APOLLO 17 COARSE FINES (4-10 mm)
SAMPLE LOCATION, CLASSIFICATION, AND
PHOTO INDEX

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By
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June 1973

INTRODUCTION

This report summarizes the range and proportions of rock types observed during a binocular microscope examination of the Apollo 17 4-10 mm coarse fines. As the examination was made through the window of the nitrogen lines at the Johnson Space Center, without the aid of thin sections or analyses of any kind, all classifications are strictly tentative. The purpose of the report is to provide lunar investigators with information on which they may select and seek allocation of particles from this size range for detailed study.

This collection of small particles from Apollo 17 is especially valuable because each individual particle is large enough for several studies (i.e., age, chemistry, and mineralogy) and because they were collected in such a way as to be unbiased by selection. Not all the 4-10 mm particles from Apollo 17 are included in this edition of this catalog. Only part of each soil sample was sieved and soils that were less than 50 grams total were not sieved at all. In addition, samples 70324, 72164, 73134, 75124, 76284, and 78464 were unavailable for description at the time this edition was printed. They are briefly described in the Apollo 17 Catalog (1). The particles that were picked out of core tubes are described elsewhere.

The systematic numbering of lunar samples used in the Apollo 17 Catalog should help the readers understand the location and scientific objective of each of these samples (1). The section of this report on sample locations was derived from the USGS Interagency Reports 69, 71, and 72 (2).

For the purpose of macroscopic examination, the particles in this catalog were dusted off individually by holding them with forceps in a jet of N_2. After dusting, the particles were separated into categories on the basis of their lithologic character as viewed through a binocular microscope. After separation into categories each group of particles was described and photographed. All of the sample descriptions and photographs are included in this catalog. The color photographs are worth a thousand words of description. The Curator's Office, JSC, maintains a file of these photos which can and should be examined before scientific investigation is planned.

References:
(1) Apollo 17 Lunar Sample Information Catalog, MSC 03211.
(2) U.S. Geological Survey Interagency Report (69, 71, 72).

Acknowledgements

I would like to thank Ursula Marvin and Jean and Stuart Agrell for their help in describing some of the samples. Robert Sutton kindly reviewed the section on sample location. The excellent photography was performed by Victor Alexander and Al Locke. Jack Warren was especially helpful in sample preparation. A large number of other staff members in the Lunar Receiving Laboratory were helpful in many ways. Finally, I also want to thank Dianne Robinson who typed and assembled this report.

Table I is a summary of the findings of this report. Stations 2, 3, and 6 contained many feldspathic fragments and Station 0, 1, 4, 5 and 9 contained many mare basalt fragments. The plagioclase rich fragments were almost always of the brecciated variety.

The following terms were used frequently:

Agglutinates - Agglutinates are delicate, glassy objects that often serve to bind a wide variety of individual mineral fragments, soil clods and brecciated material together. Generally, a smooth black glass makes up as much as 50 percent of the particles. The glass is usually vesicular.

Soil Breccia - Soil breccias are weakly lithified and very friable clods of soil. They are always well rounded, but they have survived the sieving and dusting and can usually be picked up by tweezers. They are about 90 percent gray aphanitic material and about 10 percent individual glass and mineral clasts.

Glass - Many of the soil breccias and some of the other lithic particles are coated by black glass which has apparently been splashed onto them. In addition, there are a few glass particles. They are all black and often vesicular; sometimes they are devitrified.

Mare Basalt - The floor of the Taurus-Littrow valley is apparently flooded by a mare basalt material similar to the rocks from Apollo 11. Fragments of this material range in grain size from about 2 mm down to aphanitic. They contain up to 20 percent opaques (probably ilmenite), 50 percent brown clinopyroxene, and 30 percent plagioclase, Some particles have up to a few percent of olivine - generally of a slightly larger grain size. These fragments are usually vuggy and vesicular. The vugs (up to 20 percent) are usually lined with euhedral crystals of the matrix minerals and the vesicles (up to 5 percent) usually have drussy white linings.

Aphanitic Basalt - The mare basalt fragments, range in grain size down to aphanitic. The aphanitic variety is usually dense and black and may have more ilmenite than the more coarse grained equivalents. Sometimes phenocrysts of olivine are present. A few particules in this category may be fine-grained breccia.

Breccia - The fragments called breccia in this report are equivalent to the "microbreccia" material described in the main sample catalog. They are rich in mafic minerals and probably derived from the mare basalt material. The presence of a few percent of plagioclase-rich material in the clasts of these breccias indicate the addition of highland material.

Feldspathic Breccia - The light colored breccia particles in this collection are termed feldspathic breccia if they contain over 60 percent plagioclase and if they are not of an annealed appearance. Much of the plagioclase in these particles is chalky white and probably highly shocked. The mineral assemblage of these light colored breccias also includes a gray mineral (probably orthopyroxene) and a few percent opaque mineral. Sometimes a light colored glass is associated with these particles.

"Anorthositic" Breccia - The transition from feldspathic breccia is gradational. Many of the plagioclase rich breccias have an annealed or recrystallized texture and are termed anorthositic breccia in this report. These light colored particles have a dense or coherent metaclastic texture and are made up predominantly of plagioclase and probably a good deal of orthopyroxene. Most of these particles are aphanitic.

Feldspathic Basalt - There are a number of plagioclase rich particles (especially from station 6) that I thought may have a fine-grained igneous texture. Such particles are important because there are no reported equivalent to this category in the rake samples or large rocks. However, it is possible that these particles may instead be of a highly metamorphosed origin. The major mineral was plagioclase (60-80 percent) and a gray material - probably orthopyroxene. The grain boundaries appeared distinct, especially those of the opaques which made up a few percent of the assemblage.

Anorthosite-Norite-Troctolite - A few plagioclase rich particles had a slightly larger grain size (2-4 mm) and were included in these categories. One particle had several percent pink spinel and some had olivine or orthopyroxene. However, it was disappointing not to find more particles that belong in these categories.

Sample #	Glass	Soil Breccia	Agglutinate	Mare Basalt	Aphanatic Basalt	Dark Breccia	Breccia	Feldspathic Breccia	Anorthositic Breccia	Feldspathic Basalt	Anorthosite Norite	Location
70064				3				1	1			Jack Schmitt's Pockett
70164		1	2	4				1				ALSEP site
70184				3			2					Deep core site
70274			1	5	2	1						SEP site
70314		1	2	6	3							LRV-12
70324				10			3					LRV-12
71044	3	1		21	6				1			St. 1a 1-2 cm
71064	1			77	17	4			1			St. 1a 5-6 cm
71134		2		1	1							St. 1a
71154				7	1	1						St. 1a
71504	4	7		27	1	8			2			St. 1a Near Rake Sample
72134			2	27	17	13						LRV-1
72144	2	2	2	1		2			1			LRV-2
72224								28	3	1		St. 2
72244			2					11	13			St. 2
72264			4				3	14	3			St. 2
72324			1				1		2			St. 2
72434								1	7			St. 2
72444		5	5	1				9		2		St. 2 Trench 0-4 cm
72464							1	3			3	St. 2 Skim
72504		2	2				14	20				St. 2 Near Rake Sample
72704				1		3		10	3		3	Near Nansen Rake Sample
72164							5					LRV-3

Sample #	Glass	Soil Breccia	Agglutinate	Mare Basalt	Aphanatic Basalt	Dark Breccia	Breccia	Feldspathic Breccia	Anorthositic Breccia	Feldspathic Basalt	Anorthosite Norite	Location
73124	1		2									St. 2a Skim
73134			-"Lithic fragments"-									St. 2a
73144	1						1	18	2		5	St. 2a Trench 15 cm
73154							1	1			1	St. 2a
73214	1						1	7			2	St. 3
73224							1	5			1	St. 3
73244	3	24	1	5	1	1	10	25	2		3	St. 3 Trench 0-5 cm
73264			3	2				12	8			St. 3 Trench 5-10 cm
73284				1			2	12	10			St. 3 Trench 5-10 cm
74114		20					10					LRV-5
74124						1				2		LRV-6
74244	5	13		21	25	5	1					St. 4 Trench
75064				33	1							St. 5
75084			8	43	13	15			2			St. 5
75114				11	7	10						LRV-7
75124			-"Basalt fragments"-									LRV-8
76034	2	2		2							6	St. 6
76124		18							1			LRV-9
76134				2		3					8	LRV-10 Turning Point Rock
76224		6	4				1	5	2	5		St. 6
76244				1						4		St. 6

Sample #	Glass	Soil Breccia	Agglutinate	Mare Basalt	Aphanatic Basalt	Dark Breccia	Breccia	Feldspathic Breccia	Anorthositic Breccia	Feldspathic Basalt	Anorthosite Norite	Location
76264		13		4				4	12	7		St. 6
76284				-"see description"-								St. 6
76324	1	2		2	3			33	9	11	2	St. 6
76504		18	9	7		6	1	13			8	St. 6 Near Rake Sample
77514						1		2				St. 7
77534				6		2		7			2	St. 7
78124		11	3	1								LRV-11
78224		4	5	2								St. 8
78234								2			2	St. 8
78424						6					2	St. 8 Trench 15-25 cm
78444		2	1	1				1				St. 8 Trench 6-15 cm
78464	2					6						St. 8 Trench 1-6 cm
78484						1		1				St. 8 Skim 0-1 cm
78504	4	14	4	18	20	5	12	3	4			St. 8 Near Rake Sample
79124	5			1		50				1		St. 9
79224	5	4		14		5						St. 9 Trench 0-2 cm
79244	1	18		5	5	2		3			4	St. 9 Trench 2-7 cm
79264	7	6		11	14		5		8		1	St. 9 Trench 7-17 cm
79514	1	2		3		2	2				1	St. 9

The landing site for Apollo 17 was located near the center of Taurus-Littrow Valley (Figure 1). In this area fine-grained mare basalts are overlain by a regolith that may contain dark mantling material. The valley floor is smooth and only gently rolling. Loose surface rocks range in size up to a maximum of 4 m in the ALSEP area. The craters in the landing area are subdued and most of the observable surface blocks may be ejecta from Camelot (600 m diameter and approximately 1 crater diameter to the west). The crew did not recognize a layer of dark mantle that was distinct from the regolith. The dark mantle unit can be seen in premission photographs and one of the objectives of the mission was to sample it. Possibly gardening of dark mantle and normal regolith may have destroyed original dark mantle depositional characteristics.

Sample 70164 is from a fillet of a 1.5 m boulder near the ALSEP site. Sample 70184 is from a typical soil collected about 3 m from the deep core site and included a large basalt fragment. 70274 was collected at the SEP site 180 m from the LM at azimuth 073° and it also included a basalt fragment. 70314 and 70324 were collected at the end of EVA-3 (LRV-12) near Sherlock crater about 1 km to the east of the LM. 70054 is from the residue of the BSLSS which also included several large rocks. 70064 (bag 15E) is from Jack Schmitt's pocket.

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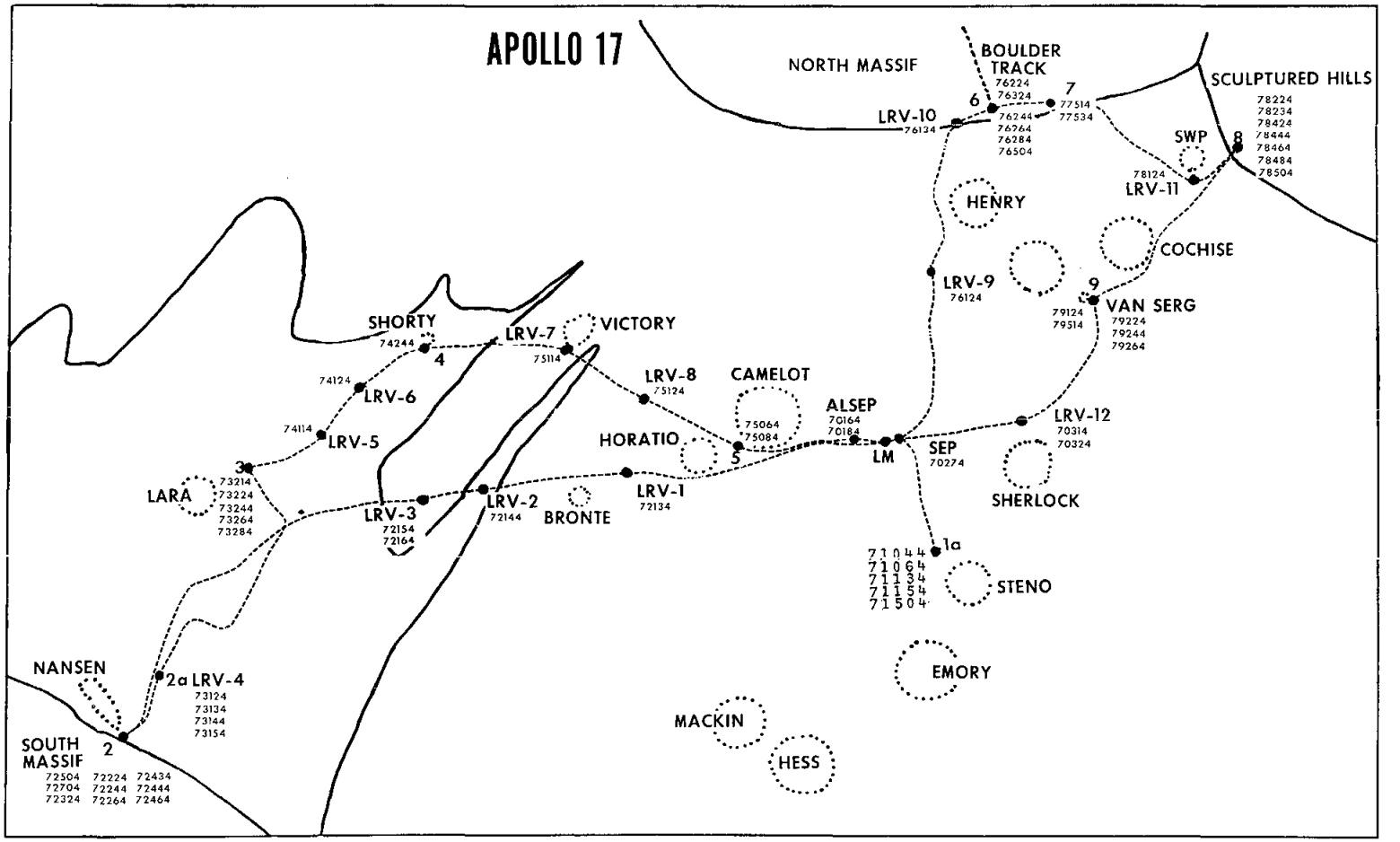

Figure 1

Sketch map of EVA traverse and sample collection stations
See figure 1 of Apollo 17 Lunar Sample Catalog (1)
Also see detailed map in USGS IR72 (2)

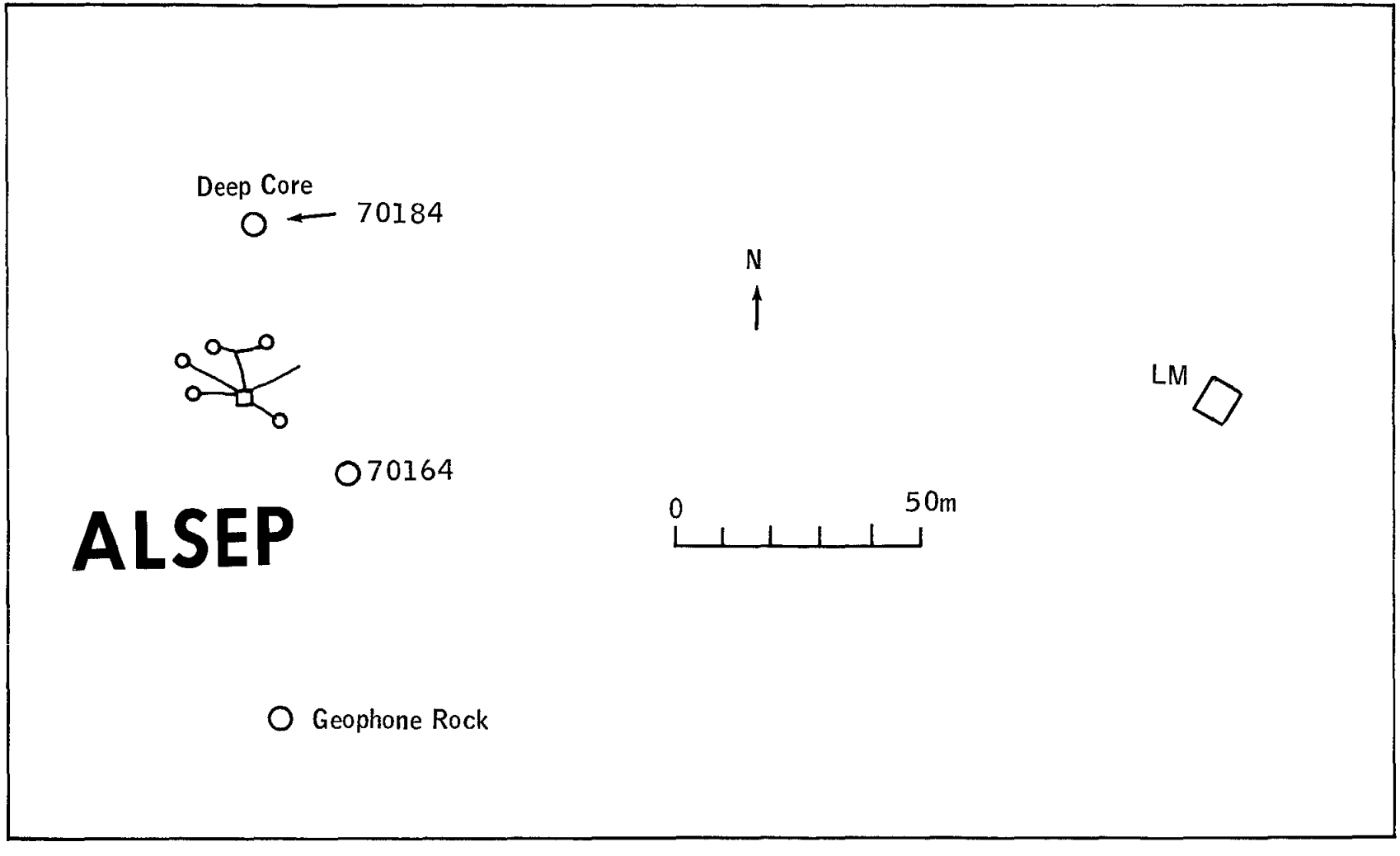

Figure 2

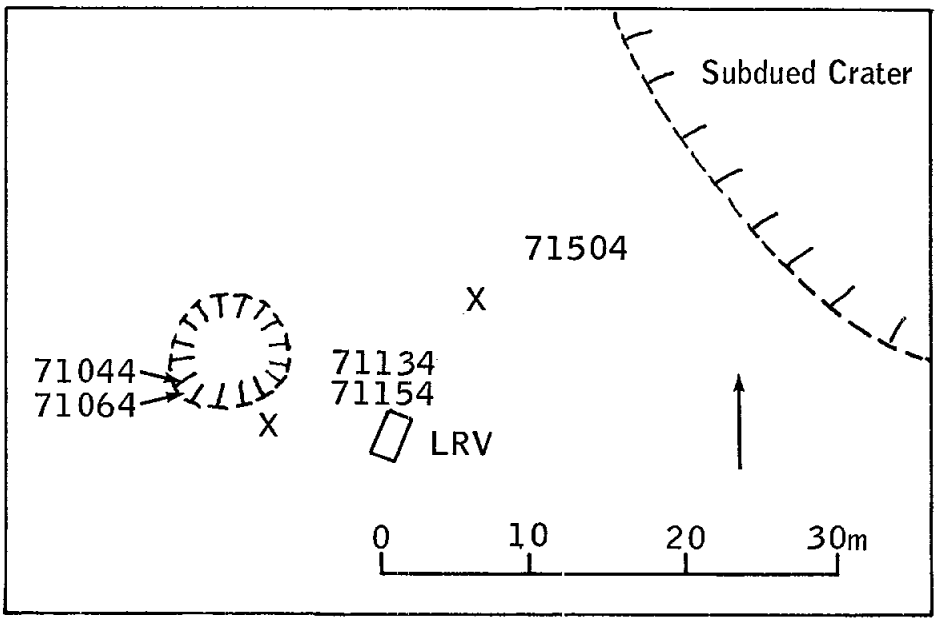

Figure 3 Station 1a

Station 1a

Station 1a is located on the subdued ejecta blanket of Steno crater about 1 km south of the SEP and about 150 m from the northwest rim of Steno. Most of the craters in the station area are subdued; ejecta is readily apparent only around the 10 m blocky crater which was the prime sampling area. Sample 71044 (1-2 cm deep) and 71064 (5-6 cm deep) were collected in the shadow of a boulder on the rim of the 10 m blocky crater. Samples 71134 and 71154 were collected during sampling of the chip hammered off of a rounded boulder nearby. 71504 was collected with the rake sample which was collected away from the prominant block population.

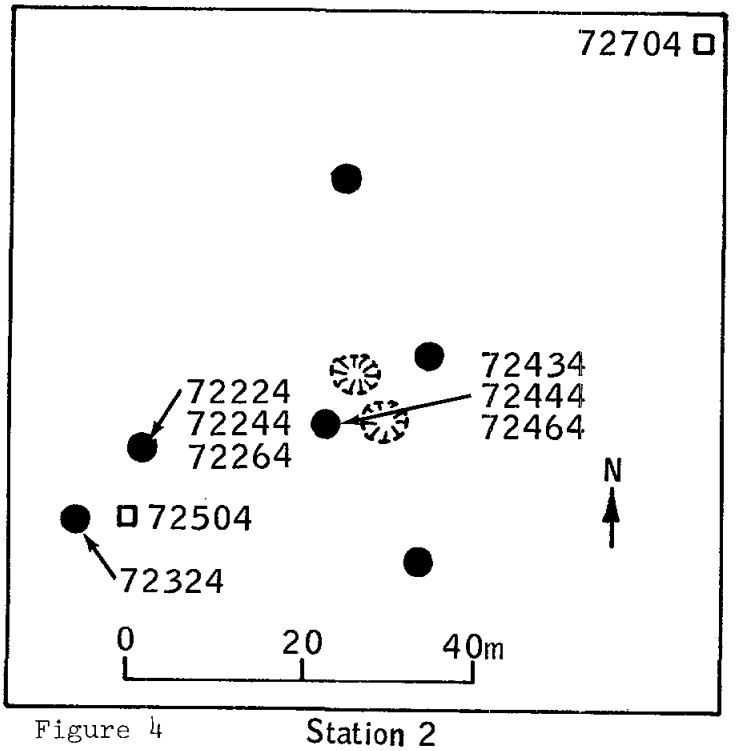

Figure 4 Station 2

Station 2

Sample 72134 (LRV-1) was collected on a ray from one of the rare, blocky rimmed craters (10-15 m) in the generally block-free area between Horatio and Bronte craters. The soil in the area appeared typical of the dark mantle region. Sample 72144 (LRV-2) was scooped from the bright rim of a small crater on the tongue of the light landslide about 3.5 km west of the LM. Sample 72164 (LRV-3) is from the dark mantle region between the tongues of the light landslide and about 4.3 km west of the LM.

Station 2 was located at the foot of South Massif near the contact between the landslide and South Massif slope materials. The station area was near several boulders that probably either rolled or were ejected from a crater higher on the massif. Sample 72224 is from a fillet (top 3 cm) "up underneath an overhang" of a 2 m boulder, but was not permanently shadowed because the overhang faces east. 72244 is another sample of fillet (to a depth of 5 cm) and 72264 is a skim sample from the upper 1 cm of soil. 72324 is a permanently shadowed soil from about 20 cm under an overhang of another 2 m boulder. 72434 is from soil obtained by scooping up two rock chips. 72444 (upper 4 cm) and 72464 (skim sample) are from soil under a 2/3 m boulder. 72504 was collected near the rake sample and should be representative of surface material from South Massif. 72704 was collected near a second rake sample taken closer to Nansen Crater and is probably landslide material.

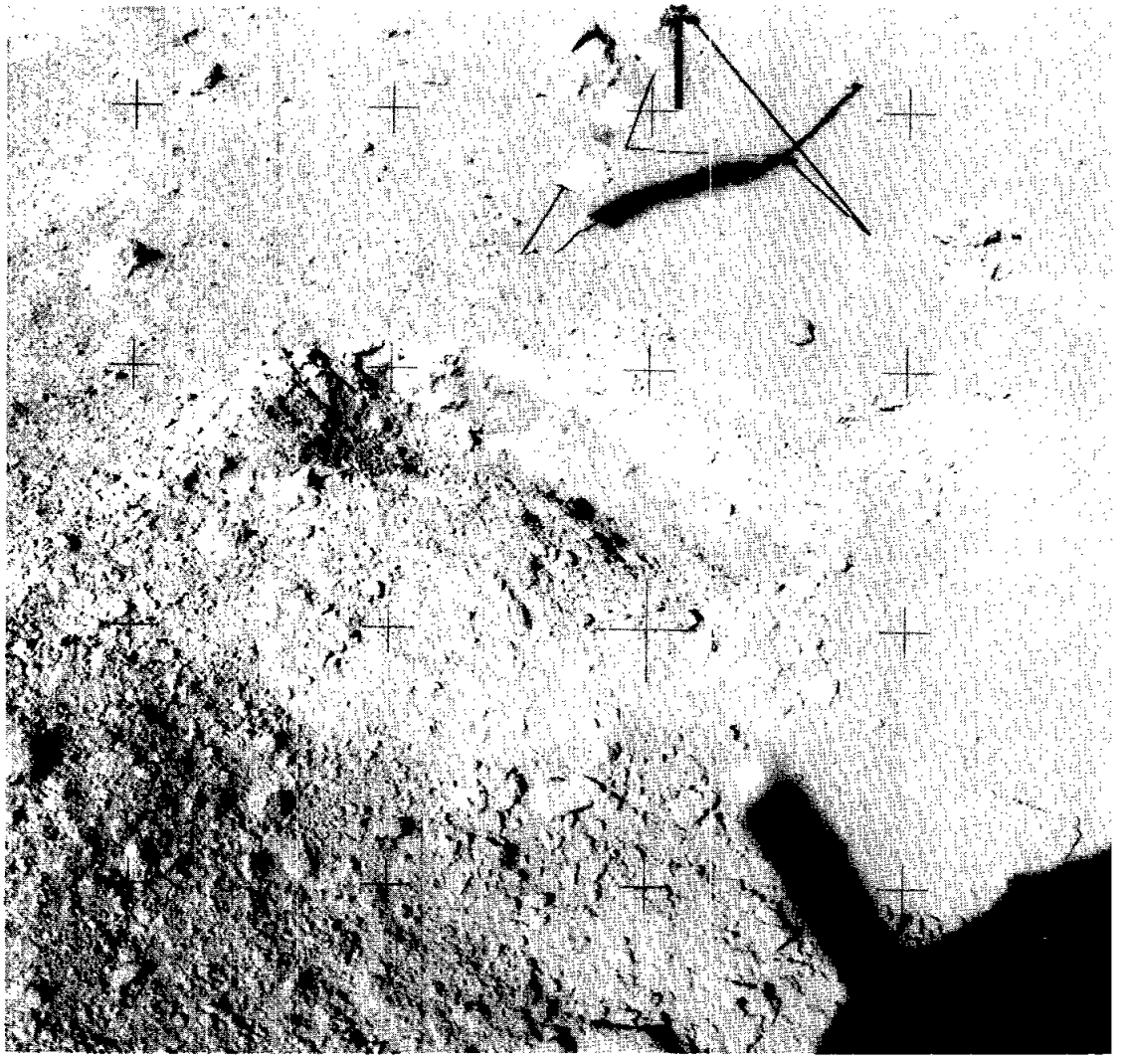

Figure 6

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Trench at Station 3

Station 2a

Station 2a was located east of Nansen crater 600 m northeast of Station 2 on the light colored material of the landslide. The crew described the surface material as blue-gray soil to a depth of about 5-10 cm and a lighter color soil below. 73124 was collected from the upper few centimeters near the trench. 73144 was from 15 cm below the surface in the trench and may be the most representative sample of landslide material returned because of its depth below the surface and distance from South Massif and the dark mantle regions. 73134 and 73154 were from soils collected while scooping up rock fragments.

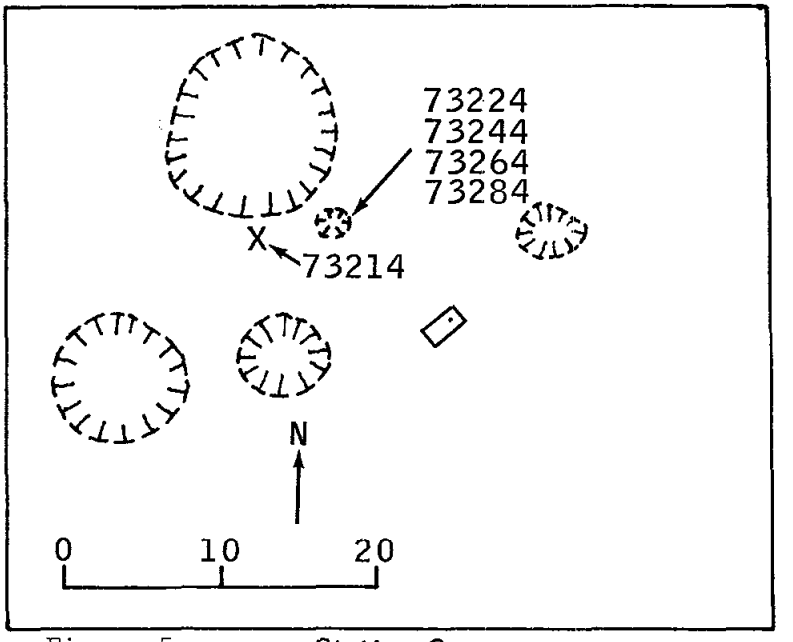

Figure 5 Station 3

Station 3

Station 3 is located on light colored landslide material near the base of the scarp and approximately 50 meters east of the rim of Lara crater. Lara crater (500 m diameter) is the largest crater in the area and is probably covered by the landslide material such that the samples that were collected are probably related to the landslide and not to Lara crater ejecta. The 10 m diameter crater that was sampled appears to have penetrated only landslide materials. 73214 was collected from the rim of the 10 m crater. 73224 was a skimmed soil sample from the upper 1/2 cm of the soil near the trench. The trench (∿10 cm deep) showed that medium-gray surface material overlies a lighter gray layer about 3 cm thick, which in turn, overlies marbled light and medium-gray material, Figure 6.

Sample 73244 was from the upper 5 cm of the trench and contains both medium-gray surface layer material and light-gray material from below the surface. 73264 is from 5-10 cm below the surface and is from the medium-gray part of the marbled zone. 73284 is also from 5-10 cm below the surface, but is from the light-gray part of the marbled zone.

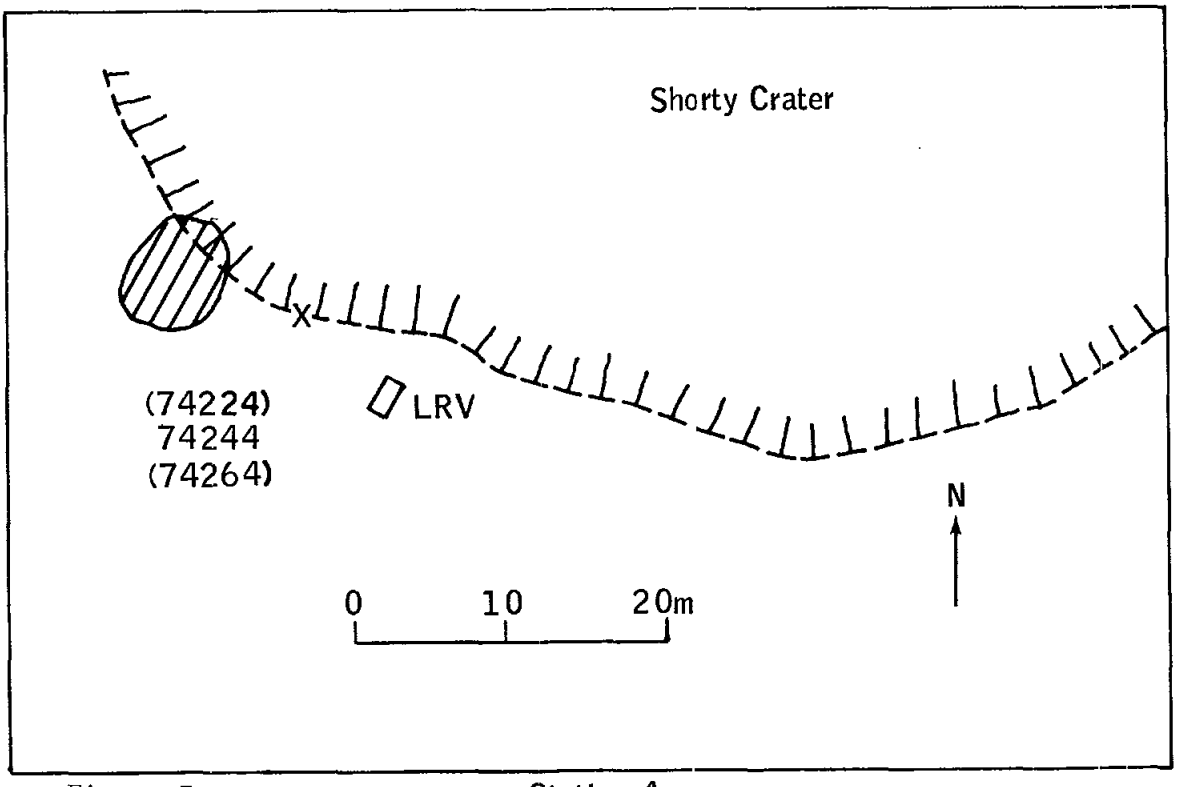

Figure 7 Station 4

Station 4

Two LRV samples were collected on the traverse to station 4. 74114 (LRV-5) was collected at an unusually blocky 15 m crater about 700 meters northeast of station 3. 74124 (LRV-6) was collected in the light-colored landslide material 1.1 km northeast of station 3.

Station 4 was located on the south rim of Shorty, a 110 m crater near the north edge of the landslide. Shorty is interpreted as a young impact crater. A trench dug in the rim crest exposed compact reddish soil buried beneath a 1/2 cm thick gray soil (Figure 8). 10 cm-wide yellowish bands form the southwest and northeast margins of the deposit and these are in steep sharp contact with the gray soil adjacent to the colored soil. 74220 is a sample of the orange soil which has not been sieved. 74244 is from the gray soil at the southwest of the meter-wide band of orange soil. 74260 (also unsieved) is from the northeast side.

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Figure 8

Trench With Orange Soil at Station 4

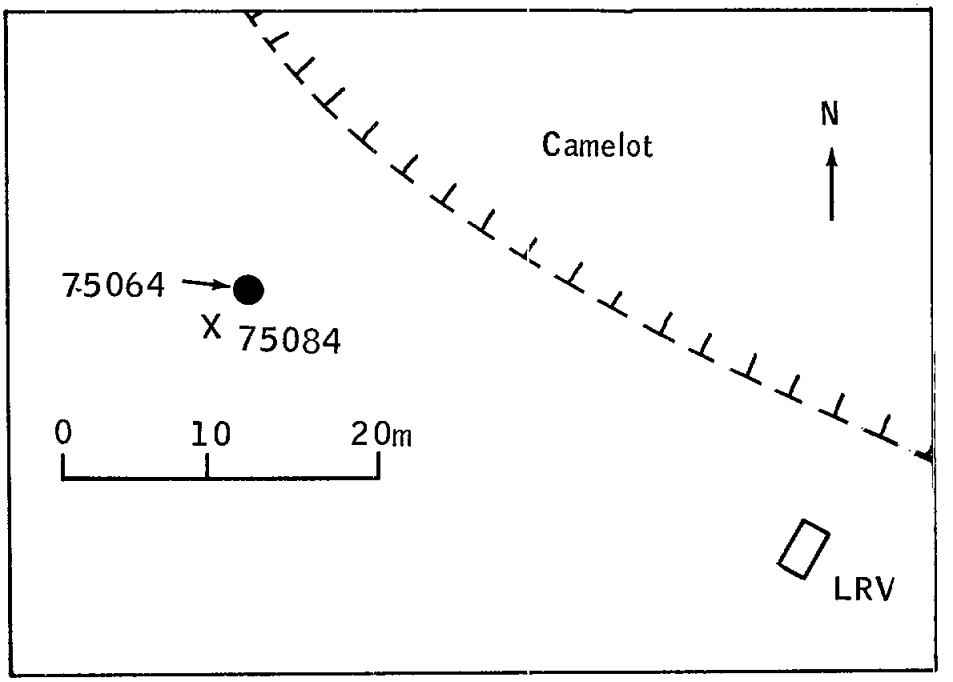

Figure 9 Station 5

Station 5

Two LRV samples were collected on the traverse to station 5. 75114 (LRV-7) is from the rim of Victory which was judged by the crew to be a series of craters. The ejecta blanket and rim appeared to be blanketed by dark mantle and the presence of landslide material was not detected by the crew at the sample site. 75124 (LRV-8) was collected at an area that was away from ejecta of any large crater and is considered a good sample of dark mantle material.

Station 5 is located within a block field on the southwest rim of the large (600 m) crater Camelot. The sample area is crowded with subrounded boulders of basalt of uniform lithology. Dark mantle material appears to partly bury these boulders which are themselves apparently cleaned by the zap-pitting process. 75064 is from a soil collected from a small hollow (1 cm deep) in a flat boulder several meters across at a point 1/2 m from the edge. A local impact probably threw this soil onto the rock. 75084 is a typical soil scooped from the upper 5 cm of the regolith.

Station 6

Two rover samples 76124 (LRV-9) and 76134 (LRV-10) were collected along the traverse to station 6. 76124 was scooped from the upper few centimeters of typical soil about half-way between SEP and station 6. Possibly some of these fragments are from Henry crater. 76134 was collected on the north side of Turning Point Rock and may include material from the fillet of this rock.

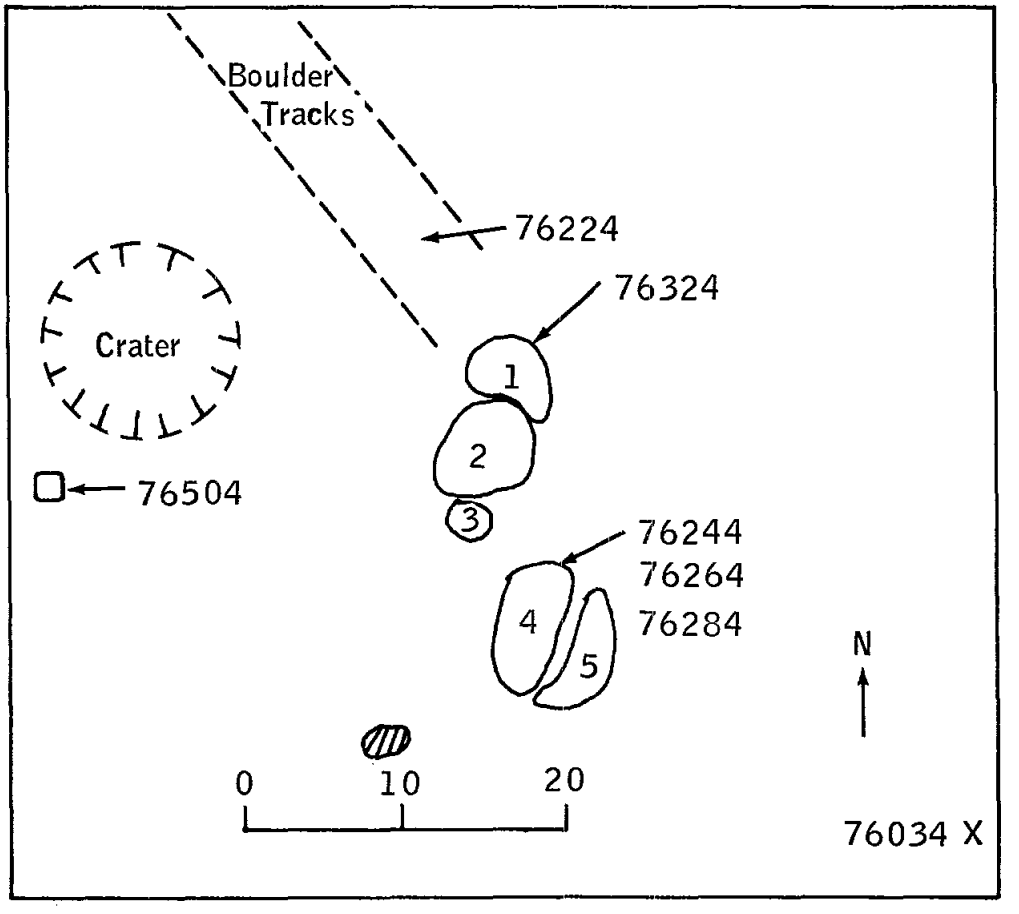

Figure 10 Station 6

Station 6 was at a cluster of five boulders on the south slope of North Massif. This area is covered by many large blocks and smaller fragments which have come from higher on the slope. 76224 was collected within the boulder track leading to this cluster of boulders (which may have originally been one boulder). This soil is similar to the other soils collected in the area of station 6. 76324 was collected from the top surface of boulder No. 1 and is also similar in color to other soils in the area of station 6. It was probably derived from soils upslope and transported by some cratering event to the top of the boulder.

Boulder No. 4 has a prominant north overhang, beneath which a shadowed sample 76244 was collected along with two samples (76264 and 76284) which were collected outside the shadow. Sample 76504 was collected on the ejecta blanket of a 10 meter crater along with a rake sample 76535. Another sample 76034 was collected a few meters downslope from station 6.

Station 7

Station 7 was located at the base of the North Massif, just above the break in slope between the valley floor and the massif. The two soils from this station (77514 and 77534) were both bagged with rock fragments selected from the surface. "Bag 542 is another bag of goodies" LMP.

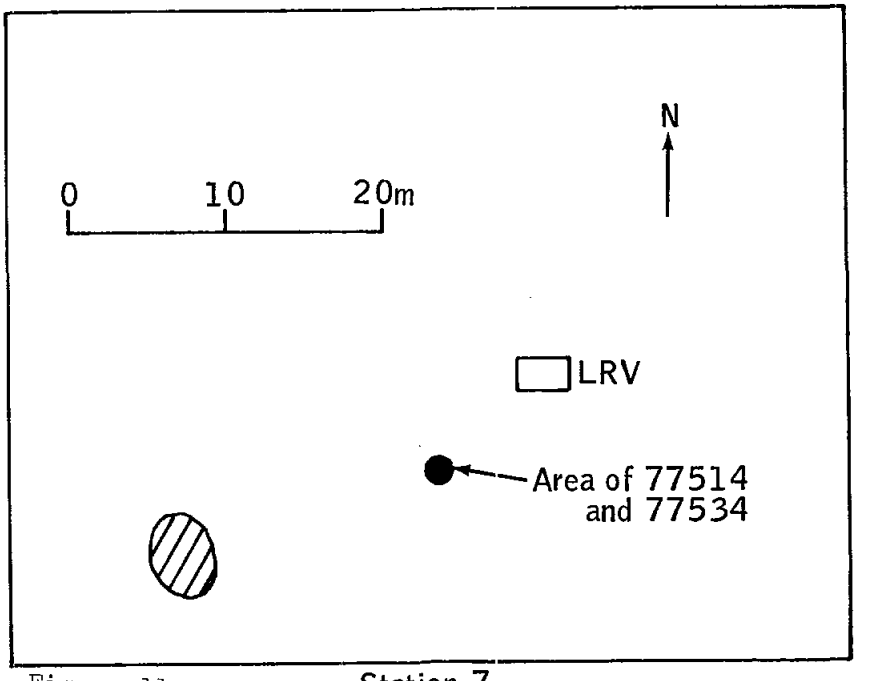

Figure 11 Station 7

Station 8

On the traverse to station 8 the crew collected a LRV-11 sample (78124) near the rim of SWP crater. The rocks in the sample area were identified by the crew as clods of soil breccia that break up easily.

Station 8 was located at a moderately inclined transition zone between the sculptured hills and the valley floor. The crew climbed up towards the hills to sample a 2/3 m gabbroic boulder. Large rocks and boulders were rare in the station area. None of the craters had raised or blocky rims. With the exception of the boulder, all the rocks larger than 20 cm had the appearance of mare basalt. Sample 78224 was collected from beneath the 2/3 m boulder and 78234 from the top and included chips of the boulder. A 25 cm deep trench was sampled at the bottom (78424 = 15 to 25 cm) and in the middle (78444 = 6 to 15 cm, 78464 = 1 to 6 cm). Sample 78484 was skimmed from the upper 1/2 to 1 cm at the edge of the trench. (Figure 13) Sample 78504 was scooped from the rake sample area near a 10 m crater.

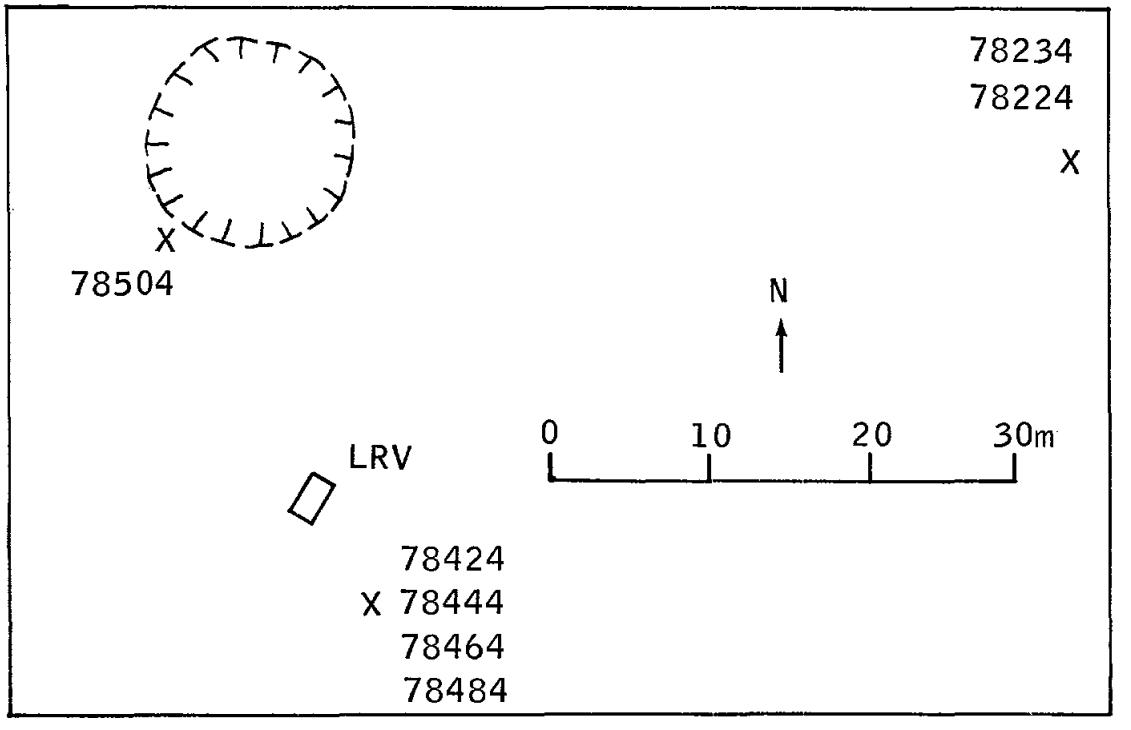

Figure 12 Station 8

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Figure 13

Trench at Station 8

Station 9

Van Serg Crater (90 m in diameter) is a fresh young impact crater with a raised blocky rim and well defined ejecta blanket. Station 9 was on the southeast rim of this crater. The large samples returned are dominated by a dark matrix breccia. The trench samples (about 70 m to the southeast of crater rim) exposed about 10 cm of a light gray soil unit below a 7 cm upper dark unit (Figure 15).

79224, approximate depth 0-2 cm
79244, approximate depth 2-7 cm
79264, approximate depth 7-17 cm

Samples 79124 and 79514 were collected on the center rim near a boulder that was also sampled.

NOTE: 79160 was not returned from the lunar surface!

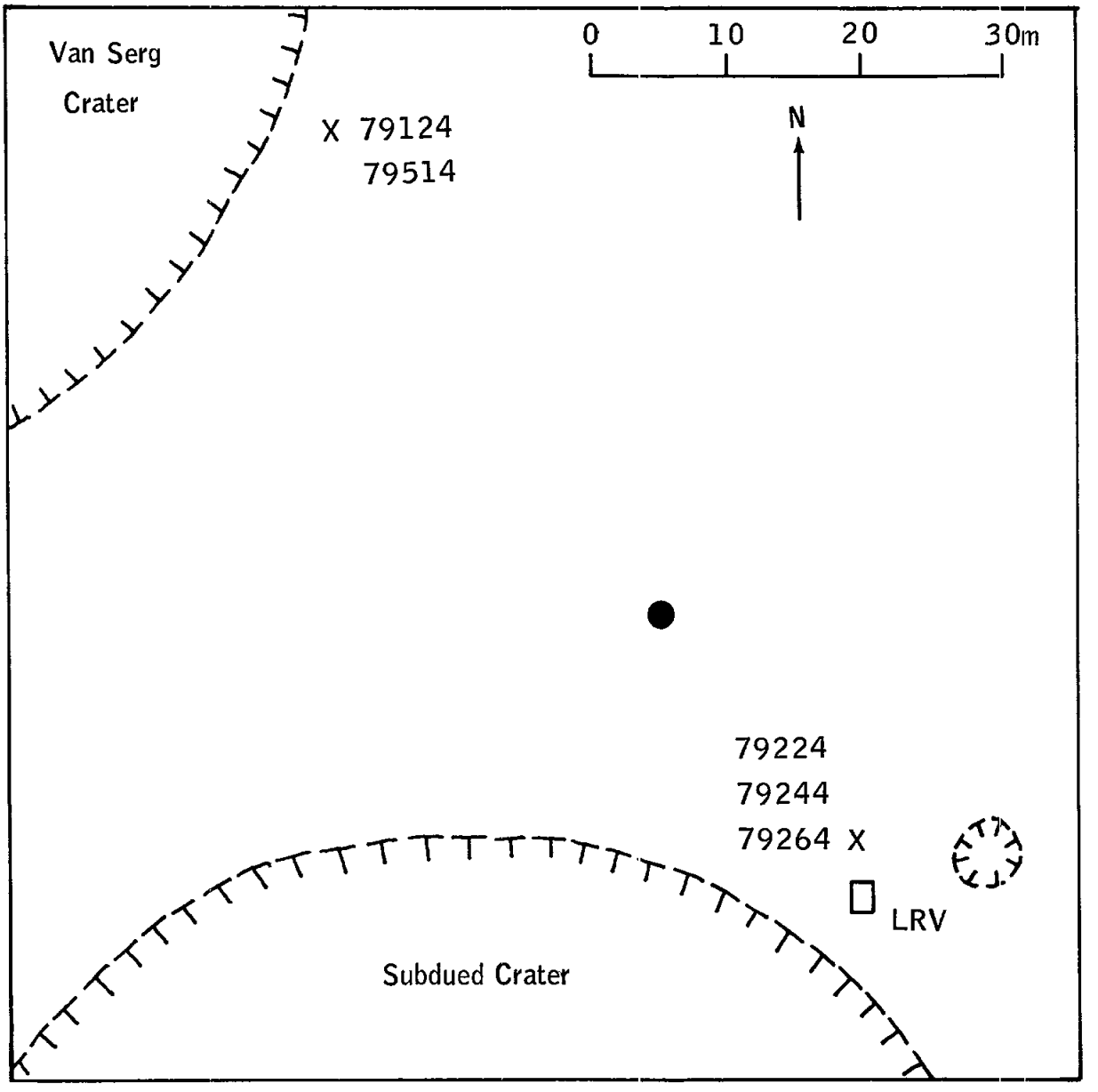

Figure 14 Station 9

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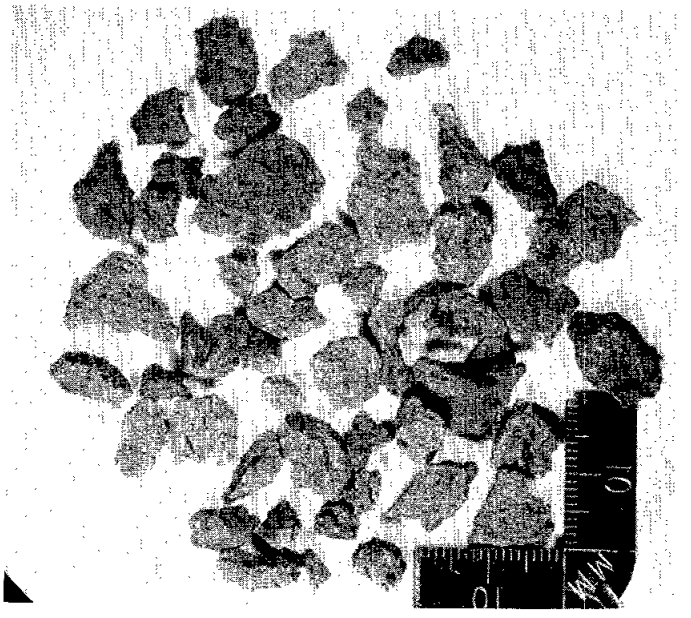
Figure 15

Trench at Station 9

70054,1

Breccia
50 particles, 63.81 grams

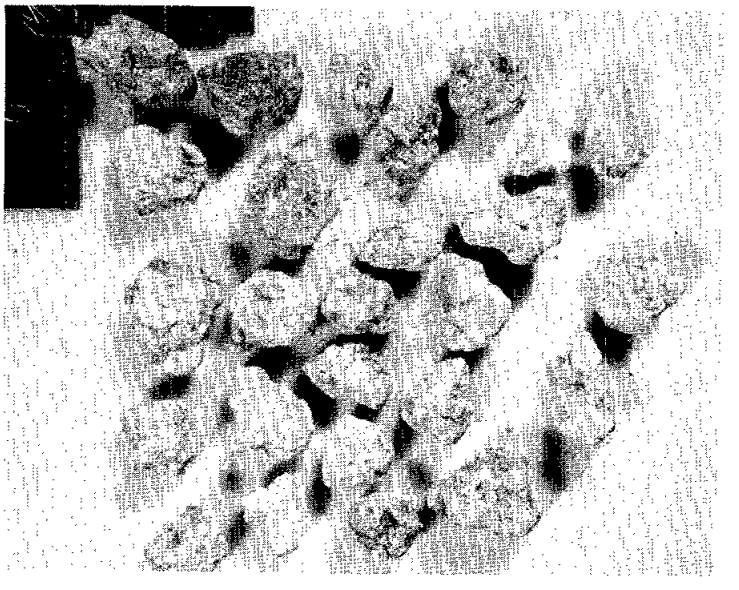
Coherence: Tough
Shape: Plate-like and angular
Surface: Fresh
Color: Tannish gray (greenish gray?)
Mineralogy: 60% plagioclase, 30% gray mineral, 10% greenish mineral
Remarks: All identical to each other; annealed texture.
Photo Number: S-73-23478



70054,2

Anorthosite
25 particles, 30.6 grams

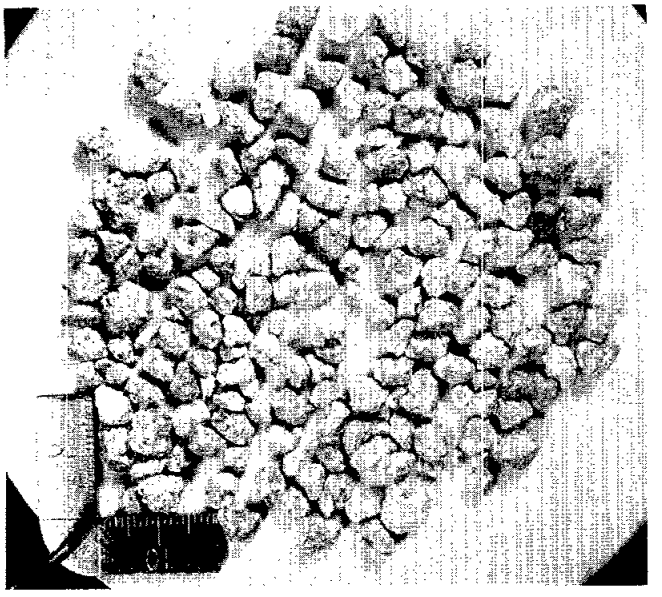
Coherence: Friable
Shape: Subrounded
Surface: Fresh
Color: White
Mineralogy: 98% chalky white plagioclase, 2% light gray, phenocrysts ∿1 mm.
Remarks: All identical to each other
Photo Number: S-73-23479



