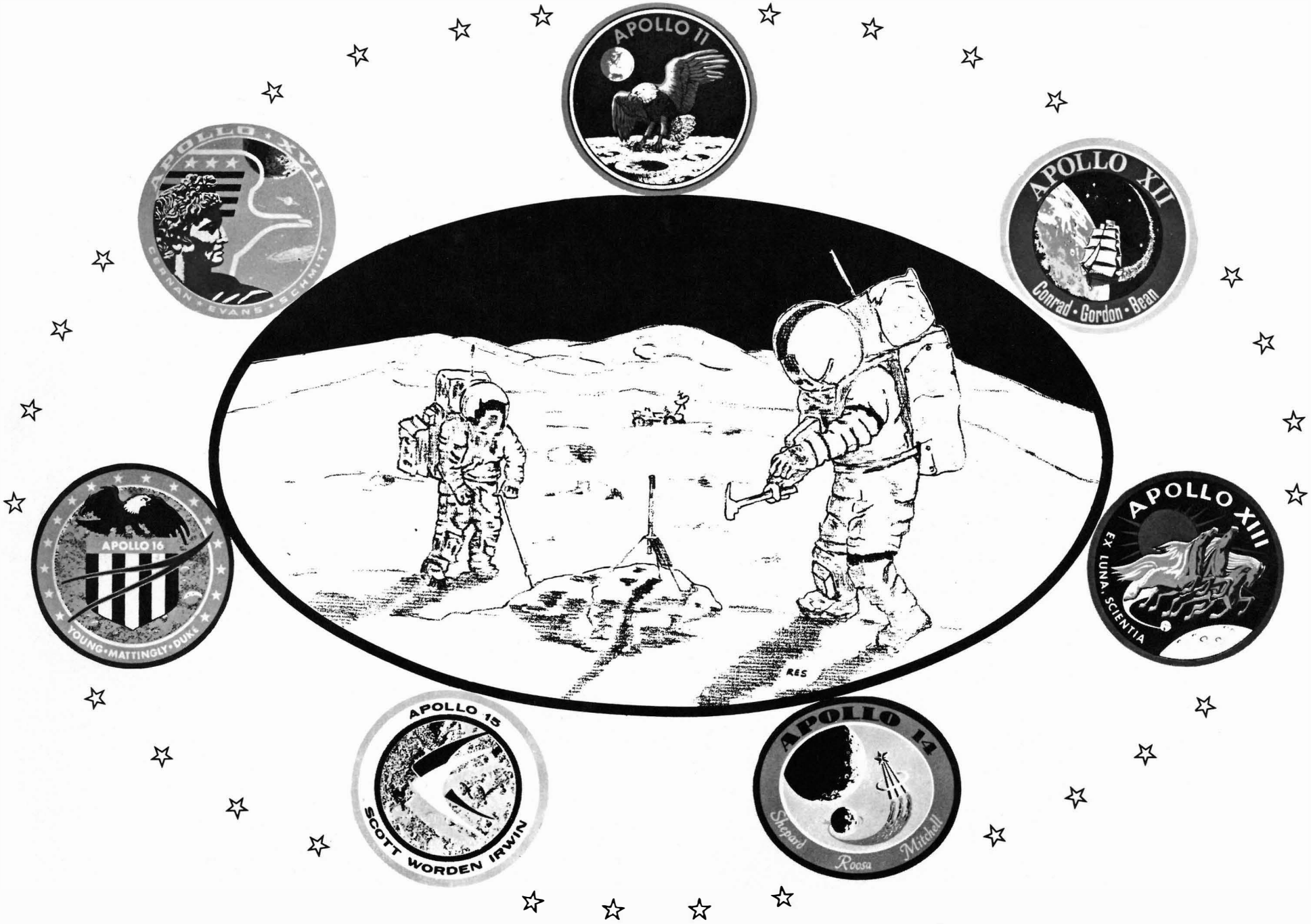

APOLLO 16 VOICE TRANSCRIPT
PERTAINING TO THE GEOLOGY OF THE LANDING SITE

APOLLO 16 VOICE TRANSCRIPT

Pertaining to the geology of the landing site

by

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INTRODUCTION

The Apollo 16 lunar module Orion landed in the Descartes region of the Moon on April 21, 1972 to initiate the fifth manned exploration of the lunar surface. The Apollo 16 crew spent 20.2 hours in surface exploration and traversed approximately 27 km on the lunar roving vehicle.

This document is an edited record of the conversations between astronauts John W. Young and Charles M. Duke on the lunar surface and EVA capcom Anthony W. England at Mission Control in Houston during the descent, landing, and 71 hours of lunar stay time. It also contains landing site observations by command module pilot Thomas K. Mattingly as well as remarks by all three astronauts during the transearth phase of the mission. It is a condensation hopefully of all the verbal data having geologic significance. All discussions and observations documenting the lunar landscape, its geologic characteristics, the rocks and soils collected, and the photographic record are retained along with the supplementary remarks essential to the continuity of events during the mission. We have deleted the words of mechanical housekeeping and engineering data while attempting not to lose the personal and philosophical aspects of the exploration.

The sources of this voice transcript are the complete audio and video tapes recorded during the EVAs and the Technical Air-to-Ground Voice Transcription prepared by NASA. The voice record is listed chronologically with each individual comment preceded by the day, hour, minute and second in Apollo Elapsed Time (AET) when the statement was made. Apollo Elapsed Time is the true mission-elapsed time after liftoff from Cape Kennedy at 12:54 p.m. E.S.T. on April 16, 1972.

Figure 1 shows the landing site area that was described, sampled and photographed by the Apollo 16 crewmen.

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GLOSSARY OF TERMS, ABBREVIATIONS, ACRONYMS, AND SYMBOLS

APOLLO 16 CREW

CC	Capsule Communicator (Anthony W. England during the EVAs, other astronauts during other time periods)
CDR	Commander (John W. Young)
CMP	Command Module Pilot (Thomas K. Mattingly)
LMP	Lunar Module Pilot (Charles M. Duke)
AET	Apollo Elapsed Time - after launch from earth (days-hrs-mins-secs)
ALSEP	Apollo Lunar Surface Experiments Package
BSLSS	Buddy Secondary Life Support System
CCW	Counter Clockwise
CM	Command Module, "Casper"
Core	Drive tube coring device for collecting soil samples
CRE	Cosmic Ray Experiment
CSVC	Core Sample Vacuum Container - for storage of chemically ultraiclean drive tube sample
DAC	Data Acquisition Camera, 16 mm
DOC	Documented Sample - soil and/or rocks that are documented by photography before and after sampling
DOI	Descent Orbit Insertion
ETB	Equipment Transfer Bag for transport of items between LM hatch and lunar surface
EVA	Extravehicular Activity - astronaut activities on the lunar surface
FS	Map unit on the landing site geologic map
HEDC	Hasselblad Electric Data Camera

GLOSSARY CONT'D.

HTC	Hand Tool Carrier
L and A	Landing and Analysis display at Cape Kennedy
LM	Lunar Module, "Orion"
LPM	Lunar Portable Magnetometer
LRL	Lunar Receiving Laboratory
LRV	Lunar Roving Vehicle - "Rover"
LSM	Lunar Surface Magnetometer
Mag/Mags	Magazine/Magazines - photographic
MESA	Modularized Equipment Stowage Assembly - a storage area on the LM that contains science equipment
NAV	Navigation
PAN	Panorama of 70-mm photographs
PHO	Photo, photographic reference in transcript keywording
PSE	Passive Seismic Experiment
RAKE	Rake Sample - sample reference in transcript keywording
RCU	Remote Control Unit
RTG	Radioisotope Thermoelectric Generator
SAMP	Sample reference in transcript keywording
SCB	Sample Collection Bag
SEQ	Scientific Equipment Bay on the side of the Lunar Module
SESC	Special Environmental Sample Container
SRC	Sample Return Container, "Rock Box"
SWC, Solar Wind	Solar-Wind Composition experiment

GLOSSARY CONT'D.

Strut	One of four legs on the LM
Plus-Z Strut	Forward leg on which the ladder is mounted
Minus-Z Strut	Rear leg of LM
Plus-Y Strut	Right leg of LM
Minus-Y Strut	Left leg of the LM
TRENCH	Trench Sample - sample reference in transcript keywording
UV	Ultraviolet
WC	A fresh 40-m crater 600 m southwest of the LM
***	Garbled or clipped transmission
- - -	Deletions between statements of statements that are not geologically relevant
-	Pause by speaker
- -	Interruption by another speaker, or abrupt termination of a recording
(words)	Explanation of words probably said that were garbled during transmission
(words?)	Explanation of words possibly said that were garbled during transmission

EXPLANATION OF KEYWORDING

The purpose of the keywords enclosed in parentheses to the right of the transcript is to inform the reader of either the phase of the mission (DESCENT, BETWEEN EVAs, etc.) during which the statements were made, or the particular location or station (LM, ALSEP, 1 etc.) where the speaker was, or between which locations (LM-ALSEP, 1-2 etc.) the speaker was traversing. There are also separate sample (SAMP xxxxx) and photo (PHO xx xxxxx) keys to denote the particular samples and photos either being described or taken at that particular moment. Normally, where both sample and photo keys occur in the same line, the photo numbers are cross-indexed to the sample numbers in that line. The occasional exceptions can be inferred from the context of the transcript -- AET 05 02 04 01 -- where the core bit sample number is not referenced to the photos that the LMP mentioned.

Where remarks in the beginning of a statement were neither specifically nor generally about the sampling or photography mentioned later in the same statement, the keywording was placed in the particular line containing the first mention of the referenced activities as with PHO 109 17828-36 in the statement made at 05 04 32 38.

Because the taking of specific photos was not always mentioned, we have keyed all photos known to show a sample or its location in the first line that contains sample keywording at the time the sample was collected.

Photo keys placed in the "- - -" lines(where non-relevant statements are deleted) show thew interval when those particular photos were taken even though not mentioned.

Conventions used in keyword sample and photo numbering:

SAMP CORE 60001-07	- Sample core 60001 through 60007 inclusive
SAMP 60090, 95	- Sample numbers 60090 and 60095
PHO 113 18296-310	- Magazine 113, frames 18296 through 18310 inclusive
PHO DAC	- Photographic reference to the Data Acquisition Camera - mounted on the Rover
PHO?	- Photo or photos taken that have not been identified

The photographic base for this map is Apollo 16 panoramic camera frame AS16-4618. The station locations and traverse routes are from compilations by the Apollo Field Geology Investigations Team under Contract No. T-5874A.

EXPLANATION

LM coordinates: 8.99° S Latitude
15.51° E Longitude

Figure 1. Apollo 16 landing site showing LM location and area traversed by astronauts during EVAs.

GEOLOGIC CONDENSATION OF THE APOLLO 16 VOICE TRANSCRIPT

* * * * DESCENT & LM WINDOW * * * *

04 08 26 55	CDR	Pitchover.	(DESCENT)
04 08 26 56	LMP	Pitchover. Hey, there it is. Gator, Lone Star. Right on.	(DESCENT)
		- - -	
04 08 27 03	LMP	Palmetto and Dot, North Ray. Looks like we're going to be able to make it, John. There's not too many blocks up there.	(DESCENT)
		- - -	
04 08 28 13	CDR	Okay Houston. We're going to be just a little long - - but we're just now abeam of Double Spot.	(DESCENT)
		- - -	
04 08 28 29	LMP	Some big blocks over here to the left, John.	(DESCENT)
		- - -	
04 08 29 02	LMP	Perfect place over here, John, a couple of big boulders. Not too bad.	(DESCENT)
04 08 29 08	LMP	Okay, 80 feet, down at 3. Looking super. There's dust.	(DESCENT)
		- - -	
04 08 29 36	LMP	Contact. Stop. Boom! Pro. Engine arm. Wow! *** Man! Look at that!	(LM WINDOW)
		- - -	
04 08 29 52	CDR	Well, we don't have to walk far to pick up rocks, Houston. We're among them.	(LM WINDOW)
		- - -	
04 08 30 13	CDR	*** I can look right out to the left and see - - Double Spot. And we're about - -	(LM WINDOW)
		- - -	

04 08 30 23	CDR	We're - - forward and to the north of Double Spot. I would guess about 200 meters to the north and maybe 150 meters to the west. It's not flatlands, though.	(LM WINDOW)
		- - -	
04 08 31 24	LMP	Hey, it sure ain't flat, John. There's that ridge to the north.	(LM WINDOW)
04 08 31 35	LMP	All we got to do is jump out the hatch and we got plenty of rocks.	(LM WINDOW)
04 08 31 41	CDR	I see Crown crater from here; I can see Ray crater from here.	(LM WINDOW)
		- - -	
04 08 31 54	CDR	Charlie's got nothing but a ridge to look at.	(LM WINDOW)
04 08 32 02	LMP	There's a ridge out in front of us, John.	(LM WINDOW)
04 08 32 07	CDR	Yes. There's a ridge in front of us, one to the side of us, and my guess is that we're in a subdued old crater that's got a lot more craters.	(LM WINDOW)
		- - -	
04 08 32 21	LMP	Say Jim this ridge in front of us does look like a subdued crater and it may be the raised rim about 50 meters in front of us, about, oh - 4 or 5 meters tall. About 30 or 40 percent of the surface is covered with boulders that are maybe half a meter in size.	(LM WINDOW)
04 08 33 58	CDR	The way these blocks are laid in here out my window, I'd guess they come from South Ray. There's some biggies out there. We got - right out in front of us about 100 meters, at my 10:30 position - I've got one that must be 3 meters across.	(LM WINDOW)
		- - -	
04 08 36 54	CDR	It's just about level, we're not going to have a bit of trouble getting out - - but it sure is not - it's not smooth - it's not that FS smooth.	(LM WINDOW)

- - -

04 08 37 12	CDR	It's not that FS smooth; we're in the middle of a block field.	(LM WINDOW)
04 08 37 17	LMP	There's Crown crater up there *** little blocks. We may have squashed a few. And, Jim we got Crown crater out - John's left window about 9 o'clock.	(LM WINDOW)
04 08 37 37	CDR	And just looking at it from here, I don't think the Rover's going to have any trouble going up that hill. I could be wrong - slopes tend to fool you.	(LM WINDOW)
04 08 37 48	CDR	It looked good going North Ray, too. There were some big blocks on the rim, but not - the tracks just looked good.	(LM WINDOW)

- - -

04 08 39 15	CDR	Man, we got a lot of rocks. That's for sure.	(LM WINDOW)

- - -

04 08 39 27	CDR	I wish I could tell you what kind of rocks those are. But some of them are very white - and doggone, if I could see; I'm not close enough to them, but I see one white one with some black; can't tell whether that's dirt or not on it. But it could be a white breccia.	(LM WINDOW)
04 08 39 52	LMP	Every one of them are angular, too, John.	(LM WINDOW)
04 08 39 54	CDR	Yeah, they're all angular. They're out of South Ray, I believe.	(LM WINDOW)
04 08 39 58	LMP	There's a pretty one over there, without any dust on it at all. Out about 50 meters, by those three little craters.	(LM WINDOW)
04 08 40 16	CDR	In fact, Houston, when I told you that I thought this terrain might be very spectacular, boy, I was not just kidding. It really is something looking at that mountain. That is a big mountain Charlie.	(LM WINDOW)

- - -

04 09 14 57	LMP	In my 2 o'clock position about - right on the rim of that little ridge we described earlier, there's a fresh little crater that is about 10 meters across, and it's just loaded with little 30, 40 centimeter blocks around it. Looks like you can see these blocks in the walls of that little crater. Looks like the thing is gonna be pretty blocky in the regolith. It really is bright outside. The surface looks almost white to me.	(LM WINDOW)
		- - -	
04 10 15 45	CDR	I'm up to frame number 30 on mag A, Charlie's camera, and I just finished shooting sort of a partial pan out the front window. Man, this place is - it's not anywhere flat around here. It's rolling terrain. And I really don't believe we're going to have any trouble at all getting up on the side of that hill, although the slopes up toward Crown look like maybe 20 degrees. We'll have to take that very carefully.	(LM WINDOW)(PHO 113 18296-310)
04 10 16 36	CDR	That first ridge is like about 10 degrees, but from there up to Cinco and Echo, it gets rather steep there.	(LM WINDOW)
04 10 16 45	CC	How about boulders?	(LM WINDOW)
04 10 16 48	CDR	It is just like we described, as very ridgy on Stone mountain. Boulders - well, we landed in a block field, you know.	(LM WINDOW)
04 10 17 07	CC	Right. Can you see any up on Stone?	(LM WINDOW)
04 10 17 14	CDR	No. Sure don't. Yeah. Maybe there is. When we get closer to it, we'll be able to tell better. I see some funny shadows up on top of it.	(LM WINDOW)
04 10 17 25	CC	Any problems in trafficability out on the EVA-1 direction.	(LM WINDOW)
04 10 17 34	CDR	It's gonna be a piece of cake, I think.	(LM WINDOW)
04 10 17 40	LMP	Tony, the problem looks like finding a flat spot to deploy the ALSEP. It's just hummocky, rolling terrain with 4- or 5-meter ridges.	(LM WINDOW)

04 10 17 57	CDR	Yeah, 100 meters from here, it's going to be on the side of a hill.	(LM WINDOW)
04 10 18 01	LMP	We can proably put it over the left there, John. Tony, I looked out - down at about 4000 feet, assessing North Ray area. There were some large blocks maybe 5 percent of the surface up around the rim, but as you look back towards Palmetto, they really petered out in a hurry, and I think we're going to be in good shape going that way.	(LM WINDOW)
04 10 18 32	LMP	One final comment here until I get back to work. About in my 1 o'clock position, about 30 meters out, just beyond the LM shadow, about twice as far as the LM shadow, there is a secondary crater with a large meter-sized block still in it. It looks like it formed the secondary, the top 3 percent or 5 percent of the block is black and white. Apparently below that is solid white.	(LM WINDOW)
04 10 19 07	LMP	And those black and white blocks - you can see them all over the place.	(LM WINDOW)
04 10 19 13	CC	Is the crater round, or is it oblong? Can you get a direction?	(LM WINDOW)
04 10 19 22	LMP	Yeah. It looks like to me it came from South Ray. It's oblong, stoved in towards Palmetto - just like those ones down at the cape that they dug out with a bulldozer.	(LM WINDOW)
04 10 19 35	CDR	I guess I have to stick to my earlier guess that we were about - maybe 200 meters north and 100 meters long past Double Spot, the northernmost crater of it. But we'll see as soon as we get out, because this is the first place I was ever at on a geology trip that I thought I knew where I was when I started.	(LM WINDOW)
04 10 20 32	CC	Roger. Okay. The one thing we would like you to see if you could decide before you get out is where you would put ALSEP.	(LM WINDOW)

04 10 21 19	CDR	Well, we'll keep looking at it, but the trouble is, right in front of us, about 50 meters, there's a ridge, and I don't know what's on the other side of that ridge. Out about 100 meters, I can see a lot of blocks, but I can't tell whether there are craters out there or not, because we're at zero phase. I just don't think we could make a prediction at this point.	(LM WINDOW)
04 10 22 19	CDR	Those blocks around South Ray are about the whitest blocks I've ever seen, around the rim of that one.	(LM WINDOW)
		- - -	
04 10 40 50	CC	Have at it. We'll take any words you've got. We expended all our questions a few minutes ago with John, and in fact I didn't even have to ask any; he just answered them all, so - but press on.	(LM WINDOW)
04 10 41 04	LMP	Okay. Looking out at 12 o'clock on the horizon there is a very hilly subdued region - well, let's say hilly terrain at 12 o'clock that goes on out of view around to 11. It's rolling, with white pockmarked craters there, and I'd say that's maybe 50 to 100 meters above the surrounding terrain where we are. As you move around from 1 to 3 o'clock approaching the - at about 1 o'clock, I would say we can see maybe a kilometer or so, but it might be very deceiving on that distance and we see more rolling terrain similar in albedo. It's a light gray with fresh craters being white. As we come on to 3 o'clock - 2:30 to 3 - the near ridge that was on our map so that blocks out North Ray and Stone mountain is, correction, Smoky is really there and it's about a 3- to 4-degree slope, and the ridge maybe goes up 10 to 15 meters. As we come into the near field at 12 o'clock in front of the LM maybe 50 to 100 meters, there's this other low ridge that we described, beyond that we can see a depression, and then it rises again to another ridge, which probably - goes into Spook crater. I think I can see Spook on the horizon at about my 12 o'clock position. As we - that is boulder covered. The largest boulder I see is perhaps 2 to 3 meters in width, and they're angular and there are three of those boulders, and one is at 12. The other two are over on that second rise away from us at about 1:30, and I'd say those	(LM WINDOW)

boulders and smaller down to 1 meter cover maybe 1 percent of the surface. The trafficability out that way looks good as far as boulders go. It's going to be up and down though. As we come into 2:30 from 50 to 150 meters, I've already described that bright fresh crater with the small blocks around it, more cobbles really. Beyond that, there are two other craters, which sort of trend into this depression that runs north-south here. There's a boulder beyond that at 2:30, which is partially buried. It has a good fillet on the south side; to the north side, and to the east side, there's no fillet at all. As we come on into 3 o'clock in the near field, I see a good size crater, perhaps 30 meters to 50 meters at 2 o'clock on the inboard side, that's my side of this ridge, and we have maybe 10 percent of the surface covered with blocks of less than half a meter.

04 10 44 26	CC	Very good Charlie. Where again was this boulder with the fillet?	(LM WINDOW)
04 10 44 33	LMP	It's at about 2:30, maybe a couple of hundred meters out, and it's on this side of the ridge that trends east-west here, that blocks out Smoky.	(LM WINDOW)
04 10 44 45	CC	Okay. Could it be sliding down the ridge, and that's why the fillet's on the south?	(LM WINDOW)
04 10 44 52	LMP	That might be the reason. I was just going to say, it's downslope so that might have been what happened.	(LM WINDOW)
04 10 45 00	LMP	Though the slope doesn't appear that steep, Tony.	(LM WINDOW)
04 10 45 05	CC	How about the Buster area? Can you identify that?	(LM WINDOW)
04 10 45 10	LMP	We sure saw it on descent. I don't see it right now. There's a bright crater to the right, maybe 50 meters of what I think is Spook, which is probably Buster, but I really wouldn't swear to it.	(LM WINDOW)
04 10 45 31	CC	Can you tell boulders over there?	(LM WINDOW)
04 10 45 37	LMP	There's not a one, as far as I can see.	(LM WINDOW)

- - -

04 10 45 49	LMP	Coming down Tony on descent it looks - as John has described, there's a distinct ray pattern across our landing site from South Ray, and the boulders effectively disappear by - we get to Palmetto. And then they don't reappear again until almost the flank of North Ray. You can see that depression that trends southward out of North Ray, and you can see the ridge line that I think will be an excellent way to climb up to North Ray in the Rover. Now this was all from 5000 feet, so I might be a little off on that, but at least the general impression was good. We could see Dogleg, we could see Cat; all of the craters that were on the stops were plainly visible. Hopefully, they'll be so when we start navigating on the ground.	(LM WINDOW)
04 10 46 48	CC	Very good. You were mentioning the boulders and the rays from South Ray. The ray itself, could you map out what extent it was, or was it just the whole general area?	(LM WINDOW)
04 10 47 02	LMP	It was a pretty wide ray coming across here. I would say it goes from our position perhaps to Spook. And maybe behind us maybe another 100 meters or so.	(LM WINDOW)
04 10 47 15	CC	Very good. How about left-right extent, did it go all the way back to South Ray?	(LM WINDOW)
04 10 47 23	LMP	Well, you'll have to ask John that. I didn't - couldn't see out that way. As we - the biggest block that I saw was one we flew over which is maybe 100 meters to 200 meters behind us, and it looked like Volkswagen size.	(LM WINDOW)
		- - -	
04 10 53 30	CDR	I can't see how far the rays go. I just assumed that this is a blocked view we're in from South Ray. It goes about 100 meters out at 10 o'clock and goes over a ridge and disappears. The next time I see it, it's at South Ray, which is, you know, pretty far away from here. South Ray is a doggone interesting crater. I wish we could get to it. The boulders on the west rim of it are just thick and white as they can be, and in the middle of it - on your map where it looks like it's a depression -	(LM WINDOW)

there appears to be a brown - a sort of a gray patch of dirt or something that was thrown out of that side of it. And then on the north, there's another ray of very white boulders coming out of it. Of course, we could see the ray pattern long before pitchover. At 22,000, I was able to get my nose up against the window and see the clue to where we were was South Ray. Because at 22,000 and at 60-degree pitch angle, we couldn't even see Stone mountain or any of the things in the rear, but you just didn't have any doubt in your mind that that big crater, and the way the pattern went, you work your around the pattern - I used the same guages to find out where we were going to land that we used on the L & A. The inverted "V" off of Stubby; Cove, Trap, Stubby, Wreck, Trap, and it works into Cove, Hidden Valley, and into Spook and from Spook off those small craters into Double Spot. And, I think we ended up landing right by one of the smaller craters that sort of form a hook off the north side of Spook, going back into Double Spot, and I think we're about 50 meters from it at 9 o'clock but - -

- - -

04 10 55 48	CC	How about the albedo?	(LM WINDOW)
04 10 55 55	CDR	Tremendous difference in albedo. On the North Ray is pure white - South Ray is pure white, and it blends into a gray, and then over here by us, it's almost totally gray. I guess you just get the feeling that these rocks may have come from somewhere else. There's a big subangular rock that I see at 11 o'clock at about 100 meters, that I would sure like to go over and look, because it looks like it's just one big piece of whatever rock it is.	(LM WINDOW)
04 10 56 37	CDR	Oh, and I do happen to see a white clast in the bottom of it.	(LM WINDOW)
04 10 56 42	CC	I was wondering about the albedo on your surface chart, on the strips and things, whether the rays are as obvious as they are on the high sun angle chart that you're carrying, or whether they look very much different at the low sun angle.	(LM WINDOW)

04 10 56 58	CDR	No, they're not, I don't think. I can see from here down to - Survey Ridge and the albedo on there is a lot lighter. It's a general gradual downslope from our landing point to Survey Ridge, and it looks like it drops maybe a hundred meters and then starts to go right back up Smoky mountain. I guess you could see on a contour map where the low spot is.	(LM WINDOW)
04 10 57 38	CDR	But there are some strange looking craters over there on Stone mountain, and the albedo contrast is really pronounced in those craters. It may be a function of shadow, we better wait until we get over there. I hesitate to say, they almost look like big - well, they must be impact craters, I guess.	(LM WINDOW)
04 10 58 07	CC	Okay. I was just wondering about whether you could recognize whether you're on a ray by albedo as well as the boulder content.	(LM WINDOW)
04 10 58 20	CDR	I think you're going to be able to; but, boy, you're not going to pick up a contact; it just tails out into something.	(LM WINDOW)
		- - -	
04 10 58 36	CDR	You're not going to be able to work across the contact. But you mainly would do it by the white boulders in the ray, I think. I can see, on ridge lines - from here, three different rays out of South Ray, I believe. Have to go down there and look at them to make sure. They seem to be riding on the ridge lines, although that's probably deceptive because I can't see down in the holes.	(LM WINDOW)

04 10 59 05	LMP	Tony, one other comment from my side, distances are pretty deceiving here for me. I'm looking out over John's shoulder, and it looks like to me you could throw a rock into South Ray from our present position; which is, I know, impossible. A second comment has to do with the orbital, since we got so much - so much look at the ground sailing around waiting to come down. Everywhere we saw the ground, which is just about the whole sunlit side. In the crater walls and on the ridges, we had the same lineation that the Apollo 15 photography showed on Hadley Delta and Hadley mountain. It was really remarkable how in the crater walls primarily, and in the ridges, and it gave you the impression that it was a fracture pattern that was all trending parallel to the - concentric around the craters, in the craters and - on the ridge, though they were sort of either parallel to the ground or at some depth, be what that may.	(LM WINDOW)
04 11 00 31	CDR	And I'm looking out here at Stone mountain, and I got a picture of it, and it looks like somebody has been out there plowing across the side of it. The benches just look like one sort of terrace right after another, right up the side. And they sort of follow the contour of it right around.	(LM WINDOW)
04 11 00 51	CC	Any differences in the terraces?	(LM WINDOW)
04 11 00 58	CDR	No Tony, not that I can tell from here. Those terraces could be rays out of Stubby or something like that.	(LM WINDOW)
04 11 01 10	CDR	Right at the edge of Stone, Stubby has got much steeper walls going off of Stone mountain than I originally imagined it. I don't think Stone mountain came up to Stubby and stopped.	(LM WINDOW)
04 11 01 40	CC	Okay. You think Stubby is punched into the edge - -	(LM WINDOW)
04 11 01 47	CDR	Well, that's my guess from here but there again, the thing is so steep that the whole side of Stone mountain right now - a good half of it is in shadow.	(LM WINDOW)
04 11 01 59	CC	Charlie. One thing, you mentioned two rock types - the black and white ones and then the all white ones. Do you see anything else?	(LM WINDOW)

04 11 02 13	LMP	Yes, there was one right out in front of the LM here, just to the right of the footpad that looks like a breccia to me. - either that, or an indurated regolith. We'll tell you when we get out.	(LM WINDOW)
04 11 02 45	LMP	Tony, we'll give you an analogy of what that black and white rock looks like. It's really a gray and white and looks like a granitic rock with very large crystals to it, though I kind of doubt that.	(LM WINDOW)
04 11 03 13	CDR	There are really some interesting rocks out here. I see some that are pure snow white, and we've got the whole run of them. It's hard to tell at this sunlight, which is so bright on the surface, just exactly what color these things are, even with the naked eye. You know, it's very deceptive. I swear I see one out there with some pink in it, but we'd better wait until we get out. We'll pick it up and make sure.	(LM WINDOW)
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04 11 04 36	CC	Hey, Charlie. When you get a chance, could you take a look at that ridge at 12 o'clock, which you described as 50 to 100 meters out, and see if that continues on around to 10 and 9?	(LM WINDOW)
04 11 04 50	CDR	Yes, it does.	(LM WINDOW)
04 11 04 53	CDR	Okay, continues on around to my side.	(LM WINDOW)
04 11 04 57	LMP	John's original observation was that we look like we're in a big old subdued crater, and that's really what it looks like Tony.	(LM WINDOW)
04 11 05 14	LMP	Man, those black and white rocks really look interesting Tony. I just can't wait to grab one of those.	(LM WINDOW)
04 11 05 28	LMP	In fact, the impression you get is that it almost looks like the color of labradorite.	(LM WINDOW)
04 11 05 56	LMP	I guess it's really a bluish cast, instead of real black to me, but in this sun it looks bluish.	(LM WINDOW)

04 11 06 14	CDR	Well, we'll bring you a small one of each. I'll tell you one thing, I'm glad we brought the rake, because we really can do it.	(LM WINDOW)
04 11 06 25	CDR	We can get a rake sample out in front of the Lunar Module with one scoop.	(LM WINDOW)
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04 11 52 22	LMP	Well I guess I can't stop talking - one final observation, Tony, is that due to the lack of dust that we had on landing and the fact that we can see blocks embedded in the side of these craters, here, I kind of got the distinct impression that the regolith is not too thick around here, and we ought to maybe think about where would be the thickest place to - in order to get the drill in.	(LM WINDOW)
04 11 52 53	CC	That's a good observation. From the films you've seen of other descents, do you think the dust was less than any of the others?	(LM WINDOW)
04 11 53 03	LMP	Well, John will have to really comment on that, but as far as my side goes, I could see right on down through it - the dust film.	(LM WINDOW)
04 11 53 18	CC	From listening to your descent, it sounded like you picked it up about 90 feet.	(LM WINDOW)
04 11 53 26	LMP	It was a little bit less than that. It was about 80, maybe 75.	(LM WINDOW)
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04 23 01 47	CDR	Okay. Houston, I'm standing out on the porch. I've got the ETB in one hand, and we're just sort of looking around here. My golly, what a view. I can see the big boulders Charlie was talking about.	(LM)
04 23 04 05	CDR	There you are our mysterious and unknown Descartes Highland Plains, Apollo 16 is going to change your image. I'm glad they got old Brer Rabbit, here, back in the briar patch where he belongs.	(LM)
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04 23 05 02	CDR	Well, don't come out until you see what we - see what we just passed over.	(LM)
04 23 05 06	LMP	It was a big rock, I tell you.	(LM)
04 23 05 09	CDR	It was a big hole.	(LM)
04 23 05 13	LMP	Okay. Close the hatch.	(LM)
04 23 06 05	LMP	Wow! Look at that landing. You almost got a big rock with the - about a 50-centimeter rock with the left leg.	(LM)
04 23 06 24	LMP	Fantastic. That's the first foot on the lunar surface; it's super, Tony. Okay, Tony, we're making little footprints here about 1/2-inch deep, not kicking up really very much. We're going to have to pull that MESA up, John; that's too low.	(LM)
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04 23 13 19	LMP	Well, Houston, here we are. Sleepy little Descartes. Boy, the old Cayley Plains are really something. Tell you, there are rocks all over the place, as we described.	(LM)
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04 23 14 15	LMP	Tony, right behind the LM here, within 3 meters of the minus-Z footpad there's a hole, a crater that is probably 10 meters deep - 5 meters maybe, but 30 degrees for angles on the side.	(LM)

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04 23 15 30	LMP	Tony, if I get 20 feet back to do the pan from the SEQ bay here, I'm going to fall in that big hole.	(LM)(PHO 113 18313-30)
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04 23 17 36	LMP	Hey, that rock under there looks like a vesicular basalt to me. The black one.	(LM)
		- - -	
04 23 20 17	LMP	John picked up the exact bottom of this old crater.	(LM)
04 23 20 25	CDR	There weren't any flat places around here, Charlie.	(LM)
04 23 20 29	LMP	Yes, but anywhere else we would have landed, we would have been on a great big slope.	(LM)
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04 23 22 50	LMP	Watch that big rock there.	(LM)
04 23 22 54	LMP	About a 50-centimeter boulder right next to the minus-Y footpad, angular.	(LM)
04 23 33 46	LMP	Okay, Tony; I'm starting with mag Alpha at count 39.	(LM)(PHO 113 18313-30)
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04 23 34 32	LMP	Okay, Tony, I'm gonna be about 20 meters behind - between the plus-Y and the minus-Z. If I get right into the SEQ bay, I'm in that big hole.	(LM)
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04 23 35 44	LMP	Okay, pan complete.	(LM)(PHO 113 18313-30)
		- - -	
04 23 35 53	CC	Okay and we'd like you to take pictures of the ablated paint, Charlie.	(LM)(PHO 113 18331-38)
04 23 36 00	LMP	I'll do it at f:8, at about 15 feet.	(LM)(PHO 113 18331-38)
04 23 36 11	CC	Okay, we'd like f:8 at 250, and f:11 at 250 of all of the ablated surfaces.	(LM)(PHO 113 18331-38)

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04 23 36 34	LMP	Tony you can see the striations caused by the descent plume. It's running John.	(LM)

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04 23 37 05	CC	Okay and when you're over at the S-band, we have a couple of more pictures of that one.	(LM)(PHO 113 18331-38)

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04 23 37 54	CC	We want you to take a picture of the white side of the yoke. The yoke has a black side and a white side. And on the white side, we want 1:250, f:5.6, f:8, and f:11.	(LM)(PHO 113 18331-38)
04 23 38 13	LMP	Okay, I've got the f:8 and f:11. I'll do the 5.6 one.	(LM)(PHO 113 18331-38)

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04 23 39 38	LMP	Tony, the pan is complete. The soil around here is very fine grain. Dusty, much like all the regolith that we've seen samples of from the other sites. The rocks are scattered. Perhaps 20 or 30 percent of the surface is covered by boulders up to 25 centimeters. Small craters pockmark up the whole place; meter to 2-meter size, covering perhaps 70 percent of the surface.	(LM)(PHO 113 18313-30)

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04 23 41 11	CDR	I'm looking at a rock here that's got all kinds of dark clasts in it, and that's got to be a breccia. Too many different kinds. Yeah, it is.	(LM)
04 23 41 27	LMP	Looking at Stone mountain. You see some lineations in it that are parallel to the local terrain - or to the normal surface, and they follow the contour lines. It looks to me it might be just some ridges - small ridges in it. They're scattered about. I say scattered about, that's not any good at all. They look like a couple of meters wide or so, and the same distance - - and separation.	(LM)

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05 00 02 54	LMP	Okay, fine. Okay. The DAC is coming out.	(LM)(PHO DAC)
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05 00 04 21	LMP	Man, I tell you, if my Christmas stocking looked like this ETB, I'd be saved. Okay, magazine P, the X is in the middle, and the frame is lined up.	(LM)(PHO DAC)
05 00 05 48	LMP	Okay the camera is running! The 16 millimeter is running!	(LM)(PHO DAC)
		- - -	
05 00 07 35	LMP	Magazine Bravo is going on the Commander's camera. And it's starting at frame count number 4.	(LM)
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05 00 19 33	LMP	I'm gonna get the control sample in.	(LM)
05 00 19 35	LMP	And it works. You can spin it right up, John.	(LM)
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05 00 24 36	LMP	We're starting the LMP's camera for the flag.	(LM)(PHO 113 18339-40)
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05 00 25 02	LMP	And, Tony, the Rover tracks - they are just barely sinking in.	(LM)
		- - -	
05 00 26 13	CDR	Okay Charlie, say when.	(LM)(PHO 113 18341-43)
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05 00 26 17	LMP	One for you. Okay, wait a minute; one more.	(LM)
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05 00 28 25	CDR	You know, we hardly kick up any dirt at all, Charlie. Just hardly any.	(LM)
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05 00 33 53	LMP	- - I'm going out where this - man, look at that breccia, John! Right there. This big, subrounded -	(LM-ALSEP)
		- - -	
05 00 39 16	LMP	This ray pattern extends back about 200 meters or maybe more to the east and goes as far as we can see off to the west, which is maybe another 200 meters. I can see Smoky mountain now, and I can see Dome. Kennesaw is plainly visible with two big craters on its flanks. And if you look toward Smoky, I see some big craters up on the top, but I can't see Ravine or North Ray yet.	(LM-ALSEP)
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05 00 40 46	LMP	Look at the size of that rock. It's about a 2-meter boulder, I just passed. Okay John?	(LM-ALSEP)
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05 00 41 37	CDR	Charlie's down there to the southwest.	(LM-ALSEP)
05 00 42 01	LMP	I think that the best place here for the ALSEP is to the LM 11 o'clock position, and I'll let John give you the range. But it's up on the top of a dome, and it's fairly flat, and I think John can drive about 290, maybe 28, down over a ridge for the thumper. There's just not any flat places here. This is the flattest I can find.	(ALSEP)
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05 00 42 57	LMP	The regolith hasn't changed any out this far. We still have numerous subrounded to angular blocks - partially buried. Here's a secondary. Here's a big boulder, the one I described, that's 2 meters across with about a 50-centimeter fillet above the - -	(ALSEP)
		- - -	
05 00 44 01	LMP	This big rock is a two-rock breccia. The matrix is a black rock - blackish to bluish - with some very fine, submillimeter-size crystals.	(ALSEP)
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05 00 45 07	LMP	John, it sure looks like we're on a more than 2-degree landing slope, but it's not.	(ALSEP)
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05 00 45 32	LMP	Okay, Tony back to this rock. The small frags in it are whitish in color with a small sub-millimeter crystal - millimeter-size crystals of - it looked like perhaps olivine in the white matrix - in the white clasts, let's say. And it's a biggie; it's right near the ALSEP. We'll get a picture for that. It'll show up in the pan.	(ALSEP)(PHO 113 18344)
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05 00 47 09	CDR	- - there's just hardly any place that hasn't got craters around here. Is that where you want to put the ALSEP?	(ALSEP)
05 00 47 13	LMP	This is the levelest spot I could find.	(ALSEP)
05 00 47 16	CDR	There's just no place that doesn't have craters and things around it. Think 290 from here, huh?	(ALSEP)
05 00 47 28	LMP	Yeah, I'm about cross-sun here.	(ALSEP)
05 00 47 34	CDR	We're 1/10 on the range in distance.	(ALSEP)
		- - -	
05 00 47 51	LMP	Is that 290?	(ALSEP)
05 00 47 52	CDR	No, let me show you 290. Like this.	(ALSEP)
05 00 47 58	LMP	Okay; that's okay.	(ALSEP)
05 00 48 00	CDR	It's right down in this hole, is what it is.	(ALSEP)
05 00 48 04	LMP	I can move it over here another 30 feet or so.	(ALSEP)
05 00 48 07	CDR	Okay, do that. Oh boy, I tell you, this place is full of holes, Houston. And rocks.	(ALSEP)
		- - -	
05 00 49 25	LMP	How does that look out there, John?	(ALSEP)

05 00 49 27	CDR	It looks like everything else around here full of holes.	(ALSEP)
05 00 49 31	LMP	I know it, and lots of craters.	(ALSEP)
05 00 49 33	CDR	Lots of craters.	(ALSEP)
05 00 49 35	CDR	We're not lacking for them.	(ALSEP)
		- - -	
05 00 50 11	CDR	If the number of craters are any indication, this has got to be old material. Even the craters have craters.	(ALSEP)
05 00 50 44	LMP	Man, I am black already, from the knees down.	(ALSEP)
05 00 50 52	CDR	Okay, have you got the Central Station lined up?	(ALSEP)
05 00 50 55	LMP	East-west.	(ALSEP)
05 00 50 57	CDR	You going to deploy your drill down there, huh?	(ALSEP)
05 00 51 06	LMP	To the south. You need to park -	(ALSEP)
05 00 51 11	CDR	I'll park over there by that rock, Charlie. Heading 180?	(ALSEP)
05 00 51 18	CDR	195.	(ALSEP)
05 00 51 19	LMP	Yeah, that'll be good. Great.	(ALSEP)
05 00 51 22	CDR	I tell you why I'll park over by that rock, because it drops off like a -	(ALSEP)
05 00 51 56	LMP	We're sort of dusty here and man we're -	(ALSEP)
		- - -	
05 00 56 16	LMP	I think we may have come a little further than we thought we were going to, Houston. I see Double Spot back there or what looks like Double Spot - and we're a good ways past that.	(ALSEP)
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05 00 57 00	LMP	John, we're not much off I'll tell you.	(ALSEP)

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05 00 59 39	LMP	Tony, let me give you a question here. The down-sun heat probe is gonna be within 2 meters of about a 5-meter crater. That's maybe a meter deep. Is that okay, or do you want me to move it?	(ALSEP)
05 00 59 57	CC	Can you move it to a crater-free area?	(ALSEP)
05 01 00 03	LMP	Yes, I can, but it will be more towards the LSM.	(ALSEP)
05 01 00 12	CC	Okay, we'd like to do that.	(ALSEP)
05 01 00 16	LMP	Okay. The one up-sun is perfect, straight up-sun.	(ALSEP)
05 01 00 34	LMP	This is a super place right here for this up-sun one. Okay here we go with a big drill coming up. Down into the crater he goes. There's a secondary - little one.	(ALSEP)

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05 01 01 22	CC	Now, when you're standing over the Rover there, could you read off the heading?	(ALSEP)
05 01 01 25	LMP	Bearing to the LM is 033, the heading is 195.	(ALSEP)

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05 01 04 47	LMP	Walking into a little 3-meter crater here, Tony, you can see. Really dig in when you go into those craters.	(ALSEP)

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05 01 06 02	LMP	I'm going to have to drill away from that crater. Tony, I'm about 4 or 5 meters away, is that okay? From that crater I described?	(ALSEP)
05 01 06 08	CC	That sounds good.	(ALSEP)
05 01 06 12	LMP	Okay, we'll start drilling right here, then.	(ALSEP)
05 01 06 21	CDR	Well, that won't be any problem. The only thing goes down past there is the LSM.	(ALSEP)

05 01 06 29	CDR	And we may have to deploy the LSM out behind the ALSEP anyway to get it from going down in that little crater there. I think 50 foot will put me right in that hole. What do you think of that, Houston, if I deploy the LSM behind Charlie's thing here?	(ALSEP)
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05 01 07 43	CC	That's okay, John. We understand you had to deploy it almost due west of the RTG?	(ALSEP)
05 01 07 51	CDR	Right.	(ALSEP)
05 01 08 08	CC	Okay, and we need about 30 feet between that heat flow hole and the LSM.	(ALSEP)
05 01 08 26	CDR	Understand. We'll give you that.	(ALSEP)
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05 01 09 20	LMP	I can stab it into the ground about - okay are you guys ready? Here we go.	(ALSEP)
05 01 09 35	LMP	Mark. Hey, that beauty is going right in.	(ALSEP)
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05 01 09 51	LMP	It's not going in. Something hard in there.	(ALSEP)
05 01 10 07	LMP	Whatever it was, we got through it, Tony. It's speeding up again.	(ALSEP)
05 01 10 13	LMP	Right on down now. It's super now. It must have been a rock.	(ALSEP)
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05 01 10 27	LMP	Okay, and first, the long stem is in.	(ALSEP)
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05 01 13 37	LMP	Here we go, second one.	(ALSEP)
05 01 13 41	LMP	Mark. Look at that beauty go. Look at that beauty stop. Look at that beauty go again.	(ALSEP)

05 01 14 01	LMP	I'm not leaning on it. It may appear that I am leaning on it, Tony, but I guarantee you I am not.	(ALSEP)
05 01 14 11	LMP	Okay. It's run into something hard down there. I can feel the torque, but whatever it is, it's going through it. Yep, it was through it. It's probably just some rocks down there in the regolith, Tony. You know, I bet it's just like the side of that fresh crater we saw back near the LM.	(ALSEP)
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05 01 16 26	LMP	Mark.	(ALSEP)
		- - -	
05 01 16 48	LMP	Tony, it bogs down as it goes down through rocks and things. Now it's getting really hard. It's giving me a lot of torque. The third stem is just about in.	(ALSEP)
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05 01 17 20	LMP	Mark. Okay, I'll call it quits on that one.	(ALSEP)
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05 01 25 36	LMP	Okay, starting on the deep drill.	(ALSEP)(SAMP CORE 60001-07)(PHO 113 18367)
05 01 25 46	LMP	Mark.	(ALSEP)(SAMP CORE 60001-07)
05 01 25 51	LMP	Mark. That one went in like gangbusters!	(ALSEP)(SAMP CORE 60001-07)
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05 01 29 21	LMP	Okay, Tony; I had a tough time getting the bit off the first stem. Got a little dusty in there, but I got it cleaned out.	(ALSEP)(SAMP CORE 60001-07)
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05 01 31 56	LMP	The problem is that the bit won't stay stuck in the ground, and when I try to get this stuff on, it spins the whole deal instead of the - -	(ALSEP)(SAMP CORE 60001-07)
		- - -	

05 01 33 19	LMP	Okay, second one going in, Tony.	(ALSEP)(SAMP CORE 60001-07)
05 01 33 24	LMP	Mark.	(ALSEP)(SAMP CORE 60001-07)
05 01 33 32	CC	Right. Don't hurry it.	(ALSEP)(SAMP CORE 60001-07)
05 01 33 33	LMP	I'm holding back on it this time.	(ALSEP)(SAMP CORE 60001-07)
05 01 34 16	LMP	Mark. Okay, the second one went in with no problem, Tony.	(ALSEP)(SAMP CORE 60001-07)
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05 01 34 54	CDR	Okay, the Central Station is erected.	(ALSEP)
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05 01 36 47	LMP	Okay, last one going on, Tony.	(ALSEP)(SAMP CORE 60001-07)
		- - -	
05 01 37 04	LMP	Boy, if that's all the sections are like that first one, pull it - right out of the ground. But I don't think that's true.	(ALSEP)(SAMP CORE 60001-07)
05 01 37 52	LMP	This ain't the cleanest place I've ever been in my life. Ooh. Dust is everywhere.	(ALSEP)
05 01 38 19	LMP	Okay, last one, Tony.	(ALSEP)(SAMP CORE 60001-07)
05 01 38 21	LMP	Mark.	(ALSEP)(SAMP CORE 60001-07)
		- - -	
05 01 38 38	LMP	Slowly going in. What I'm doing is let it do the work.	(ALSEP)(SAMP CORE 60001-07)
05 01 39 44	LMP	Mark.	(ALSEP)(SAMP CORE 60001-07)
		- - -	
05 01 41 55	LMP	We really sink in on that rim of that little crater.	(ALSEP)
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05 01 44 04	LMP	Okay, Tony. The top of the deep core has got cap number A.	(ALSEP)(SAMP CORE 60001-07)

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05 01 49 28	LMP	John, is that (LSM) going to be all right next to that rock?	(ALSEP)
05 01 49 33	CDR	There ain't much other place to put it. If it ain't next to the rock, it's going to be in that hole right next to it.	(ALSEP)
		- - -	
05 01 50 08	CC	John, how far are you from that rock?	(ALSEP)
05 01 50 14	CDR	It's about - 3 feet.	(ALSEP)
		- - -	
05 01 51 23	CC	On that hole, there, instead of putting the rammer jammer down it, I guess we would like to put the second heat flow probe down the hole and then measure it with the rammerjammer, how far it went, and just leave the heat flow probe in the hole. Does it reach over there?	(ALSEP)
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05 01 51 45	LMP	No, I don't think it will reach, Tony.	(ALSEP)
05 01 51 50	CC	Okay, then, just go ahead and measure the hole.	(ALSEP)
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05 01 53 00	LMP	All the way down I just dropped the rammer into it - it just fell in.	(ALSEP)
		- - -	
05 01 53 16	CDR	Okay, Charlie. We're about ready to go with the geophones here.	(ALSEP)
05 01 53 19	LMP	Wait a minute. I got the most beautiful thing here. I got to pick this up - before I lose it.	(ALSEP)(SAMP 60090, 95)
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05 01 54 14	LMP	I'm coming. Let me put this over here.	(ALSEP)(SAMP 60090, 95)
05 01 54 46	LMP	Tony, on the rim of that little crater, as I walked through there, there was underneath the regolith, there was a white area. I kicked up some very white soil, about 3 centimeters down.	(ALSEP)
		- - -	
05 01 55 39	LMP	Okay, Tony. I stuffed the geophone stake in, by just pushing on it about a foot. Y'all better think about that two-tenths cone penetration; at 10. It looks like the 5 would be best all the way out. I think I'll just go right up to the hilt with the two.	(ALSEP)
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05 02 03 46	LMP	Okay, Tony. I have LMP's camera.	(ALSEP)
05 02 04 01	LMP	The back of - the bottom of the bit is with Bravo - and I'm going back out and take some pictures.	(ALSEP)(SAMP CORE 60001)(PHO 113 18345-75)
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05 02 05 05	LMP	Okay. All ALSEP taken at f:11, 1/250.	(ALSEP)(PHO 113 18345-75)
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05 02 13 49	LMP	Tony, as I look up to Smoky mountain, you can see some large blocks up on the flank of Smoky mountain. On the face, it's the side next to North Ray crater.	(ALSEP)
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05 02 23 02	LMP	We got all the pictures except for the ones John's supposed to take of the mortar package. And I'm, skipping the heat flow ones. And we're up to 101 on magazine Alpha.	(ALSEP)(PHO 113 18345-75)
		- - -	
05 02 24 57	LMP	Did you see what I held just in front of the camera, Tony?	(ALSEP)(SAMP 60090, 95)
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05 02 25 04	LMP	It was a solid piece of glass, spherical and part of it's broken away, but it really - most unique piece of glass I've seen in all the samples.	(ALSEP)(SAMP 60090, 95)
05 02 25 33	LMP	It's a solid piece of glass.	(ALSEP)(SAMP 60090, 95)
05 02 25 42	LMP	And it was right out here by the drill.	(ALSEP)(SAMP 60090, 95)
		- - -	
05 02 28 56	CC	Charlie, what was the cap on the bottom end? We missed that.	(ALSEP)(SAMP CORE 60001)
05 02 29 02	LMP	Baker.	(ALSEP)(SAMP CORE 60001)
05 02 29 06	LMP	It's all full, Tony.	(ALSEP)(SAMP CORE 60001)
05 02 29 43	LMP	Delta and Baker on the bottom.	(ALSEP)(SAMP CORE 60001)
05 02 29 54	LMP	You're losing a little bit out of the third section here. Get the cap on.	(ALSEP)(SAMP CORE 60001-07)
05 02 30 14	LMP	And Echo is on the bottom of the third section.	(ALSEP)(SAMP CORE 60001-07)
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05 02 37 02	LMP	Okay, Tony. I'm going to get a couple of grab samples out here in front of the Rover about 15 feet. Look like typical rocks that are in this area. They're mostly dust covered here, but I can pick up a couple that are whitish, and I'll get a couple of cross-suns before.	(ALSEP)(SAMP 60030-35)(PHO 114 18383-84)
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05 02 40 55	CDR	I can't believe how full of holes this place is - a general comment. You got the camera, Charlie?	(ALSEP)
05 02 41 02	LMP	No, it's on the Central Station.	(ALSEP)
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05 02 41 15	LMP	Okay, bag 351 has got a grab sample. And I won't take an after.	(ALSEP)(SAMP 60030-35)
05 02 41 30	CC	After taking pictures of the mortar package there, we would like a picture of that last thump imprint.	(ALSEP)(PHO 113 18376080) (PHO 113 18381-82)

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05 02 41 43	LMP	Houston, I was just saying my first rock - even though I had to fall down to get it.	(ALSEP)(SAMP 60030-35)
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05 02 43 20	CDR	Okay. What settings do you want on that, Houston?	(ALSEP)(PHO 114 18383-84)
05 02 43 24	CC	Cross-sun on it. Normal cross-sun.	(ALSEP)(PHO 114 18383-84)
05 02 43 31	CDR	You want a stereopair?	(ALSEP)(PHO 114 18383-84)
05 02 43 32	CC	That'd be fine.	(ALSEP)(PHO 114 18383-84)
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05 02 44 15	LMP	I'm going over to this crater and get you some of this white soil. I think it is coming off of this rock here, but it looks like caliche. I never thought I'd use that word up here, but that's what the coating looks like.	(ALSEP)(SAMP 60050-59)(PHO 114 18385-88)
05 02 44 35	LMP	Come and look at it, John. It might be just a total white rock; the cross-sun, oh, man, are your settings going to be terrible.	(ALSEP)(SAMP 60050-59)
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05 02 45 15	LMP	Get a little shovelful of that stuff.	(ALSEP)(SAMP 60050-59)
05 02 45 25	CDR	Gosh, Charlie, it does look like caliche.	(ALSEP)(SAMP 60050-59)
05 02 45 27	LMP	Doesn't it look like caliche?	(ALSEP)(SAMP 60050-59)
05 02 45 28	CDR	Yeah, but it's just a bunch of white frags, I believe.	(ALSEP)
05 02 45 33	LMP	I'm going to get this rock here, too.	(ALSEP)(SAMP 60070, 75)(PHO 114 18385-88)
05 02 45 36	CDR	Put that in there?	(ALSEP)
05 02 45 37	LMP	No, go ahead, I'll get another bag for that.	(ALSEP)(SAMP 60070, 75)
05 02 45 49	CDR	Okay, that - sample of white material is going in bag 355.	(ALSEP)(SAMP 60070, 75)

05 02 46 09	LMP	Okay, John, I got your pictures.	(ALSEP)(SAMP 60070, 75)(PHO 114 18385-88)
05 02 46 13	CDR	Charlie, what are you doing with the dirt? You just threw it all over yourself.	(ALSEP)(SAMP 60070, 75)
05 02 46 17	LMP	I didn't mean to - the rock fell out.	(ALSEP)(SAMP 60070, 75)
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05 02 46 28	LMP	Okay, Tony. It's a white matrix in this rock with some clasts - it's a one-rock breccia. One of the clasts just fell out. But it really looks like a caliche matrix. Sort of friable.	(ALSEP)(SAMP 60070, 75)
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05 02 46 53	CDR	Oh - what do you want to do with these samples?	(ALSEP)(SAMP 60050-59, 70, 75)
05 02 46 56	LMP	Put them in this HTC right here.	(ALSEP)(SAMP 60050-59, 70, 75)
05 02 46 58	CDR	Okay. This number 2 one?	(ALSEP)(SAMP 60050-59, 70, 75)
05 02 47 00	LMP	Yeah. That's the one that's going on somebody's back.	(ALSEP)(SAMP 60050-59, 70, 75)
05 02 47 06	CDR	It's got the core tubes in it, so it probably goes on your pack.	(ALSEP)
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05 02 47 28	LMP	Okay. This white rock - that I picked up is in bag 373.	(ALSEP)(SAMP 60070, 75)
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05 02 47 52	LMP	Okay, John. I got to change the mag on my camera. Can you give it to me?	(ALSEP)
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05 02 49 06	LMP	Hey, Tony. Magazine Alpha is going out with 110.	(ALSEP)
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05 02 49 16	LMP	Dust everywhere, John.	(ALSEP)
05 02 49 27	LMP	Okay. Magazine Golf is going on at frame count 2.	(ALSEP)

