Returned in sample collection bag 4, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 81.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

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IN THE LUNAR REGOLITH
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SOIL: 78250

LOCATION COMMENTS: Station 8, at the base of the Sculptured Hills, south of Wessex Cleft. Soil collected along with a chip from a norite boulder (78255; 48.31 gm, coarse-grained norite).

GENERIC SUBSAMPLES:

1. (gm): < 1 mm
2. (gm): 1-2 mm
3. (gm): 2-4 mm
4. (gm): 4-10 mm
5. (gm): > 1 cm
6. 78250 (50.57 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 50.57 gm
2. Color:
3. Bag no.: Doc. bag 546
4. Container:

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO:
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

SOIL: 78440

LOCATION COMMENTS: Station 8, at base of the Sculptured Hills, south of Wessex Cleft. Soil from walls of 25 cm deep trench, above 78420 (probably from about 5 cm to 15 cm below regolith surface).

GENERIC SUBSAMPLES:

1. 78441 (162.8 gm): < 1 mm
2. 78442 (3.78 gm): 1-2 mm
3. 78443 (2.44 gm): 2-4 mm
4. 78444 (1.19 gm): 4-10 mm
5. (gm): > 1 cm
6. 78440 (81.38 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 251.59 gm
2. Color:
3. Bag no.: Doc. bag 551
4. Container: Returned in sample collection bag 4, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 77.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Miller et al., 1974)

	%
Si :	20.6
Ti :	1.9
Al :	9.1
Cr :	
Fe :	9.6
Mn :	0.131
Mg :	6.6
Ca :	7.9
Na :	0.36
K :	
P :	
S :	
O :	42.0

TRACE ELEMENTS: (Phillpotts et al., 1974)

	ppm		ppm
Sc:		La:	
V :		Ce:	24.2
Co:		Nd:	18.6
Ni:		Sm:	6.08
Ba:	113	Eu:	1.35
Sr:	149	Tb:	
Hf:		Dy:	9.18
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	5.17
		Lu:	0.806

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SOIL: 78420

LOCATION COMMENTS: Station 8, at base of the Sculptured Hills, south of Wessex Cleft. The bottom layer (10 cm thick) of a 25 cm deep trench.

GENERIC SUBSAMPLES:

1. 78421 (186.2 gm): < 1 mm
2. 78422 (4.16 gm): 1-2 mm
3. 78423 (2.41 gm): 2-4 mm
4. 78424 (1.91 gm): 4-10 mm
5. (gm): > 1 cm
6. 78420 (97.94 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 292.68 gm
2. Color: Med. gray (N5)
3. Bag no.: Doc. bag 548
4. Container:

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO:
2. Agglutinates: 63
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 46 um (< 1 cm); 41 um (< 1 mm)
2. M_d:
3.

MAJOR ELEMENTS: (Miller et al., 1974)

	wt.%
Si :	20.9
Ti :	2.3
Al :	9.2
Cr :	
Fe :	9.5
Mn :	0.127
Mg :	7.1
Ca :	8.4
Na :	0.32
K :	
P :	
S :	
O :	42.3

TRACE ELEMENTS: (Baedecker et al., 1974)

	ppm		ppm
Sc:	37	La:	
V :		Ce:	25
Co:	36	Nd:	
Ni:		Sm:	1.4
Ba:		Eu:	
Sr:		Tb:	1.6
Hf:	5.1	Dy:	
Ta:	0.79	Ho:	
Th:	1.3	Tm:	
U :		Yb:	5.4
		Lu:	

PETROGRAPHY: (90-150 um) (Heiken and McKay, 1974)

Components	%
Agglutinates	62.6
Basalt, Equi.	5.7
Basalt, Vario.	
Breccia:	
Low-Grade-Brown	7.0
Low-Grade-Colorless	1.3
Med-High Grade	2.6
Anorthosite	0.3
Cataclastic Anorthosite	0.6
Norite	-
Gabbro	-
Plagioclase	7.3
Clinopyroxene	9.0
Orthopyroxene	-
Olivine	0.6
Ilmenite	-
Glass:	
Orange	0.6
"Black"	0.3
Colorless	1.3
Brown	0.6
Gray, "Ropy"	-
Other	-
Total Number Grains	300

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SOIL: 78460

LOCATION COMMENTS: Station 8, at base of the Sculptured Hills, south of Wessex Cleft. Soil from the walls of a 25 cm deep trench from a depth of about 1-5 cm.