70054,3

Anorthosite
179 particles, 23.59 grams

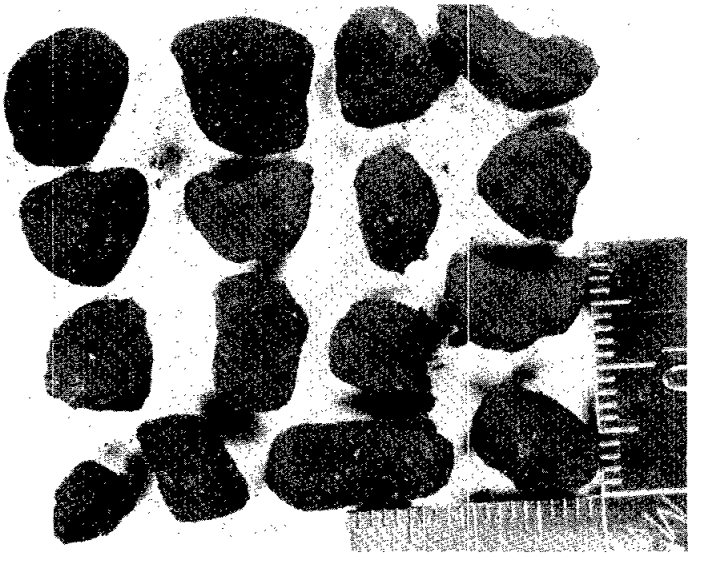
Coherence: Friable
Shape: Subrounded
Surface: Fresh
Color: White
Mineralogy: 98% chalky white plagioclase, 2% light gray, phenocrysts ∿1 mm.
Remarks: All identical to each other
Photo Number: S-73-23480



70054,4

Soil Breccia
15 particles, 7.10 grams

Coherence: Very friable
Shape: Rounded
Color: Black
Mineralogy: 98% aphanitic, 2% white clasts
Remarks: All the same as one another and as ,5; similar to 79035.
Photo Number: S-73-23481



70054,5

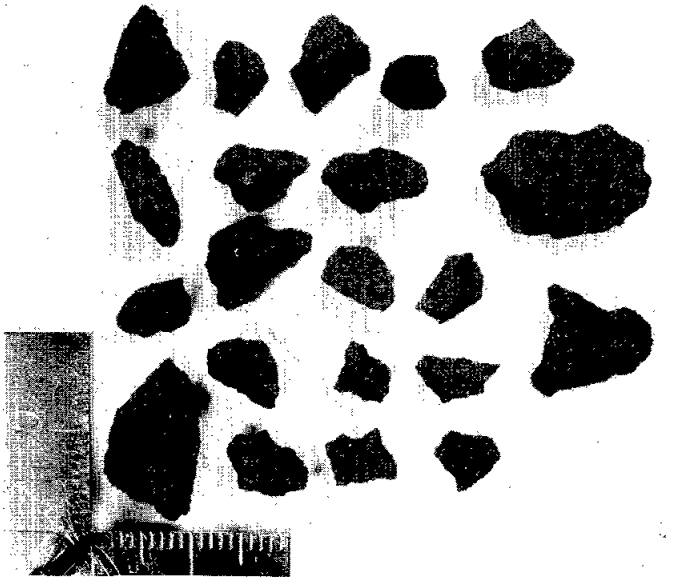
Soil Breccia
84 particles, 10.410 grams

Coherence: Very friable
Shape: Rounded
Color: Black
Mineralogy: 98% aphanitic, 2% white clasts
Remarks: All the same as one another and as 79035.
Photo Number: S-73-23482

70054,6

Basalt
21 particles, 7.010 grams

Coherence: Tough, equigranular
Shape: Angular
Surface: Fresh
Color: Dark gray
Mineralogy: 50% pyroxene, 40% plagioclase, 10% opaque
Remarks: Grain size 0.2 mm.
Photo Number: S-73-23483



70054,7

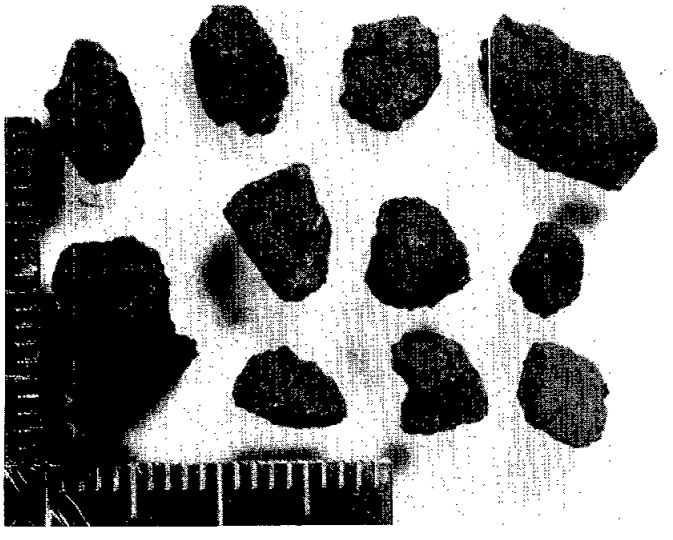
Basalt
15 particles, 3.940 grams

Coherence: Tough equigranular
Shape: Angular
Surface: Hackly
Color: Light gray
Mineralogy: 50% plagioclase, 15% opaque, 35% light brown pyroxene.
Remarks: Grain size 1-2 mm; similar to each other; some of these are similar to 70017 which was in this bag.
Photo Number: S-73-23484

70054,8

Basalt(?)
11 particles, 3.010 grams

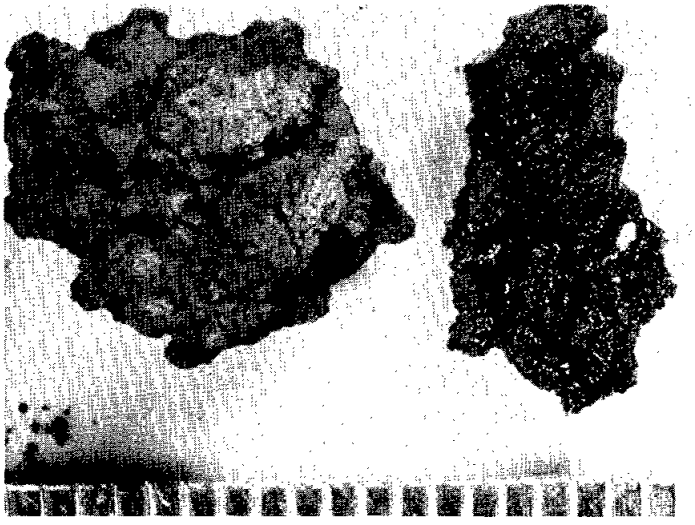
Coherence: Tough
Shape: Subrounded to angular
Color: Gray
Mineralogy: Aphanitic
Remarks: Variable texture. Grain size all less than 0.5 mm.
Photo Number: S-73-23485



70054,9

Agglutinate
2 particles, 0.860 grams

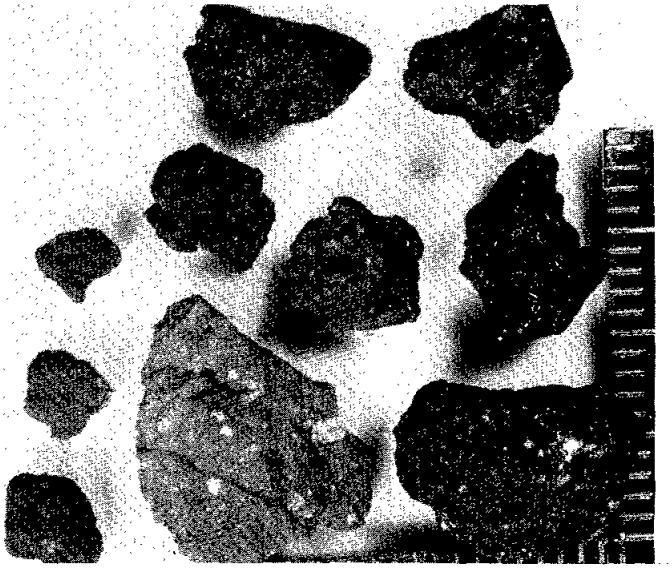
Coherence: Delicate
Shape: Irregular
Surface: One particle has shiny glass coat
Color: Gray
Mineralogy: 50% black vesicular glass, 50% light gray soil
Remarks: One particle has marble texture.
Photo Number: S-73-23486



70054,10

Breccia
10 particles, 2.630 grams

Coherence: Tough
Shape: Irregular
Surface: 40% coated with vesicular black glass
Color: Dark gray
Mineralogy: 90% dark aphanitic matrix with 10% white clasts
Photo Number: S-73-23487



70054,11

Glass
1 particle, 0.250 grams

Coherence: Tough
Shape: Rounded, blocky
Color: Dark greenish gray
Mineralogy: All glass
Photo Number: S-73-23488

70054,12

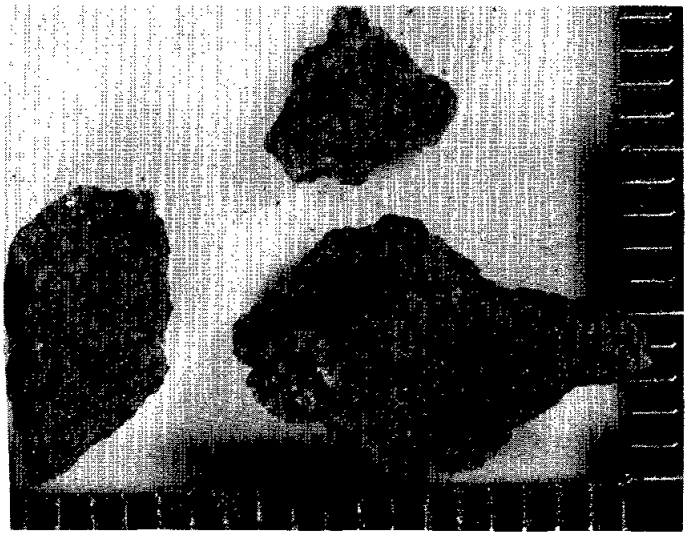
Breccia
2 particles, 0.370 grams

Coherence: Friable
Shape: Subangular
Color: Brown
Mineralogy: 50% plagioclase, 40% pyroxene, 10% matrix
Remarks: Grain size ∿0.5 mm.
Photo Number: S-73-23489

70054,13

Feldspathic Basalt
3 particles, 0.660 grams

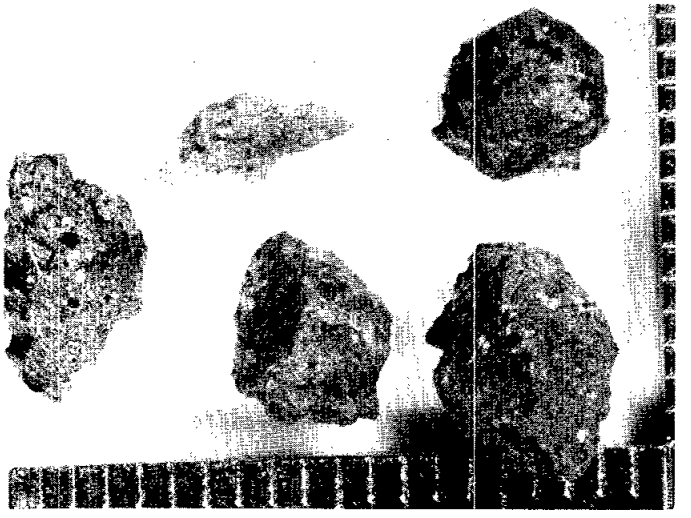
Coherence: Tough
Shape: Angular, 5% Vugs (0.5mm)
Color: Tannish gray
Mineralogy: 70% plagioclase, 25% orthopyroxene, 5% yellow green olivine
Remarks: This may be a metamorphic rock
Photo Number: S-73-23490



70054,14

Anorthositic Breccia
5 particles, 0.570 grams

Coherence: Tough
Shape: Angular to rounded
Color: White
Mineralogy: 80% plagioclase, 20% gray mineral
Remarks: Annealed breccia texture, one particle has 10% vesicles
Photo Number: S-73-23491



70064,1

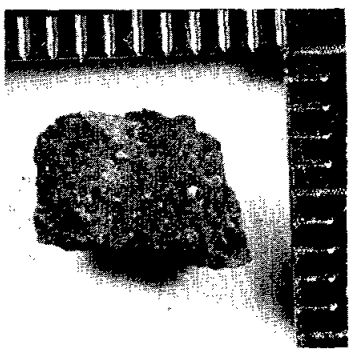
Basalt
3 particles, 0.57 grams

Coherence: Tough
Shape: Subangular to subround
Color: Dark gray (N4)
Mineralogy: Aphanitic (one olivine crystal)
Photo Number: S-73-21372

70064,2

Annealed, Plagioclase Rich Breccia
1 particle, 0.19 grams

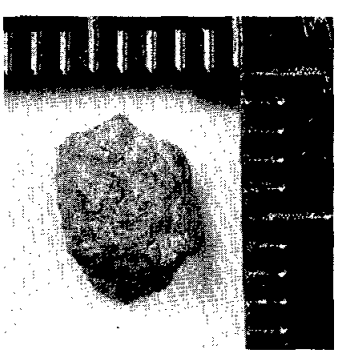
Coherence: Tough
Shape: Angular
Surface: Broken
Color: Light gray
Mineralogy: ∿80% plagioclase, ∿20% gray material (orthopyroxene?)
Photo Number: S-73-21374



70064,3

Plagioclase Rich Breccia
1 particle, 0.1 gram

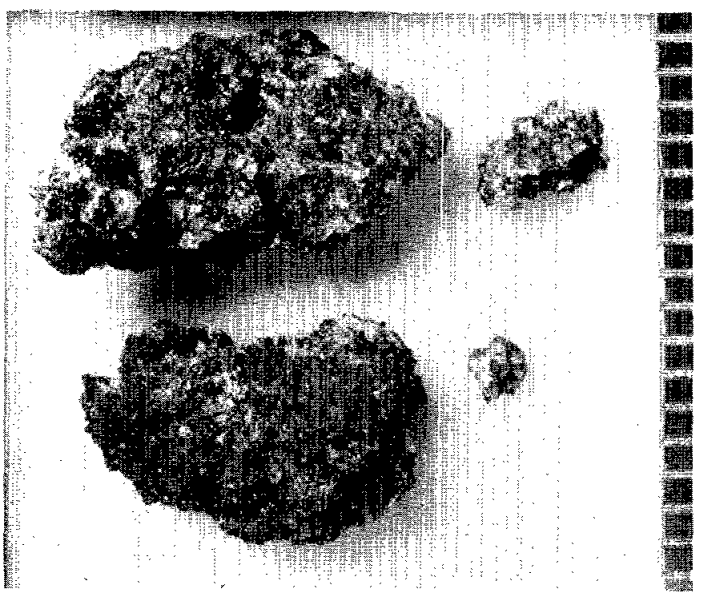
Coherence: Friable
Shape: Rounded
Color: White
Mineralogy: 90% plagioclase, 10% green mineral (or glass?)
Photo Number: S-73-21375



70164,1

Basalt
4 particles, 0.725 grams

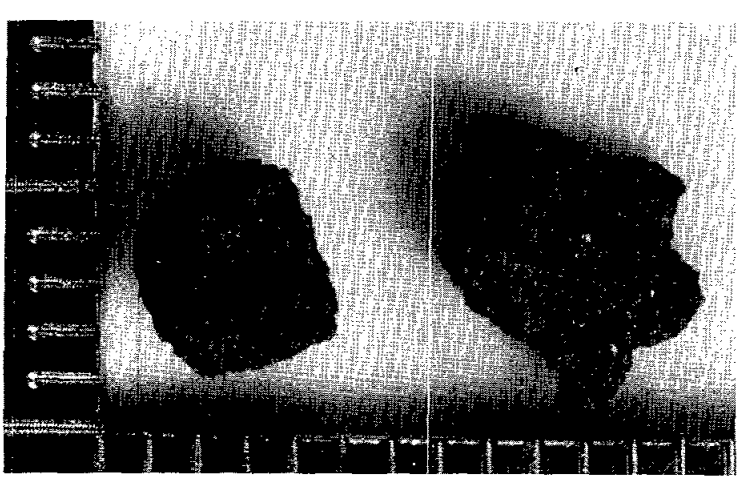
Coherence: Friable to coherent; with some penetrative fracturing
Shape: Angular
Surface: Granular; one surface of one grain coated with thin dark layer of dust(?); no zap pits observed
Color: Light cinnamon with white plagioclase laths visible to naked eye
Mineralogy: Plagioclase (white) laths up to 2 mm long. Cinnamon pyroxene grains and lustrous black ilmenite.
Remarks: Similar to 70165, grain size 1 mm
Photo Number: S-73-18711



70164,2

Basalts
2 particles, 0.200 grams

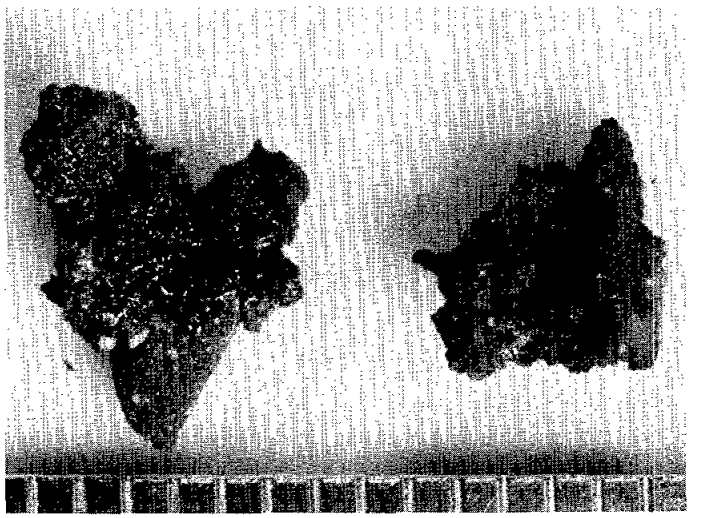
Coherence: Coherent
Shape: Rounded
Surface: Granular, with small irregular cavities; no euhedral minerals in vugs. Some surfaces partially dust covered
Color: Dark reddish gray
Mineralogy: Plagioclase, brown pyroxene, ilmenite. Average grain size 0.2 mm
Photo Number: S-73-18712



70164,3

Glass-Welded Agglutinates
2 particles, 0.140 grams

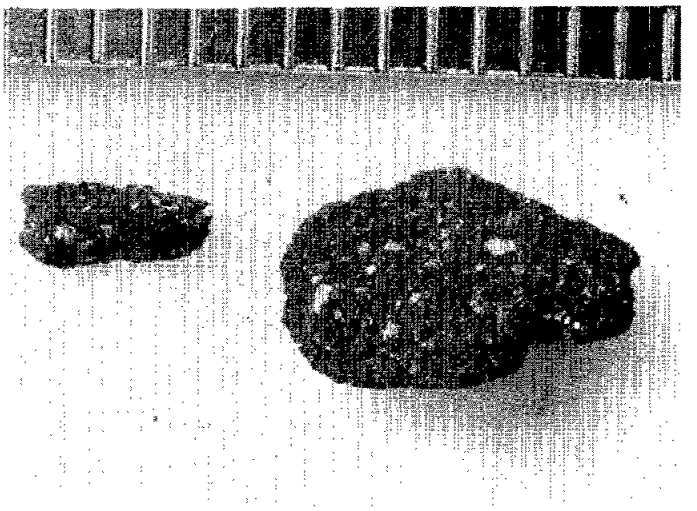
Coherence: Coherent
Shape: Irregular, delicate
Remarks: These particles consist of dark gray soil microbreccias, with angular white, yellowish, and cinnamon clasts, welded into aggregates by crusts and filaments of vesicular brownish-black glass.
Photo Number: S-73-18713



70164,4

Soil Breccia
1-1/2 particles, 0.101 grams

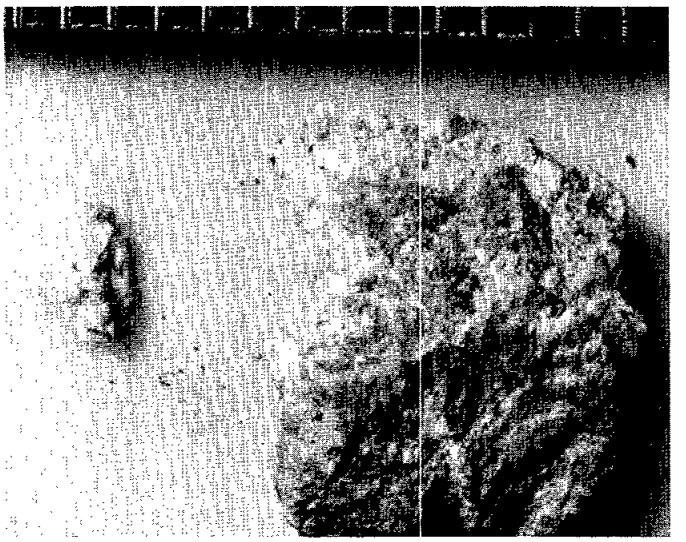
Coherence: Friable; one piece broke off during examination
Shape: Rounded
Surface: Grainy
Color: Dark gray
Remarks: Very fine-grained clastic matrix; clasts angular to rounded, white, yellow, cinnamon, lustrous black. Particle does not appear strongly annealed. No glass coating or zap pits observed.
Photo Number: S-73-18714



70164,5

Plagioclase Rich Breccia
1 particle, 0.305 grams

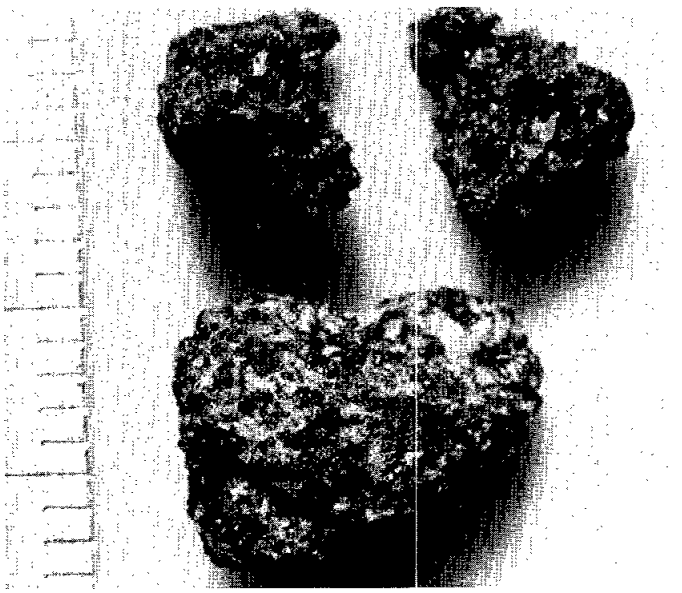
Coherence: Friable to coherent
Shape: Angular, slabby
Surface: Rough, grainy; with one small patch of thin black glass on surface that is stained, one coated with light brown material
Color: White
Mineralogy: Plagioclase (60%) mainly in chalky white ill-defined domains and vitreous tablets. Mafic silicate (40%), small yellow grains ∿0.3 mm. Opaques: very small and sparse (∿1%). A few thin veinlets of black glass. This fragment appears to be a noritic (or troctolitic) rock crushed in situ. Mafic silicates are evenly distributed throughout, but the feldspar has been partially converted to chalky material and may include maskelynite.
Photo Number: S-73-18715



70184,1

Basalt
3 particles, 1.436 grams

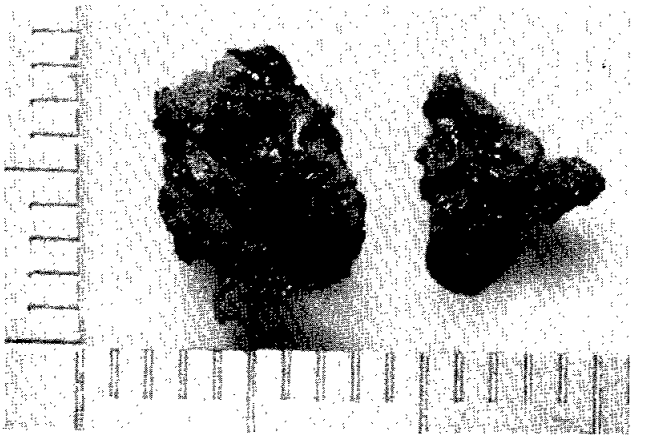
Coherence: Tough
Shape: Angular, 10% Vugs
Surface: Freshly broken
Color: Gray (N5)
Mineralogy: 45% plagioclase, 45% brown pyroxene, 10% opaques
Remarks: Possibly pieces of 70185. Grain size ∿2 mm
Photo Number: S-73-19423



70184,2

Breccia Mixed with Vesicular Glass
2 particles, 0.208 grams

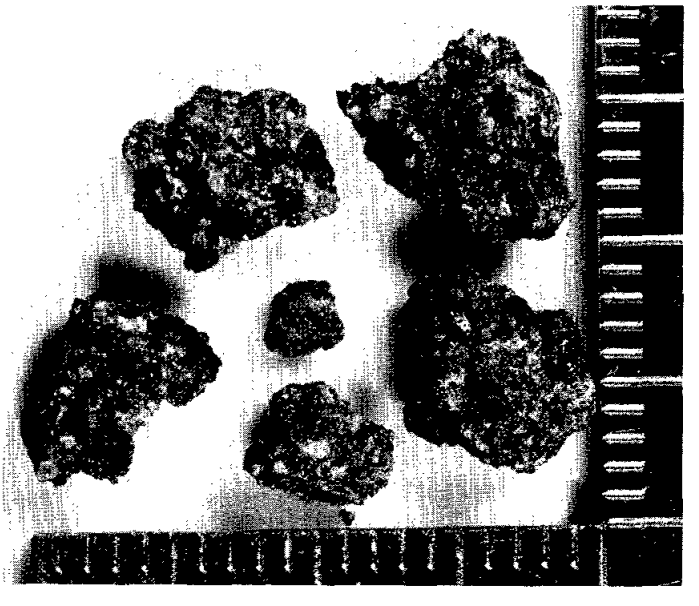
Coherence: Delicate
Shape: Angular, marbled texture, vesicles (5mm)
Color: Black glass, gray breccia
Remarks: These two particles were probably originally part of each other
Photo Number: S-73-19427



70274,1

Basalt
5 particles, 1.27 grams

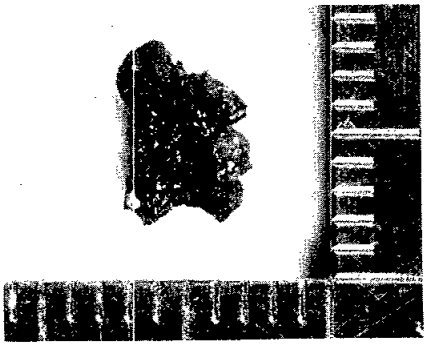
Coherence: Tough
Shape: Angular
Surface: Freshly broken
Color: Gray (N5)
Mineralogy: 45% plagioclase, 40% light brown pyroxene, 15% shiny black ilmenite
Remarks: Similar to 70275
Photo Number: S-73-21383



70274,2

Agglutinate
1 particle, 0.08 grams

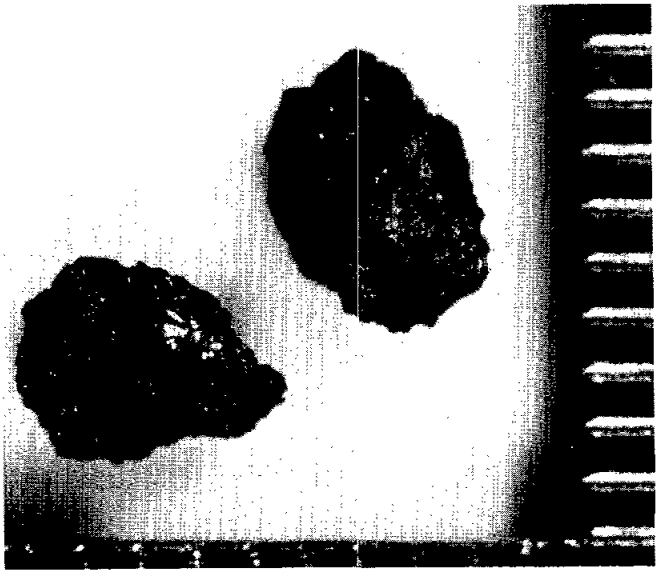
Coherence: Friable
Shape: Angular, irregular
Surface: Vesicular glass on one side, gray matrix breccia on other
Color: Gray
Mineralogy: Glass and breccia
Photo Number: S-73-21387



70274,3

Basalt
2 particles, 0.2 grams

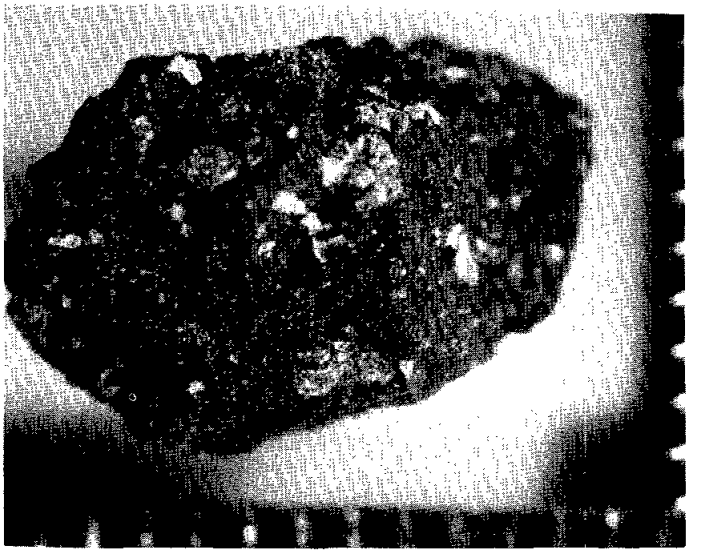
Coherence: Tough
Shape: Angular ,5 % Vugs
Surface: Fresh
Color: Dark gray
Mineralogy: Aphanitic, 1% olivine
Photo Number: S-73-21385



70274,4

Breccia
1 particle, 0.67 grams

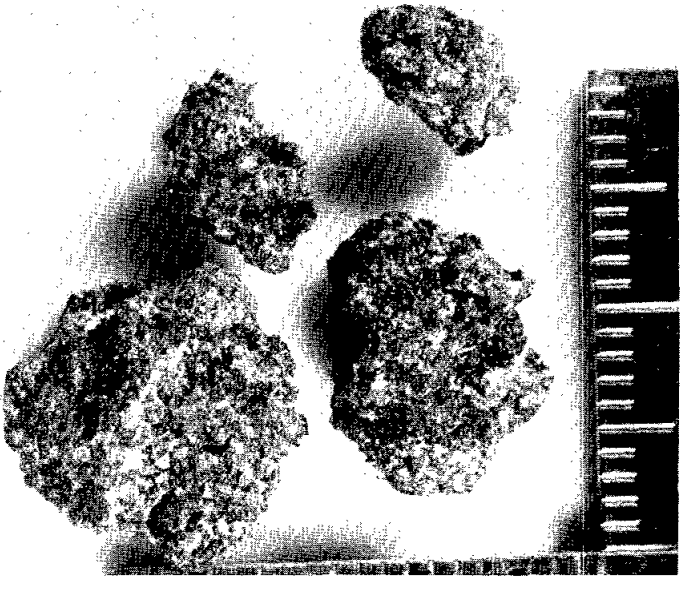
Shape: Subrounded
Surface: 5% glass coating
Color: Gray
Mineralogy: 70% dark gray matrix (fine-grained), 30% white clasts
Remarks: Similar to breccias from station 9
Photo Number: S-73-21384



70314,1

Basalt
4 particles, 2.24 grams

Coherence: Tough
Shape: Angular, 15% Vugs (1mm)
Color: Light gray
Mineralogy: 45% plagioclase, 40% light brown pyroxene, 15% opaque
Remarks: Grain size 1 mm
Photo Number: S-73-21377



70314,2

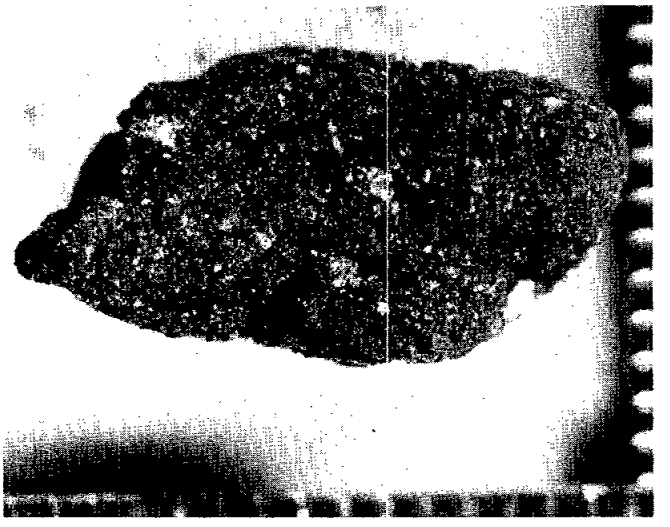
Agglutinates
2 particles, 0.27 grams

Coherence: Delicate
Shape: Irregular
Surface: Irregular, with some shiny vesicular black glass
Color: Dark gray
Mineralogy: 50% glass, 50% dark gray breccia with white clasts
Photo Number: S-73-21380

70314,3

Soil Breccia
1 particle, 0.85 grams

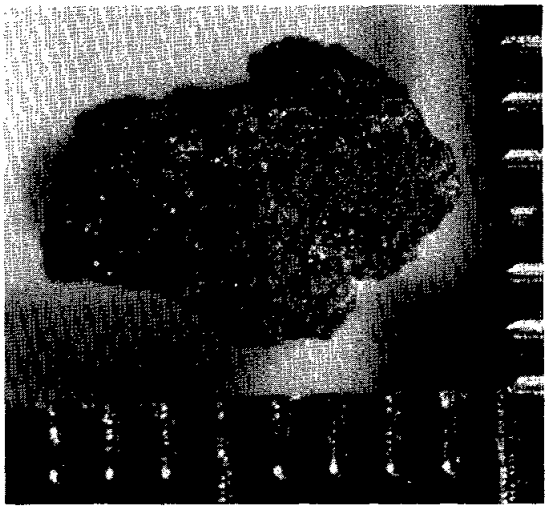
Coherence: Friable
Shape: Rounded
Surface: Grainy
Color: Dark gray
Mineralogy: 40% plagioclase, 60% mafic or glass
Remarks: No large clasts
Photo Number: S-73-21378



70314,4

Basalt(?)
1 particle, 0.21 grams

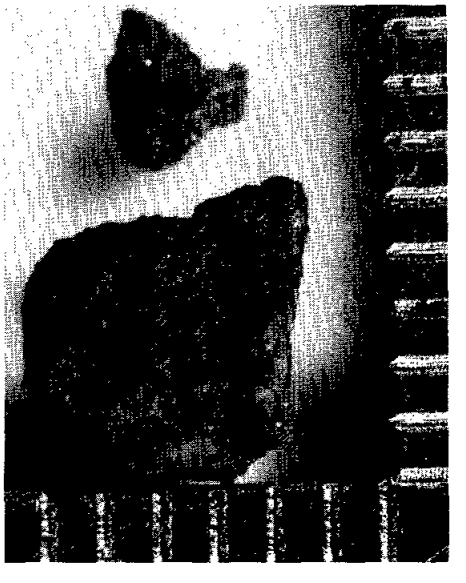
Coherence: Tough
Shape: Angular
Surface: Rough
Color: Gray
Mineralogy: 30% olivine, 30% pyroxene, 10% opaque, 30% plagioclase
Remarks: Grain size ∿1 mm, olivine is 2 mm
Photo Number: S-73-21379



70314,5

Basalt
2 particles, 0.16 grams

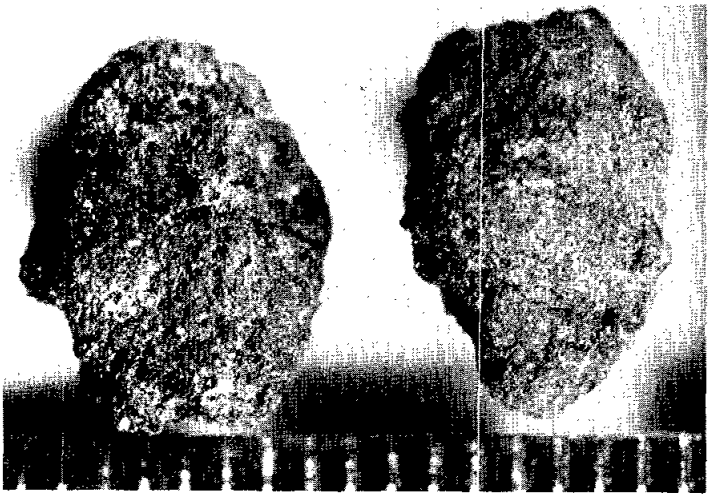
Coherence: Tough
Shape: Angular
Color: Gray
Mineralogy: Aphanitic
Photo Number: S-73-21381



70314,6

Basalt
2 particles, 1.11 grams

Coherence: Tough
Shape: Subrounded, microfractures, 5% Vugs
Color: Gray
Mineralogy: 45% plagioclase, 45% light brown pyroxene, 10% opaque
Remarks: Grain size less than 0.5 mm
Photo Number: S-73-21376



PRELIMINARY DESCRIPTION

Not yet dusted, photographed or subdivided

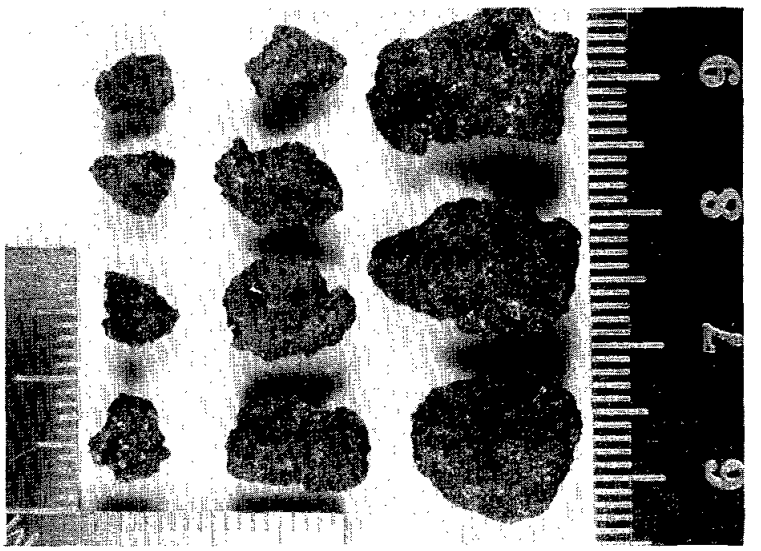
70324
4.00 grams

10 vuggy basalt fragments
3 breccia fragments

71044,1

Basalt
11 particles, 6.740 grams

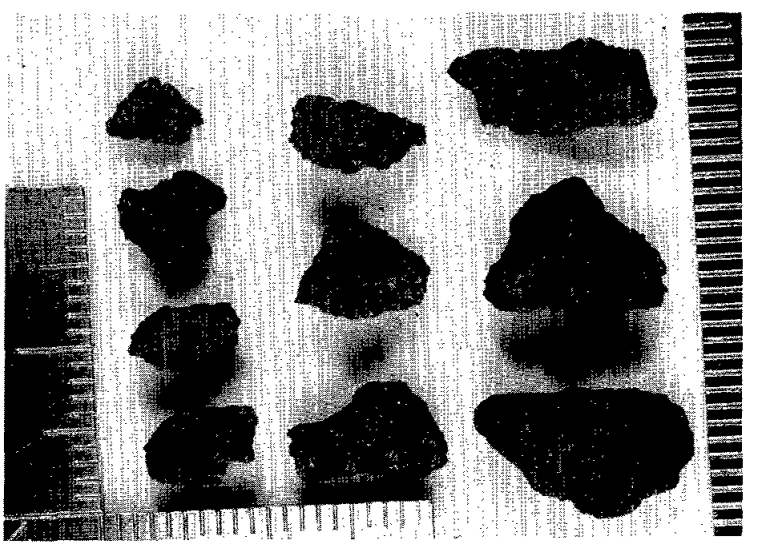
Coherence: Tough
Shape: Angular, 10% Vugs
Surface: Freshly broken, hackly
Color: Gray (N4)
Mineralogy: 45% plagioclase, 45% cinnamon brown pyroxene, 10% opaque, no olivine
Remarks: One grain has shiny, thin coat of clean glass. Grain size 1 mm.
Photo Number: S-73-18717



71044,2

Basalt
10 particles, 2.934 grams

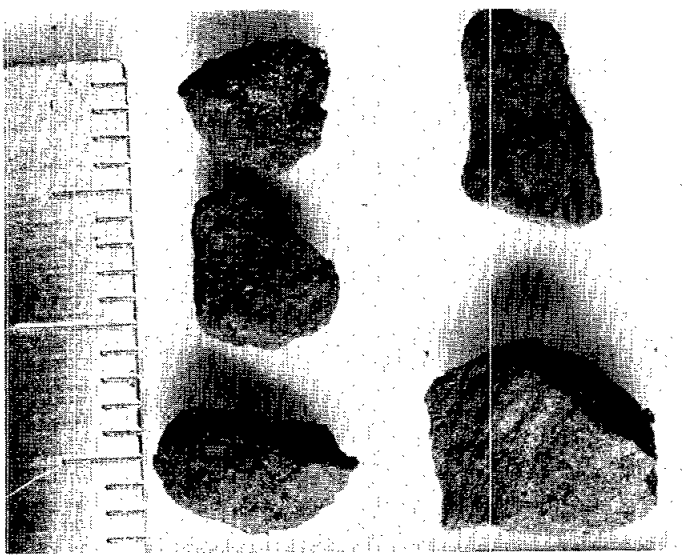
Coherence: Tough
Shape: Angular
Surface: Hackly
Color: Gray (N4)
Mineralogy: 45% plagioclase, 45% brown pyroxene, 10% opaque
Remarks: Some are vuggy (3), most are dense (7). Grain size less than 1 mm.
Photo Number: S-73-18718



71044,3

Basalt
5 particles, 1.257 grams

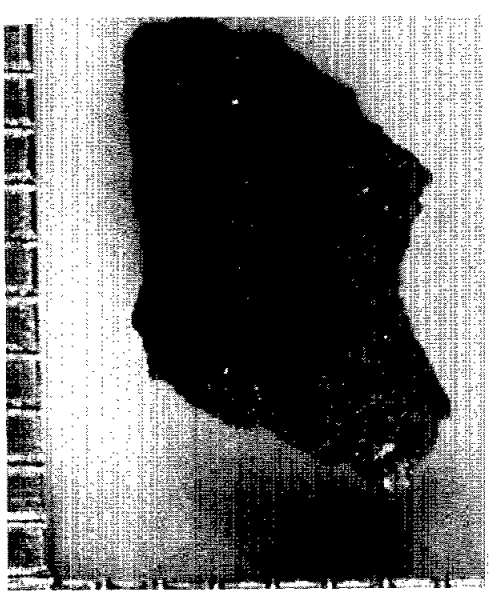
Coherence: Tough
Shape: Angular, no Vugs
Surface: Dust adhering
Color: Gray (N4)
Mineralogy: Aphanitic - too fine-grained to determine mineralogy.
Remarks: Similar to 71048.
Photo Number: S-73-18719



71044,4

Basalt
1 particle, 0.248 grams

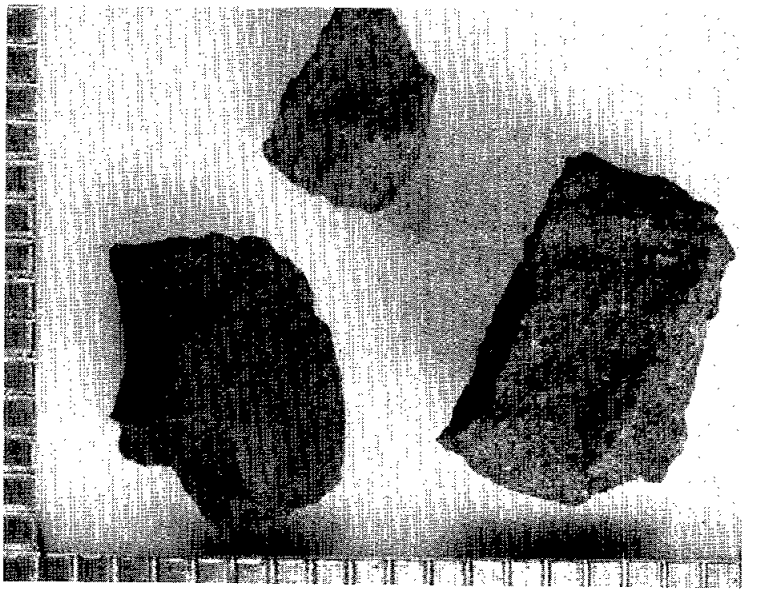
Coherence: Tough
Shape: The broken area between many large (5 mm) vesicles
Color: Dark gray
Mineralogy: Aphanitic
Photo Number: S-73-18720



71044,5

Devitrified Glass
3 particles, 0.703 grams

Coherence: Tough
Shape: Angular, blocky
Surface: Dust adhering
Color: Gray
Mineralogy: Aphanitic
Remarks: These may be very fine-grained basalts
Photo Number: S-73-18721



71044,6

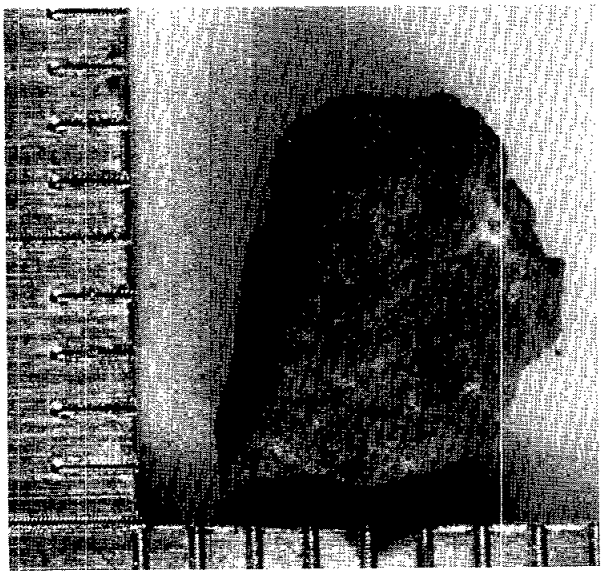
Soil Breccia
1 particle, 0.462 grams

Coherence: Friable and soft
Shape: Rounded
Color: Light gray
Photo Number: S-73-18722

71044,7

Anorthositic Breccia
1 particle, 0.194 grams

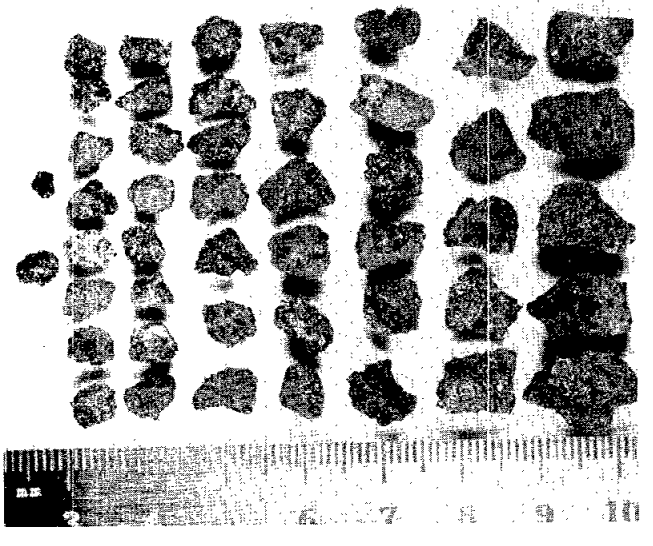
Coherence: Tough, annealed texture
Shape: Subrounded
Surface: Two zap pits lined with green glass and white spall area
Color: Whitish gray
Mineralogy: 80% plagioclase, 20% gray mineral or glass
Remarks: This particle may be a "norite"
Photo Number: S-73-18723



71064,1

Basalt
47 particles, 16.935 grams

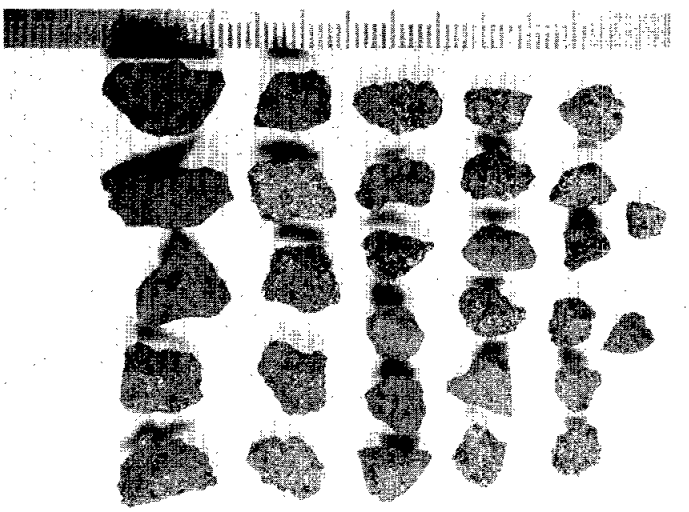
Coherence: Coherent
Shape: Angular to subangular; a few are irregular
Surface: Rough, granular; some particles vuggy with euhedral needles on plates of basaltic minerals
Color: Medium gray
Mineralogy: White plagioclase, cinnamon pyroxene, black lustrous ilmenite in medium to coarse grains are visible in all particles; yellow olivine occurs in some particles -- where present at all it tends to be in clumps; one particle has olivine cemented on one smooth surface
Photo Number: S-73-18725



71064,2

Basalt
30 particles, 9.815 grams

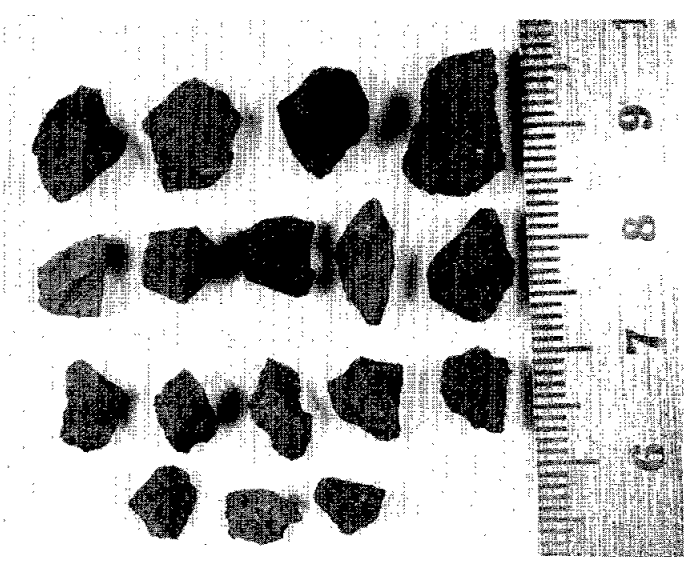
Coherence: Coherent
Shape: Angular, subangular, irregular
Surfaces: Largely coated with adhering dust which smooths the grainy rock surface
Color: Medium gray
Mineralogy: Same as in 71064,1 but having fewer vugs
Remarks: These particles are similar in composition to those of 71064,1, but are finer-grained and more liberally coated with dust
Photo Number: S-73-18726



71064,3

Aphanitic to very fine-grained basalts(?)
17 particles, 5.200 grams

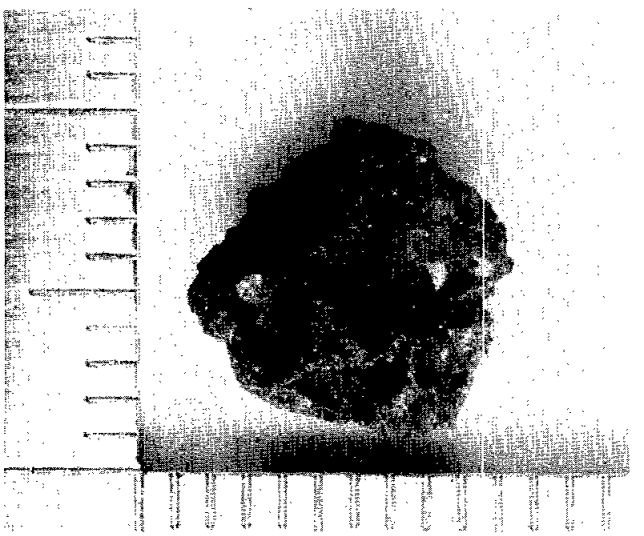
Coherence: Tough
Shape: Angular, blocky
Surface: Generally smooth; some surfaces have microgrooving, others shallow rounded cavities. Dust adhering to most surfaces.
Color: Medium dark gray
Mineralogy: Indistinguishable in most cases; a few are dense ilmenite-rich basalts with cavity walls lined with flat lying, felty ilmenite needles.
Remarks: A few of these may be glass matrix breccias but they are without obvious clasts.
Photo Number: S-73-18727



71064,4

Glass, Devitrified
1 particle, 0.271 grams

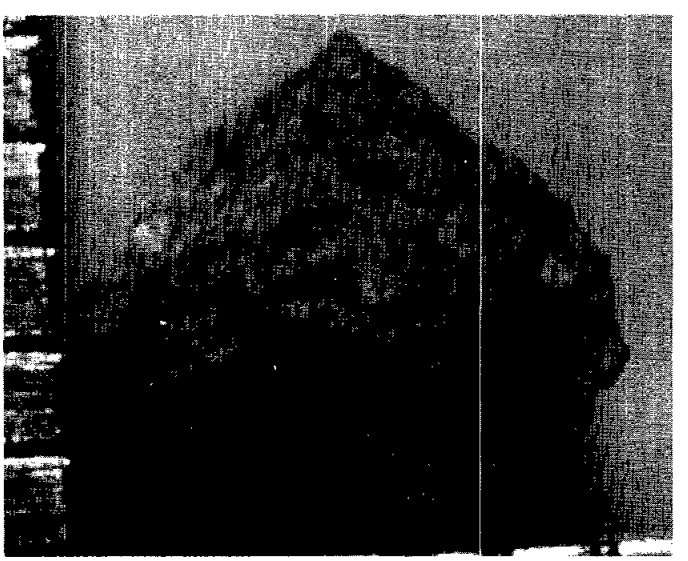
Coherence: Brittle
Shape: Angular
Surface: Vesicular on one surface; large smooth rounded cavities pitted with minute gas cavities; dust coated on other side.
Color: Dark gray; resinous luster
Photo Number: S-73-18728



71064,5

Shocked Plagioclase-Rich Rock
1 particle, 0.091 grams

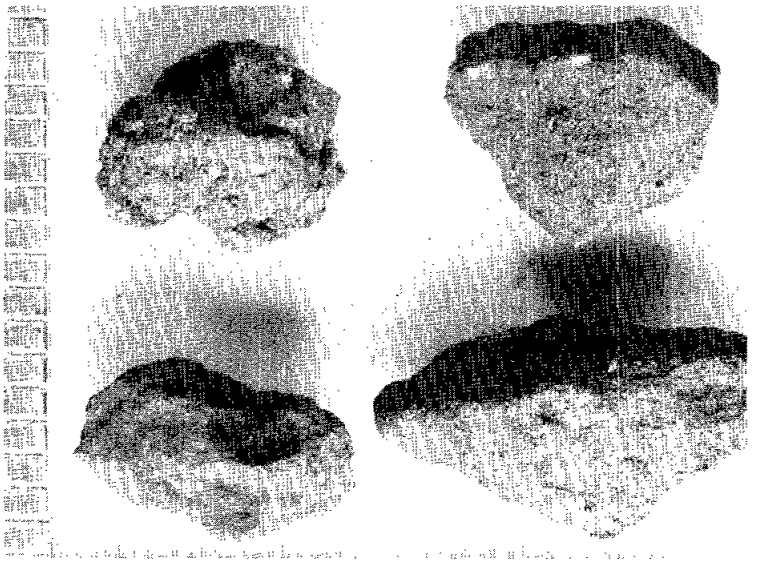
Coherence: Coherent
Shape: Subangular
Surface: Fresh surfaces chalky to sugary; two surfaces dust coated; no zap pits observed.
Color: Off-white
Mineralogy: 80% plagioclase, 18% yellow mafic silicate, 2% opaques.
Remarks: This particle appears to have been shocked in situ. The plagioclase is partly chalky (maskelynite?) but yellow silicates tend to retain their shape and fresh vitreous appearance. They and the opaques are interstitial to the plagioclase.
Photo Number: S-73-18729



71064,6

Breccia; largely aphanitic (glassy?) material
enclosing small clasts and coated with soil
4 particles, 1.092 grams