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05 02 49 50	LMP	Okay, Golf runs.	(ALSEP)(PHO 109 17746)
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05 02 50 06	CDR	Okay, Charlie, which bag do you want?	(ALSEP)
05 02 50 10	LMP	There's a set of bags over here.	(ALSEP)
05 02 50 13	CDR	Okay, 5, 6, 7, or 8 setting there. I'll get you one.	(ALSEP)
		- - -	
05 02 50 29	CDR	That big rock right there is a breccia - look at all those clasts in there.	(ALSEP)
05 02 50 33	LMP	I know it - most of them in here are breccias.	(ALSEP)
05 02 50 40	LMP	I picked up one.	(ALSEP)(SAMP 60070, 75)
05 02 50 43	CDR	Yeah, that's about a two-rock breccia there.	(ALSEP)
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05 02 52 47	LMP	In fact, Tony - looking up-sun towards the eastern part of Stone mountain, you cannot see those lineations, but as we look across-sun those lineations are there - -	(ALSEP)
		- - -	
05 02 53 03	LMP	Yeah, and they trend sort of upslope to the northwest.	(ALSEP)
		- - -	
05 02 53 27	CC	Yeah, it's funny. It turns the same as Hadley.	(ALSEP)
05 02 53 22	LMP	Yeah, it does exactly. And it goes right up over the ridge, a ridge line and back down the ridge - the one that's got Cinco craters on it, and then back down into the ridge where -	(ALSEP)
		- - -	

05 02 58 32	CDR	Okay. 033 is the bearing; the range is 0.1.	(ALSEP)
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05 02 58 48	LMP	Okay, Tony. Looking off to the northwest there, you can see South Ray crater with just tremendous amount of blocks on it with some black streaks, and here we go. Heading 274, John.	(ALSEP-1)(PHO 109 17747)
05 02 59 08	LMP	And it's going to be a piece of cake taking pictures from here, Tony. There's a big crater. There about 10 meters off to your left there, John.	(ALSEP-1)(PHO 109 17748-74)
05 02 59 17	LMP	A deepy one over here.	(ALSEP-1)
		- - -	
05 02 59 32	LMP	Okay at 043, at 0.2, just beyond the ALSEP, there are two twin craters; the biggest one's to the north, got blocks in it, up to 6 - 50 centimeters, and it's about 5 meters deep.	(ALSEP-1)
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05 03 00 44	LMP	We're still in this boulder field, on a heading of 300 now just navigating around a couple of craters, they are very angular. All of them look the same - these breccia clasts with a dark matrix with white clasts. Biggest one I've seen is about in the 12 o'clock position of the Rover, and we're 065, 0.2 and it's - about a meter across. Tony, we seem to be riding across a ridge top that trends east-west. Off to the left, it drops off drastically, about maybe a 5- to 10-degree slope into a valley which is probably Eden Valley.	(ALSEP-1)
05 03 01 43	LMP	And white - and South Ray crater is spectacular in our 10 o'clock position, and we're 072 at 0.3 now.	(ALSEP-1)
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05 03 02 48	LMP	0.4, still nothing new to report. Maybe more cobbles in this area now. in fact there are. The regolith is more cobbly in appearance, still angular. Maybe 40 percent of the surface is covered with cobbles that are 10 centimeters.	(ALSEP-1)

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05 03 03 28	LMP	We see some small fresh craters. Okay, meter size, that show some very fresh - at least, perhaps it's induration - indurated regolith. That's what it looks like, because it's - the little hard clods are the same inside the craters as on the rim.	(ALSEP-1)
05 03 04 00	LMP	At our 11 o'clock position, we're at 089 for 0.4. We have two very bright, small craters that are 2 - 3 meters across, and we see some whitish material down below in the walls of the craters there. They're about 25 meters off.	(ALSEP-1)
05 03 04 23	CC	Those rocks that you collected; were they all breccias, or could you tell?	(ALSEP-1)(SAMP 60035, 55-59, 70, 75)
05 03 04 32	LMP	I'm not sure, Tony. I think they were breccias, but they were sort of really dust-covered, so I couldn't tell you, really.	(ALSEP-1)(SAMP 60035, 55-59, 70, 75)
05 03 04 40	CC	Okay, understand. And have you seen any rocks that you're certain aren't breccias?	(ALSEP-1)
05 03 04 54	LMP	Negative. I haven't seen any that I'm convinced is not a breccia.	(ALSEP-1)
05 03 05 03	LMP	Okay. We're going generally west now, and at our 1 o'clock position on a heading of 270 at a bearing of - we're 091 at 0.5 - we're in another predominant - another distinct ray field, ray pat - ray, let's say - boulder field. We sort of passed out of one, and we're in another one.	(ALSEP-1)
05 03 05 31	CDR	Think that to the south of us is Spook?	(ALSEP-1)
05 03 05 36	LMP	It could be.	(ALSEP-1)
05 03 05 42	LMP	No, Spook's about - let's see - at 0.6, we should be at Spook, huh? Let's see. Spook is at 100 at 0.9. Not there yet. We're only 0.6, Tony. Okay. This ray field has the same pebbles and cobbles and some good secondaries here.	(ALSEP-1)

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05 03 06 28	LMP	Okay. Turn left, John, and let's go look at that - look down over there. Boy, Tony, there is some excellent little secondaries with the indurated regolith in them and on the rim. The biggest one is a couple of meters.	(ALSEP-1)
05 03 06 50	LMP	You know that might have been Spook right back there. That was a pretty big crater.	(ALSEP-1)
05 03 06 56	CDR	It sure was.	(ALSEP-1)
05 03 06 57	LMP	Right back there, John. Boy, it's really hard - there's an interesting rock. A layer - layered, really dust-covered, like a regolith, I mean a - turn left, John. There's a crater over there, a big one.	(ALSEP-1)
05 03 07 18	CDR	Boy, that is a biggie.	(ALSEP-1)
05 03 07 20	LMP	That's it. That's got to be - and here - Buster, right over here, with some blocks around it to my right.	(ALSEP-1)
05 03 07 28	LMP	Boy, that is a biggie. Okay, here is Spook and it's 089 at 0.7.	(ALSEP-1)
05 03 07 38	LMP	And that is a biggie.	(ALSEP-1)
05 03 07 41	CDR	We're almost completely past it; we're not right even with it. Where'd you say Buster is?	(ALSEP-1)
05 03 07 48	LMP	I thought it was right over here, John.	(ALSEP-1)
05 03 07 51	CC	Is the rim of Spook distinct?	(ALSEP-1)
05 03 07 52	LMP	Right straight ahead here. Negative, it's real subdued, Tony.	(ALSEP-1)
05 03 08 01	CC	Okay, do you see any ledges or anything inside of Spook?	(ALSEP-1)
05 03 08 09	LMP	No, we sure didn't. We're driving on, now. I think we're coming up on the rim of Buster, and we've got some - a real good boulder field around Buster.	(ALSEP-1)

05 03 08 24	LMP	With some frags that we'll be able to get off. The biggest boulder's a meter - cobbles - it's real good for raking here. Here it is, John. That's it, Buster, there it is. Okay, in Buster, Tony, I can see some huge boulders in the bottom of that thing.	(ALSEP-1)
05 03 08 45	CDR	That is a big crater.	(ALSEP-1)
05 03 08 49	LMP	How big is Buster, Tony?	(ALSEP-1)
05 03 08 53	CC	About 40 meters.	(ALSEP-1)
05 03 08 54	LMP	That's bigger than Buster.	(ALSEP-1)
05 03 08 56	CDR	That's Buster, 50 meters. It's 150 feet, Charlie.	(ALSEP-1)
05 03 09 01	LMP	Okay. That's Buster then.	(ALSEP-1)
05 03 09 03	CDR	Yep, sure is.	(ALSEP-1)
05 03 09 04	LMP	And, Tony, we've got some - 5-meter boulders in the bottom of it. Some real big ones. The biggest, 5 meters, and the whole bottom is covered; we're going downslope now.	(ALSEP-1)
05 03 09 19	CC	Okay, there should be a scarp around there some place.	(ALSEP-1)
05 03 09 22	LMP	Okay, we see it. Over to our 2 o'clock position, and - it looks like the rim of a crater, but I think it's a scarp.	(ALSEP-1)
05 03 09 36	CDR	What's the heading from here to - oh, man.	(ALSEP-1)
05 03 09 41	LMP	Okay, we want to head - just keep going west.	(ALSEP-1)
05 03 09 46	LMP	We want to get 100 degrees at about point - that's Station 2. Wait a minute; we want 96 at 1.5. It's about 280. Most of the rocks that we've seen look like breccias to me. Off to the right, what I thought was a scarp - turned out to be a crater on the side of a ridge that runs east-west.	(ALSEP-1)
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05 03 10 33	LMP	We're out to 089 at 1.0, Tony.	(ALSEP-1)

05 03 10 39	LMP	In this area, the regolith is real smooth. The block - the cobble population is distinctly smaller. I hope that's Spook. How big is Spook, 300 meters? There it is, there's the Buster, I mean, there's Flag. We're here.	(ALSEP-1)
05 03 11 06	CDR	It sure is, isn't it?	(ALSEP-1)
		- - -	
05 03 11 09	LMP	Okay, 088 at 1.0 is - hey, we stop, John, about 40 meters from Plum.	(ALSEP-1)
05 03 11 23	CDR	Hey, now, I don't see Plum.	(ALSEP-1)
05 03 11 24	LMP	There it is, right there.	(ALSEP-1)
05 03 11 26	CDR	That's Plum?	(ALSEP-1)
05 03 11 28	LMP	Yeah.	(ALSEP-1)
05 03 11 30	CDR	I ain't even on the rim.	(ALSEP-1)
05 03 11 32	LMP	Well, it is; - the rim is right here. We're on top of the rim.	(ALSEP-1)
05 03 11 40	LMP	Hey, stop. It's going to be terrible walking on this thing. Why don't we go turn around and go back up on the rim where it's level?	(ALSEP-1)
05 03 11 49	CDR	Suits me.	(ALSEP-1)
05 03 11 53	LMP	This is a steep slope here. Okay, Tony. It didn't seem like there was that much distance between 300 meters since Flag. That's not 300 meters. Is that 300 meters right there?	(ALSEP-1)
05 03 12 14	CDR	Charlie, you got me. I can't tell.	(ALSEP-1)
		- - -	
05 03 12 24	CDR	Okay. 087 at 1.1.	(ALSEP-1)
05 03 12 36	LMP	Well, that's a big crater anyway.	(ALSEP-1)

05 03 12 38	CDR	Yeah, it looks to me like we're due north of South Ray crater right now. I can look down there, and I feel like I'm bisecting it. No, we're not due north of it, not according to shadow.	(ALSEP-1)
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05 03 13 14	LMP	Okay, it was 0.9 - it was 0.6 between Buster and - that's got to be Buster.	(ALSEP-1)
		- - -	
05 03 13 35	CDR	That's a 40-meter crater.	(ALSEP-1)
		- - -	
05 03 13 38	LMP	Yes; that's what I'm thinking.	(ALSEP-1)
		- - -	
05 03 13 42	LMP	We're going to call this Flag.	(ALSEP-1)
05 03 13 48	CDR	Let me park the thing - - heading south.	(ALSEP-1)
		- - -	
05 03 14 40	LMP	Plum crater is sitting right on the rim - on the outer rim of - Flag, and it's - what appears to me to be 200 meters - pretty big crater - we call Flag.	(ALSEP-1)
05 03 15 12	CDR	Another big one right back here ***	(ALSEP-1)
05 03 15 14	LMP	See that big one back up there that we called - this might be Halfway, this one right here.	(ALSEP-1)
		- - -	
05 03 15 25	CC	Our measurements say that - - you should be pretty near Halfway.	(ALSEP-1)
05 03 15 31	CDR	Okay, why don't we get back and try some more, Charlie?	(ALSEP-1)
		- - -	
05 03 17 24	LMP	Okay, Tony. Based on your knowledge of our position - give us where you think Flag is.	(ALSEP-1)

05 03 17 32	CC	It looks like Plum crater would be almost due west of you about 200 meters.	(ALSEP-1)
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05 03 18 24	LMP	And - this crater here is probably - Halfway, with a smaller one on the side.	(ALSEP-1)
05 03 18 39	LMP	That is a bigger crater than that, though.	(ALSEP-1)
05 03 18 48	LMP	Okay, we're underway again, Tony.	(ALSEP-1)
05 03 19 04	LMP	Can you go to the right, John? There's a pretty fresh batch, dead ahead. That's about a tenth of a kilometer across there, though; that's a big crater right there.	(ALSEP-1)
05 03 19 21	CDR	Yeah, I don't think it's a 300 meter.	(ALSEP-1)
		- - -	
05 03 20 27	LMP	Okay, Tony, we're at 086, 1.2. We're coming into another block-ray field up ahead of us about 50 meters or so, with angular blocks. The area we have now is almost cobble free, except perhaps less than 1 percent of the surface.	(ALSEP-1)
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05 03 20 30	CDR	Yes, this is the South Ray - that's that big South Ray crater - ray, down here, I think.	(ALSEP-1)(PHO 109 17770)
05 03 20 55	LMP	You can see Eden Valley. You can see partially into Stubby. The Cinco craters are very visible up there on the side.	(ALSEP-1)
05 03 21 21	CC	Is there any albedo difference when you're in a ray or just the cobbles and boulders?	(ALSEP-1)
05 03 21 25	CDR	No, it's albedo.	(ALSEP-1)
05 03 21 37	LMP	There is no mistake in your mind when you're in a ray because of the blocks.	(ALSEP-1)
05 03 21 43	LMP	And the surface is a little bit lighter - the regolith. Blocks are very angular.	(ALSEP-1)

05 03 21 53	CDR	I'd like to sort of tack. I can see a lot better. Just a little north or a little south. (YOUNG: Zero phase sun visibility was very poor).	(ALSEP-1)
05 03 21 59	CC	Do you see both the white and the black and white, here?	(ALSEP-1)
05 03 22 05	LMP	It's mostly gray, Tony, with a - there's a big crater over there, John.	(ALSEP-1)
05 03 22 10	CDR	That's it.	(ALSEP-1)
05 03 22 11	LMP	Okay, that's it. We're coming into the south of Plum. Okay, this is probably Plum right over here - no, I guess not. Plum is 40 meters; that's not nearly 40 meters.	(ALSEP-1)
05 03 22 32	LMP	Okay, Tony, I think we finally found Spook, here - or Flag, rather.	(ALSEP-1)
05 03 22 36	CC	Okay, did you notice that scarp that's mapped that you should have driven across?	(ALSEP-1)
05 03 22 43	LMP	No, didn't see it. It's all hilly and scarpy here.	(ALSEP-1)
05 03 22 49	CC	Okay, do you notice a trend to the scarp? They all seem to be northeast.	(ALSEP-1)
05 03 22 57	LMP	Yeah, that's probably pretty close - northeast.	(ALSEP-1)
05 03 23 06	LMP	Okay, here - that's got to be it, John. But I don't see Plum. Unless this is it right here.	(ALSEP-1)
05 03 23 13	CDR	This is it right here, Charlie.	(ALSEP-1)
05 03 23 15	LMP	We are on the rim of it. Okay, we got to park on the other side about 40 meters up, do a 180 left. Well, Tony, we finally found it at 087 and 1.4.	(ALSEP-1)(PHO 109 17774)
		- - -	
05 03 23 44	LMP	It's all up and down. We're gonna be a little close here, John, but that's okay.	(ALSEP-1)
05 03 23 54	LMP	Okay. Tony, we're parking right on the rim of Plum. Dismounting.	(1)

05 03 24 08	LMP	Okay, your readings are 180, 088, 2.0, 1.4.	(1)
05 03 24 30	CC	You should be about 40 meters from Plum. Is that right?	(1)
05 03 24 36	LMP	No, we're not; we're right on the rim.	(1)
		- - -	
05 03 24 43	CDR	You'll be able to see everything we do.	(1)
		- - -	
05 03 24 49	CC	Are you still in the ray material there at Plum?	(1)
05 03 24 55	LMP	No.	(1)
05 03 24 57	CC	Good. We don't want to be.	(1)
05 03 25 02	LMP	The ray material is about 50 meters to the east of us.	(1)
05 03 25 08	LMP	Okay. We saw the boulders at Buster; we didn't see the northeast scarp. I'm going to get the pan up on the rim of Flag crater. Yeow! Is that some crater, Tony! Whew! It's a smooth crater, very subdued, but it's really steep, and there's some smaller craters 10 meters or so on the side.	(1)(PHO 109 17775-93)
05 03 25 49	LMP	I can't even see the bottom where - right where we are.	(1)
05 03 26 00	LMP	The sides are steep enough to cast a shadow from the sun.	(1)
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05 03 26 21	LMP	To the north side of Flag is a crater right on the inner rim, that has some blocks in it that are not too big, cobble size, I'd say.	(1)
		- - -	
05 03 27 05	LMP	Boy, anybody that judges Cayley Plains as a flatland.	(1)

05 03 27 11	LMP	The sides of this thing get pretty steep. I'm not going to get down too far, I can't see the bottom of it. And it's getting so steep I don't want to go any farther.	(1)
05 03 27 36	LMP	On the southwest flank of Plum, we have a buried boulder, and it's about a meter across. And that's the only boulder we see of any consequence here at Plum. In Flag, on the southwest rim about halfway down into the crater, we see a block that's sticking out, that's very angular, that's maybe 2 meters across, and it's in an area of whiter albedo. It's probably a buried block. I wouldn't call it bedrock. I see nothing that looks like bedrock.	(1)
05 03 28 15	CC	Okay, how far down from the rim are you?	(1)
05 03 28 18	LMP	Hey, John, *** halfway.	(1)
05 03 28 28	LMP	A rake soil coming up.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,75-77) (PHO 109 17794-95; 114 18389-94)
05 03 28 32	LMP	And that's done up on Flag. I can do some sampling and radial along Flag. Oh, there's a great place for the rake, see, right up there?	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,75-77)
05 03 28 50	LMP	12 o'clock? Yeah, I got the rake. Let's see, that's all I need. I can shovel -	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,75-77)
05 03 29 02	LMP	We're going up to where it's more cobbly, Tony, to get the rake sample. It's pretty smooth right here.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,75-77)
05 03 29 18	CC	Okay, the rake sample should be one crater diameter away from Plum.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,75-77)
05 03 29 25	CC	And it doesn't have to be too cobbly there.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,75-77)
05 03 29 29	LMP	Okay, this is about it then.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,75-77)
05 03 29 35	CDR	Yeah, but I don't think any of - the rocks from here may have come from Plum, but they may be some other place, too.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,75-77)
		- - -	
05 03 29 49	CDR	How about right out there, in my shadow? There's some right there that might be -	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)

05 03 29 55	CDR	I'm sure going to get them.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 29 59	LMP	Okay, down-sun, 11-footer -	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 30 03	CDR	Right here, Charlie?	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 30 05	LMP	Yeah, that's fine.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
		- - -	
05 03 30 16	LMP	Hey, Tony, I'm at 50, magazine Bravo.	(1)
05 03 30 22	CDR	Okay, I'm at 10, magazine Bravo.	(1)
		- - -	
05 03 30 40	LMP	There's the locator. And we'll start the old rake, for the first time. Get that beauty right there. Look at it come through that regolith, would you?	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79) (PHO 109 17795)
		- - -	
05 03 31 38	LMP	Move out and let's get around out of the way there. Another rake.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
		- - -	
05 03 32 24	LMP	Hey, man, I'm losing all of those.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 32 26	CDR	Yeah.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 32 27	LMP	There's three little ones, now.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 32 36	CDR	Hey, better get another one.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 32 54	CDR	There's a pretty good one.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 32 57	LMP	John, there's a glassy one right there. I can't tell what the other ones are.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
		- - -	
05 03 33 02	CDR	I can't either. They're all dust-coated.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 33 12	LMP	Okay, Tony, we got about a half a sackful going in bag -	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)

05 03 33 16	CDR	373.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 33 18	LMP	372.	(1)(SAMP 61510, 15-1,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 33 20	CDR	372.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 33 22	LMP	372 with three rakes.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 33 30	LMP	And there were lots of smaller ones, but they got - more smaller ones but they fell through the tines.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 33 38	CC	I take it the soil isn't too cohesive here.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 33 46	CDR	Hold the bag for a second.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 33 50	LMP	No, they're just small.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 33 55	LMP	If we'd picked another place - I can't get the top off.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 34 01	CDR	That's right.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 34 03	LMP	Did you get it?	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 34 05	CDR	Yeah, I got it.	(1)(SAMP 61510, 15-19,25-29,35-39,45-49,55-59,65-69,77-79)
05 03 34 15	LMP	Okay, John, if you'll step aside, I'll get a soil sample.	(1)(SAMP 61500-05)(PHO 109 17794-95; 114 18395)
		- - -	
05 03 34 54	LMP	That's about a kilo. One more scoopful?	(1)(SAMP 61500-05)
05 03 34 56	CDR	Yeah. A little one.	(1)(SAMP 61500-05)
05 03 34 59	LMP	Okay.	(1)(SAMP 61500-05)
05 03 35 02	LMP	Rock.	(1)(SAMP 61500-05)
05 03 35 06	CDR	Almost looks like black soil.	(1)(SAMP 61500-05)
05 03 35 10	LMP	Okay. Man, it's really soft here, Tony on the rim. You don't sink far, but when you walk on it, it gets very -	(1)(SAMP 61500-05)

05 03 35 23	CDR	That's the last time I do that with soil.	(1)(SAMP 61500-05)
05 03 35 25	LMP	When you rake it - did it come out? *** you mean? Look at that gnomon already, would you? Look at the color chart?	(1)(SAMP 61500-05)
05 03 35 35	CDR	Dropped dirt all over it. We'll just have to be more careful.	(1)(SAMP 61500-05)
05 03 35 40	LMP	Okay, this is 354. Going in bag 354, Houston.	(1)(SAMP 61500-05)
		- - -	
05 03 36 00	LMP	We ought to start from here, John, and do a radial sampling in towards Plum.	(1)(SAMP 61150, 55-58)(PHO 109 17796-97; 114 18396-98)
05 03 36 04	CDR	Okay.	(1)(SAMP 61150, 55-58)
05 03 36 05	LMP	Okay, why don't you go ahead and get started and I'll go get the shovel.	(1)(SAMP 61150, 55-58)
05 03 36 08	CDR	All right.	(1)(SAMP 61150, 55-58)
		- - -	
05 03 37 42	LMP	What are you picking up? That little old thing?	(1)(SAMP 61150, 55-58)
05 03 37 45	CDR	Charlie, that's as good as any of them.	(1)(SAMP 61150, 55-58)
05 03 37 47	LMP	It looks like it is gonna come apart, though, to me.	(1)(SAMP 61150, 55-58)
05 03 37 52	CDR	It might. There's three or four samples right there we can get.	(1)(SAMP 61150, 55-58)
05 03 38 00	LMP	I'll get these in the shovel.	(1)(SAMP 61150, 55-58)
05 03 38 02	CDR	Okay.	(1)(SAMP 61150, 55-58)
05 03 38 04	LMP	If you don't get out of that - if you don't get that thing in the - -	(1)(SAMP 61150, 55-58)
05 03 38 16	CC	Okay, are all of these rocks looking pretty much the same?	(1)(SAMP 61150, 55-58)
05 03 38 21	LMP	They are all covered, Tony.	(1)(SAMP 61150, 55-58)
		- - -	

05 03 38 27	LMP	Dust.	(1)(SAMP 61150, 55-58)
05 03 38 31	CDR	What do you need, Charlie?	(1)(SAMP 61150, 55-58)
05 03 38 32	LMP	Bag.	(1)(SAMP 61150, 55-58)
05 03 38 34	CDR	Okay.	(1)(SAMP 61150, 55-58)
05 03 38 35	LMP	One.	(1)(SAMP 61150, 55-58)
05 03 38 41	CDR	They're angular.	(1)(SAMP 61150, 55-58)
05 03 38 43	LMP	All angular, though, I'll tell you that. Here's one with a white streak, looks like a caliche streak through it. Leave it. That's all; it's a white rock.	(1)(SAMP 61150, 55-58)
05 03 39 05	LMP	You have four samples, John. Is that good enough?	(1)(SAMP 61150, 55-58)
05 03 39 08	CDR	Yeah. That's in bag 371.	(1)(SAMP 61150, 55-58)
05 03 39 15	LMP	Get the locator.	(1)(SAMP 61150, 55-58)(PHO 109 17797)
05 03 39 25	LMP	Hey, wait a minute; we need a soil from there.	(1)(SAMP 61140-44)(PHO 109 17796-97; 114 18396-99)
05 03 39 28	CDR	Okay. Put this in your bag.	(1)(SAMP 61140-44)
05 03 39 34	LMP	Okay; come on over.	(1)(SAMP 61140-44)
05 03 39 46	LMP	Man, that crater. That is really something. Tony, on the west side of Flag, there is a small crater maybe 2 to 3 meters across; it's real fresh, has some real bright rays, and you can see a blocky interior. Wait a minute, John, just let me shoot.	(1)
05 03 40 10	LMP	Okay. And that's about a third of the way down from the rim. Wish we could see the bottom.	(1)(SAMP 61140-44)
05 03 40 17	CDR	That's going in bag 363.	(1)(SAMP 61140-44)
05 03 40 26	CDR	Let me get an after of that, Charlie.	(1)(SAMP 61140-44)(PHO 114 18399)
05 03 40 29	LMP	Okay, I'll move.	(1)(SAMP 61140-44)(PHO 114 18399)
05 03 40 31	CDR	I'll have to get it from the other side.	(1)(SAMP 61140-44)(PHO 114 18399)

05 03 40 45	LMP	Okay. Here's one right here, John, that'll make a good one. See that one right there by that footprint? That's a good sample size. About 5 centimeters across?	(1)(SAMP 61170, 75)(PHO 109 17798; 114 18400-03)
05 03 41 02	CDR	That one right?	(1)(SAMP 61170, 75)
05 03 41 04	LMP	No, that one right here to the right of my shadow. See, right there. Let me show you.	(1)(SAMP 61170, 75)
05 03 41 10	CDR	Right there.	(1)(SAMP 61170, 75)
05 03 41 12	LMP	Right here. See?	(1)(SAMP 61170, 75)
05 03 41 14	CDR	Okay.	(1)(SAMP 61170, 75)
05 03 41 16	LMP	Okay. It's an angular subangular rock, Houston. Five centimeters. I can see some white clast shining through it.	(1)(SAMP 61170, 75)
05 03 41 30	CDR	Bet it's dust covered again.	(1)(SAMP 61170, 75)
05 03 41 32	LMP	It's all - everything here is dust-covered.	(1)(SAMP 61170, 75)
05 03 41 43	LMP	Got that beauty.	(1)(SAMP 61170, 75)
05 03 41 45	CDR	That's enough.	(1)(SAMP 61170, 75)
05 03 41 56	CDR	Okay, Charlie.	(1)(SAMP 61170, 75)
05 03 41 59	LMP	Okay, Tony, it's a white matrix; it's a breccia, looks like, white clast with some greenish-looking, very small millimeter-sized phenocrysts in a black matrix.	(1)(SAMP 61170, 75)
05 03 42 16	CDR	Goes in bag 364, Houston.	(1)(SAMP 61170, 75)
05 03 42 31	CDR	Okay. Let me get that soil sample.	(1)(SAMP 61160-64)(PHO 109 17798; 114 18400-03)
05 03 42 34	LMP	Yeah, wait a minute. Let me get out - bounce out of the way here. Uh-oh, John - fell off.	(1)
05 03 42 42	CDR	You're bouncing too high.	(1)
05 03 42 43	LMP	No. Did you close - -	(1)

05 03 42 44	CDR	I'll get it. No. I didn't close the top.	(I)
05 03 42 48	CDR	And I didn't stuff it down in there.	(I)
05 03 42 57	CDR	Just about fell down.	(I)
05 03 43 04	LMP	I got you. Got it. Two-man job.	(I)
05 03 43 15	LMP	Tony, it's really spongy here. The regolith is just real loose and noncompacted if that's a - unconsolidated is the word I'm searching for.	(I)(SAMP 61160-64)
05 03 43 29	CC	Can you see where the TV is pointed?	(I)
05 03 43 35	LMP	Yes. It's pointed down towards South Ray.	(I)
05 03 43 38	CC	Right. Over to the right on the edge of Plum there, looks like there might be rock with some phenocryst in it. If you're over that way, you might look around and see if you see something like that. It may have just been dust on it.	(I)
05 03 43 52	LMP	Okay, there's a big rock - that I've already described. Did you get the after there, John.	(I)(SAMP 61160-64)(PHO 114 18403)
05 03 43 59	CDR	Yes, I've got the after.	(I)(SAMP 61160-64)(PHO 114 18403)
05 03 44 02	LMP	Okay, coming up.	(I)(SAMP 61160-64)
05 03 44 17	LMP	Bags are a pain, aren't they? Okay.	(I)(SAMP 61160-64)
05 03 44 24	CDR	It's going in bag 356, Houston. Soil sample.	(I)(SAMP 61160-64)
		- - -	
05 03 44 52	CDR	Okay, Houston. I'm on frame count now 24.	(I)
05 03 45 02	LMP	Hey, there's one right on the rim we can get.	(I)
05 03 45 06	CDR	Okay.	(I)
05 03 45 07	LMP	There's a good size one right over here by my footprint. Actually, I took pan I where pan 2 should have been. Okay, looking down into Plum Tony, there is some cobbles and things on the inner rim. But they aren't very large - maybe 30 centimeters or so is the biggest.	(I)

05 03 45 28	CDR	Want to get some of these here, Charlie?	(1)(SAMP 61130, 35)(PHO 109 17799-800; 114 18404-08)
05 03 45 30	LMP	Yeah, that's great - that definitely is a breccia right there, John.	(1)(SAMP 61130, 35)
05 03 45 34	CDR	Yes, see the clasts in it.	(1)(SAMP 61130, 35)
05 03 45 35	LMP	Yes.	(1)(SAMP 61130, 35)
05 03 45 38	CDR	I even forgot to ask locator on that last.	(1)
05 03 45 41	LMP	No, wait a minute, I think *** that's the way that thing - the way that color chart is so covered with dust, it won't matter anyway.	(1)
05 03 45 52	CDR	I know - I'll clean it off. Go out and get this one.	(1)(SAMP 61130, 35)
		- - -	
05 03 46 21	LMP	Hey, I'd like to go to the other side, John, of Plum because those rocks over there aren't dust-covered, if you can see them.	(1)
05 03 46 32	CDR	That's a good idea, Charlie.	(1)
05 03 46 34	LMP	See right out there towards South Ray?	(1)
05 03 46 36	CDR	Yes.	(1)
05 03 46 37	LMP	Those rocks don't look as dust-covered as these. Uh-oh, I missed. Wait a minute.	(1)(SAMP 61130, 35)
05 03 46 53	CC	Nice juggling.	(1)
05 03 46 56	LMP	Well, it wasn't dust-covered. Well, we missed it. But things really fly up here - I'm amazed.	(1)(SAMP 61130, 35)
05 03 47 09	CDR	My first guess is it is a breccia with white clast in it. And I see lineations all along it, in the breccia. It's a white clast breccia is what it is. I see no other clast in it. Of course, once you get the dirt off of it might all be white. At first cut, it would be a white clast breccia. Going into 362.	(1)(SAMP 61130, 35)

05 03 47 44	LMP	Okay, Tony. This one is a - same spot - is a breccia with a white matrix - is glass-coated on one side and then typical glass - lunar surface glass coating.	(1)(SAMP 61190, 95)(PHO 109 17799-800; 114 18404-08)
05 03 47 59	CC	And when you're through with this site, you can press on around Plum if you like.	(1)
05 03 48 08	LMP	Okay, we'd like to. There is a big boulder over there, and there are some blocks - that are sitting out and aren't filleted. We'd like to try over there.	(1)
05 03 48 19	CC	Okay, use your discretion. You've got the time.	(1)
05 03 48 20	LMP	Here, John, why don't you grab that line, that crummy thing!	(1)
05 03 48 33	CDR	Okay, those are big clasts, aren't they?	(1)(SAMP 61190, 95)
05 03 48 36	LMP	Yes. See that glass right there, on the top?	(1)(SAMP 61190, 95)
05 03 48 39	CDR	Yeah.	(1)(SAMP 61190, 95)
05 03 48 45	LMP	Okay; Tony, the general terrain here is sloping off to the southwest at about 1 to 2 degrees, and the Flag crater is about to the top of this big ridge that slopes off generally to the southwest to the west of South Ray.	(1)
05 03 49 15	CC	Okay; some of the boulders you see around there, do they have fillets and, if so, are they built up on any particular side?	(1)
05 03 49 26	CDR	That's rock bag 352, Houston.	(1)(SAMP 61190, 95)
05 03 49 36	CDR	I take it back; that's rock bag number 2.	(1)(SAMP 61190, 95)
		- - -	
05 03 49 51	LMP	Man, is it dark in those shadows. Want to get an after there, John? I'll get a - get it?	(1)
05 03 50 00	CDR	Yep.	(1)
05 03 50 01	LMP	Okay, soil sample coming up. ***	(1)(SAMP 61180-84)(PHO 109 17799-800; 114 18404-08)

05 03 50 23	CDR	Okay, that soil sample's in bag 369, Houston.	(1)(SAMP 61180-84)
		- - -	
05 03 50 33	CDR	Charlie, you're gonna fall down here with all these rocks.	(1)
05 03 50 37	LMP	No. I'll get you the shovel in just a minute when I fill up, and we'll swap.	(1)(SAMP 61180-84)
		- - -	
05 03 50 59	LMP	Now, John! Look at that footprint. Look underneath that regolith. When you kicked that up a centimeter or so, under it is white, absolutely white, right here.	(1)(SAMP 61240-49, 55)(PHO 109 17801; 114 18409-11)
05 03 51 10	CDR	Well, take your old thing and do an exploratory there for a while. Let's suggest that.	(1)(SAMP 61240-49, 55)
05 03 51 21	LMP	Look! Look at that. Come over here.	(1)(SAMP 61240-49, 55)
05 03 51 24	CDR	Yes.	(1)(SAMP 61240-49, 55)
05 03 51 26	LMP	Look at that.	(1)(SAMP 61240-49, 55)
05 03 51 29	LMP	Won't you look here? Okay, the top -	(1)(SAMP 61240-49, 55)
		- - -	
05 03 51 40	CDR	Charlie's right everywhere -	(1)(SAMP 61240-49, 55)
05 03 51 45	LMP	Okay, Tony, let me describe what it is. The top centimeter of the regolith is gray, and you get down under that, and it's white.	(1)(SAMP 61240-49, 55)
05 03 51 59	LMP	*** different albedo - three shades different.	(1)(SAMP 61240-49, 55)
		- - -	
05 03 52 09	LMP	I'll dig you a little trench here. Boy, that's going to be a hard job, John. We'll sample right there and get you a scoopful of this underlying regolith.	(1)(SAMP 61240-49, 55)
05 03 52 30	LMP	It's a different albedo; it's amazing.	(1)(SAMP 61240-49, 55)

05 03 52 33	CC	Charlie, we can see that here. Why don't you go ahead and get a bag of the dark and a bag of the light, and then we'll press on to that block on the northwest side.	(1)(SAMP 61240-49, 55)
05 03 52 42	LMP	All right.	(1)(SAMP 61240-49, 55)
		- - -	
05 03 53 00	CDR	It sure is neat here. Okay; let me get a shovelful of this, right off the top here. There we go.	(1)(SAMP 61240-49, 55)
		- - -	
05 03 53 40	CDR	That is going - that top scoop is going in bag 352, Houston.	(1)(SAMP 61240-49, 55)
05 03 54 01	LMP	Ah! Try to get way down there, John, and get a - uh-oh.	(1)
05 03 54 20	CDR	Uh-oh, what?	(1)
05 03 54 21	LMP	I just - had a good scoopful, and I lost it. Let me dig out a little - another little trench. There. There she be. Coming up all white. That's all that's in there, John.	(1)(SAMP 61220-26)(PHO 109 17801; 114 18409-11)
05 03 55 11	CDR	Okay. And it's going into bag 357.	(1)(SAMP 61220-26)
		- - -	
05 03 55 37	LMP	I can't get a locator. You know we're right on the rim of -	(1)(SAMP 61220-26)
05 03 55 41	CC	We've located it on TV, so we have it.	(1)(SAMP 61220-26)
05 03 55 47	LMP	All right. Okay; we're going over to the big boulder.	(1)(SAMP 61290, 95)(PHO 109 17802, 04-05; 114 18412-14, 20-21)
		- - -	
05 03 56 33	LMP	- - looking down-sun here, down-phase at this area downslope, you get a definite feeling of lineations that run southwest, northeast - from Stone mountain, there's sort of little furrowed ridges, and pits, and things.	(1)

05 03 56 53	CC	Okay, you don't see any sharp scarps or anything like that, though?	(1)
05 03 57 00	LMP	No, sir; no, nothing like on that map.	(1)
		- - -	
05 03 57 29	CDR	Look at that, Charlie!	(1)(SAMP 61290, 95)
05 03 57 31	LMP	What's that?	(1)(SAMP 61290, 95)
05 03 57 32	CDR	That thing has - has greenish-black clast in it. Right there in that boulder, there?	(1)(SAMP 61290, 95)
05 03 57 40	LMP	Looks like it to me, too, yeah. Let's see if we can get a piece of that. Okay, Tony, this is a subrounded rock - boulder that's a meter to a meter and a half across, it has a predominant fracture set of 20 centimeters on the side that run here, southeast - correction, southwest northeast. It's the predominant fracture set.	(1)(SAMP 61290, 95)
05 03 58 06	LMP	And it's partially buried.	(1)(SAMP 61290, 95)
05 03 58 12	LMP	Okay. And John, over here also as we move around, that very white material is right under John's feet. I'll take a picture of that. And he's really changed the albedo by kicking into this little crater by this big rock. Going to get all - ah, here he comes, folks. He's got the hammer out, I knew he couldn't resist.	(1)(SAMP 61290, 95) (PHO 109 17803)
05 03 58 52	CDR	I don't know if this will work or not, Charlie, but I couldn't pick a better spot. Here we go.	(1)(SAMP 61290, 95)
05 03 58 58	LMP	Going to do it. There's a piece. Let me hold you down a little bit. Hot dog! He did it. It's a very friable rock, apparently, Houston.	(1)(SAMP 61290, 95)
05 03 59 20	CDR	Charlie, don't do that, let me do it.	(1)(SAMP 61290, 95)
05 03 59 22	LMP	I got it. Leaning on the shovel. Okay, Houston, it's got some green clast, some white clast, a grayish matrix. The clasts are millimeter-size and make up 5 percent of the rock. One big crystal, 5 millimeters across, but I can't tell what it is. But it's a beauty.	(1)(SAMP 61290, 95)

05 03 59 58	CC	Okay; you think they're still breccia?	(1)(SAMP 61290, 95)
05 04 00 05	LMP	I'm not sure I think it might be - yeah, I think it's a breccia, really, very friable.	(1)(SAMP 61290, 95)
05 04 00 13	CDR	Yeah, it's a breccia, Houston.	(1)(SAMP 61290, 95)
05 04 00 15	LMP	Yeah, uh-huh.	(1)(SAMP 61290, 95)
05 04 00 17	CDR	Well, no - it's not really. It's a breccia, and I can see at least - like Charlie said, there are two or three different type clasts in it. It's just a one-stage breccia, though, it looks like. It's going into bag 353.	(1)(SAMP 61290, 95)
		- - -	
05 04 00 45	LMP	All right. We'd like to go out and get one of those sharp rocks and a soil sample here.	(1)
05 04 00 51	CC	And while you're taking pictures there, can you take some pictures of the lineations on the ground you talked about?	(1)(PHO 109 17806-07)
05 04 01 00	LMP	Yeah, I'll do that when I get to the right spot.	(1)(PHO 109 17806-07)
05 04 01 05	LMP	Okay, I'm taking a soil sample of the fillet around this rock.	(1)(SAMP 61280-84)(PHO 109 17802, 04-05; 114 18412-14)
05 04 01 11	LMP	Boulder. John, you just whacked that beauty right off of there.	(1)(SAMP 61290, 95)
05 04 01 19	CDR	Like you say, it's friable. I hit it on a fracture set, too.	(1)(SAMP 61290, 95)
05 04 01 24	LMP	Yeah. Turn the shovel that way.	(1)(SAMP 61280-84)
05 04 01 28	CDR	368 this stuff is going into, Houston.	(1)(SAMP 61280-84)
05 04 01 31	CC	Okay, 368, the soil.	(1)(SAMP 61280-84)
05 04 01 35	LMP	Okay, I'll get the after on that, John. Okay?	(1)(SAMP 61280-84)(PHO 109 17805)
05 04 01 39	CDR	Charlie's getting the after on that soil in 368.	(1)(SAMP 61280-84)(PHO 109 17805)
05 04 01 45	CC	If you have time, can we do a second pan from here?	(1)(PHO 114 18415-32)

05 04 01 50	CDR	Yeah, I'm supposed to do that, ain't I?	(1)(PHO 114 18415-32)
05 04 01 53	LMP	Yeah, I was just thinking about that. That'd be a good idea. We're right on the rim of - we're really right on the rim - there's rocks right on the rim of - both Plum and Flag.	(1)
05 04 02 08	CDR	My guess is that the rock is the way - it's laid in here, it's probably from the bottom of Plum, somewhere, or down there somewhere.	(1)
05 04 02 17	LMP	Okay, John, I'm going to go over here and get some of these lineations.	(1)(PHO 109 17806-07)
05 04 02 22	LMP	Close up. Get something out there for scale. Tony, the lineations might be just the - I think really what it is is the shadows cast by the Sun, because the regolith is so unconsolidated - loosely packed.	(1)(PHO 109 17806-07)
		- - -	
05 04 02 52	LMP	In fact, I'm convinced of that. And, okay - that's two stereo from 7 feet.	(1)(PHO 109 17806-07)
		- - -	
05 04 03 24	LMP	Hey, John, I'm going to run on out and look at some of these angular ones out here.	(1)(SAMP 61015)(PHO 109 17808-10)
05 04 03 36	LMP	Tony, those lineations are definitely due to the shadows on this loose regolith.	(1)
05 04 03 50	CC	Okay. We're going to have to hustle you on pretty soon, so you better grab those angular rocks.	(1)
05 04 03 59	LMP	Okay.	(1)
05 04 04 00	CDR	That pan takes me through frame 53.	(1)(PHO 114 18415-32)
05 04 04 08	LMP	Tony, I'll document this one while John - coming over with the scoop. In place is a gnomon.	(1)(SAMP 61015)
		- - -	
05 04 04 36	CDR	Did you get that biggy, Charlie?	(1)(SAMP 61015)

05 04 04 38	LMP	That one right there is what I'm gonna get. Think it will go in the bag?	(1)(SAMP 61015)
05 04 04 41	CDR	No.	(1)(SAMP 61015)
05 04 04 44	LMP	Try it. This is a great way to do it, leaning on this shovel. It might go in the bag, John.	(1)(SAMP 61015)
05 04 04 55	CDR	Nah, Charlie.	(1)(SAMP 61015)
05 04 04 57	CDR	Let's not even try it.	(1)(SAMP 61015)
05 04 04 59	LMP	Don't want to try it? Okay; this angular rock is too big for a bag, and it's got some glass on it and it think it's a breccia also, Tony. It's going in John's SRC.	(1)(SAMP 61015)
		- - -	
05 04 07 30	CC	As you come around there, there is a rock in the near field on this rim that has some white on the top of it. We'd like you to pick it up as a grab sample.	(1)(SAMP 61016)
05 04 07 39	LMP	This one right here?	(1)(SAMP 61016)
05 04 07 41	CC	That's it.	(1)(SAMP 61016)
05 04 07 44	LMP	This one right here?	(1)(SAMP 61016)
05 04 07 45	CC	That's it. You got it, right there.	(1)(SAMP 61016)
05 04 07 50	CDR	That's a football-size rock.	(1)(SAMP 61016)
05 04 07 52	LMP	It's a "Dave Scott" size.	(1)(SAMP 61016)
05 04 07 56	CDR	Are you sure you want a rock that big, Houston?	(1)(SAMP 61016)
05 04 08 01	CC	Yeah, let's go ahead and get it.	(1)(SAMP 61016)
05 04 08 03	CDR	That's 20 pounds of rock right there.	(1)(SAMP 61016)
05 04 08 05	LMP	Okay. It has some big clasts in it, John.	(1)(SAMP 61016)
05 04 08 13	CDR	It sure has.	(1)(SAMP 61016)

05 04 08 27	LMP	If I fall into Plum crater getting this rock Muehlberger has had it.	(1)(SAMP 61016)
05 04 08 39	LMP	Okay; I've got it. That's 20 pounds of rock!	(1)(SAMP 61016)
		- - -	
05 04 08 56	LMP	Oh, Tony, it's got some beautiful crystals in it though.	(1)(SAMP 61016)
05 04 09 07	LMP	Okay, put it in there, John.	(1)(SAMP 61016)
05 04 09 10	CDR	Put it in where?	(1)(SAMP 61016)
05 04 09 11	LMP	In your SCB.	(1)(SAMP 61016)
05 04 09 13	CDR	I don't think it'll fit.	(1)(SAMP 61016)
05 04 09 23	LMP	It ain't gonna fit.	(1)(SAMP 61016)
05 04 09 27	CDR	Put it under your seat.	(1)(SAMP 61016)
05 04 09 30	LMP	Yeah. Kind of dusty.	(1)(SAMP 61016)
05 04 09 40	LMP	Okay, here's you a good one. Okay, Tony, I'm gonna put that little glass ball - that I haven't sacked yet - look at that, John.	(1)(SAMP 60090, 95)
05 04 09 52	CDR	Yeah, it is a big piece of glass.	(1)(SAMP 60090, 95)
05 04 09 53	LMP	Solid glass.	(1)(SAMP 60090, 95)
05 04 09 55	CDR	Black glass.	(1)(SAMP 60090, 95)
05 04 09 57	LMP	Going into bag - 4.	(1)(SAMP 60090, 95)
		- - -	
05 04 10 36	CDR	We got to do something with this bag before we leave, Charlie.	(1)(SAMP 60090, 95)
05 04 10 43	LMP	Put it under your seat. Under my seat.	(1)(SAMP 60090, 95)
05 04 10 49	LMP	My frame count is 65.	(1)
		- - -	

05 04 14 18	CDR	Okay; we're going to follow our footsteps back.	(1)
		- - -	
05 04 14 32	LMP	Okay; we're under way.	(1-2)
		- - -	
05 04 14 38	CC	Okay, we're looking at a few changes there at Spook. We're going to cut that station down to about 19 minutes. And if you get there in time, we'll have John go ahead as minimal and do the LPM. And then we'll end the LPM site measurement. And Charlie, you can do your 500 millimeter near the edge of Spook, and do a pan near the rim of Spook, and why don't you do a couple of samples of Buster if you have time left. And that'll be our Station 2.	(1-2)
		- - -	
05 04 15 39	LMP	Okay; we're making good time going back, and it's easier looking - going up-sun. You can see the craters a lot better. The regolith - the characteristics of the regolith are the same.	(1-2)
05 04 15 52	CDR	Are you using the 16, Charlie?	(1-2)
05 04 15 55	LMP	No.	(1-2)
		- - -	
05 04 16 56	LMP	As I look up-sun here - you can see these lineations, mostly furrows, I'd call them, with random orientation. And they're definitely the Sun casting shadows on unconsolidated regolith.	(1-2)
05 04 17 21	LMP	You can't believe how up and down this is, Tony.	(1-2)
		- - -	
05 04 18 14	CDR	That's Spook, isn't it? That big one right there?	(1-2)
05 04 18 19	LMP	Yea; I think it is. That's the one we called Buster.	(1-2)

05 04 18 31	LMP	Okay, Tony. We're in a real blocky boulder field here. It's probably from - thrown out from Spook. What we originally called Spook was not Spook. I think this blocky one is Spook. And we're coming up from the south side of it.	(1-2)
05 04 18 52	CDR	Yeah, I'd say, Houston, that I was farther past - I guess that I was farther past Double Spot.	(1-2)
05 04 19 07	LMP	But we got 0.8 mile, John, and Spook is supposed to be a mile. That's got to be it right down there.	(1-2)
05 04 19 15	CDR	Buster?	(1-2)
05 04 19 16	LMP	No, that's Spook.	(1-2)
05 04 19 19	CC	Okay, Spook should look about the same size as Flag.	(1-2)
05 04 19 25	CDR	*** does it look the same size?	(1-2)
05 04 19 29	LMP	No, this is the biggest crater right over here to the right.	(1-2)
05 04 19 32	CDR	Okay; well, this is Buster.	(1-2)
05 04 19 34	LMP	Okay, that's what I thought. It's a blocky crater.	(1-2)
05 04 19 36	CDR	Let's stop the Rover halfway between them?	(1-2)
05 04 19 39	LMP	Yeah.	(1-2)
05 04 19 40	CC	No, near the edge of Spook.	(1-2)
05 04 19 41	LMP	Buster is a lot bigger than - yeah, okay, it's about 50 meters or so. We're bearing 089.8.	(1-2)
		- - -	
05 04 20 00	CC	Little bit nearer to the edge of Spook so we can see into Spook.	(1-2)
05 04 20 06	LMP	What you really want to see into is Buster. Buster is about the same size as what we call Spook here. In fact, it's a more impressive crater.	(1-2)
05 04 20 23	LMP	Tony, is there a big crater to the south of Spook?	(1-2)

05 04 20 29	CDR	Cove is.	(1-2)
05 04 20 33	CC	That'd be quite a ways. Red Rose looks about like 0.8 kilometer.	(1-2)
05 04 20 44	LMP	No. Okay; well, let's park here, John. This is great sampling. We've got plenty of boulders and everything.	(1-2)
05 04 20 59	LMP	The Buster is a lot bigger than Plum is. The one we call Plum.	(1-2)
		- - -	
05 04 21 10	LMP	Okay, then we got the right place then, if it should be. Okay, we're stopped and we're 180, 087, 2.8, 0.8.	(2)
05 04 21 52	LMP	Okay; pan one up on Spook crater.	(2)(PHO 109 17811-27)
		- - -	
05 04 22 40	CC	Okay, Charlie. Are you on a ray there? Or - I know the blocks are angular.	(2)
05 04 22 48	LMP	The blocks are angular, but they are definitely coming out of Buster.	(2)
05 04 22 56	LMP	They dissipate very quickly. In fact, they don't even come to Flag.	(2)
		- - -	
05 04 24 12	LMP	Under here again, right under the regolith, the first centimeter or so, we have the white albedo material.	(2)
		- - -	
05 04 24 53	LMP	Thirty. Okay. That's gonna be cross-sun, so I'm going to do it at f:8.	(2)(PHO 109 17811-27)
05 04 25 35	LMP	Let me take these pictures.	(2)(PHO 109 17811-27)
		- - -	

05 04 28 40	LMP	I'm going to take a few of South Ray here, with the 500. We got a good view of it here.	(2)(PHO 112 18193-242)
		- - -	
05 04 29 23	LMP	The 500 millimeter's up to 50.	(2)(PHO 112 18193-242)
05 04 29 32	LMP	I had a triple, vertical, stereo pan on Stone mountain, and about five frames on old North and South Ray.	(2)(PHO 112 18193-242)
05 04 29 51	LMP	Okay, I'm finished with my pan, and the 500 - I'm gonna run over to - Buster and some sampling.	(2)(PHO 109 17811-27; 112 18293-342)
05 04 30 05	CDR	Buster is really an impressive crater. The walls are so steep, and the blocks are all over it.	(2)
		- - -	
05 04 30 19	LMP	I'm carrying John's bag, and a shovel, and I'm not taking a gnomon.	(2)
05 04 30 45	LMP	Man, that's gonna be a little steep ridge to climb.	(2)
05 04 31 07	LMP	You get - yeow whee! Man, John, I tell you, this is some sight up here - looking down into that beauty. Tony, the blocks in Buster are covered - the bottom is covered with blocks - the largest 5 meters across. The sides - the blocks seem to be a preferred orientation, northeast to southwest. They go all the way up the wall on those two sides, and on the other side, you can only barely see them outcropping in about 5 percent. Ninety percent of the bottom is covered with blocks that are 50 centimeters and larger. And I get a partial pan into there.	(2) (PHO 109 17828-36)
		- - -	
05 04 32 33	LMP	If that is a secondary, that is a big rock that hit in there.	(2)
05 04 32 38	LMP	The rocks down there are very fractured, though. The rocks down there are extremely fractured - you can see a major fracture set running - dipping about north 30 degrees on one rock. The other one is subhorizontal, so it's a - just a very impressive	(2)

		sight as far as the boulder goes. They're all angular. Some of them - well, I call some of them subrounded, but the majority of them are angular, and they have a grayish texture to them and that's about all I can tell. I got a partial pan from up here on the rim. And I'm gonna start sampling.	(PHO 109 17828-36) (SAMP 62230-38)(PHO 109 17814, 37-41)
05 04 33 32	CDR	Okay, can I give you - okay, X, 657, Y, 363, Z, 440; X, 655, Y, 360, Z, 437; X, 654, Y, 354, Z, 440.	(2)
		- - -	
05 04 34 26	LMP	Okay, there's a sort of angular to subrounded block going in bag number 5, Tony.	(2)(SAMP 62230-38)
05 04 34 33	LMP	It's dust-covered so that's all I can say about it. I got another little one, same spot; and it's got a whitish cast to it, and another little one that's got a whitish cast to the underside of it. All that in bag 5.	(2)(SAMP 62230-38)
		- - -	
05 04 35 24	CDR	Okay; 2 is installed.	(2)
05 04 35 43	LMP	And Tony, I really think we're sampling blocks out of this -	(2)(SAMP 62230-38)
05 04 35 46	CDR	Mark, Tony.	(2)
05 04 35 54	CDR	Did you get that mark?	(2)
05 04 35 56	CC	Yes, sure did and started the clock. And did you get the picture of the location, there?	(2)(PHO 114 18433-34)
05 04 36 10	CDR	Okay, do that right now. Is that okay?	(2)(PHO 114 18433-34)
05 04 36 20	LMP	Okay, Tony. From here is a soil sample going into bag 6. This is on the rim of Buster.	(2)(SAMP 62240-49; 62315)(PHO 109 17814, 37-42)
		- - -	
05 04 37 02	CDR	That was frame count 56 on magazine Baker.	(2)

05 04 37 08	LMP	That's the rock I want, but it's too big for the bag. But it might go in the bag.	(2)(SAMP 62250,55)(PHO 109 17814, 43-44)
		- - -	
05 04 37 30	CDR	Okay: 114 is X, 361 is Y, 356 is Z.	(2)
05 04 37 42	CDR	116 is X, 360 is Y, 366 is Z; 116 is X, 357 is Y, 374 is Z.	(2)
05 04 37 59	CDR	Going out and turning them around.	(2)
		- - -	
05 04 38 11	LMP	There's another rock going into bag 7.	(2)(SAMP 62250,55)
05 04 38 20	LMP	Dust-covered. Okay, I'm going about a quarter of a diameter away from Buster and sample some more.	(2)(SAMP 62250,55)
05 04 38 30	LMP	The rim of Buster is pretty good slope climbing up there.	(2)
		- - -	
05 04 40 13	CDR	Okay: X is 104, Y, 403, Z, 423; X, 107, Y, 404, Z, 425; X, 110, Y, 405, Z, 425.	(2)
		- - -	
05 04 40 44	LMP	Okay, Tony, - the rock I've got here - - is a very friable rock, and it's the most shocked rock I've ever seen; it's just pure white. The whole matrix is pure white. And it's not a breccia. Hey, John, I hate to tell you this, but I dropped my bag.	(2)(SAMP 62270, 75)(PHO 109 17814, 45-46)
		- - -	
05 04 41 26	CDR	This is really some rock, really shocked.	(2)(SAMP 62270, 75)
		- - -	
05 04 41 50	LMP	Tony, on this friable rock - this shocked one; it's very friable and I'm gonna try and get it in the bag but I'm not sure it's gonna go. And if I don't get it in the bag, I don't think it's going to survive. Well, there's part of it in the bag, anyway.	(2)(SAMP 62270, 75)