GENERIC SUBSAMPLES:

1. 78461 (264.5 gm): < 1 mm
2. 78462 (5.328 gm): 1-2 mm
3. 78463 (2.787 gm): 2-4 mm
4. 78464 (1.303 gm): 4-10 mm
5. 78465 (1.039 gm): > 1 cm
6. 78460 (138.1 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 413.057 gm
2. Color: Olive black (5Y 2/1)
3. Bag no.: Doc. bag 550
4. Container: Returned in sample collection bag 7, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 83.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Miller et al., 1974)	%	TRACE ELEMENTS: (Phillpotts et al., 1974)	ppm		ppm
Si :	19.9	Sc:		La:	
Ti :	2.1	V :		Ce:	23.2
Al :	8.5	Co:		Nd:	17.6
Cr_2O_3:		Ni:		Sm:	5.88
Fe :	10.0	Ba:	109	Eu:	1.31
Mn :	0.122	Sr:	149	Tb:	
Mg :	6.7	Hf:		Dy:	8.88
Ca :	7.9	Ta:		Ho:	
Na :	0.30	Th:		Tm:	
K :		U :		Yb:	4.88
P :				Lu:	0.78
S :					
O :	41.9				

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VOL. 3 P. 3397-3410

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VOL. 3 P. 2643-2662

MILLER,M.D. + PACER,R.A. + MA,M.-S. + HAWKE,B.R. + LOOKHART,G.L. + EHMANN,W.D. (1974)
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SOME CONCEPTS AND IS/FEO COMPILATION
IN PROCEEDINGS OF THE 9TH LUNAR AND PLANETARY SCIENCE CONFERENCE
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RHODES,J.M. + RODGERS,K.V. + SHIH,C.-Y. + BANSAL,B.M. + NYQUIST,L.E. + (1974)
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SOIL: 78480

LOCATION COMMENTS: Station 8, at base of the Sculptured Hills, south of Wessex Cleft. "Skim" soil collected to a depth of 0.5 to 1 cm, as part of the collection of samples from a 25 cm deep trench.

GENERIC SUBSAMPLES:

1. 78481 (173.9 gm): < 1 mm
2. 78482 (2.69 gm): 1-2 mm
3. 78483 (1.21 gm): 2-4 mm
4. 78484 (0.32 gm): 4-10 mm
5. (gm): > 1 cm
6. 78480 (89.33 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 267.45 gm
2. Color:
3. Bag no.: Doc. bag 549
4. Container:

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO:
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Miller et al., 1974)

	%
Si :	20.2
Ti :	1.8
Al :	9.0
Cr_2O_3:	
Fe :	9.3
Mn :	0.124
Mg :	6.8
Ca :	7.6
Na :	0.29
K_2O :	
P_2O_5 :	
S :	
O :	41.9

TRACE ELEMENTS: (Baedecker et al., 1974)

	ppm		ppm
Sc:	36	La:	
V :		Ce:	24
Co:	38	Nd:	
Ni:		Sm:	
Ba:		Eu:	1.4
Sr:		Tb:	1.7
Hf:	5.6	Dy:	
Ta:	0.68	Ho:	
Th:	1.6	Tm:	
U :		Yb:	5.3
		Lu:	

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VOL. 2 P. 1823-1844

SOIL: 78500

LOCATION COMMENTS: About 4 km northeast of LM at base of the Sculptured Hills, south of Wessex Cleft. Surface sample collected near rim of a very subdued 15 m diameter crater. Soil sample to accompany the rake sample 78525 to 78599. A rock was placed in the bag containing the soil sample (68505, basalt; 506.3 gm).