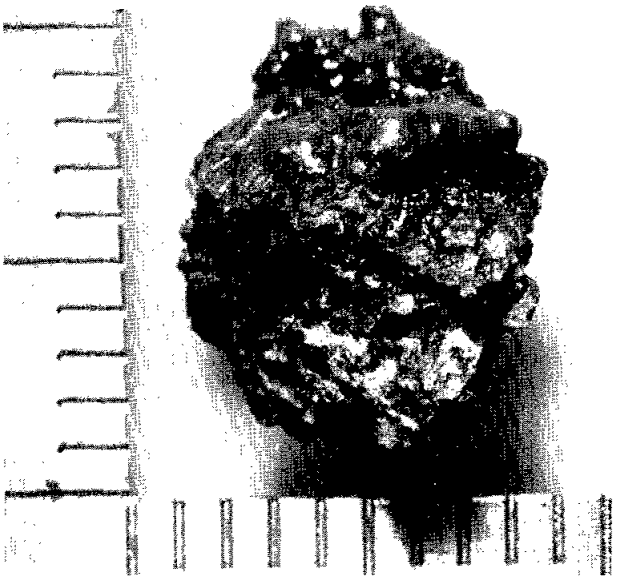
Coherence: Tough
Shape: Irregular
Surface: Rough
Color: Light gray
Mineralogy: Indeterminate
Photo Number: S-73-18730



71134,1

Basalt
1 particle, 0.325 grams

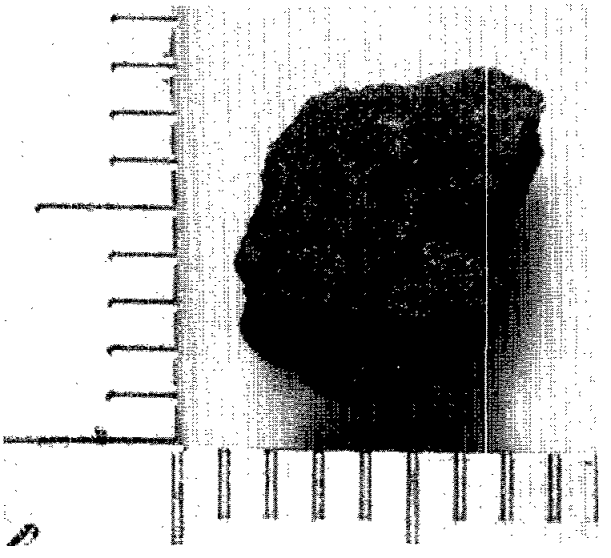
Coherence: Coherent
Shape: Subrounded; roughly lenticular
Surface: Partially coated with dark brown glass that is partly vitreous and partly devitrified. Fresh fractures on bottom surface show microslickensides on some areas.
Mineralogy: Plagioclase (white laths), pyroxene (cinnamon grains), and ilmenite (lustrous black); interstitial. Grain sizes are: plagioclase ∿0.1 mm, pyroxene ∿0.08 mm, and ilmenite ∿0.06 mm. Zap pits present in glassy crust.
Photo Number: S-73-19432



71134,2

Basalt
1 particle, 0.291 grams

Coherence: Coherent; some small non-penetrative fractures
Shape: Rounded
Surface: Grainy; with one 2.0 mm cavity partly lined with ilmenite needles up to 1 mm long.
Color: Dark brownish gray
Mineralogy: Ilmenite-rich; black ilmenite and cinnamon pyroxene are the main visible minerals; plagioclase inconspicuous but probably present.
Remarks: Average grain size <0.02 mm.
Photo Number: S-73-19431



71134,3

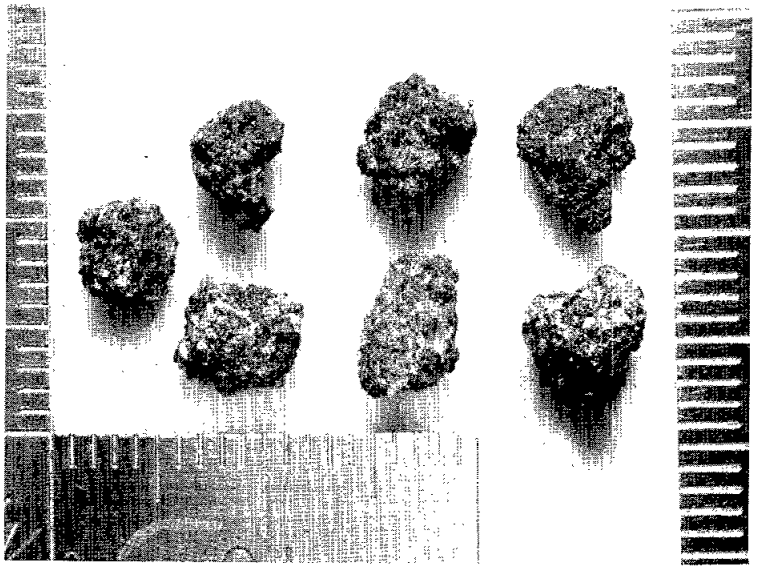
Soil Breccia
2 particles, 0.210 grams

Coherence: Friable
Shape: Rounded
Surfaces: One surface on each particle is partially coated with black glass.
Color: Matrix: medium gray; clasts mainly white, light yellow and light brown; a few are dark gray
Mineralogy: Aggregated regolith materials; clasts are small, angular to rounded and appear to include both single mineral and lithic fragments.
Photo Number: S-73-19430

71154,1

Basalt
7 particles, 1.095 grams

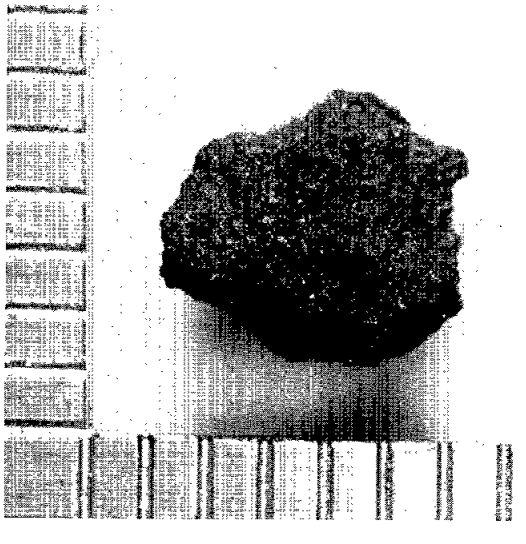
Coherence: Tough
Shape: Angular
Surface: Fresh
Color: Gray
Mineralogy: 45% plagioclase, 45% brown pyroxene, 10% opaques
Remarks: Average grain size is ∿2 mm.
Photo Number: S-73-19428



71154,2

Basalt
1 particle, 0.105 grams

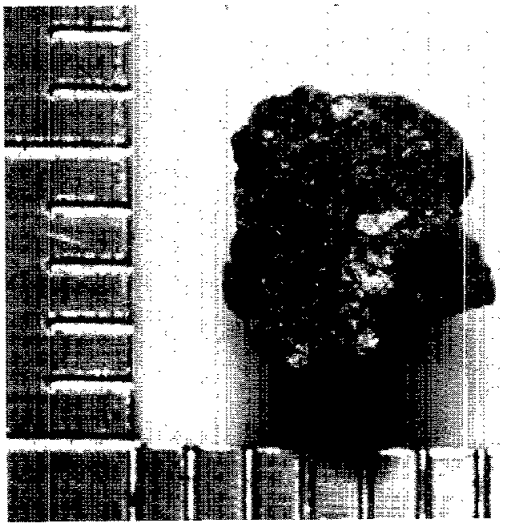
Coherence: Tough
Shape: Angular
Surface: Hackly
Color: Dark gray (N4)
Mineralogy: Aphanitic, many very small vesicles(less than 1mm)
Photo Number: S-73-19426



71154,3

Breccia
1 particle, 0.103 grams

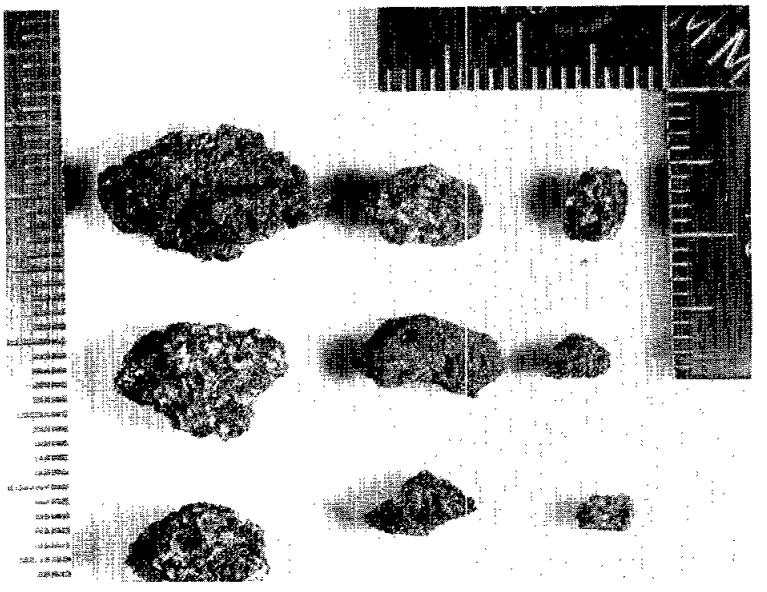
Coherence: Friable
Shape: Angular
Color: Gray
Mineralogy: 30% clasts of basalt and of plagioclase and glass and 70% dark aphanitic matrix.
Photo Number: S-73-19425



71504,1

Basalt
9 particles, 2.790 grams

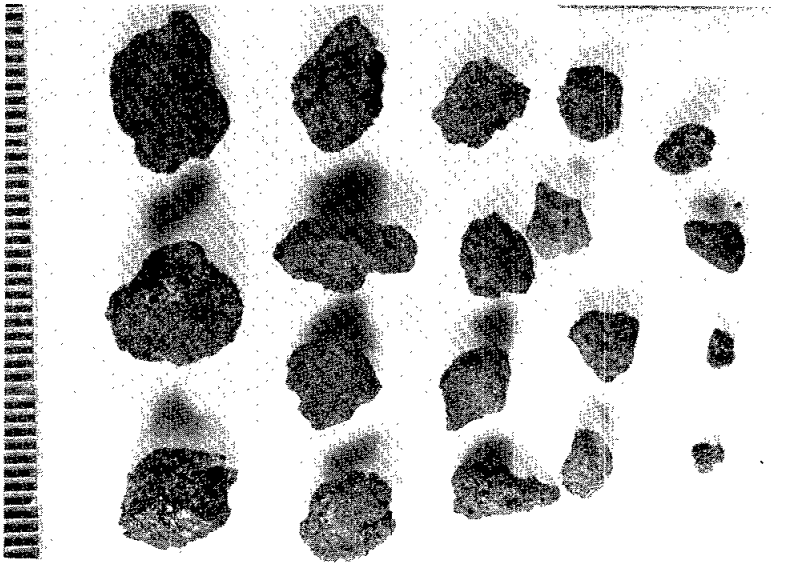
Coherence:
Shape: Angular, 10% Vugs
Color: Gray
Mineralogy: 45% plagioclase, 45% brown pyroxene, 10% opaques
Remarks: Some of these fragments contain a trace of olivine. Grain size ∿1 mm.
Photo Number: S-73-18611



71504,2

Basalt
17 particles, 4.127 grams

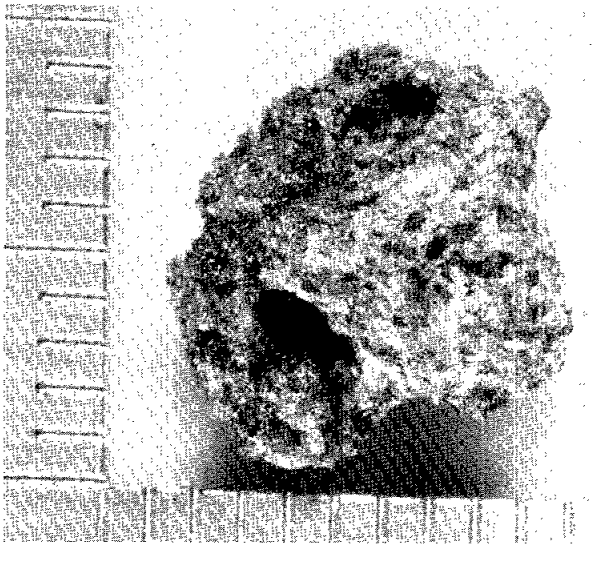
Coherence:
Shape: Subrounded
Surface: Some are coated with glass
Color: Gray
Mineralogy: 45% plagioclase, 45% brown pyroxene, 10% opaques
Remarks: Some are mottled, some are almost aphanitic. Grain size less than 1 mm.
Photo Number: S-73-18612



71504,3

Basalt
1 particle, 0.394 grams

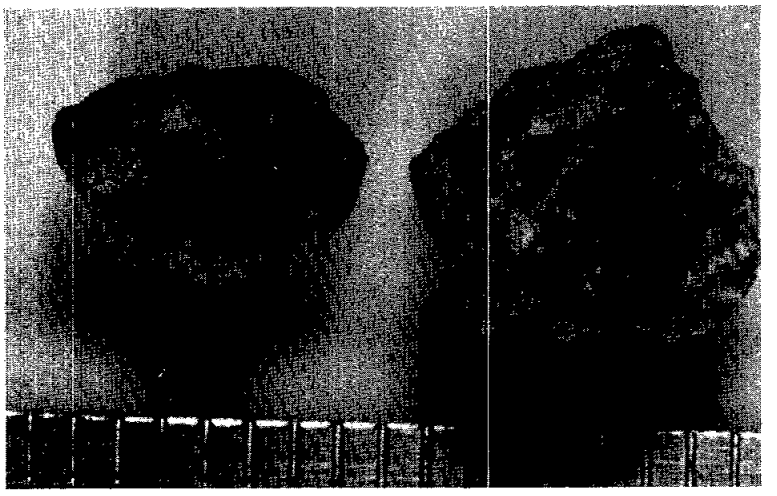
Coherence: Coherent to friable
Shape: Angular,20% Vugs
Color: Greenish
Mineralogy: 35% plagioclase, 20% brown pyroxene, 35% olivine, 10% opaques
Remarks: Grain size approximately 2 mm. This is a different kind of basalt
Photo Number: S-73-18613



71504,4

Anorthositic Breccia
2 particles, 0.575 grams

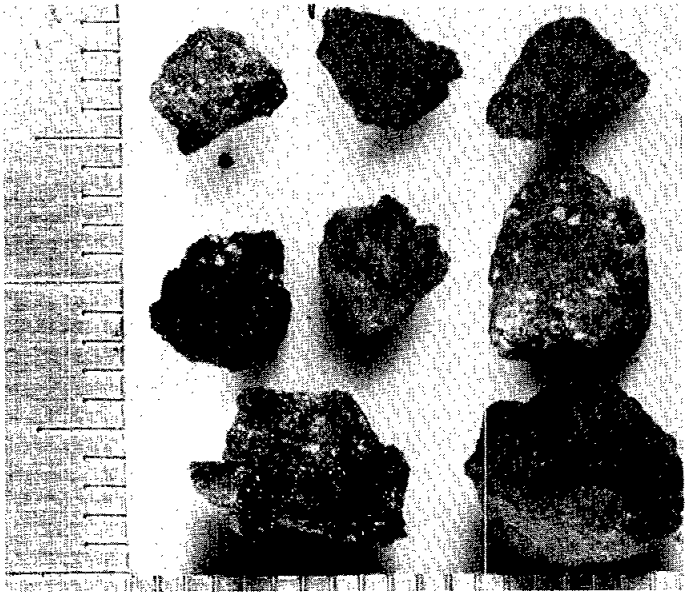
Coherence: Tough, annealed texture
Shape: Rounded
Surface: 10% glass coated
Color: White with 10% gray inclusions
Mineralogy: 90% plagioclase, 10% gray mineral or glass
Photo Number: S-73-18614



71504,5

Glass matrix breccia
8 particles, 1.086 grams

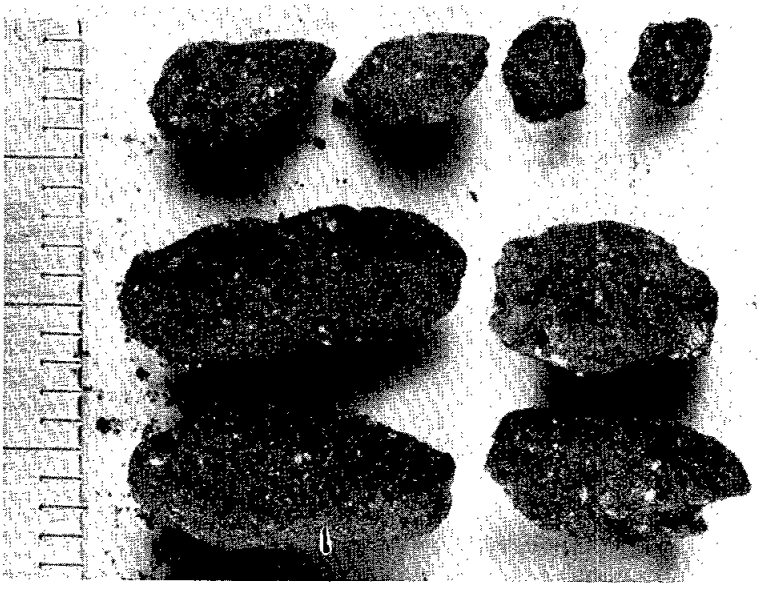
Coherence: Tough
Shape: Angular
Surface: 5% vitreous glass coating
Color: Gray
Mineralogy: 1 mm clasts of white plagioclase (10%) in dark aphanitic matrix
Photo Number: S-73-18615



71504,6

Soil Breccia
7 particles, 1.137 grams

Coherence: Very friable
Shape: Rounded
Surface: Grainy
Color: Gray
Mineralogy: (1 mm) clasts of plagioclase, pyroxene and olivine in 95% dark soil matrix
Remarks: No glass or glass coating
Photo Number: S-73-18616



71504,7

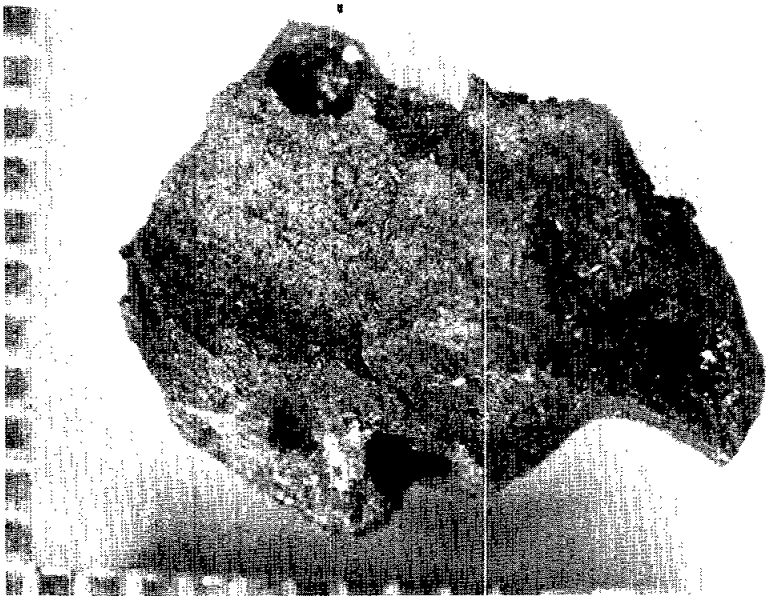
Devitrified Glass
4 particles, 0.804 grams

Coherence: Tough
Shape: Irregular
Color: Dull black
Remarks: No vesicles, these fragments may be formed by very rapid cooling as near the margin of a lava flow. Similar to aa-aa.
Photo Number: S-73-18617

71504,8

Basalt, aphanitic to glassy
1 particle, 0.954 grams

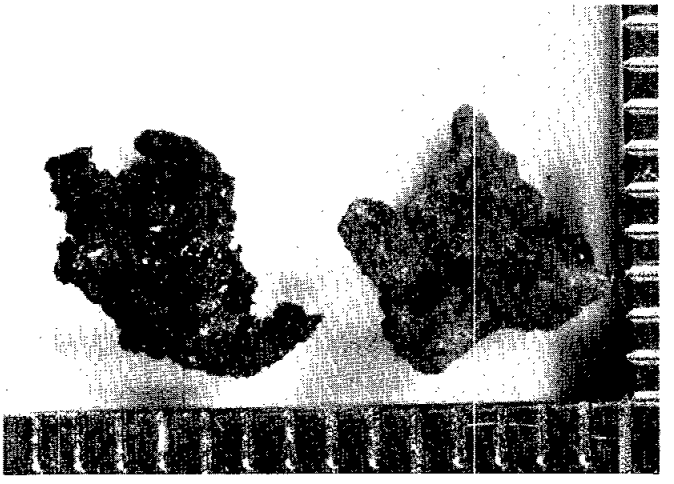
Coherence: Tough
Shape: Angular, large vesicles (2mm)
Color: Dark gray to black
Mineralogy: Fine laths of ilmenite
Remarks: Probably has higher ilmenite content than most basalts
Photo Number: S-73-18618



72134,1

Agglutinates
2 particles, 0.1 grams

Coherence: Delicate
Shape: Irregular
Color: Gray
Mineralogy: 40% glass, 60% gray matrix breccia
Photo Number: S-73-21798



72134,2

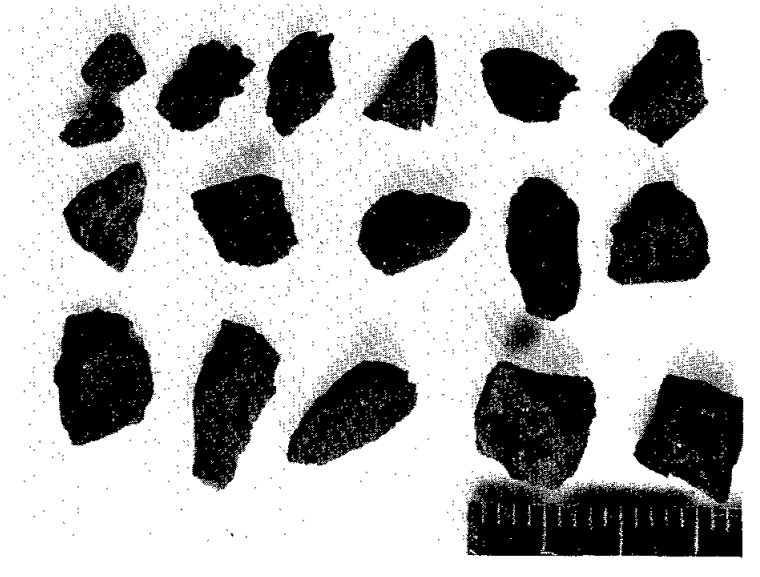
Basalt
27 particles, 5.55 grams

Coherence: Tough
Shape: Angular, 5% Vugs
Color: Gray
Mineralogy: 45% plagioclase, 45% light brown pyroxene, 10% opaque
Remarks: These range in grain size from 0.1 - 0.5 mm. Two particles in this group have trace olivine. Some of this group are almost aphanitic.
Photo Number: S-73-21799

72134,3

Basalt
17 particles, 4.05 grams

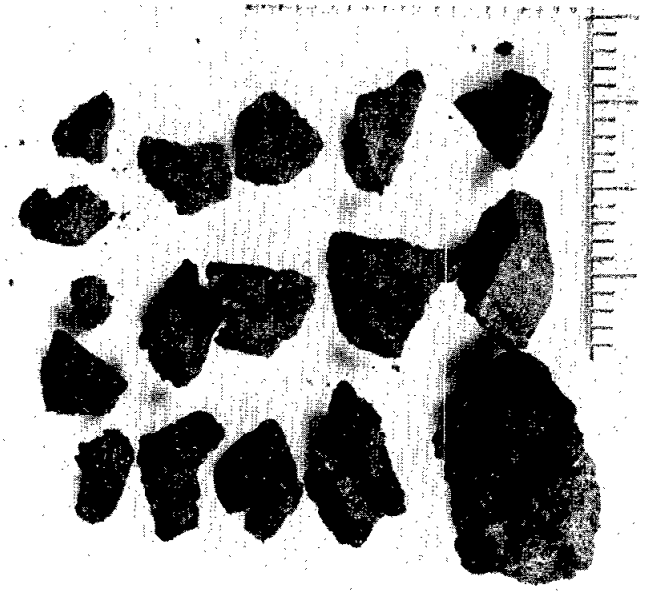
Coherence: Tough
Shape: Angular
Color: Dark gray
Mineralogy: Aphanitic
Remarks: These basalts may be devitrified glass.
Photo Number: S-73-21800



72134,4

Breccia
13 particles, 2.83 grams

Coherence: Friable
Shape: Irregular
Color: Dark gray
Mineralogy: All matrix, few clasts
Remarks: These breccias appear very similar to the aphanitic basalts in this group. Occasional clast of the more coarse basalts. Some of these are similar to 72135.
Photo Number: S-73-21801



72144,1

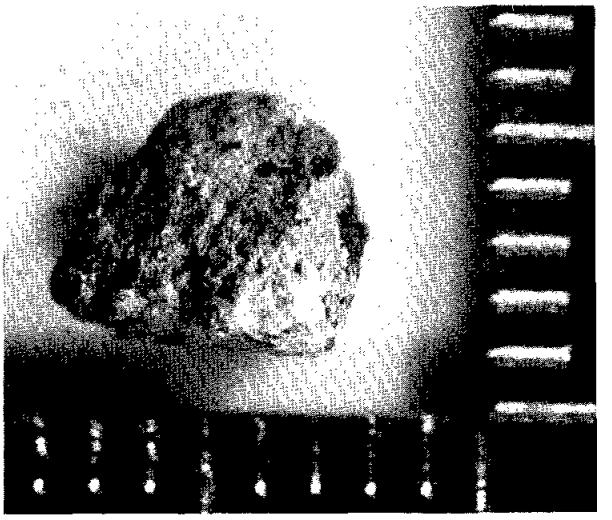
Basalt
1 particle, 0.58 grams

Coherence: Tough
Shape: Subrounded
Surface: Fresh
Color: Light gray
Mineralogy: 45% plagioclase, 45% light brown pyroxene, 10% opaque
Remarks: 1 mm grain size
Photo Number: S-73-21808

72144,2

Anorthositic Breccia
1 particle, 0.12 grams

Coherence: Tough
Shape: Smooth on three sides, broken on one side
Color: Chalky white
Mineralogy: 95% plagioclase, 5% gray glass
Remarks: Very fine-grained, shocked
Photo Number: S-73-21809



72144,3

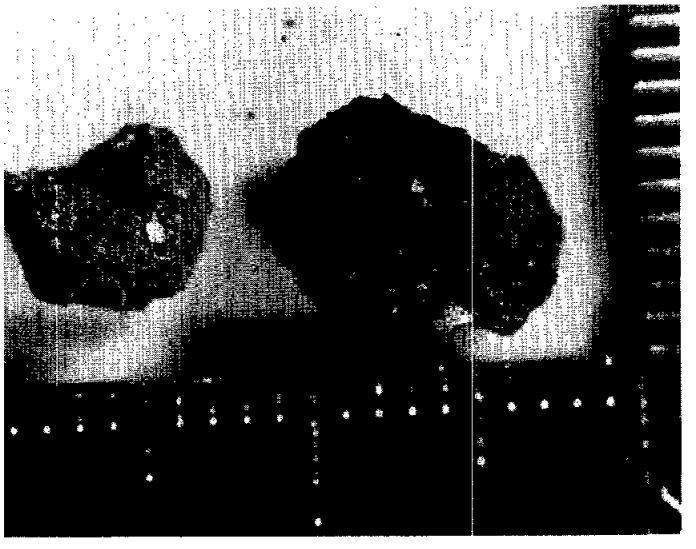
Vesicular glass
2 particles, 1.07 grams

Coherence: Tough
Shape: Irregular
Surface: One side each particle has original glass surface with old zap pits
Color: Black
Mineralogy: Glass, many large vesicles.
Photo Number: S-73-21810

72144,4

Breccia
2 particles, 0.52 grams

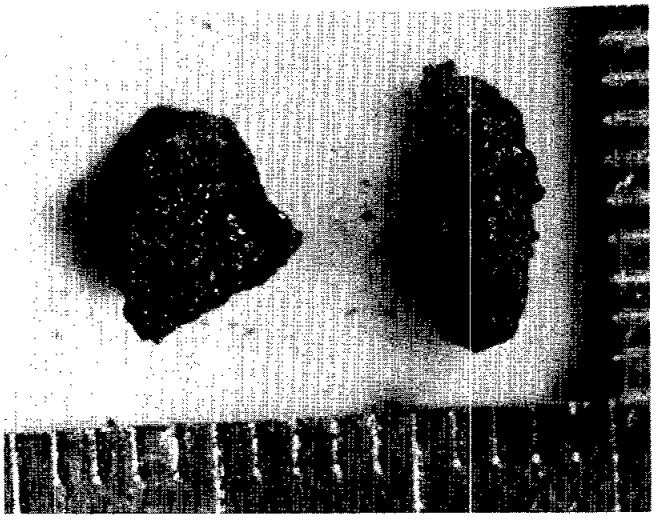
Coherence: Tough
Shape: Angular
Color: Dark gray
Mineralogy: 80% dark, fine-grained matrix, 20% white clast 1-2 mm
Photo Number: S-73-21811



72144,5

Agglutinates
2 particles, 0.15 grams

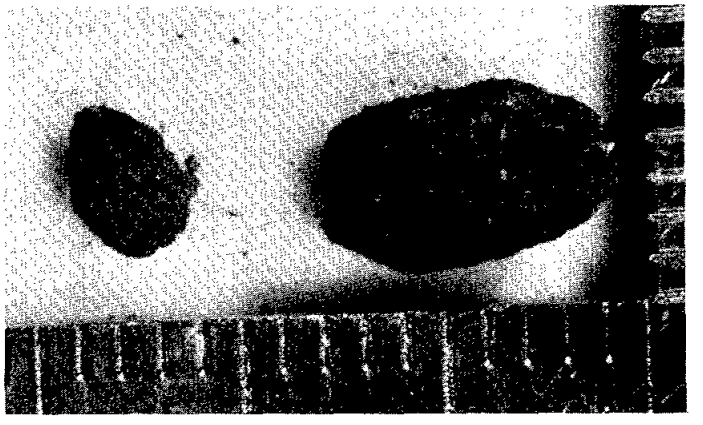
Coherence: Delicate
Shape: Irregular
Color: Gray
Mineralogy: 50% glass, 50% soil breccia
Photo Number: S-73-21812



72144,6

Soil Breccias
2 particles, 0.11 grams

Coherence: Very friable
Shape: Rounded
Color: Light gray
Mineralogy: Aphanitic
Photo Number: S-73-21813



PRELIMINARY DESCRIPTION
Not yet dusted, photographed or subdivided

72164
0.946 grams

3 dark breccia fragments
2 gray breccia fragments with white clasts
(largest fragment has 75-80% light gray to white clasts)

72224,1

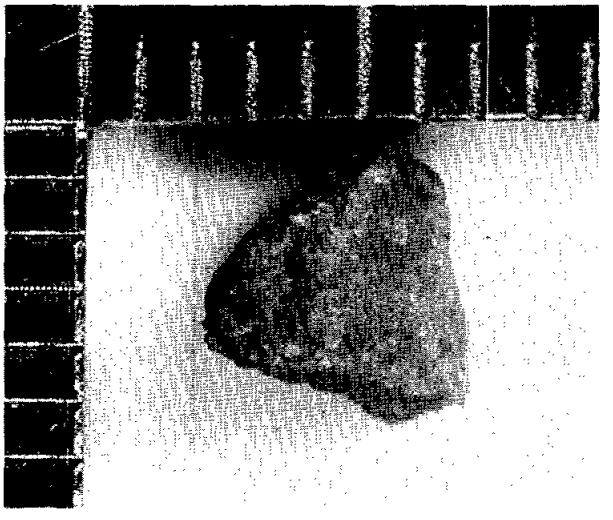
Breccias
12 particles, 1.96 grams

Coherence: Friable
Shape: Subangular
Color: Light gray
Mineralogy: 90% aphanitic light gray matrix, 10% aphanitic dark gray clasts (1 mm)
Remarks: All these are the same
Photo Number: S-73-25433

72224,2

Feldspathic Basalt
1 particle, 0.09 grams

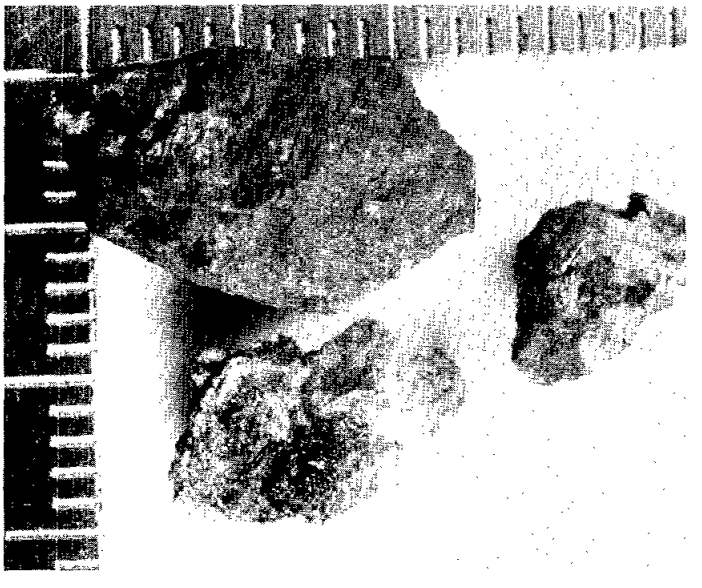
Coherence: Tough
Shape: Angular
Color: Light tan
Mineralogy: 80% plagioclase, 1% opaques, 19% light gray mineral (orthopyroxene?)
Photo Number: S-73-25434



72224,3

Breccia
3 particles, 1.55 grams

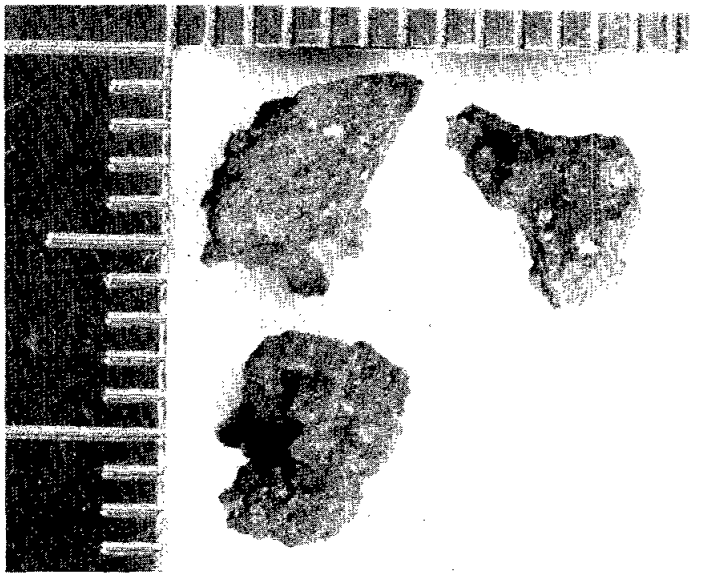
Coherence: Tough
Shape: Marbled texture
Color: Blue gray and white
Mineralogy: 60% dark blue gray (aphanitic) and 40% chalky white
Remarks: Probably feldspathic
Photo Number: S-73-25435



72224,4

Anorthosite(?)
3 particles, 0.26 grams

Coherence: Tough
Shape: Angular
Color: Dark blue gray
Mineralogy: 90% dark gray mineral (probably plagioclase), 10% chalky white plagioclase.
Remarks: Grain size ∿1 mm (cleavages suggest it is holocrystalline)
Photo Number: S-73-25436



72224,5

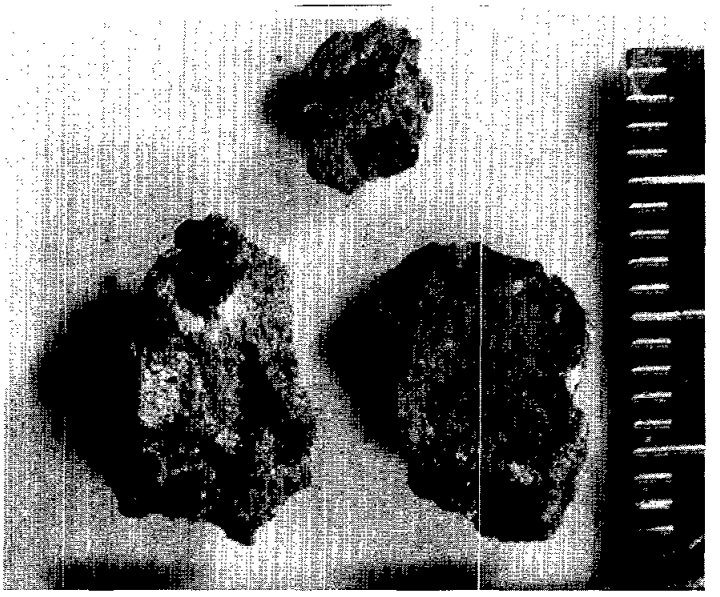
Feldspathic Breccia
13 particles, 3.46 grams

Coherence: Tough
Shape: Angular to subrounded
Surface: Often dirty
Color: Tannish gray
Mineralogy: 5% olivine, 25% gray mineral, 70% plagioclase
Remarks: Annealed texture - probably metamorphic
One particle is almost all white plagioclase,
Photo Number: S-73-25437

72244,1

Plagioclase-Rich Breccias
3 particles, 1.08 grams

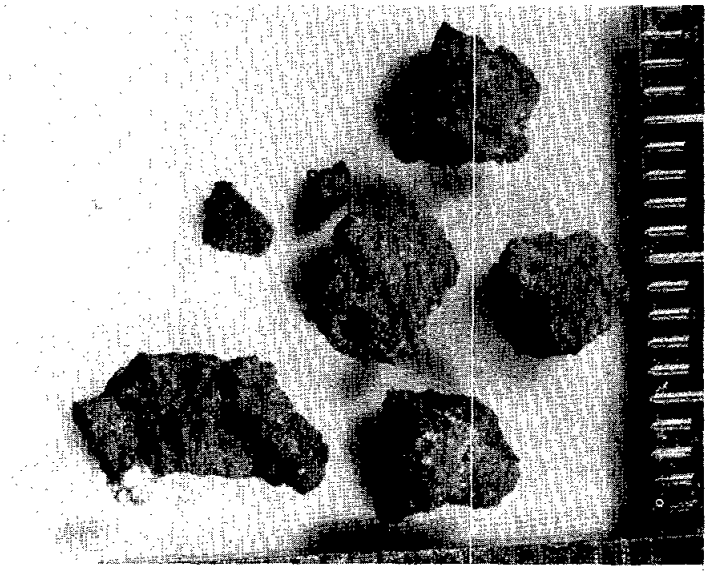
Coherence: Soft and friable
Shape: Angular, marbled texture.
Color: Light gray to white
Mineralogy: 80% plagioclase, 20% clasts of gray glass(?)
Photo Number: S-73-21815



72244,2

Anorthositic Breccias
7 particles, 0.53 grams

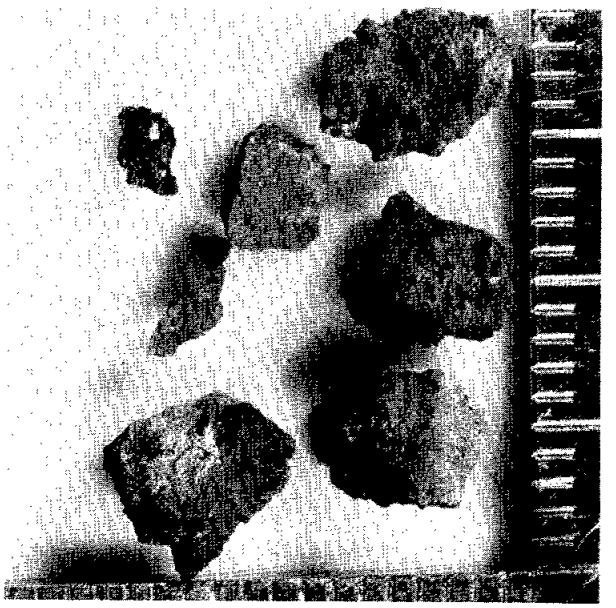
Coherence: Tough
Shape: Angular
Surface: One zap pit on one particle, glass lined
Color: Light gray
Mineralogy: 95 - 100% plagioclase, possible 10% orthopyroxene
Remarks: Annealed texture
Photo Number: S-73-21816



72244,3

Devitrified, Anorthositic Glass
6 particles, 0.52 grams

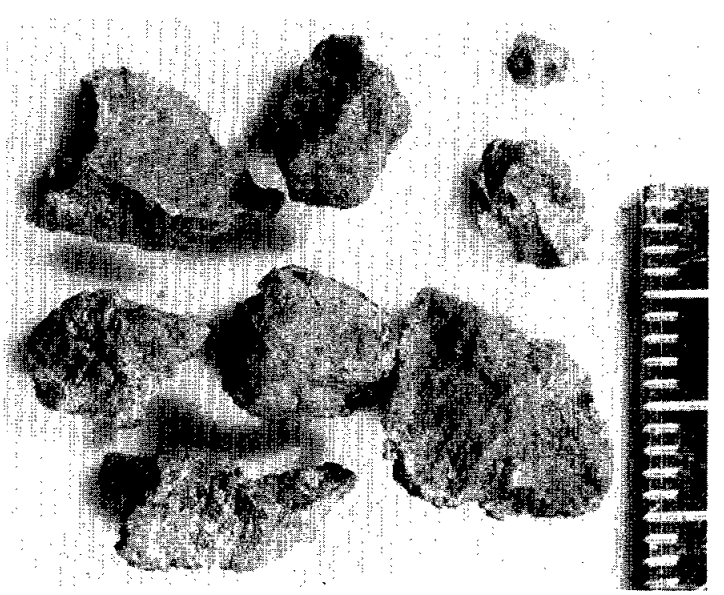
Coherence: Tough
Shape: Blocky and angular
Color: Light gray
Mineralogy: 90% plagioclase
Photo Number: S-73-21817



72244,4

Breccia
8 particles, 1.76 grams

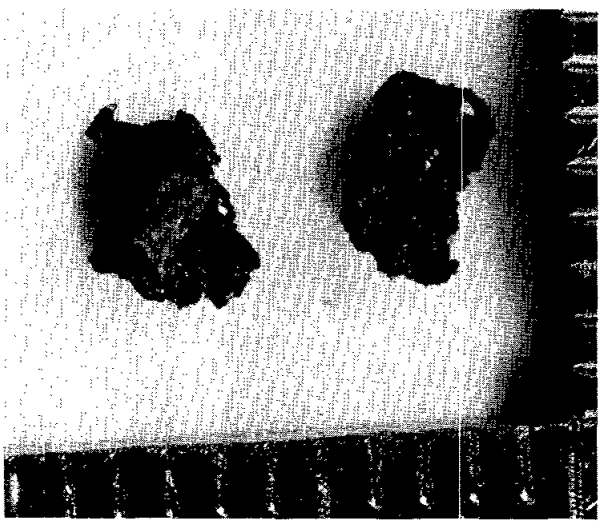
Coherence: Friable to coherent
Shape: Angular
Color: Light gray
Mineralogy: 90% plagioclase, 10% gray mineral, orthopyroxene(?)
Remarks: One particle is subrounded
Photo Number: S-73-21818



72244,5

Agglutinate
2 particles, 0.02 grams

Coherence: Delicate
Shape: Irregular
Color: Gray
Mineralogy: 20% glass, 80% soil containing 60% plagioclase
Remarks: Probably one particle originally.
Photo Number: S-73-21819



72264,1

Agglutinate
4 particles, 0.67 grams

Coherence: Delicate
Shape: Irregular
Color: Dark gray
Mineralogy: 50% vesicular glass, 50% dark gray matrix breccia
Photo Number: S-73-21803

72264,2

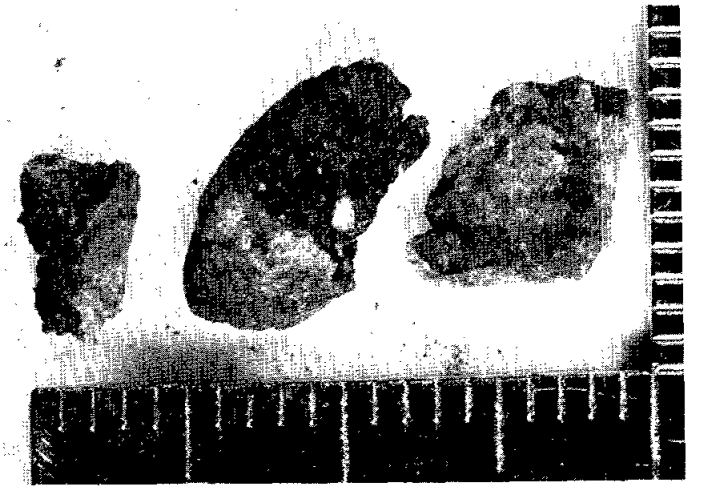
Anorthosite
3 particles, 0.18 grams

Coherence: Tough
Shape: Blocky, one particle rounded, other two angular
Color: Light gray
Mineralogy: 90% plagioclase, 8% $MgAl_2O_4$(?), 2% olivine
Remarks: $MgAl_2O_4$ is groups of minute pink minerals in one particle only. One particle is rounded and has three zap pits.
Photo Number: S-73-21804

72264,3

Breccias
3 particles, 0.58 grams

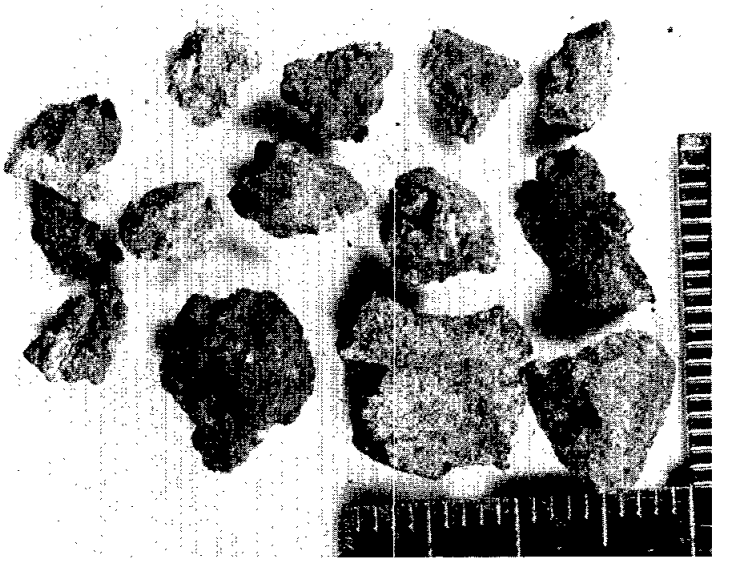
Coherence: Tough
Shape: Angular
Color: Dark gray
Mineralogy: Dark gray matrix, probably devitrified glass (80%), 20% white clasts ∿1 mm size
Photo Number: S-73-21805



72264,4

Breccias
14 particles, 2.84 grams

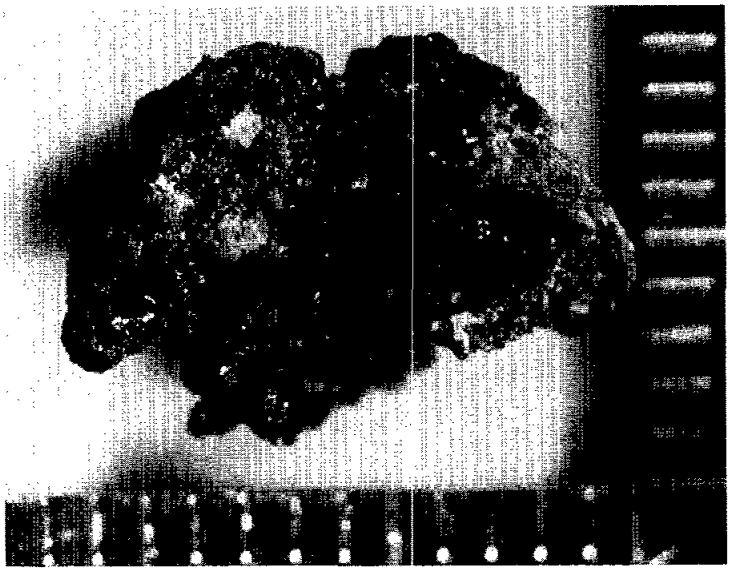
Coherence: Fragile
Shape: Vary from angular to rounded
Color: Light gray to white
Mineralogy: 85% plagioclase, 15% gray mineral or glass
Remarks: Seven particles have marked gray and light texture. Highly shocked and partially melted in some cases. Few large crystals of plagioclase.
Photo Number: S-73-21806



72324,[illegible]

Agglutinate
1 particle, 0.[illegible]8 grams

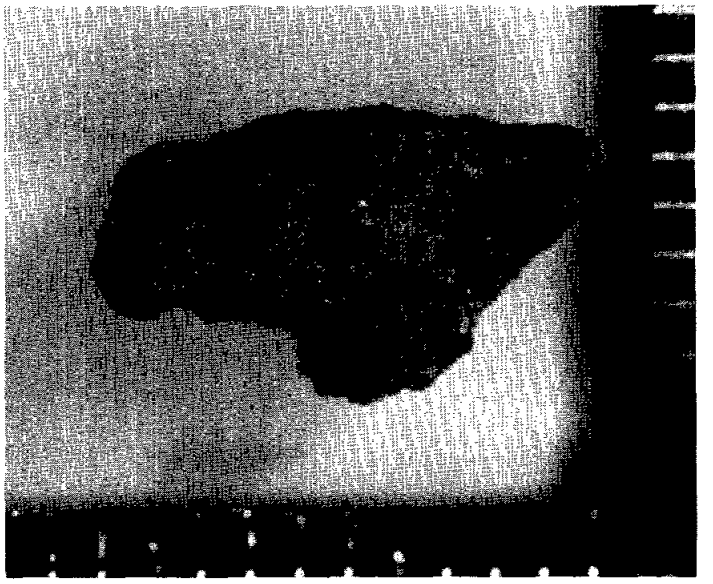
Coherence: Delicate
Shape: Irregular
Color: Dark gray
Mineralogy: 40% black shiny glass, 60% dark gray matrix
Photo Number: S-73-21821



72324,2

Breccia
1 particle, 0.23 grams

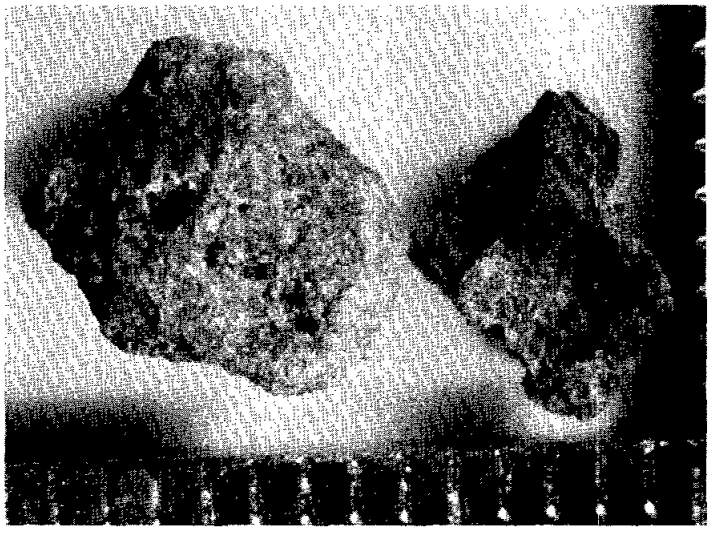
Coherence: Delicate
Shape: Irregular
Color: White
Mineralogy: 70% plagioclase, 30% orthopyroxene(?)
Remarks: Layered mixture of vuggy white mineral layers and white glass layers
Photo Number: S-73-21822



72324,3

Anorthositic Breccia
2 particles, 0.45 grams

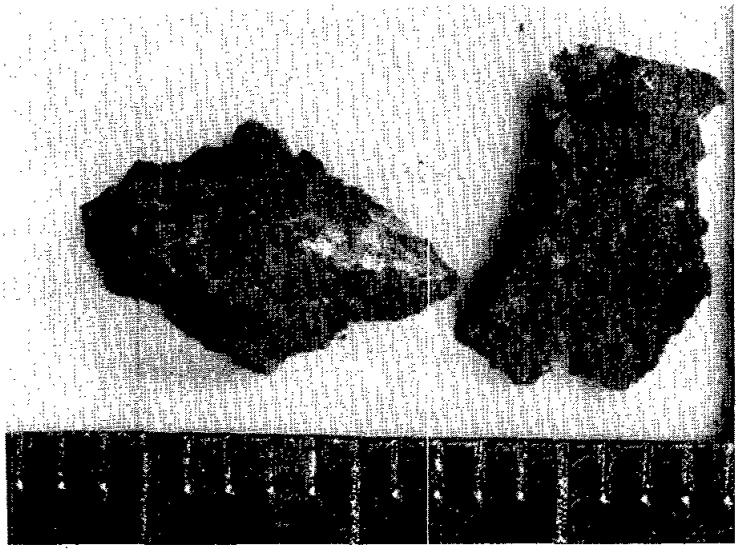
Coherence: Tough
Shape: One angular and the other rounded
Color: White to light gray
Mineralogy: 95% plagioclase, 5% gray mineral
Remarks: 5% vug in the rounded one
Photo Number: S-73-21823



72434,1

Blue Gray Breccia
2 particles, 0.31 grams

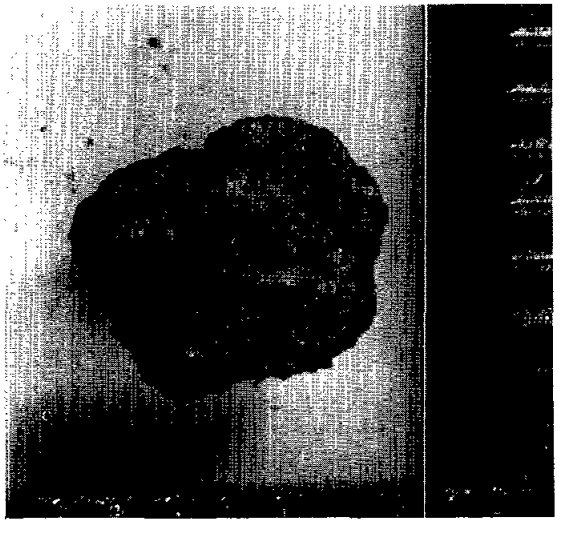
Coherence: Tough
Shape: Angular
Color: Blue gray
Mineralogy: Aphanitic, devitrified glass matrix, plagioclase ∿70%
Remarks: One particle has 1 mm plagioclase crystals attached on one side. 5% vesicles 0.5 mm
Photo Number: S-73-21879



72434,2

Feldspathic Basalt
1 particle, 0.12 grams

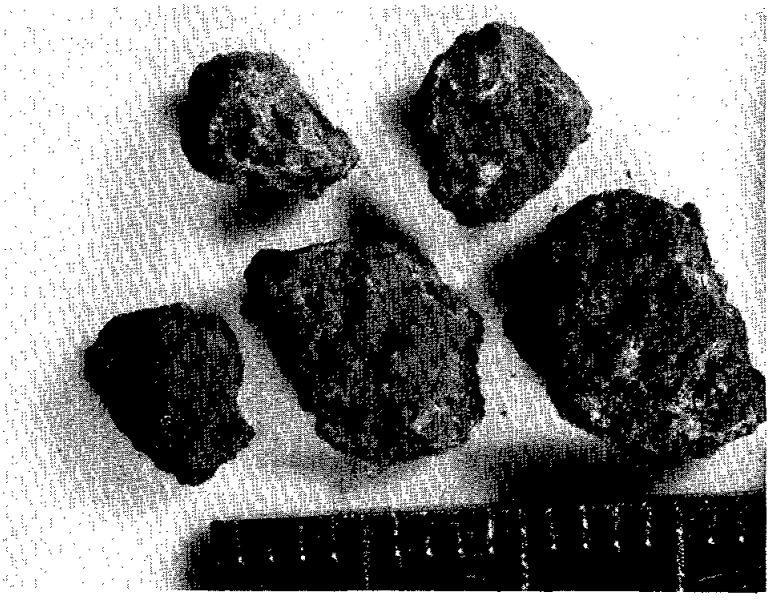
Coherence: Tough
Shape: Angular
Surface: Freshly broken
Color: Light tan
Mineralogy: 70% plagioclase (1 mm), 2-3% opaques (0.2 mm), 25% tan to greenish gray pyroxene
Remarks: Probable igneous texture. Striation on plagioclase crystals.
Photo Number: S-73-21878