05 04 42 12	LMP	It broke in two in my hand.	(2)(SAMP 62270, 75)
05 04 42 22	LMP	Okay, and that's in bag number 9.	(2)(SAMP 62270, 75)
		- - -	
05 04 44 07	LMP	Okay, bag number 10, is another one.	(2)(SAMP 62290, 95)(PHO 109 17814, 47-48)
05 04 44 12	LMP	It's an angular rock.	(2)(SAMP 62290, 95)
		- - -	
05 04 45 18	LMP	We got soil samples and about - that sample is going into bag 11, Tony.	(2)(SAMP 62280-89, 62305)(PHO 109 17814, 47-48)
05 04 45 34	LMP	That's a sackful, John. I don't see the high albedo stuff underneath.	(2)(SAMP 62280-89)
		- - -	
05 04 46 02	LMP	Houston, I hate to tell you this, but those rocks, these light ones here, they look like caliche to me.	(2)
		- - -	
05 04 48 23	LMP	Okay; I'm going to take some pictures. Wow, is that Sun bright! Ooh! There's home. You see it?	(2-LM)(PHO DAC)
05 04 48 32	LMP	John, you're not going right. That navigation had us right on. You turn to 086, we'd be pointed right at that beauty.	(2-LM)
05 04 48 42	CDR	Let's do that.	(2-LM)
		- - -	
05 04 49 30	LMP	Hey, looking back up-sun, the rays are even more pronounced. Looking up-sun rather than down-sun, the blocks stand out like *** it's just like driving on snow. By golly!	(2-LM)
		- - -	
05 04 52 30	LMP	Okay, John. We need to stop out here for the Grand Prix.	(2-LM)
		- - -	

05 04 52 39	CDR	Here's a flat place, sort of.	(2-LM)
05 04 52 41	LMP	But let - we got to get over there where the - I'd like to get over there so I won't have to get back on, see, and pick up the core stems.	(2-LM)
05 04 52 50	LMP	You've got to arm the mortar package Central Station at switch 5, CCW. Okay, why don't we go over to the right, where the stems are. *** boresight it on the LSM now.	(2-LM)
05 04 53 15	LMP	Hey, here's a big one, John.	(2-LM)
05 04 53 17	CDR	Oh, man.	(2-LM)
05 04 53 18	LMP	Hook a right.	(2-LM)
05 04 53 42	LMP	Tony, again we're just driving by the ALSEP and apologize for that heat flow. The drill seems to work just great, though. I think it's in good shape right now for next flight.	(2-LM)
05 04 54 05	CDR	There's a flat place right in here, Charlie.	(2-LM)
05 04 54 07	LMP	Yeah, that's what I was thinking. See you could go out up that way and then out over that way towards the LM. Okay?	(2-LM)
05 04 54 12	CDR	Right. Right.	(2-LM)
05 04 54 14	LMP	Okay. Let me jump off.	(LM)
05 04 54 16	CDR	A day ago, it didn't look like we were even gonna land, and now we've sampled our first Highlands.	(LM)
		- - -	
05 04 54 36	LMP	Put this camera in here, John. Okay?	(LM)
05 04 54 45	LMP	Okay. Now let me see. You're suppose to drive 45 degrees to the Sun. Okay?	(LM)
05 04 54 52	LMP	Okay. Let me get the - 16 off.	(LM)(PHO DAC)
		- - -	

05 04 55 20	LMP	Let me get the camera. Let me get it set here now. It's 24 - gonna be using the trigger, so it's 24, and f - f:8 at 250.	(LM)(PHO DAC)
		- - -	
05 04 55 59	LMP	You're right, Tony. It ain't - nothing much up here but a lot of rocks.	(LM)
		- - -	
05 04 56 08	LMP	It'll open. *** close it. This thing is stuck. I can't get it up. Let me move out. Okay. To start, I'm suppose to be about 50 meters or so from you.	(LM)
		- - -	
05 04 56 58	LMP	DAC's on -	(LM)(PHO DAC)
		- - -	
05 04 57 20	LMP	He's got about two wheels on the ground. There's a big rooster tail out of all four wheels. And as he turns, he skids. The back end breaks loose just like on snow. Come on back, John. Okay, the DAC is running. Man, I'll tell you Indy's never seen a driver like this. Okay, when he hits the craters and starts bouncing is when he gets his rooster tail. He makes sharp turns. Hey, that was a good stop. Those wheels just locked.	(LM)(PHO DAC)
		- - -	
05 04 58 09	LMP	Mark on. Okay. You could have gone the other way, but go ahead. There's the big craters there, though, aren't they?	(LM)(PHO DAC)
05 04 58 19	CDR	Yeah. I don't want to run into those holes.	(LM)
		- - -	
05 04 59 24	LMP	Mark. Okay, John. DAC's off.	(LM)(PHO DAC)
		- - -	
05 04 59 41	CDR	Okay. Where's your core tubes at, Charlie?	(LM)(SAMP CORE 60001-07)

05 04 59 43	LMP	I'll get them.	(LM)(SAMP CORE 60001-07)
		- - -	
05 05 01 37	LMP	Man, there's a beautiful secondary, Tony.	(LM)
05 05 01 41	CC	Is it oblong or round?	(LM)
05 05 01 43	LMP	- - meter size. It's round with a very angular block in it.	(LM)
05 05 01 53	CC	I guess we don't have time to look at it, Charlie.	(LM)
		- - -	
05 05 02 36	LMP	Tony, the rocks in this ray near the Lunar Module are entirely different from the ones we've been sampling. They're just different. We're gonna have to make a stop here - in Station 10 - and call Station 10 here, right in front of the Lunar Module and sample here.	(LM)(SAMP 60015)
		- - -	
05 05 03 20	LMP	Okay. I ran to the third mark down from full - whatever that is; empty, I guess. Looks like 50 percent of the mag, Tony.	(LM)(PHO DAC)
		- - -	
05 05 03 45	CDR	Okay, first arming pin is out. Second pin is going to arm. *** third pin is going to arm.	(LM)
05 05 04 56	CDR	Now they ought to all be armed. Either that or the pins are broke off. Okay. At switch 5, we'll go CCW.	(LM)
05 05 05 19	LMP	After you've been out in the Sun awhile, this shadow is really dark. *** hey, Tony. The cores are in the bag; breaking out the Solar Wind.	(LM)(SAMP CORE 60001-07)
		- - -	
05 05 06 49	LMP	This is foolproof. Point this side at Sun, dummy. Okay. Solar Wind is planted in the Descartes Highlands. Figure out where what is?	(LM)

05 05 07 20	CDR	Okay, I got a - okay, Houston; bearing, 022; range, 0.1; and that's where it is. And that is no joke. (mortar package)	(LM)
		- - -	
05 05 08 10	CDR	En route, now.	(LM)
		- - -	
05 05 08 31	CDR	Ain't nothing - there's nothing plain about this place, Houston, I'll tell you. I don't know whoever thought it was plain. Cayley Plains, man.	(LM)
05 05 08 40	LMP	Okay, Houston. These rocks - I picked up one - -	(LM)(SAMP 60015)
05 05 08 43	CC	Kind of like *** smooth.	(LM)
05 05 08 44	LMP	- - right out here that I described that blue - that - -	(LM)(SAMP 60015)
05 05 08 49	CDR	Yeah, that's smooth.	(LM)
05 05 08 50	LMP	- - that blue one that I described from the Lunar Module window, and by bluish color is because it's glass-coated, but underneath the glass, it's a crystalline rock that, to me, has the same texture as the "genesis" rock, and it's not a breccia. At least I can't - the part I'm looking about - at is it's not a breccia - maybe just one big clast. But the part I'm looking at is a one solid - it's an igneous, plutonic rock.	(LM)(SAMP 60015)
05 05 09 29	CC	Okay. How big was it?	(LM)(SAMP 60015)
05 05 09 33	LMP	It's about football size, little bit smaller. Going into plus-Z footpad.	(LM)(SAMP 60015)
05 05 09 43	CDR	Okay, Houston. Your readings are - we're parked on a heading of north. And it says the bearing is 355, the range is 0, the distance is 4.2.	(LM)
		- - -	
05 05 10 44	LMP	Okay. Tony, can I take the pictures of the SWC with my black and white?	(LM)(PHO 109 17863-64)

05 05 11 01	LMP	I've already got it on; I hope you say yes.	(LM)(PHO 109 17863-64)
05 05 11 03	CC	Yeah, go ahead.	(LM)(PHO 109 17863-64)
05 05 11 10	CDR	Okay, Houston. You're going to 3.	(LM)
05 05 11 24	LMP	*** every one of them.	(LM)
05 05 11 26	LMP	And we didn't see any at the other two craters.	(LM)
05 05 11 30	CDR	We might have missed some, but I agree I didn't ***	(LM)
05 05 11 35	LMP	Tony, I'd say 15 percent of these rocks are glass coated, and at the other - stops 1 and 2, we didn't see any.	(LM)
05 05 11 45	CC	And, Charlie, while you got the camera taking pictures there, we'd like you to go around and look at that cosmic ray and take a picture of it, and read off the temp label.	(LM)
05 05 11 56	LMP	Yeah. I already took a picture of it.	(LM)
05 05 12 00	LMP	- - 7-footer in color. Okay. I'll go read the temp. You want another picture?	(LM)
05 05 12 09	CC	No, we don't need another picture. You might comment if there's any dust on it.	(LM)
05 05 12 16	LMP	No, it's clean as a whistle.	(LM)
		- - -	
05 05 12 30	CC	Okay. We'd like you to take it off and put it on the minus-Y strut, in the shade.	(LM)
05 05 12 39	LMP	Okay. John will have to do that.	(LM)
		- - -	
05 05 13 03	CC	Okay. And, Charlie, we'd like to press on with the closeout.	(LM)
		- - -	

05 05 13 13	LMP	I've got John's bag now, and I'm gonna empty it in the SRC, keeping the core tubes out.	(LM)
		- - -	
05 05 14 25	LMP	John, can you take my bag off? I'm ready to *** you've got a whole bag. I emptied yours in there, and it wasn't even - it didn't even fill in the SRC, so take my bag off and we'll - - and I'll get on with this.	(LM)
05 05 14 39	CC	Okay, guys. We'd like to switch out the SCBs in the rock box. And we'd like to put SCB 5 in there instead of SCB 1.	(LM)
05 05 14 49	LMP	Tony, I've already emptied SCB 1 in there.	(LM)
05 05 14 56	CDR	Most of SCB 5 can go in there too, Houston.	(LM)
05 05 15 00	CC	Okay. Great.	(LM)
05 05 15 01	LMP	I think I can get them both in there. I'm emptying them in, Tony.	(LM)
05 05 15 04	LMP	Okay, Tony. Like we planned, I'm empty - I'm just emptying them into that.	(LM)
05 05 15 10	LMP	And it packs easier that way.	(LM)
		- - -	
05 05 19 14	LMP	Okay, Tony. We got all the rocks that we collected, except for a couple of biggies, into the SRC.	(LM)
05 05 19 21	CC	Outstanding, Charlie. The reason for putting those others in there, is they wanted the soils in the SRC.	(LM)
		- - -	
05 05 22 31	LMP	You finished with your pictures, John?	(LM)
05 05 22 33	CDR	No. I haven't done those yet.	(LM)(PHO 114 18435-43)
05 05 22 34	LMP	Okay. Tony, my frame count on magazine Bravo was 120.	(LM)

05 05 22 49	LMP	And I'm helping John load up. I'm doing ETB right now, while he's taking pictures.	(LM)(PHO 114 18435-43)
05 05 23 26	CDR	Cross-sun, f:5.6 at 60; 20 feet.	(LM)(PHO 114 18435-43)
05 05 23 41	CC	Charlie, was your magazine Bravo or Golf?	(LM)
05 05 23 48	LMP	Whatever the one - whatever the one the checklist said.	(LM)
05 05 23 56	LMP	I'll tell you inside; I'm bringing it inside.	(LM)
05 05 24 06	LMP	Okay, I've got all the film, John.	(LM)
05 05 24 09	LMP	All I need is your camera, and the ETB is going over to the MESA table. And I got a great big rock, a "Muley".	(LM) (SAMP 61016)
05 05 24 19	CDR	Houston, if I take a down-sun, I'll have to stand in front of this contraption. You want me to do that? In front of the camera at 3 feet?	(LM)(PHO 114 18435-43)
05 05 24 31	CC	I guess if you stand a few feet away from it, it shouldn't be too bad. Move 8 or 10 feet away, though.	(LM)(PHO 114 18435-43)
05 05 24 40	CDR	Okay. I'll take it at 8 feet.	(LM)(PHO 114 18435-43)
05 05 24 53	LMP	Tony, I take that back. That rock we picked up, the big - the "Muley" is - oh, I was going to say glass crystals, but take that back. Part of it seems to be shocked, and it's a crystalline rock on the inside under all the dust. Whatever it is.	(LM)(SAMP 61016)
05 05 25 14	CC	Okay, fine. We'll take it.	(LM)(SAMP 61016)
05 05 25 28	LMP	Okay. I dropped it onto the strut; part of it broke off. I'm sorry. Big rocks, I've done.	(LM)(SAMP 61016)
		- - -	
05 05 26 25	LMP	Okay, John's frame count is 65.	(LM)
		- - -	

05 05 29 27	LMP	Okay. That's got it. Okay. I've placed the core stems, I *** the SRC, HEDC, Commander unload SCB, close SRC I, MESA blanket, big rocks.	(LM)
		- - -	
05 05 30 55	LMP	Tony, be advised that we are not taking any SCB's up. I emptied the SCBs into the SRC.	(LM)
05 05 31 10	CDR	Are we gonna get them all in there, Charlie?	(LM)
05 05 31 12	LMP	Yeah. All the rocks went in there.	(LM)
05 05 31 15	CC	You might put - what are you going to put the big rock in? That might go in the SCB.	(LM)(SAMP 61016)
05 05 31 24	CDR	Won't fit. Remember?	(LM)
05 05 31 26	LMP	No. One of them will. The one I just picked up will. The big one that go - that we picked up out at Flag won't fit.	(LM)(SAMP 60015) (SAMP 61016)
		- - -	
05 05 33 38	CDR	I tell you, Houston, my general impression of this thing is i'm a lot more surprised at how really beat up this place is. It must be the oldest stuff around, because it's just craters on top of craters on top of craters. And there's some really big old subdued craters that we don't even have mapped on our our photo map, I'm sure of it.	(LM)
05 05 34 16	CDR	Because they just show up as gentle depressions.	(LM)
		- - -	
05 05 34 27	LMP	Tony, one of those big rock bags - I mean, those big rocks I could put into the SRC. It's an undocumented rock - grab sample. I don't mean the SRC, but the SCB. Why don't we just leave it there and get it for next time, Tony?	(LM)(SAMP 60015, 61016)
05 05 34 51	LMP	I tell you what, I'm gonna get it. Bag 5.	(LM)(SAMP 60015)
		- - -	

05 05 35 17	CC	Charlie, we think you ought to put the one that you can get in the SCB - put it in a bag and carry it up. That one that's too big, if there's no where to stow it upstairs, why don't you just leave that one down.	(LM)(SAMP 60015) (SAMP 61016)
05 05 35 29	LMP	Oh, there's a place to stow it. We just don't have the big rock bag out.	(LM)(SAMP 61016)
		- - -	
05 05 39 22	LMP	Okay, I'll tell you what. Let me jump up on the ladder and then you hand me that. Okay?	(LM)
05 05 39 32	LMP	We got an SCB, a ETB, a core stem and the core stem.	(LM)
05 05 39 37	CDR	Okay.	(LM)
		- - -	
05 05 46 30	CDR	Okay, Charlie, here comes SRC I.	(LM)
		- - -	
05 05 47 57	LMP	I brought the pallet. We've got an SCB, the core stems, and ETB.	(LM)
05 05 48 06	CDR	Okay. Hardly nothing in the SCB, right?	(LM)
05 05 48 08	LMP	One big rock is all.	(LM)(SAMP 60015)
05 05 48 19	CDR	Whew! That other big "Muley" we'll get when the - with a big rock bag later on.	(LM)(SAMP 61016)
		- - -	
05 05 48 54	LMP	Okay, Tony. We're bringing SCB number 5 in with a big rock.	(LM)(SAMP 60015)
		- - -	
05 05 49 46	LMP	Tony, read out the ETB stuff.	(LM)
		- - -	

05 05 49 54	CC	Right, you have two HEDC mags, B and D; three HEDC mags, A, C, and H; one 500-millimeter mag L; three DAC mags P, Q, and R; your maps; and six sample containment bags.	(LM)
		- - -	
05 05 50 26	LMP	I did not get those bags. I don't have that on my check list.	(LM)
		- - -	
05 05 50 35	CDR	Okay, I'll go get them.	(LM)
		- - -	
05 05 50 41	CC	Okay. They're in the left front of the MESA, John.	(LM)
		- - -	
05 05 51 56	CC	Roger. You should have six DAC mags - correction, six Hasselblad mags and three DAC mags.	(LM)
05 05 52 06	LMP	Yes, I've got all the film.	(LM)
05 05 52 18	CDR	These bags are on the left side of the MESA, right, Charlie?	(LM)
		- - -	
05 05 53 14	CDR	I'll bring them up separate, Charlie.	(LM)
		- - -	
05 07 14 06	LMP	Okay, Houston. SCB number 5 is in sample containment bag number 5, and it weighs 14 pounds.	(LM)(SAMP 60015)
		- - -	
05 07 14 28	CDR	Bet you at least 10 pounds must be the SCB.	(LM)
05 07 14 32	CC	You collected a lot of rocks out there.	(LM)
05 07 14 44	LMP	That was only one rock, and that was a grab sample that I got about 30 meters in front of the LM. Over.	(LM)(SAMP 60015)

05 07 14 55	LMP	Okay. SRC number 1 weighs 42 pounds.	(LM)
05 07 15 07	LMP	And that's all the rocks we got.	(LM)
05 07 15 42	CC	Okay. I don't know how factual it is, but I remember getting a note the last week before launch that you had your rock control weight up to 215 pounds.	(LM)
05 07 16 01	LMP	Okay, Tony. We'll get 215 pounds of rock.	(LM)
05 07 16 04	CC	I bet you will.	(LM)
05 07 16 05	LMP	How much have we got now?	(LM)
05 07 16 10	CC	Oh, you have 56 pounds you called back, including the weight of the SRC, which is about 12 pounds. So that would make it about 44 pounds.	(LM)
05 07 16 34	CC	I bet the "Muley" special down there will double your weight.	(LM)(SAMP 61016)
05 07 16 40	CDR	I'm sure it will. It gave Charlie a hernia.	(LM)(SAMP 61016)

05 08 21 18	CC	Good show. Okay, when Charlie was working around the LM there, he described a black vesicular basalt underneath the engine. Was that the only basalt you saw on all of EVA I?	(BETWEEN EVAS)
05 08 21 40	LMP	That's all I saw. There are some more blocks than that scattered, I think, around the landing area, Tony.	(BETWEEN EVAS)
05 08 21 51	CDR	Yeah, and, Tony, Charlie's idea to make this area LM 10, I mean, to make this stop 10 is a pretty good one. There's plenty to get around here.	(BETWEEN EVAS)
05 08 21 59	CC	Okay, we understand. You said that the rocks in this area look different from what you saw. About how far west did that difference go?	(BETWEEN EVAS)
05 08 22 11	CDR	There you go. I was just at zero phase. I just hang on to the Rover and try to see where the next hole is.	(BETWEEN EVAS)
		- - -	
05 08 22 41	LMP	Well, let me give it a try, Tony. I always have an opinion. The rocks around the - beyond the ALSEP, on our drive out past Spook and Buster, all had this breccia appearance to them, with the primarily grayish matrix with a dark clast. At Buster, though, there were some rocks that were very shocked, I think. In fact, they just crumbled in my hand - the one I picked up. So at least at Buster and Flag - Spook, the rocks appeared to be different in the main than they are right here.	(BETWEEN EVAS) (SAMP 62270,75)
05 08 23 32	CC	Of the rocks you saw, do you feel like you sampled all the representative types?	(BETWEEN EVAS)
05 08 23 45	LMP	Well, out there at Flag, they were all so dust covered, I don't know. I was really surprised when John broke that big boulder open and saw that whitish matrix with the clast. I frankly don't think that was a breccia, but it was pretty friable rock, anyway.	(BETWEEN EVAS) (SAMP 61290,95)

05 08 24 07	CC	You first described the "Muley" rock as a crystalline and then switched to a - correction. You first described it as a breccia, then switched to a crystalline. I wonder if you could have some third of fourth thoughts on that?	(BETWEEN EVAS)(SAMP 61016)
05 08 24 34	LMP	I'd say when I picked it up, it was pretty dust covered, and only had a couple of spots to - that I could look. One area looked like a crystalline rock. If it was a breccia, then that clast is pretty large, a centimeter or so. If it's a crystalline rock, then it's a sort of a feldspar-looking type crystal. The other, when I turned it over, it had another one of those white specks that most of the breccias have around here, and that's when I switched. So it could be a combination, Tony.	(BETWEEN EVAS)(SAMP 61016)
05 08 25 37	CC	Can you give us a numerical estimate on the proportion of the rock types in the LM area? We wonder if there's any correlation between rock type, size, shape, or angularity.	(BETWEEN EVAS)
05 08 25 53	CDR	Well, there probably really isn't a correlation like that. I was just looking out the window here. I see some very angular - very angular rocks that are white rocks. And some more grayish rocks - in other words, less white in them that are sort of subrounded - -	(BETWEEN EVAS)
05 08 26 38	CC	Okay. Do they correlate with sizes?	(BETWEEN EVAS)
05 08 26 39	CDR	- - and some rocks that are - no, these are all about the same size. No, the big whities are - it's not going to be that correlatable. I see some that's sitting out there in the middle of the LM area that look like - I swear they got some pinks in them, but if they were just a - pink with black glass in them laying across - on the way to ALSEP site. You can almost say they came from South Ray if you're a betting man. And these big ones - need to be predominantly the size of say, 20-centimeter rocks, and they're very angular. The white rocks are also smaller. They are on the order of 10 to 15 centimeters. I'm just guessing because we're sitting right here in the middle of this thing, and	(BETWEEN EVAS)

		it's sort of like we can't see the forest for the trees. They seem to be a smaller rock, maybe 6 - no - 6 to 12 centimeters, very angular. And they're probably less than 5 percent of the rock type. The other rock - the predominant rock in the area is just an old gray, subrounded, angular rock. And I would guess that's a breccia of some type. And although the surface is very boulder-strewn, as you probably notice on the television, it looks exactly at the ALSEP site, in here, at the same amount of boulders. I guess we put the thing in the same ray almost, because it's almost on a line from here to South Ray. I guess what I'm saying is I can see what I believe to be at least three different rock types out here. The white, the pinkish, and this is from the LM so I'm really not qualified to go into that - the pinkish with the black clast in it, and the subrounded gray rock.	
05 08 29 18	CC	Have we sampled all three of those?	(BETWEEN EVAS)
05 08 29 24	CDR	No, we haven't done any sampling around the LM or stations around the ALSEP site.	(BETWEEN EVAS)
05 08 29 31	CC	I understood that. I just wondered if you had picked up anything that you thought was the pink with the black specks anywhere?	(BETWEEN EVAS)
05 08 29 41	CDR	I think most of the rocks that I was - with Charlie, when he was picking up, except for that one that we beat off over there, they're all dust covered predominantly, and I never got a chance to look at them.	(BETWEEN EVAS) (SAMP 61290,95)
		- - -	
05 08 30 02	LMP	Let me say something, Tony, here. I'd like to give you what I think the three major areas that we saw today. One, here at the LM, is, I'm convinced is a ray from South Ray. The rock types being predominantly - *** over by Flag, we were out of that ray. We were in the Cayley, and I sampled on the rim of Buster. And whatever made Buster, I don't think it was a secondary, because I think the rocks that we picked up there were true shock rocks. And I just can't see a secondary doing that. So the	(BETWEEN EVAS)

		rocks around there - we were definitely out of the ray at Buster and Flag. And also, it's - excuse me. It's Buster and Spook. At Flag and Plum, we're again into Cayley with hardly any blocks visible. So you have a Cayley without the blocks farthest out. You have the Cayley with the blocks that, I think, are some of the stuff that was made from Buster on the rim, and then in here towards the LM, we have the South Ray.	
05 08 31 30	CDR	Yeah, I believe Charlie - think Charlie's right about that.	(BETWEEN EVAS)
05 08 31 43	CC	How about that albedo change in the subsurface soil that you talked about? It seemed like, of course you saw it first time at Flag, you were probably more excited about it there. Was there any difference in its nature between there and Buster and ALSEP and LM?	(BETWEEN EVAS)
05 08 32 10	LMP	No. Only around the LM, it was just in ALSEP, it was just in spots. At Buster, correction - at Plum it seemed to be everywhere, and everywhere we dug a little scoop, my predominant impression was that the white albedo was coarser grained than the fine dust-covered on top.	(BETWEEN EVAS)
05 08 32 41	CC	The white is coarser.	(BETWEEN EVAS)
05 08 32 46	LMP	That's affirmative. It looks - it sort of - I'm not going to say ash flow, but it sure looked like it was coarse, white - let me get a better word. Let me think about that one for a description.	(BETWEEN EVAS)
05 09 33 04	CC	Okay, just a question there for you, John. When you got to Halfway or what you decided was Halfway, we understand you looped around the to south, is that right?	(BETWEEN EVAS)
05 08 33 19	CDR	That's affirmative.	(BETWEEN EVAS)
05 08 33 28	CC	Okay. In any of the craters that you looked into, was there any evidence of outcrops in the walls? You mentioned the one boulder that was sticking out the side of Flag, I think it was. Was there any other evidence of any bedrock? Any ledges?	(BETWEEN EVAS)

05 08 33 47	CDR	Did you see any in Buster? Charlie didn't see any, and I didn't see any.	(BETWEEN EVAS)
05 08 33 51	CC	Okay. No benches in any of these craters at all - -	(BETWEEN EVAS)
05 08 33 53	CDR	No, these were rather subdued craters. They do have rocks sticking out of them, particularly at Buster and there was a few at Flag. But the rest of them really didn't. The deceptive part of the whole business - you know, is you can't really tell by looking at the crater how big it is. I was almost willing to buy Halfway - for being Flag.	(BETWEEN EVAS)
05 08 34 27	CDR	It's a long way from being Flag crater size.	(BETWEEN EVAS)
05 08 34 31	LMP	Tony, let me try again. The larger craters, the old subdued ones, were boulder free. The only hint that I had was this northeast-southwest rocks - just boulder distribution and Buster. And that went sort of up the wall southeast to north - southwest to northeast.	(BETWEEN EVAS)
05 08 35 10	CC	Right; understand. I guess that's why you went ahead and called it a secondary. It probably isn't. It was just a - since it was oriented with the structure of the area.	(BETWEEN EVAS)
05 08 35 23	LMP	Man, that was a big rock that came in there, if that was a secondary. I'll tell you, that is a big crater. The walls on it are - well, the east wall was still in shadow to some degree with whatever our sun angle is now; and we couldn't see in the bottom of Flag or Spook. The walls - you just couldn't get up close enough to the rim to see into the bottom.	(BETWEEN EVAS)
		- - -	
05 08 36 37	CC	Okay. On this Station 10, we're perhaps considering beefing it up, and letting you do some sampling in that area. And from what you've been saying now, it sounds like you think that the LM-ALSEP area would be a good place to spend some time. You think from your experience with the drill there, you could drive the double core all right? And how does a rake sample in that area look?	(BETWEEN EVAS)

05 08 37 08	CDR	Yeah, we can get a lot of rocks in a rake sample. Charlie says the double core will go.	(BETWEEN EVAS)
		- - -	
05 08 43 04	CC	One more geology question here. Was there any difference between the rocks in the bottom of Buster and those on the rim of Buster?	(BETWEEN EVAS)
05 08 43 28	LMP	You want me to guess Tony? I don't think so.	(BETWEEN EVAS)
05 08 43 38	LMP	Okay. And the reason I don't think so is that the rocks in the bottom were all shattered and crumbly-looking and sort of mounds of rocks with many fractures in them which was just like the one I sampled that crumbled up in my hand. So, texturally, from 50 meters, they look the same.	(BETWEEN EVAS) (SAMP 62270,75)

05 19 33 25	CC	I can just sit here and talk a few words about the traverse today, if you like. I haven't really organized the - my notes on it, so it may ramble a little bit, but I've gotten a briefing by the planning team. It looks like an interesting plan here. The traverse is almost - well, it's exactly like normal EVA 2. From Ken's words, he can see definite benches in Stone mountain and thinks that you'll have a pretty good chance of identifying them. He can see layers in South Ray, which makes the rays at Station 8 a whole lot more interesting than we had even anticipated. So right now, we'd like you to do a normal 4, 5, and 6. The main thing identifying 6 is being on the - on the slope part of the down - the bottom of the slope of the lowest bench, Station 5 being on top of the first bench, and Station 4 being on top of the second bench - in fact, it may be a little above. Right now, we're thinking that we won't have you aim for Crown, because Crown is probably a little bit more subdued than we'd like, and probably not worth the effort to get to. Cinco D and E is, as we talked about before. Probably be Station 4, probably be a good place. At the end of Station 5, we may have you do an LPM. I'll update this all in real time for you, I'm just talking about what we'll probably do here. And Station 7 we're going to eliminate and save time back - take the whole time and put it at Station 10 so you'll be able to do that primary sampling we asked for. We think that sounds great. As you drive from 6 to 8, we're more interested now that you do get some pictures of Stubby as you go along, of that area, because we don't have Station 7; so we'll ask you to turn your DAC over that way as you're driving. A DAC pointed down-sun probably wouldn't see much, anyway, in that zero phase.	(BETWEEN EVAS)
05 19 35 32	LMP	Okay, Tony, I think you'll be able to come up on Stone there. It looks like to me you're gonna be able to see right into - into South Ray and right into Stubby and all those craters. The general topography here is a downslope. From North Ray, it	(BETWEEN EVAS)

leads from the ridge to our immediate right all the way down to South Ray, and - with the lowest point really being maybe south of Survey Ridge. Over.

05 19 36 06 CC Okay, right. And we could see - I think I could see the bright area of South Ray on the TV pan. It really stands out down there. But our really exciting station looks like it might be Station 8, and we're really going to encourage you to scout around and see if you can get the samples of the dark layers that we see in South Ray. (BETWEEN EVAS)

05 19 36 31 LMP It looks like the base of Stone mountain is really topographically lower than we are right now. (BETWEEN EVAS)

05 19 36 42 CC Okay. And, also, on Station 9, it may turn out to be difficult to find a pristine area. We'll let you scout around a little bit, and pick your own Station 9 of whatever looks like isn't ray material. And on the location of Station 10, we'd like you to put it just about where you said it might go as you were driving back yesterday. It sounds like the contact between the ray and the non-ray material is just west of you there, and we'd like to run the penetrometer array along the contact but in the ray material; that is, the penetrometer array would now go in a northeast-southwest direction, and a double core would be something like 50 meters to the southwest of the deep core. Let me correct that a second here. Hold on. I'll correct that. The double core will be about 50 meters towards the LM but along the contact, so it'll be about 50 meters closer to the LM than the deep drill. And at Station 10, since you'll have a longer sampling time, we'd like you to sample on both sides of the - of the - of the ray; in other words, in the ray, along the line between the deep drill core, and the LM, and off the ray to the west. (BETWEEN EVAS)

05 19 48 14 CC Okay. As you drive from Station 6 to 8, we'd like for you to swing the DAC over and take pictures into Stubby, and all points to the south. And then we're going to really stress Station 8, because it may be chance to sample many of those materials that Ken was able to see in South Ray, so Station 8 is a key station. Station 9, we're not at all sure that (BETWEEN EVAS)

		you'll be able to recog - that we'll - the nominal Station 9 is a pristine area, so we'll just let you scout around and see if you can - find the best you can. And Station 10 will be longer.	
05 19 49 03	LMP	I was going to say, Tony. I guarantee you we'll find a place. It is out of sight of the LM that's 3 or 4 kilometers away.	(BETWEEN EVAS)
05 19 49 11	CC	Okay, good show. And Station 10 will be 12 to 15 minutes longer now, and we'd still like it on a line between the deep core and the LM, so it will be on a northeast line. And we'd like it in the ray that you described, but near enough to the edge so that you can sample off the west edge of the ray. Also, we'd like you to pick up that particular basalt that you described underneath the engine bell.	(BETWEEN EVAS)
05 19 49 48	CDR	I don't know how big this ray is, but the sample on the west edge of it. I don't understand how we're going to do that.	(BETWEEN EVAS)
05 19 50 04	CC	Where do you think that west edge was? Was it all the way back towards Spook?	(BETWEEN EVAS)
05 19 50 15	CDR	It's not that far, but I think, like if we go due west of the LM, we can go 300 meters. And we'll probably run into some really big boulders, which are probably in the center of the ray, and then they thin out a little off to the other side from the ray. And it probably runs over that way for a good long ways.	(BETWEEN EVAS)
		- - -	
05 19 51 03	CDR	All I'm saying is the ray must be 350 meters wide, and we're on probably the east half of it.	(BETWEEN EVAS)
		- - -	
05 19 54 41	CDR	Okay. Tony, in my opinion, we probably should sample the edge of ray and we should go east maybe about 100 meters.	(BETWEEN EVAS)
05 19 54 59	CDR	I said, it would probably be best to go east a hundred meters and sample the edge of the ray. We'd be closer to the edge.	(BETWEEN EVAS)

05 21 40 06	CC	Okay, I got this result on the quick look on the x-ray. I just thought I'd pass it up to you. The Descartes area is higher in aluminum silicon than Mare, but it's not as high as the highlands east of Smythii.	(BETWEEN EVAS)
		- - -	
05 22 44 54	CC	Okay, John, you're go for egress. Charlie, we'd like - -	(BETWEEN EVAS)
		- - -	

05 22 47 35	CDR	Charlie, watch out for the big rock in the footpad.	(LM)(SAMP 61016)
05 22 47 38	LMP	Yeah, I know it. I put it there. That's old beauty.	(LM)(SAMP 61016)
05 22 49 29	LMP	Okay, Tony, I'm on the old lunar terrain again.	(LM)
		- - -	
05 23 05 39	CC	And, Charlie, when you're taking that pan, let me know. I have another picture for you.	(LM)
		- - -	
05 23 06 26	LMP	Oh, the old dark slide. Come out. Expose one picture.	(LM)
05 23 08 00	LMP	Oh. John, make sure that I did all the things on - the ETB is emptied, and magazine Lima is on the camera 500, all the other film is stowed.	(LM)
		- - -	
05 23 08 56	LMP	Wait a minute I got to get a pan, John. So it'll be a few minutes. Why don't you run around and pick up a rock.	(LM)(PHO 107 17420-40)
05 23 09 02	CDR	Hey! Outstanding suggestion. Give me a rock bag, Charlie.	(LM)
		- - -	
05 23 10 13	CC	And John, if you're picking up a rock, could you get that - - the vesicular basalt underneath the engine bell?	(LM)
05 23 10 24	CDR	Yep. Sure could do that.	(LM)
05 23 10 27	LMP	Tony, that is a double "Muley" - that rock.	(LM)
		- - -	

05 23 10 59	CC	And just forget that big rock for now. That's too big to handle.	(LM)
05 23 11 07	CDR	It's inaccessible; it's underneath the engine cover.	(LM)
		- - -	
05 23 11 15	CDR	But there's probably another nice rock - I'm sure there's another good rock around here that I've been eyeing out my window I wanted to get anyway.	(LM)
05 23 11 27	LMP	I hate to tell you, but I need your camera for the - here, take mine with the black-and-white and let me have yours for the pan.	(LM)(PHO 107 17420-40)
		- - -	
05 23 12 18	LMP	Pan quad III. Well, guess what? I'm on the wrong side. If you want some of this blackish rock, John, a small one that's bagable, there's a bunch right out here that look just like what I call that basalt. In fact, there's hundreds of them.	(LM)(PHO 107 17420-40)
05 23 13 08	CDR	Yeah. They're out from that little impact crater we just landed beyond. And I want to get this nice white one right here.	(LM)(SAMP 60025)
05 23 13 18	LMP	Okay. The old pan - - starts at f:11 at 250. Okay. Exactly 60 feet to the left, Tony.	(LM)(PHO 107 17420-40)
05 23 13 46	LMP	*** the best pan. Boy, it sure looks different looking up-sun. And you can still see those lineations in Stone mountain, Tony. In fact, they're maybe a little bit more pronounced.	(LM)(PHO 107 17420-40)
05 23 14 14	CC	Okay. Do you feel like they're the same angle?	(LM)
05 23 14 18	LMP	Yeah. Exactly the same angle. Down at the bottom, there aren't any. They start in one place, that is, and it's a little ridge that's to the east of - Cinco, down at the base; the - what we call the base here. There's two pretty predominant craters over there. Right there, there aren't any.	(LM)
05 23 14 43	LMP	All over the mountain. Okay. I don't think we're going that far east, but - -	(LM)

05 23 14 49	CC	Okay. Those extra pictures - -	(LM)
05 23 14 51	LMP	Hey, Tony. What is the other pic -	(LM)(PHO 107 17441-42)
05 23 14 53	CC	Right, of the Cosmic Ray Experiment. So if you'll go over to that side, we'd like a cross-sun, at f:11, 250 at 15 feet.	(LM)(PHO 107 17441-42)
05 23 15 05	LMP	Okay. Cross-sun, f:11, 250 at 15.	(LM)(PHO 107 17441-42)
05 23 15 08	CDR	Okay. Houston. I just picked up this rock. It's a white rock, a very white rock, but it has a black glass layer on the back of it, or what appears to be black glass - a thick black glass; and it's about a hand-size specimen. I can't get it in the bag, but I'll get it anyway. And it has a lot of zap craters in it, and lining the zap craters are some whitish substance.	(LM)(SAMP 60025)(PHO 110 17866-68; 113 18303)
05 23 15 38	CC	Charlie, we'd like an up-sun of that cosmic ray also. And the settings on that will be f:5.6.	(LM)(PHO 107 17441-42)
05 23 15 46	LMP	Okay. Looking up-sun. Okay.	(LM)(PHO 107 17441-42)
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05 23 15 59	LMP	Okay; that's what it is. I don't think you're going to see much in this picture, but I'll take it. It's just really gonna show you how it's sitting. Okay. That's done.	(LM)(PHO 107 17441-42)
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05 23 16 38	LMP	Okay, we're ready for the loadup, and I'll swap cameras with you. *** put yours on your seat, John.	(LM)
		- - -	
05 23 17 15	LMP	I got two core tubes sitting up there, too. Don't let me forget those.	(LM)
05 23 17 19	CDR	Where? Up on the thing?	(LM)
05 23 17 20	LMP	Yeah. Up on the - handtool carrier -	(LM)
05 23 17 22	CDR	You want them in this SCB here - -	(LM)

05 23 17 24	LMP	No. They go back in here.	(LM)
05 23 17 27	CDR	What are we gonna do with this SCB right here?	(LM)
05 23 17 28	LMP	That is going on my back. That's the one I emptied yesterday.	(LM)
05 23 17 33	CDR	Okay. Fine. And I'll get that.	(LM)
05 23 17 36	LMP	The other one - you're going to be chock full of core tubes today, babe. I'll tell you. This is core-tube-taking day. And a suprise - whatever. Okay. I'm ready for loadup, I guess.	(LM)
		- - -	
05 23 18 03	LMP	Ah, the old lunar surface. We really kicked this stuff up, Tony, right around the Lunar Module where we walked, where you don't have the footprints and the tracks, it's very smooth, very white albedo.	(LM)
		- - -	
05 23 18 20	LMP	Yeah. Very white albedo. Where we've kicked it up, it's about two shades grayer. It's a lot darker albedo. And you know why I think that is, Tony? You look down-sun, and it's not that way. You look up-sun, and it is. I think it's the shadows that the Sun casts on the particles that have been disturbed that causes it to give a darker albedo.	(LM)
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05 23 21 47	LMP	Happy day. Okay; LRV prep. HDEC to RCU - left seat to RCU. Pan, I got. HEDC, RCU to left seat.	(LM) (PHO 107 17420-40)
05 23 21 59	CC	And Charlie, verify the Q mags on the DAC and that the DAC's running - or it runs.	(LM)(PHO DAC)
05 23 22 07	LMP	It's not running, but the Q mag is there.	(LM)(PHO DAC)
05 23 22 11	CC	Roger. We just wanted you to verify that the DAC was working.	(LM)(PHO DAC)
05 23 22 16	LMP	Okay. Just a minute. Yep.	(LM)(PHO DAC)

05 23 28 10	LMP	You rat! *** why I didn't see that secondary from out here on the ground. You can't see the rocks are buried from -	(LM)
05 23 28 21	CDR	Look at the rocks around there, Charlie.	(LM)
05 23 28 26	CDR	There's your basalts and things. Those are black. They're probably glass covered, don't you think?	(LM)
05 23 28 31	LMP	They are. I picked up one out there. See where my footprints go?	(LM)(SAMP 60015)
		- - -	
05 23 31 21	LMP	Okay. DAC's coming on -	(LM)
05 23 31 25	LMP	Mark.	(LM)(PHO DAC)
05 23 31 29	CDR	Okay, give me that first heading again, Charlie.	(LM)(PHO DAC)
05 23 31 31	LMP	164.	(LM)
		- - -	
05 23 32 04	LMP	As we cross out to the west here - or south, we see a lot of these black rocks with the white phenocrysts.	(LM-4)
05 23 32 17	CDR	Also, we see big white rocks with black phenocrysts. Black glass, I mean.	(LM-4)
05 23 32 32	LMP	Okay. We've got a great view of all the way into Stone. We're right up on a ridge here. We're at 10 degrees bearing, 1.1 range. There's a 3-meter - 1-meter boulder to the right that's very angular, that's just as we've already described: the black with the whitish inclusion. We can see all the way to the base of Stone mountain and Survey Ridge. There are some secondaries around. The terrain is covered with - about 3 percent of the surface with cobbles up to 15 centimenters, a couple of indurated little secondaries - - that are a meter or so.	(LM-4)
		- - -	

05 23 33 32	LMP	Now we're going down an incline downslope at 356 at 0.3, that is about - what would you say, about a 5-degree slope, John? And the boulder population and the cobble population has picked up over here to about 10 percent, I'd say.	(LM-4)
		- - -	
05 23 34 18	LMP	Phantom crater's over a ridge. I think we're coming by WC, is what we're really coming by. I'll try 1 o'clock - make it 3 o'clock now, 350 at 0.3.	(LM-4)
05 23 34 35	LMP	Okay. The largest blocks we see are a meter. The regolith seems to be loosely compacted, much like the regolith over at the - which is characteristic of all of the Cayley here. Most of the rocks are angular to subrounded.	(LM-4)
05 23 34 59	CC	Okay. Do you feel you're still in that ray?	(LM-4)
05 23 35 02	LMP	Still in this ray.	(LM-4)
05 23 35 05	CDR	Yep.	(LM-4)
05 23 35 07	CDR	Just covered with blocks and holes.	(LM-4)
05 23 35 12	LMP	Lots of secondaries.	(LM-4)
		- - -	
05 23 35 30	LMP	We've got 0.6 now. When we get there, we should be 353 at 1.3. We're traveling a little bit east. You look like you're headed just about for our spot. See Survey Ridge down there?	(LM-4)
		- - -	
05 23 36 07	LMP	Still down about a 2-degree - 2- to 3-degree slope now. Old Barney's really driving the beauty.	(LM-4)
		- - -	
05 23 36 30	LMP	Tony an observation here. The dust-covered rocks are mostly rounded. The angular rocks seem to be free of dust.	(LM-4)
05 23 36 44	CDR	And there sure are a lot of rocks here.	(LM-4)

05 23 36 50	LMP	*** still as we described, cobbly, cobble size is still the same. Maybe 10 percent of the surface, now. But we're starting out with the correct magazines, as per checklist.	(LM-4)
05 23 37 15	LMP	Lot easier driving down here, isn't it, John? Not any real big craters. Lot of subdued - -	(LM-4)
05 23 37 22	CDR	It's not any easier; it's just that you can see what you're doing.	(LM-4)
05 23 37 25	LMP	Yeah. But it didn't seem to be as rough, is what I thought. Okay. We're at 348 at 0.8 now; still in indurated secondaries.	(LM-4)
05 23 37 52	LMP	We see Survey right up there. That was properly mapped. Most of the secondaries - the craters here, Tony, are in the meter size. Some of the larger ones may be 5 meters. Okay. It's getting a lot rougher now. A lot more hummocky at 346 at 0.9. Slowing down to about 6 clicks. That's gonna be a steep slope up there, John.	(LM-4)
05 23 38 43	LMP	Looks like that's Survey dead ahead.	(LM-4)
05 23 38 54	CDR	Looks like to me.	(LM-4)
05 23 39 02	LMP	Apparently, this ray is pretty extensive. We haven't got out of this cobble field yet, and we're now 1.0 at 348, and the percentages are just exactly the same. Characteristics of the regolith are identical, and it still appears loosely compacted. Almost like a freshly plowed field that's been rained on.	(LM-4)
05 23 39 43	LMP	Right now we're in an area, at 1.1 at 345 - 346, with four blocks that are meter to a meter-and-a -half size - make that six blocks now. And we're in a - off to our right, there's a slight depression that's maybe 20 meters below us, that extends over to a ridge that blocks out Stubby. Okay. We're coming up to the biggest rock now we've passed on our traverse. Click. Got a picture of it. And it's got - it looks like a breccia also, Tony. It was rounded.	(LM-4) (PHO?)
		- - -	

05 23 40 40	LMP	That looks like a pretty good path off about 2 o'clock - 1 o'clock, John.	(LM-4)
05 23 40 49	LMP	Okay. Now the percentage of cobbles is picking up, Tony, at 1.2 at 344, and maybe now 20 percent of the surface is covered with cobbles up to 15 - make it 30 centimeters, with the largest blocks in the meter size. Looks like these larger ones are caused by - there's some craters here 5 meters or so that appear to me to be a series of secondaries right in this area.	(LM-4)
05 23 41 36	CC	You might bear back to the right 10 degrees.	(LM-4)
05 23 41 43	LMP	Okay, I think that's a good plan. Okay. We'll do that. You can still see the rim of South Ray, spectacularly white. It just stands out above the surrounding terrain by an order of magnitude.	(LM-4)
05 23 42 12	CDR	Okay, what's the heading down Survey Ridge, where I think we are right now, Charlie?	(LM-4)
05 23 42 15	LMP	Come down Survey at about 227, 0.4. Yeah, this is Survey. Top of Survey, Tony, has got a lot of secondaries. Thirty percent of the surface with cobble, predominantly in the 10-centimeter range, but some greater than that, up to 50 centimeters.	(LM-4)
05 23 42 46	LMP	Very blocky.	(LM-4)
05 23 42 51	LMP	I'm clicking them off as fast as my finger'll pull the trigger.	(LM-4)(PHO?)
05 23 43 04	LMP	I got it. Okay. Okay; I'd say now 70 percent - in this area, 70 percent is covered; 347 at 1.5.	(LM-4)
05 23 43 18	LMP	Tony if we'd have gone to 353 on Survey originally, we'd have been down in a big depression.	(LM-4)
05 23 43 36	LMP	Oh, man, John. This is really a ray; it just goes right in to South Ray.	(LM-4)
05 23 43 40	CDR	Boy, you just can't believe the blocks. The block population on Survey - what is it, 50 percent?	(LM-4)

05 23 43 47	LMP	Oh, I would say - estimating 60 to 70. And you can track it right in, up across, over the ridge - it blocks out Wreck and Stubby - into South Ray. We're going downslope now, off of Survey; still heading southeast.	(LM-4)
05 23 44 25	CDR	*** got to get out of these, Charlie.	(LM-4)
05 23 44 27	LMP	No. I think - yeah, the Rover's hacking it with no sweat over these little ones.	(LM-4)
05 23 44 31	CDR	Yeah, but I mean *** spend the rest of the day in the ray.	(LM-4)
05 23 44 39	LMP	Yeah. I think you can hook a right here a little bit, John. Looks pretty good. There's really a lot of craters here, Tony, at 1.6 at 348. The top of Survey is just pockmarked. They're pretty subdued, though. We can drive through them up to 3-meter ones with no problem. You're still making 6 clicks, John. The characteristics of the rocks, Tony, are the same as around the Lunar Module.	(LM-4)
05 23 45 13	CC	Okay. If you get a chance to look at the southeast side of Survey - -	(LM-4)
05 23 45 23	LMP	That's one of the white ones - -	(LM-4)
05 23 45 24	CC	- - you might see if you see any beds in there.	(LM-4)
05 23 45 31	LMP	No, not a chance.	(LM-4)
05 23 45 36	LMP	It's pretty well rounded. The only predominant feature is this ray pattern with all the secondaries	(LM-4)
05 23 45 55	LMP	Boy, it'll be no trouble sampling the South Ray at 8; it looks like that this ray goes right across it.	(LM-4)
05 23 46 07	LMP	We're 1.7 now at 352, and sort of back down in - almost - we've dropped maybe 20 meters. Just passing a secondary that's 10 meters across.	(LM-4)
05 23 46 23	CC	Okay. You should see Merriam over to your right.	(LM-4)
05 23 46 30	LMP	Merriam would be down over the ridge.	(LM-4)

05 23 46 35	LMP	Man, there's a great split boulder right there.	(LM-4)
05 23 46 42	LMP	It was an east-west split there. Very undulating terrain, hummocky; the hummocks are - oh -	(LM-4)
		- - -	
05 23 47 12	LMP	Fifty-seven for 0.4. We should be 005 at 1.6 to cross - then we turn south again. We're at 1.8, but that's because we're a little - I think we could go straight for them, John. There's Cinco's, right up there on the hill.	(LM-4)
05 23 47 39	CDR	I think we should go straight for them; I want to get out of this ray.	(LM-4)
05 23 47 44	LMP	Okay. We are we're going 180. This is terrible, this ray, isn't it?	(LM-4)
05 23 47 50	CDR	Yep. That's why I want to get out of it.	(LM-4)
05 23 47 52	LMP	Yeah. Okay. We must be coming to the edge of it. My estimate of the cobbles is back down to about 20 percent now. We have secondaries within secondaries; predominant crater size is still meter or so. Only a very few of the secondaries are indurated. Coming up on one now at 2.0 at 355. Boy isn't it something?	(LM-4)
05 23 48 38	LMP	You're still going 8 clicks, though, John. Apparently, we're still on Survey. It's a wide ridge that's furrowed parallel to the long axis. Now there's a big crater off to the right, John, and here's five right up here at about 12:30. Are - the Cincos are right south of Crown, though; so it's the ones to the right where we want to go. See that big crater up there below Crown?	(LM-4)
05 23 49 24	LMP	Okay, now you're headed right for it. And the Cincos are right to the right of that. Apparently, in fact, that big one is probably Cinco E.	(LM-4)
05 23 49 37	CC	From where you are, Cinco should be right in line with you, John - -	(LM-4)

05 23 49 39	LMP	Okay. So it is, Tony. Right now. We got it spotted.	(LM-4)
05 23 49 48	LMP	Got a little crater on the inner flank. Okay. Doing 10 clicks, and it's still in the cratered saturated downslope of Survey Ridge at 354 at 2.2 block population is still the same. Looks like we don't get out of the ray, really, until we hit and start climbing upslope at Station 6.	(LM-4)
05 23 50 21	CDR	Houston, the best idea I can give you of what this looks like, is it looks like about halfway up to that crater that we went to out at the Nevada test site. Man, I tell you, I've never seen so many blocks in my life.	(LM-4)
		- - -	
05 23 50 49	LMP	Now between us and the Survey, Tony, we really drop off again down to the base of Stone. We're going down to the base of Stone. We're going down about 4- or 5-degree slope that's still apparently, ejecta - South Ray ejecta. We're down to perhaps 10 percent now on block frequency. The character of the regolith is still the same, loosely consolidated with a raindrop pattern. It probably looks that way because of the Sun. I'm convinced of that. The rocks are mostly grayish with white clasts in them.	(LM-4)
05 23 52 03	CC	Okay, what's the bearing and range for that getting off the contact?	(LM-4)
05 23 52 09	LMP	We're right now at 354 at 2.5. We're still in a block field. It'll be another 2 clicks before we're out of it.	(LM-4)
05 23 52 24	CDR	I just don't think you can identify these things as contacts per se.	(LM-4)
05 23 52 30	CDR	They just fade out and then they go away.	(LM-4)
05 23 52 37	CC	Okay, you're about 200 or 300 meters from the contact, as it's mapped, with the Descartes or the feathering out there. We'd like you to keep an eye out for any changes in regolith.	(LM-4)

05 23 52 52	LMP	I think that's a pretty good guess as far - at least that's where the slope of Stone starts. That Stone mountain looked like it was right on top of us, and we've come 2.6 kilometers and we - it still looks just as far away.	(LM-4)
05 23 53 15	LMP	Okay, Tony, characteristics are still the same as up on Survey. Ten percent cobbles about the same size; maybe a smattering more of the larger ones, 50 centimeters and up. Some of the rocks seem in good shape - are hardly fractured, others appear to be badly fractured, but still homogeneous.	(LM-4)
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05 23 54 02	CDR	I haven't seen but one split boulder so far. Not that I've been looking, but I would if there were some.	(LM-4)
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05 23 54 25	LMP	Eight clicks, Tony. We got up to 12 there, once. We're at 355 at 2.8. Still have Crown and Cinco E in sight.	(LM-4)
05 23 54 47	LMP	We got to go over another depression - down through another depression before we hit the upslope. That's about 100 meters in front of us. Boy, it's a spectacular view looking out to the west, Tony. In fact, it looks like a whole mountain itself back to the west.	(LM-4)
05 23 55 18	LMP	That poop about being able to see the LM all the way on traverse 2, I think, was gonna be bum dope. We've come down some big swales.	(LM-4)
05 23 55 31	CDR	They may call them swales in your part of the world, Charlie. They call them mountains in mine.	(LM-4)
05 23 55 36	LMP	In my 9 o'clock position, out about a kilometer - and we're 355 at 3.0 - is a tremendous boulder that must be so far away, but it's very predominant on the skyline. Must be 5 meters or so. I can't give you any new words, Tony. The regolith is still the same. We're still in a block field. We're just about to start upslope here. Have we been climbing, John?	(LM-4)

05 23 56 25	CDR	Nope.	(LM-4)
05 23 56 26	LMP	Look at that pitch meter.	(LM-4)
05 23 56 30	CDR	Maybe we have been climbing. I doubt it.	(LM-4)
05 23 56 33	LMP	Pegged out high.	(LM-4)
05 23 56 36	CC	Okay. Charlie, we'd like that DAC on 12 frames per second.	(LM-4)(PHO DAC)
05 23 56 42	LMP	Okay; 12 frames a second coming up. You got it.	(LM-4)(PHO DAC)
05 23 56 52	LMP	Okay, you're looking right at Cinco and it doesn't feel like we're climbing, but we've been climbing for quite a while here. I just looked at the pitch meter, and it was pegged out a minute ago.	(LM-4)
05 23 57 08	LMP	We're climbing up about a 10-degree slope now.	(LM-4)
		- - -	
05 23 57 26	LMP	Okay, see that one that's sort of a funny shape. Looks like it's got a breach in the southeast side at 12 o'clock?	(LM-4)
		- - -	
05 23 57 37	CDR	Okay. Well, Houston, now that we get up to Stone - I mean up to Stone mountain, my assessment is it's not any worse then what we've been driving down.	(LM-4)
05 23 57 50	LMP	I think this is one of our benches here, John.	(LM-4)
05 23 57 54	LMP	Yeah, we're at 33, and 5 should be at 33 and - okay, Tony; we're on a flat area now at 355 at 3.3, and I think it apparently is a bench. We're passing Station 5, a little to the east.	(LM-4)
		- - -	
05 23 58 21	LMP	And it's just as blocky here - the block population is up again to about 40 to 50 percent.	(LM-4)
05 23 58 30	CC	Okay, you might look for a fresh crater that would punch through that ray material in the Descartes for Station 5 when you come back.	(LM-4)