GENERIC SUBSAMPLES:

1. 78501 (718.7 gm): < 1 mm
2. 78502 (21.38 gm): 1-2 mm
3. 78503 (16.14 gm): 2-4 mm
4. 78504 (19.16 gm): 4-10 mm
5.* (109.31 gm): > 1 cm
6. 78500 (391.1 gm): Reserve

* 78506 to 78509 and 78515 to 78518 comprise this split. Not included in total mass of soil.

MISCELLANEOUS:

1. Collected mass: 1166.48 gm
2. Color:
3. Bag no.: Doc. bag 566
4. Container:

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 36.0, submature
2. Agglutinates: 63
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 46 um (< 1 cm); 41 um (< 1 mm)
2. M_d: 31.5 um
3.

MAJOR ELEMENTS: (Apollo 17 P.E.T., 1973)

	%
SiO_2 :	42.67
TiO_2 :	5.47
Al_2O_3:	15.73
Cr_2O_3:	0.37
FeO :	13.15
MnO :	0.18
MgO :	9.91
CaO :	11.77
Na_2O :	0.35
K_2O :	0.09
P_2O_5 :	0.05
S :	0.10

TRACE ELEMENTS: (Rhodes et al., 1974)

	ppm		ppm
Sc:		La:	8.29
V :		Ce:	23.3
Co:		Nd:	18.4
Ni:	194	Sm:	6.36
Ba:		Eu:	1.37
Sr:	154	Tb:	
Hf:		Dy:	10.2
Ta:		Ho:	
Th:	-	Tm:	
U :	0.36	Yb:	5.54
		Lu:	-

PETROGRAPHY: (90-150 um) (Heiken and McKay, 1974)

Components	%
Agglutinates	35.3
Basalt, Equi.	11.0
Basalt, Vario.	
Breccia:	
Low-Grade-Brown	2.3
Low-Grade-Colorless	0.3
Med-High Grade	8.0
Anorthosite	Tr.
Cataclastic Anorthosite	2.0
Norite	Tr.
Gabbro	-
Plagioclase	13.3
Clinopyroxene	6.0
Orthopyroxene	7.3
Olivine	-
Ilmenite	3.7
Glass:	
Orange	2.0
"Black"	3.6
Colorless	1.0
Brown	2.3
Gray, "Ropy"	0.3
Other	2.0
Total Number Grains	300

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SOIL: 79120

LOCATION COMMENTS: Station 9, on the southeast rim of Van Serg Crater. Collected adjacent to a broken 0.8 m long boulder at a depth of about 3 cm.

GENERIC SUBSAMPLES:

1. 79121 (214.4 gm): < 1 mm
2. 79122 (13.97 gm): 1-2 mm
3. 79123 (13.14 gm): 2-4 mm
4. 79124 (14.48 gm): 4-10 mm
5. 79125 (1.91 gm): > 1 cm
6. 79120 (116.4 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 374.3 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 569
4. Container: Returned in sample collection bag 5, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 57.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:	%	TRACE ELEMENTS:	ppm		ppm
SiO_2 :		Sc:		La:	
TiO_2 :		V :		Ce:	
Al_2O_3:		Co:		Nd:	
Cr_2O_3:		Ni:		Sm:	
FeO :		Ba:		Eu:	
MnO :		Sr:		Tb:	
MgO :		Hf:		Dy:	
CaO :		Ta:		Ho:	
Na_2O :		Th:		Tm:	
K_2O :		U :		Yb:	
P_2O_5 :				Lu:	
S :					

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SOIL: 79220

LOCATION COMMENTS: Station 9, on the southeast rim of Van Serg Crater. From the top 2 cm (gray) soil in a 17 cm deep trench.