72434,3

Anorthositic Breccia
5 particles, 1.01 grams

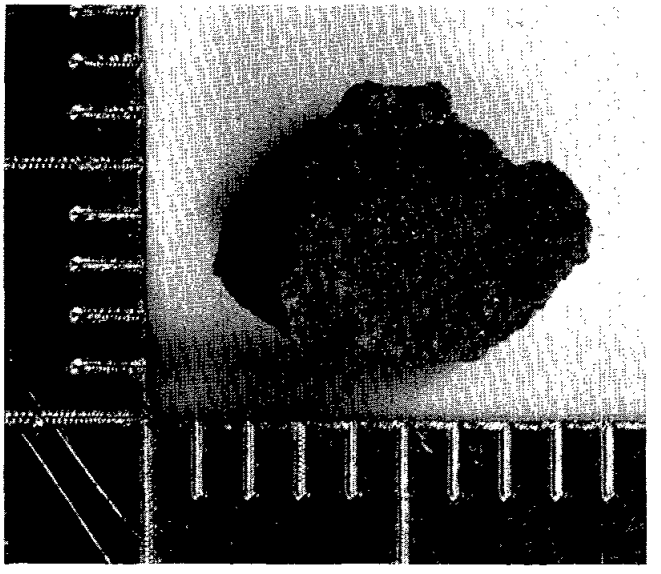
Coherence: Friable
Surface: Dust covered
Color: Tan to grayish white
Mineralogy: 80% plagioclase, 20% gray pyroxene (or glass?)
Remarks: Some large (1 mm) crystals of plagioclase.
Photo Number: S-73-21877



72444,1

Basalt
1 particle, 0.20 grams

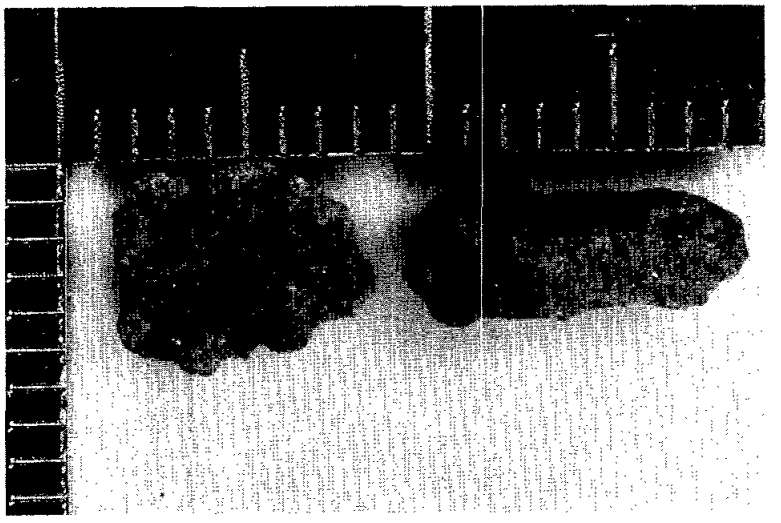
Coherence: Tough
Shape: Subrounded
Surface: Glazed or polished(?)
Color: Dark gray
Mineralogy: 10% olivine, 10% opaques, 50% light brown pyroxene
30% plagioclase
Photo Number: S-73-25444



72444,2

Feldspathic Basalt
2 particles, 0.26 grams

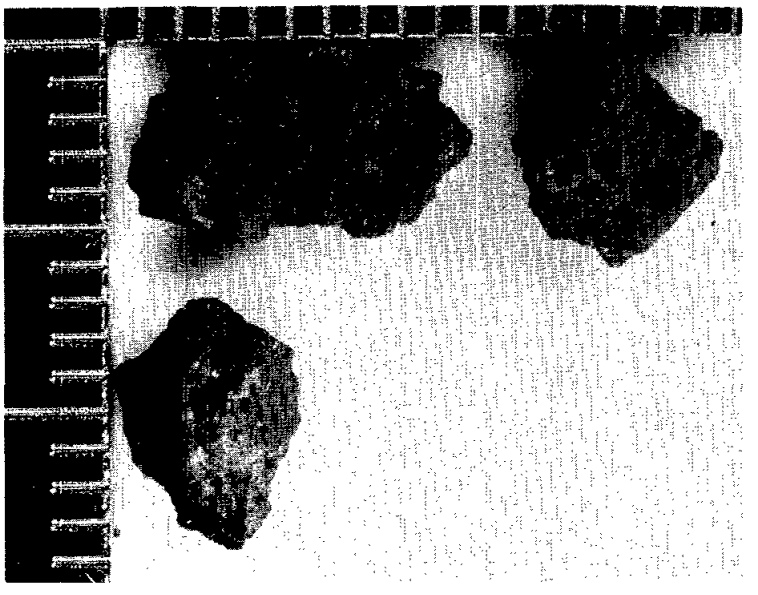
Coherence: Tough
Shape: Angular
Color: Tannish white
Mineralogy: 2% opaques, 70% plagioclase, 30% gray mineral (orthopyroxene?)
Remarks: Annealed possibly hornfelsic texture. Grain size ∿0.5 mm.
Photo Number: S-73-25445



72444,3

Feldspathic Breccia
3 particles, 0.44 grams

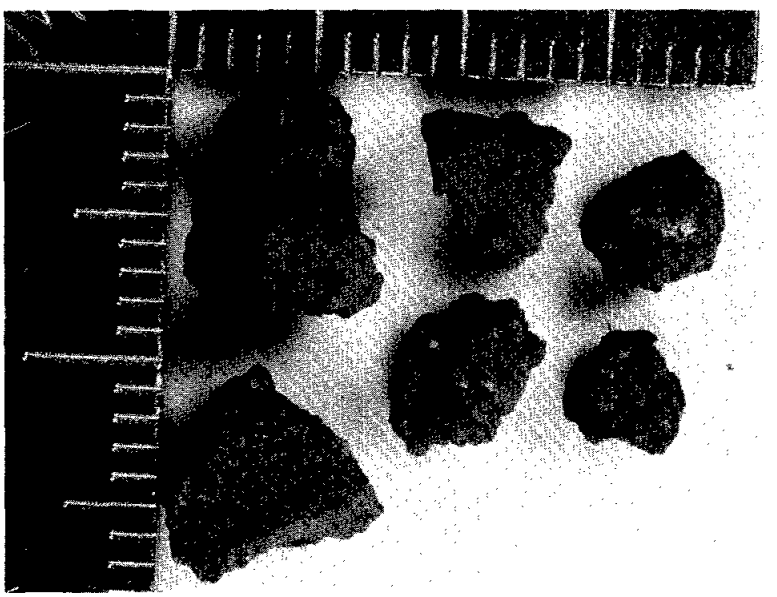
Coherence: Tough
Shape: Subrounded to subangular
Color: Dark blue gray
Mineralogy: 80% dark blue gray aphanitic matrix (probably devitrified glass) with 20% clasts of white plagioclase
Photo Number: S-73-25446



72444,4

Feldspathic Breccia
6 particles, 1.08 grams

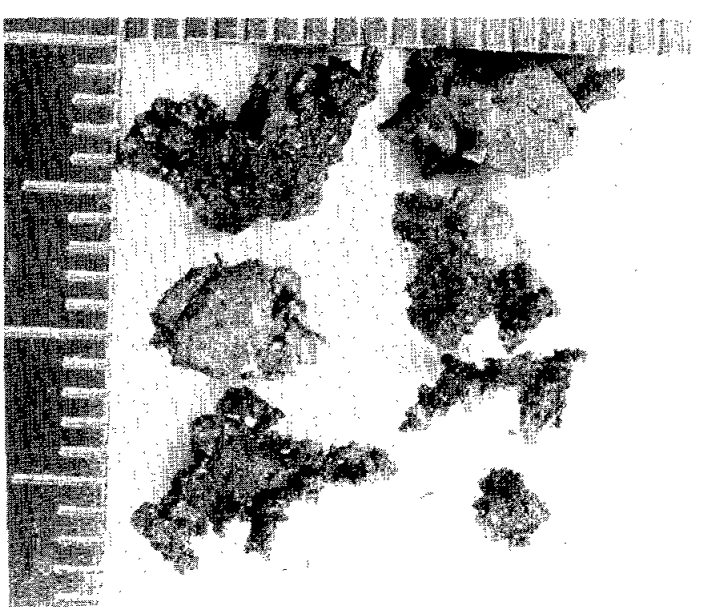
Coherence: Tough
Shape: Subangular to subrounded
Color: Light gray
Mineralogy: 80% glass matrix, 20% gray and white mineral clasts
Remarks: 5-10% vugs
Photo Number: S-73-25447



72444,5

Agglutinates
5 particles, 0.31 grams

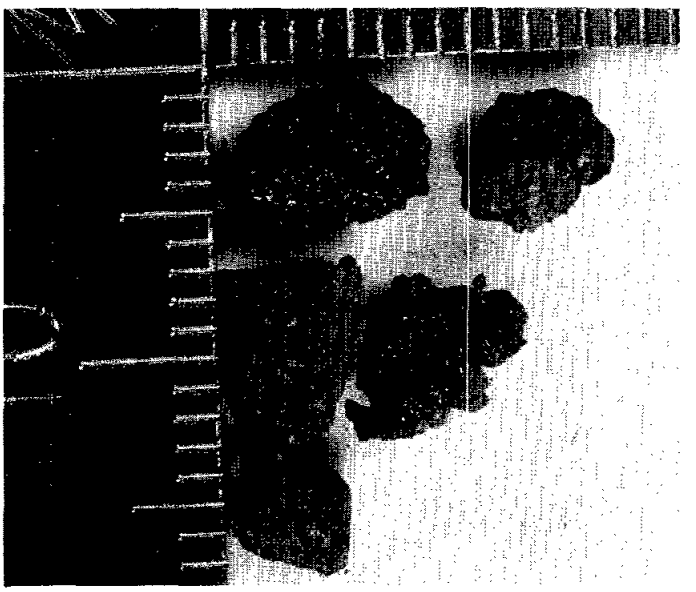
Coherence: Delicate
Shape: Irregular
Color: Dark gray
Mineralogy: 70% vesicular black glass, 30% soil clods
Photo Number: S-73-25448



72444,6

Soil Breccia
5 particles, 0.44 grams

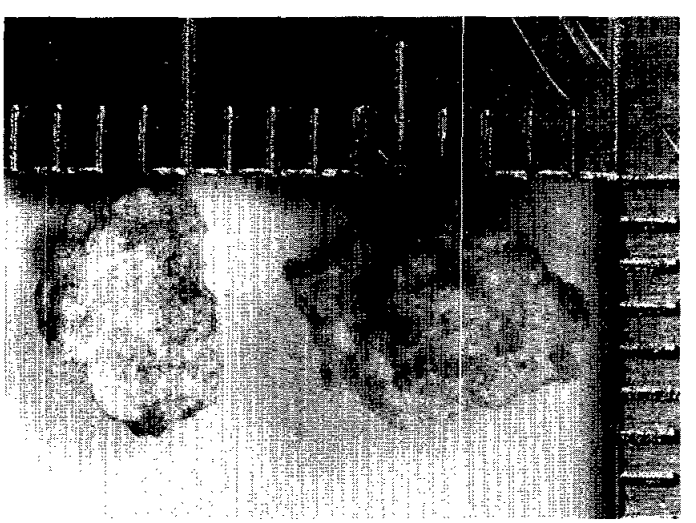
Coherence: Friable
Shape: Rounded
Color: Gray
Mineralogy: 80% soil clods, with 20% black glass coatings
Remarks: One particle is more lithified than the other and has more feldspar clasts
Photo Number: S-73-25449



72464,1

Anorthosites
2 particles, 0.27 grams

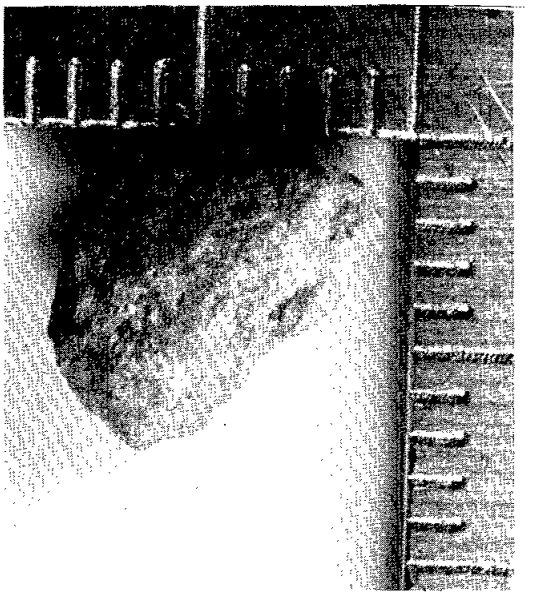
Coherence: Tough
Shape: Angular
Color: White
Mineralogy: 100% plagioclase (80% translucent, 20% chalky white)
Remarks: Grain size 1-2 mm
Photo Number: S-73-25439



72464,2

Anorthosite
1 particle, 0.32 grams

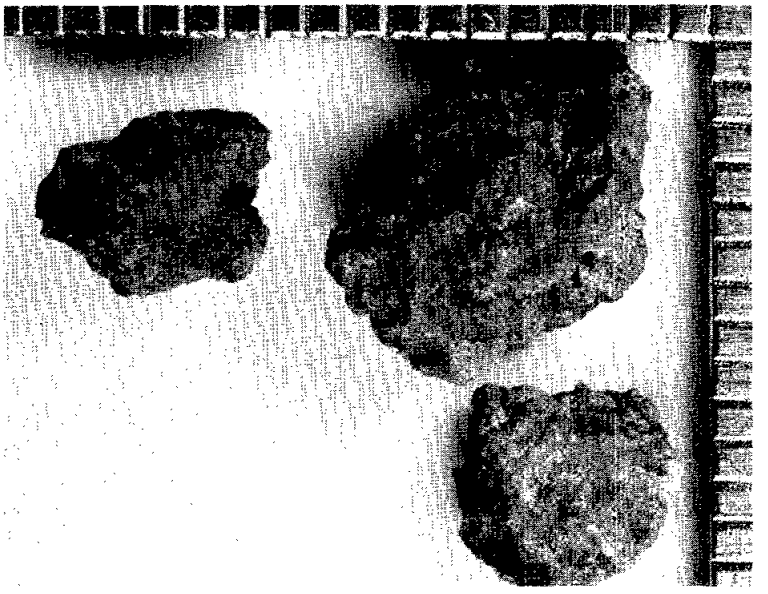
Coherence: Tough
Shape: Subround
Surface: Dirty
Color: White
Mineralogy: 90% plagioclase, 10% gray mineral (pyroxene?)
Remarks: Annealed texture
Photo Number: S-73-25440



72464,3

Feldspathic Breccia
3 particles, 0.55 grams

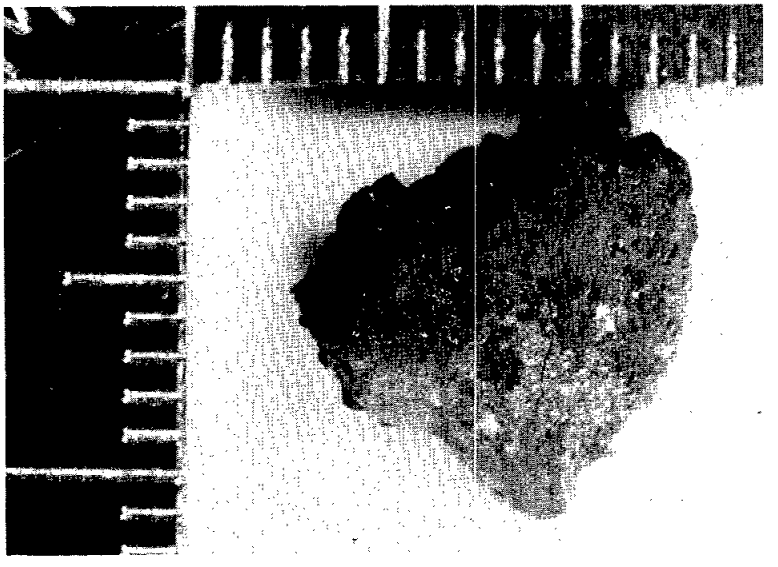
Coherence: Tough
Shape: Subangular
Color: Tannish gray
Mineralogy: ~70% plagioclase, 2% opaques, 28% gray mineral (orthopyroxene?)
Remarks: 2% vugs
Photo Number: S-73-25441



72464,4

Breccia
1 particle, 0.58 grams

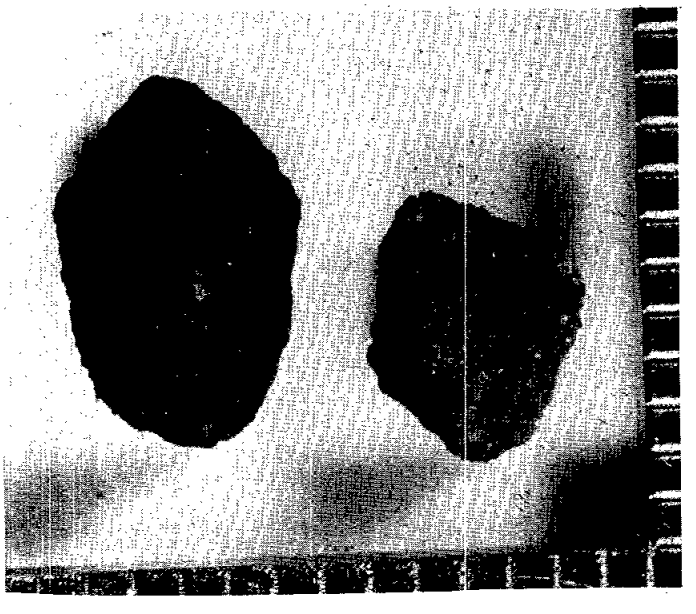
Coherence: Tough
Shape: Irregular
Color: Gray
Mineralogy: 60% aphanitic gray matrix with 40% small (1 mm) white clasts
Remarks: Vesicular glass coat on one side, small droplets of black glass on broken breccia side
Photo Number: S-73-25442



72504,1

Soil Breccias
2 particles, 0.3 grams

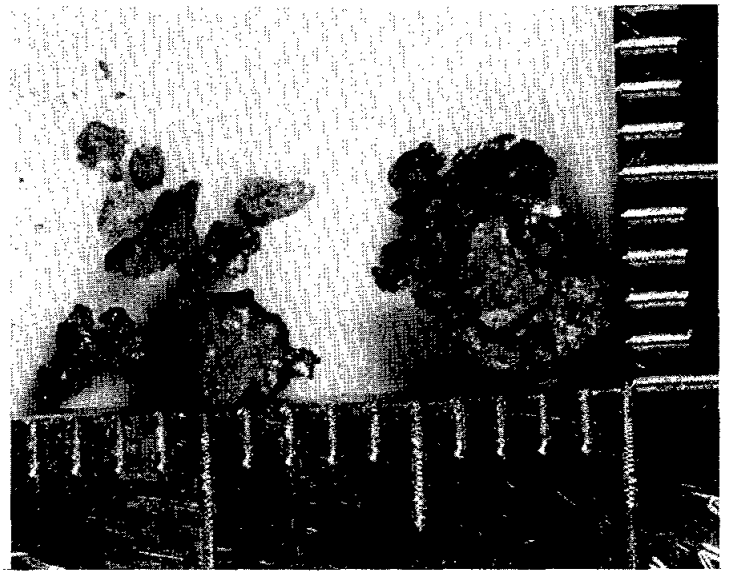
Coherence: Friable
Shape: Rounded
Surface: Grainy
Color: One gray, one light gray
Mineralogy: 40% black glass spheres, 60% fine powder matrix
Remarks: Many small spheres of glass, unlike other soil breccias
Photo Number: S-73-21868



72504,2

Agglutinates
2 particles, 0.08 grams

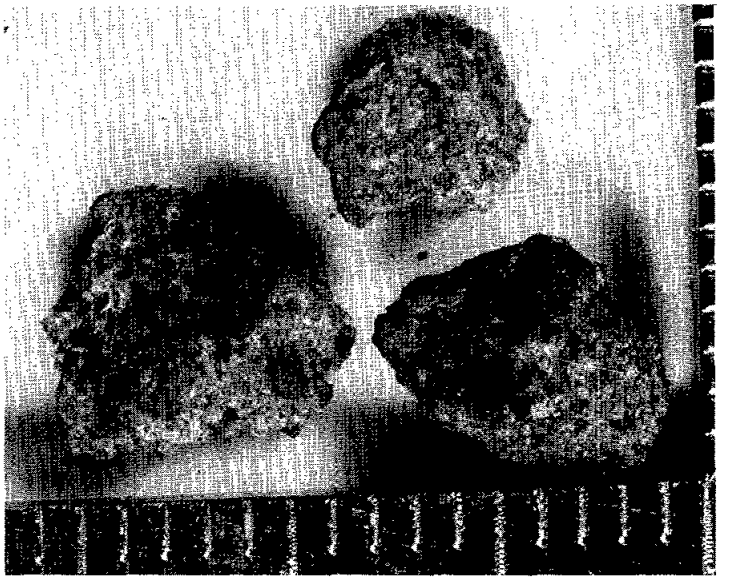
Coherence: Delicate
Shape: Irregular
Color: Black glass, gray breccia
Mineralogy: 30% glass, 70% gray matrix breccia
Remarks: Probably all one particle originally.
Photo Number: S-73-21875



72504,3

Feldspathic Basalt
3 particles, 0.49 grams

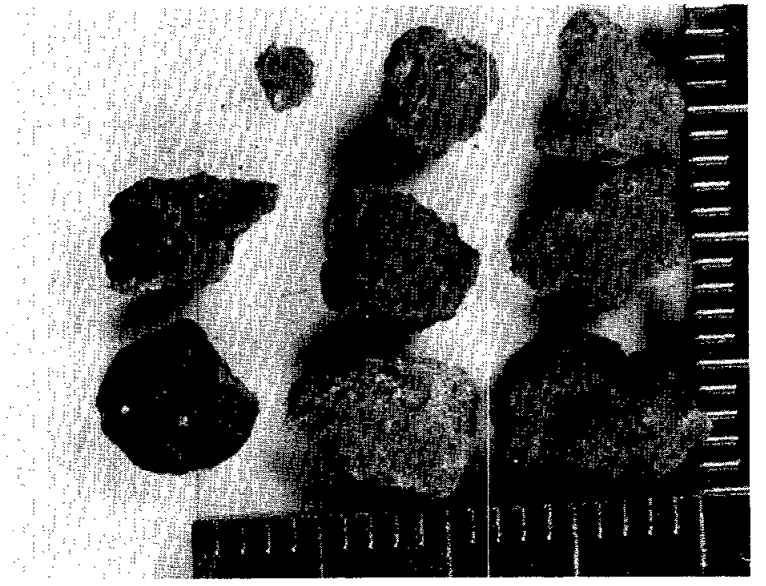
Coherence: Tough
Shape: Angular
Surface: 10% dirt coated
Color: Light tan to white
Mineralogy: 80% plagioclase, 5% opaques, 10% gray pyroxene, 5% light brown pyroxene
Remarks: Grain size ∿0.5 - 1 mm. The particles may have a primary igneous texture.
Photo Number: S-73-21874



72504,4

Feldspathic Breccia
8 particles, 1.26 grams

Coherence: Tough, two particles partly fractured
Shape: Angular, one particle is rounded
Color: Light tan to white
Mineralogy: 80% plagioclase, 20% gray mineral (orthopyroxene?)
Remarks: Grain size 0.5 mm. Zap pits on rounded grains. Annealed possibly hornfelsic texture. 5% vugs in 4 of 8 particles.
Photo Number: S-73-21873



72504,5

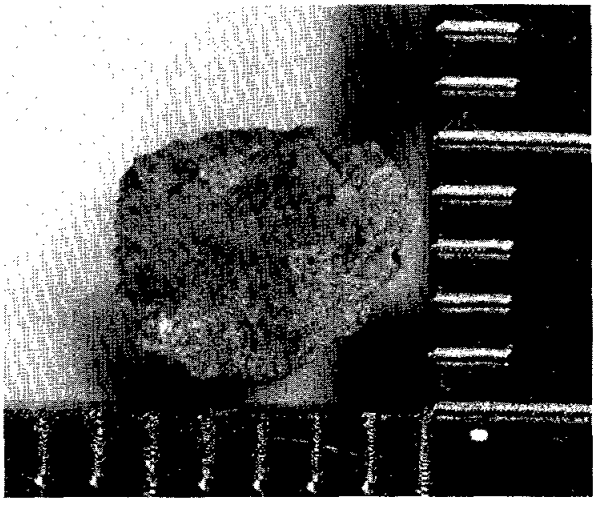
Breccia
5 particles, 0.83 grams

Coherence: Coherent to friable
Shape: Angular
Color: Black and white
Mineralogy: 60% dark gray matrix with 40% white clasts, 0.5 - 2 mm in diameter
Remarks: Overall composition is highly feldspathic
Photo Number: S-73-21875

72504,6

Breccia
1 particle, 0.08 grams

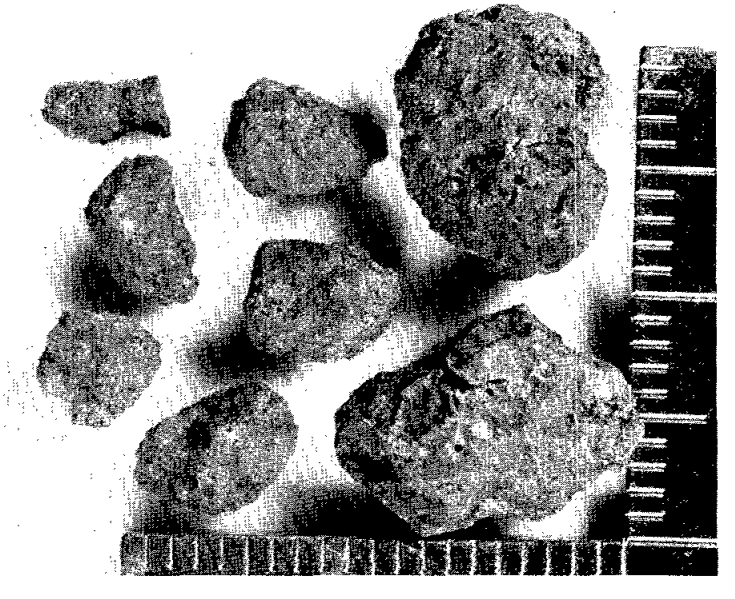
Coherence: Friable
Shape: Angular
Color: White
Mineralogy: 100% plagioclase
Remarks: Chalky and aphanitic
Photo Number: S-73-21871



72504,7

Feldspathic Breccia
8 particles, 2.13 grams

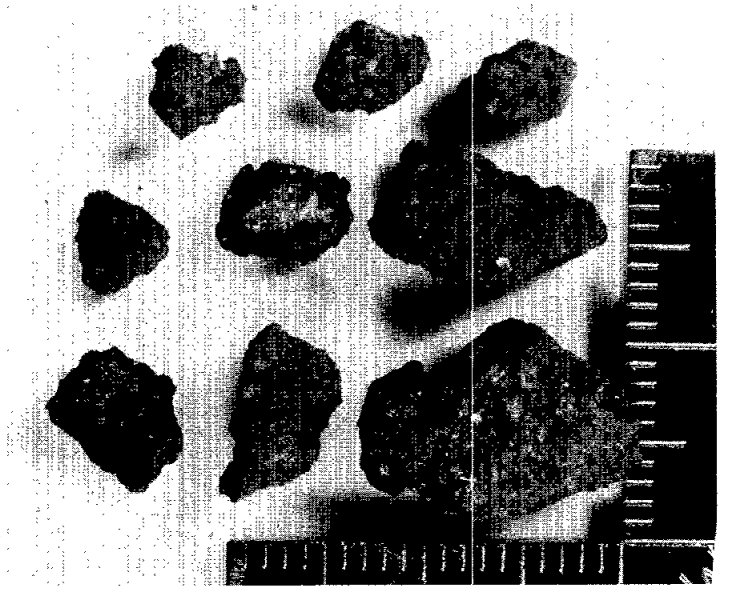
Coherence: Tough
Shape: Angular to rounded
Color: Light tan to light gray
Mineralogy: 80% plagioclase, 20% gray mineral grain boundaries not visible
Photo Number: S-73-21870



72504,8

Breccia
9 particles, 2.57 grams

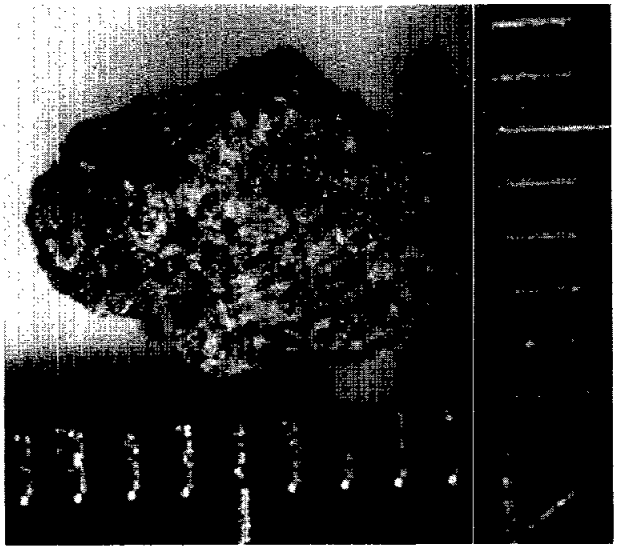
Coherence: Tough to friable
Shape: Angular to rounded
Color: Blue gray
Mineralogy: 80-90% plagioclase, cleavage of plagioclase visible, 10% gray mineral (orthopyroxene?)
Remarks: Occasional white clast in blue gray matrix. Two particles have glass lined zap pits
Photo Number: S-73-21869



72704,1

Basalt
1 particle, 0.25 grams

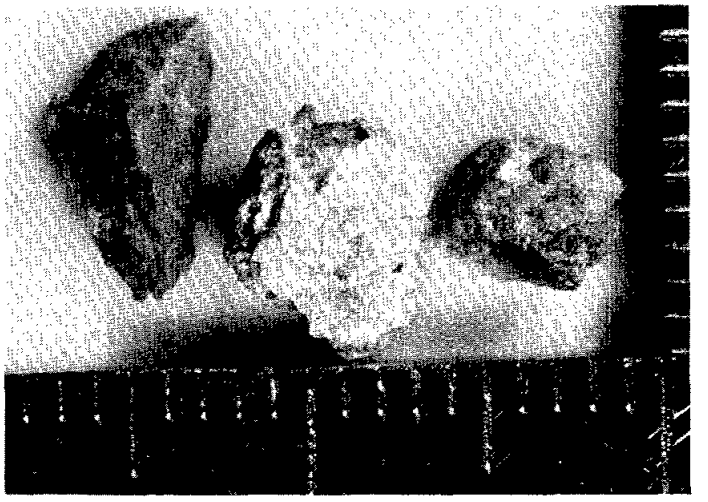
Coherence: Tough
Shape: Angular
Surface: Fresh
Color: Brownish gray
Mineralogy: 40% plagioclase (1 mm), 40% light brown pyroxene (1 mm), 10% opaque and 10% light green olivine (2 mm)
Remarks: Olivine occurs as microphenocrysts
Photo Number: S-73-21890



72704,2

Anorthosite
3 particles, 0.36 grams

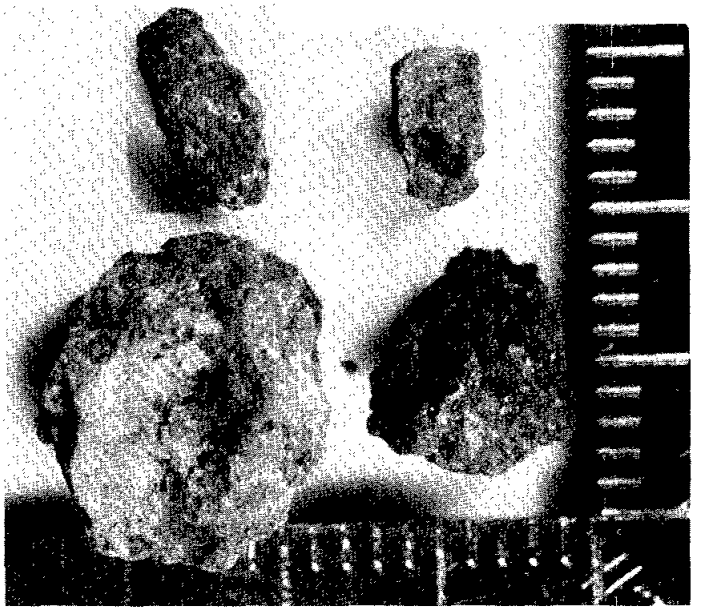
Coherence: Tough
Shape: Angular
Surface: 10% dirt covered
Color: White
Mineralogy: 100% plagioclase
Remarks: Grain size 1-2 mm. One particle translucent, one particle cloudy, one particle chalky.
Photo Number: S-73-21889



72704,3

Breccia
4 particles, 1.25 grams

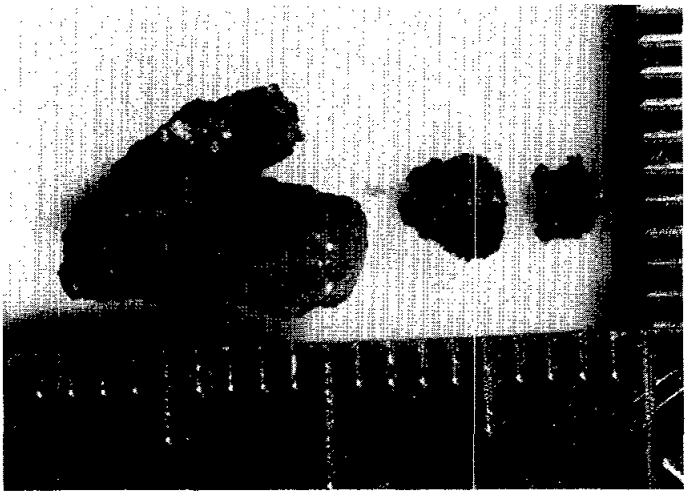
Coherence: Tough
Shape: Three angular
Color: Blue gray
Mineralogy: 80% plagioclase, 20% gray mineral (glass?)
Remarks: Annealed textures. Few vugs, one zap on rounded particle.
Photo Numbers: S-73-21888 (large two)
S-73-21887 (small two)



72704,4

Breccia
3 particles, 0.39 grams

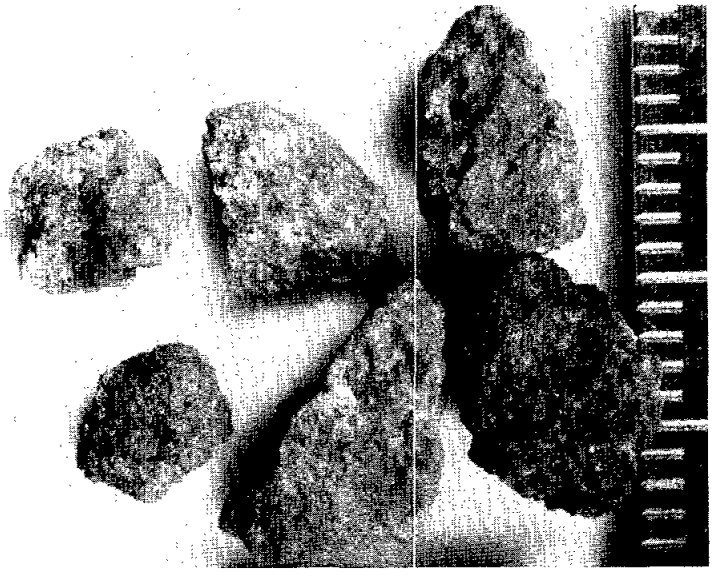
Coherence: Delicate
Shape: Irregular
Color: Dark gray
Mineralogy: 90% vesicular glass, 10% white clasts (0.5 mm)
Remarks: Similar to agglutinates
Photo Number: S-73-21886



72704,5

Feldspathic Breccias
6 particles, 1.57 grams

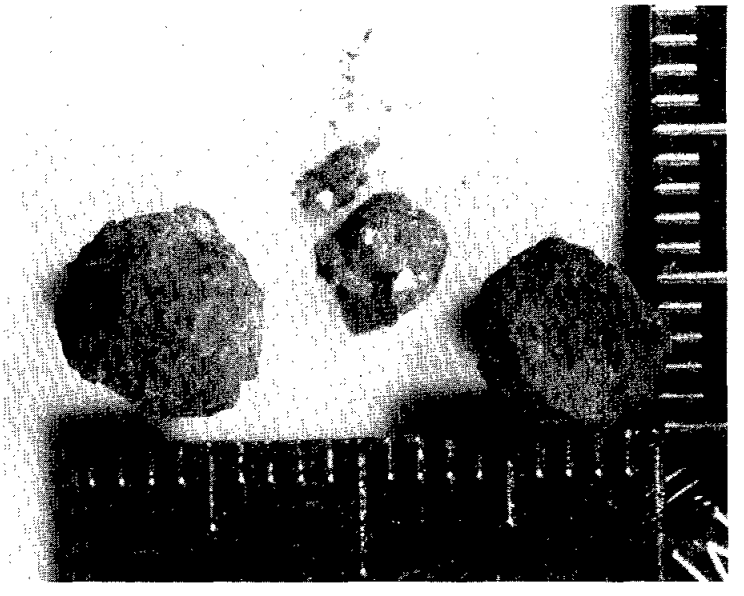
Coherence: Tough annealed, possibly hornfelsic texture
Shape: Angular to subrounded
Color: Light tan to gray
Mineralogy: 80% plagioclase, 20% gray mineral (orthopyroxene?), 2% opaques
Remarks: These particles are all a little different from each other. Two of them may be feldspathic basalt. One particle has a long, wormy vug ∿1 cm.
Photo Number: S-73-21885



72704,6

Anorthositic Breccia
3 particles, 0.72 grams

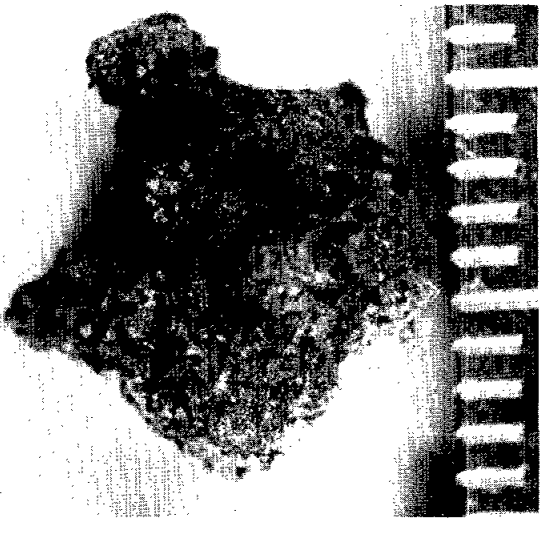
Coherence: Friable
Shape: Subangular
Color: Light gray
Mineralogy: 80-90% plagioclase, 10% gray mineral
Remarks: Fine-grained, aphanitic matrix with 10% white clasts (0.5 mm).
Photo Number: S-73-21884



73124,1

Vesicular Glass
1 particle, 0.37 grams

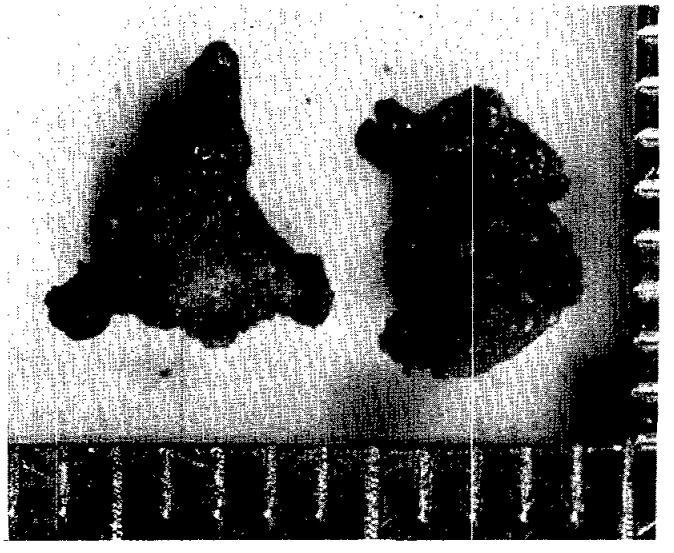
Coherence: Tough
Shape: Irregular
Surface: Smooth on one side
Color: Black
Mineralogy: Glass
Remarks: 30% vesicles - 0.5 - 2 mm diameter
Photo Number: S-73-21882



73124,2

Agglutinate
2 particles, 0.09 grams

Coherence: Delicate
Shape: Irregular
Color: Light gray
Mineralogy: 90% glass, 10% dirt
Remarks: These appear to have originally been one piece
Photo Number: S-73-21881



PRELIMINARY DESCRIPTION
Not yet dusted, photographed or subdivided

73134
9.61 grams

"Lithic fragments heavily dust-coated and some glass."

73144,1

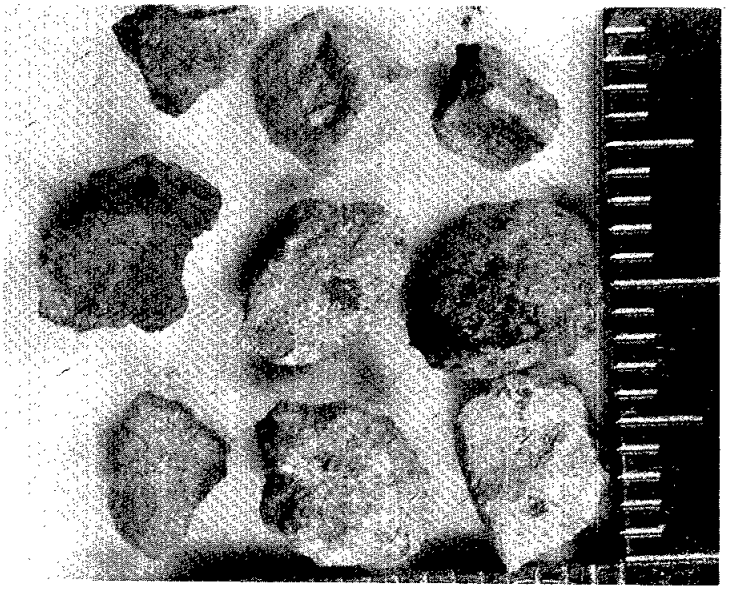
Feldspathic Breccia
7 particles, 0.23 grams

Coherence: Coherent
Shape: Subangular
Surface: Often dusty
Color: Gray
Photo Number: S-73-22209

73144,2

Feldspathic Breccia
9 particles, 1.16 grams

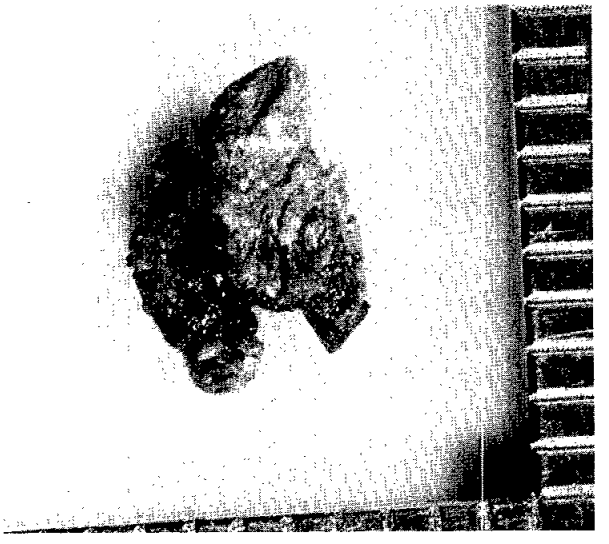
Coherence: Friable to coherent
Shape: Angular
Surface: Often dusty
Color: Pale gray
Mineralogy: Highly feldspathic matrix. Mineral clasts plagioclase dominant. A few lithic clasts sugary plagioclase-rich.
Photo Number: S-73-22210



73144,3

Glass Coating on Microbreccia
1 particle, 0.06 grams

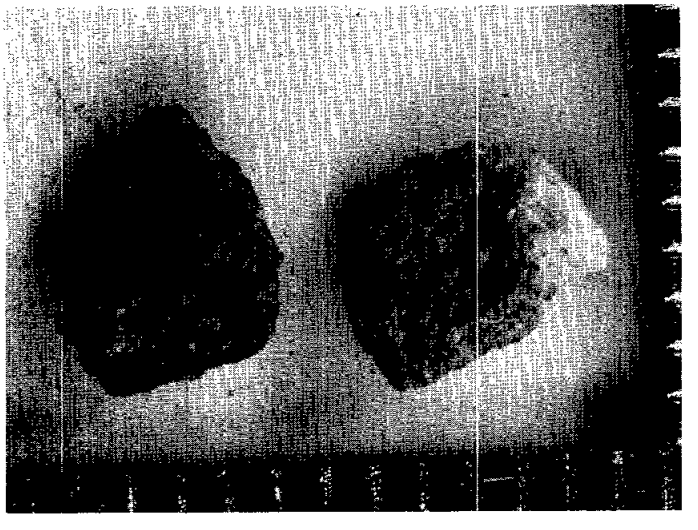
Coherence: Delicate
Shape: Irregular
Surface: Glass-smooth vesicular breccia - "dusty"
Color: Gray black glass
Mineralogy: Glass
Remarks: Glass coating on microbreccia
Photo Number: S-73-22212



73144,4

Breccia
2 particles, 0.23 grams

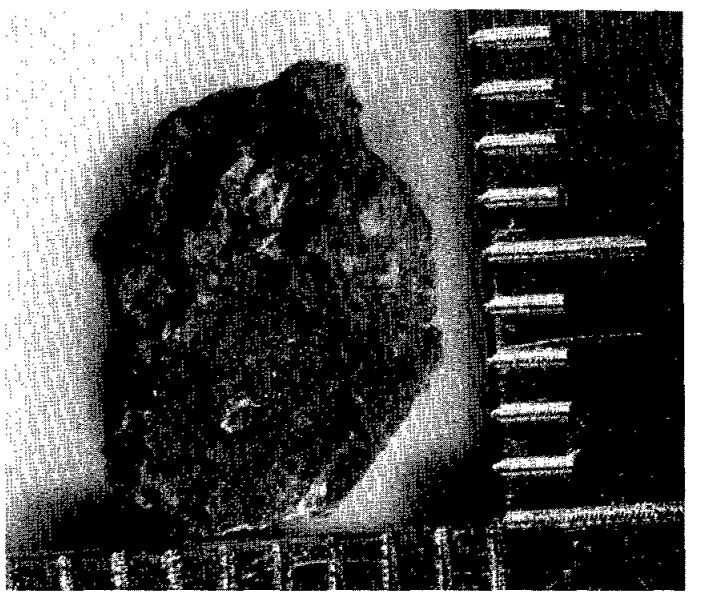
Coherence: Tough
Shape: Subangular
Surface: Rough or hackly
Color: Light gray
Mineralogy: (a) Plagioclase-rich matrix, anorthosite clast, one pink spinel
(b) Annealed anorthosite fragment
Photo Number: S-73-22206



73144,5

Glass
1 particle, 0.28 grams

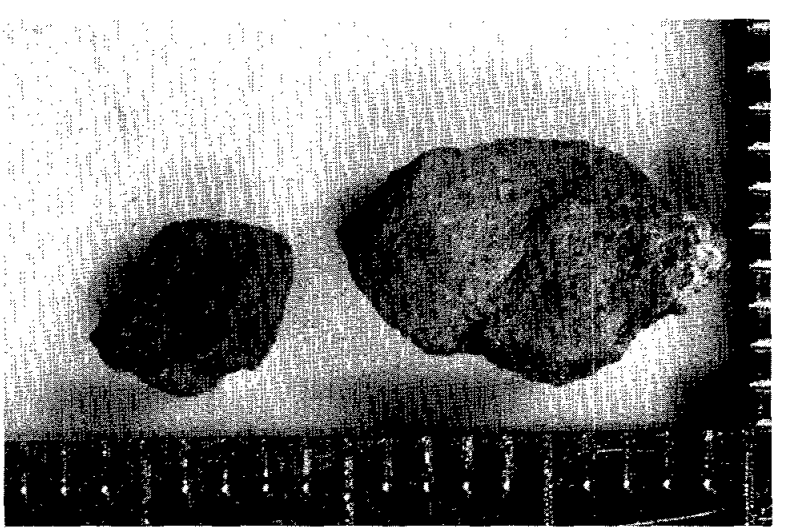
Coherence: Tough
Shape: Angular
Surface: Smooth
Color: Dark gray
Mineralogy: Vein of vesicular black glass in microcrystalline plagioclase-rich breccia including fine-grained clasts of gabbroic anorthosite
Photo Number: S-73-22207



73144,6

Feldspathic Breccia
2 particles, 0.44 grams

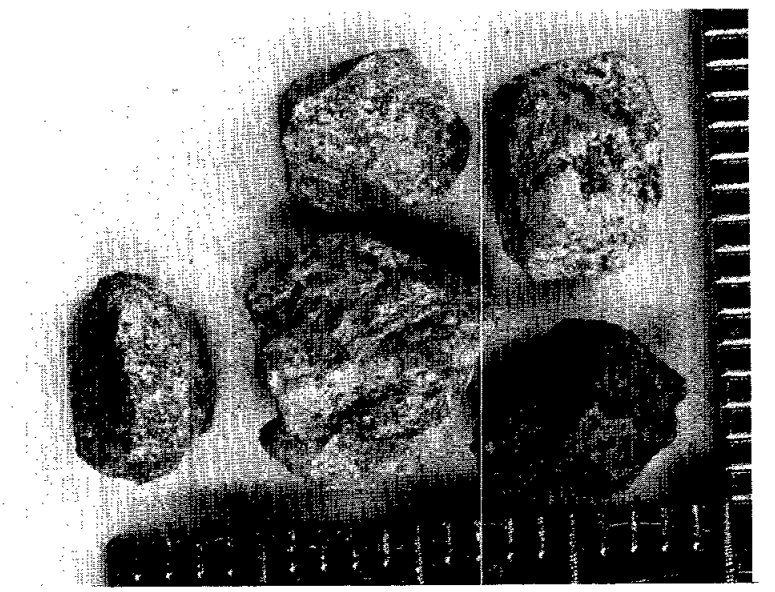
Coherence: Friable to tough
Shape: Rounded to subangular
Color: Gray
Remarks: ~70% plagioclase, ~30% gray clasts
Photo Number: S-73-22211



73144,7

Anorthosites
5 particles, 1.16 grams

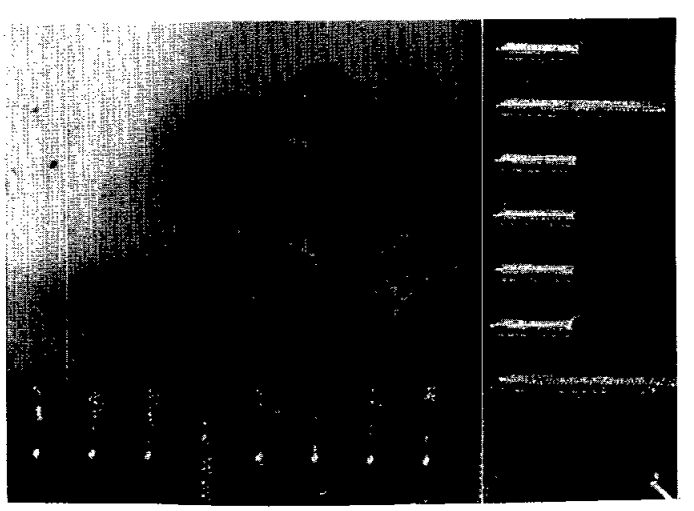
Coherence: Tough
Shape: Angular
Surface: Dusty - sugary
Color: Pale gray
Mineralogy: Plagioclase 90-70%, pale FeMg 10-30%, fine-grained
Remarks: Annealed, recrystallized texture
Photo Number: S-73-22208



73154,1

Anorthosite
1 particle, 0.11 grams

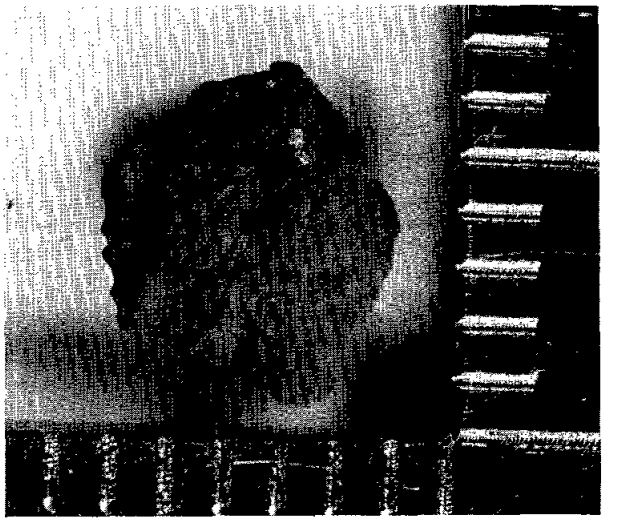
Coherence: Tough
Shape: Angular
Surface: Dirt on one side
Color: Light gray to white
Mineralogy: 85% plagioclase, 14% gray pyroxene, 1% light greenish mineral
Remarks: Grain size ∿1-2 mm
Photo Number: S-73-21794



73154,2

Breccia
1 particle, 0.09 grams

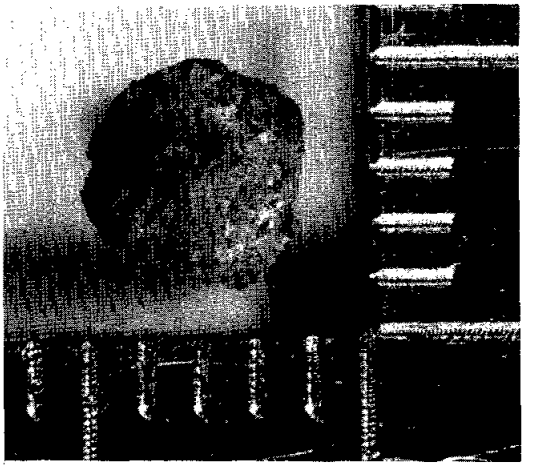
Coherence: Tough
Shape: Subrounded
Surface: Dirt adhering
Color: Blue gray
Mineralogy: Aphanitic matrix with 10% white clasts
Photo Number: S-73-21795



73154,3

Feldspathic Breccia
1 particle, 0.11 grams

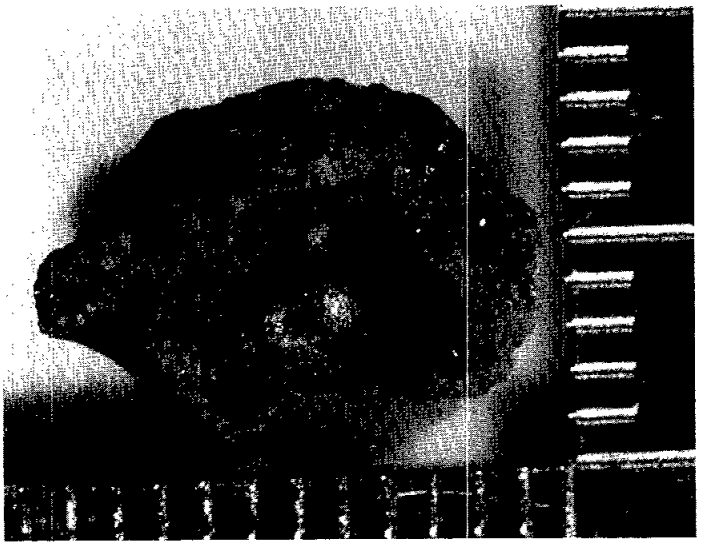
Coherence: Tough
Shape: Rounded
Color: Light tan to white
Mineralogy: 70% plagioclase, 25% tannish gray mineral, 2% opaques
Remarks: Chalky plagioclase
Photo Number: S-73-21796



73214,1

Glass
1 particle, 0.47 grams

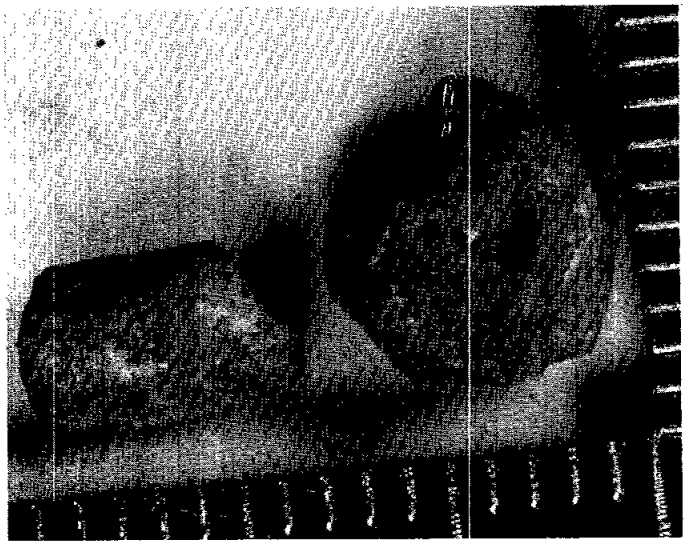
Coherence: Tough
Shape: Irregular, vesicular
Surface: Shiny
Color: Black
Mineralogy: All glass
Remarks: 2-4 mm diameter, vesicle walls define both sides of this particle. 20% vesicles range in size from 0.5 - 4 mm
Photo Number: S-73-21783