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05 23 58 48	CDR	Look at old South Ray, Charlie.	(LM-4)
05 23 58 50	LMP	There's Baby Ray, John.	(LM-4)
05 23 58 59	LMP	And it's got black sides to it. Okay, here's a crater, Tony - remind us at 354 at 3.4 - that's about 15 meters across and about 5 meters deep, and I'll bet you it punched through.	(LM-4)
05 23 59 25	LMP	And that should be a good Station 5.	(LM-4)
05 23 59 30	LMP	Man, we are really going up a hill, I'll tell you.	(LM-4)
05 23 59 37	CDR	Thats the only one I see ***	(LM-4)
05 23 59 39	LMP	Okay. See over here by this oblong one - which I think is Cinco E, John. We go up a steep slope, but then it seems to level out right up on top.	(LM-4)
05 23 59 50	CDR	Yeah. Look at that bench in Crown.	(LM-4)
05 23 59 52	LMP	I know it. No, we can't see Crown now.	(LM-4)
05 23 59 55	CDR	What is that thing with a V in it?	(LM-4)
05 23 59 56	LMP	That's Cinco E.	(LM-4)
05 23 59 59	CDR	The one with the V in it?	(LM-4)
06 00 00 00	LMP	Yeah.	(LM-4)
06 00 00 02	CDR	Let's go sample that.	(LM-4)
06 00 00 04	LMP	Okay, that's what I was thinking. See, it seems to be at the steep slope going up to it, but it looks like a bench or a little ridge on top. Okay, we're at 354 at 3.6, and you ought to see that Baby Ray, Tony. It's got a real good raised rim. It's got lots of blocks around it that are hard to estimate the size. And we are going up a steep, steep slope.	(LM-4)
06 00 00 43	LMP	And it's got black streaks coming out of it.	(LM-4)

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06 00 00 58	LMP	This is going to be spectacular! I can see Wreck, and Trap and orange juice. There's a little bench on up there, a little bit more, John.	(LM-4)
06 00 01 17	CDR	Yeah, we're getting up on a bench right now.	(LM-4)
06 00 01 19	LMP	This is going to be such a spectacular view, you can't believe it. Okay, we're at Cinco, Tony. We feel it's 3.7 at 355.	(LM-4)
06 00 01 35	CDR	See it anywhere, Charlie?	(LM-4)
06 00 01 37	LMP	What? Cinco? Yeah, this is it. Here's the one. There's one, and the big one is just to the left over there with the V in it.	(LM-4)
06 00 01 43	CC	Charlie, you probably are at one of the lower Cincos, not D or E. You should have something like 4.0.	(LM-4)
06 00 01 52	LMP	Okay. We'll go on up.	(LM-4)
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06 00 02 10	CDR	Charlie, let's go up here to this big blocks crater. Man, that's really good.	(LM-4)
06 00 02 15	LMP	That's Crown.	(LM-4)
06 00 02 16	CDR	You don't want to go up to there?	(LM-4)
06 00 02 17	LMP	Yeah, that's fine with me. Look's like a pretty steep slope.	(LM-4)
06 00 02 30	LMP	I don't think I'm going to be able to see Stubby from -	(LM-4)
06 00 02 35	CDR	Can you see it from here?	(LM-4)
06 00 02 36	LMP	Yeah, I can see it now. Boy, it's a bad place to stop here.	(LM-4)
06 00 02 49	LMP	We're in a pretty good right roll, Tony. About 5 to 10 degrees right roll, and climbing up a steep slope. And, John, here's a great ditch right up here. It might be a crater. Just right in front of us about 20 meters. Why don't we stop there?	(LM-4)

06 00 03 09	CDR	Right up there, you mean?	(LM-4)
06 00 03 10	LMP	I'm talking about just really right here. See this big block at about 1 o'clock - at 12:30?	(LM-4)
06 00 03 18	CDR	Right here?	(LM-4)
06 00 03 20	LMP	Yeah, right here.	(LM-4)
06 00 03 27	LMP	Go ahead, go ahead.	(LM-4)
		- - -	
06 00 03 31	CDR	Okay, because it's on a flat bench, too.	(LM-4)
06 00 03 32	LMP	We're at 4.0 at 355 - -	(LM-4)
06 00 03 40	LMP	I think we're just about to Crown crater.	(LM-4)
06 00 03 46	CC	Okay. The main thing is to make sure that we have a crater that's big enough - -	(LM-4)
06 00 03 52	LMP	Maybe - maybe not.	(LM-4)
06 00 03 53	CC	- - to punch us through any ray material from South Ray.	(LM-4)
06 00 03 57	LMP	This one does. Don't worry. This is a 10-meter crater that's got blocks on the inside of it that are partially covered with fillet material.	(LM-4)
06 00 04 09	LMP	And that's at 354 at 4.0. How about hooking left. Hey, this is going to be pretty good. Look at those blocks.	(LM-4)
06 00 04 25	CC	We think you're at one of the sharp Cincos - -	(LM-4)
06 00 04 26	LMP	I do, too. Hey, can't we get up there closer - right in that block, John? We won't have so far to walk. Upslope. Seems to be a flat place about right up here.	(LM-4)
06 00 04 47	CDR	Yeah. This is almost flat?	(LM-4)
06 00 04 50	LMP	Well, according to the pitch meter, it's not. It's pegged out.	(LM-4)

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06 00 05 14	CDR	I'm going up here, and set it in a crater so it doesn't go anywhere.	(LM-4)
06 00 05 26	LMP	This looks pretty good. I don't think it's going to go downslope. Tony, you can't believe it, this view looking back to the east. We see Ravine, we see the rim of North Ray that's got some really good blocks on it. Look at this slope. Look at what we have been coming up. But we cannot see in the North Ray; it's above our positon.	(LM-4)
06 00 05 55	LMP	We can see the old Lunar Module! Look at that, John. Okay, 270 on the heading.	(LM-4)
06 00 06 04	CDR	I want to go back down there and park in that flat - in that crater right there.	(LM-4)
06 00 06 13	LMP	Yeah, okay. Looks like to me, from my side, if you just turn real sharp left, you'd have it. But that's fine where it is.	(LM-4)
06 00 06 19	CDR	It's not flat, Charlie. It's pointing too downhill.	(LM-4)
06 00 06 22	LMP	Not sideways, it wouldn't be.	(LM-4)
06 00 06 24	LMP	Sideways. We got to park 270. But that'd be fine. Why don't you go down there, John?	(LM-4)
06 00 06 43	LMP	Which one are you going to park in?	(LM-4)
06 00 06 52	CDR	That one right down there, where that block is.	(LM-4)
06 00 06 54	LMP	The right?	(LM-4)
06 00 06 55	CDR	Yeah.	(LM-4)
06 00 07 07	LMP	That's a good overturnable one right there, John. Hey, we could roll that thing downhill.	(LM-4)
06 00 07 26	LMP	Look at that beauty climb over those 1-meter blocks. We're parked, Tony, at heading 270, 354, 5.2, 4.1.	(4)

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06 00 09 26	LMP	DAC's off, Tony.	(4)(PHO DAC)
06 00 09 33	LMP	Okay, the mag's empty on the DAC. My frame count is 82.	(4)(PHO DAC)
06 00 09 46	LMP	I'm around to get the 500. You can see the Lunar Module, you can see North Ray with boulders on the southwest side, and where Station 12 is, there's one huge boulder that's going to be just great. It looks like we can get up there, and there's a great ray pattern going up the side of Smoky mountain from North Ray.	(4)
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06 00 12 56	LMP	Okay, starting with the 500.	(4)(PHO 112 18243-77)
06 00 13 06	LMP	Tony, you can see the rays of South Ray come out across the landscape, albedowise. And it's really predominant. They cross right across, go right up Survey, and it's definitely a ray pattern that we were crossing. Okay, 500 of Stubby, 15 and - that's not worth 15 pictures, Tony.	(4) (PHO 112 18260-68)
06 00 13 39	CC	And, John, before you start sampling - -	(4)
06 00 13 42	LMP	Can't see much.	(4)
06 00 13 44	CC	- - could you give us a general impression of the rock types?	(4)
06 00 13 49	CDR	It looks to me like this rock pile that we're seeing in there is about the same type of rock. As you can see, they're angular. Let me go over there and look at this big one. I think they're right friable. They have a very shocked appearance. There's a boulder we could turn over, Charlie.	(4)
06 00 14 20	LMP	That's what I was saying.	(4)
06 00 14 22	CDR	It's a big one. Right behind us. The trouble is, I don't want to push it into the Rover.	(4)

06 00 14 29	LMP	I'm taking some 500 of South Ray. I can see into the rim on the inner wall on the south side. And the characteristics of the thing; it's got black streaks and white streaks coming out of the wall right over the rim, which says to me, there's two types of rocks down there.	(4)(PHO 112 18243-52, 55-59)
06 00 14 52	CDR	That's right, Charlie. That's what it says. And that's why your dark streaks show up on your photograph. It's not that that thing wasn't throwing out blocks in every which direction. That dark streak right down through the middle of your photograph is probably - it looks as dark as in the area, and it's probably dark material from South Ray.	(4)
06 00 15 17	LMP	Stubby is a very subdued old crater. It's not worth 15 pictures really. It's not much to it.	(4)(PHO 112 18260-68)
06 00 15 36	LMP	No outcrop at all. I see some secondaries in the inner flank.	(4)
06 00 15 43	CDR	It doesn't look much different than the subdued craters that we've just come across.	(4)
06 00 15 49	LMP	I've just got to get a picture with the 500 of the old Orion sitting out there.	(4)(PHO 112 18269-77)
06 00 15 56	LMP	Okay, I'm going to take a couple of North Ray.	(4)(PHO 112 18269-77)
06 00 16 05	CDR	Most of these rocks have a whitish cast to them, Houston, but -	(4)
06 00 16 13	LMP	I'm up to frame count 90 on magazine Lima.	(4)(PHO 112 18269-77)
		- - -	
06 00 17 08	LMP	Look upslope, Tony. Okay, look on upslope, and you see all this rock field that we're in here. Okay. Anyway I put the rake, the rake's coming next, John.	(4)
06 00 17 19	CDR	Okay. I was just going to get this one sample.	(4)(SAMP 64430, 35)(PHO 107 17443-47)
06 00 17 21	LMP	Okay, go ahead. Then we need a pan. That's after penetrations.	(4)

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06 00 18 23	LMP	I just came up about a 20-degree slope, and it is really loosely compacted here.	(4)
06 00 18 38	CDR	I've got a hard rock. I think it's glass coated, but it's so dust covered I can't tell, and it's going in bag 394.	(4)(SAMP 64430, 35)
		- - -	
06 00 19 02	LMP	The block population here in this immediate area is 60 to 70 percent, with the biggest one being right in our little crater here that's a meter or so. They're all very angular but the majority - prime size - the majority of them are less than, oh, less than 30 centimeters or so, though there's a good proportion of 50 - -	(4)
06 00 19 35	CDR	Let me put this in your bag, Charlie.	(4)(SAMP 64430, 35)
06 00 19 37	LMP	Got to get the rake. Most of them are dust covered. Well, not most of them; in fact, most of them are not dust covered.	(4)
06 00 19 56	CDR	Got the rake?	(4)(SAMP RAKE 64530-89)(PHO 110 17947-48; 107 17448-50)
06 00 19 58	LMP	Yeah, I got it.	(4)(SAMP RAKE 64530-89)
06 00 20 00	CDR	Shovel.	(4)
06 00 20 01	LMP	Okay.	(4)
06 00 20 03	CDR	No, we don't need the shovel. You want to use that thing, or do you want me to use the rake?	(4)
06 00 20 05	LMP	Let me rake this time and then I'll get on with the penetrometer, okay?	(4)(SAMP RAKE 64530-89)
06 00 20 09	CDR	Okay, fine.	(4)(SAMP RAKE 64530-89)
06 00 20 10	LMP	There's a place right up here, John, that looks like it's a good - -	(4)(SAMP RAKE 64530-89)
06 00 20 16	CDR	Okay, let's not go too far.	(4)(SAMP RAKE 64530-89)

06 00 20 18	LMP	I'm not. It's pretty steep. There's a place right here that's got a lot of good ones.	(4)(SAMP RAKE 64530-89)
06 00 20 38	LMP	Let me get up-sun. An 11-footer.	(4)(SAMP RAKE 64530-89)(PHO 110 17947)
06 00 21 00	LMP	Okay, got it. And let me get a locator from up here, too. Underneath this regolith up here, we've still got the same deal. Top centimeter or so is - -	(4)(SAMP RAKE 64530-89)(PHO 110 17948)
06 00 21 24	CDR	Now we rake.	(4)(SAMP RAKE 64530-89)
06 00 21 37	CDR	Okay. Most of these rocks were white clasts.	(4)(SAMP RAKE 64530-89)
06 00 21 43	LMP	Glass coated, too - a little - -	(4)(SAMP RAKE 64530-89)
06 00 21 45	CDR	Glass coated.	(4)(SAMP RAKE 64530-89)
06 00 21 46	LMP	- - on some of them.	(4)(SAMP RAKE 64530-89)
06 00 21 50	CDR	There's 12 or 13 in that first scoop, and there's - they're mostly white clast rocks.	(4)(SAMP RAKE 64530-89)
06 00 22 00	LMP	Here comes one that's got a lot of glass on it.	(4)(SAMP RAKE 64530-89)
06 00 22 10	CC	You think you're getting breccias there, then?	(4)(SAMP RAKE 64530-89)
06 00 22 17	CDR	No, we're not sure because they're dust coated too, and there's glass - there's glass on them. They could be just shocked rock.	(4)(SAMP RAKE 64530-89)
06 00 22 27	CDR	Okay, that's going into bag 395.	(4)(SAMP RAKE 64530-89)
06 00 22 30	LMP	I don't get the impression - - they're breccias, myself.	(4)(SAMP RAKE 64530-89)
06 00 22 34	CDR	I don't either. But it's just an impression.	(4)(SAMP RAKE 64530-89)
06 00 22 48	LMP	You want to get an after of that, John? I'll get a shovelful.	(4)(SAMP RAKE 64530-89)(PHO 110 17450)
		- - -	
06 00 23 22	LMP	Want to get that kilo. Okay.	(4)(SAMP RAKE 64500-25)(PHO 110 17947-48; 107 17448-50)
06 00 23 29	LMP	Some of that white stuff in the bottom.	(4)(SAMP RAKE 64500-25, 15-19, 25)

06 00 23 32	LMP	That's what I was going to say. Underneath this top gray layer, it's white again up here, just like on the Cayley.	(4)(SAMP RAKE 64500-25, 15-19, 25)
06 00 23 42	LMP	That's a kilo, isn't it?	(4)(SAMP RAKE 64500-25, 15-19, 25)
06 00 23 45	CDR	Yeah.	(4)(SAMP RAKE 64500-25, 15-19, 25)
06 00 23 46	LMP	Your old rake is finished.	(4)(SAMP RAKE 64500-25, 15-19, 25)
06 00 23 56	CDR	And it's in bag 396.	(4)(SAMP RAKE 64500-25, 15-19, 25)
06 00 24 06	CDR	Now, you want me to throw it in my bag.	(4)
06 00 24 10	CDR	Weren't we supposed to leave core tubes in there?	(4)
06 00 24 11	LMP	No, you've got core tubes. Let me carry the rocks. I'll have an easier time getting the core tubes out if your bag is empty.	(4)
		- - -	
06 00 24 24	CC	Hey, Charlie. We're having a hard time getting - - a perspective on that crater. Could you give us the dimensions, please?	(4)
06 00 24 31	LMP	Where we're standing?	(4)
06 00 24 32	CC	Right.	(4)
06 00 24 36	LMP	What do you think, 10 meters, John?	(4)
06 00 24 38	CDR	Yeah. It's an old 10-meter crater; it's really an old one. These other rocks around here might have been caused by this - matter of fact, this might of - no, I don't think so. I think these rocks were laid in here when South Ray came in.	(4)
06 00 24 59	LMP	On the penetrometer, it's benched. We'll call this crater The Bench if you want to, and I'll get one uphill, one downhill, and two in the bottom of the crater.	(4)
06 00 25 19	LMP	I'll start with a 0.5.	(4)

06 00 25 29	LMP	John, I'm glad we got those two core tubes. I think the other two fell off back at the LM.	(4)
06 00 25 37	LMP	I don't think I ever put those back in your bag.	(4)
06 00 25 57	CDR	I'm looking at a rock here that is a very angular rock, and it has white clasts with a breccia, or it has a brecciated appearance. I'll take a picture of it and sample it for you.	(4)(SAMP 64470, 75-78)(PHO 107 17451-54, 57)
		- - -	
06 00 29 08	CDR	Don't step right there, Charlie. Here's a glass splatter.	(4)(SAMP 64450, 55)(PHO 107 17455-56)
06 00 29 12	LMP	Oh yeah. I see it. A whole big bubble of it, isn't it?	(4)(SAMP 64450, 55)
06 00 29 22	CDR	I'm going to grab sample this glass splatter behind the Rover.	(4)(SAMP 64450, 55)
06 00 29 33	LMP	Good. John, if you see it, there's one under that rock. Is that the one you're talking about?	(4)(SAMP 64450, 55)
06 00 29 40	CDR	Yeah.	(4)(SAMP 64450, 55)
06 00 29 41	LMP	Okay. Tony, can I start on number 5 on the penetrometer?	(4)
06 00 29 44	CC	Okay.	(4)
06 00 29 49	LMP	Okay. I'm going up out of this crater - up on the top part of it.	(4)
06 00 29 57	CDR	And that's going into bag 397.	(4)(SAMP 64450, 55)
06 00 30 05	LMP	Tony, you just can't believe that South Ray crater. It is perfectly - cylindrical - circular. And it's amazing. It's just really apparent that we got two types of rocks there. Okay, I'm about up on the side now, starting with 5. And we're pushing it in.	(4)
06 00 30 56	LMP	Okay. That's as far as it's gonna go, Tony. And it went to half - about three-quarters of the way up to the red mark.	(4)

06 00 31 15	CC	Okay. We'd like you to - -	(4)
06 00 31 16	LMP	*** going back down in the flat part.	(4)
06 00 31 18	CC	- - change to 220.	(4)
06 00 31 22	LMP	Okay. And, Tony, when you push on the thing, you can't push with a very smooth force, and you're gonna see some spikes on the recording, I'm sure.	(4)
06 00 31 45	LMP	And if you want my opinion on the thing, I don't think we're hitting hard ground. I think what I did is probably hit a rock, and I should have probably moved this thing over a little bit.	(4)
06 00 31 59	CC	Okay. We'll just go with the 0.2 and see how that does.	(4)
06 00 32 04	LMP	Okay.	(4)
06 00 32 15	CDR	I'm sampling independently, and I've got four samples in bag 398. They're so dust covered that I can't tell anything about them - - but I suspect they're lying by this big rock, and they may be the same kind of rock Chariie, I'm going to get that bag out from underneath your seat and put the samples in there.	(4)(SAMP 64470, 75-78)
06 00 32 39	LMP	You know, John, with all these rocks here, I'm not sure we getting Descartes.	(4)
06 00 32 47	CDR	That's right. I'm not either.	(4)
06 00 32 48	LMP	We ought to go down that crater without any rocks.	(4)
06 00 33 01	LMP	The 0.2 went all the way in.	(4)
		- - -	
06 00 33 16	LMP	It was very light pressure. It just depends on whether you hit a rock down there or not. This is really loosely consolidated - this regolith - loosely packed.	(4)
06 00 33 36	CC	Was that Index on 6?	(4)

06 00 33 41	LMP	That's affirmative. Going to 7.	(4)
		- - -	
06 00 33 55	LMP	Hey, turn the big eye up to the right, Tony, if you want to watch this other one.	(4)
06 00 34 12	LMP	It seems a little more firmly packed here.	(4)
06 00 34 23	LMP	Okay, that one bottomed out now.	(4)
06 00 34 28	LMP	It's up above the red mark. And it got progressively harder. So I think that was a good reading. I don't think that was necessarily a rock down there.	(4)
06 00 34 49	LMP	Okay. Going to 8 and I'm going downslope.	(4)
06 00 35 02	LMP	John, this crater over here looks like it might be - just downslope here looks like it might be one of the Cincos, and it could be Descartes material, because it's just some little blocks around it. And there's some little blocks inside the rim, too.	(4)
06 00 35 31	CDR	Okay, Houston. I'm digging an exploratory trench right here to see if the material is black.	(4)(SAMP TRENCH 64420-25)(PHO 107 17458-62)
06 00 35 43	CDR	Now - it's sure not. I mean the material is not white. It's just the same as it -	(4)(SAMP TRENCH 64420-25)
		- - -	
06 00 36 02	LMP	I went down. That one bottomed out.	(4)
06 00 36 12	LMP	But it went all the way in.	(4)
06 00 36 19	CDR	I've gone down about -	(4)(SAMP TRENCH 64420-25)
06 00 36 35	CDR	Shovel width, and it's all the same material. And I don't see any layering in it or anything.	(4)(SAMP TRENCH 64420-25)
06 00 36 50	LMP	I've gone to number - sequence to number 9, and I'm stowing this beauty.	(4)
06 00 37 01	LMP	And that one test downhill was on the steepest part.	(4)
		- - -	

06 00 37 23	LMP	Tony, do you want this double core - in the ditch here or downslope where I think is probably closer to Descartes?	(4)(SAMP CORE 64001-02)(PHO 110 17949-51)
06 00 37 43	CDR	I've got a sample out of the deepest part of this trench that I'm digging, and it's going into bag -	(4)(SAMP TRENCH 64420-25)
06 00 38 00	CDR	Bag 399.	(4)(SAMP TRENCH 64420-25)
		- - -	
06 00 38 16	CC	Charlie. Why don't we just go ahead and take it downslope there about your last penetrometer place?	(4)(SAMP CORE 64001-02)
06 00 38 24	LMP	John, I'm going to come over there - - and get a couple of cores from you.	(4)
06 00 38 39	CDR	Okay. I'm going to leave those two cores in that bag.	(4)
06 00 38 53	CDR	I wish I could say these rocks look different, but they don't.	(4)
06 00 38 58	CC	And do you see a blocky rim crater within walking distance?	(4)
		- - -	
06 00 39 23	LMP	Yeah. That was one right up there. Uh-huh. Yeah. That's 30 meters away - up there. Getting out of this little crater is pretty hard; but I think you'll be able to hack it.	(4)
		- - -	
06 00 40 23	CDR	Charlie, get a picture of the LM.	(4)
06 00 40 25	LMP	I did - with the 500.	(4)(PHO 112 18269-77)
		- - -	
06 00 41 05	LMP	The old double core is assembled. Tony, in the regolith, you see little bright speckles looking at you, and I think it's glass particles. John has already sampled - some of them.	(4)(SAMP CORE 64001-02)

06 00 41 56	CDR	Here's some blocky rim secondary. Here's a nice little one.	(4)
06 00 42 04	CC	Okay, John. That might be a good place to get a rock. We're really looking for one where the rock around the secondary - rock around the crater - should come from the crater; not from the secondary.	(4)
06 00 42 19	CDR	Yeah. I would suppose that all of them - do you think all the blocks on the upslope side were the secondary that made it? Don't you reckon - if it's from South Ray? Let me go down and sample off the south rim.	(4)
		- - -	
06 00 42 39	CDR	I think you really need a primary impact crater to avoid the problem.	(4)
06 00 42 49	LMP	I don't want to get down there too far. This thing is deep. I'm to the 2:30 position of the Rover, and I'm going to start with this double core - got it assembled. Okay. I pushed it in. I got in almost to the top of the first stem by pushing it in.	(4)(SAMP CORE 64001-02)
06 00 43 32	LMP	There comes your 7-footer cross-sun, and I'll get you a locator. I'm just going to get you a locator now that I'm downslope. It won't be in the ground.	(4)(SAMP CORE 64001-02)(PHO 110 17949-50) (PHO 110 17951)
		- - -	
06 00 44 00	LMP	Okay, Tony, about halfway up the second one - it's getting a little harder, but it's going on in.	(4)(SAMP CORE 64001-02)
06 00 44 18	CC	Okay. Maybe we're getting down to Descartes there.	(4)(SAMP CORE 64001-02)
06 00 44 27	LMP	Huh? That might be. Boy, those rays from South Ray - you can just track right across through Stubby right on up to Survey. You know, Tony, South Ray was mapped as big a crater as North Ray, and it's not nearly as big. It's just the ray pattern - the whiteness that makes it look this big.	(4)

06 00 45 09	CDR	I'm standing on the rim of this crater over here. The only rock I see on the south rim of this obvious secondary is not too big. I can get down into the crater and look down in it, and see if I can scratch away to a bench, if you'd like to do that.	(4)(SAMP 64800-04)(PHO 107 17463-66)
06 00 45 43	CC	Okay. I don't think we need to do that, John. Charlie will bring up a rake there; and, maybe from that, we'll be able to get Descartes.	(4)
06 00 45 59	CDR	Are you getting a rake, Charlie?	(4)
06 00 46 01	LMP	I'm finishing up the double core right now. I've got it back here, and I'm taking it apart.	(4)(SAMP CORE 64001-02)
06 00 46 11	LMP	Capped, bottom section.	(4)(SAMP CORE 64001-02)
		- - -	
06 00 46 35	LMP	That's full. Bottom section was 38.	(4)(SAMP CORE 64001-02)
		- - -	
06 00 47 05	CDR	What I'll do, Houston, is get a soil sample off this rim. That's the only thing I can be assured of that's Descartes right at this point.	(4)(SAMP 64800-04)
06 00 47 20	CDR	That's going in bag 400.	(4)(SAMP 64800-04)
06 00 47 31	LMP	Top section is number 43.	(4)(SAMP CORE 64001-02)
		- - -	
06 00 47 52	CDR	Okay. From this vantage point I'd like to shoot a pan.	(4)(PHO 107 17467-89)
06 00 48 00	CDR	It might be able to make some stereo with it.	(4)(PHO 107 17467-89)
06 00 48 29	CDR	I tell you, this is a graphic illustration of a secondary from South Ray, though, and it'll show up good if I can bend over good enough to get it.	(4)
06 00 48 47	LMP	Okay, Tony, the double core is under my seat -	(4)
06 00 48 51	LMP	All finished. Do you really want me to grab the rake, Tony? I got to go up and help John.	(4)

		- - -	
06 00 49 07	CC	Yeah, we'd like you to take the rake on up there.	(4)
06 00 49 12	LMP	Okay. I'm putting it together now.	(4)
		- - -	
06 00 50 01	CDR	Roger. Do you know where we landed? Charlie Alpha 81!	(4)
06 00 50 12	CDR	Charlie Alpha 81. We're about 200 meters north of Double Spot.	(4)
06 00 50 21	LMP	Yeah. There's Double Spot.	(4)
06 00 50 23	LMP	Exactly north of Double Spot, John.	(4)
		- - -	
06 00 50 43	LMP	Hey, John, did you make those little footprints here around in this stuff? Yes, I guess I did.	(4)
06 00 50 48	CDR	No, sir. I didn't. I came across that ridge there, and I don't advise you to get down in there either.	(4)
06 00 50 56	LMP	This is steep. Where do you want this -	(4)(SAMP RAKE 64810-37)(PHO 107 17465-66, 90-91)
06 00 51 00	CDR	On the rim, I think, Charlie.	(4)(SAMP RAKE 64810-37)
06 00 51 01	LMP	Why don't we get outside the rim? That would be definitely Descartes - right down here.	(4)(SAMP RAKE 64810-37)
06 00 51 05	CDR	The object is to get the stuff that's been knocked out of the ground and landed on the rim.	(4)(SAMP RAKE 64810-37)
06 00 51 10	LMP	Okay, I'll sample right up here. That's a definite secondary right there, isn't it?	(4)(SAMP RAKE 64810-37)
06 00 51 19	CDR	Boy, I mean to tell you if that's not I never saw one.	(4)(SAMP RAKE 64810-37)
06 00 51 27	CDR	- Hank Moore would like to see that.	(4)(SAMP RAKE 64810-37)
06 00 51 37	CDR	Let me get the rake sample, Charlie. Get it.	(4)(SAMP RAKE 64810-37)

06 00 51 43	LMP	Okay. There's a lot of goodies right there on the inner rim.	(4)(SAMP RAKE 64810-37)
06 00 51 48	CDR	That's where I'll rake - right there.	(4)(SAMP RAKE 64810-37)
06 00 51 53	LMP	Okay. Don't fall into that Mutha.	(4)(SAMP RAKE 64810-37)
06 00 51 59	CDR	Pretty good size, isn't it?	(4)(SAMP RAKE 64810-37)
06 00 52 01	LMP	Yeah. Here, let me have the shovel. Okay. I got it.	(4)(SAMP RAKE 64810-37)
06 00 52 13	LMP	That's a clod. That's an indurated clod. Here's some rocks. Good deal, boy. That's great. Hey, let's fill this one up, and then -	(4)(SAMP RAKE 64810-37)
		- - -	
06 00 52 41	LMP	Real dust-covered, mostly centimeter size, Tony - about 15 frags - some smaller than that.	(4)(SAMP RAKE 64810-37)
06 00 52 52	CDR	I've already got my shovel full here, Charlie.	(4)(SAMP RAKE 64810-37)
06 00 52 54	LMP	Okay. Of the dirt?	(4)(SAMP RAKE 64810-37)
06 00 53 03	LMP	I hate to tell you this, but I think it's indurated regolith.	(4)(SAMP RAKE 64810-37)
06 00 53 07	LMP	Because I'm just breaking it up.	(4)(SAMP RAKE 64810-37)
06 00 53 10	CDR	Very friable. Like dust - dirt clods.	(4)(SAMP RAKE 64810-37)
06 00 53 14	LMP	Which is probably what it is.	(4)(SAMP RAKE 64810-37)
06 00 53 17	CDR	Want to get another one?	(4)(SAMP RAKE 64810-37)
06 00 53 19	LMP	Yeah. Can you try another one?	(4)(SAMP RAKE 64810-37)
06 00 53 28	LMP	I don't think these are rocks. If they are, they are very friable. I think it's just indurated regolith.	(4)(SAMP RAKE 64810-37)
06 00 53 40	CDR	Well, there may be a rock or two in there.	(4)(SAMP RAKE 64810-37)

06 00 53 55	CDR	Maybe some of them are rocks. That was three scoops, and we're not documenting this to the best of our ability, because I think we're standing too close to the rim here to -	(4)(SAMP RAKE 64810-37)
06 00 54 09	LMP	Down-sun, I'd be in big hole.	(4)(SAMP RAKE 64810-37)
06 00 54 12	CDR	If Charlie goes down-sun to take the picture, we're in trouble.	(4)(SAMP RAKE 64810-37)
06 00 54 17	CDR	It ought to be in the pan.	(4)(SAMP RAKE 64810-37)
06 00 54 18	CC	Right. We see it.	(4)(SAMP RAKE 64810-37)
06 00 54 19	CDR	The locator shot will be in the pan, and I'm going to shoot this - this is an up-sun, after, of the rake sample, stereo.	(4)(SAMP RAKE 64810-37)(PHO 107 17490-91)
06 00 54 31	LMP	That was in bag 401.	(4)(SAMP RAKE 64810-37)
06 00 54 37	LMP	We can get the dense rocks here for the padded bags. There's plenty of them around, but they'll probably be out of South Ray. All these blocks that we see here came out of this secondary.	(4)(SAMP RAKE 64810-37)
06 00 54 54	CDR	Yeah.	(4)(SAMP RAKE 64810-37)
06 00 54 55	LMP	Every one.	(4)(SAMP RAKE 64810-37)
06 00 54 56	CC	We'll collect the padded bags back near the Rover. There's no point in going back up there.	(4)
06 00 55 08	LMP	Well, that's what we're going to do. I just wondered if secondary was okay for you.	(4)
06 00 55 14	CC	We're getting them to work it. We will need a second pan in the area of the penetrations there.	(4)(PHO 110 17952-74)
06 00 55 24	LMP	I'll do that. Boy, isn't it loose? On your footing here, John, it feels like I'm really sinking in.	(4)(PHO 110 17952-74)
06 00 55 35	CDR	Charlie, you really are.	(4)
06 00 55 53	LMP	You know, John, that black stuff is glass - on those rocks.	(4)

06 00 55 57	CDR	Sure it is. That's what I said.	(4)
06 00 56 04	CC	Okay, fellows, we'll save the padded bags for later.	(4)
06 00 56 17	LMP	I think we have enough rocks from the South Ray.	(4)
06 00 56 25	LMP	I got to get one more view from up here. I'll take the pan from right here.	(4)(PHO 110 17952-74)
		- - -	
06 00 56 49	LMP	Okay, let's see; how do I do this? F:11 at 74. Do you want me to change the mags on the - 16? It's about empty.	(4)(PHO 110 17952-74) (PHO DAC)
06 00 57 15	CC	That's affirmative.	(4)(PHO DAC)
		- - -	
06 00 57 21	CC	Should be mag R.	(4)(PHO DAC)
06 00 57 25	LMP	If I get this - top of this one in that picture - it's going to be a miracle.	(4)(PHO 110 17952-74)
06 00 57 44	LMP	Doing this pan, I've moved about 2 feet downslope, so I don't know if things are going to match up too well or not.	(4)(PHO 110 17952-74)
06 00 57 55	LMP	Okay. And, after that pan I'll be leaving here with frame count 110.	(4)(PHO 110 17952-74)
06 00 58 12	LMP	You, dog, you!	(4)
06 00 58 14	CDR	What are you talking about? Did you drop it, Charlie?	(4)
06 00 58 15	LMP	Yeah, but I got it. Get downslope here, and it's a piece of cake.	(4)
		- - -	
06 00 59 23	CDR	Okay. I think the fact that we didn't run across any white soil may be significant around here.	(4)
		- - -	

06 01 00 13	CDR	My frame count is 76, magazine Charlie.	(4)
06 01 00 19	LMP	John, could you give me magazine Romeo?	(4)(PHO DAC)
06 01 00 24	LMP	Hey, Tony. I think on this next one we ought to stop away from any boulders down at 5, so we can get some Descartes.	(4)
		- - -	
06 01 01 03	LMP	Okay. We could move 40 feet - 50 meters, downslope, and I think we'd have Descartes, but we'll look.	(4)(PHO DAC)
06 01 01 17	CDR	I've got the frame count. DAC's mag's R - and the bags we're skipping. Okay; DAC, f:8, 250.	(4)
06 01 01 27	LMP	I've got to change that.	(4)
06 01 01 35	CC	Okay. That 50 meters downslope you described - is that a blocky rim crater, or why do you think that is Descartes?	(4)
06 01 01 44	LMP	Because there's no blocks around it at all.	(4)
06 01 01 48	CDR	It's just an old subdued crater.	(4)
06 01 01 51	LMP	It's got a few blocks around it. Tony, I can see that one downslope that you wanted us to stop at that's at Station 5. It won't be any trouble getting there, but if you give us a vector, that'll be certain.	(4)
06 01 02 09	CC	Okay. The vector will be 352 heading and 0.7.	(4)
		- - -	
06 01 02 42	CC	What they're looking for is a primary impact crater at Descartes.	(4)
06 01 02 43	CC	What we're looking for is a primary impact with a blocky rim crater.	(4)
06 01 02 52	LMP	Suppose we give you a primary impact with no block?	(4)
06 01 03 10	CC	And we don't want one without blocks. It'll almost have to be blocky.	(4)

06 01 03 20	LMP	Strapped in. Let me turn the camera on.	(4)(PHO DAC)
06 01 03 30	LMP	Okay, wait a minute. I don't feel it - running.	(4)(PHO DAC)
06 01 03 50	CDR	We'll have to get it next time.	(4)(PHO DAC)
06 01 03 55	LMP	Must not have the mag in there right because it's not running.	(4)(PHO DAC)
06 01 04 01	CDR	Can't fix it without getting out.	(4)(PHO DAC)
06 01 04 11	LMP	The camera's not running this time. I'll fix it when we get down to 5. You won't miss much.	(4)(PHO DAC)
06 01 04 31	LMP	See that string of secondaries in Stubby?	(4-5)
06 01 04 43	LMP	On the south flank of Stubby?	(4-5)
06 01 04 48	LMP	Hey, what should our bearing and range be back to the LM, Tony, when we hit that crater?	(4-5)
06 01 05 07	CC	It'll be 354 at 3.4.	(4-5)
06 01 05 16	LMP	Okay. We're headed 354 and going - that thing is taking us straight for the LM, John. Downslope is easy.	(4-5)
		- - -	
06 01 06 07	LMP	You know, it was really not apparent we were climbing this steep a slope.	(4-5)
		- - -	
06 01 06 33	LMP	Okay, we've got a 354 bearing back to the LM right now, so we'll just keep on that.	(4-5)
06 01 06 58	LMP	Coming back downslope 354 at 3.8 is about the same stuff.	(4-5)
06 01 07 17	LMP	We're about to cross our tracks.	(4-5)
06 01 07 32	LMP	We're going back down our tracks.	(4-5)
		- - -	

06 01 07 43	LMP	That big crater I was thinking about is right back there - it looks like.	(4-5)
06 01 07 52	CDR	No wonder we broke the pitch meter. Just as well we did.	(4-5)
		- - -	
06 01 08 13	CC	Probably a good idea you couldn't see how steep it was going up.	(4-5)
06 01 08 18	CDR	Darn right it was.	(4-5)
06 01 08 41	LMP	I'm keeping my eye out for a blocky rim one.	(4-5)
		- - -	
06 01 09 03	CDR	How about this one right here, Charlie?	(4-5)
06 01 09 04	LMP	Yep, that's it, John. That's a good one.	(4-5)
06 01 09 13	LMP	Okay. It's stop 5. We're supposed to park at -	(4-5)
06 01 09 18	LMP	180.	(4-5)
		- - -	
06 01 09 35	LMP	That doesn't look like a secondary, John.	(5)
06 01 09 38	CDR	It doesn't look like one to me either.	(5)
06 01 09 41	LMP	It might be a primary impact, but I think those blocks - the rocks there are from South Ray. I think we ought to get a rake sample here.	(5)(SAMP RAKE 65510-88)(PHO 110 18019-20; 107 17492-95)
06 01 09 50	CC	How big is that crater?	(5)
06 01 09 55	LMP	About 15 meters across.	(5)
06 01 10 05	CDR	We're parked right on the rim of it.	(5)
06 01 10 11	LMP	The biggest blocks we see are about 50 centimeters, or bigger; and they're in the bottom and all over the crater - no preferred orientation. Okay. We're parked at 174, 353 5.9, 3.5.	(5)

06 01 10 48	LMP	Wow!	(5)
06 01 10 58	CDR	In a hole?	(5)
06 01 11 01	LMP	No, it's downslope for me over here.	(5)
06 01 11 16	CDR	Me too, Charlie. Fact is, let's bring the Rover back up here.	(5)
06 01 11 23	LMP	Well, I'm out - I'm not getting out again, and getting back in.	(5)
06 01 11 26	CDR	No, I don't mean that. I mean let's bring the Rover back up here.	(5)
06 01 11 29	LMP	Oh, you want to pick it up, huh?	(5)
		- - -	
06 01 11 36	CDR	Okay, now. We've got to swing it around.	(5)
		- - -	
06 01 11 51	CDR	That's more like it.	(5)
		- - -	
06 01 12 15	LMP	The camera didn't run. X is still there. The film looks good.	(5)(PHO DAC)
		- - -	
06 01 13 47	CC	Our best bet here at this crater is to look for - - a rounded, as well as angular - the angular boulders are probably from South Ray. And maybe the rounded ones are working their way out of the regolith here. So that may be a clue to our getting Descartes.	(5)
06 01 14 12	CDR	Roger. Well, I'll tell you what. If we do a rake sample in the wall, would probably be our best bet.	(5)(SAMP RAKE 65510-88)
06 01 14 20	LMP	That's what I would like to do.	(5)(SAMP RAKE 65510-88)
		- - -	

06 01 14 39	LMP	Man, we come a long way. I thought this thing was just right next door to us.	(5)
		- - -	
06 01 15 14	CDR	Even South Ray looks like it's accessible. There may be blocks down there that won't quit.	(5)
06 01 15 27	LMP	There's some big black ones. See those big black blocks there, John?	(5)
06 01 15 30	CDR	Yeah.	(5)
06 01 15 31	LMP	On the side of it. And there's some big white ones there, too. The black ones are the biggest.	(5)
		- - -	
06 01 16 13	CDR	Let me get the rake sample here.	(5)(SAMP RAKE 65510-88)
06 01 16 18	CDR	F:11 and 11.	(5)(SAMP RAKE 65510-88)
06 01 16 21	LMP	Okay, go ahead, pick a place. I'll get the gnomon. You going to get it? Okay.	(5)(SAMP RAKE 65510-88)
06 01 16 44	LMP	We seem to be on a bench here that's about 50 meters wide, and the slope here on the bench is only about 2 degress - maybe 3 or 4 degrees - maybe 10 - no, about 5 degrees.	(5)(SAMP RAKE 65510-88)
06 01 17 02	CDR	Here's about a foot and a half across secondary - looks like a primary that cut into the rim - the upper rim of this 10 - or 20-meter - yeah, this 20-meter secondary. How about sampling out of the wall of that one?	(5)(SAMP RAKE 65510-88)
06 01 17 27	LMP	John, I don't think - this big crater is a secondary.	(5)(SAMP RAKE 65510-88)
06 01 17 33	LMP	That little one is.	(5)(SAMP RAKE 65510-88)
06 01 17 34	CDR	This little bitty one is probably a primary, too because - look at the glass on the bottom. Man, you've got to have velocity to do that.	(5)
06 01 17 42	LMP	Yeah, I agree.	(5)

06 01 17 43	CC	Okay, does it look like it knocked out any rocks?	(5)
06 01 17 50	CDR	Yeah. I don't think the rocks that are there were there because of -	(5)
06 01 17 55	LMP	Yeah, it does, John. There's some rocks right in that corner there, right by your footprint.	(5)
		- - -	
06 01 18 03	LMP	See that one right there - by the rake?	(5)(SAMP RAKE 65510-88)
06 01 18 05	LMP	And here's one right in the very bottom. Why don't you get that scoop going? And I'll go over here and get a locator.	(5)(SAMP RAKE 65510-88)(PHO 110 18020)
06 01 18 18	CC	We'd like a documented sample of a glass-covered rock, if you can find one.	(5)(SAMP 65016)
06 01 18 30	CDR	We've got several - we've already picked up a couple of beads for you, but we didn't document them.	(5)(SAMP 65016)
06 01 18 55	LMP	Now, that's a good bagful.	(5)(SAMP RAKE 65510-88)
06 01 18 57	LMP	One scoop.	(5)(SAMP RAKE 65510-88)
06 01 19 00	CDR	Want me to do it again?	(5)(SAMP RAKE 65510-88)
06 01 19 02	LMP	Well, we got a bagful.	(5)(SAMP RAKE 65510-88)
06 01 19 03	CDR	Notice the color of the material, Charlie, in the bottom of it - it's white. We get a kilo of soil.	(5)(SAMP RAKE 65510-88)
06 01 19 11	LMP	That's what this is. This isn't rocks.	(5)(SAMP RAKE 65510-88)
06 01 19 14	CDR	Friable soil?	(5)(SAMP RAKE 65510-88)
06 01 19 15	LMP	Yeah.	(5)(SAMP RAKE 65510-88)
06 01 19 16	CDR	That could be Descartes, Charlie.	(5)(SAMP RAKE 65510-88)
06 01 19 19	LMP	That rake soil - sample was in 332, and I just, pinched one of the rocks, and it broke.	(5)(SAMP RAKE 65510-88)
06 01 19 34	LMP	It's probably going to be a bagful of soil when we get it back.	(5)(SAMP RAKE 65510-88)

06 01 19 38	CC	Well, that may still be Descartes.	(5)(SAMP RAKE 65510-88)
06 01 19 44	CDR	It may be.	(5)(SAMP RAKE 65510-88)
06 01 19 46	LMP	I think it is.	(5)(SAMP RAKE 65510-88)
06 01 19 47	CDR	The lower material in the crater is - - lighter albedo *** somewhere between the gray and the white out on the plains.	(5)(SAMP RAKE 65500-04)
		- - -	
06 01 20 08	LMP	Want another one?	(5)(SAMP RAKE 65500-04)(PHO 110 18019-20; 107 17492-95)
06 01 20 10	CDR	Yeah. Lighter albedo - much lighter albedo. And if I had my druthers, it's somewhere between the gray and the white out on the plains.	(5)
06 01 20 24	LMP	That's good, John. It's about a kilo.	(5)(SAMP RAKE 65500-04)
06 01 20 25	CDR	It's somehwere between the gray of the surface and the white material that we picked up out on the plains. And we got a bagful of most of that from scooping underneath the rock samples.	(5)(SAMP RAKE 65500-04)
06 01 20 40	CC	After this, we'd like you to move to the rim of the main crater, and spend some time just describing the rocks you see, and then sample the rim.	(5)
06 01 20 58	CDR	There's one of those glass jobs, Charlie, right there.	(5)
06 01 21 01	LMP	Where?	(5)
06 01 21 02	CDR	Right there.	(5)
06 01 21 10	LMP	I don't see it.	(5)
06 01 21 11	CC	Okay. We'd like a documented glass sample, if you have a chance.	(5)(SAMP 65016)
06 01 21 17	CDR	That wasn't big enough to document.	(5)
06 01 21 20	LMP	But we'll look for a rock that's glass-coated, Tony.	(5)(SAMP 65016)

06 01 21 27	LMP	If we were to sample on the upslope side of this crater where it's shielded toward South Ray and the wall if it wasn't caused by South Ray then we ought to be looking at the real Descartes.	(5)(SAMP RAKE 65710-95)(PHO 110 18021-22; 107 17496-99)
		- - -	
06 01 22 03	LMP	Here's a glass-covered one right here.	(5)
06 01 22 09	LMP	Remember that right by that footprint. Right where I stopped walking. Man, you're going to get me down in that crater.	(5)
06 01 22 19	CDR	No, I'm not.	(5)
06 01 22 20	LMP	I'm not going to get a down-sun of that.	(5)
06 01 22 23	CDR	I don't think you ought to.	(5)
06 01 22 24	CC	No, let's forget the down-sun.	(5)
06 01 22 25	LMP	I'll get the cross-sun, okay?	(5)(PHO 110 18021-22)
06 01 22 27	CDR	Now, the only rocks we see are really angular, and they're on this rim. And I guess the problem is - it was a cratering event (which) was probably so long ago. There's just not even a hint of any ledges or bedrock in this rascal.	(5)(SAMP RAKE 65710-95)
06 01 22 56	LMP	John, why don't you take the rake right here in front of the gnomon - I've already documented that area - and see what you get?	(5)(SAMP RAKE 65710-95)
06 01 23 04	CDR	Take the rake what, Charlie?	(5)(SAMP RAKE 65710-95)
06 01 23 06	LMP	And just right here in front the gnomon and see what you get. One scoop and - it might be -	(5)(SAMP RAKE 65710-95)
06 01 23 12	CDR	Okay.	(5)
06 01 23 13	LMP	I got the pictures.	(5)(SAMP RAKE 65710-95)(PHO 110 18021-22)
		- - -	
06 01 23 27	CDR	I don't think you're gonna get anything but soil! One or two.	(5)(SAMP RAKE 65710-95)

06 01 23 31	LMP	I don't either. There's some rocks, 2.	(5)(SAMP RAKE 65710-95)
		- - -	
06 01 24 12	LMP	There we got a few of those. Let me try one more scoopful.	(5)(SAMP RAKE 65710-95)
06 01 24 17	CC	Okay. Do those look like clods too?	(5)(SAMP RAKE 65710-95)
06 01 24 23	LMP	No, they don't. There's at least one of them that's glass coated.	(5)(SAMP RAKE 65710-95)
06 01 24 34	CDR	Hey, there's some.	(5)(SAMP RAKE 65710-95)
06 01 24 36	LMP	These are whitish type rocks, very small, they may have come from South Ray.	(5)(SAMP RAKE 65710-95)
06 01 24 49	LMP	How about one more scoop John?	(5)(SAMP RAKE 65710-95)
		- - -	
06 01 25 10	CDR	Hey, look at that -	(5)(SAMP RAKE 65710-95)
06 01 25 13	LMP	And all of those are rounded.	(5)(SAMP RAKE 65710-95)
06 01 25 14	CDR	And Charlie pointed out the different characteristics of these rocks that we're just getting right now and maybe that's the key is that - they're more rounded, than the South Ray crater rocks are.	(5)(SAMP RAKE 65710-95)
06 01 25 31	CDR	There are a few angular in there, but these are mostly rounded; and I see some little black glass on one, but they're mostly rounded, whitish rocks covered with dust, of course.	(5)(SAMP RAKE 65710-95)
06 01 25 42	LMP	These are a couple of good ones.	(5)(SAMP RAKE 65710-95)
06 01 25 49	LMP	Bag 334.	(5)(SAMP RAKE 65710-95)
		- - -	
06 01 26 01	LMP	Houston, do you want us to go sample the rim of this thing again - some more?	(5)
06 01 26 06	CDR	They want us to get a glass-coated one, and there's a good one right up on the -	(5)

06 01 26 10	CDR	Let's go up there and get it.	(5)
		- - -	
06 01 26 18	CC	Did you get your soil there?	(5)
06 01 26 22	CDR	No. We didn't. I'll get a scoopful.	(5)
06 01 26 25	CC	You're doing so well inside the rim there, we'd kind of like you to stay inside the rim and just kind of work around and see what you can find.	(5)(SAMP RAKE 65700-04)(PHO 110 18021-22; 107 17496-99)
06 01 26 35	LMP	Okay. Let me get some soil here.	(5)(SAMP RAKE 65700-04)
06 01 26 51	CDR	Wait a minute, Charlie.	(5)(SAMP RAKE 65700-04)
06 01 26 53	LMP	You really feel like you're on the verge of instability, don't you?	(5)(SAMP RAKE 65700-04)
06 01 26 59	CDR	Yeah.	(5)(SAMP RAKE 65700-04)
06 01 27 04	CDR	I've got the gloves so dirty. There's a - 100 kilos. Okay. That's 100 kilos that's going into bag 402.	(5)(SAMP RAKE 65700-04)
06 01 27 16	CDR	Hope you're able to document it with the TV, because we've stomped all over it.	(5)(SAMP RAKE 65700-04)
06 01 27 22	LMP	These after pictures are going to be - on this kind of terrain, you're bouncing so much trying to keep your balance, that you just sort of obliterate the place you picked it up.	(5)
06 01 27 26	CC	When you dig down there, you're not getting - - any of that white soil. Is that right?	(5)
06 01 27 43	CDR	That's correct; we're not. I kicked some of it away to see just how -	(5)
06 01 27 51	LMP	Here's an old rounded rock that's fractured, badly beat up. Let's get that one.	(5)(SAMP 65070, 75)(PHO 107 17500-02)
06 01 28 04	LMP	I was going to say take a picture of that. This gnomon is worthless. It's against the stops.	(5)
06 01 28 17	CDR	That one right there?	(5)(SAMP 65070, 75)

06 01 28 18	LMP	Yeah. That one right there.	(5)(SAMP 65070, 75)
06 01 28 19	CDR	I'll get a - cross-sun.	(5)(SAMP 65070, 75)(PHO 107 17500-02)
06 01 28 23	LMP	That's all we're going to be able to get.	(5)
06 01 28 26	CDR	Well, it's sort of an up-sun.	(5)
06 01 28 33	CDR	I'll shoot these at 5.6. Stereopair up-sun. I can get the location all right.	(5)
06 01 28 40	LMP	Oh, don't work at that, John.	(5)
06 01 28 42	CC	We can get the location off the TV.	(5)
06 01 28 47	CDR	Was an old rock, wasn't it? *** it crumbled to pieces.	(5)(SAMP 65070, 75)
06 01 29 01	CDR	That was fruitless there.	(5)(SAMP 65070, 75)
06 01 29 05	LMP	Get it - get that - that right there.	(5)(SAMP 65070, 75)
06 01 29 07	CDR	I am. I'm trying to get upslope on it.	(5)(SAMP 65070, 75)
06 01 29 10	LMP	Here let me - I can get it.	(5)(SAMP 65070, 75)
06 01 29 28	LMP	Okay. I got it.	(5)(SAMP 65070, 75)
06 01 29 32	CC	The white rock that you picked up and the ones you just have here, can you see any crystals in it?	(5)(SAMP 65070, 75)
06 01 29 40	LMP	Yes, sir. I sure can. It's a bluish crystal, a couple of millimeters size.	(5)(SAMP 65070, 75)
06 01 29 49	CDR	Bluish?	(5)(SAMP 65070, 75)
06 01 29 51	LMP	Well, that's what it looked - grayish maybe - and one corner of it's got a glass rind on it about a half a centimeter thick.	(5)(SAMP 65070, 75)
06 01 30 08	LMP	It doesn't look like a breccia, Tony. It looks like a crystalline rock.	(5)(SAMP 65070, 75)

06 01 30 13	CDR	Yeah, it's got a lot of - it's fine grained - it seems to be a fine-grained crystalline rock anyway, the part that we can see. The particles in it are millimeter size, though. I see some millimeter-size sparklies flashing at me. That's going in bag 403.	(5)(SAMP 65070, 75)
06 01 30 34	LMP	Hey, John, I'm having (to) about strike out on this rake here. I can't - get a couple of little ones each time, but - - about it.	(5)(SAMP 65030, 35)(PHO 110 18023-26; 107 17503-07)
06 01 30 47	LMP	Want to move on around there about 10 feet or so?	(5)(SAMP 65030, 35)
06 01 30 50	CDR	Okay.	(5)(SAMP 65030, 35)
06 01 30 51	LMP	Pick a spot. I'll follow in your tracks. You're sliding downhill about 2 inches every time you - I can't get going , here. Look at that glass-covered one right there, John.	(5)(SAMP 65030, 35)
06 01 31 12	CDR	Let's get it, Charlie.	(5)(SAMP 65030, 35)
06 01 31 14	LMP	I'll back off and get the - cross-sun here.	(5)(SAMP 65030, 35)(PHO 110 18023-24)
06 01 31 26	CDR	Yeah, I'll have to get an up-sun here, or else do a lot of work.	(5)(SAMP 65030, 35)
06 01 31 34	LMP	Gonna be just one rock and one bag here.	(5)(SAMP 65030, 35)
06 01 31 52	LMP	Hey, Tony. We just picked you up a glass rind rock - at least a quarter of it's got glass on it, and it's so dust covered that it - - defies description.	(5)(SAMP 65030, 35)
06 01 32 12	CDR	404 is the bag number - -	(5)(SAMP 65030, 35)
		- - -	
06 01 32 30	LMP	Okay. Let me try a rake here - let me get an after here.	(5)(SAMP 65030, 35)(PHO 110 18025-26)
06 01 32 32	CDR	Get an after, Charlie.	(5)(SAMP 65030, 35)(PHO 110 18025-26)
06 01 32 33	LMP	Okay. Got it. Here, let me rake up here. Here's some - these are either clods or - -	(5)(SAMP RAKE 65310-66)(PHO 110 18023-26; 107 17503-07)