GENERIC SUBSAMPLES:

1. 79221 (152.6 gm): < 1 mm
2. 79222 (7.22 gm): 1-2 mm
3. 79223 (6.24 gm): 2-4 mm
4. 79224 (9.75 gm): 4-10 mm
5.* 79225 to 79228 (22.22 gm): > 1 cm
6. 79220 (93.49 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 291.52 gm
2. Color: Olive gray (5Y 4/1)
3. Bag no.: Doc. bag 483
4. Container: Returned in sample collection bag 5, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 81.0, mature
2. Agglutinates: 44
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z: 50 um (< 1 cm); 53 um (< 1 mm)
2. M_d:
3.

MAJOR ELEMENTS: (Apollo 17 P.E.T., 1974)

	%
SiO_2 :	41.67
TiO_2 :	6.52
Al_2O_3:	13.57
Cr_2O_3:	0.42
FeO :	15.37
MnO :	0.21
MgO :	10.22
CaO :	11.18
Na_2O :	0.34
K_2O :	0.09
P_2O_5 :	0.06
S :	0.12

TRACE ELEMENTS: (Korotev, 1976)

	ppm		ppm
Sc:		La:	7.46
V :		Ce:	25.6
Co:		Nd:	
Ni:		Sm:	6.90
Ba:		Eu:	1.44
Sr:		Tb:	1.78
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	6.70
		Lu:	0.94

PETROGRAPHY: (90-150 um) (Heiken and McKay, 1974)

Components	%
Agglutinates	44.4
Basalt, Equi.	14.4
Basalt, Vario.	
Breccia:	
Low-Grade-Brown	8.5
Low-Grade-Colorless	1.0
Med-High Grade	1.0
Anorthosite	-
Cataclastic Anorthosite	0.3
Norite	-
Gabbro	-
Plagioclase	6.9
Clinopyroxene	6.5
Orthopyroxene	-
Olivine	-
Ilmenite	1.3
Glass:	
Orange	4.2
"Black"	3.3
Colorless	2.3
Brown	2.3
Gray, "Ropy"	3.6
Other	-
Total Number Grains	306

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SOIL: 79240

LOCATION COMMENTS: Station 9, on the southeast rim of Van Serg Crater. From the 2-7 cm level of a 17 cm deep trench.

GENERIC SUBSAMPLES:

1. 79241 (174.3 gm): < 1 mm
2. 79242 (11.32 gm): 1-2 mm
3. 79243 (10.46 gm): 2-4 mm
4. 79244 (10.85 gm): 4-10 mm
5. 79245 (10.11 gm): > 1 cm
6. 79240 (113.3 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 330.34 gm
2. Color: Med. dark gray (N4)
3. Bag no.: Doc. bag 484
4. Container: Returned in sample collection bag 5, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 51.0, submature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS:
(Rose et al., 1974)

	%
SiO_2 :	41.73
TiO_2 :	6.79
Al_2O_3:	13.9
Cr_2O_3:	0.46
FeO :	15.64
MnO :	0.20
MgO :	9.90
CaO :	11.08
Na_2O :	0.39
K_2O :	0.90
P_2O_5 :	0.80

TRACE ELEMENTS:
(Rose et al., 1974)

	ppm		ppm
Sc:	56	La:	<10
V :	81	Ce:	
Co:		Nd:	
Ni:	275	Sm:	
Ba:	117	Eu:	
Sr:	147	Tb:	
Hf:		Dy:	
Ta:		Ho:	
Th:		Tm:	
U :		Yb:	6.4
		Lu:	

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SOIL: 79260

LOCATION COMMENTS: Station 9, on the southeast rim of Van Serg Crater. From the lowest 10 cm in a 17 cm deep trench.