73214,2

Anorthosite
2 particles, 0.55 grams

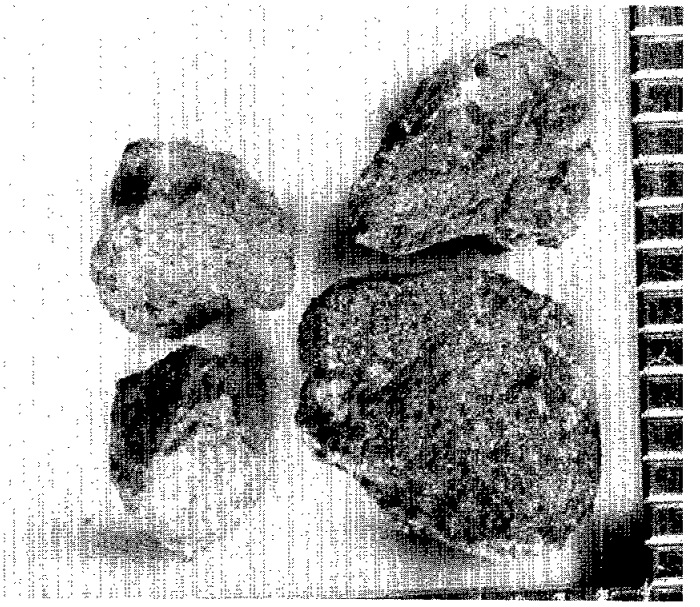
Coherence: Tough
Shape: Subrounded
Surface: 10% dirt covered
Color: White
Mineralogy: 95% plagioclase, ~5% pink spinel in interstices(?)
Remarks: Annealed recrystallized texture
Photo Number: S-73-21784



73214,3

Feldspathic Breccia
4 particles, 0.53 grams

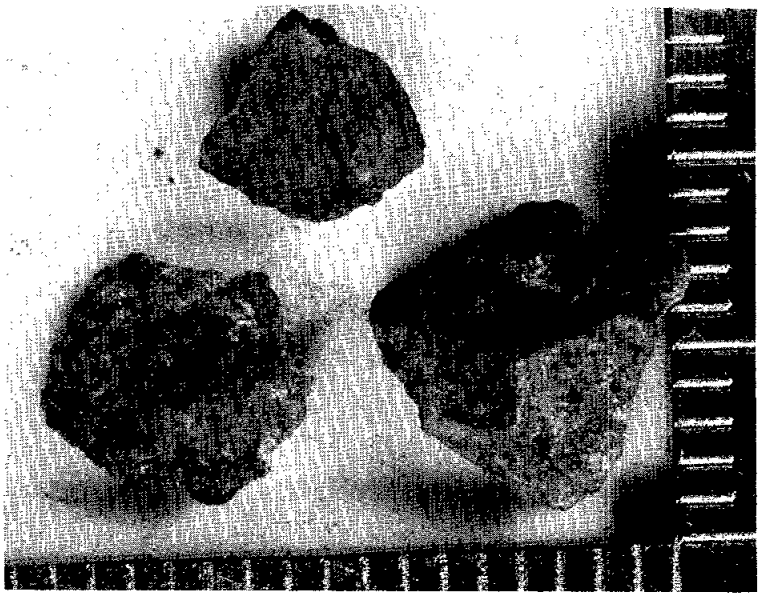
Coherence: Tough
Shape: Angular to subrounded
Color: Blue gray
Mineralogy: ∿80% plagioclase, 20% gray mineral
Remarks: Annealed plagioclase
Photo Number: S-73-21785



73214,4

Feldspathic Breccia
3 particles, 0.73 grams

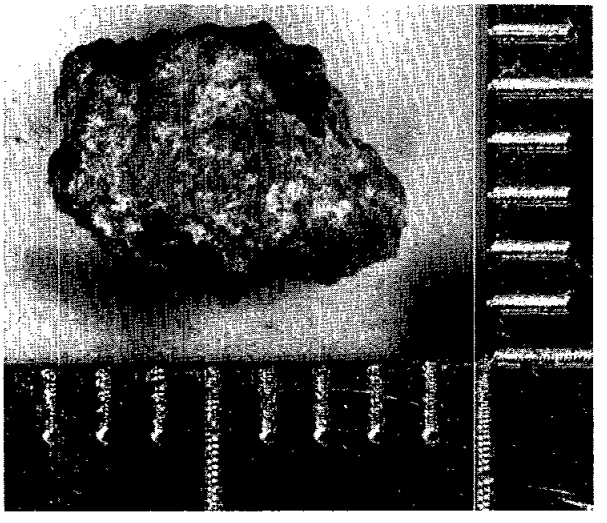
Coherence: Tough
Shape: Subrounded
Surface: 10% dirt
Color: Tannish white
Mineralogy: 70% plagioclase, 2% opaque, 25% gray pyroxene (orthopyroxene), 3% light greenish mineral (olivine)
Remarks: One particle has grain size ∿1 mm and ∿10% light brown pyroxene, somewhat mottled texture, possible hornfelsic texture
Photo Number: S-73-21786



73214,5

Breccia
1 particle, 0.15 grams

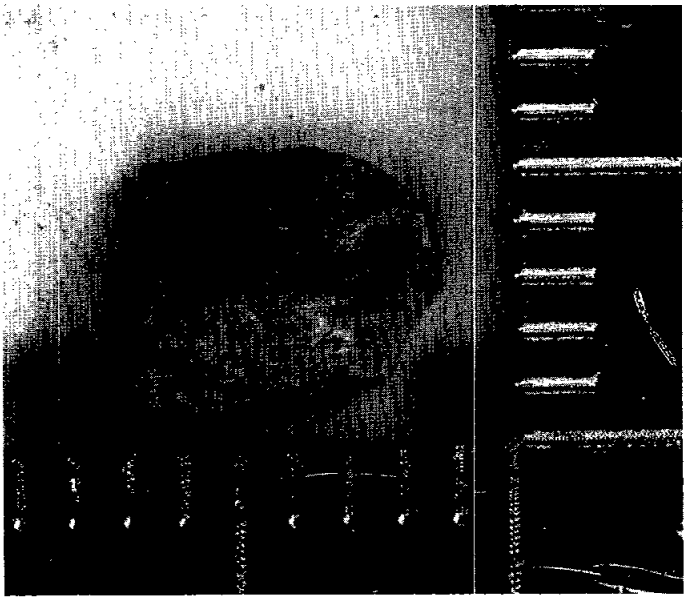
Coherence: Friable
Shape: Irregular
Surface: Dirty
Color: Black and white
Mineralogy: 70% devitrified black glass and 30% chalky white plagioclase
Photo Number: S-73-21787



73224,1

Anorthosite
1 particle, 0.13 grams

Coherence: Tough
Shape: Subrounded
Color: Dull white
Mineralogy: 100% plagioclase
Remarks: Annealed, fine-grained
Photo Number: S-73-21789



73224,2

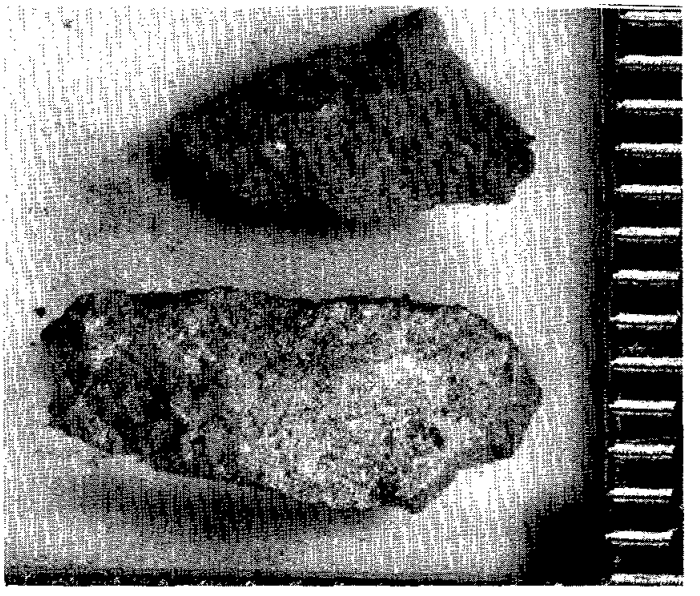
Feldspathic Breccia
3 particles, 1.0 grams

Coherence: Tough
Shape: Angular
Surface: 10% coated with white dirt
Color: Blue gray
Mineralogy: ∿80% plagioclase, 20% gray mineral
Remarks: One particle has a 0.5 mm bloodied spinel grain. Annealed plagioclase.
Photo Number: S-73-21790

73224,3

Feldspathic Breccia
2 particles, 0.38 grams

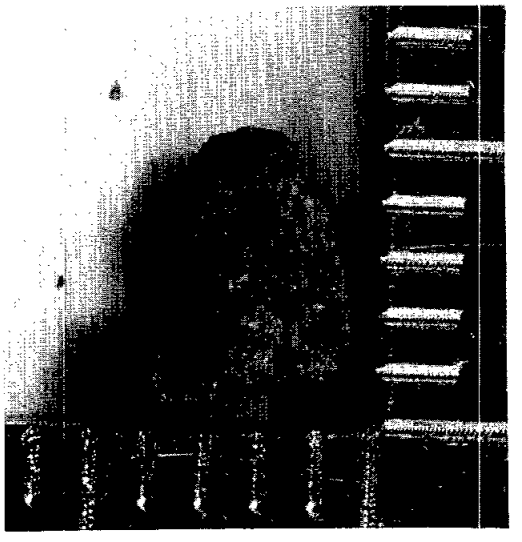
Coherence: Tough
Shape: Angular elongate
Color: Tannish white
Mineralogy: 20% tannish gray pyroxene, 70% plagioclase, 10% light green mineral, 1% opaque
Remarks: Greenish mineral has microporphyritic texture. Grain size 0.5 mm with green mineral up to 1 mm
Photo Number: S-73-21791



73224,4

Breccia?
1 particle, 0.1 grams

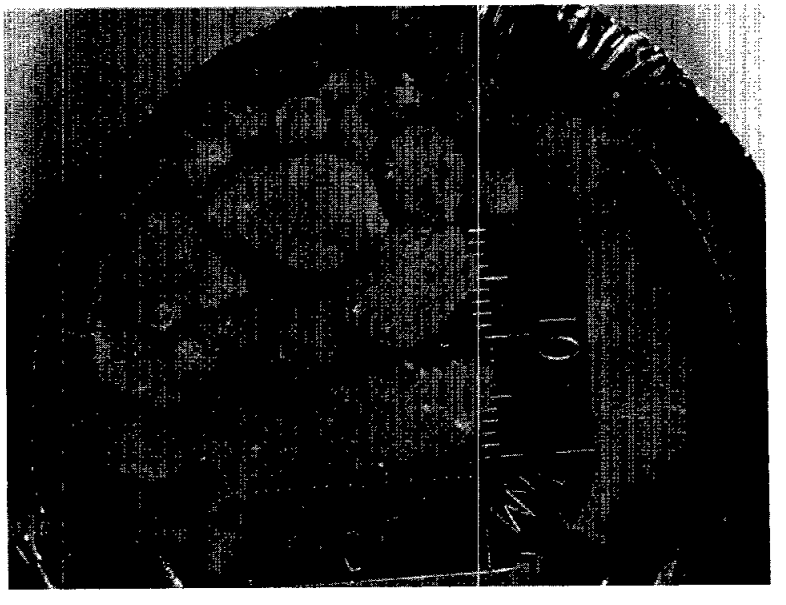
Coherence: Friable
Shape: Rounded
Color: Light brown
Mineralogy: 50% light brown glass or pyroxene, 20% white plagioclase and 30% gray mineral (or matrix)
Photo Number: S-73-21792



73244,1

Soil Breccia
24 particles, 6.19 grams

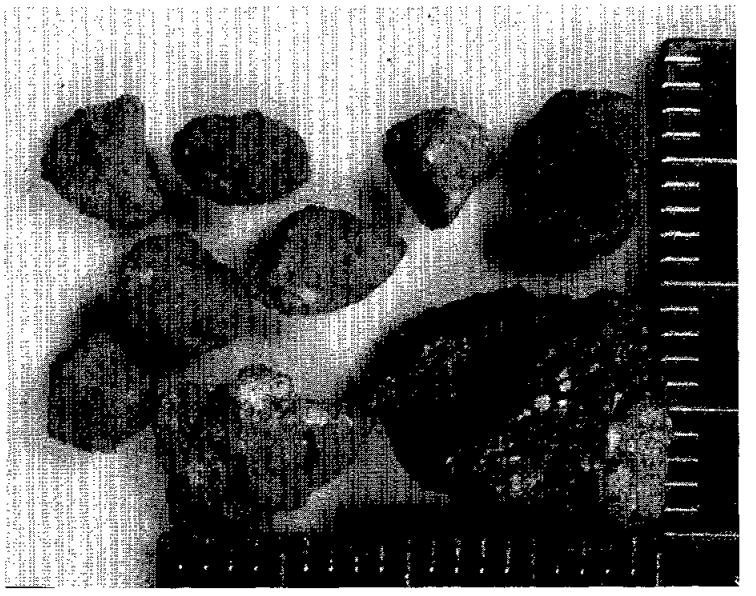
Coherence: Soft, very friable
Shape: Rounded
Surface: Dusty, loose
Color: Pale gray, but yellow hue
Mineralogy: Highly feldspathic
Photo Number: S-73-22193



73244,2

Breccia
9 particles, 2.08 grams

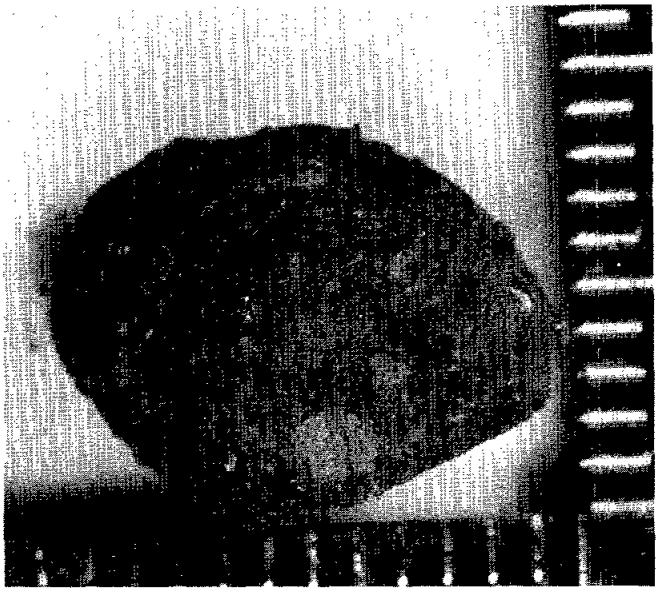
Coherence: Coherent
Shape: Angular - subangular
Surface: Some dusty, some smooth
Color: Range in pale gray
Mineralogy: Matrix plagioclase-rich. Lithic clasts crushed anorthositic types. Largest fragment has striations on one surface and some adherent glass. One contains pink spinel. Also differs in being slightly darker in general color. Largest fragment is different from the others.
Photo Number: S-73-22194



73244,3

Soil Microbreccia
1 particle, 0.84 grams

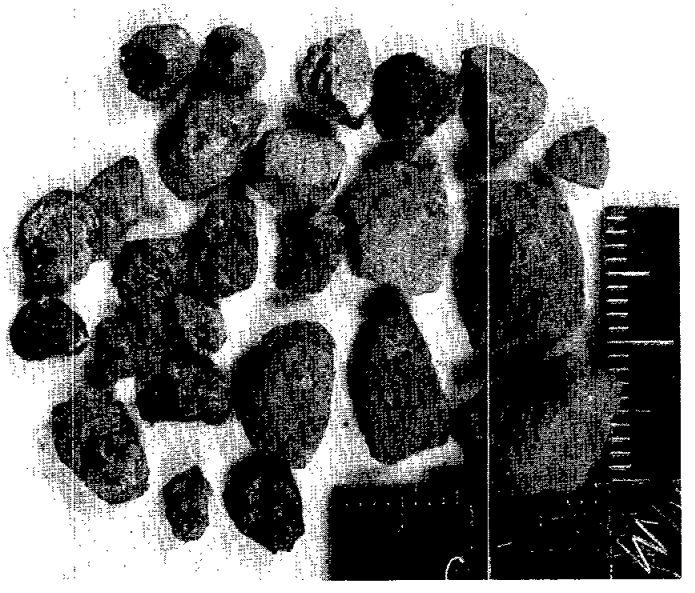
Coherence: Friable
Shape: Rounded
Surface: Sandy loose
Color: Gray - brown hue compared with ,1.
Remarks: Glass spheres visible, embedded in sample
Photo Number: S-73-22195



73244,4

Feldspathic Breccia
25 particles, 6.71 grams

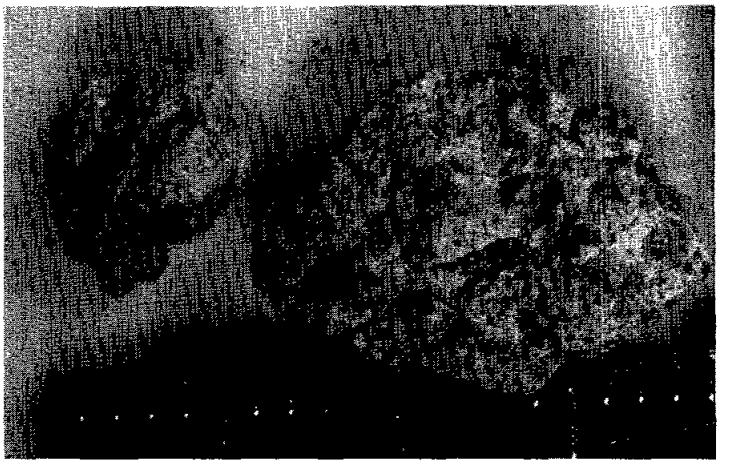
Coherence: Tough
Shape: Angular - subangular
Surface: Hackly
Color: Pale gray - much same as ,1.
Mineralogy: ~70% sugary plagioclase, 30% gray mineral (orthopyroxene?)
Remarks: Annealed texture
Photo Number: S-73-22196



73244,5

Crushed Anorthosite
2 particles, 0.97 grams

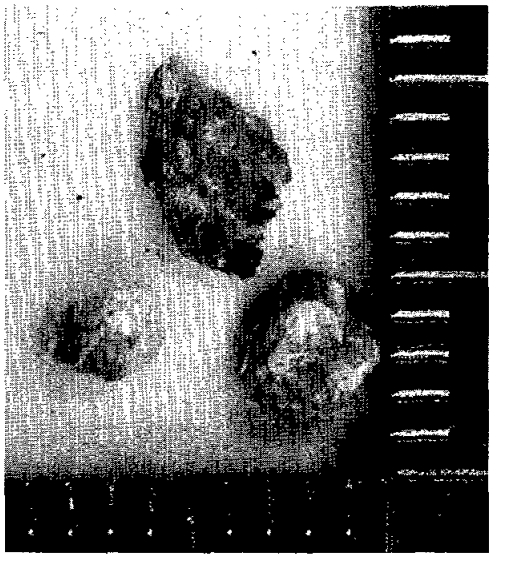
Coherence: Coherent
Shape: Subangular
Surface: Knobbly
Color: White
Mineralogy: Plagioclase > 90% - fine gray
Fragments in chalky white matrix
Photo Number: S-73-22197



73244,6

Anorthosite
3 particles, 0.08 grams

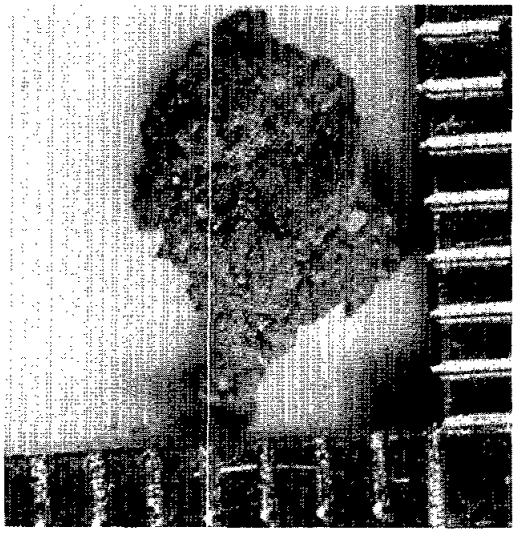
Coherence: Tough
Shape: Angular
Surface: Hackly to smooth
Color: White
Mineralogy: ∿90% sugary plagioclase
Remarks: Recyrstallized texture
Photo Number: S-73-22198



73244,7

Pale Agglutinate
1 particle, 0.03 grams

Coherence: Delicate
Shape: Irregular
Surface: Adherent mineral grains on glass
Color: Gray
Mineralogy: 50% glass - 50% soil
Remarks: Glass bonded feldspathic agglutinate
Photo Number: S-73-22199



73244,8

Glass
3 particles, 0.49 grams

Coherence: Tough
Shape: Angular
Surface: Vitreous
Color: Brown gray
Mineralogy: One is a glass seam, one partially devitrified, other glass coating and vein on soft microbreccia.
Photo Number: S-73-22200

73244,9

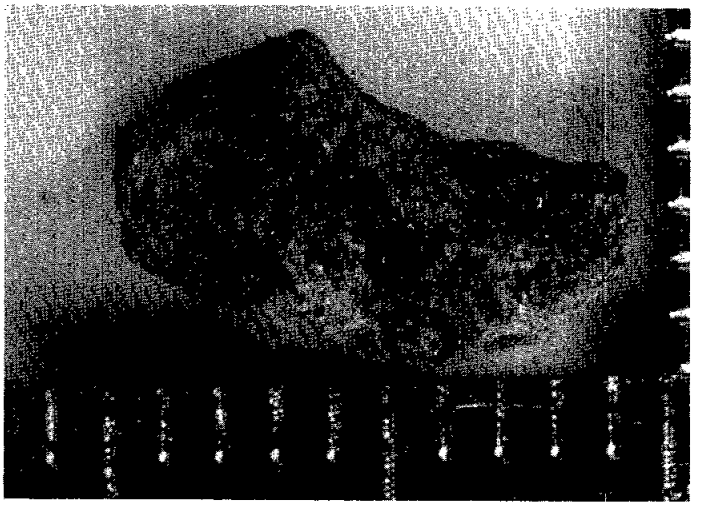
Basalt
4 particles, 0.64 grams

Coherence: Coherent
Shape: Angular
Surface: Hackly
Color: Gray - brown
Mineralogy: Plagioclase 30%, pyroxene-cinnamon 60%, opaques 10%
Grain size 0.2 mm average
Photo Number: S-73-22201

73244,10

Olivine Rich Basalt
1 particle, 0.31 grams

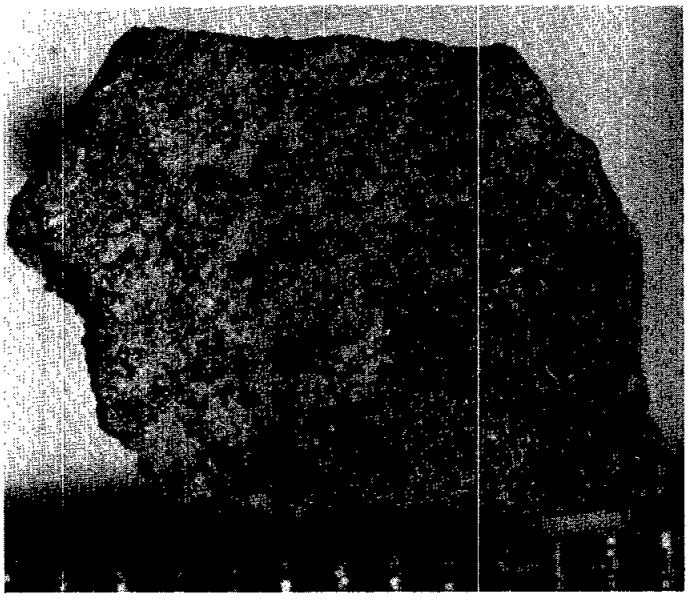
Coherence: Tough
Shape: Blocky
Surface: Hackly
Color: Gray - green
Mineralogy: Olivine - microphenocrysts 2 mm 30%, plagioclase 40%, pyroxene-green brown 25%, opaques 5%.
Photo Number: S-73-22202



73244,11

Olivine - Ilmenite Basalt
1 particle, 1.06 grams

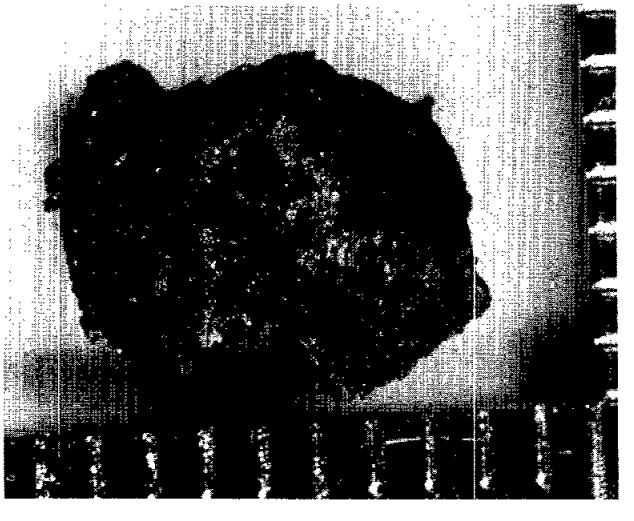
Coherence: Tough
Shape: Subangular
Surface: Hackly
Color: Dark gray
Mineralogy: Olivine green ± 10% phenocrysts in dark finer-grained matrix, ilmenite 30%
Photo Number: S-73-22203



73244,12

Breccia
1 particle, 0.6 grams

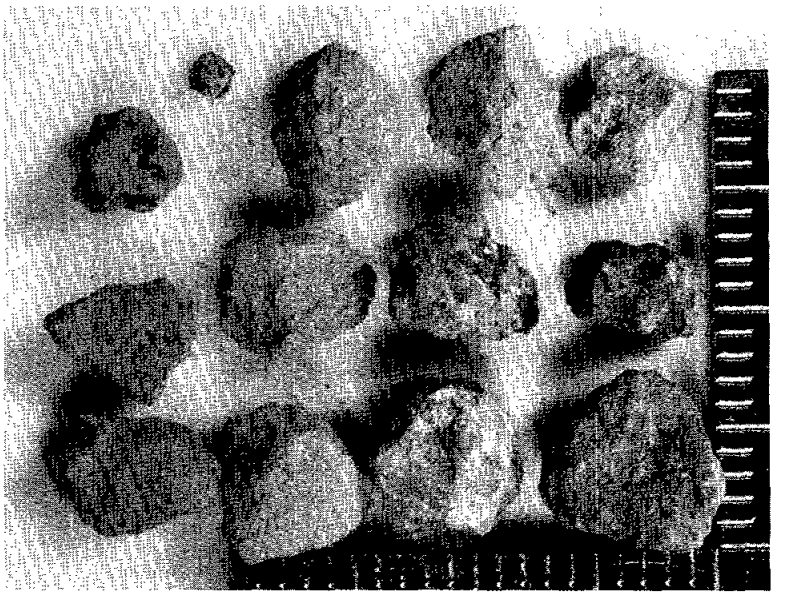
Coherence: Tough
Shape: Irregular
Surface: Hackly, metal covered, splashed
Color: Dark gray, silvery metallic
Mineralogy: Feldspathic soil breccia coated and veined by Fe metal with subordinate yellow phase(?) troilite.
Remarks: Unique metal features, splashed and veining structures.
Photo Number: S-73-22204



73264,1

Feldspathic Breccia
12 particles, 2.06 grams

Coherence: Coherent
Shape: Subangular
Surface: Very dusty
Color: Pale gray
Mineralogy Plag-rich
Photo Number: S-73-22214



73264,2

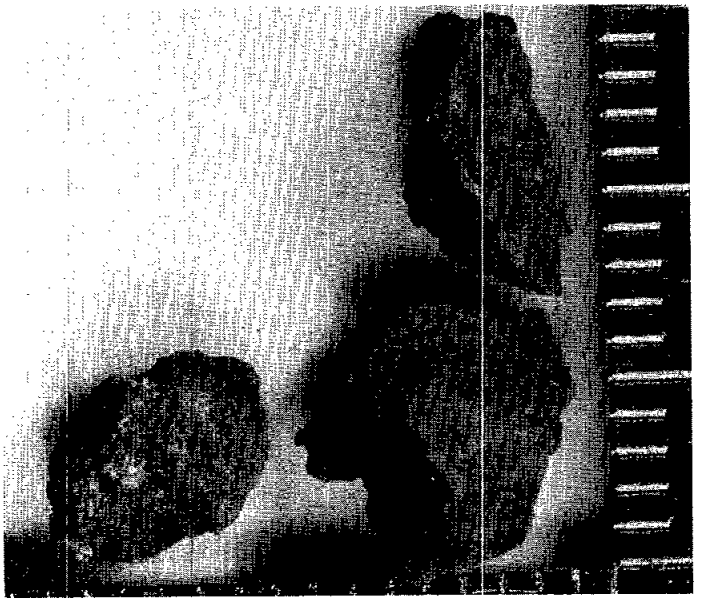
Fine-grained, recrystallized metaclastic
5 particles, 2.03 grams

Coherence: Tough
Shape: Angular
Surface: 1/2 very dusty
Color: Two types, one aphanitic - gray, other sugary texture, paler gray yellow hue.
Mineralogy: Gray type plagioclase-pyroxene; pale gray type plagioclase or pyroxene, slightly coarser grain size.
Remarks: Non-vesicular, highly recrystallized.
Photo Number: S-73-22215

73264,3

Vesicular Recrystallized Metaclastic
3 particles, 0.52 grams

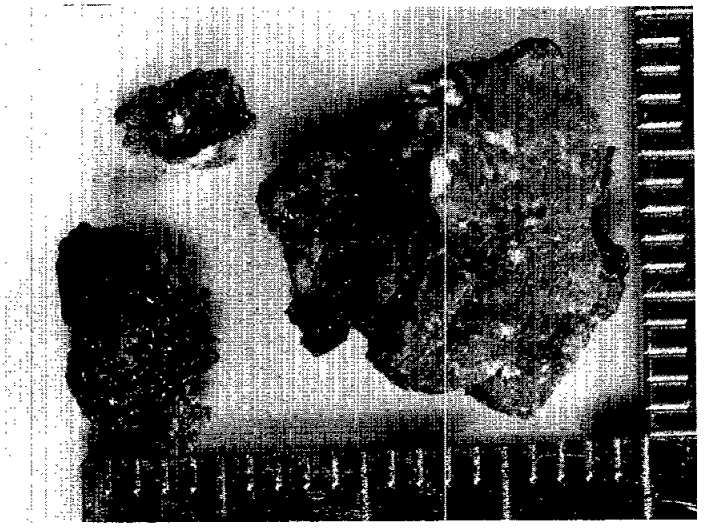
Coherence: Tough
Shape: Subangular
Surface: Fine hackly
Color: Gray
Mineralogy: ~70% plagioclase, and 30% interstitial colorless pyroxene (orthopyroxene?)
Remarks: 5% vesicles
Photo Number: S-73-22216



73264,4

Agglutinated Breccia
3 particles, 0.97 grams

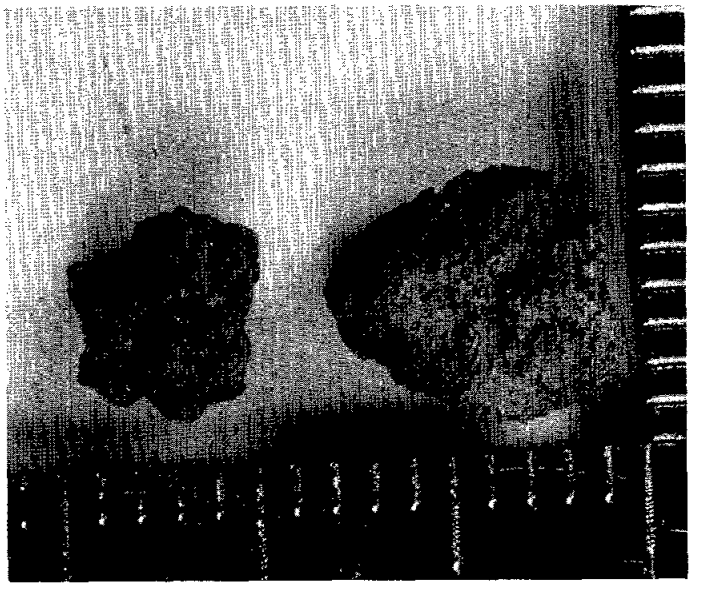
Coherence: Friable
Shape: Irregular
Surface: Glass coated
Color: Glass dark gray, yellowish tint in places
Mineralogy: Breccia pale gray friable feldspathic soil breccia with feldspathic clasts dominant
Remarks: Fresh surfaces on glass, vesicular and blistery, flows into cracks in microbreccia.
Photo Number: S-73-22217



73264,5

Basalt
2 particles, 0.52 grams

Coherence: Tough
Shape: Rounded
Surface: Dusty
Color: Gray
Mineralogy: Cinnamon pyroxene, plagioclase and ilmenite visible but dust obscures details
Remarks: Small vugs present. Mare type basalt.
Photo Number: S-73-22218



73284,1

Breccia
12 particles, 3.31 grams

Coherence: Coherent
Shape: Subangular
Surface: Dusty
Color: Pale gray
Mineralogy: Feldspar rich matrix composed of minute mineral fragments, mineral clasts glassy and chalky feldspar common, pale pyroxene and olivine rare.
Remarks: Largest fragment possibly rare recrystallized microbreccia.
Photo Number: S-73-22228

73284,2

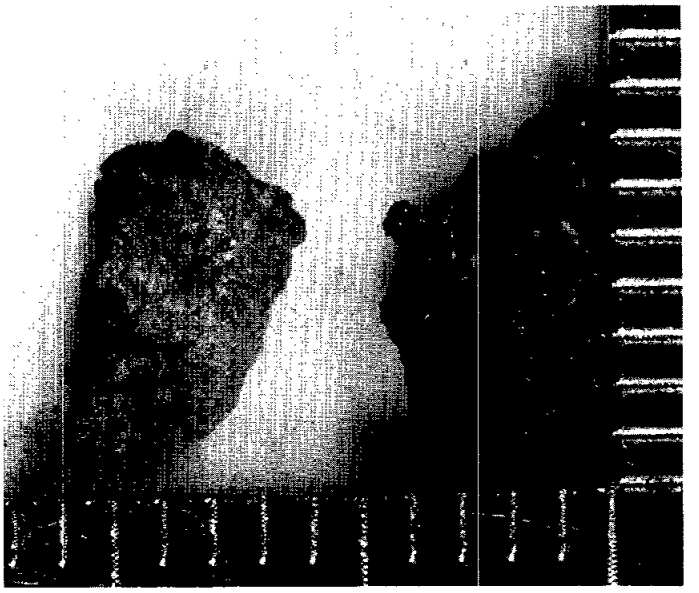
High Grade Metaclastic
7 particles, 1.56 grams

Coherence: Tough
Shape: Angular
Surface: Dusty - crystalline
Color: Medium gray
Mineralogy: ~70% fine-grained plagioclase
Photo Number: S-73-22229

73284,3

Glass Bearing Breccias
2 particles, 0.19 grams

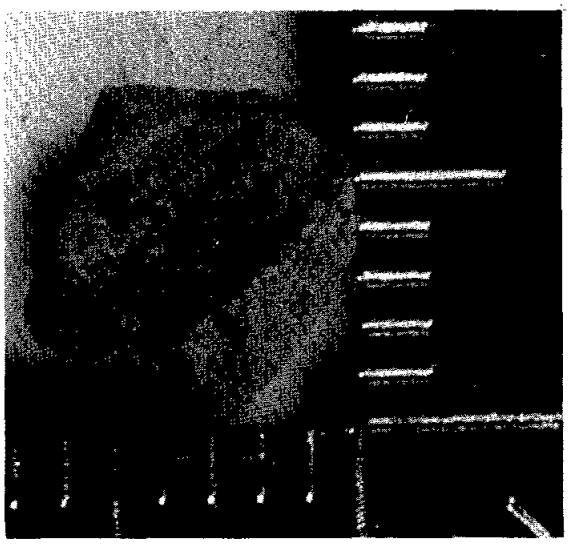
Coherence: Coherent
Shape: Irregular
Surface: Smooth to rough
Color: Pale and medium gray
Mineralogy: Microbreccia (of ,1) one with gray glass coating, other with possible seams of glass in microbreccia
Photo Number: S-73-22230



73284,4

High Grade Metaclastic
1 particle, 0.36 grams

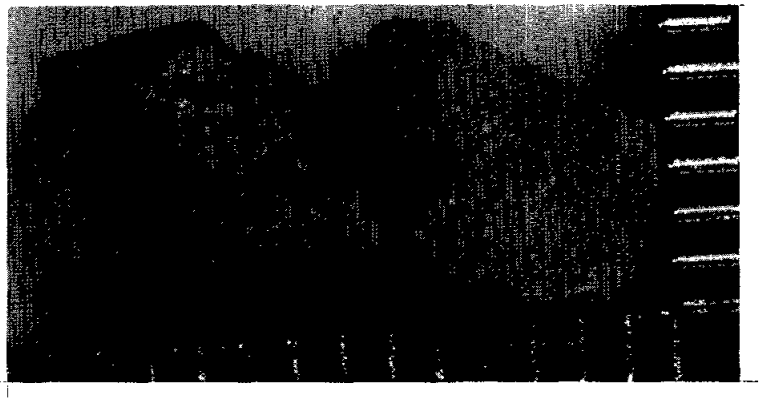
Coherence: Tough
Shape: Angular
Surface: Crystalline
Color: Medium gray
Mineralogy: ∿60% fine-grained plagioclase and ∿40% gray pyroxene. Several mineral clasts of pale green olivine.
Photo Number: S-73-22231



73284,5

Granulitic Anorthosite
2 particles, 0.42 grams

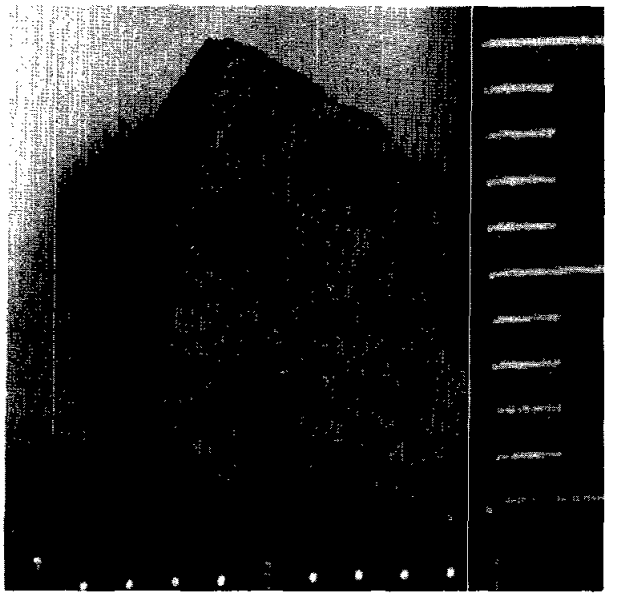
Coherence: Tough
Shape: Subangular
Surface: Smooth, dusty
Color: Very pale gray
Mineralogy: 80% sugary plagioclase. Pyroxene is also present.
Remarks: One fragment has a glass lined (colorless) zap pit.
Photo Number: S-73-22232



73284,6

Basalt
1 particle, 0.92 grams

Coherence: Tough
Shape: Blocky
Surface: Dusty
Color: Dark gray
Mineralogy: 50% plagioclase, 45% pyroxene (cinnamon color), 5% opaques
Photo Number: S-73-22233



PRELIMINARY DESCRIPTION
Not yet dusted, photographed or subdivided

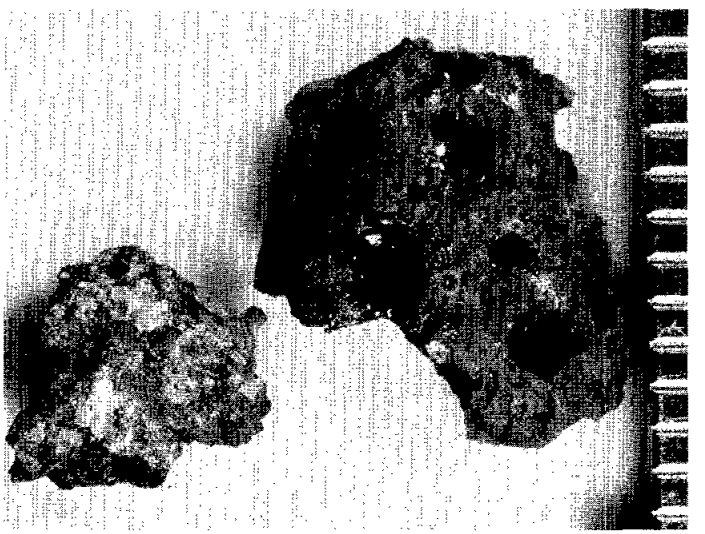
75124
0.956 grams

"100% basalt fragments in flat, elongate, subangular to subrounded."

76034,7

Glass Crust
2 particles, 0.27 grams

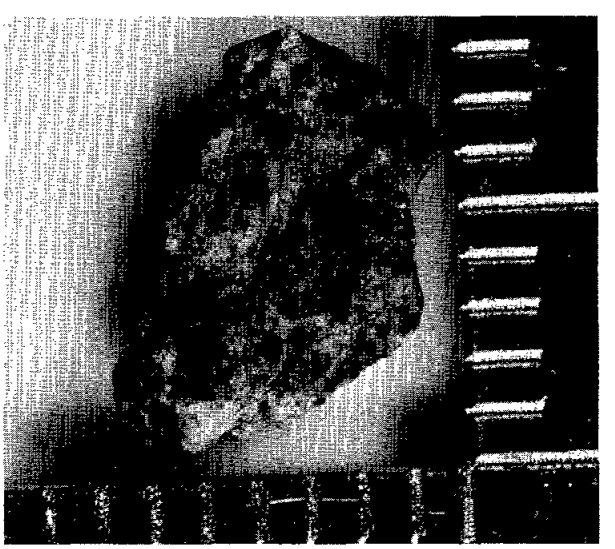
Coherence: Delicate
Shape: Irregular
Surface: One side is vesicular glass (vesicles ∿1 mm) with zap pits on it. Other side is glass with attached chalky white plagioclase.
Color: Black and white
Mineralogy: 80% glass, 20% plagioclase
Photo Number: S-73-21916



76124,1

Anorthositic Breccia
1 particle, 0.18 grams

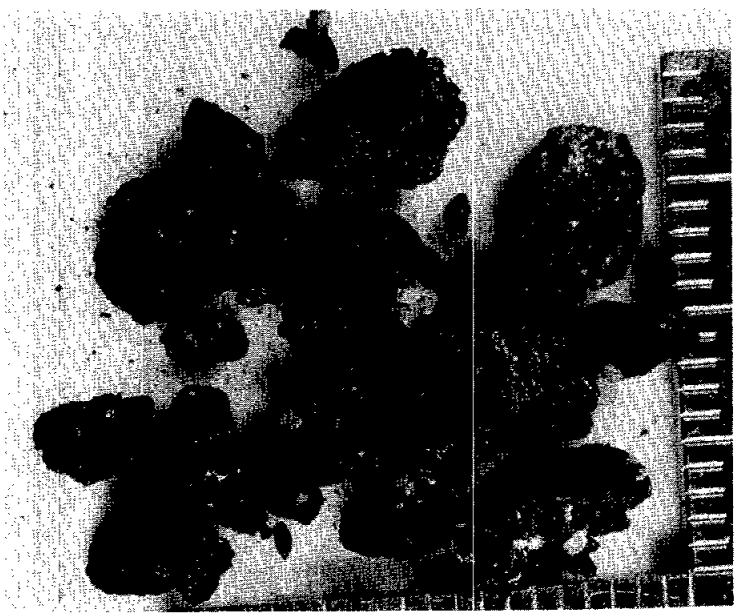
Coherence: Friable
Shape: Subrounded
Surface: Dirty and with glass splashes
Color: White
Mineralogy: 80% chalky white plagioclase, 20% light gray patches of plagioclase.
Remarks: Glass lined zap pits, glass splashes and many spall zones. This is a good particle for zap pit studies. Nearly saturated(?).
Photo Number: S-73-21960



76124,2

Soil Breccia
18 particles, 1.1 grams

Coherence: Friable
Shape: Irregular and rounded
Surface: Glass coated
Color: Gray
Mineralogy: 80% soil, 10% black glass (agglutinated), 10% white clasts
Photo Number: S-73-21961



76134,1

Basalt
1 particle, 0.11 grams

Coherence: Tough
Shape: Subrounded
Surface: 30% adhering dirt
Color: Light gray
Mineralogy: 50% plagioclase, 40% light brown pyroxene, 10% opaques
Remarks: This may be a clast out of a soil matrix breccia. Grain size 2 mm.
Photo Number: S-73-21969

76134,2

Basalt
1 particle, 0.11 grams

Coherence: Tough
Shape: Angular
Color: Dark gray
Mineralogy: Aphanitic
Remarks: Grain size 0.2 mm - appears to be rich in mafic minerals
Photo Number: S-73-21971

76134,3

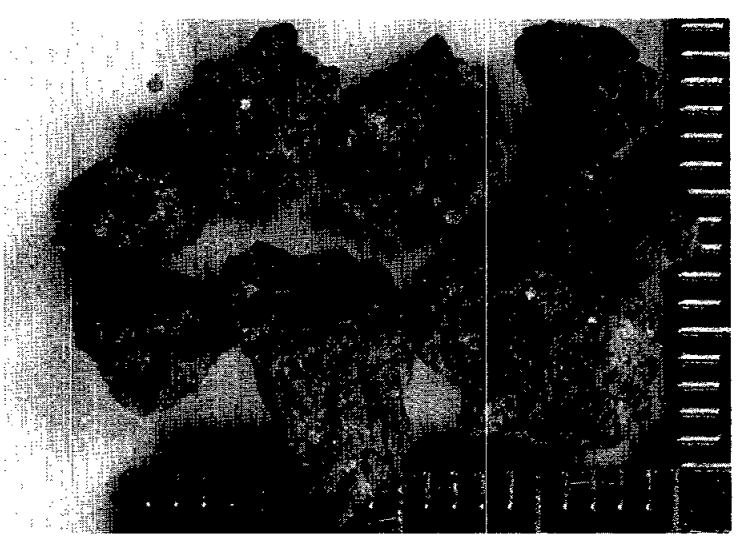
Breccia
3 particles, 1.37 grams

Coherence: Tough
Shape: Angular
Surface: One particle has thick coat of vesicular black glass on one side.
Color: Gray
Mineralogy: 80% gray matrix, 20% white clasts
Remarks: One blood red (∿0.5 mm) spinel grain. Similar to Van Serg breccia.
Photo Number: S-73-21972

76134,4

Vesicular Norite
8 particles, 1.42 grams

Coherence: Tough
Shape: Blocky to subrounded
Surface: Dirt in vesicles
Color: White
Mineralogy: 2% opaques, 60% plagioclase (light gray to chalky white), 38% light greenish yellow mineral (orthopyroxene?)
Remarks: Four of these eight have up to 40% vesicular cavities by volume. These are the most unusual particles, all very similar to each other. They must be reworked material because they have many vesicles as well as mottled appearance. Similar to 76135.
Photo Number: S-73-21970



76224,1

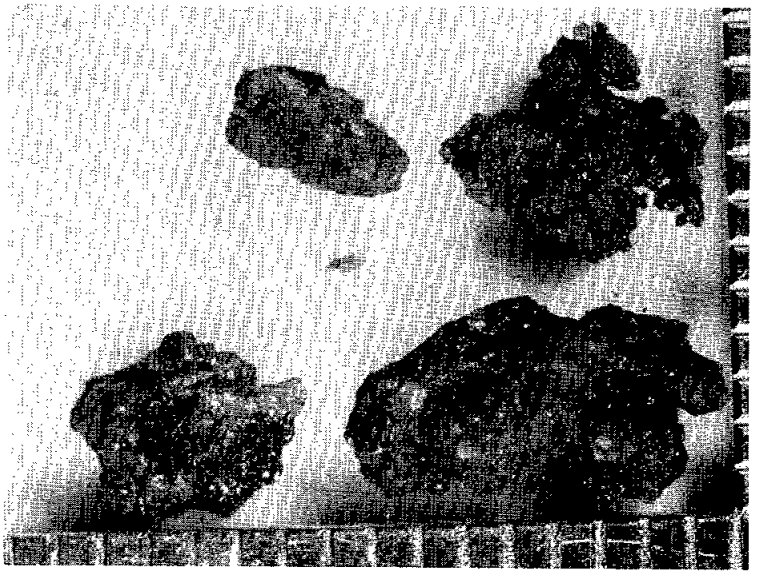
Soil Breccias
6 particles, 0.54 grams

Coherence: Friable
Shape: Rounded
Color: Gray
Mineralogy: Aphanitic matrix with white clasts
Remarks: Small black spheres visible in matrix
Photo Number: S-73-22625

76224,2

Agglutinate
4 particles, 0.25 grams

Coherence: Delicate
Shape: Irregular
Color: Dark gray
Mineralogy: 80% glass, 20% soil
Photo Number: S-73-22626



76224,3

Anorthosite
2 particles, 0.31 grams

Coherence: Tough
Shape: Angular
Color: White
Mineralogy: 90% plagioclase, 10% gray mineral
Remarks: Annealed texture
Photo Number: S-73-22627

76224,4

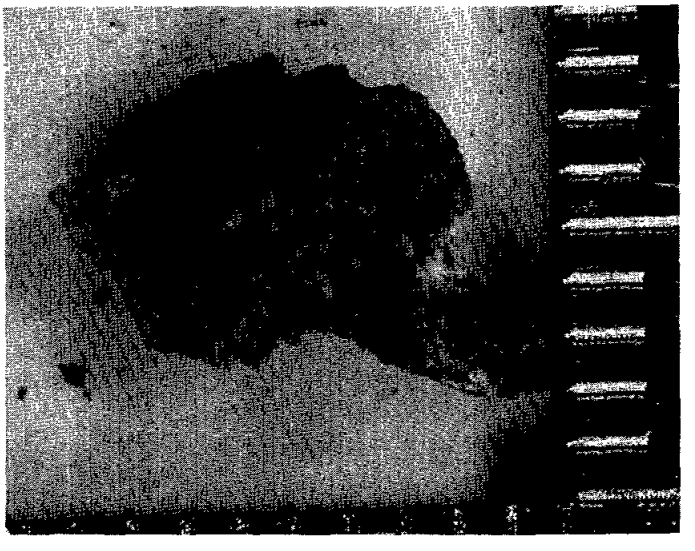
Feldspathic Basalt
5 particles, 0.53 grams

Coherence: Tough
Shape: Angular
Surface: Two particles have original surface with vuggy texture
Color: Tannish white
Mineralogy: 60% plagioclase, 30% gray mineral, 10% yellowish green mineral
Remarks: Grain size less than 0.5 mm. These may be metamorphic rocks.
Photo Number: S-73-22628

76224,5

Breccia
1 particle, 0.15 grams

Coherence: Fractured
Shape: Irregular, angular
Surface: Dirty
Color: Tannish white
Mineralogy: 80% plagioclase, 20% gray matrix
Photo Number: S-73-22629



76224,6

Feldspathic Breccia
5 particles, 1.45 grams

Coherence: Tough
Shape: Angular to subrounded
Color: Blue gray
Mineralogy: 80% plagioclase, 20% gray mineral, almost aphanitic
Remarks: Annealed texture, may be devitrified plagioclase glass.
Photo Number: S-73-22630

76244,1

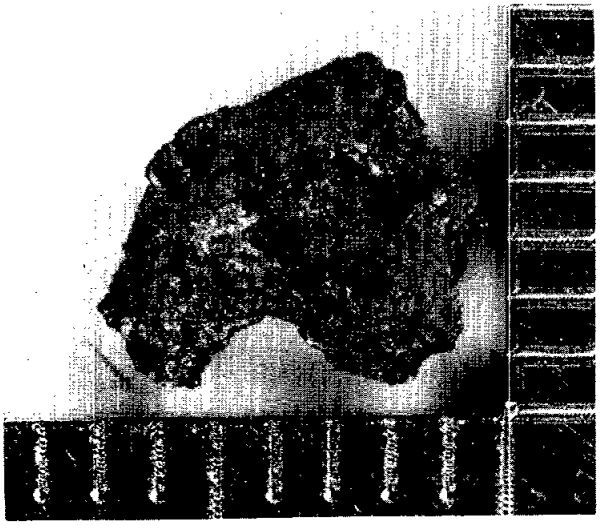
Feldspathic Basalt
4 particles, 1.38 grams

Coherence: Tough
Shape: Angular
Surface: Two particles have original surface on one side
Color: Tannish gray
Mineralogy: 60% plagioclase, 35% gray mineral (orthopyroxene?), 5% yellowish green mineral, 2% opaques.
Remarks: 10% vesicles (2 mm), 5% vugs (1 mm). Possible hornfelsic texture
Photo Number: S-73-22644

76244,2

Basalt
1 particle, 0.1 grams

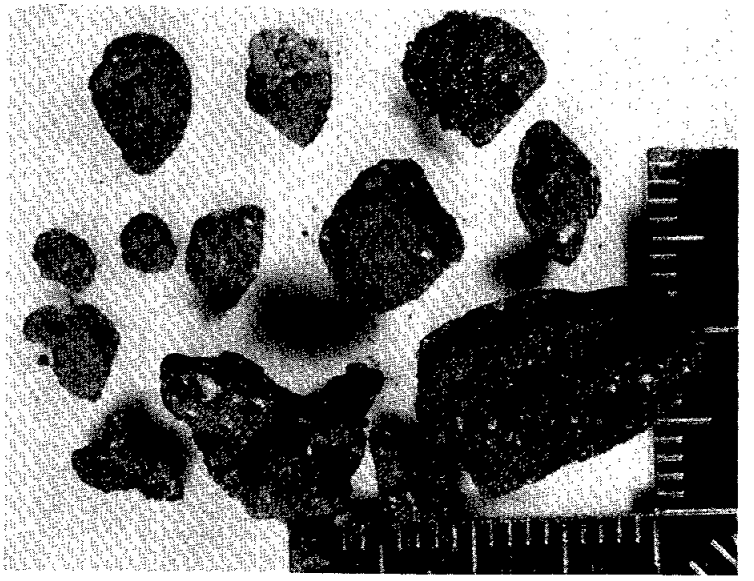
Coherence: Tough
Shape: Subrounded
Surface: Dirty
Color: Gray
Mineralogy: 45% plagioclase, 45% light brown pyroxene, 10% opaques
Remarks: Mare basalt
Photo Number: S-73-22645



76264,1

Soil Breccia
13 particles, 3.01 grams

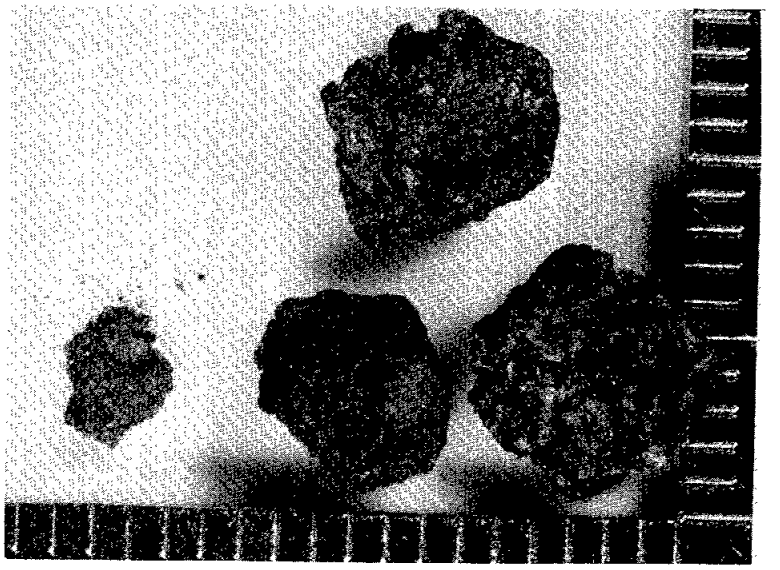
Coherence: Friable
Shape: Rounded and irregular
Surface: Three particles have glass coatings, such as agglutinates
Color: Light gray
Mineralogy: 90% aphanitic soil, 10% black glass
Photo Number: S-73-22632



76264,2

Basalt
4 particles, 0.64 grams

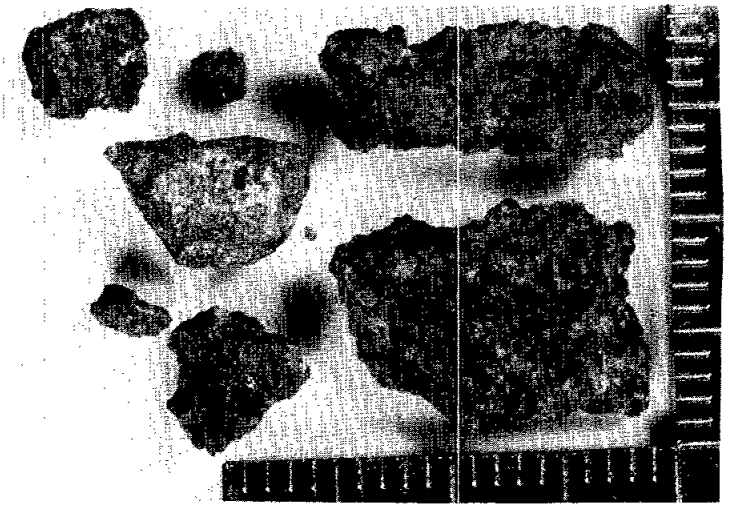
Coherence: Tough
Shape: Subrounded
Color: Gray
Mineralogy: 40% plagioclase, 40% light brown pyroxene, 15% opaques and 5% olivine
Remarks: Grain size 0.5 - 2 mm. The finer grain size particles appear to have more mafics.
Photo Number: S-73-22633



76264,3

Feldspathic Basalt
7 particles, 1.79 grams

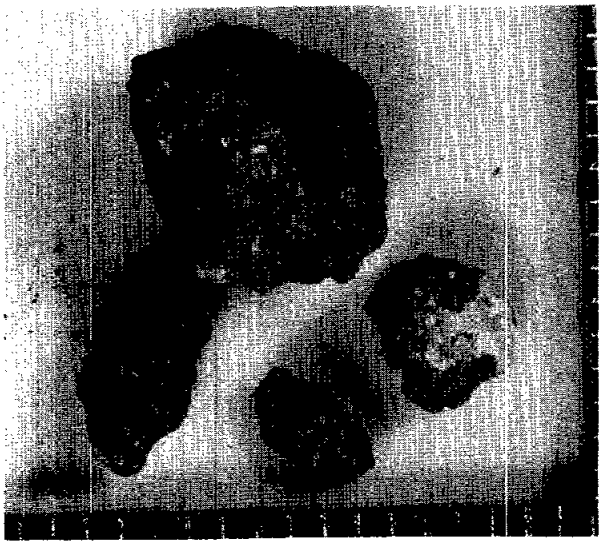
Coherence: Tough
Shape: Angular
Color: Tannish gray
Mineralogy: 60% plagioclase, 30% gray mineral (orthopyroxene?), 8% yellowish green and 2% opaques.
Remarks: 15% vugs and irregular vesicles with smooth walls. Possible hornfelsic texture.
Photo Number: S-73-22634



76264,4

Feldspathic Breccia
4 particles, 0.53 grams

Coherence: Friable
Shape: Subrounded
Color: Light gray
Mineralogy: 80% light gray matrix with both 10% white and 10% black clasts (0.5 mm)
Remarks: These were probably all one piece initially.
Photo Number: S-73-22635



76264,5

Anorthositic Breccia
12 particles, 2.14 grams

Coherence: Tough
Shape: Angular to rounded
Color: Blue gray to light gray
Mineralogy: 70-100% plagioclase, 30% gray mineral (orthopyroxene?)
Remarks: Annealed texture
Photo Number: S-73-22636

PRELIMINARY DESCRIPTION
Not yet dusted, photographed or subdivided

76284
10.69 grams

"3% black glass spheres, 6% light gray crystalline fragments, 3% pale green breccia, 85% dark gray breccias."