06 01 32 56	LMP	That was a whitish rock. That one probably came from South Ray. Wait a minute. Here's some good ones - dusty ones.	(5) (SAMP RAKE 65310-66)
		- - -	
06 01 33 26	CDR	Most of those are either little rocks - -	(5)(SAMP RAKE 65310-66)
06 01 33 33	CDR	There's a round one, Charlie.	(5)(SAMP RAKE 65310-66)
06 01 33 34	LMP	Hey, there's a great one, John. There's a good rock right there.	(5)(SAMP RAKE 65310-66)
06 01 33 37	CDR	I don't think this is going to be a simple problem, even after you - - get the rocks back because they're so dark - so darn - dark - It's 405.	(5)(SAMP RAKE 65310-66)
06 01 33 54	CDR	Go in bag 405. That's a big round rock that's dust covered. I see white streaks through it, and I can't tell from the clasts showing through that I can see whether it - I don't know whether I can see any glass on it or not. But it's a friable white rock, and it's rounded.	(5)(SAMP RAKE 65310-66)
06 01 34 17	CDR	Going into bag 405 with Charlie's rake sample.	(5)(SAMP RAKE 65310-66)
06 01 34 24	CDR	You see because there is so doggone many craters around here, I mean - -	(5)
06 01 34 29	CC	We'd like you to find the steepest slope that you can work on there, and dig as deep as you can with that rake.	(5)(SAMP RAKE 65920, 25-27)(PHO 107 17508-09)
06 01 34 38	CDR	Let me do that, Charlie.	(5)(SAMP RAKE 65920, 25-27)
06 01 34 40	LMP	We're on it right now, babe. I'll tell you.	(5)(SAMP RAKE 65920, 25-27)
06 01 34 42	CC	Okay, can you dig into the face of the slope a bit?	(5)(SAMP RAKE 65920, 25-27)
06 01 34 45	CDR	Let me dig. Charlie, let me do that.	(5)(SAMP RAKE 65920, 25-27)
06 01 34 49	LMP	Okay. I'll swap with you.	(5)(SAMP RAKE 65920, 25-27)
06 01 34 53	CDR	Hold the gnomon.	(5)(SAMP RAKE 65920, 25-27)

06 01 35 00	LMP	Hey, how about right up here, John. Here's a steep part, or right over there where we walked from. Where you going?	(5)
06 01 35 07	CDR	On a steep slope.	(5)
06 01 35 08	LMP	Okay, right to your left is a good one. Right where we been.	(5)
06 01 35 15	CDR	Steepest is closest to the rim.	(5)(SAMP RAKE 65920, 25-27)
06 01 35 18	LMP	That's right. Right up there.	(5)(SAMP RAKE 65920, 25-27)
06 01 35 21	CDR	Man, you don't make much headway.	(5)
06 01 35 53	LMP	Okay, Tony. We've gone vertically into the wall, about a foot, and it all looks the same. Occasionally, you see a white splotch.	(5)(SAMP RAKE 65920, 25-27)
		- - -	
06 01 36 19	LMP	Hey, John, I tell you what. Let me get upslope.	(5)
06 01 36 28	CDR	Move out of the shadow, Charlie. I can't see it.	(5)
06 01 36 33	CDR	Whoop. One thing about being on a 20-degree slope. You can get down on your knees.	(5)(SAMP RAKE 65920, 25-27)
		- - -	
06 01 37 17	LMP	Looks like just indurated regolith, doesn't it.	(5)(SAMP RAKE 65920, 25-27)
06 01 37 21	LMP	Don't see any rocks. Here let me do this.	(5)(SAMP RAKE 65920, 25-27)
06 01 37 35	CDR	There's one.	(5)(SAMP RAKE 65920, 25-27)
06 01 37 36	LMP	Yeah.	(5)(SAMP RAKE 65920, 25-27)
06 01 37 42	CDR	There's some.	(5)(SAMP RAKE 65920, 25-27)
06 01 37 50	LMP	Yeah, they're rocks all right. Going in bag 335, three little ones, Tony.	(5)(SAMP RAKE 65920, 25-27)
06 01 37 56	LMP	No, they aren't; they're clods.	(5)(SAMP RAKE 65920, 25-27)
06 01 38 05	LMP	But, anyway, 335.	(5)(SAMP RAKE 65920, 25-27)

06 01 38 11	LMP	Here, let me have the rake a minute. Let me try something.	(5)
06 01 38 15	CDR	Here you go.	(5)
06 01 38 16	CC	Well, you think the rock concentration near the surface is a lag surface, then?	(5)(SAMP RAKE 65920, 25-27)
06 01 38 27	LMP	Apparently so because in this wall here, we're not getting a thing.	(5)(SAMP RAKE 65920, 25-27)
06 01 38 32	CC	Okay, why don't you take a soil right there - - fill up a soil bag.	(5)
06 01 38 37	LMP	And there's less soil here - I mean less rocks here than on the other side of the crater. The side towards the Rover is - -	(5)(SAMP RAKE 65920, 25-27)
06 01 38 56	CDR	This could be a South Ray, course, that's downslope too.	(5)
06 01 39 04	LMP	Now there is a pure - there are two rocks, right there.	(5)(SAMP 65900-09, 15-16)(PHO 107 17508-09)
06 01 39 08	CDR	Hey, Charlie, I got to put this one in your bag before I can get it.	(5)
		- - -	
06 01 39 32	LMP	Get you a soil - they want a soil bag full. Hate to waste a bag on that one, but - -	(5)(SAMP 65900-09, 15-16)
06 01 39 39	CDR	Let's put the soil in there with the ***	(5)(SAMP 65900-09, 15-16)
06 01 39 42	CDR	Bag 406 will have one rock in it and a soil sample from this low area.	(5)(SAMP 65900-09, 15-16)
06 01 39 55	LMP	Let's fill up the bag.	(5)(SAMP 65900-09, 15-16)
06 01 39 59	LMP	And, Tony, a lot of this soil is coming out from about 6 inches down - - out of this crater. You know, John, I think if we got a running start straight at the Rover, we'd make it up the other side.	(5)(SAMP 65900-09, 15-16)
		- - -	

06 01 40 22	CDR	Let's go around the rim.	(5)
06 01 40 25	CC	Okay, the plan back at the Rover is now we'd like John to take an LPM measurement and, Charlie, if you could sample around the rim there near the Rover and take both angular and round whatever you find.	(5)
		- - -	
06 01 41 07	LMP	Hey, John. It's easier to go straight across. That was fun.	(5)
06 01 41 11	CDR	I haven't had any trouble.	(5)
		- - -	
06 01 41 17	CDR	Going 45 feet on an LPM is - gonna put me over the edge here. I'm gonna go out at right angles to the Rover, around this crater rim, for this measurement, Houston. It may not be exactly 45 feet, but it'll be close.	(5)
06 01 41 39	CC	Charlie, we'd like some fist-size samples here.	(5)
06 01 41 46	LMP	Okay, we've got a ton of them. We'll get them for you.	(5)
		- - -	
06 01 42 11	CC	And, John, why don't you take a pan when you document the location of that LPM tripod. That'll take care of our pan.	(5)
		- - -	
06 01 42 23	LMP	I already took one pan.	(5)(PHO 110 17991-18018)
		- - -	
06 01 42 37	CC	Charlie, where did you take your pan from?	(5)(PHO 110 17991-18018)
06 01 42 50	LMP	On the south rim of that crater.	(5)(PHO 110 17991-18018)
06 01 42 56	LMP	About 10 feet to the 4 o'clock position of the Rover.	(5)

06 01 52 48	CC	And, while you're up there, you might adjust the DAC. Maybe you can get it running.	(5)(PHO DAC)
06 01 52 55	LMP	I already did, and it's running. It'll be running.	(5)(PHO DAC)
		- - -	
06 01 53 10	LMP	That is a crystalline rock if I've ever seen a crystalline rock.	(5)(SAMP 65015)
06 01 53 14	CDR	First one today.	(5)(SAMP 65015)
06 01 53 16	LMP	Yeah.	(5)(SAMP 65015)
06 01 53 17	CDR	At least the first one you could say was one, maybe. *** - -	(5)(SAMP 65015)
06 01 53 19	LMP	That is a great rock. Okay, John, could you - when you get around there, could you give me a film mag, black and white?	(5)(SAMP 65015)
		- - -	
06 01 53 32	CC	Call that one that "great Young."	(5)(SAMP 65015)
06 01 53 37	CDR	Oh. Come on.	(5)(SAMP 65015)
06 01 53 40	LMP	It's not very big, but it's just a nice rock.	(5)(SAMP 65015)
06 01 53 46	LMP	Yeah, it was made about - it looks like it's about 3 days old. No, it must be on the order of 4 billion.	(5)(SAMP 65015)
		- - -	
06 01 54 09	LMP	- - magazine I.	(5)
		- - -	
06 01 54 55	LMP	Okay, Tony. Magazine India.	(5)
06 01 55 01	LMP	And starting with frame count number - about number 3. I guess I fired off a couple.	(5)
		- - -	
06 01 58 36	CC	And, Charlie, DAC on as you start back - -	(5)(PHO DAC)

06 01 58 40	CDR	Okay. We're in and we're on our way.	(5-6)
06 01 58 43	LMP	It's already on.	(5-6)(PHO DAC)
06 01 58 45	CC	That Station 6 will be completely nominal.	(5-6)
06 01 58 46	LMP	This is 3.60 at 2.9. Why don't we just make it 3.5 at - at 2.9.	(5-6)
06 01 59 01	CDR	Okay, Charlie. I want to follow my tracks down this thing.	(5-6)
		- - -	
06 01 59 12	CC	We would like Station 6 at the lowest terrace on Stone mountain and a blocky crater, if possible.	(5-6)
		- - -	
06 01 59 44	LMP	There's a pretty big crater, with some blocks around it. I think that might do.	(5-6)
		- - -	
06 02 00 04	LMP	Look, there's one right down there, John; 12 o'clock, there's one, about 200 meters.	(5-6)
		- - -	
06 02 00 26	CDR	I'm just glad that we don't have that - watch the Rover go TV. Or I don't think we'd be going.	(5-6)
		- - -	
06 02 00 46	LMP	Just to the left there, John. See those blocks over there in that crater?	(5-6)
06 02 00 50	CDR	Say, where?	(5-6)
06 02 00 51	LMP	Okay, your 10 o'clock position.	(5-6)
06 02 00 54	CDR	That big block there?	(5-6)
06 02 00 55	LMP	No, well, on over farther than that.	(5-6)
06 02 00 56	CDR	You want to take off and go that way now? I can't see nothing. I got my blinder down.	(5-6)

06 02 01 05	LMP	Oh, I'm sorry. Okay, now hook a left. No, not through this crater.	(5-6)
06 02 01 13	LMP	Right on the other side of this crater.	(5-6)
		- - -	
06 02 01 18	LMP	Well, that's only 3.3, John. Why don't we go down a little bit further.	(5-6)
06 02 01 24	CDR	This one right here?	(5-6)
06 02 01 26	LMP	Yeah, that one's only 3.3 down. They think about 3.0. Turns out it's not a crater at all anyway. It's just a swale.	(5-6)
06 02 01 39	LMP	Yeah. Really some interesting angular blocks here. Okay, Tony. It's still apparently - well it's - we veered - we're steering about 340 now, and - we're getting some angular blocks and cobbles just as we described before - 20 percent of the surface, perhaps.	(5-6)
		- - -	
06 02 02 55	LMP	Over on - Smoky, I can see the lineations over there, but they are more widely spaced than on Stone here and mostly parallel to the Cayley. Bear left a little bit, John, if you can. Okay. We're at 3. We can start looking for a place now.	(5-6)
06 02 03 32	CDR	Here's the bench right down here, I think.	(5-6)
06 02 03 33	LMP	Yeah, I see it.	(5-6)
06 02 03 35	LMP	Now if we drive along the bench, maybe we'll find a blocky crater.	(5-6)
06 02 03 51	CDR	Want to go right or left?	(5-6)
06 02 03 53	LMP	Left. Because then Station 8's on over to the left.	(5-6)
06 02 04 05	CDR	Look at that block there, Charlie.	(5-6)
06 02 04 06	LMP	Where?	(5-6)

06 02 04 07	CDR	That big block right over there.	(5-6)
06 02 04 09	LMP	I know it. That's the one I described. It's a giant size.	(5-6)
06 02 04 21	LMP	We're at 3.0 at 355. Driving west, along a bench, trying to find a blocky crater.	(5-6)
06 02 04 43	LMP	Passing these big glass-splattered rocks that apparently came out of South Ray. Think every one of them did, frankly.	(5-6)
06 02 05 06	LMP	Here's a crater, John, that's about 10 meters, - fairly blocky rim, angular. Want to stop here? It's a secondary on this side.	(5-6)
06 02 05 21	LMP	It's a secondary. We're at 357 at 3.1, and we got a secondary that's fairly blocky rim. There's one just a little upslope from us that might be better. But there's not as many blocks on the rim. Same size crater.	(5-6)
06 02 05 44	CC	Okay; we'd like some more blocky ones.	(5-6)
06 02 05 51	LMP	Okay, I think it's a secondary.	(5-6)
06 02 05 54	LMP	Okay, you can park a 180 here, John.	(5-6)
06 02 05 59	CDR	Okay, but - I can't park 180. If I park 180, we'll be downslope from it.	(5-6)
06 02 06 07	LMP	No, the crater's over to the left.	(5-6)
		- - -	
06 02 06 17	LMP	Why don't you just park north? I can point that antenna north.	(5-6)
06 02 06 24	LMP	You ought to get over here to the right a little bit so the TV won't be looking into the Sun.	(5-6)
06 02 06 37	CDR	Now I'll just swing around and point it north.	(5-6)
		- - -	
06 02 07 21	LMP	180, 357, 6.7, 3.1.	(6)

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06 02 08 16	CDR	Now this is harder ***	(6)
06 02 08 18	LMP	It is.	(6)

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06 02 08 22	LMP	It's a lot harder.	(6)
06 02 08 23	CDR	Yeah, we didn't sink near - of course, we're not standing on the rim of a crater. But this is harder, because we just sort of bounce here.	(6)
06 02 08 31	LMP	Yeah, it's a lot more - the regolith character - as John said, it's really changed.	(6)
06 02 08 44	LMP	When we walk, we don't bounce as much - I mean, we don't sink in as much.	(6)

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06 02 09 31	CDR	What you doing there, Charlie?	(6)
06 02 09 33	LMP	*** what this rock's made out of. I'm trying to get a fresh surface.	(6)
06 02 09 38	CDR	I wouldn't do that. It's not worth doing.	(6)
06 02 09 54	CDR	*** help you there. That okay?	(6)
06 02 10 00	CC	Ah, thank you much there, John.	(6)
06 02 10 01	CDR	Man, that is some rock.	(6)
06 02 10 05	LMP	That matrix there's pure white with black phenocryst in it. It might be clast. It might be a breccia. And it's got some lathlike crystals in it.	(6)
06 02 10 31	LMP	That's the one I'm talking about. See, I just broke that open.	(6)
06 02 10 34	CDR	Yeah, that's a two-rock breccia. Let me get a bigger piece of it, Charlie.	(6)

06 02 10 37	LMP	You can't whack it off.	(6)
06 02 10 40	CDR	Too hard to whack?	(6)
06 02 10 41	LMP	Yeah, I've whacked about five times, as hard as I could.	(6)
06 02 10 44	CDR	It has a white matrix with a square clast and elongate clasts in it.	(6)
06 02 10 51	CDR	And it's rounded, too.	(6)
06 02 10 59	LMP	Looks like some more of them right down here, John, that are - that are sample - - that are sample size.	(6)(SAMP 66030-37)(PHO 108 17627; 107 17512-17)
06 02 11 08	CDR	Okay, let's get some of those.	(6)(SAMP 66030-37)
06 02 11 10	LMP	I'll start the pan.	(6)(PHO 108 17606-26)
		- - -	
06 02 12 07	LMP	Okay, pan's complete, Tony.	(6)(PHO 108 17606-26)
06 02 12 11	LMP	Grab the gnomon, John, and how about a set of tongs and a shovel?	(6)
		- - -	
06 02 12 35	LMP	Yeah. That's the gnomon stick. See the legs?	(6)
06 02 12 39	LMP	They're still in the bag.	(6)
06 02 12 53	CDR	See what happened?	(6)
06 02 12 55	CC	No. We can't see it now - -	(6)
06 02 12 56	LMP	Pulled it right out of there.	(6)
06 02 12 58	CDR	You blew it.	(6)
06 02 13 01	LMP	Okay, I got the wand, and the legs stayed in the bag. Okay, give me a shovel, John. We can use the scoop.	(6)
		- - -	

06 02 13 13	CDR	Where do you want to go?	(6)
06 02 13 15	LMP	I don't care. Anywhere is fine. Here's a nice little cracked one right there.	(6)(SAMP 66030-37)
06 02 13 21	LMP	These are angular - there's some angular and rounded rocks right there.	(6)(SAMP 66030-37)
		- - -	
06 02 13 32	LMP	You can stick the tongs in there, John.	(6)(SAMP 66030-37)
06 02 13 36	LMP	It'll go in the ground. I tried that a minute ago. It worked great. I don't see why I'm doing a down-sun - but I'll do it.	(6) (PHO 108 17627)
06 02 13 53	LMP	Hey, Tony, can you get a locator from the TV on this sample?	(6)(SAMP 66030-37)
06 02 13 56	CC	I sure can. We've got it now.	(6)(SAMP 66030-37)(PHO 110 18021-22)
		- - -	
06 02 14 37	CDR	That's going in bag 407. It was some soil and some dirt, a rounded rock.	(6)(SAMP 66030-37)
06 02 14 53	CDR	Let's grab this angular one next.	(6)(SAMP 66050, 55)(PHO 108 17627; 107 17512-17)
		- - -	
06 02 15 03	CDR	Let me get it with the tongs.	(6)(SAMP 66050, 55)
06 02 15 16	LMP	Might be the same kind, John, that you picked up up the way there.	(6)(SAMP 66050, 55)
		- - -	
06 02 15 30	LMP	That is - partially sacked. There we go. You got it.	(6)(SAMP 66050, 55)
06 02 15 33	CDR	Get the after. Got it. 408 is the bag number.	(6)(SAMP 66050, 55)(PHO 107 17515-17)
06 02 15 55	CDR	Why don't you get a soil sample?	(6)(SAMP 66040-44)(PHO 108 17627; 107 17512-17)

06 02 15 57	LMP	Okay; that's a good idea.	(6)(SAMP 66040-44)
		- - -	
06 02 16 07	LMP	Maybe we could go to one more area. And so we won't salt it with it, this is just one broken-up block here.	(6)(SAMP 66040-44)
06 02 16 28	LMP	338 is the soil sample.	(6)(SAMP 66040-44)
06 02 16 36	LMP	See anything down under there, John?	(6)(SAMP 66040-44)
06 02 16 45	CDR	No. This is the second - this is rim of it. It's very soft. I didn't have any trouble digging down with the shovel.	(6)(SAMP 66040-44)
06 02 16 56	LMP	Solid gray all the way - -	(6)(SAMP 66040-44)
06 02 16 57	CDR	Solid gray all the way down. I see no layering.	(6)(SAMP 66040-44)
06 02 17 01	LMP	Let me put this in your bag.	(6)
06 02 17 11	LMP	John, how about on the upper rim there?	(6)(SAMP 66080-86)(PHO 108 17628-29; 107 17518-20)
06 02 17 15	LMP	This might have been a secondary.	(6)(SAMP 66080-86)
06 02 17 17	CDR	Look at that right over there, Charlie.	(6)(SAMP 66080-86)
06 02 17 18	LMP	It's a really unique white-looking something -or-other.	(6)(SAMP 66080-86)
06 02 17 32	LMP	I think it's soil.	(6)(SAMP 66080-86)
06 02 17 40	CDR	Well, you want to get some of it? It's unusual soil, if it is.	(6)(SAMP 66080-86)
06 02 17 45	LMP	It looks like a little teeny impact, doesn't it?	(6)(SAMP 66080-86)
06 02 17 56	LMP	Hey, let's get a quick one and then go on up here and get some of these blocks on the upper rim.	(6)(SAMP 66080-86)
06 02 18 02	CDR	There's f:ll. It's a down-sun. Turn around and get a locator.	(6)(SAMP 66080-86)(PHO 108 17628-29)
06 02 18 28	LMP	Got you a bag coming, John. Hey, Tony, what we're picking up is a white - it looks like a little patch of indurated regolith, and it's whitish in color.	(6)(SAMP 66080-86)

06 02 18 51	LMP	Let's get a little bit more of the white, John. That got most of it; it was just on the end of the scoop.	(6)(SAMP 66080-86)
		- - -	
06 02 19 24	LMP	That's got it. I'll get your after.	(6)(SAMP 66080-86)
06 02 19 27	CDR	I'll get it, Charlie.	(6)(SAMP 66080-86)(PHO 107 17520)
06 02 19 28	LMP	Okay, that's in bag - that soil sample's in 339.	(6)(SAMP 66080-86)
06 02 19 37	CDR	I'm through frame count 106, now.	(6)
06 02 19 46	CDR	Maybe we can get a chance to get up another sample ***	(6)(SAMP 66070,75)(PHO 108 17630-31; 107 17521-22)
		- - -	
06 02 20 02	CDR	I been hankering for a piece off that rock.	(6)(SAMP 66070,75)
06 02 20 05	LMP	Here's an old-rounded one right here, John. With the white spots - in it. Here's a real angular one right over here. It's probably out of a -	(6)(SAMP 66070,75)
06 02 20 20	CDR	Let's get this rounded one, Charlie - - just on a hunch.	(6)(SAMP 66070,75)
06 02 20 24	LMP	Okay, I agree. Down-sun, here.	(6)(SAMP 66070,75)(PHO 108 17630)
06 02 20 38	LMP	Got it.	(6)(SAMP 66070,75)(PHO 108 17630)
06 02 20 39	CDR	Wait a minute. Get a locator.	(6)(SAMP 66070,75)(PHO 108 17631)
06 02 21 12	CDR	In bag 409, Houston. And it's so dust-covered that I'm unable to describe it, although it's a white subrounded rock. And I can't distinguish any crystalline structure in it. It's going in bag 409.	(6)(SAMP 66070,75)
06 02 21 34	CDR	Charlie, put that one in mine. Yours is full.	(6)(SAMP 66070,75)
06 02 21 36	LMP	Okay. Yours is getting full, too. We got to change our bags. Whoops! My bag is full?	(6)
		- - -	

06 02 21 56	LMP	Bring me the scoop a minute. Let me whack this thing right here. It's so good that I can't pass it up. All right, there's a good place to whack.	(6)(SAMP 66090,95)(PHO 107 17523-26; 108 17632-33)
06 02 22 15	CDR	Oh, that's hard - you got it!	(6)(SAMP 66090,95)
06 02 22 18	CDR	Demolished it.	(6)(SAMP 66090,95)
06 02 22 19	LMP	That's a great rock! Look at that! I'm sorry we didn't get it documented before, but that is a good sample. I think it's a crystal rock.	(6)(SAMP 66090,95)
06 02 22 32	CC	Okay, let's go ahead and document it now - - so we get the location of the one that's still in place. It didn't look like it moved.	(6)(SAMP 66090,95) (PHO 107 17526)
06 02 22 40	CDR	No, he didn't move anything there. I'm gonna do an up-sun on this documentation.	(6)(SAMP 66090,95)(PHO 107 17523, 25)
06 02 22 44	LMP	Okay, I'll get a cross-sun here. It's a grayish bluish - rock, Tony, in the matrix with some white clast in it.	(6)(SAMP 66090,95)(PHO 108 17632-33)
06 02 23 06	LMP	Let me get it with this - it isn't any trouble, John.	(6)(SAMP 66090,95)
06 02 23 22	LMP	The matrix is so fine-grained, I can't tell, but it's definitely got a blue cast to it and there are inclusions of a whitish - it looked like plag to me.	(6)(SAMP 66090,95)
		- - -	
06 02 23 45	CDR	And then, needle-like black crystals in it, too.	(6)(SAMP 66090,95)
06 02 23 49	CDR	I see one in there that's a millimeter wide by 3 millimeters long, and some other needle-like crystals in it.	(6)(SAMP 66090,95)
06 02 23 58	LMP	Here's another piece - came off the same rock.	(6)(SAMP 66090,95)
06 02 24 02	CDR	It has this white clast in it. It's got to be a breccia, Charlie.	(6)(SAMP 66090,95)
06 02 24 07	LMP	Think so?	(6)(SAMP 66090,95)
06 02 24 09	LMP	They don't really look like -	(6)(SAMP 66090,95)

06 02 24 13	CDR	That's going in bag 410.	(6)(SAMP 66090,95)
		- - -	
06 02 25 46	LMP	Hey, is the DAC supposed to be on? Yes, the DAC's on. Okay. Turning the DAC on.	(6)(PHO DAC)
06 02 25 58	LMP	The DAC is on.	(6)(PHO DAC)
		- - -	
06 02 27 12	CC	We'll need a frame count.	(6)
06 02 27 19	CDR	*** mine's 111.	(6)
06 02 27 29	LMP	Fifty for me.	(6)
		- - -	
06 02 29 36	LMP	Look at that blue rock - that we just whacked on!	(6)(SAMP 66090,95)
		- - -	
06 02 30 02	LMP	Okay. Okay, we're going - cross-slope, Tony and I feel like I'm about to fall out. We're still in the blocky field. In fact, it's just South Ray material, I think, just all over the place.	(6-8)
		- - -	
06 02 30 44	LMP	Okay, I can still see old Orion. We sure parked on a - you landed on a - the highest point around, John. Even down in that crater - you can still see it.	(6-8)
06 02 31 03	LMP	Okay, we're back into a thicker part of the ray. The regolith is here covered with cobbles about 40 to 50 percent. You're gonna have to bear way left, John. Look at that piece of glass we just rolled over. This'll be great - - 015, we've got to go.	(6-8)
06 02 31 41	CDR	What do you want, 015?	(6-8)
06 02 31 44	LMP	Yeah.	(6-8)
		- - -	

06 02 32 15	LMP	We're not going to be able to see Stubby. It's on the other side of a big ridge.	(6-8)
06 02 32 24	LMP	The map was wrong. It's been mapped wrong. We're down in a little swale now, and there's about a 30-meter ridge off to our left about 300 meters; it blocks out Stubby. You want us to go up and travel along that ridge?	(6-8)
06 02 32 46	LMP	We could do it. I'd like to see back into Stubby.	(6-8)
06 02 32 57	CC	Well, why don't you press on up there?	(6-8)
06 02 33 07	CDR	Might as well. We've got to go by that big rock. Is that where we're going, to that big rock?	(6-8)
06 02 33 13	LMP	That'd be a great place to sample the ray. That's probably on the ray. But we want to go left, about 10 o'clock, up on the - top of that ridge.	(6-8)
06 02 33 21	CDR	Okay; will you be able to take pictures?	(6-8)
06 02 33 22	LMP	Yeah.	(6-8)
06 02 33 37	LMP	This is really a ray. Coming out over the ridge - you can distinctly see the rays from South Ray - the whiter albedo and the contact between the white ray and the Cayley here. Quite apparent.	(6-8)
06 02 34 04	LMP	We're now at 005 at 3.0. And the contact I'm talking about this is at 12:00 probably a couple hundred meters.	(6-8)
06 02 34 15	CDR	I don't want to be discouraging about this sort of thing, but I feel like this may be a problem we're going to have to attack statistically out here. Because it is really difficult to tell - just looking at a rock, except for the roundness, what kind of rock it is. Now there's a vesicular-looking rock right there.	(6-8)
06 02 34 42	CDR	That's the first rock I've seen with vesicles in it.	(6-8)
06 02 35 02	LMP	Okay, Tony, we're travelling now - southwest. We're at 006 at 3.0 -	(6-8)

06 02 35 11	LMP	And we've still got a couple hundred meters to go up to the ridge. John, why don't you swing directly south and let's go straight up that beauty, see what we see up there. Probably nothing but another ridge.	(6-8)
06 02 35 27	CDR	It's pretty steep, Charlie.	(6-8)
06 02 35 40	CDR	That's really a steep ridge.	(6-8)
		- - -	
06 02 36 00	CDR	We've lost the rear-wheel drive.	(6-8)
		- - -	
06 02 36 21	CDR	And with that in mind, I'd just as soon not go up to this ridge.	(6-8)
06 02 36 27	CC	Okay; we suggest you head on towards 8 and stay on fairly flat ground.	(6-8)
		- - -	
06 02 37 14	LMP	At 007, 3.1 - passing another secondary that's elongate in the direction of South Ray. Those are the big blocks they were talking about, John. Right over there, there are four or five of them.	(6-8)
		- - -	
06 02 38 10	LMP	How about stopping up there in the middle of all of those big boulders, John?	(6-8)
06 02 38 25	CDR	Call that Station 8?	(6-8)
06 02 38 16	LMP	Call that Station 8. That's gonna be about it.	(6-8)
06 02 38 50	LMP	There's one that's overturnable, I'll bet you. Right there. Look at that elongate one.	(6-8)
06 02 39 12	LMP	Okay, Tony, we're at 010 and 3.0, and we've got about three or four - 2- or 3-meter-size blocks, one black and some white ones.	(6-8)
06 02 39 32	LMP	Okay, 180 John, on the heading. No, 270; they want a NAV update.	(6-8)

06 02 39 43	CC	Okay, and we're looking primarily for blocks from South Ray. So if you feel like this is the ray, this sounds great. And we don't need a NAV update, so 180 is great.	(6-8)
		- - -	
06 02 40 08	LMP	This is fine here.	(6-8)
06 02 40 19	LMP	176, 011, 7.9, 2.9.	(8)
		- - -	
06 02 42 25	LMP	Starting our pan from about the 1 o'clock position of the Rover, sort of bracketing these blocks here.	(8)(PHO 108 17663-81)
06 02 42 36	CDR	Okay; Station 8.	(8)
		- - -	
06 02 42 41	CC	And verify the DAC's off.	(8)(PHO DAC)
		- - -	
06 02 43 08	LMP	Thanks for the reminder, Tony.	(8)(PHO DAC)
		- - -	
06 02 43 23	LMP	And the regolith here, is firmer than up on - Stone. We're in a blocky field here. Predominant size is 10 to 15 centimeters, but the biggest one is a couple of meters. And you'll see that 12 o'clock from the Rover.	(8)
06 02 43 50	CC	Wow! That's a real boulder.	(8)
06 02 43 51	LMP	It has a bluish cast to it - black maybe. Okay, you already see it, huh? And beyond that, there's a white one. It looks like that big one that John sampled. Think we ought to get one of those. Okay; pan's complete. Double core here is the first thing. And I'll sample - I think we're in the ray, so I'll just sample - right out - do it right over here.	(8) (PHO 108 17663-81)
		- - -	

06 02 45 09	LMP	Yeah, I need to get a double core or two.	(8)(SAMP CORE 68001-02)(PHO 107 17529; 108 17682-86)
		- - -	
06 02 46 29	CDR	There's a boulder over here we can split.	(8)
06 02 46 36	LMP	That one off to your right down there - I think we could turn that one over.	(8)
06 02 46 45	CDR	Yeah. I think you're right. I think we could turn that one over, Charlie.	(8)
06 02 46 48	LMP	How about samples of those two? That white one and that big one on the other side over there?	(8)
		- - -	
06 02 47 05	CDR	Okay, well I can get a rake soil here while you're doing that.	(8)(SAMP RAKE 68510-37)(PHO 107 17527-31)
06 02 47 09	LMP	I'll just have to take the scoop off. Can you do that rake soil by yourself, you think?	(8)
06 02 47 17	CDR	Yeah.	(8)
06 02 47 24	CDR	Rake soil away from the boulders.	(8)(SAMP RAKE 68510-37)
06 02 47 47	CC	How near are you to the edge of this ray?	(8)
06 02 47 56	LMP	Goes in both directions as far as we can see.	(8)
		- - -	
06 02 48 01	LMP	The whole area is just covered with these rocks.	(8)
		- - -	
06 02 48 21	CC	I guess we're just looking for a variety then in the boulder protocol.	(8)
06 02 48 28	LMP	Okay, we can give you that, I'll tell you. There's two big boulders at 12 o'clock that are going to be a great sampling. One of them is a rounded and - but the biggest - and the other one is a white - and it's black. The other is white and it's very sharp, very angular.	(8)

06 02 48 58	LMP	Okay, I pushed the double core in about halfway up the first.	(8)
06 02 49 12	CDR	Charlie, I get a locator on you and a down-sun, too.	(8)
		- - -	
06 02 49 58	CDR	What's the matter, Charlie?	(8)(SAMP CORE 68001-02)
06 02 50 01	LMP	Not going in too well.	(8)(SAMP CORE 68001-02)
06 02 50 05	CDR	Pretty hard around here.	(8)(SAMP CORE 68001-02)
		- - -	
06 02 50 32	LMP	Nope, I can't do it. I can't get down that far.	(8)(SAMP CORE 68001-02)
06 02 50 51	LMP	Now I'm going to have to go get the tongs.	(8)(SAMP CORE 68001-02)
06 02 50 55	LMP	And the hammer. I don't think the double core is going to go in. Do you want me pull it out and shake it out and try another place? I think I hit a rock - -	(8)(SAMP CORE 68001-02)
06 02 51 06	CC	Okay, yeah, we'd sure like you to do that.	(8)(SAMP CORE 68001-02)
06 02 51 13	LMP	That one just stopped all at once, so I think I did hit a rock.	(8)(SAMP CORE 68001-02)
		- - -	
06 02 52 05	CDR	Out of five scoops, I've got about 10 rock frags, one of which has some interesting black glass along the sides of it, the other of which is covered with black glass - but in the most there's not much of that material around here. That's going into bag 411.	(8)(SAMP RAKE 68510-37)
06 02 52 39	CDR	Where you're away from boulders there's hardly anything but soil - very few rocks, in other words.	(8)(SAMP RAKE 68510-37)
		- - -	
06 02 53 50	LMP	Hey, there are little glass beads all over the place here, John.	(8)(SAMP RAKE 68500-05)(PHO 107 17527-33)

06 02 53 53	CDR	And places where little white rocks seem to have hit, too. I'll get a soil sample here.	(8)(SAMP RAKE 68500-05)
06 02 54 46	LMP	Boy, it is hard under here, Tony.	(8)(SAMP CORE 68001-02)
06 02 54 49	CC	Right, it sure looks it, but I can see you're getting it down.	(8)
06 02 54 50	LMP	*** it's in.	(8)(SAMP CORE 68001-02)
06 02 54 58	LMP	It's a little off vertical, but you're just going to have to take it.	(8)(SAMP CORE 68001-02)
06 02 55 03	LMP	Boy, I hope that thing is full of gold, because that was a hard one. Whew!	(8)(SAMP CORE 68001-02)
06 02 55 23	LMP	I can't believe it. It comes out so easy.	(8)(SAMP CORE 68001-02)
06 02 55 34	LMP	The bottom one is 36.	(8)(SAMP CORE 68001-02)
		- - -	
06 02 55 41	CDR	Okay, the soil sample here is going in bag 412.	(8)(SAMP RAKE 68500-05)
06 02 56 13	CDR	I don't know what this is staring here at me here, but I'm going to pick it up because -	(8)(SAMP 68030, 35)(PHO 107 17532-37)
06 02 56 23	CC	Anything that stares at you, you'd better pick up.	(8)(SAMP 68030, 35)
06 02 56 24	CDR	It's a glass, but in this sunlight, it's reflecting red, green - like a rainbow.	(8)(SAMP 68030, 35)
06 02 56 46	LMP	Found the first prism on the Moon, John.	(8)(SAMP 68030, 35)
		- - -	
06 02 58 01	CDR	I don't know if that thing will last or not. No, I guess it was just black glass but it was the way the sun was reflecting off of it. Isn't that too bad? Anyway, that's a sample - and it's going in bag 413.	(8)(SAMP 68030, 35)
06 02 58 25	LMP	The bottom core was 36 and the top part is 29.	(8)(SAMP CORE 68001-02)
		- - -	

06 03 00 05	CDR	How about if we just leave the TV on - just drive over to where we're going to sample these boulders and test this thing out a little. Will that mess you up too bad? Or do you lose SYNC or something and never get it back.	(8)
		- - -	
06 03 03 02	LMP	There's a lot of glass around here.	(8)
		- - -	
06 03 08 01	LMP	This is really some rock. It's a two-rock breccia, with the matrix being blue to me, in this light anyway, and the white clasts are fragments of crystalline rocks - that appear to be fairly coarse-grained - take that back - let's say, fine-grained -	(8)
06 03 08 42	CDR	That's the one you want to turn over, Charlie.	(8)
06 03 08 45	LMP	This thing! Gosh! I can't even budge it.	(8)
06 03 08 48	CDR	It's a biggie.	(8)
06 03 08 49	LMP	Hey! I did budge it.	(8)
06 03 08 53	LMP	I want to get a chip out of it. Look at that rock over there, John. If that's not a crystalline rock, I'll - -	(8)
		- - -	
06 03 09 07	CDR	Stereo on it?	(8)
06 03 09 08	LMP	Yeah, but I didn't get a closeup. I don't think we can turn that one over, John. I can move it. I can rock it.	(8)(PHO 108 17693-96)
06 03 09 17	CDR	Wait a minute. Let's go over here and look. Let's not put no effort into it. I believe we can push it this way.	(8)
06 03 09 27	LMP	Well, let's get a chunk off of it before we - - push it.	(8)

06 03 09 32	CDR	No, I don't think so either.	(8)
06 03 09 34	LMP	There's a better one to turn over right down there. It's about half this size.	(8)(SAMP 68110, 15)(PHO 107 17541-47)
06 03 09 37	CDR	Yeah. It'll work good.	(8)
06 03 10 03	CDR	Got a few footprints around it for scale now, Houston. You got your hammer Charlie?	(8)(SAMP 68110, 15)
06 03 10 11	LMP	Yeah, I got the hammer, and I'm bringing the tongs and the scoop for a little fillet sample around it.	(8)(SAMP 68110, 15) (SAMP 68120-24)
06 03 10 23	LMP	We might think of a padded bag sample here. This big one's a breccia, but the other one looks like a crystalline rock.	(8) (SAMP 68110, 15)
06 03 10 45	LMP	Let's see, let me get a little closeup of this thing.	(8)(PHO?)
06 03 10 54	CC	Okay, why don't you try to chip out some of those clasts there, and we won't worry about overturning this one, but maybe you can get a fillet here. If you haven't messed up the fillet by getting in there too close.	(8)(SAMP 68110, 15) (SAMP 68120-24)
		- - -	
06 03 11 30	LMP	Okay. John, let's find a good place to whack.	(8)(SAMP 68110, 15)
06 03 11 33	CDR	Let's get the fillet first, though -	(8)(SAMP 68120-24)(PHO 107 17541-47)
		- - -	
06 03 11 41	CDR	Actually, I don't see any fillet, per se. I think it just hit and made a - stick it in the dirt. *** end it up in the dirt, Charlie. *** tell which way is up. How about right there?	(8)(SAMP 68120-24)
06 03 12 13	CDR	*** cross-sun stereo, where are you gonna ***	(8)(SAMP 68120-24)(PHO 107 17541-43)
06 03 12 17	LMP	Okay, just take a picture of it and I'll hold the scoop in.	(8)(SAMP 68120-24)(PHO 107 17541-43)
06 03 12 21	CDR	*** standing in the shadow, Charlie. Get the after, Charlie.	(8)(SAMP 68120-24)(PHO 107 17544-47)

06 03 12 27	LMP	Huh?	(8)(SAMP 68120-24)(PHO 107 17544-47)
06 03 12 29	CDR	Get it in the after.	(8)(SAMP 68120-24)(PHO 107 17544-47)
		- - -	
06 03 12 45	CDR	Okay, here we go. Man, you can't see anything with *** down in the shadow like that. There we go. Hey, John, here's a little piece just sitting up here on top of the rock.	(8)(SAMP 68120-24)
06 03 13 26	CDR	That sample's in bag 374.	(8)(SAMP 68120-24)
		- - -	
06 03 13 35	LMP	We got to find a place to chip that.	(8)(SAMP 68110, 15)
06 03 13 44	CDR	Here's a place that's hanging out, Charlie.	(8)(SAMP 68110, 15)
06 03 13 52	LMP	Okay, let me get a before. Why don't you put your hammer down there.	(8)(SAMP 68110, 15)(PHO ?)
06 03 14 03	CDR	They've got enough documentation on the scale.	(8)(SAMP 68110, 15)
06 03 14 06	LMP	Okay. That looks great. Got to hit it, it looks like.	(8)(SAMP 68110, 15)
06 03 14 13	CDR	Yeah, but it's right at a fracture, so it'll come off in good shape.	(8)(SAMP 68110, 15)
06 03 14 20	LMP	Man, the whole rock's coming apart. Super job, John.	(8)(SAMP 68110, 15)
06 03 14 30	CDR	It was one of those fractures that's all included with glass.	(8)(SAMP 68110, 15)
06 03 14 39	CDR	See those glass fractures that - -	(8)(SAMP 68110, 15)
06 03 14 41	CDR	I think the after on this one will be pretty interesting.	(8)(SAMP 68110, 15)(PHO 107 17547)
06 03 14 44	LMP	Okay, Tony, that - -	(8)(SAMP 68110, 15)
06 03 14 46	CDR	Don't stick that in the bag.	(8)(SAMP 68110, 15)

06 03 14 47	LMP	Yeah - is going in 340.	(8)(SAMP 68110, 15)
		- - -	
06 03 15 14	LMP	There we go. How cameras keep running in this dirt, I'll never know.	(8)
06 03 15 26	CDR	Ah, plop.	(8)
06 03 15 32	CDR	Got it. Now, how about that rock over yonder.	(8)(SAMP 68410, 15-16)(PHO 107 17548-50; 108 17697-98)
06 03 15 37	LMP	That's the one I'm going for. Did you get the after?	(8)(SAMP 68410, 15-16)
06 03 15 40	CDR	No, I sure didn't, but I *** won't have any trouble putting this back in place.	(8)
06 03 15 57	LMP	Look at that beauty, John! That is a crystalline rock, no breccia.	(8)(SAMP 68410, 15-16)
06 03 16 03	CDR	A no-breccia, crystalline rock, huh?	(8)(SAMP 68410, 15-16)
06 03 16 07	LMP	And it is whitish to gray, with a lot of zap pits in it.	(8)(SAMP 68410, 15-16)
06 03 16 14	CDR	It even has what look to be - no, those are zap pits, aren't they?	(8)(SAMP 68410, 15-16)
06 04 16 24	LMP	Yeah. In fact, the whole area - there's a lot of this rock here, scattered all over - scattered around.	(8)(SAMP 68410, 15-16)
06 03 16 33	CC	We'll need a picture, and then we'll see if you can turn it over.	(8)(SAMP 68410, 15-16)
06 03 16 42	CDR	No, we can't turn that one over.	(8)(SAMP 68410, 15-16)
06 03 16 46	CDR	Think we can turn that over, Charlie?	(8)(SAMP 68410, 15-16)
06 03 16 47	LMP	Yeah, we might, if we grab hold of this corner. I'd like you to get a big sample first, though. Get a down-sun.	(8)(SAMP 68410, 15-16) (PHO 108 17697)
06 03 16 55	CDR	Where do you want a sample from?	(8)(SAMP 68410, 15-16)
06 03 16 57	LMP	See that sharp corner? Right up at the top there?	(8)(SAMP 68410, 15-16)

06 03 17 00	CDR	Off the top?	(8)(SAMP 68410, 15-16)
06 03 17 02	LMP	Yeah.	(8)(SAMP 68410, 15-16)
06 03 17 06	CDR	Okay. *** think I can get that. It's fractured right there.	(8)(SAMP 68410, 15-16)
		- - -	
06 03 17 27	CDR	Well, if that ain't pure plag, I never seen it.	(8)(SAMP 68410, 15-16)
06 03 17 31	LMP	Don't it look like pure plag to you?	(8)(SAMP 68410, 15-16)
06 03 17 32	CDR	I don't know what it is, though.	(8)(SAMP 68410, 15-16)
06 03 17 35	LMP	It's pure feldspar, looks like - -	(8)(SAMP 68410, 15-16)
06 03 17 38	CDR	Pure feldspar. Don't it look like it's been - it's so sandy looking, it could have been reworked or something.	(8)(SAMP 68410, 15-16)
06 03 17 48	LMP	Maybe partially shocked.	(8)(SAMP 68410, 15-16)
06 03 17 49	CDR	Shocked, yeah.	(8)(SAMP 68410, 15-16)
06 03 17 51	LMP	But it's pure plag - it's plag, Tony.	(8)(SAMP 68410, 15-16)
06 03 17 56	LMP	And it's in 341. Whack off - another piece right here, John.	(8)(SAMP 68410, 15-16)
06 03 18 03	LMP	This rock is pretty predominant.	(8)(SAMP 68410, 15-16)
		- - -	
06 03 18 08	CDR	No, it isn't friable; it just fractured.	(8)(SAMP 68410, 15-16)
06 03 18 12	CDR	Where do you want to hit it off, Charlie?	(8)(SAMP 68410, 15-16)
06 03 18 14	LMP	Right at that sharp - right there; yeah. See how that comes off. Pretty friable isn't it?	(8)(SAMP 68410, 15-16)
06 03 18 22	CDR	Yeah. Bet it's shocked.	(8)(SAMP 68410, 15-16)
06 03 18 25	LMP	Yeah.	(8)(SAMP 68410, 15-16)
06 03 18 32	CDR	Put that in the same bag?	(8)(SAMP 68410, 15-16)

06 03 18 33	LMP	Yeah, let's put them all - and there's another piece down there.	(8)(SAMP 68410, 15-16)
06 03 18 37	CDR	We got to get the after.	(8)(SAMP 68410, 15-16)(PHO 107 17550)
06 03 18 38	LMP	Okay, I'll get the after of that right here.	(8)(SAMP 68410, 15-16)(PHO 108 17698)
06 03 18 43	CDR	Okay, the first two pieces - the first piece was off the top of the rock, the second piece is under the shadow of the gnomon shovel, and they're both going in bag number whatever Charlie says.	(8)(SAMP 68410, 15-16)
06 03 18 56	LMP	341.	(8)(SAMP 68410, 15-16)
06 03 18 58	LMP	We're gonna have another piece that came out of the same - the second whack.	(8)(SAMP 68410, 15-16)
06 03 19 08	LMP	John, let's put this other piece in another bag, because this one has got no dust in it at all. Just hold that gnomon, let me *** this one up.	(8)(SAMP 68410, 15-16)
06 03 19 18	CC	And we'd like you to still have a try at turning it over.	(8)
06 03 19 20	LMP	Let's do it without getting any -	(8)
06 03 19 25	CDR	Okay. Try to get that rascal over?	(8)
06 03 19 30	LMP	Well, we can try.	(8)
06 03 19 31	CDR	We ought to try rolling it down in that hole.	(8)
06 03 19 39	CDR	*** greenish hue to it, too, I'm making that up, maybe.	(8)
06 03 19 43	LMP	The other piece of that rock's going in 342. I see at least 10 other rocks around here that have that same appearance, so it's not a completely anomalous rock.	(8)(SAMP 68410, 15-16)
06 03 20 04	LMP	The bag's getting full, John.	(8)
06 03 20 13	LMP	I don't think we can turn that one over, but I think we can turn that one over down over there.	(8)
06 03 20 22	LMP	I was going to push it that way - -	(8)

06 03 20 23	CDR	Think you're right.	(8)
06 03 20 24	LMP	- - because we can get down below it.	(8)
		- - -	
06 03 20 29	CDR	Here's a rock with glass splattered all over its body.	(8)
06 03 20 36	CDR	Let me do that, Charlie.	(8)
06 03 20 37	LMP	No, we can both lift it.	(8)
06 03 20 46	CDR	No way.	(8)
06 03 20 47	CC	Okay, let's forget that one.	(8)
06 03 20 49	LMP	- - budged once, but I don't think we're gonna do it. Tony, there's one off at the 3 o'clock position of the Rover that I think we can turn over.	(8)
		- - -	
06 03 21 13	LMP	Unfortunately - - you'll never budge that rock.	(8)
06 03 21 30	CC	I'm not so sure we got a good fillet on this last one, so we might be willing to sample another.	(8)(SAMP 68820-25)(PHO 108 17699-701)
06 03 21 39	LMP	Okay. Sorry that y'all gonna be looking up-sun, Tony, but - oh, man, John, that's a biggie. Looks bigger than I thought.	(8)(SAMP 68820-25)
06 03 22 05	CDR	Big?	(8)(SAMP 68820-25)
06 03 22 06	LMP	Yeah.	(8)(SAMP 68820-25)
06 03 22 08	CDR	Now, we take the documentation first, right?	(8)(SAMP 68820-25)
06 03 22 14	LMP	Yeah, let me take a cross-sun - -	(8)(SAMP 68820-25)(PHO 108 17699-700)
06 03 22 17	CDR	I'll get the cross-sun.	(8)(SAMP 68820-25)
06 03 22 18	LMP	Okay, then we'll see if we can move it. I don't think, we can. It's got a pretty big base to it. Okay, 7 foot at f:8. I got it. Hey, I - got a good fillet around it.	(8)(SAMP 68820-25) (PHO 108 17699-700)

06 03 22 43	CDR	It does.	(8)(SAMP 68820-25)
06 03 22 48	LMP	It doesn't have any dust on the top of it. I thought we could get the fillet sample here, but it doesn't have any dust on the top.	(8)(SAMP 68820-25)
06 03 22 58	CC	We don't need dust from the top. If this is a better fillet than the other, you might take a soil sample there, and then a reference soil away, and then a chip off the rock, and we'll have a good fillet sample.	(8)(SAMP 68820-25)
06 03 23 09	LMP	Okay, this is a better - this is a better fillet than the other one.	(8)(SAMP 68820-25)
06 03 23 13	CDR	Okay, but I thought you didn't want breccia.	(8)
06 03 23 21	LMP	Just crystalline or tough breccia for fillet sample.	(8)(SAMP 68820-25)
06 03 23 25	CDR	I don't know whether it's tough or not. You mean hard.	(8)(SAMP 68820-25)
06 03 23 29	LMP	Yeah.	(8)(SAMP 68820-25)
06 03 23 30	CDR	Not tough.	(8)(SAMP 68820-25)
06 03 23 32	LMP	Yeah, hard *** let's try it, John, okay?	(8)(SAMP 68820-25)
06 03 23 36	LMP	We'll fill that square. Okay, fillet coming in from this side. There's a good one right over here. Already got the cross-sun.	(8)(SAMP 68820-25) (PHO 108 17699-700)
06 03 23 57	CDR	My personal guess is that the fillet didn't come off that rock.	(8)(SAMP 68820-25)
06 03 24 01	LMP	Mine, too; 375.	(8)(SAMP 68820-25)
06 03 24 16	CDR	*** Charlie, wait a minute. Let me put this in your bag and give you a hand *** turn that. Got to get a rock off the top before we turn it, right?	(8) (SAMP 68815)(PHO 108 17699-701; 107 17553-54)
06 03 24 28	LMP	No, they don't have to do that. They want a chip off of it, though.	(8)(SAMP 68815)
06 03 24 35	CDR	Okay, let's get the chip.	(8)(SAMP 68815)

06 03 24 37	LMP	I got a footprint in, but the scoop will be right west of where the fillet was taken.	(8)
06 03 24 53	CC	We'll need a reference soil.	(8)(SAMP 68840-48)(PHO 108 17702; 107 17555-57)
06 03 25 02	LMP	Yeah, we'll get it.	(8)(SAMP 68840-48)
06 03 25 04	CDR	Lift up, Charlie.	(8)(SAMP 68815)
06 03 25 05	LMP	That's a hard breccia, ain't it?	(8)(SAMP 68815)
06 03 25 06	CDR	A hard, hard rock.	(8)(SAMP 68815)
06 03 25 10	LMP	Hit it right here on this corner right here in the - in your shadow now. Down a little bit. There you go.	(8)(SAMP 68815)
06 03 25 24	CC	Hey, Charlie, you just dropped a sample.	(8)
06 03 25 26	CDR	That just opened up. Charlie, you're bouncing around too much - - your top came loose.	(8)
		- - -	
06 03 25 49	LMP	Could you stick that back in my bag, John?	(8)
		- - -	
06 03 26 28	CDR	Let me get it, Charlie.	(8)(SAMP 68815)
06 03 26 34	LMP	Dadgun thing's gonna be too big to go in there, anyway.	(8)(SAMP 68815)
06 03 26 44	LMP	Go ahead.	(8)
06 03 26 50	CDR	I got you.	(8)
06 03 26 52	LMP	Get it?	(8)
06 03 26 53	CDR	Yeah.	(8)
06 03 26 58	LMP	Want to crack it in two or bring the whole - it's not gonna be any good unless we can get it in the sack.	(8)(SAMP 68815)
06 03 27 02	CDR	It isn't gonna be any good unless we put it in the sack?	(8)

06 03 27 05	LMP	I don't think they'll ever recognize it again.	(8)(SAMP 68815)
06 03 27 07	CDR	Oh, yeah; throw it in my bag.	(8)(SAMP 68815)
06 03 27 11	LMP	Let's - okay. Okay, Tony, that fillet - that chip off that block - -	(8)(SAMP 68815)
06 03 27 22	CDR	Okay, and it opened up a clear fillet, and there's a lot of - this is a vesicular type of breccia *** after stero there -	(8)(SAMP 68815) (SAMP 68815)(PHO 107 17553-54)
06 03 27 36	LMP	Another piece that fell off here.	(8)(SAMP 68810)(PHO 108 17699-701; 107 17553-54)
06 03 27 39	LMP	Well, I was gonna put it in a sack so they'll make sure - all that hammering, I don't want them to lose it. Yeah.	(8)(SAMP 68810)
06 03 27 50	CDR	Hey, let's push it over.	(8)(SAMP 68810)
06 03 27 52	LMP	Don't think we can. Okay, that came off the rock right there. Okay, Tony, a loose piece off the side of the rock is going in bag 343.	(8)(SAMP 68810)
06 03 28 15	CDR	*** to push that rock.	(8)
		- - -	
06 03 28 20	LMP	- - the other way, downslope with it, John.	(8)
06 03 28 30	CDR	Okay, lean on it.	(8)
06 03 28 38	LMP	That's too much work, John.	(8)
		- - -	
06 03 28 42	LMP	We can rock it out of there.	(8)
06 03 28 49	LMP	Getting a full sack too.	(8)
06 03 28 59	CDR	*** hold this here for a second, Charlie?	(8)
06 03 29 01	LMP	Yeah, wait a minute. Let me get this top closed. Turn around just a minute to your right; thank you. Okay. Go ahead. *** think you can do it, John. *** what I was trying.	(8)

06 03 29 24	CDR	You were trying to pick it up?	(8)
06 03 29 25	LMP	That's what I tried - yeah, I tried from that edge, too. *** not even budging it.	(8)
06 03 29 32	CDR	Well, you just can't get a grip on it.	(8)
06 03 29 34	LMP	No, you can't, not with these gloves. Here's your hammer back. We got to go off 5 meters and get a reference soil.	(8)(SAMP 68840-48)
		- - -	
06 03 30 04	CDR	I think the reference soil is back there at the soil sample.	(8)(SAMP 68840-48)
06 03 30 08	LMP	Okay, here's 5 - here's a pretty pristine area right over here, John, we haven't been walking - we can just go over here and get it. Take the shovel down there and I'll - is that 5 meters?	(8)(SAMP 68840-48)
06 03 30 24	CDR	Yeah, that's about 5 meters. Fifteen feet, maybe.	(8)(SAMP 68840-48)
06 03 30 26	LMP	Yeah. Okay, I get the down-sun.	(8)(SAMP 68840-48)(PHO 108 17702)
06 03 30 32	CDR	Okay, the shovel will be in the rocks. *** near these rocks, and we had the shovel to pick it up with.	(8)(SAMP 68840-48)
06 03 30 49	LMP	And that serves as a locator, too, Tony.	(8)(SAMP 68840-48)(PHO 108 17702)
		- - -	
06 03 31 03	CDR	I was looking for a boulder to turn over, and I can't see any.	(8)
06 03 31 06	LMP	There's a little one right up there; it's about a foot and a half.	(8)
06 03 31 09	CDR	That one right there?	(8)
06 03 31 10	LMP	Yeah, uh-huh. Okay, Tony; is one scoopful enough?	(8)(SAMP 68840-48)
06 03 31 18	CC	Roger. One scoopful.	(8)(SAMP 68840-48)
06 03 31 32	LMP	Got a little glass bead in it, John.	(8)(SAMP 68840-48)

06 03 31 36	LMP	That's good. Went right in. Okay, that one shovelful, is in 344.	(8)(SAMP 68840-48)
06 03 31 56	LMP	Put it in my bag, John. Yours is full.	(8)(SAMP 68840-48)
		- - -	
06 03 32 12	LMP	There's one down here, but that's quite a ways down to your left. There's one down there, but it's pretty far downslope.	(8)
06 03 32 22	CDR	How about - this one right here - we can turn it over, Charlie. It just isn't very big, that's all.	(8)
06 03 32 26	LMP	That's right, that's what they just said; they don't want that one.	(8)
		- - -	
06 03 32 50	LMP	Okay, here we go. There goes a bag. There goes another bag - -	(8)
06 03 32 56	CDR	- - sample bag.	(8)
06 03 32 57	LMP	- - two bags. Dadgunnit.	(8)
06 03 33 05	CDR	I think we ought to trade those bags - samples.	(8)
06 03 33 09	LMP	Yeah, I'm gonna empty them in the seat.	(8)
06 03 33 12	CC	Right, those babies look about full.	(8)
06 03 33 13	CDR	Yeah, I think we should do that.	(8)
06 03 33 21	CDR	They really are full. We ought to go trade them out right now.	(8)
06 03 33 26	CDR	Both sets. *** our hard work here. Let's go trade them, Charlie.	(8)
		- - -	
06 03 34 42	CC	- - we'd like you to take some 500 millimeters, when you get a chance, of Stone mountain.	(8)(PHO?)
06 03 34 48	LMP	All righty; I'll do it.	(8)(PHO?)