GENERIC SUBSAMPLES:

1. 79261 (187.8 gm): < 1 mm
2. 79262 (11.74 gm): 1-2 mm
3. 79263 (11.46 gm): 2-4 mm
4. 79264 (15.85 gm): 4-10 mm
5. 79265 (2.6 gm): > 1 cm
6. 79260 (118.9 gm): Reserve

MISCELLANEOUS:

1. Collected mass: 348.35 gm
2. Color: Olive gray to olive black (5Y 4/1 to 5Y 2/1)
3. Bag no.: Doc. bag 485
4. Container: Returned in sample collection bag 5, in air. processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 43.0, submature
2. Agglutinates: 22

GRAIN SIZE PARAMETERS:

1. M_z: 125 um (< 1 cm); 70 um (< 1 mm)
2. M_d:
3.

MAJOR ELEMENTS: (Apollo 17 P.E.T., 1979)

	%
SiO_2 :	42.26
TiO_2 :	6.09
Al_2O_3:	14.43
Cr_2O_3:	0.40
FeO :	14.60
MnO :	0.20
MgO :	9.82
CaO :	11.48
Na_2O :	0.35
K_2O :	0.11
P_2O_5 :	0.07
S :	0.12

TRACE ELEMENTS: (Rhodes et al., 1974)

	ppm		ppm
Sc:		La:	8.31
V :		Ce:	22.2
Co:		Nd:	17.8
Ni:	177	Sm:	6.18
Ba:		Eu:	1.39
Sr:	154	Tb:	
Hf:		Dy:	10.0
Ta:		Ho:	
Th:	-	Tm:	
U :	0.32	Yb:	5.53
		Lu:	0.71

PETROGRAPHY: (90-150 um)
(Heiken and McKay, 1974)

Components	%
Agglutinates	22.3
Basalt, Equi.	13.3
Basalt, Vario.	
Breccia:	
Low-Grade-Brown	1.3
Low-Grade-Colorless	0.3
Med-High Grade	8.3
Anorthosite	0.6
Cataclastic Anorthosite	0.6
Norite	0.3
Gabbro	-
Plagioclase	12.7
Clinopyroxene	16.6
Orthopyroxene	1.6
Olivine	-
Ilmenite	7.0
Glass:	
Orange	4.0
"Black"	2.6
Colorless	3.2
Brown	2.0
Gray, "Ropy"	1.3
Other	1.6
Total Number Grains	300

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SOIL: 79510

LOCATION COMMENTS: Station 9, on the southeast rim of Van Serg Crater. Surface sample collected about 2-3 m east of a boulder and sample 79120.

GENERIC SUBSAMPLES:

1. 79511 (179.2 gm): < 1 mm
2. 79512 (11.32 gm): 1-2 mm
3. 79513 (9.94 gm): 2-4 mm
4. 79514 (12.24 gm): 4-10 mm
5.* 79515 (93.23 gm): > 1 cm
6. 79510 (107.6 gm): Reserve

* Samples 79515 to 79519, 79525 to 79529, and 79535 to 79537 derived from this split.

MISCELLANEOUS:

1. Collected mass: 413.53 gm
2. Color: Olive gray (5Y 3/1)
3. Bag no.: Doc. bag 570
4. Container: Returned in sample collection bag 5, in air. Processed in N_2.

SELECTED CHEMICAL AND PHYSICAL PROPERTIES OF SOIL

MATURITY PARAMETERS:

1. I_s/FeO: 61.0, mature
2. Agglutinates:
3.
4.

GRAIN SIZE PARAMETERS:

1. M_z:
2. M_d:
3.

MAJOR ELEMENTS: (Mason et al., 1974)

	%
SiO_2 :	41.69
TiO_2 :	6.13
Al_2O_3:	13.79
Cr_2O_3:	0.43
FeO :	15.11
MnO :	0.27
MgO :	10.31
CaO :	10.73
Na_2O :	0.27
K_2O :	0.18
P_2O_5 :	0.06
S :	

TRACE ELEMENTS: (Laul et al., 1974)

	ppm		ppm
Sc:	50	La:	8.7
V :	85	Ce:	29
Co:	37	Nd:	21
Ni:	170	Sm:	7.3
Ba:	100	Eu:	1.52
Sr:		Tb:	65
Hf:	5.6	Dy:	10
Ta:	0.99	Ho:	
Th:	-	Tm:	
U :		Yb:	5.7
Zr:	150	Lu:	0.86
Ir:	8		
Au:	3		

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