76324,1

Anorthosite
2 particles, 0.26 grams

Coherence: Tough
Shape: Angular
Color: White and gray
Mineralogy: 70% large white crystals of plagioclase attached to 30% gray annealed plagioclase mass on one side.
100% plagioclase, grain size approximately 4 mm, possibly single crystal. One small zap pit
Photo Number: S-73-21929

76324,2

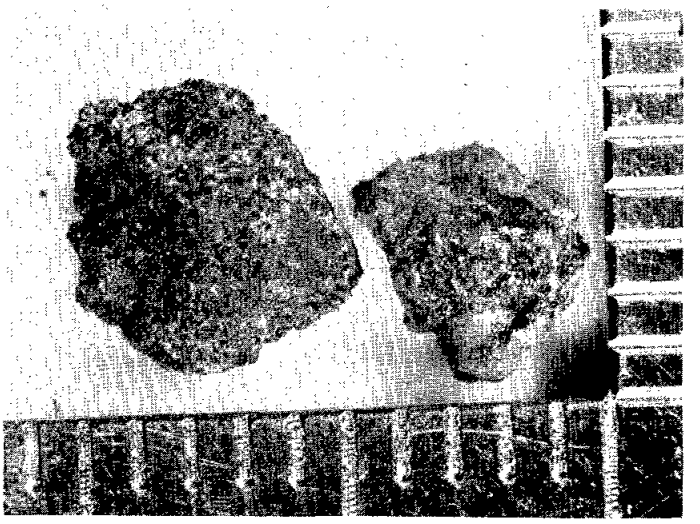
Soil Breccia
2 particles, 0.19 grams

Coherence: Soft and friable
Shape: Rounded
Surface: 30% glass venier
Color: Dark gray
Mineralogy: 70% aphanitic gray soil, 20% white plagioclase rich clasts
Photo Number: S-73-21923

76324,3

Basalt
2 particles, 0.17 grams

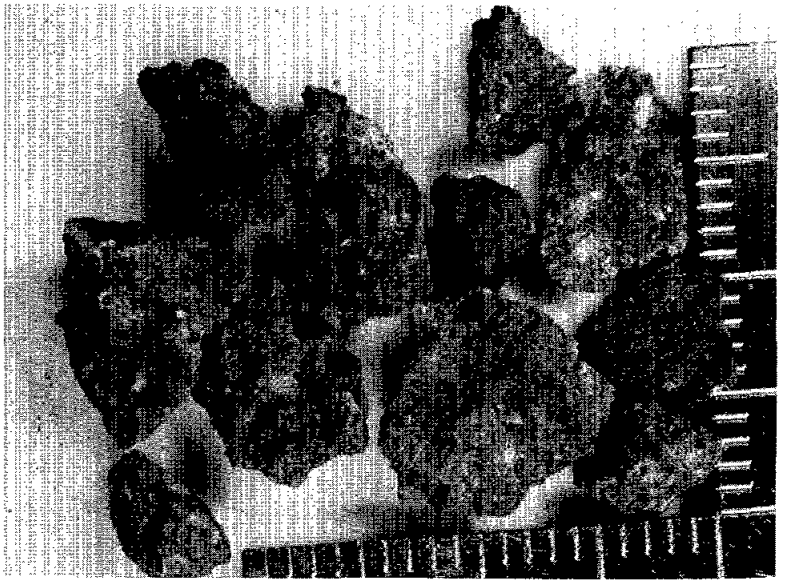
Coherence: Tough
Shape: Rounded
Color: Gray
Mineralogy: 45% plagioclase, 45% light brown pyroxene, 10% opaques.
Remarks: Grain size 0.5 mm (mare basalt)
Photo Number: S-73-21919



76324,4

Feldspathic Basalt
11 particles, 2.06 grams

Coherence: Tough
Shape: Angular
Color: White to light gray
Mineralogy: 70% plagioclase, 25% gray mineral (orthopyroxene?), 5% light yellow green mineral.
Remarks: Grain size (∿0.5 mm). Some of these may have hornfelsic texture. 5% vesicles.
Photo Number: S-73-21926



74114,1

Soil Breccia
~20 particles, 4.81 grams

Coherence: Very friable
Shape: Rounded
Surface: Dusty
Color: Gray
Mineralogy: Feldspar rich (?)
Photo Number: S-73-22238

74114,2

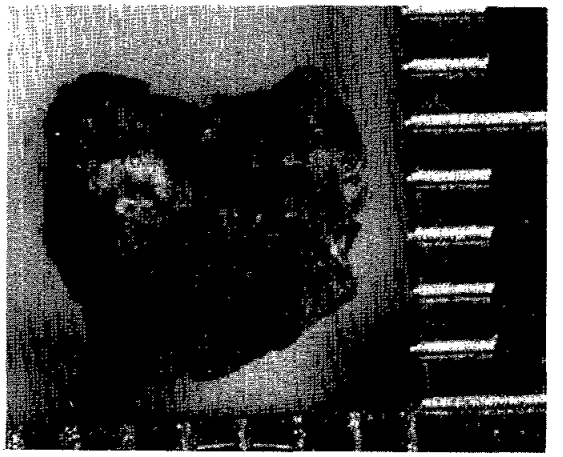
Breccias
10 particles, 2.17 grams

Coherence: Friable, just coherent
Shape: Rounded, subrounded
Surface: Dusty
Color: Gray, some with brown hue
Remarks: These include all more coherent fragments in original sample. All very dusty, but possibly include 1 anorthositic clast, 3 high grade fine-grained metaclastics, 3 slightly indurated microbreccias, and 3 soil clods with surface dimples which may be glass seams.
Photo Number: S-73-22239

74124,1

Breccia - Glass Coated
1 particle, 0.13 grams

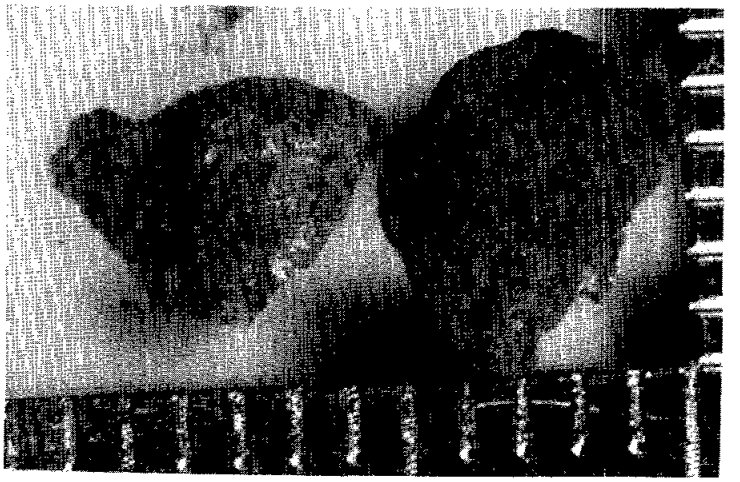
Coherence: Coherent
Shape: Irregular
Surface: Coating glass, dark vesicular
Color: Gray black glass
Mineralogy: Gray microbreccia, feldspar clasts dominant
Photo Number: S-73-22235



74124,2

Noritic Anorthosite
2 particles, 0.26 grams

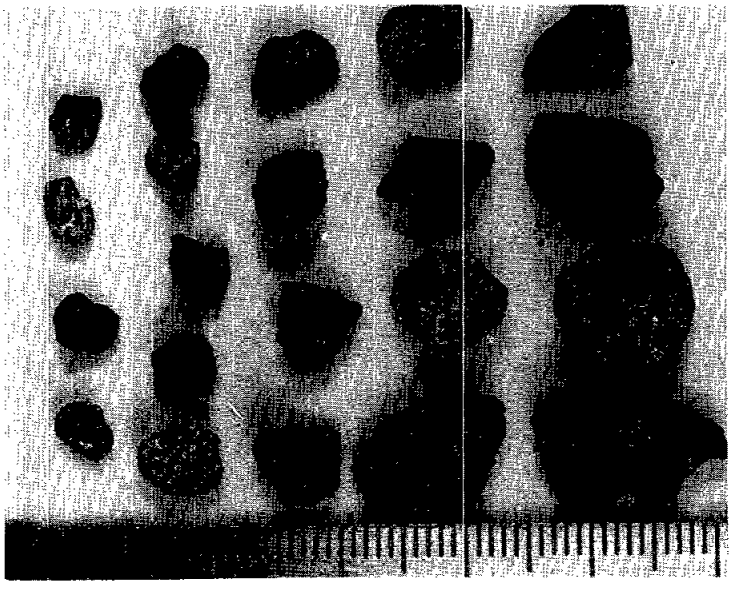
Coherence: Tough
Shape: Angular, rounded
Surface: Dusty
Color: Very pale gray, one has dark gray coating
Mineralogy: Plagioclase 70-50%, pyroxene 50-30%
Remarks: One fragment is coated with fine-grained metaclastic or devitrified glass with many small plagioclase crystals.
Photo Number: S-73-22236



74244,1

Basalt
21 particles, 7.360 grams

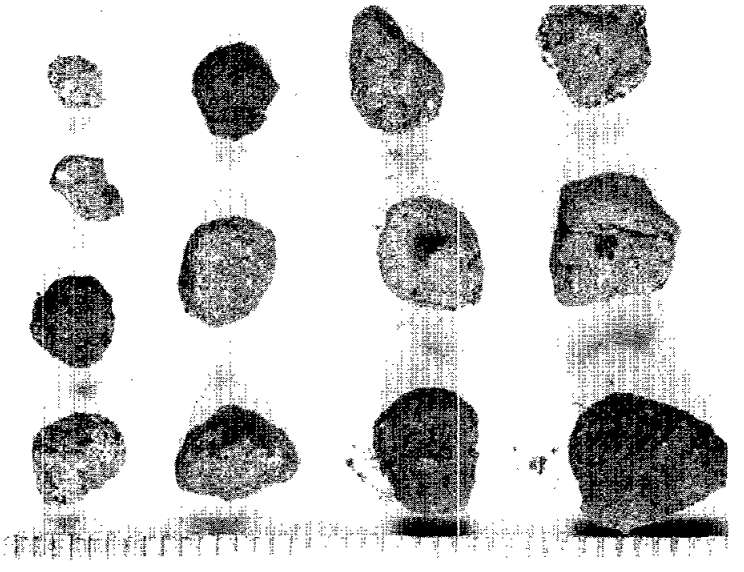
Coherence: 5 friable, 16 tough
Shape: Angular to subangular
Surface: Dirt adhering to surface of all grains
Color: Light gray
Mineralogy: 45% plagioclase, 45% pyroxene, 5-20% ilmenite
Remarks: Few (75%) vugs. Grain size variable (0.2 - 2mm), these basalts also vary in ilmenite content.
Photo Number: S-73-19391



74244,2

Soil Breccia
13 particles, 2.061 grams

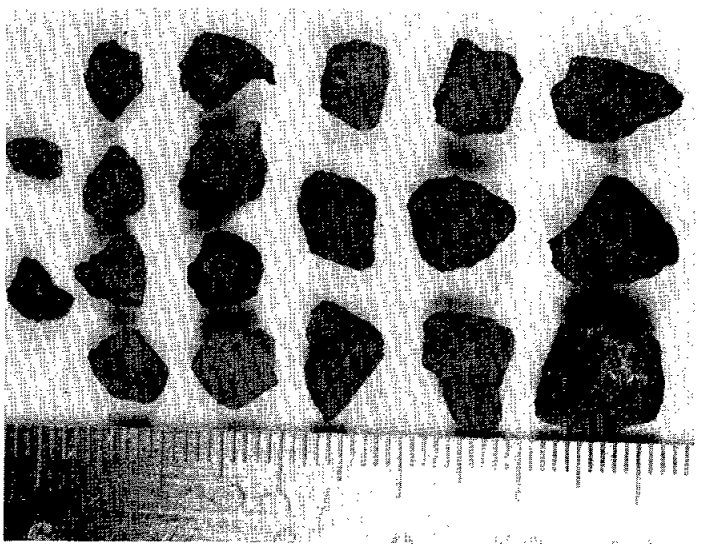
Coherence: Friable
Shape: Rounded
Color: Light gray
Mineralogy: Clasts of plagioclase, pyroxene, and glass - no orange glass visible.
Remarks: One particle is half basalt clast
Photo Number: S-73-19392



74244,3

Basalt
19 particles, 6.735 grams

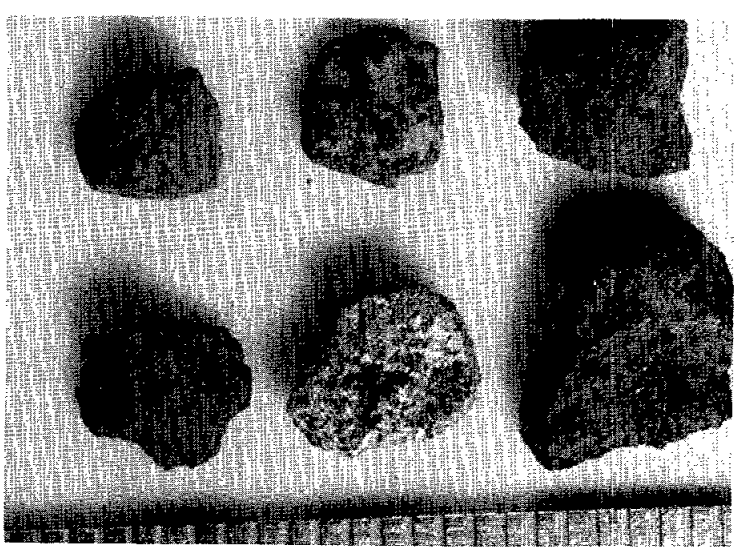
Coherence: Tough
Shape: Subrounded
Surface: Welded dust coatings
Color: Gray
Mineralogy: Aphanitic
Remarks: Some of these may be glass matrix breccias.
Photo Number: S-73-19393



74244,4

Glass Matrix Breccias
6 particles, 1.083 grams

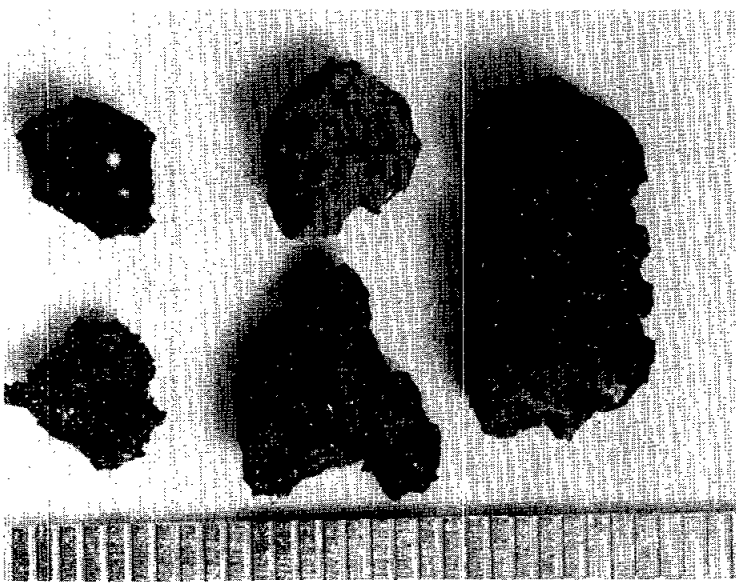
Coherence: Tough
Shape: Subangular
Surface: Welded dust coat
Color: Gray
Remarks: One fragment has half of a basalt fragment
Photo Number: S-73-19394



74244,5

Glass, Vesicular
5 particles, 1.289 grams

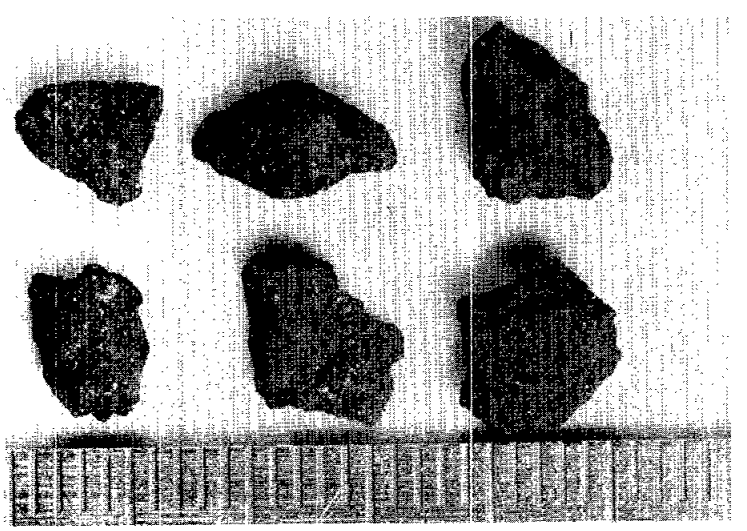
Coherence: Tough
Shape: Angular
Surface: Freshly broken
Color: Black
Remarks: Vesicles (50%) ranging in size from 0.1 mm - 3 mm.
One particle has feldspar-rich glass.
Photo Number: S-73-19395



74244,6

Basalt
6 particles, 1.180 grams

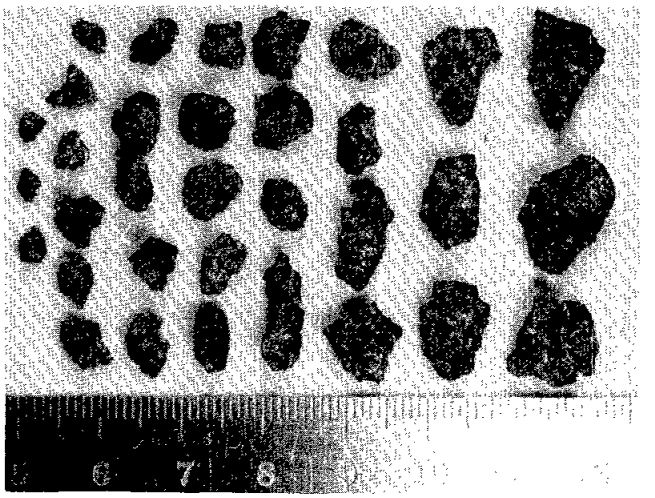
Coherence: Tough
Shape: Angular
Color: Dark gray
Mineralogy: Aphanitic except for 10% olivine phenocrysts (2 mm)
Photo Number: S-73-19396



75064,1

Basalt
33 particles, 10.765 grams

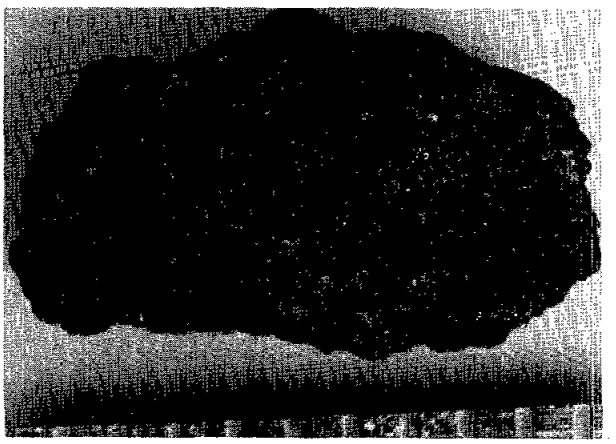
Coherence: Coherent
Shape: Angular to subrounded
Surface: Coarsely granular; small irregular cavities are common but do not have euhedral crystals inside them. Exterior surfaces smoother than freshly fractured ones, and darkened by thin coat of dust. No glass crysts on zap pits observed.
Color: Pale reddish brown.
Mineralogy: Plagioclase (white) ∿35%; pyroxene (cinnamon) 45-50%; opaque (lustrous black) 15-20%.
Remarks: Plagioclase occurs in laths up to 3 mm long; pyroxene and opaques (probably ilmenite) fill interstices and also tend to occur together in clumps, forming a glomeroporphyritic texture. Grain size 1-2 mm.
Photo Number: S-73-19398



75064,2

Basalt
1 particle, 0.323 grams

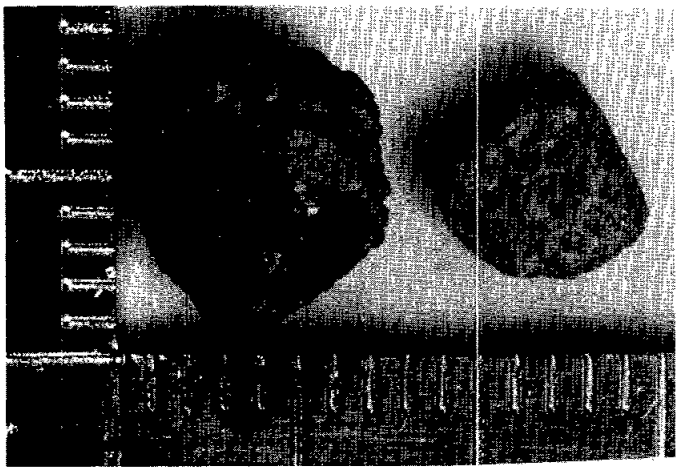
Coherence: Friable to coherent; penetrative fractures could easily cause spalling of small chips.
Shape: Subangular, slabby
Surface: A few zap pits.
Color: Dark gray
Mineralogy: Very fine-grained rock rich in reddish-brown pyroxene and ilmenite. Plagioclase present but inconspicuous; mode impossible to judge but appears ilmenite-rich. Sparse olivine grains are coarser than average grain-size of groundmass. Surface reflections suggest presence of needles and microporphyritic texture, but this is uncertain.
Photo Number: S-73-19399



75084,1

Annealed Plagioclase-Rich Breccias
2 particles, 0.503 grams

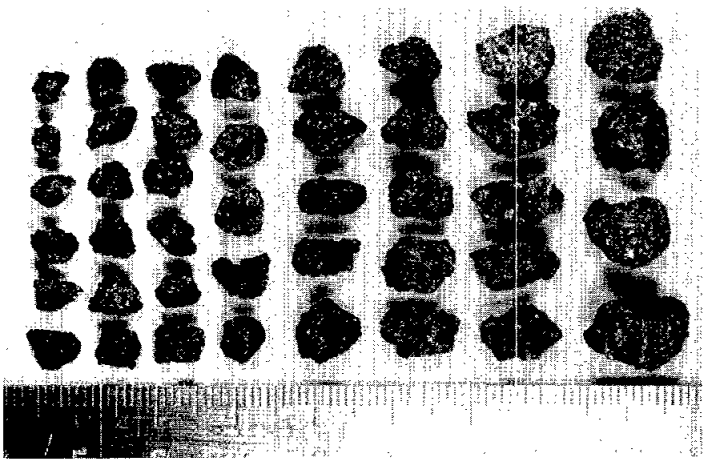
Coherence: Tough
Shape: Rounded
Color: White
Mineralogy: 95% plagioclase, 5% gray mineral (orthopyroxene?)
Remarks: One side of one particle has 5% broken glass.
Photo Number: S-73-19453



75084,2

Basalt
42 particles, 13.141 grams

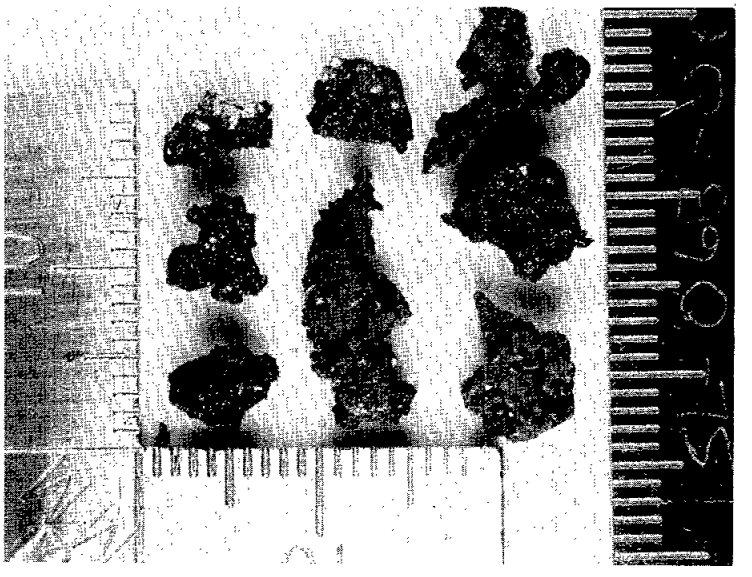
Coherence: Tough
Shape: Angular
Surface: Fresh
Color: Gray
Mineralogy: 45% plagioclase, 45% brown pyroxene, 10% opaques.
Remarks: Very few vugs. All these are very similar to one another. Average grain size 1-2 mm.
Photo Number: S-73-19452



75084,3

Agglutinates
8 particles, 0.960 grams

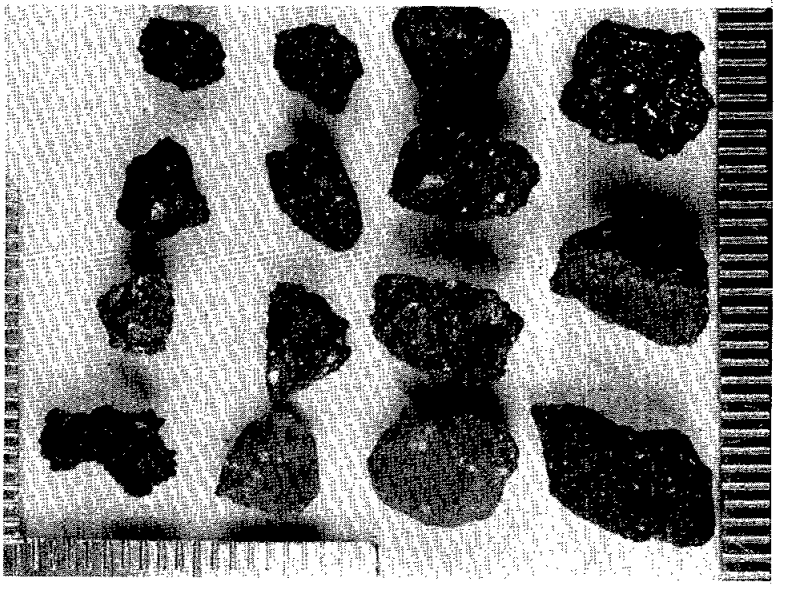
Coherence: Delicate
Shape: Irregular
Color: Shiny black glass, dull black breccia
Mineralogy: 50% glass, 50% soil breccia
Photo Number: S-73-19451



75084,4

Breccia
15 particles, 2.552 grams

Coherence: Friable to tough
Shape: Subangular, some irregular
Color: Gray
Mineralogy: Clasts of white in dark gray matrix
Remarks: A few particles have black vesicular glass attached to one side. Nine out of 15 of these have black matrix similar to Van Serg breccia. Six out of 15 are soil matrix breccias.
Photo Number: S-73-19450



75084,5

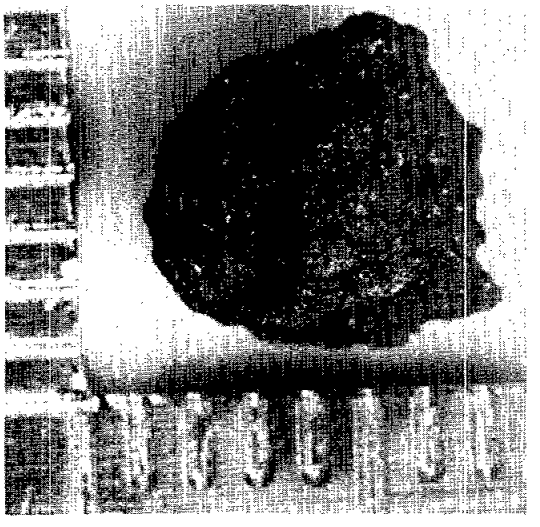
Basalt
12 particles, 4.243 grams

Coherence: Tough
Shape: Angular to subrounded
Color: Gray
Mineralogy: Aphanitic - some are approximately 45% plagioclase, 45% pyroxene, 10% orthopyroxene.
Remarks: Two particles coated by welded dust and glass.
Photo Number: S-73-19449

75084,6

Basalt

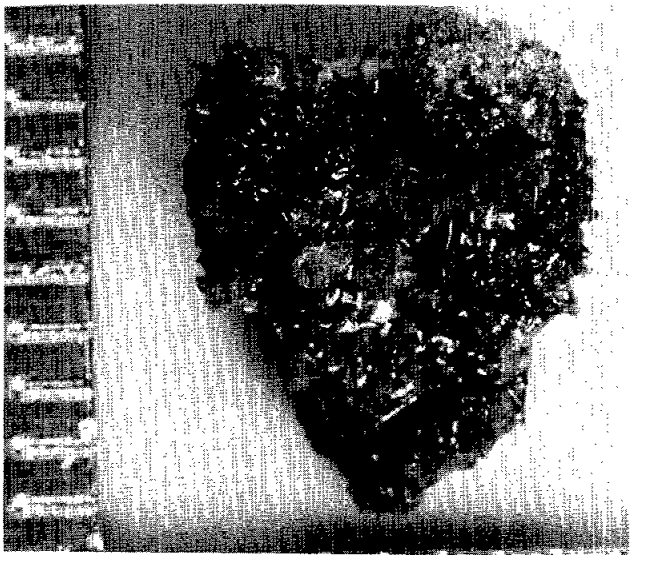
Coherence: Tough
Shape: Angular
Surface: Fresh
Color: Black, sometimes shiny
Mineralogy: Aphanitic, possibly ilmenite rich
Remarks: Not similar to other basalts of this soil.
Photo Number: S-73-19448



75084,7

Basalt
1 particle, 0.315 grams

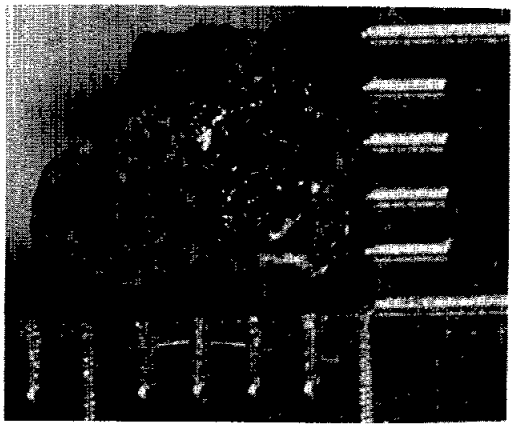
Coherence: Fragile
Shape: Angular
Surface: Glass coated
Color: White and green
Mineralogy: Chalky plagioclase coated with multicolored glass.
Remarks: One side is coated with green, brown, and clear glass which appears to be melted minerals of this fragment.
Photo Number: S-73-19447



75114,1

Breccia
1 particle, 0.11 grams

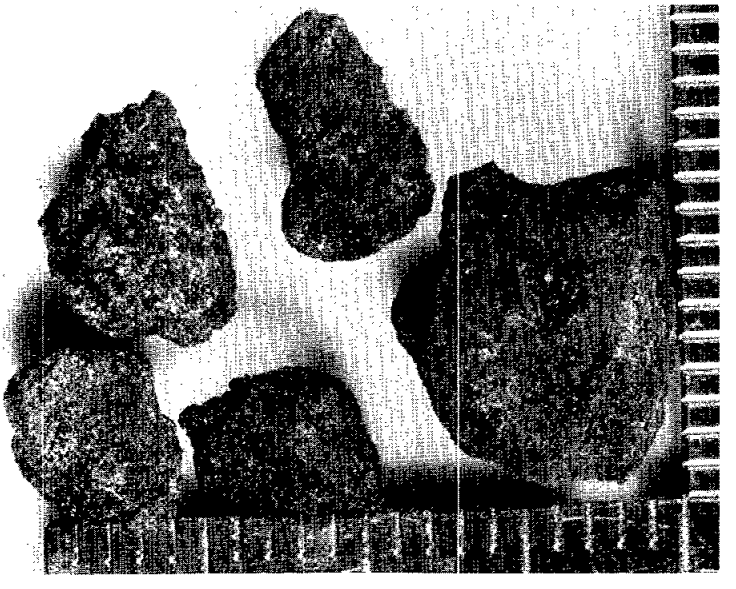
Coherence: Friable
Shape: Irregular, marbled
Surface: Half glass coated
Color: Black and white
Mineralogy: 50% gray matrix breccia with white clasts, 50% black glass.
Remarks: 1 mm vesicles in gray matrix
Photo Number: S-73-21963



75114,2

Basalt
5 particles, 1.75 grams

Coherence: Tough
Shape: Angular
Surface: Freshly broken
Color: Light gray
Mineralogy: 45% white plagioclase, 45% light brown pyroxene, 10% opaque
Remarks: 5% vesicles. Grain size 0.5-1 mm.
Photo Number: S-73-21964



75114,3

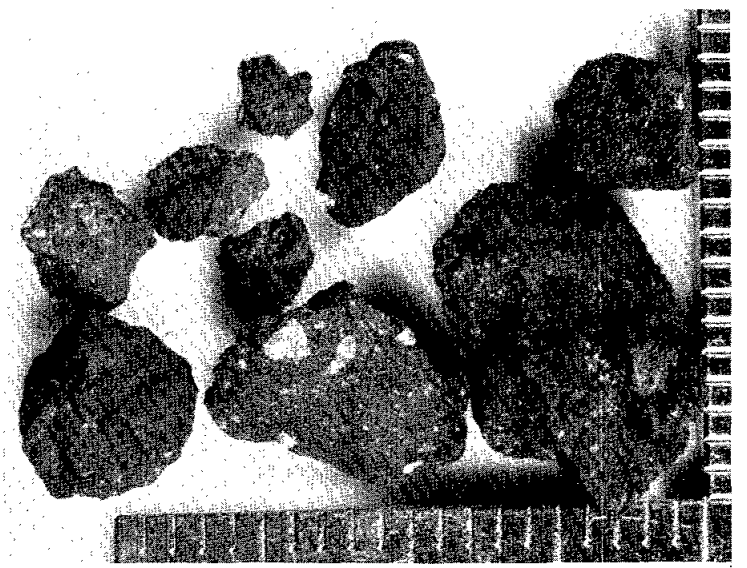
Basalt
6 particles, 1.78 grams

Coherence: Tough
Shape: Angular
Color: Dark gray
Mineralogy: 30% plagioclase, 50% pyroxene, 20% opaque
Remarks: 5% vugs. Grain size 0.2 - 0.5 mm. The finer grain size appears more mafic.
Photo Number: S-73-21965

75114,4

Breccia
9 particles, 1.43 grams

Coherence: Tough
Shape: Angular to subrounded
Surface: 5% thin glass veins
Color: Gray
Mineralogy: 70% aphanitic gray matrix, 30% white clasts of plagioclase-rich rock types.
Photo Number: S-73-21966



75114,5

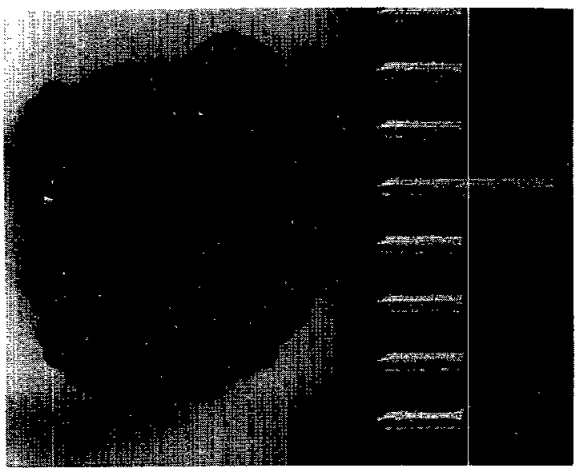
Basalt
7 particles, 1.69 grams

Coherence: Tough
Shape: Angular
Surface: 20% dirt coated, 20% smooth
Color: Shiny and dull black
Mineralogy: Aphanitic
Remarks: Vague texture indicating long needles of some opaque mineral. Devitrified black glass. These may be pieces of the dark mantle, but they are gradational to the basaltic rocks of group 3.
Photo Number: S-73-21967

76034,1

Basalt
1 particle, 0.1 grams

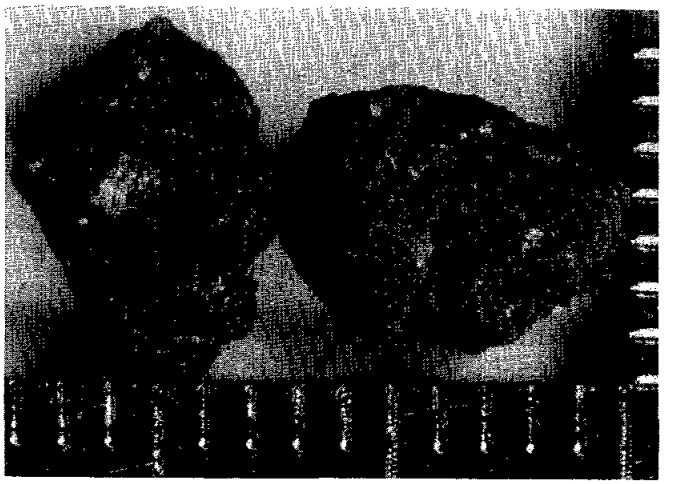
Coherence: Tough
Shape: Subrounded
Color: Light gray
Mineralogy: 20% opaque, 40% plagioclase, 40% light brown pyroxene
Remarks: 5% vugs. Grain size 0.5 mm.
Photo Number: S-73-21917



76034,2

Soil Breccia
2 particles, 0.33 grams

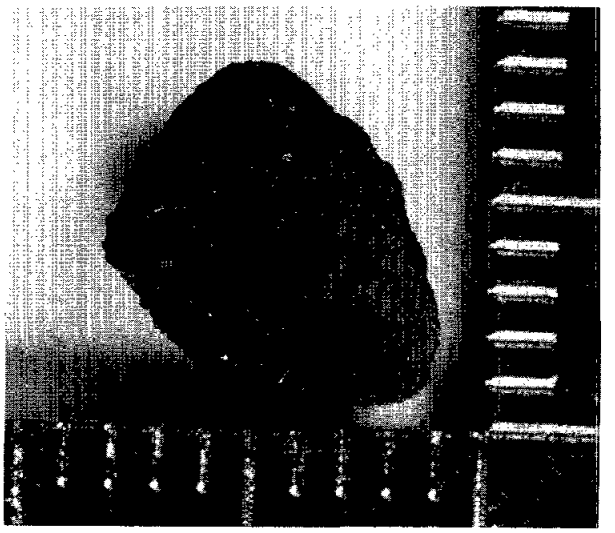
Coherence: Friable
Shape: Rounded
Color: Light gray
Mineralogy: 90% aphanitic matrix, 10% white clasts
Photo Number: S-73-21914



76034,3

Basalt
1 particle, 0.43 grams

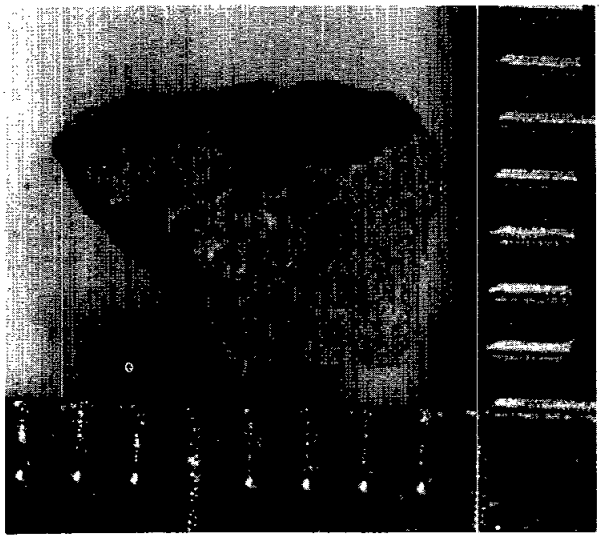
Coherence: Tough
Shape: Rounded
Surface: Dirty
Color: Dark gray
Mineralogy: Aphanitic
Photo Number: S-73-21930



76034,4

Norite?
1 particle, 0.15 grams

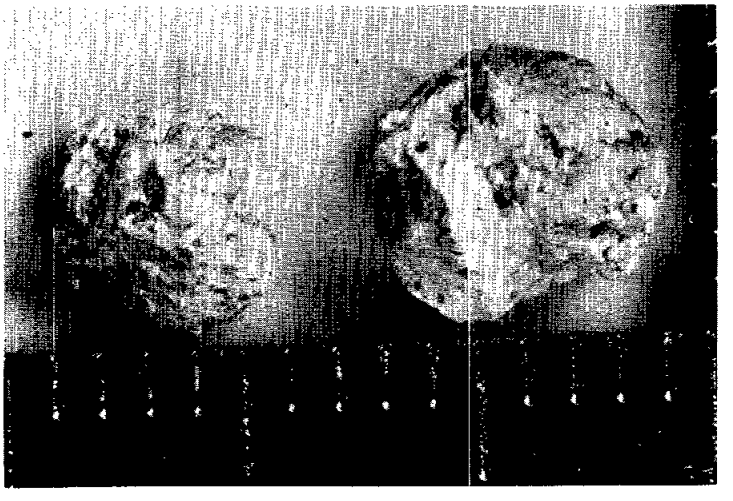
Coherence: Tough
Shape: Subrounded
Color: White
Mineralogy: 5% opaque, 70% white plagioclase, 35% gray pyroxene (orthopyroxene?)
Remarks: Annealed texture, such as hornfelsic. Grain size less than 0.5 mm.
Photo Number: S-73-21924



76034,5

Anorthosite
2 particles, 0.23 grams

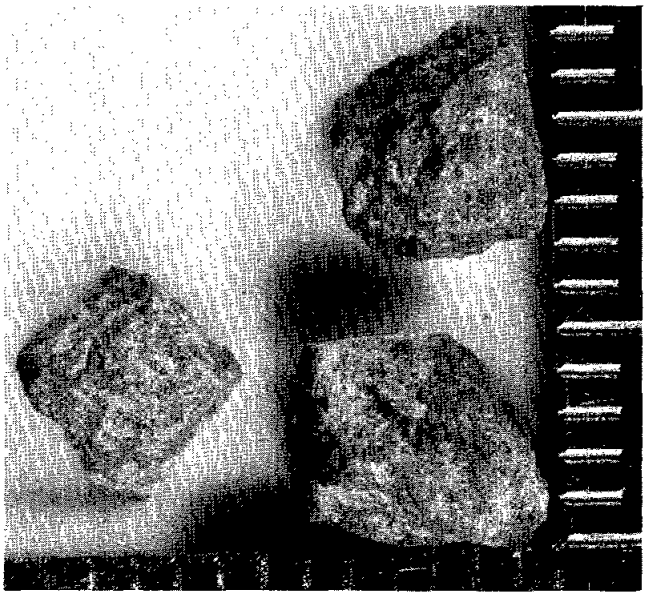
Coherence: Tough
Shape: Angular
Color: White
Mineralogy: 100% chalky white plagioclase
Remarks: Single crystals, but badly shocked
Photo Number: S-73-21920



76034,6

Anorthosite
3 particles, 0.43 grams

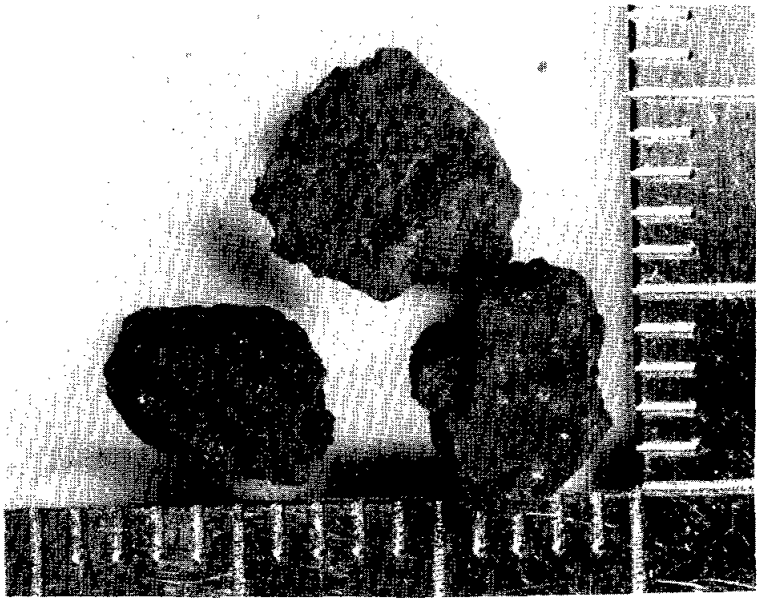
Coherence: Tough
Shape: Subrounded
Surface: Coated with whitish dust
Color: Light gray
Mineralogy: 100% plagioclase, possibly some pyroxene mineral
Remarks: Annealed texture
Photo Number: S-73-21927



76324,5

Basalt
3 particles, 0.44 grams

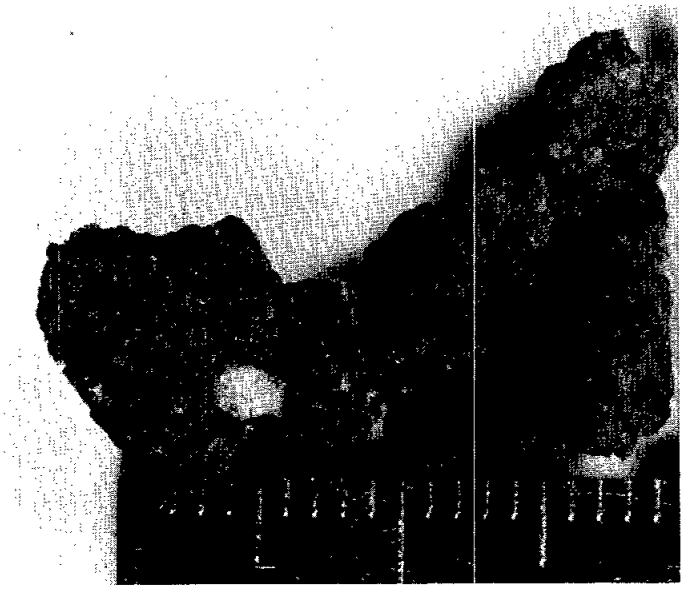
Coherence: Tough
Shape: Subrounded
Surface: Zap pits
Color: Dark gray
Mineralogy: Aphanitic, mafic rich
Remarks: These could be devitrified glass
Photo Number: S-73-21918



76324,6

Plagioclase Rich Breccia
2 particles, 1.81 grams

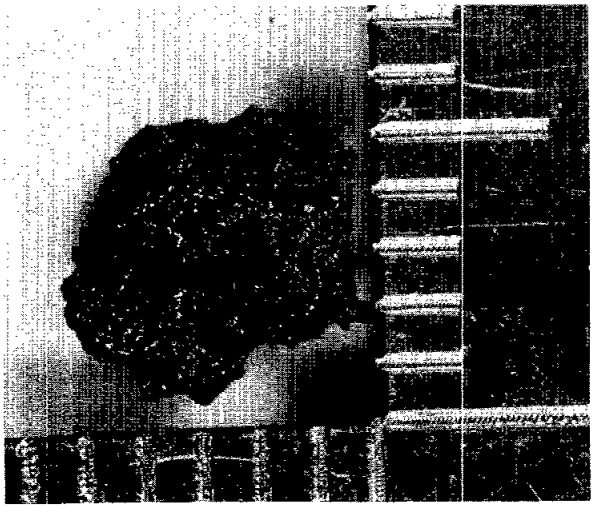
Coherence: Tough
Shape: Angular
Surface: 20% dirt coated
Color: Light tan
Mineralogy: 70% plagioclase, 25% gray mineral, 5% light brown
Remarks: Clasts of plagioclase
Photo Number: S-73-21922



76324,7

Glass
1 particle, 0.08 grams

Coherence: Delicate
Shape: Rounded
Surface: Glass coated
Color: Black
Mineralogy: 90% glass, 10% plagioclase
Photo Number: S-73-21912



76324,8

Anorthositic Breccia
9 particles, 1.29 grams

Coherence: Tough
Shape: Angular to subrounded
Color: Light gray
Mineralogy: 70% plagioclase, 30% gray mineral or glass
Remarks: Annealed texture
Photo Number: S-73-21921

76324,9

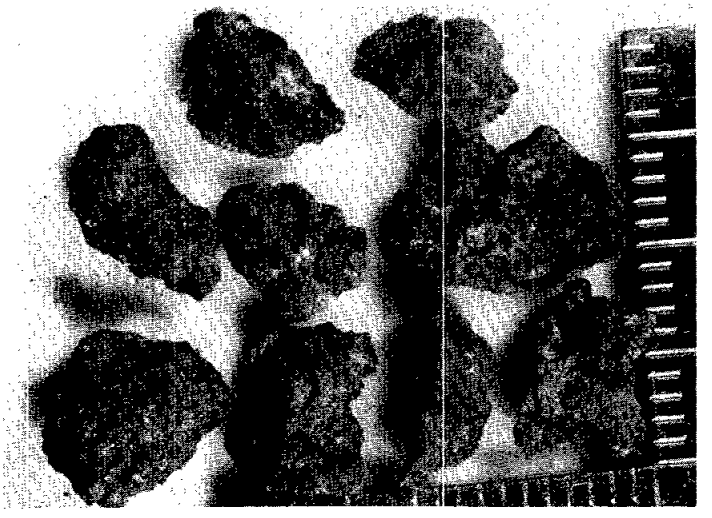
Feldspathic Breccia
22 particles, 3.13 grams

Coherence: Tough
Shape: Subrounded to angular
Color: Blue gray to gray
Mineralogy: 70% plagioclase, 30% blue gray mineral or glass
Remarks: Annealed texture
Photo Number: S-73-21915

76324,10

Feldspathic Breccia
9 particles, 1.93 grams

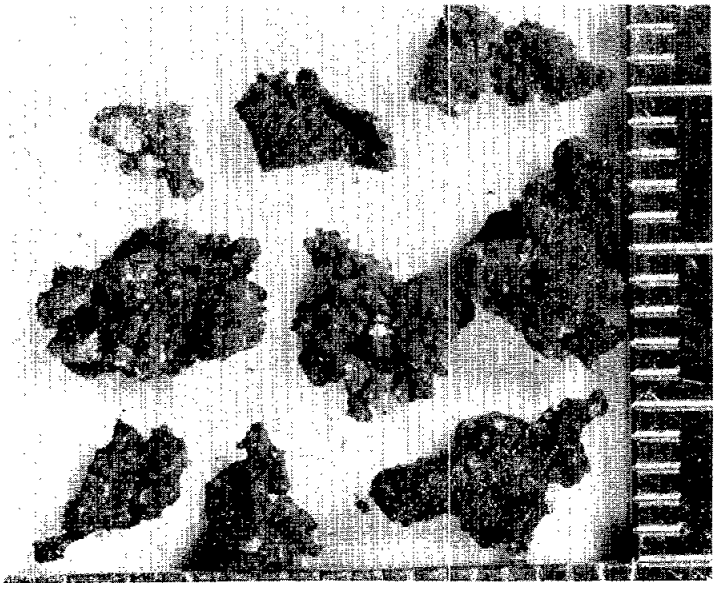
Coherence: Somewhat friable
Shape: Angular to subrounded
Color: Light tan
Mineralogy: 70% plagioclase, 25% light gray mineral (orthopyroxene?), 5% brown mineral
Remarks: Not annealed - grain boundaries still visible
Photo Number: S-73-21925



76504,1

Agglutinate
9 particles, 0.36 grams

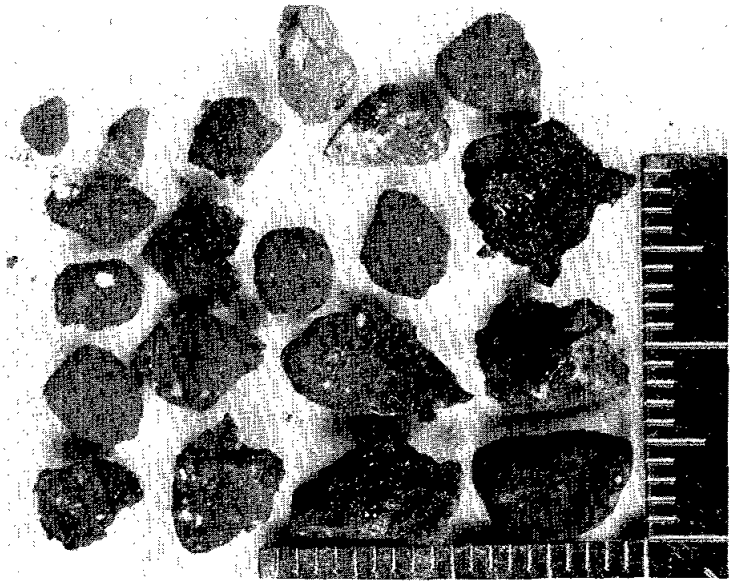
Coherence: Delicate
Shape: Irregular
Color: Black
Mineralogy: 80% glass, 20% soil particles
Photo Number: S-73-22615