06 03 34 58	LMP	When I shade my eyes I can still see those lineations climbing right up to the southwest, and starting at the Cayley and going right on up across the mountain. Let's change these bags.	(8)
		- - -	
06 03 38 15	LMP	Tony, we're breaking out bag 4.	(8)
		- - -	
06 03 39 40	CDR	Charlie, since I don't have to carry the gnomon any more, I could carry a sample bag in one hand. We could use that technique.	(8)
06 03 39 54	LMP	That's yours now; it's on.	(8)
06 03 40 02	LMP	Okay. Now, there's one under my feet that's partially full of rocks. Let me get that. Just use that.	(8)
06 03 40 06	CDR	That thing is full, that's why, and there is another rock under there that has to go in -	(8)(SAMP 68815)
06 03 40 11	LMP	Okay; we'll just break out a new one then.	(8)
06 03 40 23	LMP	Okay; I'm breaking out bag number 6.	(8)
06 03 40 27	CC	Okay: SCB 6.	(8)
		- - -	
06 03 41 08	LMP	Okay; I was just gonna say - there's some good crystalline, that white crystalline rock that we picked up there. There's some good fist-size ones that would make good padded bag samples.	(8)
		- - -	
06 03 42 26	CC	Okay; Charlie. What SCB did you have on before - -	(8)
06 03 42 34	LMP	I think it was number 2, stand by.	(8)
06 03 42 41	CDR	It was number 2.	(8)
06 03 42 47	CDR	No; sorry. That was mine. Charlie had number 1.	(8)

06 03 42 59	CDR	And I had number 2.	(8)
		- - -	
06 03 44 07	LMP	Okay, Station 8, 10. Got the sampling. Rake soil was done. Okay; only one boulder sample. Sorry we couldn't turn one over. Tony. Okay; that was frame count 120, Tony.	(8)
		- - -	
06 03 44 45	LMP	Okay; we've still got three quarters of a mag on the magazine R. Do you want me to turn it on?	(8)(PHO DAC)
06 03 44 57	CC	Yeah. Let's go ahead and turn it on.	(8)(PHO DAC)
06 03 45 02	LMP	Okay. We'll let her run, one frame a second - - f:8.	(8)(PHO DAC)
		- - -	
06 03 45 15	CDR	Roger, my frame count is 142.	(8)
		- - -	
06 03 46 27	LMP	You know, it's a shame we never did *** get to see into Stubby.	(8)
06 03 46 33	CDR	I thought you were looking in it from Stone there.	(8)
06 03 46 34	LMP	Oh, I did from there, but you can't see this east side of it to see whether the thing is really filled in from a flow or not or whether it's just subsequent. That's what I really wanted to find out.	(8)
		- - -	
06 03 48 15	CDR	Okay, Houston; we're proceeding to Station 9.	(8-9)
		- - -	
06 03 49 10	LMP	Still in a cobble area, with boulders up to a meter. Looks just like our last stop. This is a shallow saucer area, but there's no boulder to sneak up on.	(8-9)
		- - -	

06 03 49 50	LMP	I can still see the ascent stage of Orion. And we're in a boulder field now that has a population of cobble size up through 15 centimeters covering 30 percent of the surface.	(8-9)
		- - -	
06 03 50 21	LMP	This 015 for 2.7 - according to them, we're almost there.	(8-9)
06 03 50 29	CDR	I think we're just too close to the ray patterns off South Ray.	(8-9)
		- - -	
06 03 51 08	CDR	All righty, we have just found your place.	(8-9)
06 03 51 09	LMP	There it is right over there. See that big rock John?	(8-9)
06 03 51 14	LMP	Down in that big hollow.	(8-9)
06 03 51 24	CDR	That ain't a hollow; that's a crater.	(8-9)
		- - -	
06 03 51 24	LMP	That one - it's over there about 50 meters, 2 o'clock.	(8-9)
		- - -	
06 03 51 32	LMP	It's on the side facing the LM.	(8-9)
06 03 51 38	CC	You say it's on the side facing the LM? We wouldn't want to face the LM. We want to not see descent.	(8-9)
06 03 51 46	LMP	I blew it. It's on the side of the crater away from the LM.	(8-9)
06 03 51 55	LMP	Yeah, no way to see the LM from over here.	(8-9)
06 03 51 57	CDR	Yeah, but Charlie, we can't get off the samples around - -	(8-9)
06 03 52 02	LMP	Why not?	(8-9)

06 03 52 04	CDR	Oh, okay; let's drive up here.	(8-9)
06 03 52 22	LMP	This rock's so big you can't even reach over it.	(8-9)
06 03 52 29	LMP	But you can sneak around on the side. This is a steep slope right here, babe.	(8-9)
06 03 52 36	CDR	That's what I was telling you. How about that rock right there?	(8-9)
06 03 52 43	LMP	That one right here is fine.	(8-9)
06 03 52 44	CDR	Okay.	(8-9)
06 03 52 51	LMP	Yeah, this is - 180 parking, I guess. Yeah. Let's don't get too close - we've got to sneak up on it.	(8-9)
06 03 53 12	LMP	You parked right in a crater, for me. That's good, now.	(8-9)
06 03 53 18	CDR	Yeah, but that ain't 180.	(8-9)
		- - -	
06 03 53 48	LMP	We're at 176, 0.7 - 007, 8.7, 2.6.	(9)
06 03 54 28	CC	We copy that and DAC off.	(9)(PHO DAC)
		- - -	
06 03 55 21	LMP	I'll get a pan out here.	(9)(PHO 108 17714-39)
06 03 55 39	LMP	Let's see, number 8.	(9)
		- - -	
06 03 56 45	LMP	Okay, pan is complete. Okay, we need the surface samplers. And that starts with the Beta and then the velvet and then a skim and a scoop.	(9)(PHO 108 17714-39) (SAMP 69003-04)(PHO 108 17740-41; 107 17558-65)
06 03 57 04	CDR	Hey, we snipped that rock over there, the one I'm gonna sneak up on, Charlie.	(9)(SAMP 69003-04)
		- - -	

06 03 58 03	LMP	I'm going to get a shovel for the scoop. And I thought we'd maybe start on a double core for the CSVC.	(9)
06 03 58 24	CDR	Okay; well, let me get these samples out of the way.	(9)(SAMP 69003-04)
06 03 58 31	CC	And, Charlie, was that DAC off?	(9)(PHO DAC)
06 03 58 42	LMP	Yeah, I got the DAC off.	(9)(PHO DAC)
		- - -	
06 03 59 03	LMP	If you'll pan left, we'll show you the rock we're going to sneak up on.	(9)(SAMP 69003-04)
06 03 59 19	LMP	Don't open it - don't open that.	(9)
06 03 59 26	CDR	It's between us and the LM. It's between the LM and us.	(9)(SAMP 69003-04)
06 03 59 30	LMP	They don't want you to open this thing until you get right up next to the rock.	(9)
		- - -	
06 03 59 40	LMP	I'm going to get the other one.	(9)(SAMP 69003-04)
		- - -	
06 04 01 51	CC	Okay. Did that disturb the surface on the other side there?	(9)(SAMP 69003-04)
		- - -	
06 04 02 06	CDR	*** no, we didn't disturb it at all.	(9)(SAMP 69003-04)
		- - -	
06 04 02 17	CDR	There you go. Get it?	(9)(SAMP 69003-04)
06 04 02 22	LMP	Yeah. In an area that wasn't - that that didn't go in, right?	(9)(SAMP 69003-04)
06 04 02 25	LMP	John was sneaking just like this. He really got up to it before it even knew he was coming.	(9)(SAMP 69003-04)
		- - -	

06 04 02 43	LMP	Man, that's a great sneak. Okay; that's good. right there.	(9)(SAMP 69003-04)
06 04 03 03	LMP	Beautiful. You picked some up on that one. Only on one corner. He got some on one corner, Houston.	(9)(SAMP 69003-04)
		- - -	
06 04 03 19	LMP	I'd say about 20 percent of it's covered.	(9)(SAMP 69003-04)
06 04 03 31	LMP	I mean 20 percent of the whole thing is covered. These go in your rock bags, don't they? I mean in the SCBs?	(9)(SAMP 69003-04)
06 04 03 39	CDR	Yeah. I don't know. Let me take them back and put them under the seat. I don't know where they go.	(9)(SAMP 69003-04)
06 04 03 43	LMP	I think they go in the SCBs. Tony, do these go in the SCBs?	(9)(SAMP 69003-04)
06 04 03 48	CC	They'll go in the SCB that doesn't go in the SRC.	(9)(SAMP 69003-04)
06 04 03 53	LMP	Yeah, okay. We've already got that one collected.	(9)
		- - -	
06 04 04 18	LMP	Okay, now we got to go get - after two, place the gnomon. I'll put the shovel. We got a cross-sun after, and a down-sun on locator.	(9)(SAMP 69003-04) (PHO 107 17558-60)
06 04 04 28	CDR	Okay. Well, that's going to be hard to get. Don't put the dirt all over there!	(9)(SAMP 69003-04)(PHO 107 17558-60)
06 04 04 31	LMP	I didn't. I missed it.	(9)
06 04 04 44	LMP	You can get a cross-sun from over on the this side.	(9)(SAMP 69003-04)(PHO 107 17558-60)
		- - -	
06 04 05 12	LMP	I'll go get the down-sun. There we go.	(9)(SAMP 69003-04)(PHO 108 17740)
06 04 05 20	CDR	Turn and get a locator.	(9)(SAMP 69003-04)(PHO 108 17741)
06 04 05 42	CDR	I'm looking back at the LM. Charlie, you can get a picture of the - I can get a picture and it'll show that - that rock is between us and the LM.	(9)(SAMP 69003-04) (PHO 107 17560)

		- - -	
06 04 06 08	LMP	We got to get a skim.	(9)(SAMP 69920-24)(PHO 108 17740-41; 107 17558-63)
06 04 06 17	CDR	Can we skim where the pristine sample was?	(9)(SAMP 69920-24)
06 04 06 19	CC	We'd like to skim next to it.	(9)(SAMP 69920-24)
06 04 06 20	LMP	No, they want it right beside it, right there ***	(9)(SAMP 69920-24)
06 04 06 23	CDR	You can't see any of that stuff.	(9)(SAMP 69920-24)
06 04 06 24	LMP	Yeah, I can see. Okay, here we go. Get me a bag ready.	(9)(SAMP 69920-24)
06 04 06 48	LMP	Tony, I probably got 5 millimeters on that skim.	(9)(SAMP 69920-24)
		- - -	
06 04 06 59	CDR	What setting should I open this up to show you these prints we got in the vacuum here? I mean in the shadow?	(9)(SAMP 69920-24)(PHO 107 17561-63)
		- - -	
06 04 07 23	CDR	That's going into bag 376?	(9)(SAMP 69920-24)
		- - -	
06 04 07 43	CC	John, 5.6 at 250th.	(9)(SAMP 69920-24)(PHO 107 17561-63)
06 04 07 52	CDR	Okay. I'll get you a little flight line of that. Charlie's scoop is being taken right under the -	(9)(SAMP 69940-45)(PHO 107 17561-63)
06 04 08 10	LMP	You got it.	(9)(SAMP 69940-45)
06 04 08 28	LMP	Okay, there you go. That's going in bag 377, Houston.	(9)(SAMP 69940-45)
06 04 08 38	CC	We'd like to get that CSVC.	(9)(SAMP CSVC 69001)(PHO 108 17742-43)
06 04 08 43	LMP	Okay, Tony. We can turn this rock over. If you want us to get that sample in, we need an extension.	(9)(SAMP CSVC 69001)
06 04 08 59	LMP	Yeah, I'll go get the CSVC then.	(9)(SAMP CSVC 69001)

06 04 09 00	CC	All right. We'll go ahead and do the CSVC.	(9)(SAMP CSVC 69001)
06 04 09 03	LMP	John, you want to start sampling while I do that. Okay, I'm going.	(9)(SAMP 69930,35)(PHO 108 17740-41; 107 17558-60,64-6-72 71-72)
06 04 09 25	CC	John, can you turn that over by yourself?	(9)(SAMP 69930, 35)
06 04 09 30	CDR	Well, I'm going to give it a go.	(9)(SAMP 69930, 35)
		- - -	
06 04 10 12	LMP	Getting a sample off of it, John?	(9)(SAMP 69930, 35)
06 04 10 14	CDR	Yeah.	(9)(SAMP 69930, 35)
06 04 10 29	CC	John, you lost the bag?	(9)
06 04 10 32	CDR	Yeah, lost my whole set of bags. Oh, shoot.	(9)
06 04 10 56	LMP	May I borrow your hammer, John? This core, I think might be able to push it in, but -	(9)(SAMP CSVC 69001)
06 04 11 07	LMP	Okay, we'll just do it right here. Tony, I'm 15 meters out to the left of the - -	(9)(SAMP CSVC 69001)
06 04 11 18	CC	Roger. We're watching you, Charlie.	(9)(SAMP CSVC 69001)
06 04 11 31	LMP	Okay, there we go. Pushed it in halfway, Tony.	(9)(SAMP CSVC 69001)
06 04 11 36	CC	Okay. And remember not to hammer this one all the way in.	(9)(SAMP CSVC 69001)
06 04 11 46	CDR	The top of that rock is a hard breccia, and I'm just going to throw it under your seat, Charlie.	(9)(SAMP 69930, 35)
06 04 11 58	LMP	Is it in a bag?	(9)(SAMP 69930, 35)
06 04 11 59	CC	Did you have a bag number?	(9)(SAMP 69930, 35)
		- - -	
06 04 12 03	CDR	373. (378)	(9)(SAMP 69930, 35)
06 04 12 16	LMP	Okay, Tony, that's about 7 centimeters out.	(9)(SAMP CSVC 69001)
06 04 12 19	CC	Looks good to us.	(9)(SAMP CSVC 69001)

06 04 12 25	LMP	Feels good to me, too, to get that over.	(9)(SAMP CSVC 69001)
06 04 12 30	CDR	Yeah, that's got it all - on three sides.	(9)
06 04 12 58	CDR	Here's the picture to show where the top rock came out. Charlie, I got it!	(9)(SAMP 69930, 35)(PHO 107 17572)
		- - -	
06 04 13 14	LMP	He did it, Houston! He did it.	(9)
06 04 13 23	CC	So you can not only sneak up on them, you can flip them over, huh?	(9)
06 04 13 31	CDR	Yeah. That's a biggie. Man, it looks like it's been sitting there for quite a while. Look at that soil underneath.	(9)
06 04 13 43	CDR	Before I stomp all over it, Charlie, sneak over here and let's get some of this soil.	(9)(SAMP SOIL 69960-65)(PHO 107 17573-80)
06 04 13 46	LMP	Okay.	(9)(SAMP SOIL 69960-65)
06 04 13 47	CC	Right. A chip off the bottom and the soil will probably do it.	(9)(SAMP 69950,55; SOIL 69960-65)
06 04 13 54	CDR	A chip off the bottom.	(9)(SAMP 69950,55)(PHO 108 17741; 107 17573-80)
06 04 14 00	LMP	I see a place where we can get a chip off the bottom.	(9)(SAMP 69950,55)
		- - -	
06 04 14 18	LMP	Hey, John, let me cap this little beauty here before we lose it - before I forget about it. Yeah, I'm coming with the scoop. What else do you need?	(9)(SAMP CSVC 69001)
06 04 14 35	CDR	I need the hammer.	(9)
06 04 14 36	LMP	I got it.	(9)
06 04 14 44	CDR	Hey, why don't you just sort of sneak up so you don't sprinkle any dirt down in the bottom of this place where we turned it over.	(9)(SAMP 69950,55)
06 04 14 50	LMP	Yeah, okay.	(9)(SAMP 69950,55)

06 04 14 52	LMP	Look at that soil! It's all cake looking, isn't it?	(9)(SAMP SOIL 69960-65)
06 04 14 54	CDR	Yeah, it is.	(9)(SAMP SOIL 69960-65)
06 04 15 01	LMP	Okay. Let me get the soil before you start whacking. Okay?	(9)(SAMP SOIL 69960-65)
06 04 15 04	CDR	Yeah.	(9)
06 04 15 05	LMP	The bottom is glass covered, Houston.	(9)(SAMP 69950,55)
06 04 15 14	CDR	Yeah, white glass.	(9)(SAMP 69950,55)
06 04 15 18	LMP	No, the black stuff is the glass. That other is the crystal. That's a crystalline rock.	(9)(SAMP 69950,55)
		- - -	
06 04 15 32	LMP	And it looks just like an alkali flat in the cake that's under it, Tony. And that's right from the deepest part. That sample is right in the middle, which happens to be the deepest penetration that boulder made.	(9)(SAMP SOIL 69960-65)
06 04 16 02	LMP	There's a sackful. 379.	(9)(SAMP SOIL 69960-65)
06 04 16 29	LMP	Where are you going to whack it, John?	(9)(SAMP 69950,55)
06 04 16 31	CC	And, Charlie, your SCB is open, so a rock might come out.	(9)
06 04 16 37	LMP	Okay. Real friable, isn't it?	(9)(SAMP 69950,55)
06 04 16 49	CC	Now you found a real rock.	(9)(SAMP 69950,55)
06 04 16 50	LMP	Aha! Look at that piece here, let me get it, John. Back up. I'll go get it. There it is right there.	(9)(SAMP 69950,55)
06 04 17 10	CDR	Can't you just pick it up with your shovel?	(9)(SAMP 69950,55)
06 04 17 12	LMP	I don't want to get it too dirty.	(9)(SAMP 69950,55)
06 04 17 21	LMP	Okay, we got you about a 4-centimeter chip.	(9)(SAMP 69950,55)
		- - -	

06 04 17 38	LMP	And that's not glass, John. Those are crystals. Those are big crystals. At least 5 millimeters, with a bluish cast to them.	(9)(SAMP 69950,55)
06 04 17 59	CDR	That's going in bag 380, Houston.	(9)(SAMP 69950,55)
06 04 18 07	CDR	It looks to me like it's a shocked rock with a lot of - and this is a guess - a lot of black glass in the fracture patterns.	(9)(SAMP 69950,55)
06 04 18 23	LMP	Okay, I'll hold it.	(9)(SAMP 69950,55)
06 04 18 45	LMP	Okay, that was about a 5-footer, Tony. A little down-sun, and the shovel is right where the - -	(9)(SAMP 69950,55)(PHO 108 17741)
06 04 18 52	CDR	Bag was.	(9)(SAMP 69950,55)(PHO 108 17741)
06 04 18 53	LMP	- - bag was. Close my top on that thing, John.	(9)(SAMP 69950,55)(PHO 108 17741)
		- - -	
06 04 19 43	LMP	Yeah, I've got to close this CSVC up; take me a couple of minutes. You could go get a sample. Okay?	(9)(SAMP CSVC 69001)
06 04 19 51	CDR	Fair enough.	(9)
06 04 19 56	CC	Okay, we'd like you to pack up, John, if you could help Charlie. I think we'll have to get on.	(9)
06 04 20 05	LMP	He can't help me with it.	(9)(SAMP CSVC 69001)
06 04 20 07	LMP	Unless you could get the top of that CSVC.	(9)(SAMP CSVC 69001)
06 04 20 23	CDR	Where is it?	(9)(SAMP CSVC 69001)
06 04 20 32	LMP	It's in the SCB number 2.	(9)(SAMP CSVC 69001)
06 04 20 34	CDR	Where? I'll get it. Just stay there.	(9)(SAMP CSVC 69001)
06 04 20 43	LMP	The plunger went right down. It's about 4 centimeters from the top.	(9)(SAMP CSVC 69001)
06 04 21 06	CC	And before you stick it in there, could we have the core tube number?	(9)(SAMP CSVC 69001)

06 04 21 12	LMP	Thirty-four.	(9)(SAMP CSVC 69001)
		- - -	
06 04 22 54	CC	All right Charlie, that CSVC goes in the SRC.	(9)(SAMP CSVC 69001)
06 04 23 00	LMP	Roger. Okay.	(9)
06 04 23 09	CDR	Okay. Back to Station 10, Charlie.	(9)
06 04 23 15	CC	And Charlie, before you get on there, we'd like the DAC on at 12 frames per second.	(9)(PHO DAC)
		- - -	
06 04 23 51	CC	We need frame counts.	(9)
06 04 23 55	LMP	I'm leaving with about 161.	(9)
06 04 24 02	CDR	I got 165. I probably ought to change this mag.	(9)
06 04 24 09	LMP	Do you want me to change the mags, Tony?	(9)
06 04 24 16	CC	Yeah, let's both change.	(9)
		- - -	
06 04 24 25	LMP	Tony, I don't have a black and white left. I'm going to run off a couple, John.	(9)(PHO 108 17744)
06 04 24 34	CDR	Okay. I'm out. Three frames to go and I'm out.	(9)(PHO 107 17581-83)
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06 04 24 47	LMP	Okay, magazine Bravo has got something in it - a few frames. You used about 50 on it yesterday. And we can use magazine Delta. Both put color on. Is that okay, Tony?	(9)
06 04 24 59	CC	Okay. That sounds fine. Let's put Bravo on John's since he doesn't shoot while he's driving.	(9)
		- - -	
06 04 25 25	LMP	Delta for me and Bravo for you.	(9)
		- - -	

06 04 26 01	LMP	Magazine Delta is working, and I'm starting with frame count number - oh, about 1.	(9)(PHO 115 18471-72)
		- - -	
06 04 27 14	LMP	The DAC is set at f:8 at 12 frames a second. And I'm not going to turn it on until we start moving, Tony.	(9)(PHO DAC)
		- - -	
06 04 27 34	CDR	Frame number 66 on Bravo.	(9)
		- - -	
06 04 30 54	LMP	Tony, I can't get over how hilly this place is. It's one hill right after the other - or ridge.	(9-10)
		- - -	
06 04 31 20	CDR	Okay, pictures (DAC) are going.	(9-10)(PHO DAC)
06 04 31 24	LMP	Tony, you're not going to see much out the right side of my in-motion Hasselblad because this DAC camera magazine effectively blocks out that part of the field.	(9-10)(PHO 115 18473-553)
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06 04 32 06	CDR	Anybody that ever called this place Plains, Cayley Plains, really didn't know what he was talking about. There isn't a plain around here.	(9-10)
		- - -	
06 04 32 25	LMP	John picked the only flat place within a kilometer to land.	(9-10)
		- - -	
06 04 32 38	LMP	I don't know what this big crater is over here. This one - Tony, really the ridges here and we're looking off - we're now at 007. You'll see it in the Hassel - and in the 16, but off to the 2 o'clock from 007 to 2.6, at north headings; there's an old subdued crater that's probably 30 meters deep.	(9-10) (PHO 115 18482)

06 04 33 06	CDR	And how many meters around?	(9-10)
06 04 33 10	CDR	900 meters long.	(9-10)
06 04 33 12	LMP	No, not that much. Better than 300, anyway.	(9-10)
06 04 33 16	CDR	Yeah, it's 300 meters across.	(9-10)
06 04 33 20	LMP	And it didn't even show on the map.	(9-10)
06 04 33 23	CDR	I tell you what it did show in.	(9-10)
06 04 33 27	CDR	Those low angle looks that we got at the landing site.	(9-10)
		- - -	
06 04 33 43	LMP	We're coming in an area that's not quite as blocky. I'd say maybe - 10 percent of the surface is covered with cobbles. Still same size. There's one big boulder that I just got a picture of.	(9-10) (PHO 115 18486)
06 04 34 05	CDR	Buried.	(9-10)
06 04 34 06	LMP	It's just buried 3 meter - well, it's buried all over. I was going to say it's mostly from - wasting from upslope, but that is not true.	(9-10)
06 04 34 33	LMP	Off to our right is the big crater - the big, deep - very subdued that just shows - I see no large rocks, no outcrops at all anywhere around there. All I do is see big boulders that are part - apparently part of this ray, the biggest one being 2 meters.	(9-10)
06 04 35 09	CDR	I'm making 11 clicks now on this relatively smooth region.	(9-10)
06 04 35 28	LMP	Tony, it's a very old surface, apparently. The - every crater here is very subdued, from the half-meter size up to the 4- or 5-meter size.	(9-10)
06 04 35 42	LMP	Completely saturated. Here come a couple of angular blocks that you just got a picture of. They remind me of the one we sampled up there at Station 8. We're getting into an area now at 007, 2.6 - where it's more pebbly than cobbly, being 4 centimeters or so.	(9-10)(PHO 115 18487)

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06 04 36 49	LMP	Okay. We're at 007 at 2.6, and we can - - see just the top of Orion.	(9-10)

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06 04 37 15	CDR	Here's a glass-covered one right there. Little round - looks like a bowling ball.	(9-10)
06 04 37 19	CDR	We're doing V-max now, 8 clicks - 9 clicks, because we're going up a real steep slope.	(9-10)

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06 04 37 52	LMP	We just topped out on a rise, and we're going down into another swale. I can see Flag crater off at 11 o'clock, and we're heading 007. It's boulder strewn on the south side. Pointed straight ahead of us, it's between us and the Lunar Module. It's a - uh-oh.	(9-10)
06 04 38 22	CDR	What's the matter, Charlie?	(9-10)
06 04 38 24	LMP	The range keeps still saying 2.6. I think it's working. Well, anyway, you better delay that range, Tony. It's been 2.6 for quite a while.	(9-10)
06 04 38 46	LMP	We can see the LM, though.	(9-10)
06 04 38 49	LMP	Now we're going down in another 2 to 300-meter - maybe 500-meter subdued crater. That's really going to be a steep slope, if we go straight into it, but John is adroitly maneuvering around it.	(9-10)
06 04 39 05	CDR	I'm not going down that critter.	(9-10)
06 04 39 07	LMP	That is really steep.	(9-10)
06 04 39 09	CDR	Look at that hole in the bottom of it.	(9-10)

06 04 39 10	LMP	I know it. Tony, it's a subdued crater without any rim at all. It is sort of oblong - -	(9-10)
06 04 39 19	CDR	But look at that - that hole in the bottom has a ledge in it.	(9-10)
06 04 39 26	LMP	I know it. This reminds me of Big Sag. You know Big Sag on the map, west of North Ray.	(9-10)
06 04 39 40	CDR	Up. Up. Up.	(9-10)
		- - -	
06 04 40 14	CC	- - by time and speed, you're about 1.2 kilometers.	(9-10)
06 04 40 20	LMP	Okay. Then our distance and range is stopped.	(9-10)
06 04 40 25	CDR	Our distance is - our bearing appears to be okay.	(9-10)
06 04 40 34	LMP	Hey, Tony, you remember out in Hawaii at Kapoho where we saw those very small little sink-hole craters?	(9-10)
06 04 40 46	LMP	This looks like a big one of those.	(9-10)
06 04 40 47	CDR	The one down in the middle of that hole?	(9-10)
06 04 40 48	LMP	Yeah.	(9-10)
06 04 40 49	CDR	I agree with you. That's what I was thinking.	(9-10)
06 04 40 52	LMP	In fact, the whole area looks like just a big slump. Something fell out the bottom. Because there's no rim to this thing at all, John.	(9-10)
06 04 41 01	CC	It'd sure be good if you could swing the DAC over that way, if it's still running.	(9-10)(PHO DAC)
		- - -	
06 04 41 11	LMP	It's running, but I don't have strength in my hands. Let John turn over that way and we'll give you a couple of - as he swings around, I'll give you a couple of pictures of it. Can you make a 360, John?	(9-10)(PHO DAC) (PHO 115 18507-11)
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06 04 41 39	CDR	Let's just make a 360 this way.	(9-10)(PHO 115 18507-11)
06 04 41 41	CC	Okay, and get it on your Hasselblad, please.	(9-10)(PHO 115 18507-11)
06 04 41 18	LMP	Okay, that's what we're doing.	(9-10)(PHO 115 18507-11)
06 04 41 50	CDR	That would be a neat way to take a pan, Charlie.	(9-10)(PHO 115 18507-11)
06 04 41 52	LMP	That's just what I'm doing, taking a pan of that thing. We got it.	(9-10)(PHO 115 18507-11)
06 04 42 00	LMP	We got a pan from the Rover, Tony, with a 360.	(9-10)(PHO 115 18507-11)
06 04 42 03	CC	Okay. And if you can turn the DAC off, please turn it off.	(9-10)(PHO DAC)
06 04 42 11	LMP	Okay, wait a minute. Well - apparently it wasn't running, Tony, because I've still got half a mag left. I'll turn it back on.	(9-10)(PHO DAC)
06 04 42 36	LMP	My arms are just too short - - to get that thing on and off from the Rover seat. I should have turned it on on the side, but at 12 frames a second I thought we'd just run too much out. Okay, it's running now.	(9-10)(PHO DAC)
		- - -	
06 04 43 30	LMP	Okay, still in a cobbly area. There are apparently two distinct sizes. Those are the 6-centimeter size and below - well, around 6 centimeter - and those around 15 centimeters. Cover 30 percent of the surface.	(9-10)
		- - -	
06 04 44 08	LMP	The NAV system is gone completely, John. That bearing's not even working, I don't think.	(9-10)
		- - -	
06 04 45 30	LMP	We got to go on top of that ridge over there, and then we'll be there. John, see those blocks up on the top of Smoky?	(9-10)
06 04 45 37	CDR	Yes.	(9-10)

06 04 45 38	LMP	If you head for those, the LM was right in line with those from our last stop. And I'm convinced that bearing was good from our last stop because we haven't changed much. Okay, Tony, coming up into the area now to our 9 o'clock - we're heading 020 - it looks like another one of those old subdued sag areas.	(9-10)
06 04 46 09	CC	And we're going to cut back on our Station 10 just a little bit here, and we'll skip that photography of the heat flow cable. We'd like you to park halfway between ALSEP and the LM, and do a nominal Station 10, except we'll drop the trench.	(9-10)
		- - -	
06 04 46 56	LMP	We're coming up on that area now as we top a rise - a ridge that is bouldery, about 10 to 12 percent of area is covered with boulders greater than 50 centimeters. And it's cobbly covering about 60 percent. Apparently a secondary around here somewhere caused all this. But we don't see the crater.	(9-10)
		- - -	
06 04 47 46	LMP	There's the secondary. We're coming up on our 10 o'clock position. There's about a - what, 50 meters, John, you think?	(9-10)
06 04 47 56	CDR	Yep.	(9-10)
06 04 47 57	LMP	Fifty-meter crater that's a secondary or at least - it might be a primary, with these blocks just being out of it. And it's quite deep.	(9-10)
06 04 48 12	CDR	That's probably a prim - I don't know whether that's a secondary or primary, though.	(9-10)
06 04 48 18	LMP	We could tell. The block distribution seems to be - radially equivalent. I think that was probably a primary punched into the old Cayley.	(9-10)
06 04 48 45	CDR	It (DAC) is empty. Reading empty.	(9-10)(PHO DAC)
06 04 40 48	LMP	Okay, it's off.	(9-10)(PHO DAC)

06 04 48 53	CDR	What's that thing up there on the hill, Charlie?	(9-10)
06 04 48 58	LMP	Where? Straight ahead?	(9-10)
06 04 49 00	CDR	Yeah.	(9-10)
06 04 49 02	LMP	That's a rock.	(9-10)
06 04 49 04	LMP	We got to get over this ridge, John, and we'll see the old LM. Man, I am covered from head to foot - with dust.	(9-10)
		- - -	
06 04 49 47	LMP	I think we're going to probably come out a little east of - where we need, John.	(9-10)
06 04 50 08	LMP	We ought to cross the tracks if we get too far east.	(9-10)
		- - -	
06 04 50 21	LMP	Must be a pretty steep slope here. Man, look at those angular blocks there, would you. Around there. Tony, here are 30 or 40 very angular blocks - 50 centimeters or so - and they have the same character as the ones we sample bagged, so - apparently, a ray material.	(9-10)
06 04 50 48	LMP	A little comment about the regolith. The regolith is texturally the same throughout. The only difference is a white - the difference in albedo that you can see on some of the fresh craters and also in the rays as we were going towards South Ray.	(9-10)
		- - -	
06 04 52 05	CDR	Okay, Houston, we just topped the ridge and the LM is about 200 meters from us.	(9-10)(PHO 115 18547)
		- - -	
06 04 52 55	LMP	How about swinging right and let me get a picture of that, John? With the Rover and - a little bit more. We want a nominal Station 10, so it's between the core - -	(9-10)(PHO 115 18549)
		- - -	

06 04 53 28	CDR	*** between the mortar package and the - mortar package and the Rover?	(9-10)
06 04 53 33	LMP	Yeah, that's a good place to park. I've got to go over here and get the penetrometer in line. Yeah, that'd be good. Mortar package and the Rover.	(9-10)
		- - -	
06 04 54 13	CDR	Which way we want to park on this one, Charlie?	(9-10)
06 04 54 15	CC	180.	(9-10)
06 04 54 16	LMP	Pointing south again. 180. Hook a right. I can't believe how hilly this place is. There's not a flat place around.	(9-10)
06 04 54 27	CDR	Right, except where that LM is.	(9-10)
06 04 54 29	LMP	Except right there where that LM is.	(9-10)
		- - -	
06 04 54 51	LMP	The heading says we're at 176, 65.	(10)
		- - -	
06 04 57 47	LMP	I'm starting on the double core, Tony.	(10)(SAMP CORE 60009-10)(PHO 115 18555-58)
06 04 57 50	CC	John, since we're running behind here, I wonder if you could operate the penetrometer.	(10)
06 04 58 07	CDR	A piece of cake.	(10)
		- - -	
06 04 59 16	CDR	Look at that, Charlie.	(10)
06 04 59 23	CDR	Somebody up there likes us. That's bag number 4. See where it is?	(10)
06 04 59 30	CDR	Came off, and it's hanging between the fender and the frame.	(10)
		- - -	

06 04 59 44	CDR	Double core. Okay, can be anywhere out in front of the Rover.	(10)(SAMP CORE 60009-10)
		- - -	
06 05 00 29	CDR	Want me to help you with the penetrometer?	(10)
06 05 00 32	LMP	Well, I've got the double core right now.	(10)
06 05 00 46	LMP	I bet you I don't get this in here, but I'll try it.	(10)(SAMP CORE 60009-10)
06 05 00 49	CDR	I think you will.	(10)(SAMP CORE 60009-10)
06 05 00 55	LMP	I don't know. Okay, that's pushed in.	(10)(SAMP CORE 60009-10)
06 05 00 59	CDR	Let me do that, and you do the penetrometer because I know how to do that one.	(10)(SAMP CORE 60009-10)
06 05 01 02	LMP	Okay. That's a good swap.	(10)
06 05 01 14	LMP	John, see if I got the red dot on my camera. It stopped running.	(10)
06 05 01 22	CDR	Sure do.	(10)
06 05 01 23	LMP	Okay, how about spinning it once for me.	(10)
06 05 01 43	LMP	Cross-sun as far as you can push it in. Okay. You want to hammer on this?	(10)(SAMP CORE 60009-10)(PHO 115 18557-58)
		- - -	
06 05 02 20	LMP	Okay, Tony, which - you want me to start with the 0.5?	(10)
06 05 02 27	CC	Right, it will be the 0.5 - well, actually you have the 0.2 on there. Why don't you do the string of 0.2 and then we'll come back and get the 0.5 near the double core.	(10)
06 05 02 38	LMP	Well- no I took the 0.2 off.	(10)
06 05 02 42	LMP	I don't have anything on here now.	(10)
06 05 02 44	CC	Fine, let's press for the 0.5.	(10)

06 05 02 49	LMP	Okay. It gets hard down there, doesn't it, John?	(10)(SAMP CORE 60009-10)
06 05 02 54	CDR	Yeah, I don't think it's going to go. How many hits you want me to give it, Houston, before I quit?	(10)(SAMP CORE 60009-10)
06 05 03 15	LMP	Now, you're getting it a little bit, John. It's going in, John, about a quarter inch a stroke.	(10)(SAMP CORE 60009-10)
		- - -	
06 05 04 32	LMP	It's in. John, it's in. That's far -	(10)(SAMP CORE 60009-10)
06 05 04 36	CDR	How far do you want to drive it, Charlie?	(10)(SAMP CORE 60009-10)
06 05 04 38	LMP	That's far enough.	(10)(SAMP CORE 60009-10)
06 05 04 41	LMP	Yeah, they don't want any more than that.	(10)(SAMP CORE 60009-10)
06 05 04 42	CDR	Gee, it came right back out, too.	(10)(SAMP CORE 60009-10)
		- - -	
06 05 05 09	CC	Okay, John, you want to turn that over? That stuff may come out of that.	(10)(SAMP CORE 60009-10)
06 05 05 36	LMP	I finally got that 0.5 back on. And I got number 6, Tony. Is that okay? I don't think I've used 6.	(10)
		- - -	
06 05 06 11	LMP	I'll bypass - no, I'm on 9 -	(10)
06 05 06 13	CC	Yeah, 9's good, Charlie.	(10)
06 05 06 14	LMP	I'm going to bypass 9 and go to 10.	(10)
06 05 06 18	LMP	I just passed it on. I'm going to go to 10.	(10)
06 05 06 27	CDR	Okay, it's full in the bottom of it, anyway.	(10)(SAMP CORE 60009-10)
06 05 06 31	CC	Okay. And that one should be fairly near the double core, Charlie.	(10)
06 05 06 38	LMP	It is, within 3 meters - 2 meters.	(10)
		- - -	

06 05 07 04	LMP	Okay, that bottomed it out, Tony.	(10)
06 05 07 07	LMP	*** 0.5	(10)
06 05 07 08	CC	Why don't we go to a 0.2 and do it just in the same place.	(10)
06 05 07 13	LMP	Okay. And then work towards the -	(10)
06 05 07 19	CC	Work towards the deep core.	(10)
		- - -	
06 05 07 45	CDR	Yeah, that rammer-jammer only went in an inch.	(10)(SAMP CORE 60009-10)
		- - -	
06 05 08 13	CDR	There's the 0.2.	(10)
06 05 08 16	LMP	Going to 11, Tony.	(10)
		- - -	
06 05 09 40	LMP	Okay, Tony. Here come the 0.2.	(10)
		- - -	
06 05 10 06	LMP	The 0.2 almost went in all the way.	(10)
06 05 10 11	CDR	Okay, the upper one was 45, the bottom one was (5)4.	(10)
06 05 10 23	LMP	Okay, Tony. Be advised I'm sorry that I'm spiking this thing out occasionally, but this is the only way we can do it.	(10)
		- - -	
06 05 10 34	LMP	Okay, I'm moving - I've got two more to do, cycling 12. And this is about a fourth of the way - right here. Okay, number 12.	(10)
06 05 10 59	CC	And, John, we should wait on your pan until Charlie's through there.	(10)
06 05 11 08	LMP	Okay. That's about the same distance, Tony.	(10)

06 05 11 14	LMP	Cycling to 13.	(10)
06 05 11 36	CC	Hey, John. While you're sampling - - there, you might look around and see if you see any of that vesicular basalt.	(10)(SAMP 60110,15)(PHO 114 18445-48)
06 05 11 46	CDR	That's what I'm a looking for.	(10)(SAMP 60110,15)
		- - -	
06 05 12 16	LMP	It's in. It is - all but about 5 inches.	(10)
		- - -	
06 05 12 49	LMP	- - cycling to 14.	(10)
06 05 13 06	LMP	And I'm right by the double core. I - I mean the deep core.	(10)
06 05 13 13	LMP	The ground's pretty beat up with footprints. Should I go to a pristine area or stay here?	(10)
06 05 13 23	CC	Just move it over out of the footprints.	(10)
06 05 13 27	LMP	Okay. I've got a good spot. About 2 meters toward the Central Station.	(10)
06 05 13 48	LMP	That one's going all the way in, too. If I didn't lose my balance.	(10)
		- - -	
06 05 14 17	CC	Okay, Charlie. One flat plate by the double core, and that'll about do it.	(10)
		- - -	
06 05 16 04	CDR	But, Charlie. I just don't see any vesicular basalt.	(10)(SAMP 60110,15)
		- - -	
06 05 16 37	CC	And, John, as Charlie takes - - that penetration, we can go ahead and take your pans.	(10)(PHO 114 18449-67)
06 05 16 48	LMP	Tackling the 15.	(10)

06 05 16 54	LMP	And it's somewhere between this mass of footprints - aha, there it is. Okay, Tony, right beside double core.	(10)
06 05 17 22	LMP	It went in about - 6 centimeters.	(10)
06 05 17 42	LMP	Yeah. Let me try one out here in pristine area a couple of meters away, here. I wonder whether they did with all that foot walking over there. Might have just fouled that up. Nope. That one went in about the same.	(10)
		- - -	
06 05 18 46	CDR	Okay, Houston. I collected one sample, which was a sharp angular.	(10)(SAMP 60110,15)
06 05 18 57	CC	Okay. And we're going to have to pack up and head home.	(10)
06 05 19 03	LMP	Okay. Home is about 50 meters away.	(10)
06 05 19 12	CDR	Can you put this back there, Charlie?	(10)
06 05 19 23	CDR	That sample is going in bag sample 381, and I'll shoot the pan here in a second.	(10)(SAMP 60110,15) (PHO 114 18449-67)
06 05 19 42	CDR	And it was a black rock but I don't think it was vesicular basalt; I think it was a breccia.	(10)(SAMP 60110,15)
06 05 19 49	CDR	That way, it's the same type as we've been sampling it. Going into sample bag 4 on top of the - sample (Station) 9 samples.	(10)(SAMP 60110,15)
06 05 20 03	LMP	I'm up to frame count 91 on magazine Delta.	(10)
06 05 20 14	LMP	Does the CSVC go into the rock box?	(10)
06 05 20 26	CC	Yes, it does.	(10)
06 05 20 40	LMP	Hey, John, I'm going to take that samp - SCB number 2, my camera, and I'm heading home.	(10)
		- - -	

06 05 21 08	CDR	Good, that pan completes me up to frame of 89.	(10)
		- - -	
06 05 23 06	CC	Okay. Charlie, we can put four core tubes plus CSVC in the rock box and then plus what documented samples you can get in there.	(LM)
06 05 23 16	LMP	Four core tubes, CSVC, documented sample, gotcha.	(LM)
		- - -	
06 05 24 21	CC	And, John, as you get off the Rover, we'd like you to take a picture of the UV camera; it should be about f:5.6 at 250.	(LM)(PHO 114 18468-70)
		- - -	
06 05 24 43	CC	Just take it anywhere. As long as we can see that location, that's all we're looking for.	(LM)(PHO 114 18468-70)
		- - -	
06 05 26 25	LMP	Hey, Tony, I'm putting core tubes 29, 43, 45, and 54 in the rock box.	(LM)
06 05 26 49	LMP	CSVC is in the rock box. Packing it in there.	(LM)
06 05 26 56	LMP	You want an unbagged rock in the rock box, Tony. I don't think you do.	(LM)
		- - -	
06 05 27 37	CC	Charlie, yeah, you can put unbagged rocks in the SRC.	(LM)
		- - -	
06 05 28 13	CDR	I think this bag here has got so little in it we can -	(LM)
06 05 28 20	LMP	Let's empty it into the SRC, there's some more will go in the SRC.	(LM)
06 05 28 23	CDR	Well, okay. But this is only - this has got those two whatchacallems there.	(LM)

06 05 28 27	LMP	What you mean?	(LM)
06 05 28 30	CDR	All those. They can't go in the SRC. Where do they go, in the ETB?	(LM)
06 05 28 36	LMP	Oh, no, in a rock box - in a rock bag somewhere. Why don't you put them back here in mine, John. It's back on the Rover here.	(LM)
		- - -	
06 05 29 26	LMP	We're packing up the rock box, Tony.	(LM)
06 05 29 30	LMP	Got the rocks in it. The liner's coming off and I put the other core tubes in a - tell you in a minute.	(LM)
06 05 29 49	CDR	Beautiful, they just fit right in the top.	(LM)
06 05 29 52	LMP	Good. What's the number on that one, John?	(LM)
06 05 29 56	CDR	That's SCB 2. No, yeah, I.	(LM)
06 05 30 02	LMP	John's crystalline rock in the two bore for the two - other core tubes go in - in number 3, Tony.	(LM)
06 05 30 17	LMP	Where'd those two core tubes go that you had?	(LM)
06 05 30 20	CDR	I put them in here. Four (54?) and 45 are in your seat.	(LM)
06 05 30 23	LMP	Oh, okay, then I got them already.	(LM)
		- - -	
06 05 30 41	LMP	Okay. We got two bags out that we - -	(LM)
06 05 30 45	CDR	Yeah, extra.	(LM)
06 05 30 47	LMP	Well, good. Okay, we're going to have three - I don't know how full mine is.	(LM)
		- - -	
06 05 31 20	CDR	Okay. We hardly got any rocks in it at all.	(LM)

06 05 31 22	LMP	I think I can stuff them in this other bag over here, John.	(LM)
06 05 31 26	CDR	Okay. I'll take SCB 1 and put it by the footpad, Charlie.	(LM)
		- - -	
06 05 32 04	CC	Okay, Charlie, you called out that you put two core tubes and John's crystalline rocks in SCB 3; that should have some empty core tubes and core caps in it. Could you straighten that out?	(LM)
06 05 32 18	LMP	It had two core tubes empty, and we used the bag, Tony, that's true -	(LM)
		- - -	
06 05 33 00	LMP	How about core tubes?	(LM)
06 05 33 02	CDR	That's aft, a couple of core tubes in number 1.	(LM)
06 05 33 03	LMP	Oh, good, okay, we'll take those out.	(LM)
06 05 33 05	CDR	Are they empty?	(LM)
06 05 33 06	LMP	Yeah, they're empty. Okay, put them under my seat.	(LM)
		- - -	
06 05 33 23	LMP	Okay, SCB 3 is going to go up with us, the SRC is going to go up with us, and I'm packing the ETB.	(LM)
06 05 33 31	CDR	And I'm going to put these two bags under - under your seat, Charlie.	(LM)
06 05 33 38	CDR	Now here's a - something like that *** critter.	(LM)
		- - -	
06 05 34 41	LMP	John, could you get those goodies in the left seat bag there in my bag and pass them over?	(LM)
06 05 34 51	CC	Okay, and verify you got those rocks in the bags that you tossed under the seat.	(LM)

06 05 35 01	LMP	Yes, that's - let's see, there's one - no, there's one over there I think at the corner - it's at a - no, we got them all. Yeah, there it is.	(LM)
06 05 35 10	CDR	That's it.	(LM)
06 05 35 13	CDR	That's a glass ball that I found out there, Houston, I never said nothing about.	(LM)(SAMP 65016)
		- - -	
06 05 35 42	LMP	John, here's another - piece of glass - hollow ball.	(LM)(SAMP 65016)
06 05 35 47	CDR	Yeah, let's put it in this here thing.	(LM)(SAMP 65016)
06 05 35 54	CDR	Aw, rats!	(LM)
06 05 35 56	LMP	Those things just bounce out of your hand -	(LM)
06 05 36 11	CDR	Okay, I got magazine Lima; the 500's going back under the seat.	(LM)
		- - -	
06 05 36 46	CDR	Okay, SCB number I is sitting over there on a foot strut, Charlie.	(LM)
06 05 36 52	LMP	Your mike's coming off the 16, batteries into the Sun - - into the ETB.	(LM)
		- - -	
06 05 38 26	LMP	Okay, two padded bags, we're just going to leave. One set maps, we got; one mag from DAC, one mag. Okay, it's all loaded. Padded bags are staying under the seat, Houston.	(LM)
		- - -	
06 05 39 16	LMP	And we don't have big "Muley" yet - don't let us forget to get big "Muley" here.	(LM)(SAMP 61016)
		- - -	

06 05 41 27	LMP	Two SCBs, we got. Looks like we're going to have everything. Pallet 2 to ascent stage, two SCBs to ascent stage.	(LM)
06 05 42 09	LMP	Okay, John, I'm gonna take one of these up to the ascent stage.	(LM)
06 05 42 13	LMP	Oh, rats.	(LM)
06 05 42 20	CDR	He did kick it open. Wait a minute. Move, Charlie. Let me get it.	(LM)
06 05 42 27	CDR	Where's that sample that was in it?	(LM)
06 05 42 38	LMP	There you go. The top just wasn't too closed.	(LM)
06 05 42 47	CDR	Okay, I got the bag. No, wait a minute. *** do with the sample? There it goes.	(LM)
06 05 42 53	LMP	Another sample.	(LM)
06 05 43 13	LMP	The thing's not designed to fit in there, John.	(LM)
06 05 43 15	CDR	It goes in there.	(LM)
		- - -	
06 05 51 46	CDR	Are you ready for a rock box?	(LM)
		- - -	
06 05 53 39	LMP	Okay, babe, you got two rocks - two SCBs and an ETB to come up.	(LM)
		- - -	
06 05 54 53	LMP	Okay, two SCBs and we got it.	(LM)
		- - -	
06 06 04 04	CDR	Close hatch and lock.	(LM)

* * * * BETWEEN EVA 2 AND EVA 3 * * * *

06 07 08 23	LMP	Okay, the SRC number 2 weighs 41 pounds. SCB 3, which is in sample containment bag number 3, weighs 30 pounds. SCB 1, which is in sample containment bag number 4, weighs 26 pounds.	(BETWEEN EVAS)
		- - -	
06 08 13 07	CC	Okay. Discussing Station 4 here, we'd like your general impression of the rocks. Especially the bigger blocks. You described mostly breccias and white crystalline rocks. Were there any others - and could - could you just talk about them a little bit?	(BETWEEN EVAS)
06 08 13 33	CDR	Well, we didn't see any that we recognized or we'd have told you about it. I think the big blocks were just big brothers to the little blocks. That secondary that we were working up there was a classic. It really was. And the pan showed it. Must have come from South Ray. It had a great block land in the middle. It was a breccia surrounded by all kinds of little blocks. I think that's - that's about the only rock that we saw. You know, we're not really sure. It's our first guess as to what those rocks are up there - whether they're breccias or crystalline rocks. I'm sure you all know that. But most of them were very dust covered. I only saw one clear cyrstalline in the whole - in the whole EVA except for the ones I get in ray and - and that was the one I picked up - I think it was Station 5, or 6.	(BETWEEN EVAS)
06 08 14 54	LMP	I think, Tony, my view is the same. We had only a predominance of South Ray ejecta all around. Mostly some of the smaller rays were given to Descartes. It just occurred to me that everywhere we were, there was a boulder field of varying sizes and intensity and you could see eruptive force - you could look back at South Ray and you could see the rays coming our way and spreading and fanning out as they flow.	(BETWEEN EVAS)

06 08 15 34	CDR	You know, it just may be that South Ray crater is - is so *** everything or most everything around here. You know, the - like we said about the rays at South Ray, some were white and some were black rays and just a little layer of dust. I didn't see a - hardly a clear surface all day long. I felt right at home like we were back in the United States studying geology - and everybody said the rocks would be crystal clear. Well, here it's all covered up. And it is my opinion when you hit one and got a cleavage surface - that made all the difference in the world to a rock description, but a person may not be able to do that often.	(BETWEEN EVAS)
06 08 16 30	LMP	Does that answer your question, Tony?	(BETWEEN EVAS)
06 08 16 32	CC	Right. And the Station 4, 5, and 6 area - you mentioned that 5 and 6 got progressively - the surfaces got progressively firmer. I wonder, could you see any contact or was it a gradual thing?	(BETWEEN EVAS)
06 08 16 51	LMP	No, we couldn't. Just when we got off the Rover and felt it under your feet. The softest spot was up on the top, at Station 4. Progressively firmer as we went out, like you say, went down to 6. And you just noticed it when you got out.	(BETWEEN EVAS)
06 08 17 10	CC	Okay. Understand.	(BETWEEN EVAS)
06 08 17 12	CDR	Of course, when we were working, it felt - we were working in a couple of craters on Station 4. Right on the - you know - right on the rim of the craters, we suspected it'd be softer, too.	(BETWEEN EVAS)
06 08 17 25	CC	Okay. And Station 4, 5, and 6 also, we're - we're pretty confident that your - that the ejecta or the rocks at Station 4 were from South Ray. At 5 and 6 in particular, though, was there any indication that the craters either by their orientation or from the secondary blocks lying around - that the source was, in fact, South Ray?	(BETWEEN EVAS)
06 08 17 51	CDR	Yeah, I would think the crater itself - it probably be South Ray crater. Although the rocks generally looked more rounded, may be from a different layer. The - the cross work of patterns you should be able	(BETWEEN EVAS)

		to see that in the film, but the pattern of rocks were all in the - in the far wall, which was away from South Ray crater.	
06 08 18 14	CC	Hey, incidently, the backroom is really impressed. They are very excited about your choice of sampling on that inner wall of that crater - I guess it was at 5 or 6 - and think that you did - you had a good chance there of getting real Descartes. In fact, they think they've got it in the box. What they're thinking right now is that the mat - the areas where you're able to kick up and see white underneath are ray materials. But you didn't see that at 5 and 6. So, we think we may - you may have got Descartes there.	(BETWEEN EVAS)
06 08 18 47	CDR	Okay. I'll tell you one thing. If this place had air, it'd sure be beautiful. It's beautiful with - with or without air, but the scenery today up on top of that Stone - on top of Stone mountain - you'd have to be there to see and to believe it. It's just dazzling. And I hope it showed up good on television - -	(BETWEEN EVAS)
06 08 20 09	CC	Okay. And we've lost one piece of - - hardware here. We wonder where SCB 2 went?	(BETWEEN EVAS)
06 08 20 23	LMP	Okay. I dumped that in the SRC and it's on the Rover. We're gonna use it tomorrow.	(BETWEEN EVAS)
06 08 20 54	CC	We were wondering if - wondering what happened to the SESC that was in the pocket there, but it looks like we're in good shape.	(BETWEEN EVAS)
06 08 21 01	CDR	The SESC is back on the Rover. I was looking at it just before we got in.	(BETWEEN EVAS)
06 08 21 43	CDR	Okay. Tell everybody in the backroom thank you and we really enjoyed it today. By golly, that view from up on Stone mountain is something else.	(BETWEEN EVAS)
06 08 22 10	LMP	Tony, I'd like to say the same thing. Thanks. I think they did a great job and they kept us thinking and on our toes and came up with the right sugges - suggestions at the opportune times and thank you, too, for keeping us going. It was a good job.	(BETWEEN EVAS)

06 08 22 28	CC	Hey, I went back in the backroom after the EVA and they're just ecstatic back there. I know you didn't - you didn't - we didn't see exactly what we expected to see, but we think you got - you got everything that we went up there for. We're in really good shape.	(BETWEEN EVAS)
06 08 22 57	LMP	You just can't believe the ridges and valleys and ridge rilles, here. I tell you - the local slope might be 2 or 3 degrees, but, man, that Double Spot - whoever picked that place to land - it's the only level spot around here. Any place else, you'd really be in trouble.	(BETWEEN EVAS)
06 10 22 38	LMP	Hey, Tony, one final comment. We've been talking about that crater that we took a pan of as we spun around and - gosh, it - I said, looked like Big Sag. John and I are leaning towards Endogenesis on that, and hopefully from the films that we got you might be able to sort that out.	(BETWEEN EVAS)
06 10 22 58	CC	Okay. We'll sure take that in consideration. I don't know whether it'll affect tomorrow, but - but I think it's a good obser - observation. We'll see you.	(BETWEEN EVAS)
		- - -	
06 19 45 52	CC	Okay. Fine. Do you want a quick briefing on the traverse today?	(BETWEEN EVAS)
06 19 46 00	LMP	Okay. One comment, Tony, that - about - we were talking about last night that we didn't pass on, that the feeling we got from all the crystalline rocks was that they had a sugary texture to them.	(BETWEEN EVAS)
06 19 46 46	CC	The only change right after egress, Charlie, instead of putting on mag L, I'll ask you to put mag M on the 500 millimeter. That will give you a full mag, and that would be all you need. That will save a change up at Station 11, and at the LM site there, we'd like you to shoot off some pictures of - a pan of Stone mountain, but I'll call you on that when you get out; otherwise, the LM area is nominal. And you go up to Station 11 slash 12, which will be just one station for about an hour and 5 minutes. We're	(BETWEEN EVAS)

going to drop the near-field polarimetry up there, and we'll concentrate on big boulder samples, a permanently shadowed sample, and the padded bag sample on the - the special samples area. We'll still like a stereopan, a far-field polarimetry of the crater interior; we'll try to get about an 80-meter base on that, and, when you get up there, Charlie, I'll brief you on what looks like the best way to do that. And we'll return along the same route you went up, and about a - one-half to 1 kilometer off the rim when you still feel you're on the continuous ejecta blanket, we'll call that Station 13. We'll do a Station 13 with the TV, and we'll lengthen it to 15 to 20 minutes. I've got a - a fixed time here, but I don't see it right in front of me right now, and that instead of a rock soil will be a rake soil and - plus a couple of documented samples. And then the rest of the time will be spent back in the LM area. We'll put a - we'll make a Station 10 prime which is about 50 meters west of your Station 10. So it makes a triangle with the deep core, which would be south of it and the Station 10 which would be northeast of it and the Station 10 prime which makes that northwest corner of the triangle, and we'll ask for a rake soil at Station 10 prime, a - a double core at that station, a rake soil at Station 10; and then whatever time is left to 35 minutes will be documented samples. Now, the end of the EVA is pretty much nominal except, John, when you go out to the permanent parking location of the AL - or of the Rover, we'd like you to make sure you take a camera along, and we'll do an LPM measurement there after you've parked it, and we'll also ask you to try to find us a dense crystalline rock if you can find it. If you can't find a crystalline one, then at least a dense breccia, and we'll do the rock on top of the LPM measurement. And that's pretty much it. I'm going to try to keep you to the time line - the time line as much as possible because we've really got a hard time for getting back in. I know - I know the - they won't allow us to go over at all.