76504,2

Soil Breccias
18 particles, 2.02 grams

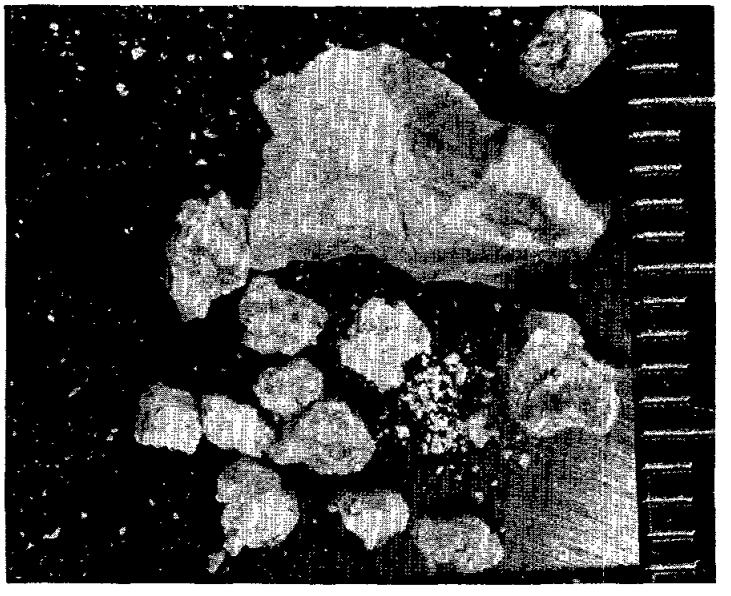
Coherence: Friable
Shape: Rounded and irregular
Surface: Half of these particles are glass coated with glass similar to that of agglutinates.
Color: Dark gray
Mineralogy: 80% soil, 20% glass
Remarks: Similar to 76506
Photo Number: S-73-22616



76504,3

Anorthosite
8 particles, 0.37 grams

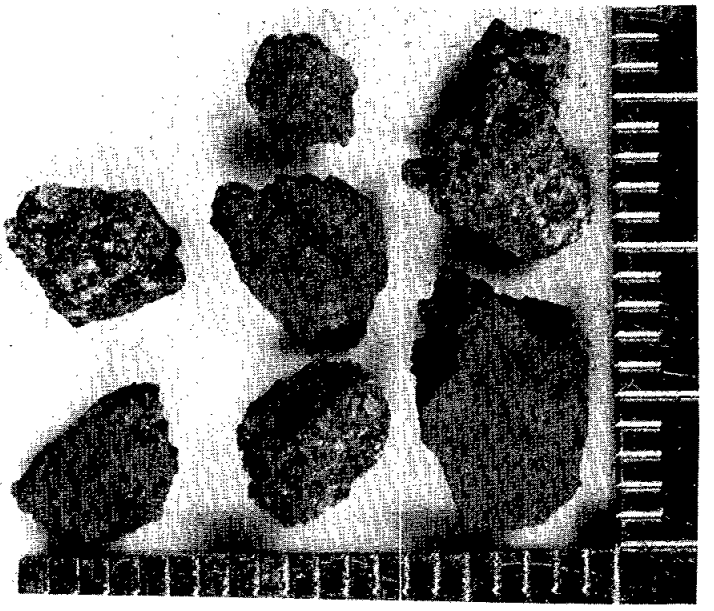
Coherence: Soft
Shape: Angular
Color: Chalky white
Mineralogy: 100% plagioclase
Remarks; Highly shocked
Photo Number: S-73-22617



76504,4

Basalt
7 particles, 1.17 grams

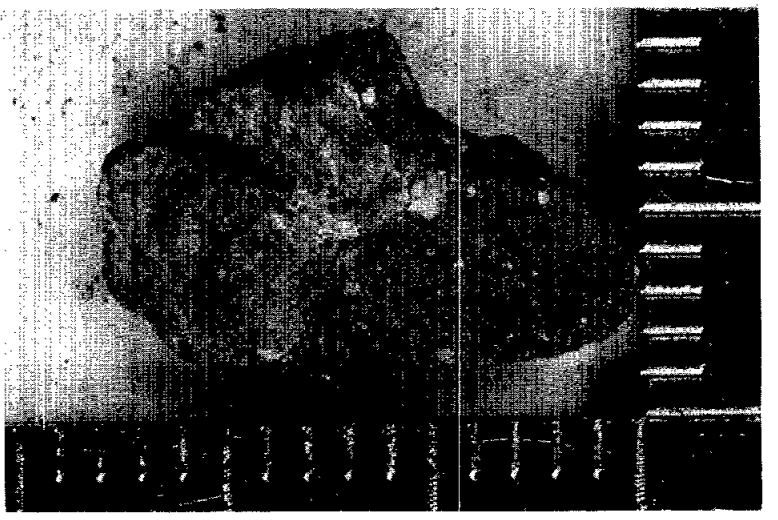
Coherence: Tough
Shape: Subrounded
Surface: Dirty
Color: Gray
Mineralogy: 45% plagioclase, 45% light brown pyroxene, 10% opaque
Remarks: Mottled, possibly clasts from breccias
Photo Number: S-73-22618



76504,5

Soil Breccia with Anorthositic Clast
1 particle, 0.42 grams

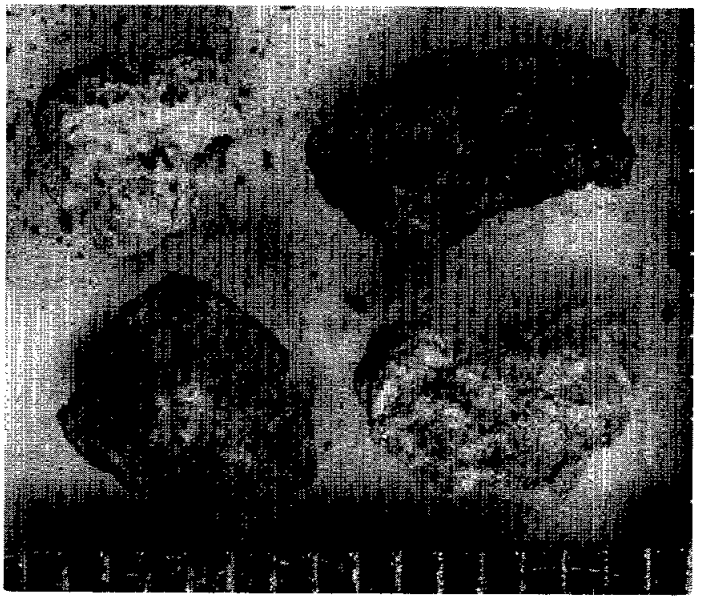
Coherence: Friable
Shape: Angular
Color: Gray
Mineralogy: 50% anorthositic breccia as clast in soil matrix
Remarks: Clast is all plagioclase, annealed texture
Photo Number: S-73-22619



76504,6

Feldspathic Breccia
4 particles, 0.59 grams

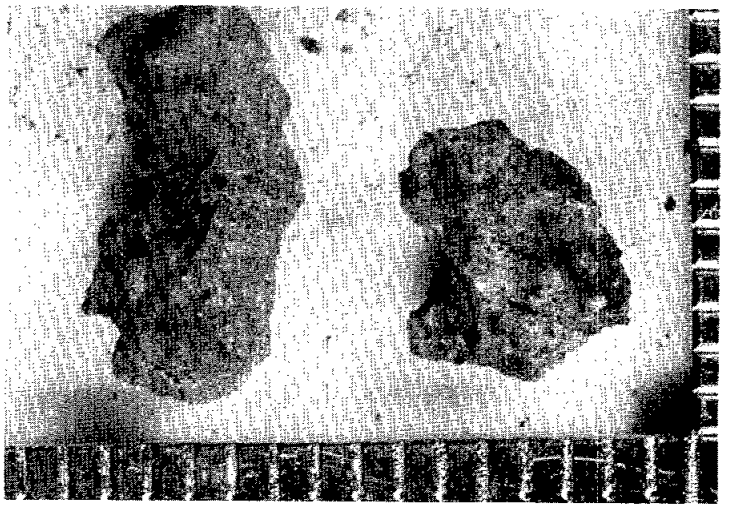
Coherence: Friable
Shape: Angular to subrounded
Color: White
Mineralogy: 80% plagioclase, 10% gray mineral, 10% yellow green mineral.
Remarks: Each particle is somewhat different texture
Photo Number: S-73-22620



76504,7

Feldspathic Breccia
2 particles, 0.39 grams

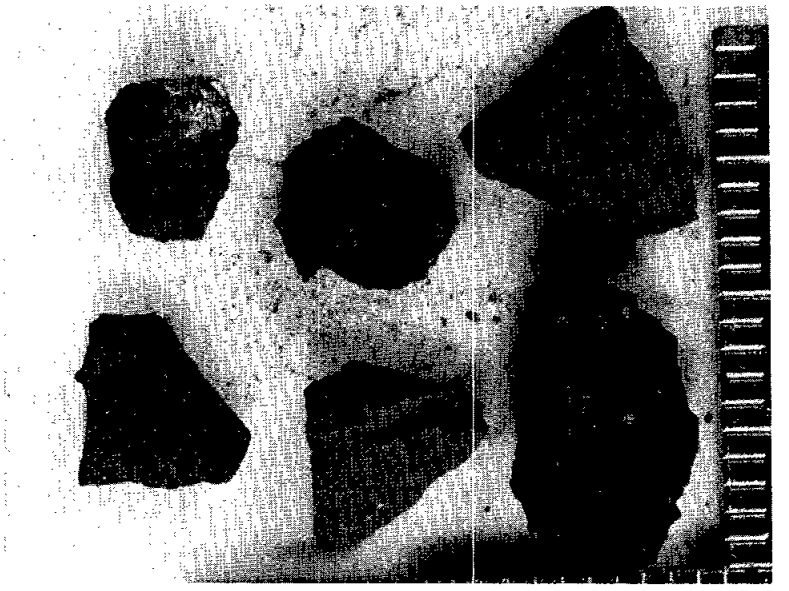
Coherence: Tough
Shape: Angular
Surface: Dirty
Color: Tannish white
Mineralogy: 60% plagioclase, 30% gray mineral (orthopyroxene), 10% yellow green mineral
Remarks: Grain size is 0.5 mm. Possible hornfelsic texture. 5% vesicles.
Photo Number: S-73-22621



76504,8

Breccia
6 particles, 1.75 grams

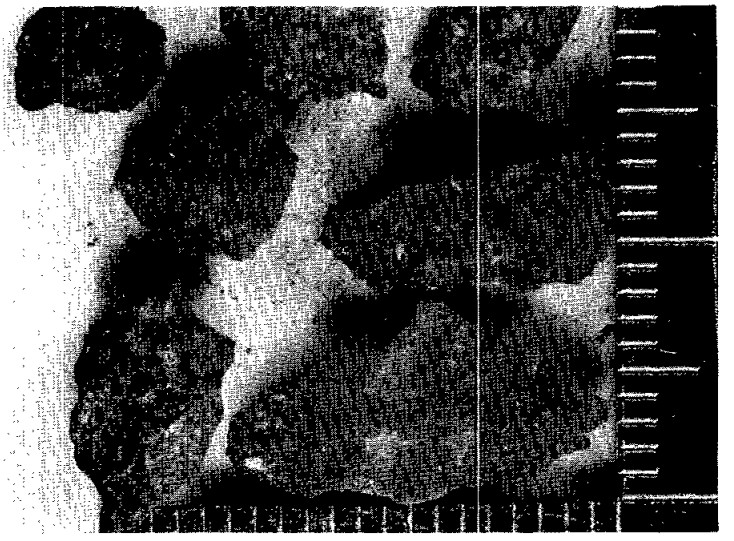
Coherence: Tough
Shape: Subangular
Surface: Dirty
Color: Dark gray to blue gray
Mineralogy: 80% plagioclase, 20% glass
Remarks: Annealed texture
Photo Number: S-73-22622



76504,9

Feldspathic Breccia
7 particles, 1.95 grams

Coherence: Tough
Shape: Subrounded to angular
Surface: Dirty
Color: Tannish white
Mineralogy: 80% plagioclase, 20% gray mineral or glass
Remarks: Each particle different from the other. Some have highly annealed texture
Photo Number: S-73-22623



77514,1

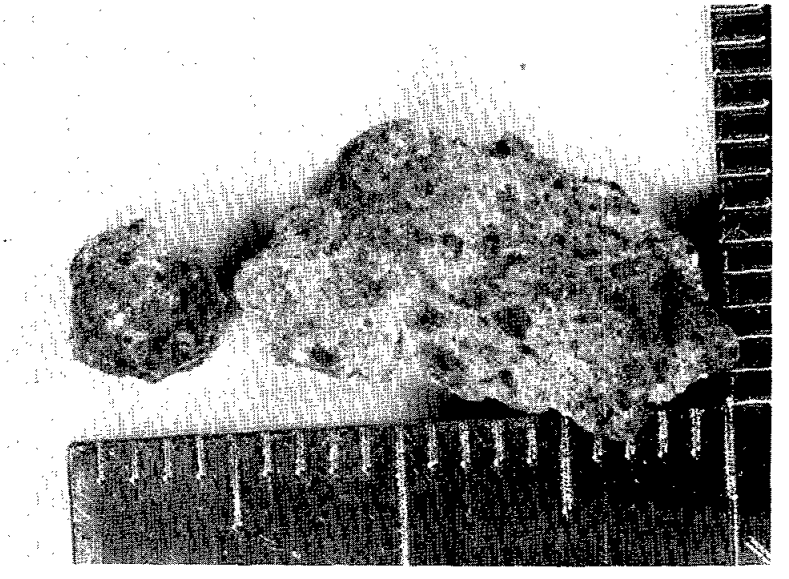
Breccia
1 particle, 0.55 grams

Coherence: Friable
Shape: Rounded
Surface: Little droplets of black glass on all sides ∿10% surface
Color: Dark gray
Mineralogy: 10% clasts (white) in dark aphanitic matrix
Photo Number: S-73-22592

77514,2

Feldspathic Breccia
2 particles, 0.65 grams

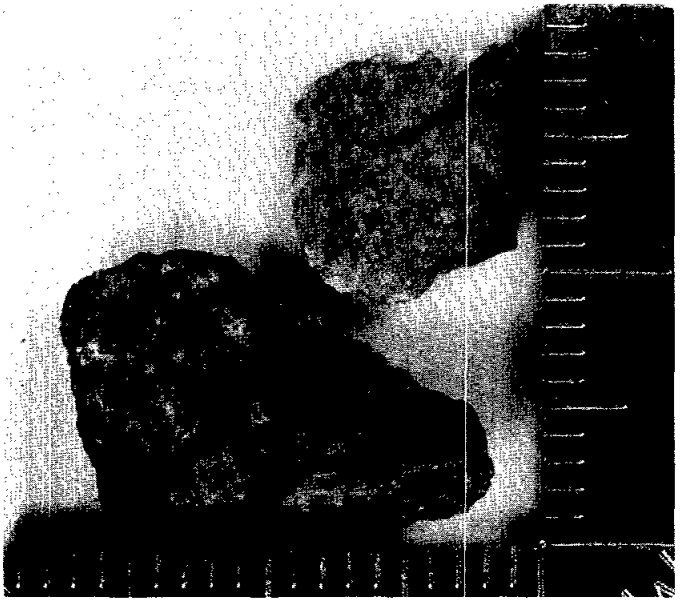
Coherence: Tough
Shape: Angular to subrounded
Surface: One side original surface (rounded)
Color: White
Mineralogy: 60% chalky white plagioclase matrix with 10% yellowish green mineral, 10% large plagioclase and 20% large (1-2 mm) gray mineral.
Photo Number: S-73-22593



77534,1

Anorthosite
2 particles, 1.38 grams

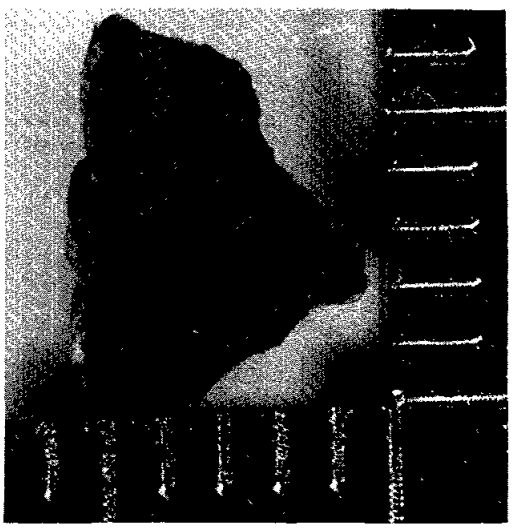
Coherence: Tough
Shape: Angular
Surface: Zap pits
Color: Light blue gray
Mineralogy: 85% plagioclase, 15% orthopyroxene, 1% olivine
Remarks: Annealed texture, grain size ∿0.5 mm
Photo Number: S-73-22638



77534,2

Feldspathic Breccia
1 particle, 0.08 grams

Coherence: Friable
Shape: Angular
Color: Chalky white
Mineralogy: 100% plagioclase
Remarks: Shocked
Photo Number: S-73-22639



77534,3

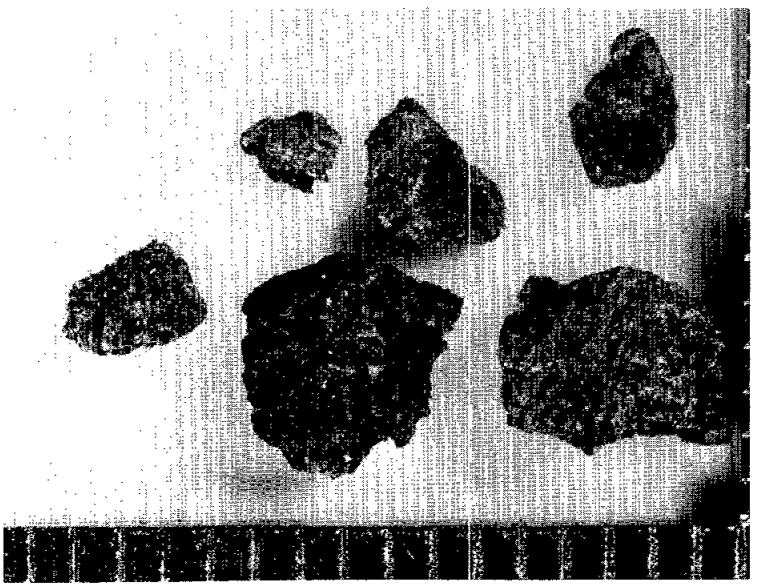
Breccia
2 particles, 0.37 grams

Coherence: Delicate to tough
Shape: Irregular
Surface: Glass coated
Color: Black
Mineralogy: 70% dark gray matrix with abundant 30% white clasts
Remarks: Vesicular glass coat
Photo Number: S-73-22640

77534,4

Basalt
6 particles, 0.23 grams

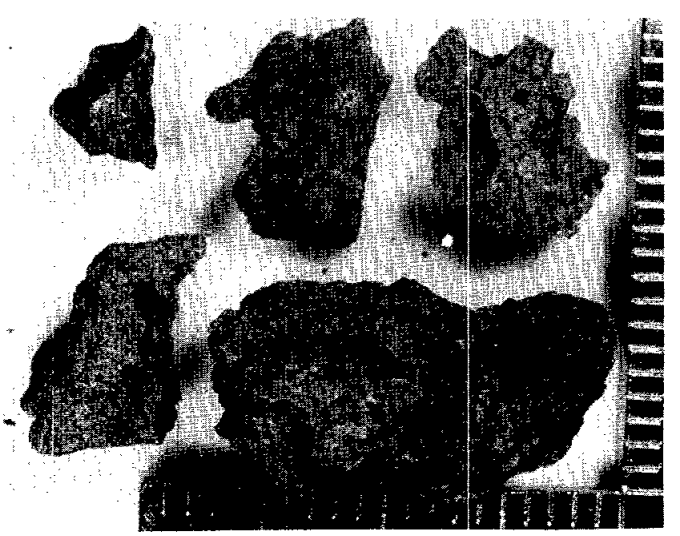
Coherence: Fractured
Shape: Angular
Color: Light gray
Mineralogy: 20% opaque, 40% plagioclase, 40% light brown pyroxene
Photo Number: S-73-22641



77534,5

Feldspathic Breccia
5 particles, 2.28 grams

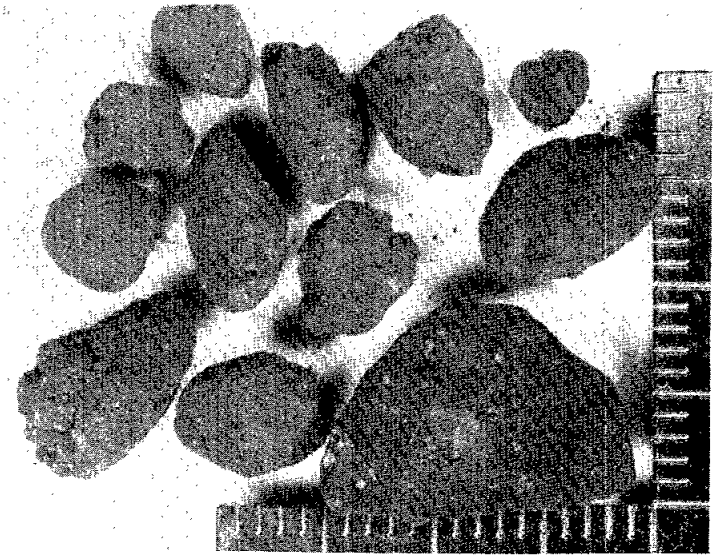
Coherence: Tough
Shape: Angular
Surface: Dirt on exterior surface
Color: Tannish white
Mineralogy: 70% plagioclase, 5% opaque, 25% gray mineral (orthopyroxene?)
Remarks: 10% vesicles (1 mm with smooth interior walls). One particle has clast contain large (2 mm) plagioclase crystals. This may be a metamorphic rock.
Photo Number: S-73-22642



78124,1

Soil Breccia
11 particles, 2.06 grams

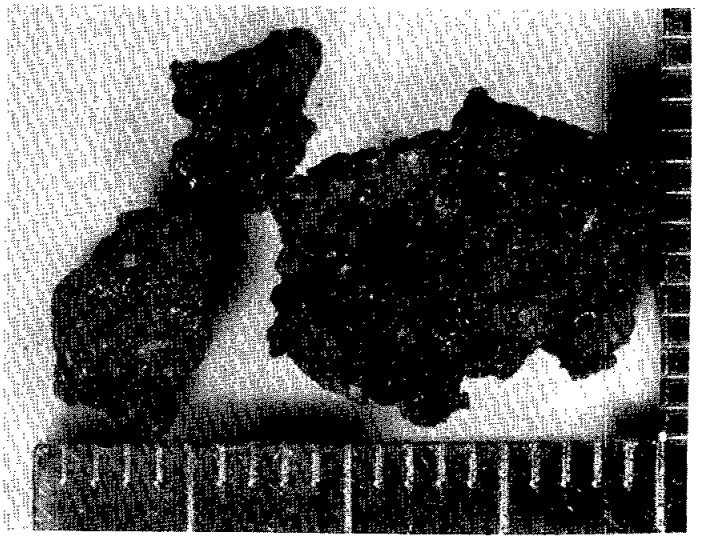
Coherence: Very friable
Shape: Rounded
Color: Gray
Mineralogy: 100% soil with few clasts
Photo Number: S-73-22595



78124,2

Agglutinated Soil
3 particles, 0.71 grams

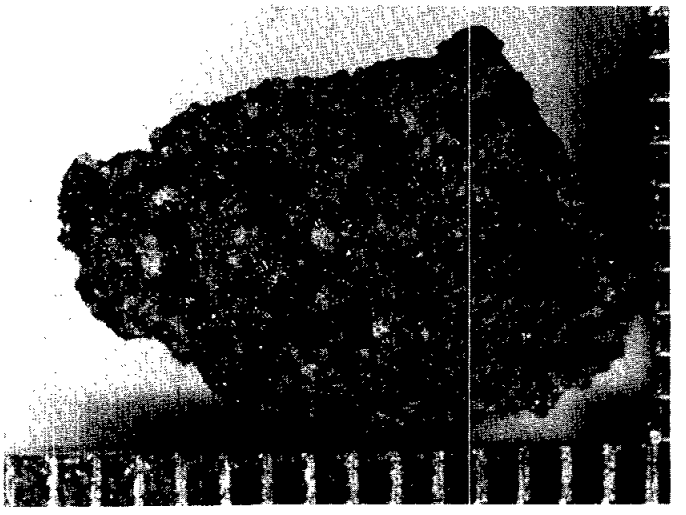
Coherence: Delicate
Shape: Irregular
Color: Gray
Mineralogy: 50% glass and 50% soil finely intermixed in many layers
Remarks: 30% cavities, irregular. The glass is vesicular and has shiny surface
Photo Number: S-73-22596



78124,3

Basalt
1 particle, 0.94 grams

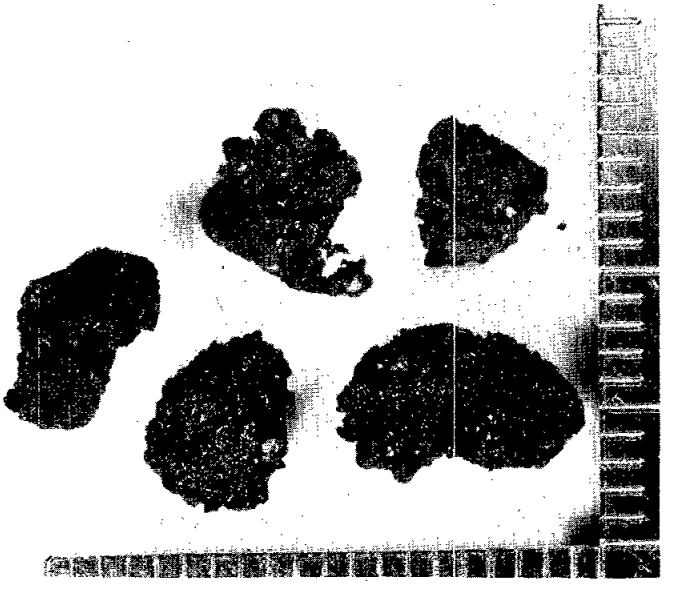
Coherence: Tough
Shape: Subrounded
Surface: Dirty
Color: Gray
Mineralogy: 45% plagioclase, 45% light brown pyroxene, 10% opaque
Remarks: Grain size 0.5 - 1 mm
Photo number: S-73-22597



78224,1

Agglutinate
5 particles, 0.46 grams

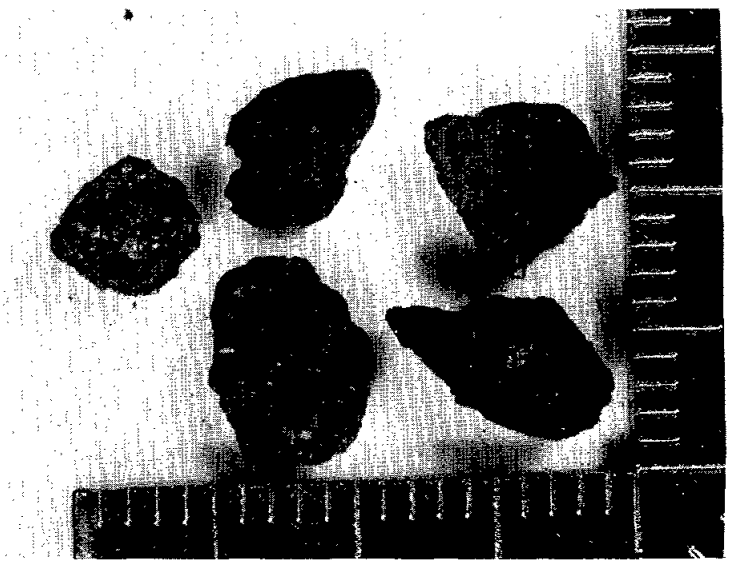
Coherence: Delicate
Shape: Irregular
Color: Dark gray to black
Mineralogy: Shiny 50% black glass, 50% soil
Remarks: 30% irregular cavities
Photo Number: S-73-22611



78224,2

Soil Breccias
4 particles, 0.53 grams

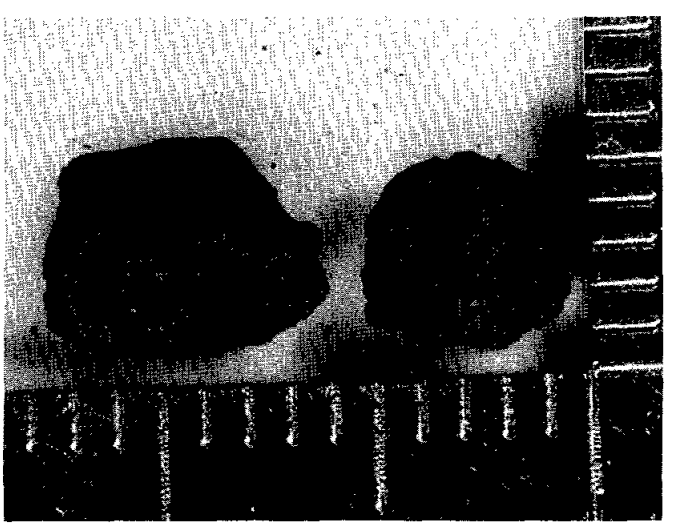
Coherence: Very friable
Shape: Rounded
Color: Gray
Mineralogy: Aphanitic, few white mineral patches
Photo Number: S-73-22612



78224,3

Basalt
2 particles, 0.33 grams

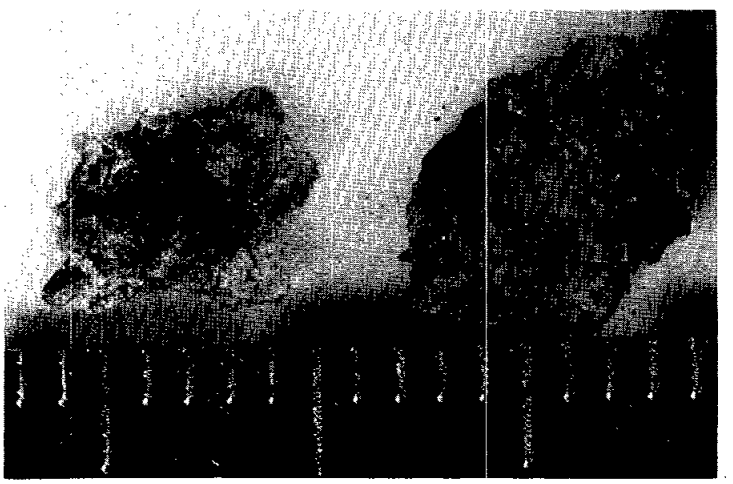
Coherence: Tough
Shape: Rounded
Surface: Dirty
Color: Gray
Mineralogy: 45% plagioclase, 45% light brown pyroxene, 10% opaque
Remarks: Grain size less than 0.2 mm
Photo Number: S-73-22613



78234,1

Troctolite
2 particles, 0.37 grams

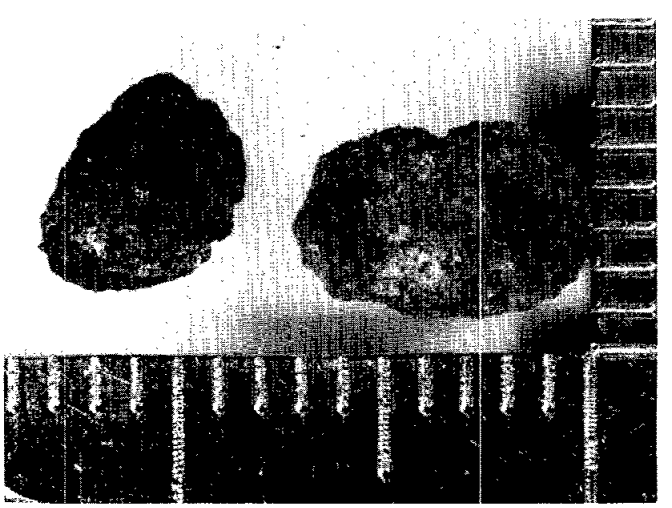
Coherence: Coherent, but fractured
Shape: Angular
Color: White
Mineralogy: 40% polygonized yellowish olivine, 60% grayish white plagioclase.
Remarks: Grain size 3 mm
Photo Number: S-73-22608



78234,2

Feldspathic Breccia
2 particles, 0.3 grams

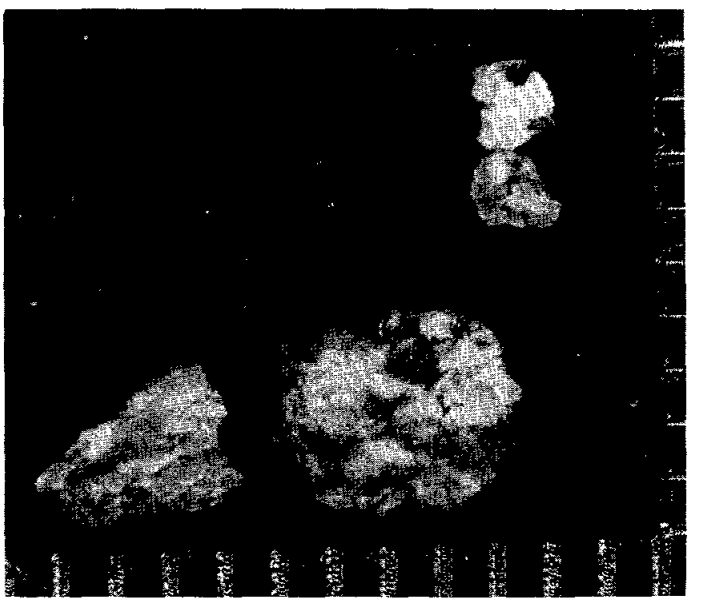
Coherence: Tough
Shape: Rounded
Surface: Coated with glass and dirt vanier except for spall zone
Color: Dark gray
Mineralogy: 80% plagioclase, 20% gray mineral (orthopyroxene?)
Photo Number: S-73-22609



78424,1

Anorthositic Breccia
4 particles, 0.1 grams

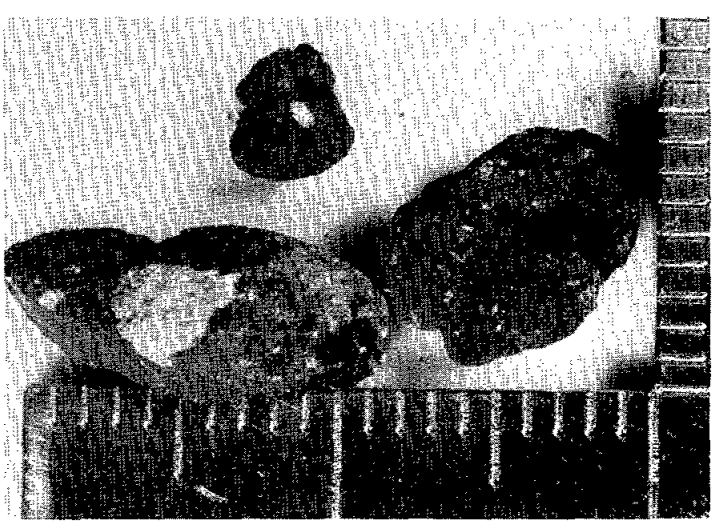
Coherence: Friable
Shape: Angular
Surface: 20% glass on surface
Color: White
Mineralogy: 80% chalky white plagioclase, 20% clear glass interlaced throughout
Remarks: Shock vitrified
Photo Number: S-73-22599



78424,2

Breccia
3 particles, 0.59 grams

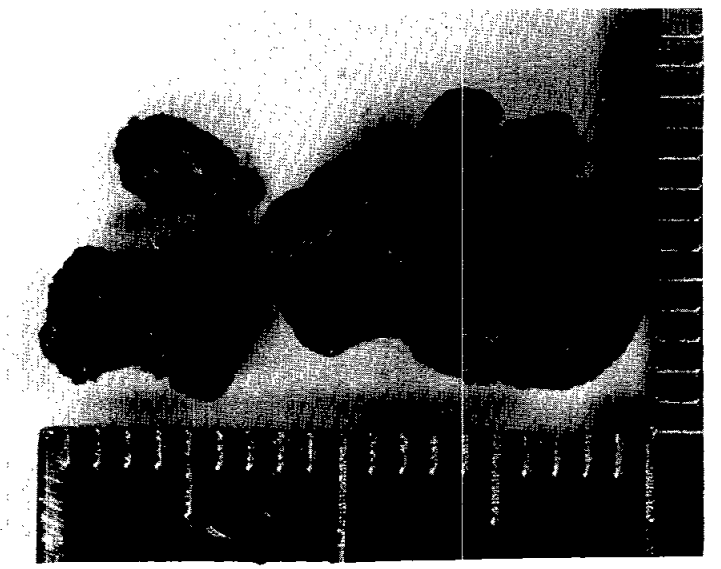
Coherence: Friable
Shape: Subrounded
Surface: Black glass on one particle
Color: Dark gray
Mineralogy: 20% white clasts in 80% aphanitic soil. Well lithified but not melted. Vague. Slickenside.
Photo Number: S-73-22600



78424,3

Glass Matrix Breccia
3 particles, 1.11 grams

Coherence: Tough
Shape: Angular
Color: Dark gray
Mineralogy: 30% phenocrysts or xenocrysts of plagioclase in 70% dark gray glassy matrix (aphanitic)
Remarks: This may be an unusual basalt
Photo Number: S-73-22601



78444,1

Soil Breccia
2 particles, 0.55 grams

Coherence: Friable
Shape: Rounded
Surface: One particle has thin venier of black shiny glass
Color: Gray
Mineralogy: 10% white clasts, 90% aphanitic soil
Photo Number: S-73-22603

78444,2

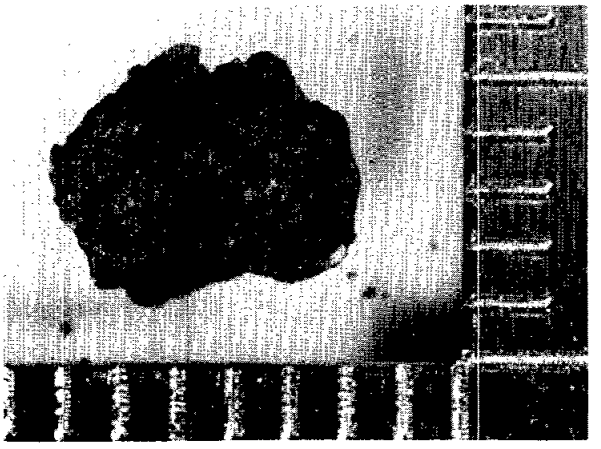
Agglutinate
1 particle, 0.18 grams

Coherence: Delicate
Shape: Irregular
Color: Black
Mineralogy: 50% shiny black glass and 50% soil
Remarks: Glass cuts soil clods
Photo Number: S-73-22604

78444,3

Feldspathic Breccia
1 particle, 0.11 grams

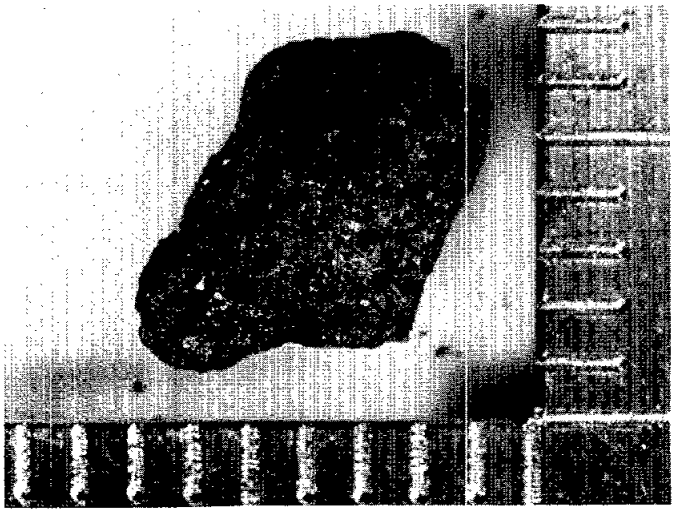
Coherence: Tough
Shape: Subrounded
Color: Light blue gray
Mineralogy: 100% devitrified plagioclase rich glass
Remarks: Aphanitic
Photo Number: S-73-22605



78444,4

Basalt
1 particle, 0.2 grams

Coherence: Tough
Shape: Rounded
Surface: 20% dirt covered
Color: Light gray
Mineralogy: 45% plagioclase, 45% light honey brown pyroxene, 10% opaque
Remarks: Grain size ∿1 mm
Photo Number: S-73-22606



PRELIMINARY DESCRIPTION
Not yet dusted, photographed or subdivided

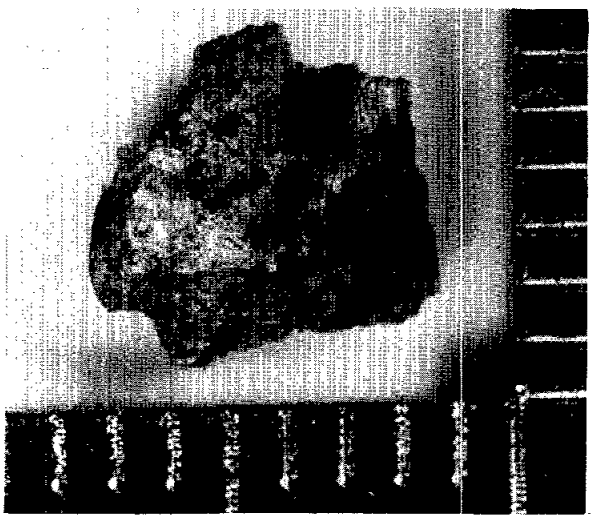
78464
1.303 grams

2 cindery black glass fragments
6 dark gray breccia fragments with white clasts

78484,1

Feldspathic Breccia
1 particle, 0.12 grams

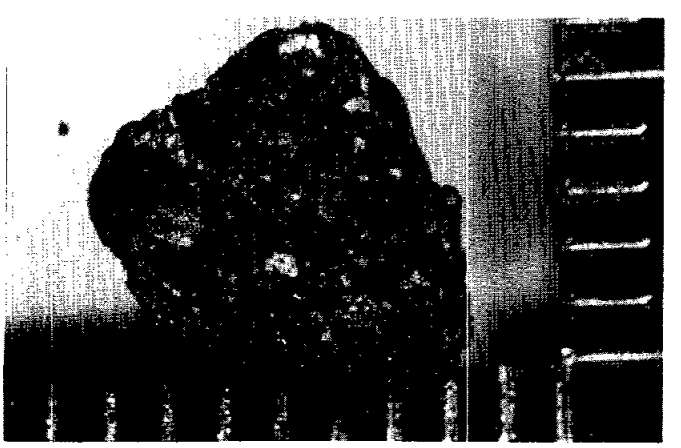
Coherence: Coherent
Shape: Angular
Color: White
Mineralogy: 70% chalky white matrix with 30% gray mineral (orthopyroxene?) clasts, possibly all plagioclase
Remarks: Fractured
Photo Number: S-73-23444



78484,2

Breccia
1 particle, 0.2 grams

Coherence: Tough
Shape: Irregular
Surface: One side coated with vesicular black glass
Color: Gray
Mineralogy: 70% aphanitic gray matrix, 20% white clasts, 10% glass clasts of multicolors
Photo Number: S-73-23445



78504,1

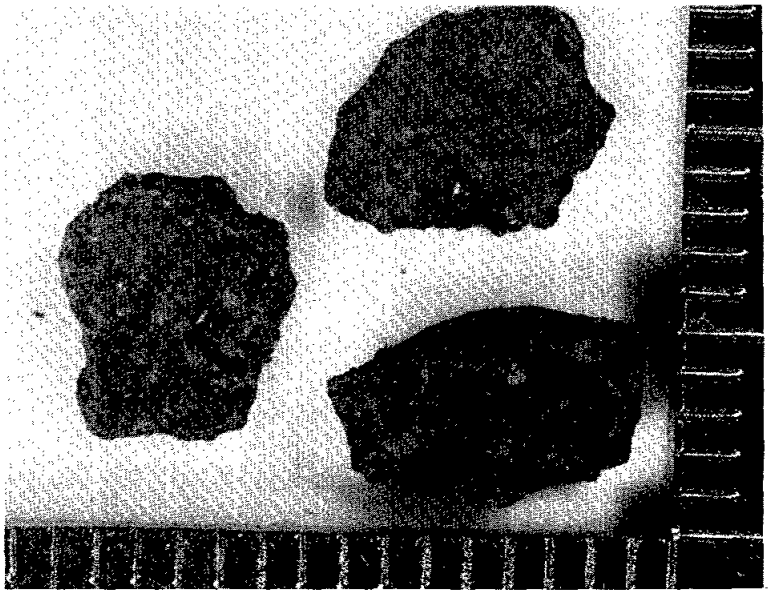
Anorthositic Breccia
4 particles, 0.920 grams

Coherence: Tough to friable
Shape: Angular
Surface: Dirty, one particle has black glass on one side
Color: White
Mineralogy: 100% plagioclase
Remarks: Annealed and shocked textures
Photo Number: S-73-23420

78504,2

Feldspathic Glass
3 particles, 0.330 grams

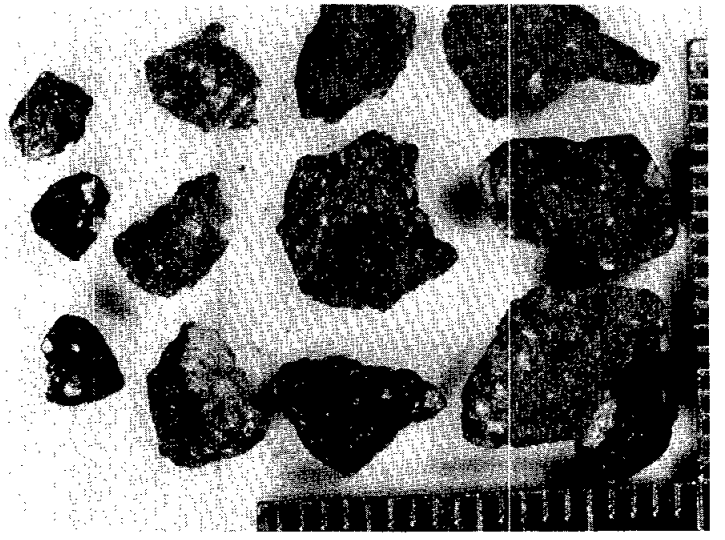
Coherence: Tough
Shape: Angular
Color: Light gray
Mineralogy: ∿80% plagioclase, 20% orthopyroxene - devitrified glass
Remarks: Two zap pits and plagioclase microlites(?)
Photo Number: S-73-23421



78504,3

Breccias
12 particles, 1.560 grams

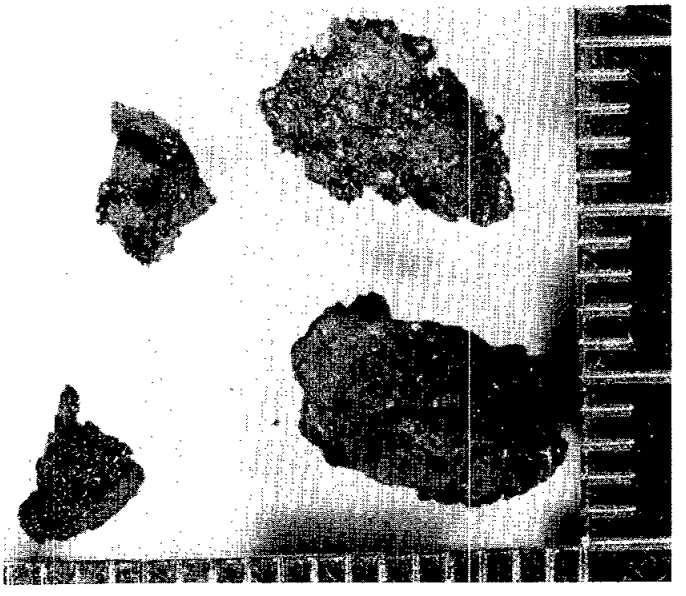
Coherence: Tough to friable
Shape: Angular to subrounded
Surface: 10% black glass coatings
Color: Dark gray
Mineralogy: 70% dark gray matrix with 30% white clasts
Remarks: Variety of breccia textures. Some may be mature soil breccias that have been lithified.
Photo Number: S-73-23422



78504,4

Agglutinates
4 particles, 0.350 grams

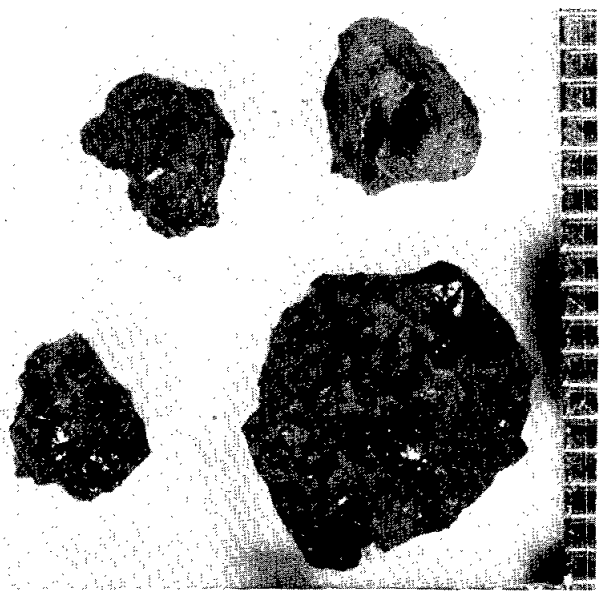
Coherence: Delicate
Shape: Irregular
Color: Dark gray
Mineralogy: 50% black glass, 50% soil breccia
Photo Number: S-73-23423



78504,5

Black Glass
4 particles, 0.560 grams

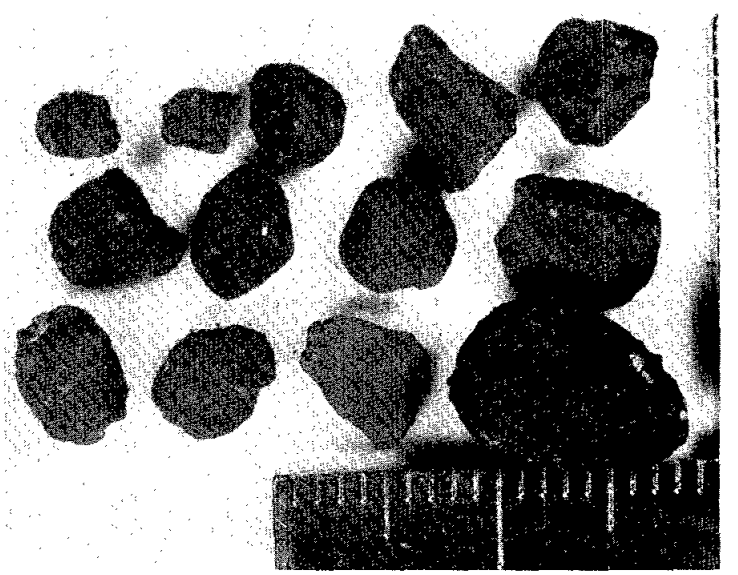
Coherence: Tough
Shape: Blocky and vesicular
Color: Black
Mineralogy: 90% glass, 10% vesicles
Remarks: Vesicles 0.5 to 1.0 mm. Dirt in vesicles. Two particles appear devitrified
Photo Number: S-73-23424



78504,6

Soil Breccias
13 particles, 1.530 grams

Coherence: Very friable
Shape: Rounded
Color: Light gray
Mineralogy: 90% aphanitic soil, 5% white plagioclase, 5% dark glass spheres
Photo Number: S-73-23425



78504,7

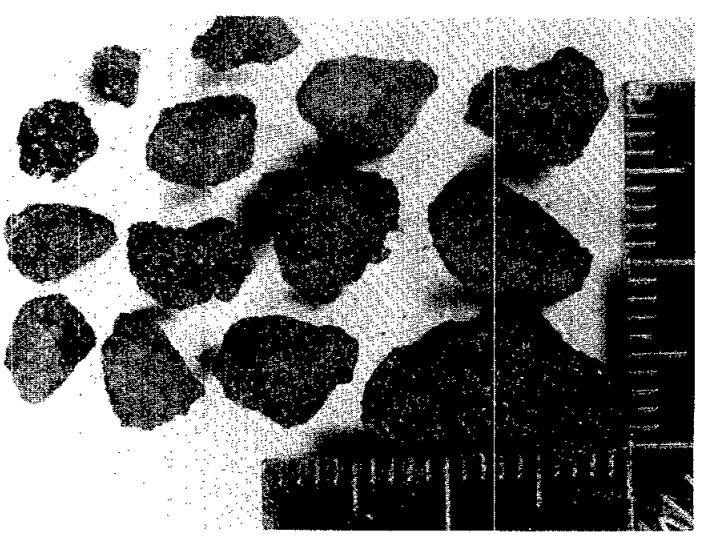
Basalt
4 particles, 1.930 grams

Coherence: Friable to coherent
Shape: Angular
Color: Light gray
Mineralogy: 45% plagioclase, 45% light brown pyroxene, 10% opaque
Remarks: Grain size 1 - 2 mm.
Photo Number: S-73-23426

78504,8

Basalt
14 particles, 1.930 grams

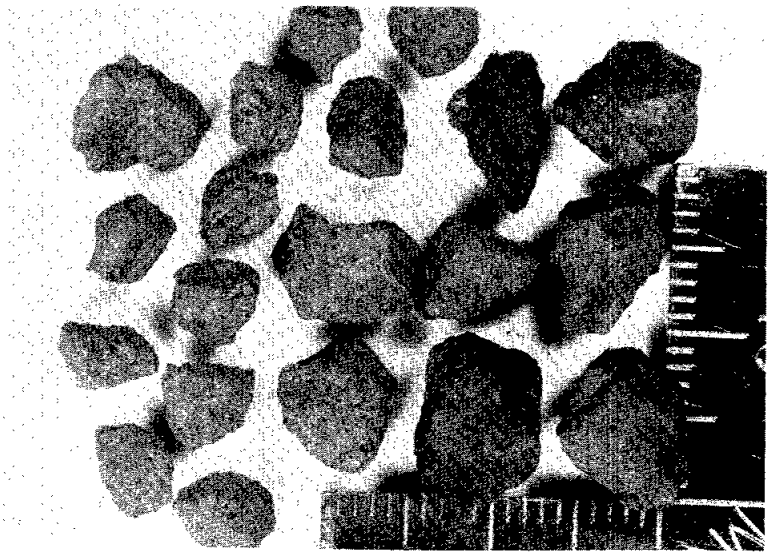
Coherence: Tough
Shape: Angular to subrounded
Surface: 20% dirty
Color: Light gray
Mineralogy: 35% plagioclase, 50% light brown pyroxene, 5% olivine, 10% opaques
Remarks: Grain size 0.5 mm. Not all grains have olivine
Photo Number: S-73-23427



78504,9

Basalt
20 particles, 3.150 grams

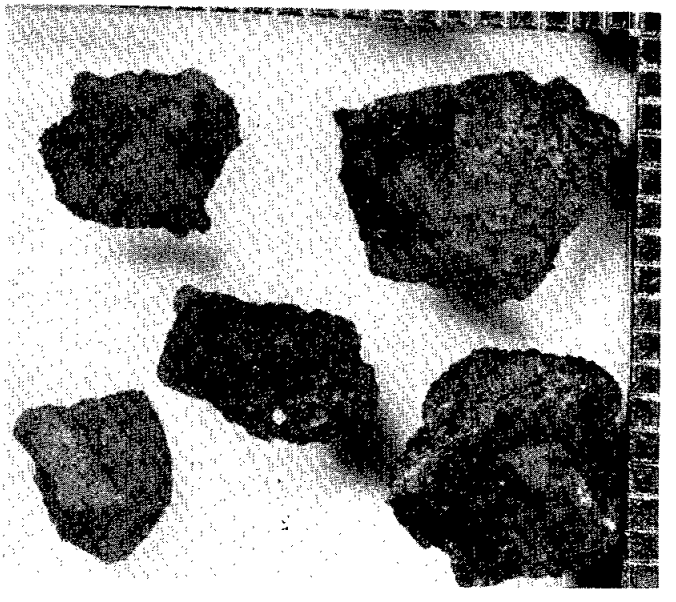
Coherence: Tough
Shape: Angular to subrounded
Surface: 50% of surface has adhering dirt
Color: Dark gray
Mineralogy: Aphanitic - some particles possibly ilmenite-rich
Remarks: 5% vugs - no vesicles. Some of these particles may just be devitrified black glass
Photo Number: S-73-23428