06 20 38 46 CC Incidentally, you have about 123 pounds of rocks, which means you can get about another 100 pounds. (BETWEEN EVAS)

06 21 39 38	CC	Out again on that sunny Descartes Plains.	(LM)
06 21 39 45	CDR	Ain't any plains around here, Tony. I told you that yesterday.	(LM)
		- - -	
06 21 41 04	CDR	They won't tell us apart today. We both have red stripes. Have to mush today, Charlie.	(LM)
06 21 44 43	CC	Okay, the change on that 500 millimeter is magazine Mike.	(LM)
06 21 44 58	CC	And while you have it in your hand, we'd like a pan of Stone mountain with it.	(LM)(PHO 105 17054-116)
		- - -	
06 21 45 52	LMP	Okay, Tony, you said magazine R to the right seat. I'm going to use magazine S on the DAC. We used up R yesterday.	(LM) (PHO DAC)
06 21 46 50	LMP	Magazine Mike.	(LM)
		- - -	
06 21 49 41	CDR	And the big rock bag is on the hand tool carrier.	(LM)
		- - -	
06 21 50 38	LMP	The 500 is complete. I'm up to frame count 65.	(LM)(PHO 105 17054-116)
06 21 50 44	CC	Okay. On Mike 65.	(LM)(PHO 105 17054-116)
06 21 50 50	LMP	I got a horizontal pan east-to-west - three levels of it. Top to bottom of the mountain.	(LM)(PHO 105 17054-116)
06 21 51 02	CC	How about those lineations? Do you see them still today.	(LM)
06 21 51 12	LMP	Yeah, they're still there. They seem wider apart today than they did yesterday, though.	(LM)
		- - -	

06 21 56 59	LMP	Okay, Tony, pan is complete.	(LM)(PHO 116 18563-91)
		- - -	
06 21 57 19	LMP	I could use some bags John.	(LM)
06 21 57 23	CDR	Okay, this one here goes on me. This is bag 4.	(LM)
06 21 57 27	LMP	And we could put this one on me. That's the one with SESC in it.	(LM)
06 21 57 40	LMP	Here let me put that one on. Is that the SESC? You want me to put this one on you?	(LM)
06 21 57 45	CDR	Okay.	(LM)
		- - -	
06 22 09 13	CDR	Okay. We're all set to go. And off we go.	(LM-11)
06 22 09 18	LMP	Our first heading out of here is 030. The DAC is on.	(LM-11)(PHO DAC)
06 22 09 51	CC	Charlie, can you turn that DAC off for another 19 minutes.	(LM-11)(PHO DAC)
		- - -	
06 22 09 58	LMP	Okay, it's off.	(LM-11)
06 22 10 06	CDR	This ridge up here would be a good place to park the Rover. It's reading 162 and 0.1 now. And that's how far away we are.	(LM-11)
		- - -	
06 22 10 33	LMP	We're topping out now on the little ridge. We can see Dome and Smoky. On top of the ridge there are boulders just like we saw yesterday. A half meter or so. Cobbles about 5 percent of the surface. Looks like a lot of the secondaries though. The boulder population is really concentrated around the secondaries, and we'll get some pictures of that. The regolith up here is identical. You can see these little lineations which is, I think, a function of sun angle.	(LM-11)

06 22 11 25	CDR	I think the boulder population is starting to thin, Charlie.	(LM-11)
06 22 11 27	LMP	I do too. The cobbles are getting smaller like we might be just out of this ray. We don't see any of the - maybe one or two of the half-a-meter size boulders now.	(LM-11)
06 22 11 41	CC	There are a couple of those mounds mapped about 200 meters off to your left. We're wondering if you can see those.	(LM-11)
06 22 11 51	LMP	No, we're at 180 at .3 and topping out really on top of a ridge here.	(LM-11)
06 22 12 05	CDR	Better go over this way more, Charlie.	(LM-11)
06 22 12 07	LMP	Yeah, there's North Ray right up there. Look at the big rocks, John. We got a good view of North Ray here, and as I look at it there's a northeast -southwest line of boulders that come out from the southwest rim and go up the northeast rim on to Smoky mountain.	(LM-11)
06 22 12 33	CDR	There's Palmetto too.	(LM-11)
06 22 12 35	LMP	Yep, we see Palmetto. Coming down the ridge now, we look like we're going into a "Big Sag" type area. It's at 12 o'clock at 3 or 400 meters and we are now at 188 at .4.	(LM-11)
06 22 12 53	CDR	We may be into Palmetto right now, Charlie. That may be Palmetto.	(LM-11)
06 22 12 58	LMP	No, thats over there on the rim, isn't it? That big thing right there? No, Palmetto's at - - 2.1	(LM-11)
06 22 13 05	CC	You should be about half way to Palmetto. You're looking right below Turtle mountain, we bet.	(LM-11)
06 22 13 11	CDR	That's where we are.	(LM-11)

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06 22 13 28	LMP	Okay, we're going downslope now, Tony. About a 5-degree slope and we're going to go down perhaps 50 or 60 meters before we start climbing back out again toward Palmetto. Up around North Ray we see two tremendous blocks at about Station 11 and 12, that appear to be black in color. Black with white spots. We're just about out of the ray material now. We only see a few cobbles left.	(LM-11)
06 22 14 02	CC	Might be a good idea to try to get there for our Station 11.	(LM-11)
06 22 14 10	LMP	That's what I thought we were going to pick. Those two big rocks there on that ridge. That's Palmetto right there I guess, off to the left there isn't it John? Course we've only been .6 though.	(LM-11)
06 22 14 24	LMP	We're at 195 at .6 and there's a big depression off to our 2 o'clock position, on a heading of 030 with some white boulders on the inner rim. It's a very subdued feature.	(LM-11)
		- - -	
06 22 14 53	LMP	The east side is a very shallow slope into this pit.	(LM-11)
		- - -	
06 22 15 20	LMP	This big depression off to the left that I was describing is - on the east side it's a very shallow slope into it, about 4 or 5 degrees. But on the far end the west side and the southwest side, it has very steep walls - 20 degrees or so.	(LM-11)
06 22 15 37	CC	You're looking right at the base of Turtle mountain.	(LM-11)
		- - -	
06 22 15 57	CDR	Where's Turtle mountain? Right here.	(LM-11)
06 22 15 58	LMP	It's way off to the left. We just passed it. We could do a 360 and get a pan of it.	(LM-11)
06 22 16 03	CDR	How about that rock there Charlie?	(LM-11)
06 22 16 08	LMP	Sure has got some lineations in it.	(LM-11)

06 22 16 09	CDR	Yeah, look at the size of it.	(LM-11)
06 22 16 13	LMP	Oh, this big one coming up you mean?	(LM-11)
06 22 16 15	CDR	Yeah.	(LM-11)
06 22 16 16	LMP	It seems to me that this is a more subdued surface over here than going towards South Ray. Not as many craters. It's almost, except for 3 or 4 meter-size craters, it's all subdued and just hummocky and rolling.	(LM-11)
06 22 16 37	CDR	Yeah, that's true. It's much better driving. We're doing 10 clicks.	(LM-11)
		- - -	
06 22 16 51	LMP	There's about a 4-meter boulder with a good fillet - -	(LM-11)
06 22 16 61	CDR	That's been there for awhile.	(LM-11)
06 22 17 01	LMP	- - we're just passing it at 195 at 0.9. And it's rounded.	(LM-11)
06 22 17 04	CC	How are we doing now on the rounded versus angular boulders?	(LM-11)
06 22 17 08	LMP	And we can see in to Ravine - okay; most of them over here are, half and half rounded to angular. There are some small, indurated secondary craters, and as we approach Palmetto, the boulder population is beginning to pick back up.	(LM-11)
06 22 18 09	LMP	As you look to the northeast you get quite a spectacular terrain view of rolling hills occasionally pock-marked with large boulders. The craters are very subdued, and the hills almost appear smooth - off to the northeast. That might be a function of the sun angle though.	(LM-11)(PHO 114 18449-67)
		- - -	
06 22 18 47	LMP	I think we're coming up on the rim now John. There it is.	(LM-11)
		- - -	

06 22 18 57	LMP	Okay, Tony, we topped out on the rim of Palmetto, and hit it right on the nose at 1.2 at 189, and it's a tremendous crater. The walls to the northwest, south and the southeast here are steeper than the wall to the northeast. It looks like it almost breached to the northeast.	(LM-11)
06 22 19 42	LMP	John's cutting away from the rim now because it's a little bit easier going. There's a good ejecta blanket of half-meter-sized boulders around the rim of Palmetto and there's some of these secondary craters here.	(LM-11)
06 22 20 00	CDR	Palmetto is as big as Meteor isn't it?	(LM-11)
06 22 20 06	LMP	Of cobble size, I'd say 30 or 40 percent of the surface - let's make it 30 percent in the half-meter size, and maybe one for every 10 square meters.	(LM-11)
06 22 20 30	CDR	We're traveling about a 100 meters inside the rim and we're at 195, 1.4 now.	(LM-11)
		- - -	
06 22 20 44	LMP	To the northwest you can see large blocks on the rim.	(LM-11)
06 22 20 52	CDR	Hey Charlie, there's Dot.	(LM-11)
06 22 20 53	LMP	Yeah, I see Dot. Right on the rim. The large boulders over there seem to be 3 or 4 meters to the northwest on the flank of Palmetto, but I think they came from North Ray.	(LM-11)
		- - -	
06 22 21 21	LMP	Angularity is sorta rounded.	(LM-11)
06 22 21 25	LMP	Apparently the only thing preserved there is the large blocks out of North Ray. But we don't see very many small ones. I think our trafficability is going to be excellent. Though it looks like a steep slope climbing that rim, doesn't it?	(LM-11)
06 22 21 47	CDR	It's not near as bad as Stone mountain.	(LM-11)

06 22 21 52	LMP	The boulder field out of North Ray does not reach Ravine. It stops on the outer flank of Ravine about a 10th of a crater diameter away.	(LM-11)
06 22 22 15	LMP	Most of the rocks here are rounded. We got some real good secondaries. The types are very difficult to identify as we go by. We're now at 193 at 1.7.	(LM-11)
		- - -	
06 22 22 38	LMP	Palmetto has a very definite raised rim to it. And we're going to be going off the rim down probably a 5- to 10-degree slope into a valley before we start climbing up to North Ray.	(LM-11)
		- - -	
06 22 22 58	LMP	These valleys in here tend to trend towards Big Sag.	(LM-11)
06 22 23 09	CC	Charlie could you go ahead and - - put the DAC on now?	(LM-11)(PHO DAC)
		- - -	
06 22 23 24	LMP	Okay, it's running.	(LM-11)(PHO DAC)
06 22 23 30	LMP	And I got it pointed off to the left.	(LM-11)(PHO DAC)
06 22 23 35	LMP	We're now in an area at 195 at 1.9 that is about a half meter-size boulder every 5 meter square. Some of these blocks are angular. They're fractured, they appear to be grayish in color, dust covered. Most all of them have fillets. Man, look at that slope! That's End crater right there, just over that rim there - just to your left. End crater is on about a 10 to 12 degree slope, pointed toward North Ray.	(LM-11)
06 22 24 30	CDR	We're traveling due east here for awhile to pick up a little smooth ground.	(LM-11)
06 22 24 36	LMP	What do you say? Are we going down about a 5-degree slope here or 10?	(LM-11)
06 22 24 41	CDR	Yeah, 5 or 10. More like 10.	(LM-11)

06 22 24 43	LMP	We're about maybe a half a crater diameter to the northeast of Palmetto. About a 10 degree slope, and the boulder population is about 5 degrees here, and the small cobbles have just about disappeared. Very smooth regolith, except for these 20- to 30-centimeter boulders, which are not very numerous. We're really moving out downslope, at about 12 to 15 kilometers an hour.	(LM-11)
06 22 25 29	LMP	It's remarkable how subdued all these craters are. It's almost a smooth plain - except for a few of the 5-meter craters or so. The 1-meter size and smaller are just about gone. They're just - apparently - very subdued. We're at 2.2 at 195. We'll swing the camera around towards the front. It's looking off to the right now.	(LM-11)
06 22 26 14	CDR	Let's get a better heading here from 2.2 to 195.	(LM-11)
06 22 26 22	LMP	Okay. End crater was 2.1. What they want is about - just directly north, John.	(LM-11)
		- - -	
06 22 26 29	CDR	We're down to where the rock population is almost nonexistent.	(LM-11)
		- - -	
06 22 26 40	LMP	It's really easy going, Tony. Well he's got his full blower at 11 clicks and we're just going over an undulating terrain. The ridge lines here predominantly trend east-west, and they are about 5 meters in relief, and really the only significant craters that you have out here are the ones that are 5 meters and larger, and they're only maybe - cover 30 percent of the surface.	(LM-11)
06 22 27 18	CDR	Look at that view! Look at those boulders!	(LM-11)
06 22 27 20	LMP	Look at those rocks. Tony, there are some tremendous boulders on North Ray, they get bigger as we go near them.	(LM-11)

06 22 27 28	CDR	Okay, one reason why North Ray looks like in the photos, it had such steep walls on one side, is because the rim is raised on one side higher than the other, don't you get that impression, Charlie?	(LM-11)
06 22 27 41	LMP	Yeah, I sure do.	(LM-11)
06 22 27 45	CC	Do you think you'll be able to recognize the edge of the continuous ejecta blanket?	(LM-11)
06 22 27 52	LMP	Right now I can't - -	(LM-11)
06 22 27 59	CDR	I think we're starting to get into it right now, Charlie.	(LM-11)
06 22 28 01	LMP	Well the cobbles or boulders are picking up. We're at 2.6 at 192 and beginning to pick up a high frequency, maybe 10 percent now, of cobbles and boulders. John, I think it looks like - see that white boulder dead ahead? Looks like the greatest variety of boulders is going to be over there, but that is farther east than our Station 11, but further north than Station 11, is called for. It's almost at the foot of Smoky -	(LM-11)
06 22 28 43	CDR	Let's go up on the rim and see what we've got up here.	(LM-11)
06 22 28 48	LMP	Okay, I'd love to.	(LM-11)
		- - -	
06 22 29 04	LMP	Okay, Tony in this area now for 192 at 2.7 we're getting into a greater frequency of 1 meter size craters and it's making it a little bit bumpier ride.	(LM-11)
06 22 29 16	CC	Okay, you might watch for a change in soil color or albedo as you go along there.	(LM-11)
06 22 29 24	CDR	That's what we're watching for. I get the (feeling that) the real change comes up - - a little closer to the - that one.	(LM-11)
		- - -	

06 22 29 45	LMP	John I don't think we're going to go straight between those two big rocks. Looks like to me like that's a pretty steep slope. If we swing them a little bit east here, and then go up just on the edge of that boulder ray right there, we'll make it.	(LM-11)
06 22 30 01	CDR	Over here?	(LM-11)
06 22 30 02	LMP	Okay, Tony now that we get over here and can see down off the flank of North Ray, we can see good boulder rays out of North Ray that go for perhaps - I'm going to say half a crater diameter, boulders greater than a meter size.	(LM-11)
06 22 30 24	CC	Okay, could you take a look up at Smoky area there and see what kind of structure and texture you can see on the face.	(LM-11)
06 22 30 34	LMP	Been looking at that - can't see anything except for a couple of rays - the boulders out of North Ray - that trend, one goes almost into Ravine that I described, and one goes on up to the top. In the northeast wall of Ravine, you can see the lineation. To the northeast they are horizontal; to the north they are dipping east about 30 degrees.	(LM-11)
06 22 31 01	CC	Can you push your camera up that far to get a picture of that?	(LM-11)
06 22 31 08	LMP	I'll take the camera off and do it.	(LM-11)
06 22 31 14	CDR	Charlie, don't do that.	(LM-11)
06 22 31 16	LMP	No sweat.	(LM-11)
06 22 31 33	CDR	Take a picture of that crater the road had us going through.	(LM-11)
06 22 31 40	LMP	Oh, yeah, I did.	(LM-11)
06 22 31 41	CDR	That's a nice one.	(LM-11)
06 22 31 45	LMP	That to me looks like just a big sink feature John.	(LM-11)
06 22 31 56	CDR	Okay, we're definitely in the regolith right now because see how these blocks are all laid in there? Remember how it was up at that crater - at Schooner?	(LM-11)

06 22 32 10	CDR	Those rocks are laid into the ejecta blanket. That's where they came from.	(LM-11)
06 22 32 13	LMP	At 191 at 3.1 we're coming into some good size whitish-looking rocks that are 3 and 4 meters across, they are fractured. There's probably a permanent shadowed sample - no that wouldn't be - -	(LM-11)
06 22 32 28	CDR	If you didn't know better you say that they were bedrock outcrops, but they are just laid in there I'm sure from North Ray.	(LM-11)
06 22 32 36	LMP	And as we go to the southeast side of North Ray, there is a big sink feature - a big pit, that's elongate east-west and we could drive in it from the east, but once you get into the south of South Ray it is really a deep pit, Tony. And that ridge line that we saw from the LM is on the west side of that deep pit. It's probably a hundred meters below the rim of North Ray.	(LM-11)
06 22 33 15	CC	And on the boulders you are looking at now that you think might be thrown in, you might talk about the fillet sizes away and towards the crater, see if that corresponds with the secondary.	(LM-11)
06 22 33 35	LMP	We are not close to any of them right now. We're in a very smooth area. At 3.4 at 190, we're down in this area where I've just described it goes into that big pit off to our west.	(LM-11)
06 22 33 57	LMP	About a crater diameter from North Ray off to the east, I see some 3-meter boulders that are all rounded and sitting in the regolith with good fillets. Okay, now here's one, Tony off to the right - - at 34.	(LM-11)
06 22 34 19	LMP	It's a 2 meter size boulder with a fillet that looks like sort of equidimensional around the boulder.	(LM-11)
06 22 34 35	CC	Okay, I understand. Do you see any clasts in these boulders?	(LM-11)
06 22 34 37	LMP	We just passed another, 1 meter - they just look whitish to me.	(LM-11)

06 22 34 46	LMP	That was another one we just passed. 1 meter size. It had the biggest fillet upslope.	(LM-11)
06 22 34 51	CDR	Here's a new crater right there Charlie.	(LM-11)
06 22 34 53	LMP	Right to the right.	(LM-11)
06 22 34 54	CDR	Yeah.	(LM-11)
06 22 34 55	LMP	These craters that we call secondary, that are indurated, I frankly think are very, very fresh craters, because it looks very cloddy around them, and the other ones that are secondaries do not appear that way, over.	(LM-11)
06 22 35 27	CDR	I'm not so sure that this isn't such an old crater, that the secondaries aren't eroded down. We've really got good going right here. Before we get too far along, let's study this thing and see if we can figure out a way to get up that rim without going through all the boulders - -	(LM-11)
06 22 35 34	LMP	John, see that big one off to the right over there.	(LM-11)
06 22 35 38	CDR	I see that.	(LM-11)
06 22 35 39	LMP	Okay, I think up that slope looks to me to be the best. Of course, it might be straight ahead might be best.	(LM-11)
06 22 35 45	CDR	I don't see any rocks straight ahead.	(LM-11)
06 22 35 49	LMP	We're heading about 3.0 and 187. The large boulders will be off to our right. There's a black brownish looking one and then there is a solid white one that's right at the base of Smoky mountain and North Ray. That might be worth a little jog over there if it's not too far. It's the most unique white boulder we've seen.	(LM-11)
06 22 36 21	CC	Okay. We'll keep that in mind on the way back.	(LM-11)
06 22 36 29	LMP	Okay we're at 3.7 and 186. And we just passed two frothy looking boulders. The biggest one is perhaps 5 meters across, and they have vertical jointing or fracturing to them, and they have a frothy appearance to it. I'm about 20 meters from it now.	(LM-11)

06 22 36 58	LMP	Man, that is a big rock!	(LM-11)
06 22 37 04	LMP	Okay Tony there's not any house size rocks but the biggest ones are maybe 5 meters. And it's really smooth except for these big rocks out here, it's smooth going.	(LM-11)
06 22 37 23	LMP	There's a real fresh little crater right there. See the rays - - off to the left?	(LM-11)
06 22 37 28	LMP	It's about a meter size.	(LM-11)
06 22 37 29	CC	Hey could you use a couple more words - - to describe that frothy rock?	(LM-11)
06 22 37 38	LMP	It's got a hackly surface to it - -	(LM-11)
06 22 37 41	CDR	It's black in color. Right Charlie?	(LM-11)
06 22 37 44	LMP	Yeah.	(LM-11)
06 22 37 46	CDR	Okay we're going up a pretty steep slope right now Houston. I think we're almost to the rim, Charlie.	(LM-11)
06 22 37 54	LMP	Yeah we are. Looks like we're just about 20 meters from the rim.	(LM-11)
06 22 37 59	CDR	I'm going to slow down here.	(LM-11)
06 22 38 01	LMP	How about hooking a right over here, John.	(LM-11)
		- - -	
06 22 38 23	CC	Okay, we'd like you to go to 12 frames per second.	(LM-11)(PHO DAC)
06 22 38 29	LMP	Okay. You got it.	(LM-11)(PHO DAC)
		- - -	
06 22 38 41	CDR	We're on a relatively flat surface now.	(LM-11)

06 22 38 45	LMP	The rocks here Tony are all rounded. Most of them - 70 percent are rounded and the other ones are subangular, mostly dust-covered grayish in color. The big rocks are not on the rim. The big rocks are further away from the rim. At least we can't see any big rocks as we approach the rim, but we're still climbing upslope.	(LM-11)
06 22 39 17	LMP	Man, look, there's a tremendous one - there's a 10 meter boulder off to the right over there John. There's a fresh crater. Really fresh one that has a white interior that's punched in about 2 meters deep, and that was at 181 at 4.0. Hey there's some beautiful white ones over there - - John, at 2 o'clock. Think this is the rim, right here?	(LM-11)
06 22 39 56	CC	We still think you're about 500 meters to the rim.	(LM-11)
06 22 39 59	LMP	We'll be able to sample these white ones. Here's some - we are, there's the rim, up there.	(LM-11)
06 22 40 07	CDR	Sure is.	(LM-11)
06 22 40 11	LMP	Sure is, Tony. You were right. We just climbed - what we thought was the rim was one of these little hummocks.	(LM-11)
06 22 40 18	LMP	Little hummocks - - it was a pretty steep hummock.	(LM-11)
		- - -	
06 22 40 27	LMP	Okay I'm going to pan the DAC around to get to that boulder field that goes up to north - Smoky mountain. It's really tremendous. The boulders are very angular over there. They're dark gray in color. Some of them are almost solid white. The most unique ones appear to be solid white. Up on the rim here they appear to be almost white, none of the dark ones. And we're at 180 at 4.1. Smooth regolith. John, the rim is left.	(LM-11)(PHO DAC)
06 22 41 09	CDR	The rim's right there.	(LM-11)
06 22 41 10	LMP	No sir. I bet it's over there to the left where those rocks are. But you might be right. That's too far away. You're right that's probably too far west.	(LM-11)

06 22 41 22	CC	We think the most direct route from where you are to the rim would be about a heading of 350.	(LM-11)
06 22 41 33	LMP	We're heading that way and those white rocks are - -	(LM-11)
06 22 41 40	CDR	Right on the rim Charlie.	(LM-11)
06 22 41 41	LMP	- - right on the rim.	(LM-11)
06 22 41 42	CC	Outstanding. Can you see on around to see if there are any black rocks around at 3 o'clock in the crater?	(LM-11)
06 22 41 51	LMP	Well, we can't see in the crater. But around at the 3 o'clock position, yeah there's a biggy. The biggest one is this 10- to 15-meter boulder that is on the rim and it's blackish.	(LM-11)
06 22 42 04	CC	Okay is there any chance of working around towards that contact? If we could get both the white and black in one stop that would be really fine.	(LM-11)
06 22 42 15	CDR	No way.	(LM-11)
06 22 42 18	LMP	That's pretty far. I think we could do it with a short stop over there. When we get up there we might be able to find a black rock.	(LM-11)
06 22 42 28	LMP	We're definitely on the ejecta blanket here. And, oh, within 100 meters or so I think of the rim.	(LM-11)
06 22 42 44	LMP	The rocks are just white, crystalline white looking.	(LM-11)
		- - -	
06 22 42 56	CDR	Yeah we're 179 at 4.4 right now.	(LM-11)
		- - -	
06 22 43 08	CDR	He wants us to park - -	(LM-11)
06 22 43 10	LMP	360. Go on out to the rim. Okay that's a breccia. That white one is a breccia.	(LM-11)
06 22 43 20	CDR	There's the rim.	(LM-11)

06 22 43 22	LMP	Yeah there it is. Okay I think we can get over there, maybe get them a picture. We're headed about 360 aren't we?	(LM-II)
06 22 43 31	CDR	Yep.	(LM-II)
06 22 43 35	LMP	I can't believe the size of that big black rock over here. And I don't think that's a breccia John. But, although it might be. I see some large white clasts.	(LM-II)
		- - -	
06 22 44 15	CDR	What I'd like to do is park where it's flat.	(LM-II)
06 22 44 30	LMP	Right here's where they get a great view of the interior - of the upper third of the wall. Okay Tony we're on the rim.	(LM-II)
06 22 44 50	CDR	If we go 360 and park right here it'll be flat.	(LM-II)
		- - -	
06 22 45 15	LMP	- - 360 179, 5.5, 4.5	(II)
		- - -	
06 22 46 25	LMP	John, read my frame count.	(II)
		- - -	
06 22 46 31	CDR	165. You better change that out.	(II)
06 22 46 33	LMP	Okay. Took 165 pictures coming up here, Tony.	(II)(PHO III 18034-192)
		- - -	
06 22 46 44	LMP	I'm going to put another black-and-white on, Kilo.	(II)
		- - -	
06 22 47 14	CDR	Man, does this thing have steep walls.	(II)
06 22 47 16	LMP	They said 60 degrees.	(II)

06 22 47 18	CDR	Now, I tell you, I can't see to the bottom of it, and I'm as close to the edge as I'm going to get.	(II)
		- - -	
06 22 48 48	LMP	Okay, do you want me to start out with the 500?	(II)(PHO 105 17118-82)
06 22 48 50	CC	Right. Go ahead and start out with your 500.	(II)(PHO 105 17118-82)
06 22 48 52	LMP	Okay. I have magazine Kilo frame count 1, I think it was.	(II)
06 22 49 13	LMP	Those rocks you're looking at now, Tony, are white and they look like breccias to me. The big black one is off behind the TV, and you're going towards the rim on the crater right now.	(II)
06 22 49 34	CDR	The unfortunate thing about it, Houston, is that rascally rim - it goes down - it slopes in to it about - say 10 or 15 degrees, which is the kind of slope I'm standing on right now and then all of a sudden in order to see the bottom, I've got to walk another 100 yards down a 25 to 30 degrees slope and I don't think I'd better. Maybe we can drive around to the other side and see down into it.	(II)
06 22 50 13	CC	Man, is that a hole in the ground.	(II)
06 22 50 14	LMP	The inside - it really is. I see no bedrock, though. All I see is boulders around the crater. There's nothing that reminds me of bedding, just loose boulders, though, it might very well be it's so shocked that they could be real boulders - I mean real bedrock there.	(II)
06 22 50 37	CDR	The boulder layers are horizontally oriented and of course, they are all covered with talus. Over on the north wall in particular, about one-third of the way from the top, is a line of boulders which you'd probably ought to be able to see on the TV, but they're all oriented right in that line, which would lead one to think that it's bedding there. Don't you see that line right over there, Charlie?	(II)
06 22 51 11	LMP	I'm worried about trying to get this crazy camera going here.	(II)

06 22 51 24	CC	That line of boulders on the north wall, what color were they?	(II)
06 22 51 30	CDR	In this light they appear to be dark boulders.	(II)
06 22 51 36	CC	The white rocks you see there. Do they look like the Cone crater type white rocks?	(II)
06 22 51 48	LMP	No, not to me.	(II)
06 22 51 55	CDR	Better let me get a piece of one, Charlie. This is definitely a breccia right here, a big foot and a half breccia. It's a white matrix with dark clasts, and it looks to be a three-rock breccia; some of the dark clasts here even darker clasts than those.	(II)
06 22 52 24	LMP	Okay, Tony, I picked up magazine Mike - it's on the 500.	(II)
06 22 52 30	CDR	Okay, Houston, I just picked up a grab sample of breccia. It's very friable. It looks shocked. It has black glass in it - glass a couple of millimeters across, and it's so worn down that you know what it really looks like? It looks like a - if I can use the analogy. I'm not sure what the heck it is. It looks like a (tuff?) - it just looks like a rock - the clasts are sticking out of it.	(II)(SAMP 67030-35)
06 22 53 20	LMP	Okay, Tony, what other pictures do you want me to get with the 500? I've done the interior of the crater. Did you say you wanted Smoky or Stone mountain?	(II) (PHO 105 17118-82)
06 22 53 29	CC	Okay, we'd like some more pictures of Smoky.	(II)(PHO 105 17183-215)
06 22 53 41	CC	And John, in your mineral description, could you see crystal shape?	(II)(SAMP 67030-35)
06 22 53 44	CDR	Could I see a crystal shape? Now the clasts in there are very angular. Maybe that's a zap crater - the white matrix doesn't have any crystalline structure that I can recognize.	(II)(SAMP 67030-35)
06 22 54 34	CC	And Charlie verify that you turned the DAC off.	(II)(PHO DAC)
06 22 54 41	LMP	Yeah, I think so, I'll check again.	(II)(PHO DAC)

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06 22 54 48	CC	We'd like Charlie there to go ahead and take the far-field pan of the crater and go on around and do a full pan. It looks like you could probably do the thing from one place and John, we'd like you to start ranging out in the most - the best traverse direction for about 80 meters if you can go that far, and survey the area as you go out, and Charlie will follow you along, and sample as you come back.	(11)(PHO 116 18592-614)
06 22 55 17	CDR	Okay, that would be 80 meters to the northeast here.	(11)

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06 22 55 29	LMP	Pan is complete and I'm up to 165 on magazine Mike.	(11)(PHO 116 18592-614)
06 22 55 38	LMP	My description of the crater: 60 percent of it is covered with boulders up to 3 meters - make that 50 percent of it on the interior. We cannot see the bottom. The boulders are sprayed out from the center in rays - that about every eighth to quarter of a crater you have a definite ray.	(11)
06 22 56 10	CC	John did you get bag number on that?	(11)(SAMP 67030-35)
06 22 56 12	LMP	Do you still want me to take the 500?	(11)
06 22 56 16	CDR	Yeah. Excuse me 373 I think. (382)	(11)(SAMP 67030-35)
06 22 56 21	CDR	It's in the bottom of SCB 7. Anyway I can identify that rock for you.	(11)(SAMP 67030-35)

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06 22 56 31	CC	After your 500 millimeter do the far-field pan and the 3 polarizer settings of the far side of the crater, and then when you follow John along take the 500 millimeter with you.	(11)(PHO 116 18592-614)

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06 22 57 08	LMP	Okay, Tony, I'm starting this polarimetry from about the 10 o'clock position of the Rover.	(11)(PHO 106 17239-77)

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06 22 57 28	LMP	I'm starting in the right position, I've got f:6, 125th at 74. And I'll do a partial pan with each film - with each setting. It's going to be about an eight-picture pan.	(II)(PHO 106 17239-48)
06 22 57 51	LMP	Man I wish I could see the bottom of this beauty.	(II)
06 22 58 00	LMP	That was in the right - going from right to left in the right setting - center setting going from left to right.	(II) (PHO 106 17249-62)
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06 22 58 34	LMP	In the left setting, going from right to left. Tony we can look out at my 12 o'clock postion here, I can look down and see a large block that on this inner flank here that I can't - - it's dust-covered, and I can't tell you what type it is.	(II)(PHO 106 17263-77)
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06 22 59 27	LMP	Okay, Tony, magazine Kilo, I'm up to 40 with the far field.	(II)
06 22 59 35	LMP	I'm in the left position - I'm going back to the right. You want that stereo base, right?	(II)
06 22 59 42	CC	That's right. We'd like you to leave the polarizer on and take the 500 milimeter with you also and then range out your 80 meters.	(II)
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06 23 00 14	CDR	It (SCB) fell off enroute.	(II)
06 23 00 19	LMP	Hey Tony if that thing (SCB) fell off - the SESC was in it.	(II)
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06 23 00 46	LMP	I'm going to get the shovel. Tony are you going to want a rake sample along the rim here?	(II)
06 23 00 59	CC	No, let's go get the polarizer first and polarizing pictures and we'll do the sampling on the way back.	(II)

06 23 01 10	CDR	This is about as far as I'd like to go.	(II)
06 23 01 14	LMP	That's about 80 meters. Man are we dusty.	(II)
06 23 01 19	CDR	I can't see the bottom of the crater though.	(II)
06 23 01 20	LMP	I know it. That's a shame. You see that big rock beyond John, Tony?	(II)
06 23 01 28	CC	Yeah, we sure do. How about rolling that one over?	(II)
06 23 01 33	LMP	No way.	(II)
		- - -	
06 23 02 02	LMP	Right under the upper dull gray soil there's a layer of whitish material, much like it was at South Ray.	(II)
06 23 02 26	LMP	I'll go over and there's the shovel you can use to pick that up with John.	(II)
06 23 02 32	LMP	Okay I'm going to get the far field from right here and I must have a 70 to 90 meter base, I'd say.	(II)(PHO 106 17278-317)
06 23 02 46	LMP	Maybe only 50 - let me move down a little bit further.	(II)(PHO 106 17278-317)
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06 23 02 56	CDR	Okay, Houston I'm going to pick up a sample which I think is the black type rock, but it is sort of dust covered.	(II)(SAMP 67050,55)(PHO 116 18615-18)
06 23 03 13	LMP	Starting the pan in the right position, Tony.	(II)(PHO 106 17304)
06 23 03 17	LMP	From right to left.	(II)
06 23 03 33	CDR	No, I was wrong, it was a very friable, must be shocked white rock with a lot of black clasts - looks like about 50 percent of the rock is black clasts, which was a lot more than the last rock I picked up and it sure is friable. So that means it's taken a heck of a beating and that's going into bag number 383.	(II)(SAMP 67050,55)

06 23 04 40	LMP	The pan is complete in all three settings and I'm up to 80. Do you want a 500 from here also, Tony.	(II)(PHO 106 17278-317)
06 23 05 11	CC	Right, sure do, you probably have 20 or 25 pictures left in that 500 so maybe that'll give you the entire inside of the crater there. We'll just shoot up the rest of the roll in there.	(II)
		- - -	
06 23 06 40	LMP	I'm doing some vertical stereo's of these rays coming out of the crater. Ah, out of film.	(II)(PHO 105 17216-35)
06 23 06 56	CC	How much of the inside did you get?	(II)
06 23 07 02	LMP	Oh, I got I partial pan of about 3 quarters of the way up of the entire wall, and then 2 ray, 2 vertical - almost 2 vertical rays.	(II)
		- - -	
06 23 07 54	LMP	Look at this rock right here, John. Pure white.	(II)(SAMP 67070,75)(PHO 106 17318-19)
06 23 08 00	LMP	Yeah, it's really shocked whatever it is. It looks like chalk, Tony, it's so shocked. It's about pebble size and it's broken open, let's make it 5 centimeters long, broken open. Let me get this one documented. Okay, the polarizing filter's coming off, I hope.	(II)(SAMP 67070,75)
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06 23 09 11	CDR	The black clasts in this rock are really, really black material. It's either a very fine-grained black breccia, I'll tell you what it looks like, it looks like that black breccia, fine-grained lined(?) that had that white clasts in it on Apollo 15. Although here, the matrix is white and the clasts are black.	(II)(SAMP 67015)(PHO 116 18619-23)
06 23 09 54	CC	How large are the clasts?	(II)(SAMP 67015)
06 23 09 57	CC	Is this black breccia frothy too?	(II)(SAMP 67015)

06 23 10 03	CDR	Three centimeters. No, it's not frothy at all. It's dense.	(11)(SAMP 67015)
06 23 10 10	CDR	It could be a very dense basalt-like rock. It looks like it has the 90-degree cleavage on it and I'm hard put to tell that. That's just the way it breaks. But it's sure shocked. It's too big to go in the bag but I'm going to put it in there anyway.	(11)(SAMP 67015)
06 23 10 36	CDR	At least it has a shocked appearance.	(11)(SAMP 67015)
		- - -	
06 23 10 44	LMP	I was going to get this one over here.	(11)(SAMP 67070,75)
06 23 10 47	LMP	I finally got the polarizing filter off, Tony.	(11)
06 23 10 55	LMP	Okay, looking back from where we are, Tony, towards the west - south rather, I can see South Ray.	(11)
06 23 11 07	CDR	I'd like to make sure we're not overlooking something here, Charlie.	(11)
06 23 11 11	LMP	That's why I'd like to go on down to that black rock down there, John.	(11)
		- - -	
06 23 11 19	LMP	Big one.	(11)
06 23 11 20	CDR	Okay, here's a small secondary up here on top of the rim. It's about a meter across, about a meter deep and it has either very angular black clasts or part of this black rock in total, and they must be 4 or 5 centimeters across in there and I'll get one or two of those babies.	(11)(SAMP 67090,95)(PHO 116 18624-28)
06 23 12 02	LMP	Hey, John. Can I get a bag from you.	(11)(SAMP 67070,75)
		- - -	
06 23 12 19	LMP	I picked up that white -	(11)(SAMP 67070,75)
06 23 12 25	CDR	I'll get it for you.	(11)(SAMP 67070,75)

06 23 12 26	LMP	Thank you. That white shocked rock. It's broke in two. There's two pieces of it. Partially documented, the befores anyway, and 384.	(II)(SAMP 67070,75) (PHO 106 17318-19)
06 23 12 43	LMP	I'm going back and get some bags.	(II)
06 23 12 50	CDR	Now, I've got Charlie's shovel for scale for the before shot.	(II)(SAMP 67090,95)(PHO 116 18624-27)
		- - -	
06 23 14 04	LMP	Y'all didn't see any bags fall off anywhere, did you?	(II)
06 23 14 08	CC	No, we didn't see them.	(II)
06 23 14 15	CDR	The outer surface of that rock is dust covered. It appears to be a really black glass. It's going into 385.	(II)(SAMP 67090,95)
06 23 14 44	LMP	You can see Baby Ray, way on past Kennesaw, where there's a bright fresh crater down there on it's flank.	(II)
		- - -	
06 23 15 03	CDR	What really attracts me to this rock, even though it's dust covered, Houston, is the fact that it has right angles to it. It did, before I picked it up.	(II)(SAMP 67090,95)
		- - -	
06 23 15 44	CDR	Yeah, this next one that's going in, was so dust covered after I picked it up and dropped it into the dirt, I can't describe it to you. Other than to say it's dust covered. It's going into bag 386.	(II)(SAMP 67110,15)(PHO 116 18624-28)
06 23 16 01	LMP	Okay, Tony, the 500 is complete. What do you want me to do now?	(II)(PHO 105 17216-35)
06 23 16 05	CC	Just go back and sample. We'd like big boulder samples and look for that - well, I guess, we're just boulder sampling now.	(II)
06 23 16 16	LMP	I'd like to go up to the southwest around the rim the other direction from John and try my hand at these large white rocks.	(II)

06 23 16 28	CDR	I don't think we can drive the Rover over to here.	(II)
06 23 16 31	LMP	No, I agree. I was just going up here a little bit, John, and do some of the flight-line stereo of this 3 meter block up here. Tony, some of these places are - rocks are glass covered. They are all fractured - very beat-up looking.	(II) (PHO 106 17323-30)
		- - -	
06 23 17 11	CDR	If you're going to boulder sample, Charlie, I'd better come and help you.	(II)(SAMP 67430,35)(PHO 106 17320-22)
06 23 17 14	LMP	No, I'm just going to whack - I'm not gonna really do - the true thing. I'll be down there to help you in a minute.	(II)(SAMP 67430,35)
06 23 17 21	CDR	Charlie, you want to go down to this big boulder down here?	(II)
06 23 17 24	LMP	I'd like to in a minute. I wanted to make sure we get whatever this is up here on these white rocks.	(II)(SAMP 67430,35)
06 23 17 32	CC	John, how far away is that big boulder?	(II)
06 23 17 38	CDR	It is about 150 meters but the rocks around it are really something else. That's the problem - its trafficability up to it.	(II)
		- - -	
06 23 18 23	LMP	Okay - here's an old glassy rock, Tony, that's glass coated. Anyway, it went into 415.	(II)(SAMP 67430,35)
06 23 18 45	LMP	And it was hackly looking on the surface - that's why I stopped to get it.	(II)(SAMP 67430,35)
06 23 18 57	CDR	Charlie, we could probably get a pretty good cross section up here with just a rake sample.	(II)
06 23 19 01	LMP	Yeah, I agree.	(II)
06 23 19 26	LMP	I'm going to give you a little stereo on this boulder.	(II)(PHO 106 17323-30)
06 23 19 30	CC	If you see any clasts - - or anything in it, a closeup might look good.	(II)(PHO 106 17327-30)

06 23 19 36	LMP	That's what I'm going to do.	(II)(PHO 106 17327-30)
		- - -	
06 23 19 49	CDR	Want to give me a hand with this rake sample, Charlie.	(II)
06 23 19 54	LMP	Yeah, if you can standby just a minute, John.	(II)
06 23 20 01	CDR	Did you describe this one with the black streak running through it?	(II)
06 23 20 09	LMP	No.	(II)
06 23 20 14	CDR	It has a black fracture pattern running right through the middle of it. It's about 6 - it looks like a Sudbury breccia.	(II)
		- - -	
06 23 20 35	CC	Charlie, while you're up at that boulder, if you can get - - some of that fillet as well as the boulder?	(II)(SAMP 67460-64)(PHO 116 18632-33; 106 17333-36)
06 23 20 43	LMP	Okay, I don't have anything to fillet with, but we'll see.	(II)(SAMP 67460-64)
		- - -	
06 23 21 12	LMP	There's one of these white rocks up here, John, that's got a fracture on it.	(II)(SAMP 67450,55)(PHO 106 17331-32)
06 23 21 19	CDR	Got a hammer?	(II)(SAMP 67450,55)
06 23 21 20	LMP	Yeah, I got the hammer. It's just loose, the stuff is lying up there on the top.	(II)(SAMP 67450,55)
06 23 21 30	LMP	Hey, Tony, we'll fillet sample for you up here.	(II)(SAMP 67460-64)
06 23 21 39	CDR	Got a shovel?	(II)(SAMP 67460-64)
06 23 21 40	LMP	No, I don't have a shovel but I got a hammer.	(II)(SAMP 67460-64)
06 23 21 48	CDR	I'll come up there and help you. We can do the rake sampling.	(II)

06 23 21 57	CC	Charlie, if possible, we'd like some samples on that stuff on top of the boulder.	(11)(SAMP 67450,55)
06 23 22 03	LMP	That's what I'm going to do.	(11)(SAMP 67450,55)
06 23 22 13	LMP	I'm not going to give you any scale, though.	(11)(SAMP 67450,55)
		- - -	
06 23 22 27	LMP	It looks like the same thing that John had described. It's a friable breccia with a black clast being aphanitic. The largest clast I see is not in the sample but it's a black one that's a centimeter across. It has a bluish tint to it. It looks like all those shocked rocks that Fred Horz was telling us about. Exactly, and that's in bag 416.	(11)(SAMP 67450,55)
		- - -	
06 23 23 35	CDR	Charlie, put that in my bag.	(11)(SAMP 67450,55)
06 23 23 37	LMP	Okay. You don't have a bag. It fell off. Let's just use this one, okay? They want a fillet up here, John. Could we get a fillet - up there where that gnomon is? I'll get the cross-sun.	(11)(SAMP 67450,55) (SAMP 67460-64) (PHO 106 17333-34)
06 23 24 24	LMP	That fillet is 417.	(11)(SAMP 67460-64)
06 23 24 40	CDR	Okay, I'll get the down-sun here.	(11)(SAMP 67460-64)(PHO 116 18633)
06 23 24 45	LMP	There's an after and I'll try to get a locator from up here.	(11)(SAMP 67460-64)(PHO 106 17335) (PHO 106 17336)
		- - -	
06 23 24 58	CDR	Did you get the boulder off the top?	(11)(SAMP 67450,55)
06 23 25 01	LMP	Yes, I did. I got that sample.	(11)(SAMP 67450,55)
06 23 25 03	CDR	It's a multi-rock breccia.	(11)(SAMP 67450,55)
06 23 25 09	LMP	The matrix is the white - with the black being the clasts.	(11)(SAMP 67450,55)

06 23 25 15	CDR	Yeah, I see at least 2 different colors of light-dark clasts. They must be at least a 3 rocker.	(II)(SAMP 67450,55)
06 23 25 27	CC	You feel like you got all three?	(II)
06 23 25 28	CDR	The rake sample, Charlie.	(II)(SAMP RAKE 67510-76)
06 23 25 29	LMP	Okay, good idea, John.	(II)(SAMP RAKE 67510-76)(PHO 116 18637-40)
06 23 25 35	CDR	I can't imagine how they wouldn't be in the clasts that Charlie picked up. Look at these rocks here, that I just stepped on.	(II)
06 23 26 00	LMP	Hey, John, I'm chipping out this little tiny, this big black clast here. It's coming right out. I don't think we got any of it in that sample that I got. And this thing is so friable. Hey, I got it.	(II)(SAMP 67475)(PHO 106 17337)
		- - -	
06 23 26 35	LMP	This black clast I chipped out is an aphanitic matrix, it looks like a typical basalt to me. I got a picture of it after I chipped it out. I didn't think I was going to be able to, but it came out, get a 5 footer. It's going in 418.	(II)(SAMP 67475)(PHO 106 17337)
06 23 27 15	LMP	I haven't seen a rock like that before in the Apollo samples.	(II)(SAMP 67475)
		- - -	
06 23 27 38	CDR	I have a rock here that is a fine white crystalline rock. It's pretty well dust covered, but I don't see any clasts in it.	(II)(SAMP 67410,15)(PHO 116 18634-36)
06 23 27 57	CDR	Of course it could be just a hunk of matrix that got busted loose. But as fine as these clasts are in it - that's going into bag 387 as fine as these rocks are, I don't see how you can miss one.	(II)(SAMP 67410,15)
06 23 28 16	LMP	Sorry, we're working behind that big rock there Tony, from the tube. John why don't we get out - - and do a rake sample where they can see us.	(II)

06 23 28 29	LMP	Just anywhere we rake, we got a good rake-soil sample.	(11)
		- - -	
06 23 28 48	CDR	Let's get a soil sample right here.	(11)(SAMP 67480-89,95)(PHO 116 18637-40)
06 23 28 51	LMP	Okay.	(11)(SAMP 67480-89,95)
06 23 28 54	CDR	Here, take this. I can get it with this.	(11)(SAMP 67480-89,95)
06 23 28 56	LMP	Okay, you want to document it?	(11)(SAMP 67480-89,95)
06 23 28 59	CDR	Yes, we can, but it don't really see much -	(11)(SAMP 67480-89,95)
		- - -	
06 23 29 27	LMP	The regolith here, Tony up on this crater rim is really soft. We're sinking in on the slopes about 6 inches or so.	(11)(SAMP 67480-89,95)
06 23 29 49	LMP	The soil sample here is 419.	(11)(SAMP 67480-89,95)
		- - -	
06 23 30 07	LMP	Let's get in a clear spot, John, to rake, okay?	(11)(SAMP RAKE 67510-76)
06 23 30 10	CDR	Well we can do it down there too.	(11)(SAMP RAKE 67510-76)
06 23 30 11	LMP	It looks almost fruitless up here. Oh no, there's some rocks.	(11)(SAMP RAKE 67510-76)
06 23 30 18	CDR	Lot of rocks there, Charlie, one rake sample.	(11)(SAMP RAKE 67510-76)
06 23 30 21	LMP	One rake sample right out here, Tony.	(11)(SAMP RAKE 67510-76)
06 23 30 27	LMP	You can see us on the tube.	(11)(SAMP RAKE 67510-76)
06 23 30 29	LMP	It's going in 420.	(11)(SAMP RAKE 67510-76)
06 23 30 36	CDR	Just hold still.	(11)(SAMP RAKE 67510-76)
06 23 30 39	LMP	Oh, he's got some nice ones there.	(11)(SAMP RAKE 67510-76)
		- - -	

06 23 30 46	CDR	Got them in there?	(11)(SAMP RAKE 67510-76)
06 23 30 47	LMP	Yes.	(11)(SAMP RAKE 67510-76)
06 23 30 51	LMP	They're so dust covered I can't really see what they are.	(11)(SAMP RAKE 67510-76)
		- - -	
06 23 31 04	CDR	Let me put that one in.	(11)
06 23 31 07	LMP	Okay, where you want to go?	(11)
06 23 31 08	CDR	Going back to it.	(11)
06 23 31 09	LMP	I got it, I got it, John	(11)
06 23 31 12	CDR	Let me get it. Over there.	(11)
		- - -	
06 23 31 26	LMP	Hey give me my bag, I'm not carrying a bag.	(11)
06 23 31 35	LMP	Why don't we go down half way, John, and do another rake sample and then go on down to the big black rock.	(11)(SAMP RAKE 67610-76)(PHO 106 17338; 116 18641-43)
06 23 31 43	CDR	Alright.	(11)(SAMP RAKE 67610-76)
06 23 31 46	LMP	That'll be about 150 meters radial - not radial, but concentric sampling.	(11)(SAMP RAKE 67610-76)
		- - -	
06 23 32 29	LMP	Here, let me take this down and we'll get down in this little hollow - and we'll use that (tong) for the gnomon - how's that for the rake sample?	(11)(SAMP RAKE 67610-76)
		- - -	
06 23 33 03	LMP	Then we'll get a down-sun - -	(11)(SAMP RAKE 67610-76)(PHO 106 17338)
06 23 33 05	CDR	And a cross-sun here.	(11)(SAMP RAKE 67610-76)(PHO 116 18641-42)
		- - -	

06 23 33 24	LMP	John, have I still got my SCB on my back?	(II)
06 23 33 29	CDR	Yep.	(II)
06 23 33 35	CDR	Come right down this way.	(II)
06 23 33 40	LMP	Okay, John's getting about 2 rakes, he's doing 2 rakes and he's got about 15 pebbles.	(II)(SAMP RAKE 67610-76) (SAMP RAKE 67610-76)
06 23 33 52	CDR	There's not any there.	(II)
06 23 33 54	LMP	That's a pretty good full sample. There you go, look at that. That's a bag full now. The third one was really fruitful.	(II)(SAMP RAKE 67610-76)
06 23 34 09	CDR	Okay, turn it. There you go. I could see vesicles in one of them.	(II)(SAMP RAKE 67610-76)
06 23 34 17	LMP	Yes, I could too. That's in 421.	(II)(SAMP RAKE 67610-76)
		- - -	
06 23 34 41	LMP	And getting a soil.	(II)(SAMP RAKE SOIL 67600-05)(PHO 106 17338; 116 18641-43)
		- - -	
06 23 35 09	LMP	422 for the soil sample.	(II)(SAMP RAKE SOIL 67600-05)
06 23 35 13	LMP	That's enough, John. That's a hundred grams.	(II)(SAMP RAKE SOIL 67600-05)
		- - -	
06 23 35 29	LMP	Okay, get an after of that please, while I pick this bag up.	(II)(SAMP RAKE SOIL 67600-05)(PHO 116 18643)
06 23 35 30	CDR	It's a large number.	(II)(SAMP RAKE SOIL 67600-05)
		- - -	
06 23 35 46	CDR	Okay, Charlie, let's go back to the Rover. Put your bag on there and head out for the big rock, because you got a bag on your back, and we'll use it.	(II)
06 23 35 59	LMP	Okay.	(II)

06 23 36 07	LMP	Look at the size of that biggie.	(II)
06 23 36 11	CDR	It is a biggie, isn't it. It may be further away than we think.	(II)
06 23 36 17	LMP	No, it's not very far. It's just right beyond you.	(II)
		- - -	
06 23 36 23	LMP	I got the shovel. The rakes best choice. And I got some bags - -	(II)
06 23 36 30	CDR	You got enough bags, I'll leave mine here.	(II)
06 23 36 33	LMP	Well, I've only got about ten or so.	(II)
06 23 36 37	CDR	Okay, that's how many I got.	(II)
06 23 36 39	LMP	Okay, bring yours too.	(II)
06 23 36 43	CDR	A rake and a shovel, right?	(II)
06 23 36 44	LMP	No, not the shovel.	(II)
06 23 36 45	CDR	Just the rake?	(II)
06 23 36 46	LMP	Yes, the rake is the best way.	(II)
06 23 36 48	CDR	That's what I got.	(II)
06 23 36 53	LMP	We'll stop about half way down here and do another rake, how's that?	(II)(SAMP RAKE 67710-76)(PHO 106 17339-40; 116 18644-46)
06 23 36 57	CDR	Good idea, Charlie.	(II)(SAMP RAKE 67710-76)
		- - -	
06 23 37 13	CDR	That's about half way, maybe. Okay, let me just dob this down here somewhere. I think we can get a permanently shadowed under that big rock. Look at that fillet on this side, Charlie.	(II)(SAMP RAKE 67710-76)
06 23 37 31	LMP	Okay, well we need the shovel for that.	(II)(SAMP RAKE 67710-76)
06 23 37 33	CDR	Well, it's here.	(II)(SAMP RAKE 67710-76)