78504,10

Breccias
5 particles, 5.240 grams

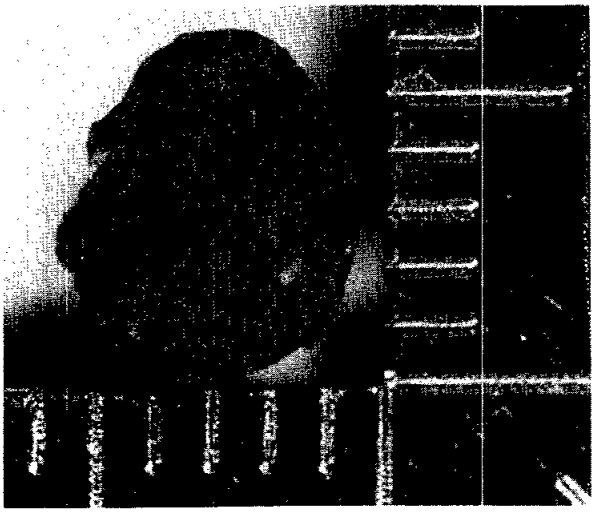
Coherence: Friable to coherent
Shape: Irregular to angular
Color: Gray
Mineralogy: Mostly dark minerals - not feldspathic
Remarks: Five different types of breccias - not soil or dark matrix type
Photo Number: S-73-23429



78504,11

Soil Breccia with Norite Clast
1 particle, 1.020 grams

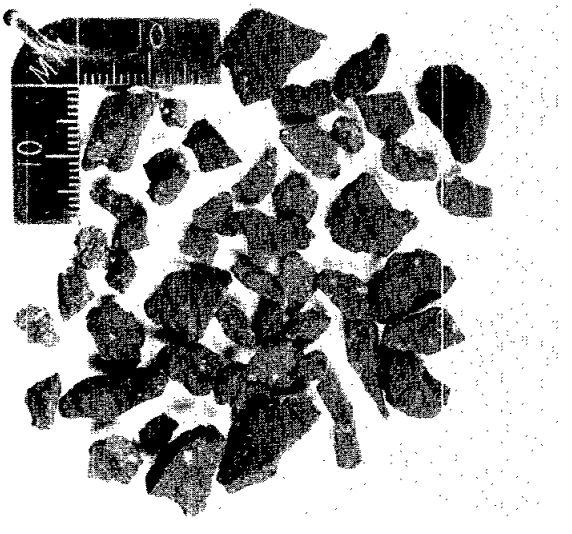
Coherence: Friable
Shape: Rounded
Mineralogy: ∿80% soil matrix, 20% clasts cf 80% plagioclase, 20% gray mineral
Remarks: Broken corner reveals clast which may make up majority of breccia. Grain size 1-2 mm.
Photo Number: S-73-23430



79124,1

Van Serg Breccia
50 particles, 11.81 grams

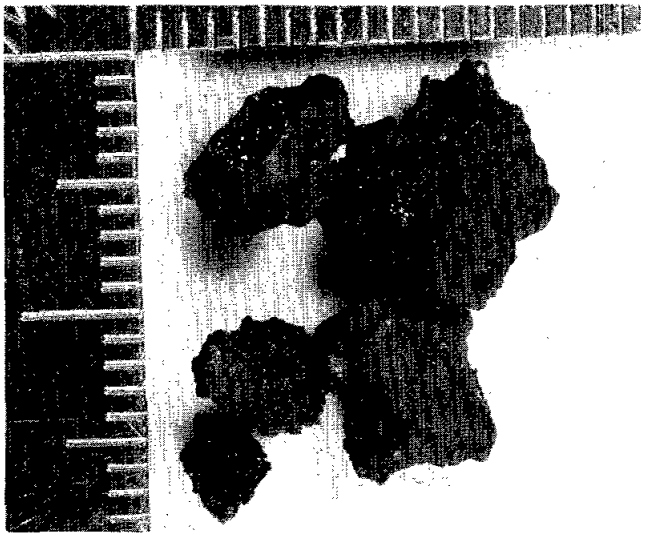
Coherence: Tough
Shape: Angular
Color: Black
Mineralogy: 90% aphanitic black matrix with 8% white clasts (1 mm) and 2% red glass clasts
Remarks: All alide, this rock breaks intc slabby plates
Photo Number: S-73-25428



79124,2

Vesicular Glass
5 particles, 0.80 grams

Coherence: Delicate
Shape: Irregular
Color: Black (transparent edges are deep reddish)
Mineralogy: 90% glass, 10% Van Serg breccia
Remarks: 20% vesicles (all sizes)
Photo Number: S-73-25429



79124,3

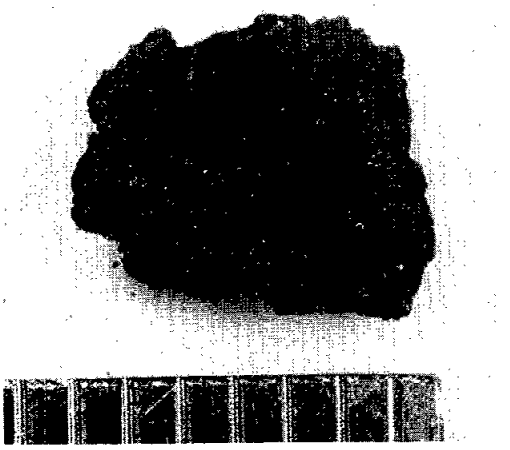
Feldspathic Basalt
1 particle, 0.13 grams

Coherence: Tough
Shape: Subangular
Surface: Dirty
Color: Tannish white
Mineralogy: 80% plagioclase, 20% gray mineral
Remarks: Annealed or metamorphic texture
Photo Number: S-73-25430

79124,4

Basalt
1 particle, 0.13 grams

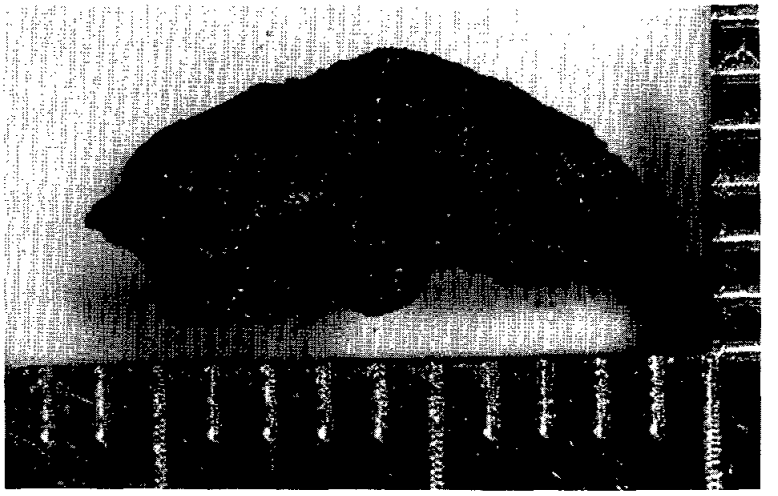
Coherence: Tough
Shape: Angular
Color: Dark gray
Mineralogy: Aphanitic
Remarks: Shiny laths of some unknown mineral
Photo Number: S-73-25431



79224,1

Glass
1 particle, 0.14 grams

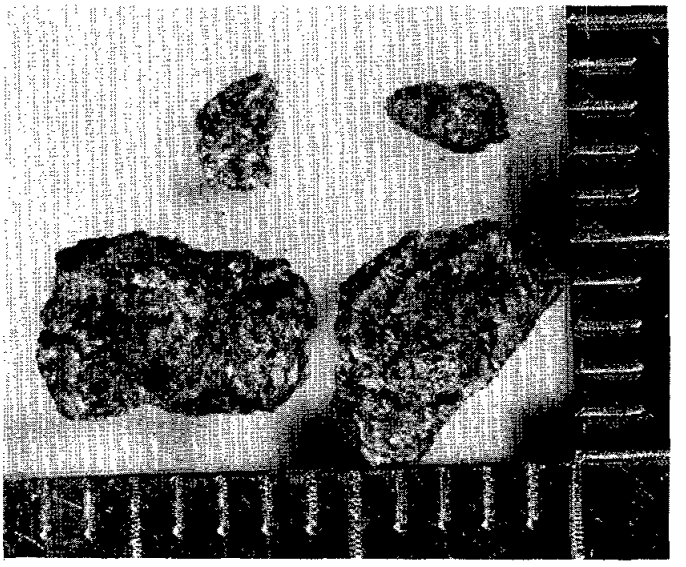
Coherence: Friable surface
Shape: Irregular - fluted
Surface: Coated with black cindery material
Color: Very black
Remarks: 10% vesicles visible on broken end. This may be a volcanic cinder of the elusive dark mantle !
Photo Number: S-73-23447



79224,2

Basalt
4 particles, 0.21 grams

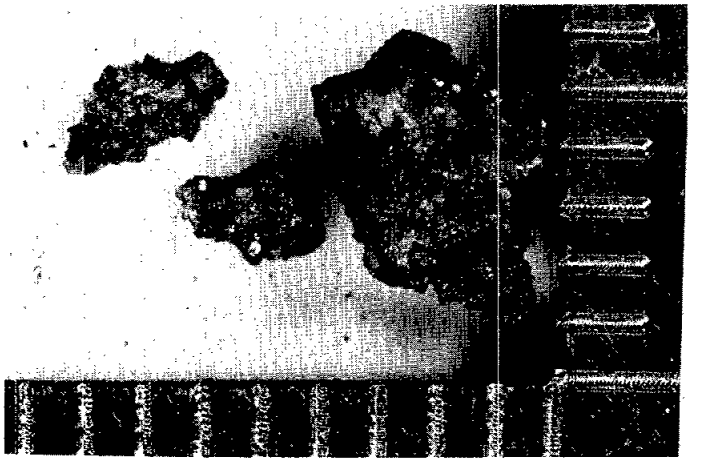
Coherence: Friable
Shape: Angular
Surface: Hackly
Color: Light gray
Mineralogy: 60% chalky plagioclase, 20% opaque, 20% brown pyroxene
Remarks: Grain size 1 mm
Photo Number: S-73-23448



79224,3

Basalt
3 particles, 0.08 grams

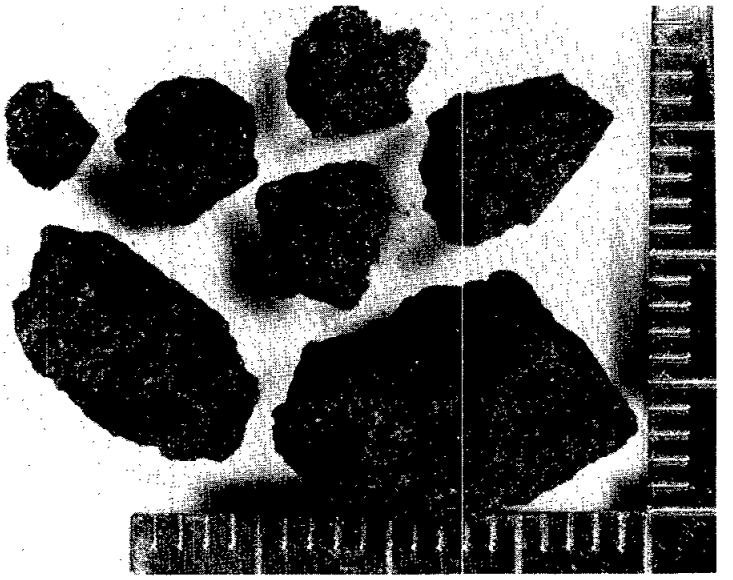
Coherence: Tough
Shape: Angular
Surface: Hackly
Color: Light gray
Mineralogy: 45% plagioclase, 45% brown pyroxene, 10% opaque
Remarks: Texture equigranular. Grain size 2 mm
Photo Number: S-73-23449



79224,4

Basalt
7 particles, 2.43 grams

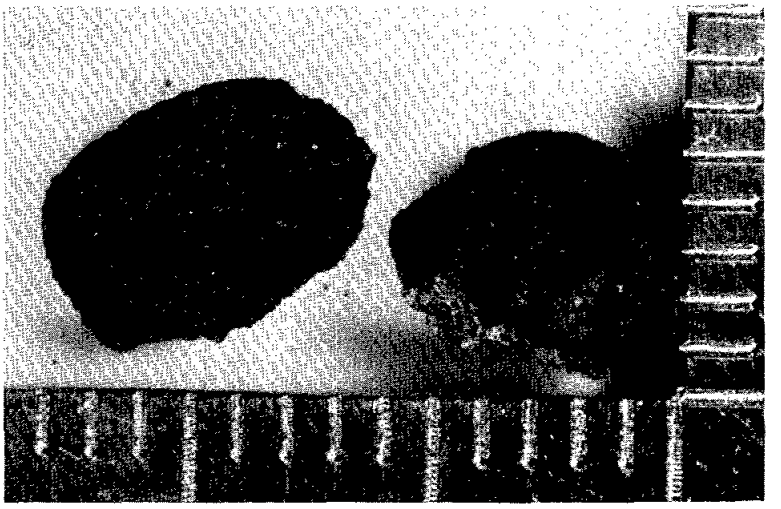
Coherence: Tough
Shape: Subangular
Color: Gray
Mineralogy: 45% plagioclase, 45% brown pyroxene, 10% opaque
Remarks: Grain size to 0.5 mm. Aphanitic.
Photo Number: S-73-23450



79224,5

Soil Breccia
2 particles, 0.23 grams

Coherence: Very friable
Shape: Rounded
Color: Dark gray
Mineralogy: Aphanitic
Remarks: One particle has basalt clasts as ,2. Very dark soil.
Photo Number: S-73-23451



79224,6

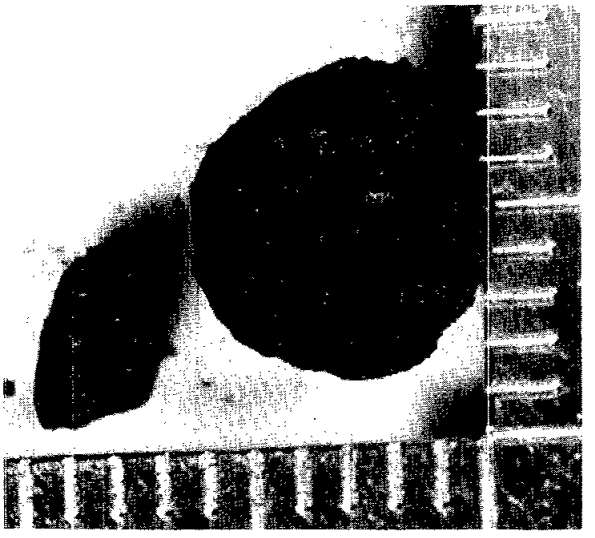
Breccia
2 particles, 0.31 grams

Coherence: Tough
Shape: Subangular
Color: Dark gray
Mineralogy: 10% white clasts in 90% dark aphanitic matrix
Photo Number: S-73-23452

79224,7

Breccia
2 particles, 0.23 grams

Coherence: Friable
Shape: Rounded
Color: Black
Mineralogy: 100% aphanitic soil
Remarks: If there is a dark mantle - this is it!
Photo Number: S-73-23453



79224,8

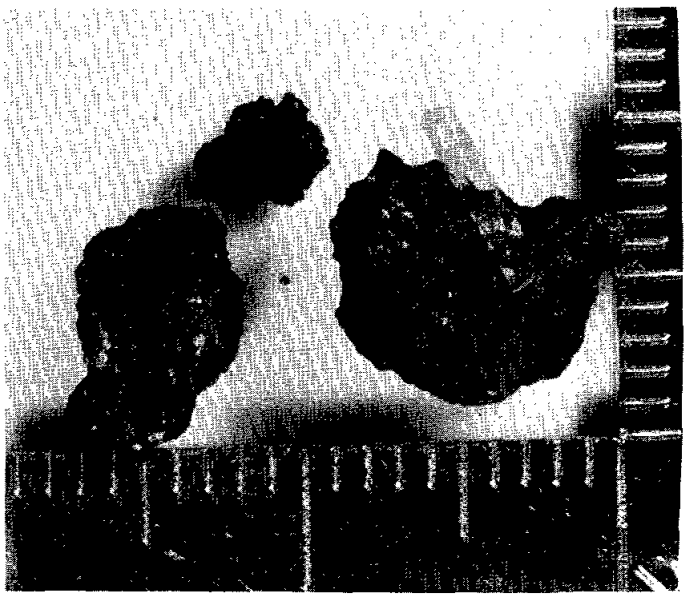
Glass
4 particles, 0.71 grams

Coherence: Tough but fractured
Shape: Angular
Color: Black to very dark green
Mineralogy: 50% vesicular black glass, 50% dense dark green
Photo Number: S-73-23454

79224,9

Breccia
3 particles, 0.76 grams

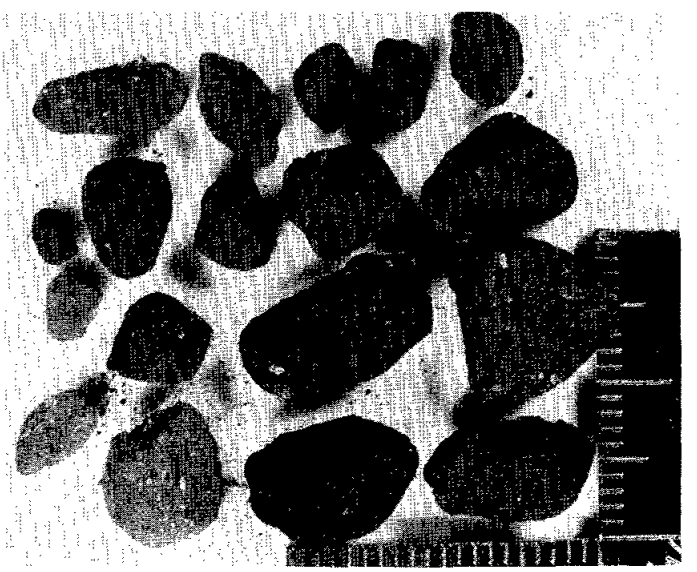
Coherence: Tough
Shape: Irregular
Color: Dark gray
Mineralogy: Aphanitic dark glassy matrix, possible devitrified glass
Photo Number: S-73-23455



79244,1

Soil Breccias
18 particles, 4.490 grams

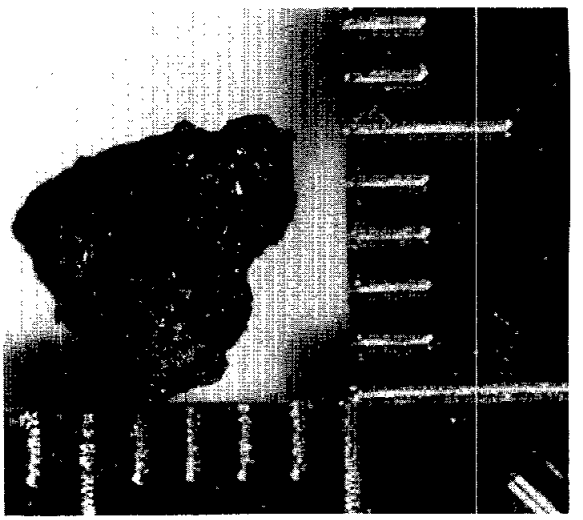
Coherence: Very friable
Shape: Rounded
Surface: Grainy
Color: Gray
Mineralogy: Aphanitic with 10% white clasts
Photo Number: S-73-23467



79244,2

Breccia
1 particle, 0.090 grams

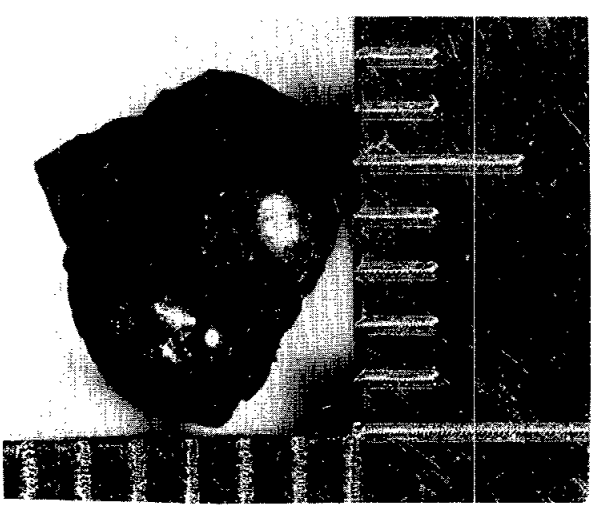
Coherence: Friable
Shape: Irregular
Surface: 50% glass coated
Color: Dark gray
Mineralogy: 80% dark aphanitic soil, with 20% black vesicular glass coating
Photo Number: S-73-23468



79244,3

Glass
1 particle, 0.070 grams

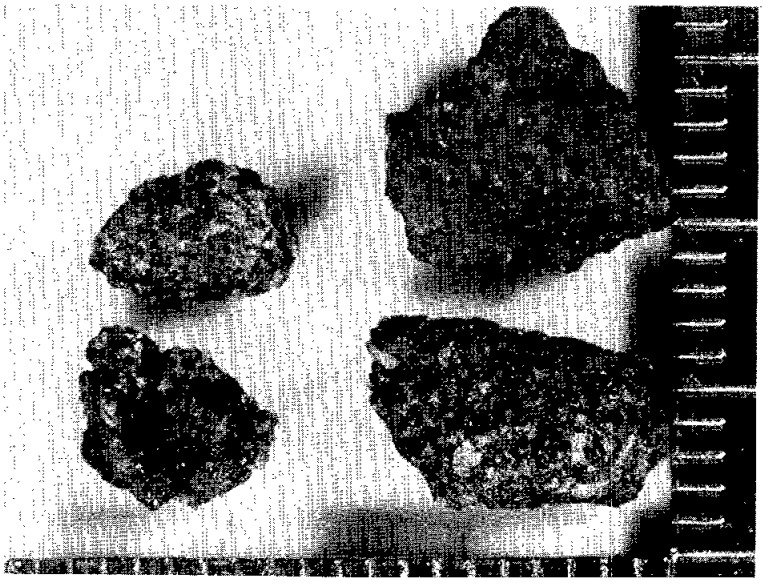
Coherence: Tough
Shape: Hemispherical
Surface: Glossy
Color: Black
Mineralogy: 100% black glass
Remarks: Broken piece of outer and inner walls of a glass bubble, radius ∿1 cm.
Photo Number: S-73-23469



79244,4

Basalt
4 particle, 1.340 grams

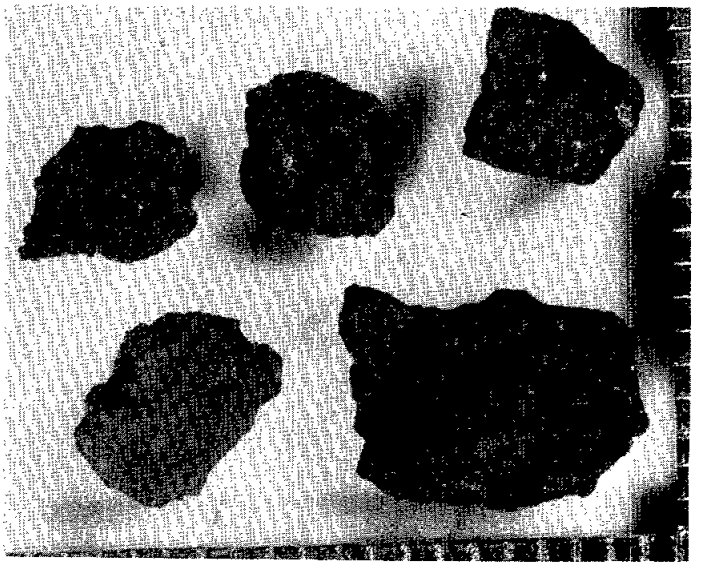
Coherence: Tough
Shape: Angular
Surface: Hackly
Color: Light gray
Mineralogy: 45% plagioclase, 45% light brown pyroxene, 10% opaque
Remarks: Grain size 1 mm
Photo Number: S-73-23470



79244,5

Basalt
5 particles, 0.990 grams

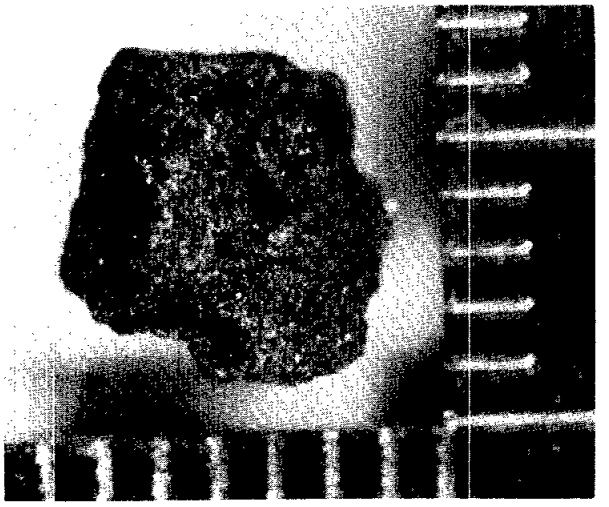
Coherence: Tough
Shape: Subrounded
Color: Gray
Mineralogy: Aphanitic
Remarks: No olivine
Photo Number: S-73-23471



79244,6

Basalt
1 particle, 0.230 grams

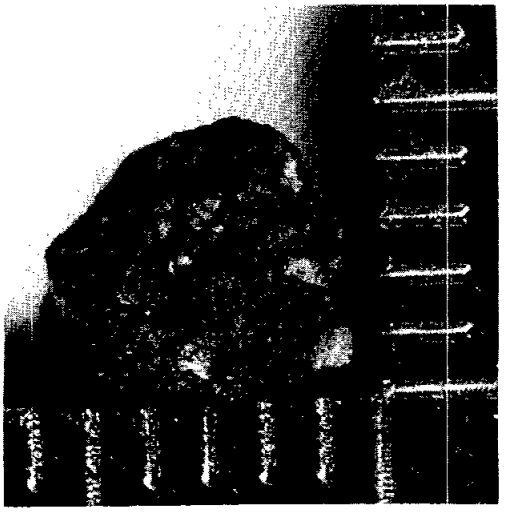
Coherence: Tough
Shape: Subrounded
Color: Gray
Mineralogy: 60% plagioclase, 40% pyroxene (gray to brown), no opaques?
Remarks: Grain size 0.5 mm
Photo Number: S-73-23472



79244,7

Breccia
1 particle, 0.090 grams

Coherence: Tough
Shape: Angular
Color: Dark gray
Mineralogy: 30% white clasts in 70% dark matrix
Photo Number: S-73-23473



79244,8

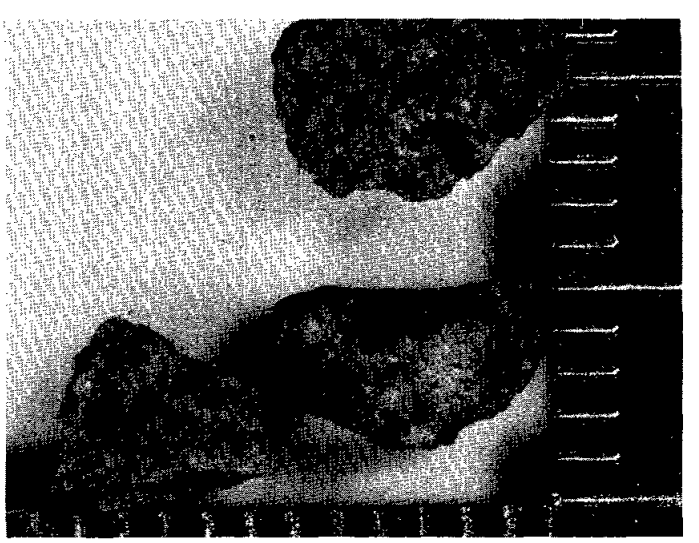
Norite?
1 particle. 0.690 grams

Coherence: Tough
Shape: Rounded
Surface: 80% covered with glass and dirt coat
Color: Light gray
Mineralogy: 60% plagioclase, 20% gray orthopyroxene, 20% light green mineral
Remarks: Grain size 1 mm
Photo Number: S-73-23474

79244,9

Anorthosite
3 particles, 0.380 grams

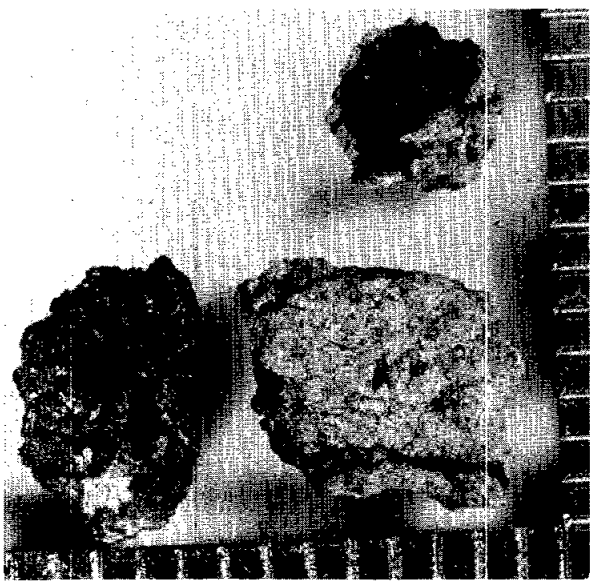
Coherence; Tough
Shape: Angular
Color: White
Mineralogy: 80% plagioclase, 20% grayish green mineral
Remarks: Annealed brecciated texture. Grain size ∿0.5 mm
Photo Number: S-73-23475



79244,10

Feldspathic Breccia
3 particles, 0.300 grams

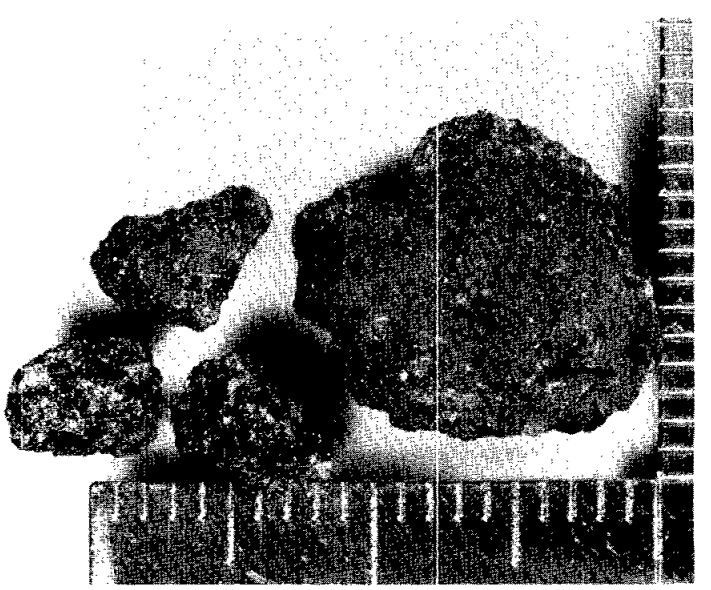
Coherence: Delicate
Shape: Irregular
Color: White
Mineralogy: 80-90% chalky white plagioclase, 10% black glass
Remarks: Marbled texture
Photo Number: S-73-23476



79264,1

Basalt
4 particles, 1.97 grams

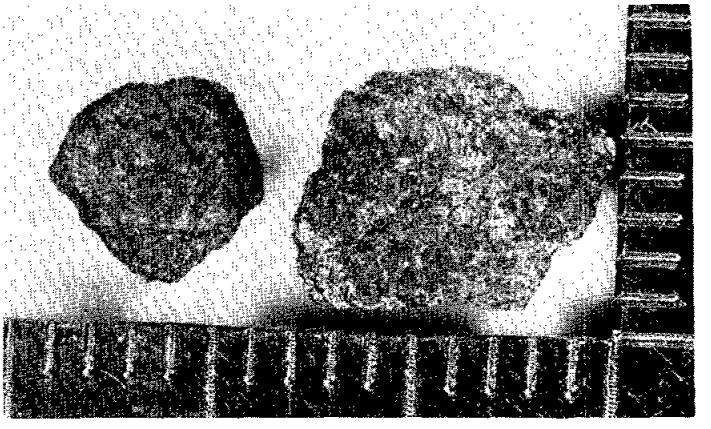
Coherence: Tough
Shape: Subrounded
Color: Gray
Mineralogy: 45% plagioclase, 45% light to dark brown pyroxene, 10% opaques
Remarks: Grain size ∿1 mm
Photo Number: S-73-23432



79264,2

Basalt
2 particles, 0.29 grams

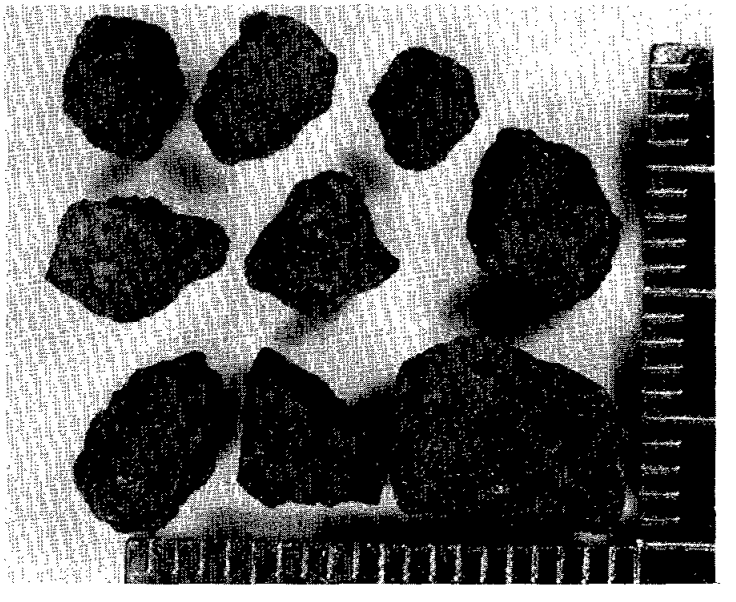
Coherence: Tough
Shape: Subrounded
Color: Light gray
Mineralogy: 50% plagioclase, 40% pyroxene, 10% opaque
Remarks: Grain size 0.5 mm
Photo Number: S-73-23433



79264,3

Basalt
9 particles, 2.33 grams

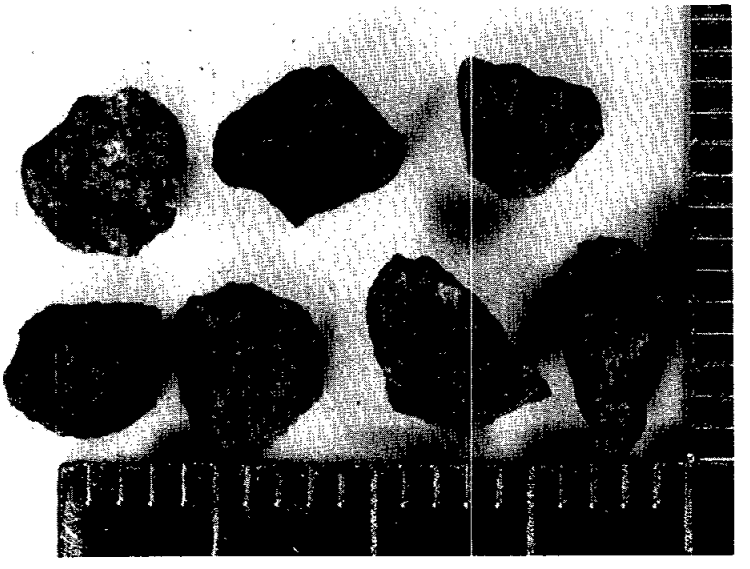
Coherence: Tough
Shape: Rounded
Surface: Dirty
Color: Gray
Mineralogy: 45% plagioclase, 45% pyroxene, 10% opaque
Remarks: Grain size aphanitic to 0.5 mm. A few grains have trace of olivine.
Photo Number: S-73-23434



79264,4

Anorthosite
7 particles, 0.29 grams

Coherence: Tough
Shape: Angular
Surface: Dirty
Color: Light gray
Mineralogy: 80% plagioclase, 20% gray mineral
Remarks: Annealed brecciated texture
Photo Number: S-73-23435



79264,5

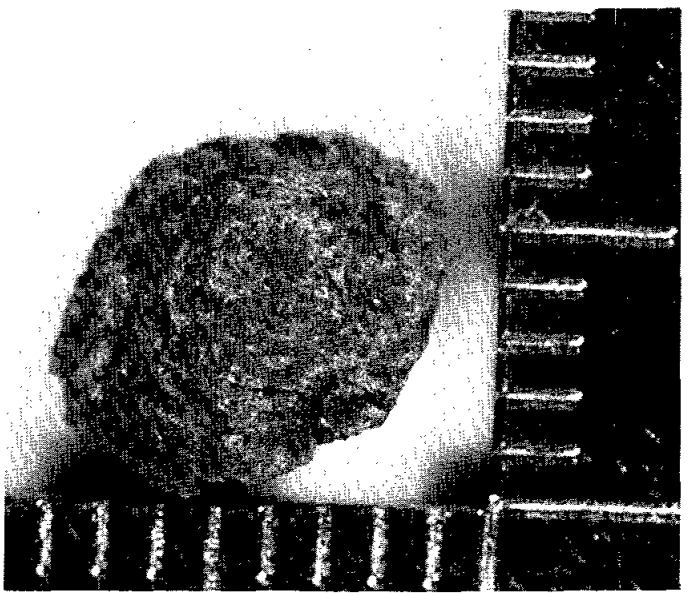
Anorthosite
1 particle, 0.95 grams

Coherence: Tough
Shape: Angular
Color: Tannish white
Mineralogy: 80% plagioclase, 10% gray pyroxene, 8% light brown pyroxene, 2% opaques
Remarks: Grain size of plagioclase and opaques is 1-2 mm and pyroxene is 0.2 mm. Annealed breccia texture.
Photo Number: S-73-23436

79264,6

Anorthositic Breccia
1 particle, 0.22 grams

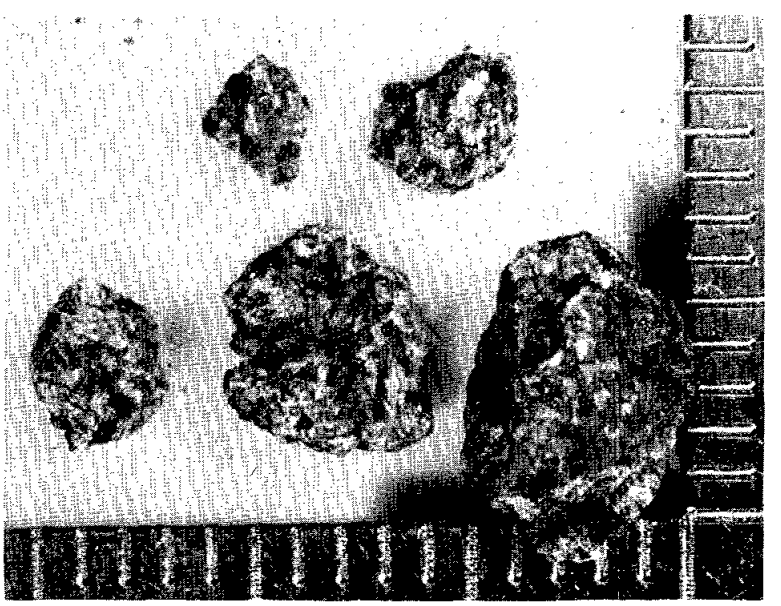
Coherence: Tough
Shape: Subrounded
Color: Tannish white
Mineralogy: 80% plagioclase, 8% gray (orthopyroxene), 8% greenish (olivine) and 4% opaque
Remarks: Annealed breccia texture
Photo Number: S-73-23437



79264,7

Basalt
5 particles, 0.36 grams

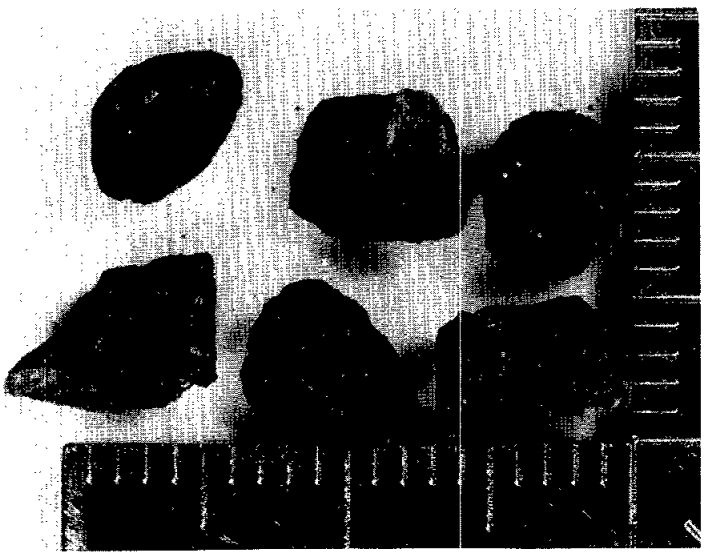
Coherence: Tough
Shape: Angular
Surface: Hackly
Color: Light gray
Mineralogy: 55% chalky white plagioclase, 25% opaques, 20% pyroxene
Photo Number: S-73-23438



79264,8

Soil Breccias
6 particles, 0.76 grams

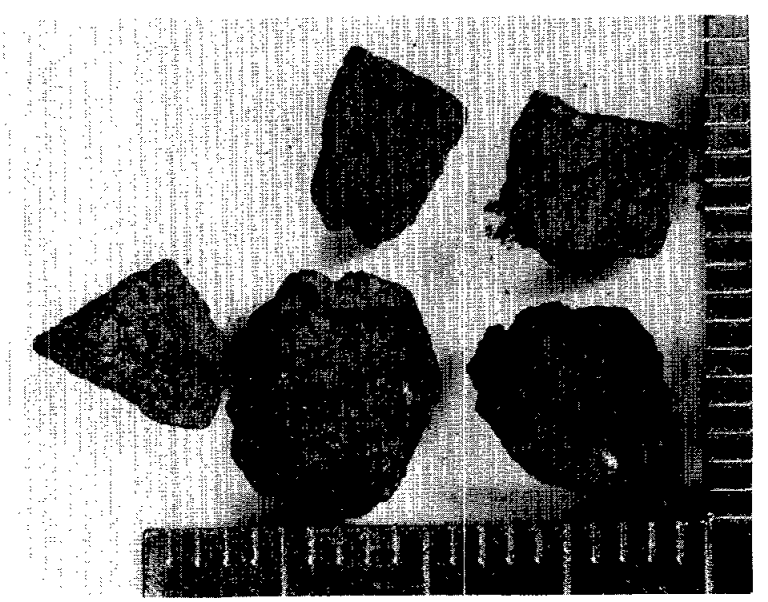
Coherence: Friable to very friable
Shape: Rounded
Surface: Grainy
Color: Light gray
Mineralogy: Aphanitic with 10% white clasts
Photo Number: S-73-23439



79264,9

Basalt
5 particles, 1.25 grams

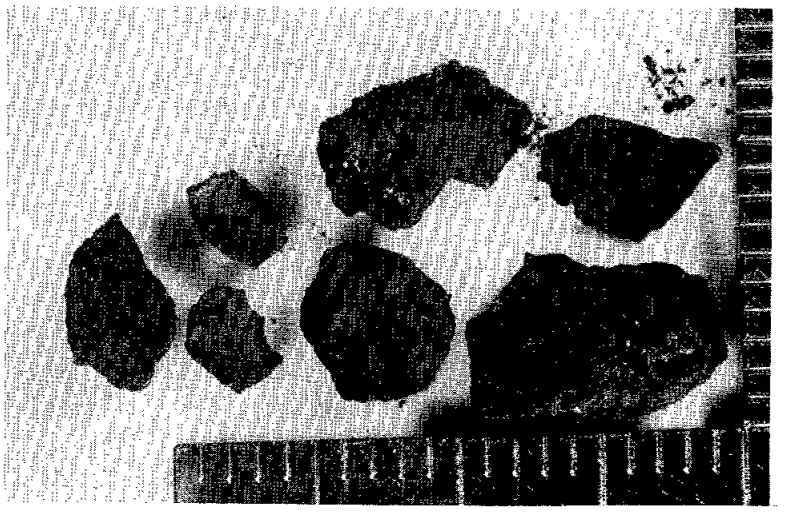
Coherence: Tough
Shape: Angular to subangular
Surface: Dirty
Color: Gray
Mineralogy: Aphanitic with 15% olivine phenocrysts.
Remarks: No vugs
Photo Number: S-73-23440



79264,10

Glass
7 particles, 0.77 grams

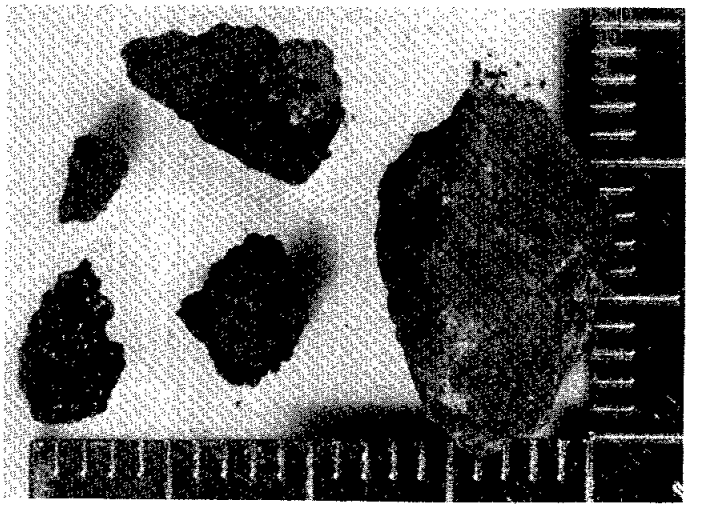
Coherence: Tough
Shape: Blocky, one is plate like
Surface: Dirty
Color: Dark gray
Mineralogy: All glass
Remarks: Different colors (all dark)
Photo Number: S-73-23441



79264,11

Breccia
5 particles, 1.29 grams

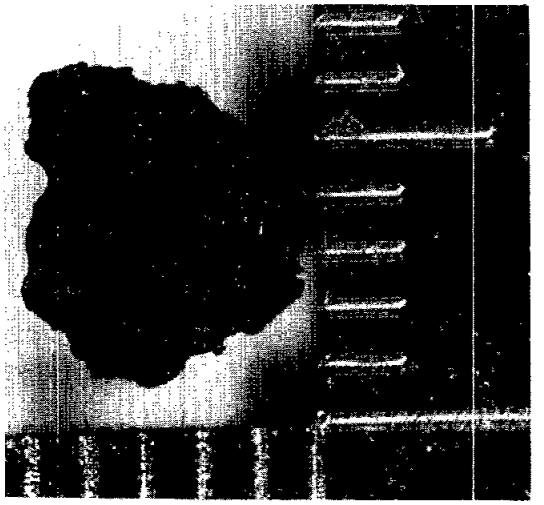
Coherence: Friable to tough
Shape: Subrounded
Color: Gray
Mineralogy: Variable texture and composition
Photo Number: S-73-23442



79514,1

Basalt
1 particle, 0.12 grams

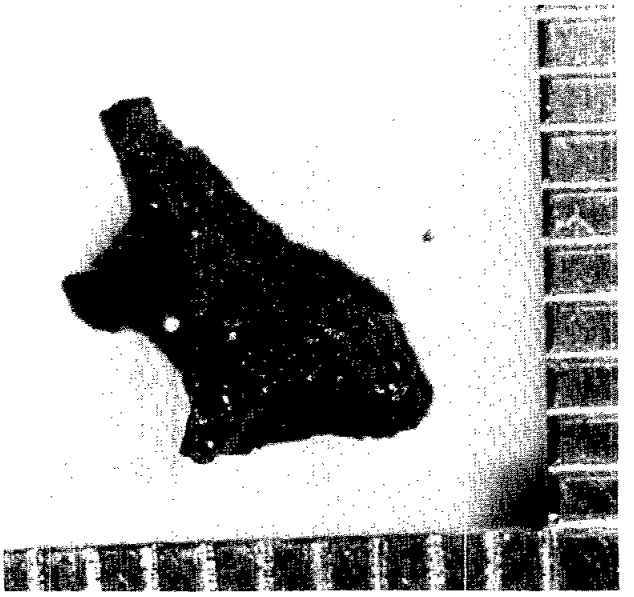
Coherence: Tough
Shape: Rounded
Color: Dark gray
Mineralogy: 30% plagioclase, 60% pyroxene, 10% opaque
Remarks: Grain size less than 0.5 mm
Photo Number: S-73-23457



79514,2

Glass
1 particle, 0.09 grams

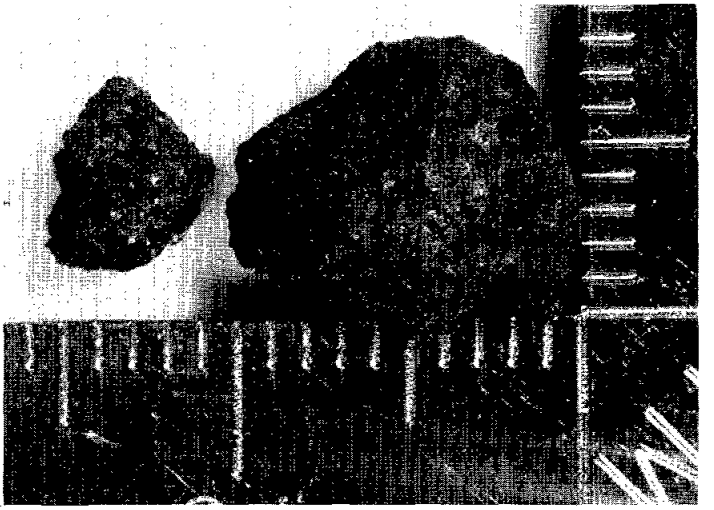
Coherence: Tough
Shape: Irregular
Surface: Smooth walls of vesicles
Color: Shiny black
Mineralogy: All glass
Remarks: Large vesicles define walls of particles
Photo Number: S-73-23458



79514,3

Basalt
2 particles, 0.78 grams

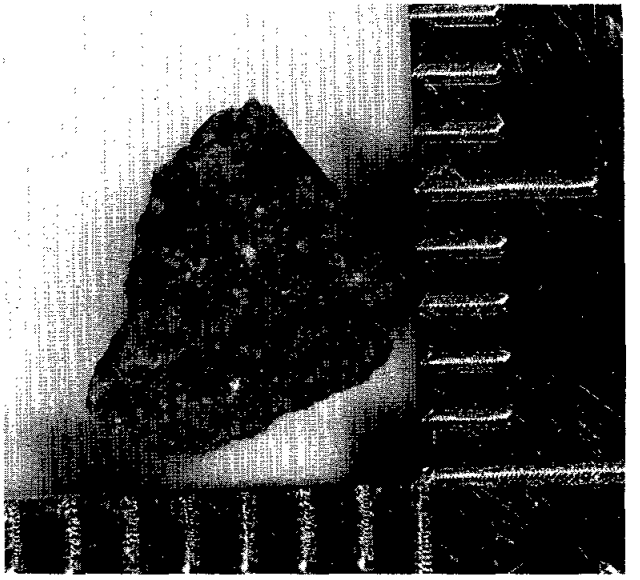
Coherence: Tough
Shape: Rounded
Color: Gray
Mineralogy: 45% plagioclase, 45% pyroxene, 10% opaque
Remarks: Grain size ∿0.5 mm
Photo Number: S-73-23459



79514,4

Anorthosite
1 particle, 0.09 grams

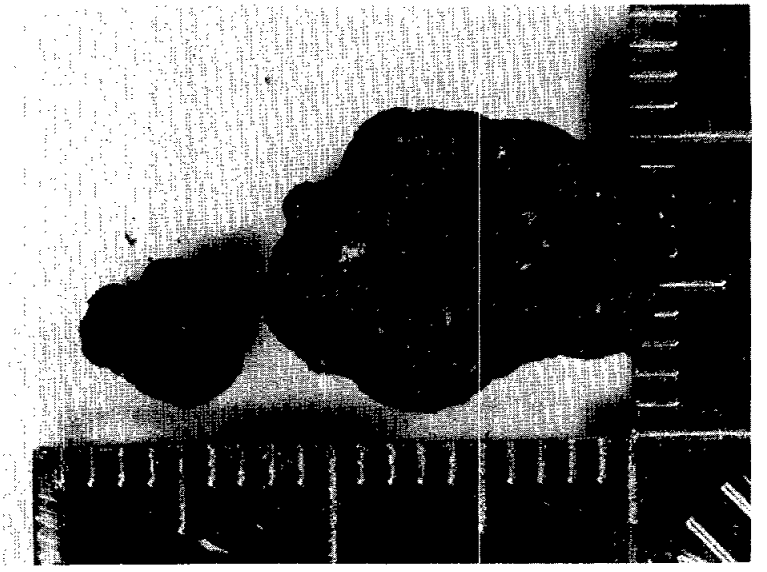
Coherence: Tough
Shape: Subangular to subrounded
Color: Tannish white
Mineralogy: 90% plagioclase, 10% gray mineral
Remarks: Zap pits. Annealed texture
Photo Number: S-73-23460



79514,5

Soil Breccia
2 particles, 0.93 grams

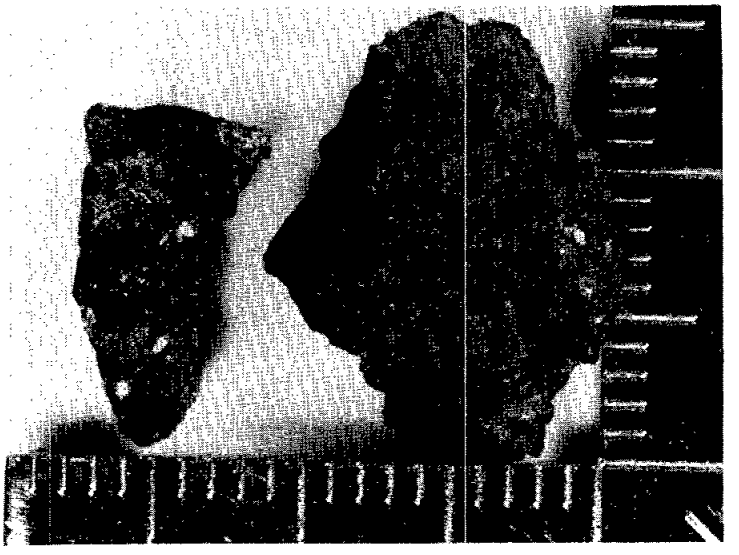
Coherence: Soft and friable
Shape: Rounded
Color: Light gray
Mineralogy: Aphanitic
Remarks: Large particles have glass splashes on surface
Photo Number: S-73-23461



79514,6

Breccia
2 particles, 1.85 grams

Coherence: Tough
Shape: Angular to subrounded
Color: Gray
Mineralogy: Many (~50%) basaltic clasts visible in glass matrix breccia. These two were different from all other and from each other.
Photo Number: S-73-23462



79514,7

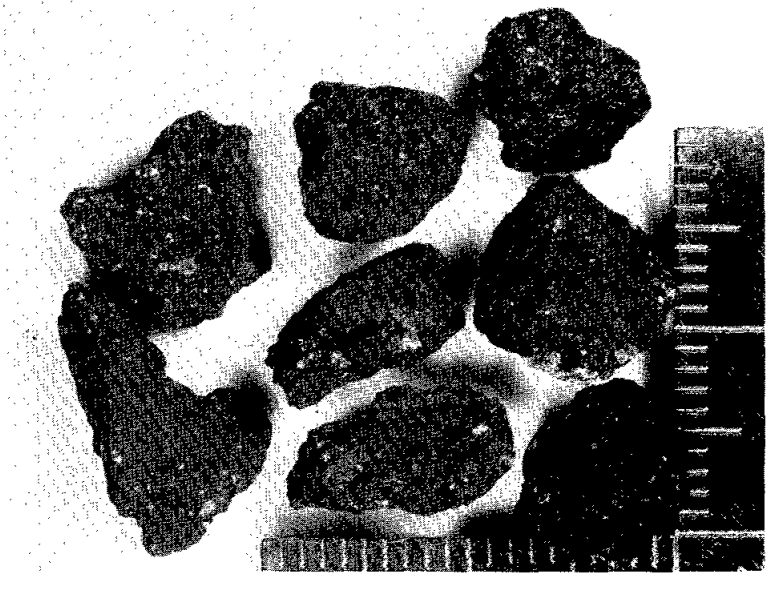
Breccia
3 particles, 2.5 grams

Coherence: Tough
Shape: Subrounded
Color: Gray
Mineralogy: 15% light clasts in 85% aphanitic dark matrix
Remarks: Similar to ,8 and ,9.
Photo Number: S-73-23463

79514,8

Van Serg Breccia
8 particles, 2.93 grams

Coherence: Tough
Shape: Subrounded
Color: Gray
Mineralogy: Same as ,7 and ,9
Photo Number: S-73-23464



79514,9

Van Serg Breccia
18 particles, 2.69 grams

Coherence: Tough
Shape: Subrounded
Color: Gray
Mineralogy: Same as ,7 and ,8
Photo Number: S-73-23465