06 23 37 35	LMP	Okay, yes, we can reach in there.	(II)(SAMP RAKE 67710-76)
06 23 37 52	LMP	Wait a minute, wait, wait wait. Don't know why I'm taking that down-sun now that the chart isn't there.	(II)(SAMP RAKE 67710-76) (PHO 106 17339)
06 23 38 22	LMP	He's getting a couple of whitish frags and then dust-covered gray-looking frags. I think you got a bag full there, John.	(II)(SAMP RAKE 67710-76)
06 23 38 34	CDR	Yep, three scoops and a bag full. It's all salted with that one white rock here.	(II)(SAMP RAKE 67710-76)
06 23 38 53	LMP	That's in 423.	(II)(SAMP RAKE 67710-76)
06 23 38 59	CDR	Hang onto this. That's going in Charlie's SCB.	(II)
06 23 39 09	LMP	Get an after of that, John, and I'll get the soil sample.	(II)(SAMP RAKE 67710-76)(PHO 116 18646) (SAMP RAKE SOIL 67700-08)(PHO 106 17339-40; 116 18644-46)
06 23 39 14	CDR	There's the after.	(II)(SAMP RAKE 67710-76)(PHO 116 18646)
06 23 39 15	LMP	It's hard under there, you know it?	(II)(SAMP RAKE SOIL 67700-08)
06 23 39 22	CDR	Yes, that's why the rake wouldn't go down.	(II)(SAMP RAKE SOIL 67700-08)
06 23 39 27	CDR	I'm not going anywhere. Hit it again.	(II)(SAMP RAKE SOIL 67700-08)
06 23 39 32	LMP	Tony, there must be a big rock right under here.	(II)(SAMP RAKE SOIL 67700-08)
06 23 39 37	LMP	I can't get the rake in.	(II)(SAMP RAKE SOIL 67700-08)
06 23 39 40	CDR	Look at that, Charlie.	(II)(SAMP RAKE SOIL 67700-08)
06 23 39 41	LMP	I know, it's all white under there isn't it?	(II)(SAMP RAKE SOIL 67700-08)
06 23 39 47	LMP	Down about a centimeter or less, it's all white.	(II)(SAMP RAKE SOIL 67700-08)
06 23 39 59	LMP	I think it might be a rock surface, and we're just in its - one of those friable ones, the fractured ones, and we're just chipping off - here, John, I can get a soil sample from where you kicked it up with your foot.	(II)(SAMP RAKE SOIL 67700-08)
06 23 40 23	LMP	Okay, you want another one?	(II)(SAMP RAKE SOIL 67700-08)
06 23 40 34	CDR	That soil sample is going in bag -	(II)(SAMP RAKE SOIL 67700-08)

06 23 40 41	LMP	388, Tony.	(II)(SAMP RAKE SOIL 67700-08)
06 23 40 42	CC	Okay, 388. And we better press on for the big boulder.	(II)
06 23 40 47	LMP	Okay, we're headed that way. You get the tongs, John?	(II)
06 23 40 54	CDR	Yes.	(II)
06 23 40 55	LMP	I'll carry the rake. My guess is that most of these rocks around here are extremely shocked.	(II)
06 23 41 14	LMP	All these in this area look the same.	(II)
06 23 41 21	CDR	In the sunlight, Houston, this white rock has sort of a greenish hue to it, this white rock breccia. Which is what all this is we're walking on right now is this white rock breccia that Charlie chipped out of - and I guess this is probably the second layer up. I would reckon - if we could see to the bottom, we could say for sure if this big black rock is right out of the bottom. But my guess from the old photograph, it probably is.	(II)
06 23 42 00	CDR	See this rock right here, Charlie.	(II)
06 23 42 03	LMP	Look at the size of that rock.	(II)
06 23 42 10	LMP	The closer I get to it, the bigger it is.	(II)
06 23 42 13	CDR	Yes, but look at the permanent shadowed part, Charlie.	(II)
06 23 42 14	LMP	On this side over here?	(II)
06 23 42 15	CDR	Yes. No, right here on this one. See that shadow? That must be permanent.	(II)
06 23 42 20	LMP	No, I bet you it's not. The Sun's going down over there, John.	(II)
06 23 42 25	CDR	Yes, you're right.	(II)
06 23 42 26	LMP	If you come back here in two weeks, it'll be dark. Well, maybe a week and you'll have Sun over there. Okay Tony, this is a very blocky area here.	(II)

06 23 42 43	CDR	And look at those - look at the shape of that rascal.	(II)
06 23 42 50	LMP	Yes. We don't see any glass, though, particularly.	(II)
06 23 42 57	CDR	No, I guess I'd have to call this a black matrix - looks like the matrix has reversed itself now, it's all black matrix.	(II)
06 23 43 11	LMP	Well, Tony, that's your House Rock right there.	(II)
06 23 43 15	CDR	Don't get too near the edge of that thing, it falls off. Look over at your right, it falls off pretty good.	(II)
06 23 43 21	LMP	I'm just going to take a little stereo here.	(II)(PHO 106 17341-44)
06 23 43 30	CDR	We had to come down a pretty good slope to get to this rock, so we may have to leave early to get back.	(II)
06 23 44 02	LMP	Look at that. See it's glass coated and this is just fractured off. We could pull that off. Big chunks of that will come right off.	(II)
06 23 44 15	LMP	It's got a bluish tint to it, doesn't it?	(II)
06 23 44 19	CDR	It does.	(II)
06 23 44 20	LMP	It doesn't look like real basalt.	(II)
06 23 44 24	CDR	Look at that shatter cone right there, Charlie. I'll be darned.	(II)
06 23 44 28	LMP	It is. Yeah.	(II)
06 23 44 29	CDR	I'm sure.	(II)
		- - -	
06 23 44 33	LMP	Put your tongs up there and I'll get a closeup.	(II)(PHO 106 17345-46)
06 23 44 39	CDR	Well, that settles that.	(II)
06 23 44 41	LMP	Move it down a little bit.	(II)
06 23 44 42	CDR	That settles that, doesn't it, Houston?	(II)

06 23 44 45	LMP	Okay, here's the chunk of it. The black rock looks - some of it's glass-coated, Tony, and man, that is a shatter cone.	(11)(SAMP 67930,35-37)(PHO 106 17345-46; 116 18647-49,52-53)
06 23 45 00	CDR	Charlie, let's get a piece of it.	(11)(SAMP 67930,35-37)
06 23 45 01	LMP	Okay, here you go. I got a piece. Give me a bag. On the next one how about stepping back and as I point to it, I'll pull off another piece; and we'll put a couple of pieces in here.	(11)(SAMP 67930,35-37)
06 23 45 18	CDR	Okay.	(11)(SAMP 67930,35-37)
06 23 45 20	LMP	That's going in bag 389.	(11)(SAMP 67930,35-37)
06 23 45 23	LMP	Okay, let's just take a picture of that. So you'll know where it came from.	(11)(SAMP 67930,35-37)(PHO 116 18649-53)
06 23 45 31	LMP	It's pretty badly shattered, Tony, so I don't know whether it's going to stay together or not.	(11)(SAMP 67930,35-37)
06 23 45 38	CDR	Hit it, Charlie, I'll get the picture. That's right near the shatter cone.	(11)(SAMP 67930,35-37)(PHO 116 18649-53)
06 23 45 49	CDR	I might suspect as much. Now don't worry about that.	(11)(SAMP 67930,35-37)
06 23 45 57	LMP	Okay let's pour a little sample back (?)	(11)(SAMP 67930,35-37)
06 23 45 58	CDR	Scoot back and I'll get an after.	(11)(SAMP 67930,35-37)(PHO 116 18649-53)
06 23 46 11	LMP	Okay 5 samples in 389 Tony.	(11)(SAMP 67930,35-37)
06 23 46 15	LMP	That's black. There's a faint - - look at that veinlet running through - - right there, John. - a breccia. Man, that's a big rock. Here's this white stuff, here's a rock John, that is not a breccia. It's a clast in a black rock.	(11)(SAMP 67910, 15)(PHO 116 18652-53)
06 23 46 46	CDR	Better put that in your bag.	(11)(SAMP 67915)
06 23 46 47	LMP	Okay.	(11)(SAMP 67915)
06 23 46 48	CDR	Put it back where you got it for a second and let me - - get a picture of it. Now, let's fit it in. No, just move away, they can fit it in. Okay, that how it was more or less?	(11)(SAMP 67915)(PHO 116 18652-53)

06 23 47 02	LMP	Yeah, more or less.	(11)(SAMP 67915)
06 23 47 03	CDR	Okay, now get it.	(11)(SAMP 67915)
06 23 47 06	LMP	Let's get an after.	(11)(SAMP 67915)
06 23 47 10	CDR	Yeah, that has a clast of that rock in in it too.	(11)(SAMP 67915)
06 23 47 11	LMP	I wish we could partially stick that in a bag.	(11)(SAMP 67915)
06 23 47 15	CDR	We could stick it in your bag.	(11)(SAMP 67915)
06 23 47 16	LMP	Oh, okay. I mean one of these cause it might break up. Okay, that's 424.	(11)(SAMP 67915)
06 23 47 23	CDR	No, it isn't going to break up.	(11)(SAMP 67915)
06 23 47 24	LMP	That's unbagged, and it's grapefruit size, and it was a white matrix. It's not as nearly shocked, and it's a large clast about a 3 meter clast out of this big black rock. Part of it.	(11)(SAMP 67915)
06 23 47 41	CDR	3 meter?	(11)(SAMP 67915)
06 23 47 42	LMP	No, this clast is about 3 meters.	(11)(SAMP 67915)
06 23 47 45	CDR	Centimeters, Charlie.	(11)(SAMP 67915)
06 23 47 47	LMP	Well, it goes from here all the way up to there.	(11)(SAMP 67915)
06 23 47 51	CDR	Oh, that's the one you're talking about.	(11)(SAMP 67915)
06 23 47 52	LMP	Yeah.	(11)(SAMP 67915)
06 23 47 53	CDR	Did you get a stereo of that - did you get a flight line of that?	(11)(SAMP 67915)(PHO 106 17341-44)
06 23 47 55	LMP	Yeah.	(11)(SAMP 67915)(PHO 106 17341-44)
06 23 47 58	LMP	I got a pan of it. Okay, John, I'm going to whack off another - could you get a picture of this, with the hammer in? Let me get some of the unshocked white stuff.	(11)(SAMP 67915)(PHO 106 17341-44) (SAMP 67950,55-57)(PHO 116 18653)
06 23 48 12	CDR	Wait a second.	(11)(SAMP 67950,55-57)(PHO 116 18653)

06 23 48 16	LMP	Got it?	(II)(SAMP 67950,55-57)(PHO 116 18653)
06 23 48 19	CDR	Yeah.	(II)(SAMP 67950,55-57)(PHO 116 18653)
06 23 48 27	CDR	Hard isn't it.	(II)(SAMP 67950,55-57)
06 23 48 28	LMP	Yeah, it's hard, but I'm going to get a piece.	(II)(SAMP 67950,55-57)
06 23 48 33	CDR	I got it, Charlie.	(II)(SAMP 67950,55-57)
06 23 48 34	LMP	Okay, here's a good piece right up here.	(II)(SAMP 67950,55-57)
06 23 48 44	CDR	Bag open?	(II)(SAMP 67950,55-57)
06 23 48 46	LMP	Okay, I've got it. Of the white clast with - it's not nearly as shocked, is going in 425.	(II)(SAMP 67950,55-57)
06 23 49 01	LMP	Okay, here's another piece right there, John.	(II)(SAMP 67950,55-57)
06 23 49 02	CDR	Huh?	(II)(SAMP 67950,55-57)
06 23 49 04	LMP	Here's another big piece right over here.	(II)(SAMP 67950,55-57)
06 23 49 07	CC	Did you all see a permanently shadowed sample around there?	(II)(SAMP SOIL 67940-48)(PHO 116 18653)
06 23 49 13	CDR	No, we don't.	(II)(SAMP SOIL 67940-48)
06 23 49 16	CC	Our best guess is that it should be on the south side - - if there's any.	(II)(SAMP SOIL 67940-48)
06 23 49 24	CDR	Well we were over on the south side and we didn't see any.	(II)(SAMP SOIL 67940-48)
06 23 49 29	CDR	The hole unfortunately is a - sort of an *** east-west split there, Charlie.	(II)(SAMP SOIL 67940-48)
06 23 49 36	LMP	I know, it is an east-west split. Tony, we got an east-west split here, and we can get the rake in.	(II)(SAMP SOIL 67940-48)
06 23 49 46	CC	Why don't you go ahead and take a soil out of that.	(II)(SAMP SOIL 67940-48)
06 23 49 48	LMP	Here John. Okay. Put that in mine.	(II)
06 23 49 55	CC	You're going to have to leave after this sample.	(II)

06 23 50 01	LMP	Okay, I was gonna say it's probably a long hike back up that hill.	(II)
06 23 50 09	CDR	In there or not, Charlie?	(II)(SAMP SOIL 67940-48)
06 23 50 11	LMP	Yeah, I can get in here. Right up next to this rock right here would be a good point. I got it.	(II)(SAMP SOIL 67940-48)
06 23 50 26	CDR	Get the bag square, - okay.	(II)(SAMP SOIL 67940-48)
06 23 50 33	LMP	Wait a minute, I'll give you a little bit more.	(II)(SAMP SOIL 67940-48)
06 23 50 46	CDR	It's not a classic east-west split Houston, but it's one.	(II)(SAMP SOIL 67940-48)
06 23 50 51	CDR	Bag 390.	(II)(SAMP SOIL 67940-48)
06 23 50 52	CC	Okay, bag 390. And we need a reference soil.	(II)(SAMP 67960)(PHO 106 17347-48)
06 23 50 56	CDR	We'll need the tongs for a second.	(II)
06 23 51 05	CDR	Don't go down there 5 meters and I don't want - -	(II)
06 23 51 07	LMP	I'm not.	(II)
		- - -	
06 23 51 16	LMP	There you go.	(II)
06 23 51 19	CDR	Okay.	(II)
06 23 51 23	LMP	I guess you ought to stick the tongs in, and we ought to document this.	(II)(SAMP 67960)(PHO 106 17347-48)
06 23 51 27	CDR	Okay.	(II)(SAMP 67960)
06 23 51 29	LMP	We'll do a partial and then I'll do a cross-sun of it.	(II)(SAMP 67960)(PHO 106 17347-48)
06 23 51 34	CDR	We're going to do a reference sample. Let's get that huge mass right there.	(II)(SAMP 67960)
06 23 51 36	LMP	Okay.	(II)(SAMP 67960)

06 23 51 39	CDR	The tongs are not going to go in this ground, Charlie.	(II)(SAMP 67960)
06 23 51 41	LMP	I know it. It's a big rock down there. Why don't you just hold it there, and I'll take the picture.	(II)(SAMP 67960)(PHO 106 17347-48)
06 23 51 47	CDR	Okay.	(II)(SAMP 67960)
06 23 51 48	LMP	Click, click, okay.	(II)(SAMP 67960)(PHO 106 17347-48)
06 23 52 00	CDR	Got it, you got it.	(II)(SAMP 67960)
06 23 52 10	LMP	Okay, Tony, this soil here is very hard, and the rake really won't go into it. Bending the tines like we use to in training.	(II)(SAMP 67960)
06 23 52 20	CC	If you can see anything around there that's kind of loose and not in an east-west split, kind of scoop some of that up, if you can't, we'll just have to leave it.	(II)
06 23 52 34	CDR	There's nothing loose.	(II)
06 23 52 35	LMP	Okay, there's about 25 grams.	(II)(SAMP 67960)
		- - -	
06 23 52 46	LMP	Okay, got it.	(II)(SAMP 67960)
		- - -	
06 23 53 07	LMP	There's a real frothy rock right there, John. Want to throw that in?	(II)(SAMP 67970,75)
		- - -	
06 23 53 23	CDR	Can you hold this, Charlie?	(II)
06 23 53 28	LMP	What, the tongs?	(II)
06 23 53 31	CDR	Yeah. Just for a second.	(II)
06 23 53 32	LMP	Yeah.	(II)
06 23 53 33	CDR	Going to do that bag better.	(II)

06 23 53 38	LMP	Man, that rock had cracked off just in the right - this large block is a very - the house size one, it's about 20 or 30 - 20 meters long, by maybe 10 meters high, and it's a large breccia, got a grab sample going in 393 (392?), white matrix with glass on it.	(II) (SAMP 67970,75)
06 23 54 05	CDR	Don't backup anymore, Charlie.	(II)
06 23 54 06	LMP	Lost my balance. It's got some fractures in it that run north.	(II)(SAMP 67970,75)
		- - -	
06 23 54 18	LMP	Here you go, John. Here's your tongs. Would you pick up my bag and let me move down to get a little bit in stereo and I'll be right with you.	(II)(PHO 105 17349-55)
06 23 54 25	CDR	Okay, let's go on back.	(II)
06 23 54 26	LMP	I am. I'll be right with you.	(II)
06 23 54 35	CC	Did you see anything that you were pretty confident was igneous?	(II)
		- - -	
06 23 54 45	LMP	Yeah, this rock we -	(II)
06 23 54 51	CDR	An igneous rock.	(II)
06 23 54 53	LMP	Yeah, if we would have brought the padded bags, this right here is an igneous rock.	(II)
06 23 54 56	CDR	The whole place looks igneous, Houston.	(II)
06 23 55 01	LMP	These large clasts in it are igneous.	(II)
06 23 55 02	CC	For the padded bags, we wanted lying-on-the-surface stuff.	(II)
06 23 55 08	CDR	Is that what you're talking about volcanic?	(II)
06 23 55 13	LMP	I'll take the bags. Can you get them out with the tongs?	(II)

06 23 55 19	CDR	Well, you're going to have to hold that until I get the tongs unloose.	(II)
06 23 55 22	LMP	Wait a minute.	(II)
06 23 55 23	CDR	Hold the bag.	(II)
06 23 55 24	LMP	I'm trying to.	(II)
06 23 55 30	CDR	I can't believe it.	(II)
06 23 55 31	LMP	We've got it. I can't either. Let's go.	(II)
		- - -	
06 23 55 50	LMP	Sorry. Sorry we had to get down in here, but that was a unique sample we thought.	(II)
06 23 55 57	CDR	Okay, this big black rock, this big black and white rock right here, that we're just traversing by is also the same kind of rock. Yeah, and look at the size of it.	(II)
06 23 56 08	LMP	They're all the same. There's two rock types here, Tony. That white matrix one, and then the one with the black.	(II)
06 23 56 13	CDR	And there are places where the black and the white are about 50-50 down here too.	(II)
06 23 56 23	CDR	There are very few of those.	(II)
06 23 56 26	LMP	And it has the same character of the rocks up close that I would think that South Ray rocks had, when you look on the rim of that crater.	(II)
06 23 56 47	CDR	Can we put those two rock bags under your seat or do you have too much stuff in there now?	(II)
		- - -	
06 23 57 02	LMP	Sure.	(II)
06 23 57 11	CC	If you see a fist-size igneous rock near the Rover we'll use the padded bags here, if not we'll just forget them - for now.	(II)(SAMP 67235)(PHO 116 18654-57)

06 23 57 16	LMP	Okay.	(11)
		- - -	
06 23 57 32	LMP	I bet you all of this stuff up here is really shocked. Does that make any difference to you? And therefore it's not going to be too hard.	(11)(SAMP 67235)
06 23 57 44	CC	All right, if you find a good dense one that you think has a good hard surface on it we'll go ahead and take it.	(11)(SAMP 67235)
		- - -	
06 23 58 05	LMP	We'll pick one up and give it a try anyway.	(11)(SAMP 67235)
06 23 58 09	CDR	I'm going to get one right here.	(11)(SAMP 67235)
		- - -	
06 23 59 30	CDR	It'd be too big for a padded bag.	(11)(SAMP 67235)
06 23 59 31	LMP	No, it'll go in.	(11)(SAMP 67235)
06 23 59 39	LMP	Well, let's give it a go.	(11)(SAMP 67235)
		- - -	
07 00 00 36	LMP	Why don't you put it in number 6 there John. Now, let's see if I can find another one here.	(11)(SAMP 67235)
07 00 00 51	CDR	Okay, but get a smaller one Charlie.	(11)(SAMP 67215)(PHO 106 17355-56)
07 00 01 17	CC	We'd like to switch out the mag in the DAC.	(11)(PHO DAC)
07 00 01 31	LMP	I'll tell you this regolith is about an inch deep here in most places. There's just lots of rocks under this stuff.	(11)(SAMP 67215)
07 00 01 50	LMP	You can barely get the shovel in anywhere. Okay we got two rocks for your padded bags but I'm not sure they are going to do you any good they are so dust covered.	(11)(SAMP 67215)
07 00 02 09	LMP	I hit one with the shovel here that I've got in my hand that you just saw me pick up and it didn't break anyway so at least it's that hard.	(11)(SAMP 67215)

		- - -	
07 00 02 35	LMP	Okay what mag - just give me a magazine -	(11)(PHO DAC)
07 00 02 49	CDR	T or U okay. It's T.	(11)(PHO DAC)
		- - -	
07 00 02 56	LMP	I'll put the mag on.	(11)(PHO DAC)
		- - -	
07 00 04 12	CC	And we want the DAC at f:4 and 12 frames per second.	(11)(PHO DAC)
07 00 04 16	LMP	It's set and it's on f:4 now.	(11)(PHO DAC)
07 00 04 31	CDR	Okay, Charlie, here's bag 6.	(11)(SAMP 67215)
07 00 04 35	LMP	Okay, John. Both padded bags are in there.	(11)(SAMP 67215,35)
07 00 04 39	CDR	The velcro came off both those bags and we weren't able to put them tight like they're supposed to be.	(11)(SAMP 67215,35)
07 00 04 46	CC	They go under your seat, John.	(11)(SAMP 67215,35)
07 00 05 01	CDR	We put them in an SCB.	(11)(SAMP 67215,35)
		- - -	
07 00 05 15	CC	Fine, let's just leave them in the SCB.	(11)(SAMP 67215,35)
07 00 05 33	LMP	Okay. They're right on the top in number 6 and there're no rocks on top of them.	(11)(SAMP 67215,35)
		- - -	
07 00 07 20	LMP	Okay, what's my mag count?	(11)
07 00 07 24	CDR	It's 122, Charlie.	(11)
		- - -	
07 00 07 35	CDR	Mine is 102.	(11)
07 00 07 53	LMP	Good grab sample.	(11)(SAMP 67016, 20, 25)(PHO 116 18658-60)

07 00 07 55	CDR	I thought you'd like that one.	(11)(SAMP 67016, 20, 25)
		- - -	
07 00 08 05	LMP	Okay, frame count for polarimetry we've done and I think we've got enough pans. Did Stone, Kiva, North Ray.	(11)
		- - -	
07 00 09 07	LMP	Okay, Tony, one final comment here, again, no impression of - to me, anyway, of layering or bedrock - just loose rocks in the walls and they're splayed out in ray patterns.	(11)
07 00 09 25	CDR	Man, that's some hole.	(11)
07 00 09 26	LMP	And there's about 1, 2, 3, 4, 5, 6, 7, 8, 9 rays coming out of there intermixed red and - white and black rocks in each of the rays and that's in about - maybe a half of the crater.	(11)
07 00 09 45	CC	Station 13 - - now will be right down your tracks about a half a kilometer and we'd like you to stop in the midst of those big boulders you described on the way up.	(11)
		- - -	
07 00 10 05	LMP	DAC's running?	(11-13)(PHO DAC)
07 00 10 13	LMP	There are your tracks. See them back over there?	(11-13)
07 00 10 16	CDR	Looks to me like we just go around the circle here, Charlie.	(11-13)
07 00 10 22	CDR	Okay, Station 13, right down the same way we came.	(11-13)
07 00 10 30	LMP	We can't see old Orion from here. This is going to be something going down this hill.	(11-13)
07 00 10 38	CDR	Are you sure we - I'm not sure we came up that hill.	(11-13)
07 00 10 45	LMP	Yeah, we did. There are the tracks.	(11-13)

07 00 10 53	LMP	Look at that slope! This is at least a 15-degree slope we're going down and that Rover came right up it and you never even knew it.	(11-13)
		- - -	
07 00 11 17	LMP	I shoulda had the camera pointing forward. Hey, Tony, that was at - make it 179 at 4.4, that little steep slope there. Whoever said this was the Cayley Plain?	(11-13)
07 00 11 43	CDR	I went down the rim of the crater here. We just set a new world speed record, Houston. 17 kilometers an hour on the Moon.	(11-13)
		- - -	
07 00 12 23	LMP	Going back across-sun, the tracks, we just barely penetrated the regolith maybe 1/8 of an inch or so. Whatever it is, it's going to be real firm here.	(11-13)
		- - -	
07 00 13 03	CC	Station 13 has a rake soil, then, documented samples till you run out of time.	(11-13)
07 00 13 12	CDR	Okay, we'll go up on this ridge here, Charlie, cause that's where the big blocks were.	(11-13)
07 00 13 18	LMP	Yeah. That big one we thought was the rim and it was -	(11-13)
07 00 13 21	CDR	Yeah. What we're up on now is a sort of a pre-rim rim of this impact crater. And it's 600 meters from the rim.	(11-13)
07 00 13 45	LMP	Okay, Tony, I'm panning your camera around at various places here on the 16 to get right and left.	(11-13)(PHO DAC)
07 00 13 51	CC	It's probably out of film now.	(11-13)(PHO DAC)
07 00 13 56	LMP	Already?	(11-13)(PHO DAC)
07 00 13 58	CC	No, we're just going to turn it off now.	(11-13)(PHO DAC)
07 00 14 05	CDR	It's half full, Charlie.	(11-13)(PHO DAC)

07 00 14 08	LMP	Okay, turning it off.	(11-13)(PHO DAC)
07 00 14 39	LMP	Tony, we just topped a - there's a big rock over there but this other one is down at the bottom of this hill here, John, we came by. We just topped another rise, and we're looking to the southeast across the - back towards the Kant Plateau. It's an undulating surface.	(11-13)
07 00 15 14	CDR	Here's the big rocks down here, Charlie.	(11-13)
07 00 15 15	LMP	That's them, yeah. But it's undulating til it hits the scarp of - I think I'd call it the Kant Plateau - that's the scarp on the map that you can map around - like a little reentrant on the map back to the east. We can see back up that way and all the way up on to the top of the plateau.	(11-13)
		- - -	
07 00 16 00	CDR	See that big rock over there? Maybe that's a permanently shadowed one. Try it?	(11-13)
07 00 16 04	LMP	I don't think so, but we can go look. You know, following our tracks back, we might find it, the CSVC.	(11-13)
		- - -	
07 00 16 23	LMP	On down this ridge, we're going down about - at least a 5-degree slope. We have one real filleted rock that we're just passing now at 3.8 at 183, and then we have another rock down here that's the same size, about 3 meters across that has hardly any fillet. And that's the one we're going to stop by.	(11-13)
07 00 16 49	LMP	Is that what you meant John for permanently shadowed?	(11-13)
07 00 16 51	CDR	Yeah.	(11-13)
		- - -	
07 00 17 19	LMP	If we park north we'll be in good shape for them.	(11-13)
07 00 17 22	CDR	Let's do that.	(11-13)

07 00 17 23	LMP	Okay, be able to see that biggy. That rock right there looks like that great big one we sampled up on the rim, John.	(11-13)
07 00 17 31	CDR	Sure does.	(11-13)
07 00 17 33	LMP	That's good. I just don't think it's going to be permanently shadowed through.	(11-13)
07 00 17 37	CDR	I don't either.	(11-13)
		- - -	
07 00 18 16	LMP	We're at 358 184 6.5 3.8 50.	(13)
		- - -	
07 00 18 56	LMP	I'm going to start a pan.	(13)(PHO 106 17386-407)
07 00 19 07	CC	Okay, the plan here is a rake soil first together, and after you've done that we'd like John to take an LPM and Charlie you can go sample.	(13)
07 00 19 20	LMP	Okay, let me get a pan first.	(13)(PHO 106 17386-407)
		- - -	
07 00 21 51	LMP	This area here is on a slope - about a 5-degree slope away from North Ray, and this big block that you'll see in a moment is downslope, filleted, predominantly downslope here. The surrounding terrain is covered with - not covered but 10 percent with cobbles. It's very subdued on the meter-sized craters, in fact, it's a very smooth plain, but on a slope. The rock types here appear to be same as we sampled up on top. We'll get you a rake soil out in front of this big boulder over here.	(13)
07 00 22 55	LMP	Both of us got bags on our backs so why don't we just take these little bags.	(13)
07 00 23 00	CDR	Okay.	(13)
07 00 23 08	CDR	Let me get tongs for a gnomon.	(13)

07 00 23 18	CC	Okay, Charlie, if you could grab the bottom of the gnomon and the sheaf there, we could use that for a color and photometric scale. We won't have the level, but at least we'll get part of it.	(13)
07 00 23 36	CDR	It would be good if there wasn't so much igneous soil on it. When I have it we'll put it out there.	(13)
		- - -	
07 00 23 58	LMP	Hey, John. See those 4 or 5 little rocks right there?	(13)(SAMP RAKE 63520-98)(PHO 106 17408-09; 116 18661-67)
07 00 24 00	CDR	Yes.	(13)(SAMP RAKE 63520-98)
07 00 24 01	LMP	Stick her down right there and let me.	(13)(SAMP RAKE 63520-98)
		- - -	
07 00 24 28	LMP	There's the down-sun and we'll - up the slope adroitly like a gazelle. Back to Station 13, Tony, it sure looks good.	(13)(SAMP RAKE 63520-98)(PHO 106 17408)
		- - -	
07 00 25 00	CDR	Get a bag for me, Charlie.	(13)(SAMP RAKE 63520-98)
07 00 25 01	LMP	Okay.	(13)(SAMP RAKE 63520-98)
07 00 25 12	LMP	Okay, there's some glass in there, a black chip. In one rake we got about 10 little, and the regolith here seems to be a little bit more loosely compacted then up on the top.	(13)(SAMP RAKE 63520-98)
07 00 25 35	CDR	I can't get my gnomon in.	(13)(SAMP RAKE 63520-98)
07 00 25 45	LMP	Not very productive though, on the small chips.	(13)(SAMP RAKE 63520-98)
		- - -	
07 00 26 30	CDR	Okay, there's about 20 small rocks going into to bag 343.	(13)(SAMP RAKE 63520-98)
07 00 26 34	LMP	That's three scoop fulls Tony.	(13)(SAMP RAKE 63520-98)
07 00 26 46	LMP	Okay and a soil.	(13)(SAMP 63500-09,15)(PHO 106 17408-09; 116 18661-67)

07 00 26 51	CDR	Let me get another bag from you Charlie.	(13)(SAMP 63500-09,15)
		- - -	
07 00 27 18	CDR	Okay, that looks like 2 scoopfuls going into bag 346.	(13)(SAMP 63500-09,15)
07 00 27 26	LMP	Sack it.	(13)(SAMP 63500-09,15)
07 00 27 31	CDR	Ah, isn't that beautiful. If it gets out of there we'll call it Houdini.	(13)(SAMP 63500-09,15)
07 00 27 44	LMP	Houston, the big eye's looking right at the big rock. What do you think of that beauty?	(13)
07 00 27 45	CC	That's exactly what we're looking at - - while John's doing the LPM we'd like you to hammer on that rock a bit.	(13)
07 00 27 53	LMP	I'm going to hammer. I'll hammer chips from corners.	(13)
07 00 28 00	CC	And if you get a chance and it looks like some soil right on the south side, kind of underneath - might be permanently shadowed you might take some of those and just put it in the bag.	(13)(SAMP SOIL 63320-24)(PHO 106 17413)
07 00 28 11	LMP	All righty.	(13)
07 00 28 27	CDR	I didn't park too good to do the LPM. If I go 45 feet from here I'm going to be in the middle of a crater. Is that okay?	(13)
07 00 28 37	CC	No pick a fairly level - just go a different direction.	(13)
07 00 28 44	CDR	Okay, you don't mind if I go out behind the Rover, for example.	(13)
07 00 28 47	CC	No, that's fine.	(13)
07 00 28 50	CDR	Instead of at right angles to it.	(13)
07 00 28 53	LMP	John, where are those bags that still got the bracket on it - is it under your seat here?	(13)
07 00 29 00	LMP	The bags that had the brackets on them?	(13)

07 00 29 01	CDR	Oh I think they were bounced out.	(13)
07 00 29 05	LMP	No, yeah - here you go.	(13)
		- - -	
07 00 29 16	CDR	Okay, well I think I'll go out as far - I'll go out east-southeast.	(13)
07 00 29 31	CDR	It's off to our starboard bow or something.	(13)
		- - -	
07 00 30 12	LMP	Okay, I'm going to get on the sunlit side so I'll know what I'm whacking on here. That might be a permanently shadowed soil right in there. I think it is, as a matter of fact. It'll pass.	(13) (SAMP SOIL 63320-24)
07 00 30 33	CC	Let's get one of those.	(13)(SAMP SOIL 63320-24)
07 00 30 38	LMP	Okay, I'll do it. Phew! Hey, what's the setting for in there - 250 at 5.6? Would that look into there?	(13)(SAMP SOIL 63320-24)(PHO 106 17410-12)
07 00 30 52	CC	Let's try that.	(13)(SAMP SOIL 63320-24)
07 00 30 53	LMP	Yes sir, baby, that is a perfect shadowed soil sample.	(13)(SAMP SOIL 63320-24)
07 00 31 08	LMP	It is really perfect! John, you couldn't have picked a better rock!	(13)(SAMP SOIL 63320-24)
		- - -	
07 00 31 52	LMP	I don't know how long that rock's been there, but that dirt has been shadowed ever since it's been here.	(13)(SAMP SOIL 63320-24)
07 00 32 01	LMP	That's why - I got it from about a meter up under there, Tony.	(13)(SAMP SOIL 63320-24)
07 00 32 13	LMP	And I'm sorry, but it's going to have to go in a little ol' plastic bag here.	(13)(SAMP SOIL 63320-24)
07 00 32 20	LMP	And it's number 426.	(13)(SAMP SOIL 63320-24)

07 00 32 21	CC	Any chance getting soil underneath that now for the control?	(13)(SAMP SOIL 63340-44)(PHO 106 17413)
07 00 32 30	LMP	Underneath the shadowed, you mean?	(13)(SAMP SOIL 63340-44)
07 00 32 33	CC	Underneath where you just touched, just dig deeper.	(13)(SAMP SOIL 63340-44)
07 00 32 40	LMP	Yeah, let me tip my visor down, that thing is bright! Get out of the sun. Yeah, I can get that for you. That's about 100 grams, Tony, maybe 200.	(13)(SAMP SOIL 63340-44)
		- - -	
07 00 33 46	CDR	Get a picture of it.	(13)(SAMP SOIL 63340-44)
		- - -	
07 00 34 21	CDR	Can I help you Charlie? Let me put that in the bag.	(13)(SAMP SOIL 63340-44)
07 00 34 24	LMP	I got it.	(13)(SAMP SOIL 63340-44)
		- - -	
07 00 34 35	CC	Okay, that'll be good on the soil sample. And we'd like to spend the rest of the time, and there isn't much of it, hammering on that rock.	(13)
07 00 34 46	LMP	Okay, there's about 50 grams in the control.	(13)(SAMP SOIL 63340-44)
07 00 35 50	CDR	It's going into the bag 427.	(13)(SAMP SOIL 63340-44)
07 00 35 00	CDR	Boy, it just might be permanently shadowed Houston, because it's downslope.	(13)(SAMP SOIL 63340-44)
07 00 35 14	LMP	I reached in there about 2 to 3 feet it looked like to me.	(13)(SAMP SOIL 63340-44)
07 00 35 20	CDR	That there is one of those gopher holes.	(13)(SAMP SOIL 63340-44)
		- - -	
07 00 35 37	CDR	One thing about this rock - - this is the one that I noticed when we were coming up the way that had some of these holes in it - look like vesicles.	(13)
07 00 35 45	LMP	Yep, they sure do, big ones - biggies!	(13)

07 00 35 48	LMP	Now I'm out of film, I think.	(13)(PHO 106 17417)
07 00 35 50	CDR	Couldn't be zap holes.	(13)
07 00 35 54	CC	Okay, Charlie, we'd like magazine Foxtrot on your camera.	(13)
07 00 36 00	LMP	Okay.	(13)
		- - -	
07 00 36 08	CDR	Okay, let me take a picture for you, Charlie. Where at and how much?	(13)
07 00 36 09	LMP	No, that's okay. Look at this. Tony, this is a black matrix with some excellent crystals in it and also that are milky in color. Don't see any cleavage though, or striations - about a centimeter across, and it has a matrix of that white rock like up on the rim - not a matrix but some clasts of that.	(13)
07 00 36 50	LMP	Tony, say again the mag?	(13)
07 00 36 54	CC	You'll need magazine Foxtrot.	(13)
07 00 37 03	CDR	I'll take the LPM readings. Okay, 161 711 117, 160 711 120, 160 712 117.	(13)
		- - -	
07 00 37 53	CC	Okay, Charlie, just get a couple of samples there and you should be about ready to go, then, when John gets that reeled up.	(13)
07 00 38 02	LMP	That's what I'm going to do.	(13)
07 00 38 16	LMP	Okay, I got a handful of chips there.	(13)(SAMP 63335,50,55)
07 00 38 33	CDR	See here - Charlie, when you get under the dirt, it's all white.	(13)
07 00 38 38	LMP	I know, hey, 428, Tony.	(13)(SAMP 63335)(PHO 106 17413-17; 116 18670-71; 117 18727-30)
		- - -	

07 00 40 23	LMP	Okay, Tony, I got three chips off of the rock scattered over about a 2-meter area. One of them is too big to go in the bags, but the other - the one is right now going in 429.	(13) (SAMP 63350,55)(PHO 106 17413-16)
		- - -	
07 00 40 49	LMP	Get this other rock.	(13)(SAMP 60017)(PHO 106 17417; 116 18670-71; 117 18727-30)
		- - -	
07 00 41 17	LMP	And, Tony, this rock here looks like the same - it's the same character as the ones up on the rim.	(13)(SAMP 60017)
07 00 41 34	LMP	That great, huge black one that we sampled except that we don't - that one up there didn't have any of these holes in it. I can't really say what these holes are here. They just look - they're vugs - let's just call them vugs. What caused them I don't know.	(13)(SAMP 60017)
07 00 42 00	CDR	Yeah, they look more vuggy to me although they're round.	(13)
07 00 42 03	LMP	They look like drill holes is what they look like.	(13)
		- - -	
07 00 42 11	LMP	Here, put those up for me.	(13)(SAMP 63335,50,55; 60017)
07 00 42 19	CDR	Okay, they look like the holes that you get in rocks where you have a venting of gas that comes up through there like along -	(13)
		- - -	
07 00 42 31	LMP	Vesicle pipe.	(13)
07 00 42 33	CDR	Yeah, vesicle pipe that's it.	(13)
		- - -	
07 00 43 21	CC	Charlie, you've got about 4 minutes on the DAC - - at 12 frames per second and you can either use it that way or one frame per second, either way you want, on the way back, which ever looks best to you.	(13)(PHO DAC)

07 00 43 35	CDR	Why don't we go at one frame a second all the way back to the Rover?	(13)(PHO DAC)
		- - -	
07 00 44 01	CC	And, we like your frames before you load up.	(13)
		- - -	
07 00 44 11	LMP	Okay, I'm 6 on magazine Foxtrot.	(13)
07 00 44 17	CDR	I'm at 112.	(13)
		- - -	
07 00 44 28	CDR	Make that 114, Houston.	(13)
07 00 44 33	LMP	That Smoky mountain is a steep-sided mountain, Tony. I got a good view of Ravine here, and it's steep sided on the Smoky mountain side, but very undulating on the other side - on the Cayley side. And you can see Cat crater, and it doesn't look very blocky, so I guess it's probably, it's sharper than the rest, but there're still no blocks around it.	(13)
07 00 45 34	CC	Charlie, if you haven't gotten on yet we'd like to change that to 12 frames. Evidently your DAC is about out of electrical power.	(13)(PHO DAC)
07 00 45 42	LMP	Okay, it's going at 12.	(13)(PHO DAC)
07 00 45 50	LMP	I'll start it when we get started, but it's on 12.	(13)(PHO DAC)
07 00 45 56	LMP	F:4.	(13)(PHO DAC)
		- - -	
07 00 46 11	LMP	Hope we picked up the right rocks. I think there are two predominant type rocks here, the aphanitic black looking ones that really appear to be crystalline to me, and not necessarily lava-like.	(13)
07 00 46 33	CDR	Okay, we're on our way, Houston.	(13-10')
07 00 46 36	CDR	And we're going to follow our tracks.	(13-10')

07 00 46 41	CC	Station 10 makes a triangle with ALSEP and the old Station 10. We'll call it Station 10 prime, and it's about 50 meters to the northwest of the old 10.	(13-10')
		- - -	
07 00 47 20	LMP	Okay, I'll take the same set of pictures coming back, Tony.	(13-10')(PHO 117 18730-800; 116 18672-80)
		- - -	
07 00 47 31	LMP	That we took going out to get the different sun angles. This taking pictures from the Rover here is really good. The camera's just in the right position, Tony, so I hope they will come out. Okay, off to the right, we're at 3.7 186, off to our right we have some more of the rounded rocks, whitish in character.	(13-10')(PHO 117 18730-800; 116 18672-80)
07 00 48 04	CDR	So far on this trip my personal estimation of Charlie's slope estimates is you can take them and double them, everyone of them.	(13-10')
		- - -	
07 00 48 35	LMP	Houston, this is the roughest terrain to be plains I ever saw.	(13-10')
		- - -	
07 00 48 56	LMP	Tony, looking back now at 2 o'clock, and we're heading 140 188 3.6, you can see End crater right on the flank of Palmetto, and you can see the rim of Dot. Palmetto is one of the highest features around, and its rim is really raised. I can see some large blocks on the north side of it that I couldn't see before. And I would estimate 2 meters or so in size.	(13-10')
07 00 49 52	LMP	Off to the right toward that - which we described going out, now I can see 4 or 5 2-meter size boulders, whitish in color, with no fillets around them.	(13-10')
07 00 50 12	LMP	I guess we would be off the ejecta blanket here, wouldn't you say, John?	(13-10')

07 00 50 15	CDR	Yeah.	(13-10')
07 00 50 16	LMP	This is probably right in between the North and South Ray ejecta because there is hardly any pebbles; it's almost a completely smooth surface, maybe 2 percent, Tony, with cobbles up to 5 centimeters. An occasional 20-centimeter block.	(13-10')
07 00 50 46	CC	As that Sun gets higher, it must be about like looking at that zero phase everywhere.	(13-10')
07 00 50 53	CDR	Naw, the visibility gets pretty good at high sun angle. It's still bad going out of the Sun and into the Sun. But it's pretty good the way we're going right now. Want to take a picture into Palmetto, Charlie?	(13-10')
07 00 51 08	LMP	If we can get in there, I'd like to. Yeah, go up by Dot.	(13-10')
07 00 51 11	CDR	Okay.	(13-10')
07 00 51 12	LMP	That's going to be a pretty steep slope though.	(13-10')
07 00 51 15	CDR	Well, I'll tell you what. We'll go up there and do a 360 pan. How would that be?	(13-10')(PHO 117 18766-71)
07 00 51 19	LMP	Okay. I'll do just 1-frame setting. It'll be a little off on exposure but - we'll see what it looks like.	(13-10')(PHO 117 18766-71)
07 00 51 31	CDR	Developed a new technique for panning, Houston, 360 degrees on the Rover. Clicking away. That ought to make stereo for you.	(13-10')(PHO 117 18766-71)
07 00 51 45	LMP	We look like we're in a - old - secondary area now, Tony, at 191 at 3.1 -	(13-10')
07 00 51 54	CDR	I think this is a South-Ray ray.	(13-10')
07 00 51 55	LMP	You do?	(13-10')
07 00 51 56	CDR	Yeah.	(13-10')
07 00 51 57	LMP	Yeah, you're probably right.	(13-10')

07 00 51 59	CDR	A big hunk of South Ray. Right? Same rocks and everything. And we're traversing it right now. It's a big rough - big old blanket full of South Ray material.	(13-10')
07 00 52 10	LMP	Look at those big rocks up on the - off to the west there, John, up on the - you probably can't see them, but they're about 10 - stand out starkly against - - the skyline on the far ridge.	(13-10')
07 00 52 23	CDR	Yeah.	(13-10')
07 00 52 25	CDR	Yeah, there's one of those black rocks like we got out of South Ray. That's a couple of meters, black rock. Houston, now we've talked about that one when we passed by the first time. That's the same rock that we saw on the rim. That's the same class of rock, I would think, that was that Big House rock.	(13-10')
		- - -	
07 00 53 35	CDR	Are we up on the rim of Palmetto?	(13-10')
07 00 53 37	LMP	No, we got a long way to go yet.	(13-10')
07 00 53 39	LMP	See there is Dot.	(13-10')
07 00 53 40	CDR	Oh, yeah.	(13-10')
07 00 53 42	LMP	Dot's the white spot up on the top there.	(13-10')
07 00 53 47	LMP	I've seen the same characteristics in South Ray rocks, as North Ray rocks, being the black and the white. The streaks up the side of the craters are basically the same. The North Ray, you got to guess at it a little bit more, and that might be totally what my guess is. It could be wrong, but I kinda think they're at least similar rock.	(13-10')
		- - -	
07 00 55 05	LMP	Yeah, I think you - I think we could make it up over there, John, if you broke right here, but, I guess you want to follow the old track. We were pretty close to the rim there for one time.	(13-10')

07 00 55 13	CDR	Yeah, we'll get there.	(13-10')
07 00 55 14	LMP	We know this way works.	(13-10')
		- - -	
07 00 55 28	LMP	But, Tony, if we sample one of these very fresh craters with the indurated regolith that to me look like they're maybe the freshest thing around. Can you all date that with the - just from the regolith that is - the glassy shards or whatever is in there?	(13-10')
		- - -	
07 00 56 15	LMP	There's a lot of them around the rim and I'd like to at least pick up some of that and see what you all could do with it.	(13-10')
07 00 56 22	CC	That sounds like a good idea. We've got a definite maybe from the back room there.	(13-10')
07 00 56 30	LMP	Okay, and, Tony, we're looking into End crater, and it's a blocky crater. There're blocks inside of it, and there're some on the rim, half meter size. And maybe 10 centimeters, naw let's make it -	(13-10')
07 00 56 41	CC	Right, and you're asking about a stop. We don't want to stop. We want to go on to 10 prime.	(13-10')
07 00 56 52	LMP	Naw, we weren't talking about a stop. I was just describing End crater there. It is a blocky rim crater.	(13-10')
07 00 57 00	LMP	As we suspected.	(13-10')
		- - -	
07 00 57 12	CDR	We're doing 14 clicks.	(13-10')
		- - -	
07 00 57 40	LMP	When we hit a bump, Tony, and bounce down, that rear wheel that lost the fender, showers dirt all over the front of us, and that's what gets the LCRU and the camera so dirty.	(13-10')
		- - -	

07 00 58 32	LMP	It takes just about any terrain. It's really a remarkable machine.	(13-10')
07 00 58 37	CDR	Sure is climbing a slope right now, Charlie. We're only doing - got at V-max and we're only doing 8 clicks. So you know this has got to be steep.	(13-10')
		- - -	
07 00 59 11	LMP	Okay, Tony, we're at - just passing End crater, and the rocks appear to be the same as we sampled, in texture, they're maybe not as shocked, as the ones up on the rim. I could grab you one in about a minute.	(13-10')
07 00 59 40	CC	No we better press on.	(13-10')
07 00 59 42	LMP	Lets go over and look at the rim, John, here.	(13-10')
07 00 59 48	CC	Incidentally we were able to track you in the Rover on the way out with the PSE and they're able to see you now on the way back with the active seismic geophones. We'd like to be sure that you are in the same tracks you were going out.	(13-10')
07 01 00 05	CDR	That's true.	(13-10')
07 01 00 07	LMP	And we're at 192 at 1.9. Hook a right please, get this old picture.	(13-10')(PHO 117 18764)
07 01 00 29	LMP	Hey, Tony, we're going to drive over to the rim of Palmetto, which is a pretty good site.	(13-10')
07 01 00 36	LMP	And we see some blocks on the inner rim, but nothing that really appears to be outcrop, and it's really a deep crater, Tony. It's -	(13-10')
07 01 00 53	CDR	Don't see the bottom.	(13-10')
07 01 00 54	LMP	We can't see the bottom and we're right on the rim. It must be 100 meters or so deep.	(13-10')
07 01 01 01	CDR	Pictures of it, Charlie?	(13-10')
07 01 01 02	LMP	No I didn't get it, I thought we were going to do a (360).	(13-10')

07 01 01 05	CDR	Okay, here we go.	(13-10')
07 01 01 07	LMP	Okay, starting now, click - click - click - click - click - click. Okay that's about a 4 shoter, it might not be completely overlapped, but I think it will be good enough.	(13-10')(PHO 117 18766-71)
07 01 01 31	LMP	Okay, we're heading out, Tony.	(13-10')
07 01 01 35	LMP	And the rim here is cobbly, I wouldn't say it's blocky, but it's cobbly.	(13-10')
07 01 01 43	CDR	I think we've been averaging 11 kilometers, Houston.	(13-10')
07 01 01 51	LMP	Look at that view back towards South Ray, isn't that spectacular?	(13-10')
07 01 01 57	CC	Looking ahead at the tracks, could you tell when you picked up the softer regolith? On the tracks that you came out?	(13-10')
07 01 02 06	LMP	They've all looked the same, haven't they to you, John?	(13-10')
		- - -	
07 01 02 17	CC	Right, you - mentioned up on North Ray that you only went in - an eighth of an inch or so.	(13-10')
07 01 02 26	CDR	The regolith does change character right past the LM. And it's a lot less blocky, you know? I think this ray right here -	(13-10')
		- - -	
07 01 02 30	LMP	I think this is probably ray, yeah. It's probably either that or it came out of Palmetto.	(13-10')
07 01 02 48	CDR	This would have been a good choice for a rocky traverse. See over there in the west, that far rim over there, don't you see something looks like - down in that ledge down there.	(13-10')
07 01 03 07	LMP	Yes there are 2 spots over there that might be outcrop, Tony. There's a -	(13-10')

07 01 03 14	CDR	Oh, that's probably a secondary or something that's probably a big rock clot from North Ray.	(13-10')
07 01 03 22	CDR	Yeah, that's what it is.	(13-10')
07 01 03 23	CDR	It's hit in there -	(13-10')
07 01 03 25	LMP	Yeah, there's one farther around though on the southwest rim, John, that sticks out like it's eroded away from underneath it.	(13-10')
07 01 03 35	LMP	That has a hint of bedrock, but it's - and that's about on the southwest rim - about 20 percent down from the upper rim of Palmetto, Tony.	(13-10')
07 01 03 50	LMP	But it's just one little isolated block and I don't really think it means much. Still can't see the LM, we're on the -	(13-10')
07 01 04 02	CDR	See South Ray though, get a picture.	(13-10')
07 01 04 04	LMP	I'm getting them as fast as I can pull the trigger. We thought we'd be able to see the rim from here, Tony, but we're - you can't do it - I mean the LM, but you can't do it. This thing says 194 or 1.4. I bet you that's right. We came farther east.	(13-10')(PHO 117 18777)
07 01 04 40	CDR	Yeah, we're way east.	(13-10')
07 01 04 43	LMP	Yeah, okay, Tony, between Gator and Palmetto.	(13-10')
		- - -	
07 01 04 57	LMP	Between Gator and Palmetto, we almost hit a great big rock, but old Percy here avoided it. Look at that. 194, John, takes us right out our tracks. Betwen Gator and Palmetto Tony, there's a swale, a depression that runs east-west, that is apparently more cratered than - and a lot fresher crater there, than what we been driving on between Palmetto and North Ray.	(13-10')
		- - -	
07 01 07 07	CDR	How many gammas did you say that LSM was, Tony, 300 and some?	(13-10')

07 01 07 12	CC	313.	(13-10')
07 01 07 16	CDR	How many times higher than that - that's ten times higher than what the Apollo 12 guys got isn't it?	(13-10')
07 01 07 26	CC	No, it's not that much greater, it's about 100 more than they got on Apollo 14.	(13-10')
07 01 07 35	CDR	That's what I thought. Well the magnetic field of the Moon in places is a lot more than anybody ever believed it would be.	(13-10')
07 01 07 44	CC	That's right. From lunar orbit it only looks like - from high lunar orbit, it only looks like 2 or 3 gamma at most.	(13-10')
07 01 07 53	LMP	John, that looks like an endogenic crater right over there to me.	(13-10')
07 01 07 56	CDR	Which one?	(13-10')
07 01 07 57	LMP	Off at 2 o'clock. It has no rim to it -	(13-10')
07 01 08 03	CDR	Looks like a sink hole type.	(13-10')
07 01 08 04	LMP	Looks like a sink hole, big doodle bug hole. And that's, Tony, at our 2 o'clock and we're presently at 0.9 at 198.	(13-10')
07 01 08 13	CC	We know exactly which one you're talking about.	(13-10')
07 01 08 15	LMP	It's only about 100 meters or so from us.	(13-10')
07 01 08 17	CC	Is it on top of a little dome?	(13-10')
07 01 08 24	LMP	Yeah we are.	(13-10')
		- - -	
07 01 08 50	LMP	Tony, this crater is about, I'd say at least 200 meters across, has no rim, and no blocks associated with it, except for rays.	(13-10')
07 01 09 11	LMP	Do we do a 360?	(13-10')
		- - -	

07 01 09 32	LMP	Make it about 115 270, little bit further right, John, that's good; now you can go back.	(13-10')
07 01 09 42	LMP	Got it - I've got it. Okay? There - now there is a fresh crater with glass right in the bottom of that little fresh crater right back there. Meter size.	(13-10')(PHO 117 18789)
07 01 09 54	CDR	198 at 0.7 is the crater that Charlie's talking about.	(13-10')
07 01 10 12	CDR	And that's not on the map either. It doesn't even show up. I guess my opinion of this place is that on our traverse maps the rimless features, the very low subdued rimless craters, they just don't even show up, and they're just not there hardly.	(13-10')
07 01 10 36	CDR	And unless they've got a raised rim, they don't measure it, they don't show up in photography apparently.	(13-10')
07 01 10 44	LMP	Tony, that sink hole, or whatever it was - subdued crater we passed back there, is really deep, I'm surprised - I really don't have a map right here with me but it was probably 40 meters deep or so.	(13-10')
07 01 11 05	CC	Right, we've got it on the map here.	(13-10')
07 01 11 06	LMP	We couldn't see the bottom of it.	(13-10')
		- - -	
07 01 11 22	LMP	NAV is 196 at .5, we ought to see the old beauty when we top the rise here. John just ran over a basketball size rock with the right wheel and just - there she is John.	(13-10')
07 01 11 46	LMP	We're about on top of a ridge maybe 30 meters above and that NAV system has us pointed right at the Lunar Module. Look at that.	(13-10')(PHO 117 18794)
07 01 12 01	LMP	Okay, it's 0.4. We're about 20 meters up, 30 meters up above it, Tony.	(13-10')

07 01 12 15	CC	Okay. If you can recognize an edge of the ray, in the neighborhood of 50 meters, north of the ALSEP area, that would be a good place to pick Station 10 prime. Our photo shows the edge of the ray in there.	(13-10')
07 01 12 30	CDR	This would be a good place to look for it from Charlie, right up here.	(13-10')
		- - -	
07 01 12 36	CDR	Pick the edge of a ray, 50 meters or so north of an ALSEP site - of the ALSEP. Tony you can hardly tell where one - they're not as distinct - the gradational pattern is just too gradual.	(13-10')
07 01 12 57	CC	Just pick a place 50 meters north and we'll call that 10 prime.	(13-10')
07 01 13 17	LMP	Tony, we must be out of battery power because this camera - this DAC stopped running - - with about 50 percent of the mag left.	(13-10')(PHO DAC)
		- - -	
07 01 13 33	LMP	Okay, John let me get a picture of that. That is beautiful. Another picture? Okay. Back a little bit. I can't believe that big hole there, I can't believe it right behind us.	(13-10')(PHO 117 18797-98)
07 01 13 58	LMP	Hook a right, John, let me get another picture while we're running. You know that might be an end of a ray right there, see that, it's almost a blockless feature.	(13-10')(PHO 117 18799)
07 01 14 18	LMP	That might just be due to the downslope though. Don't run into our hole.	(13-10')
		- - -	
07 01 14 32	CDR	Where do you want to park this thing Houston, 50 meters from the AL - -	(13-10')
		- - -	

07 01 14 42	LMP	The northwest.	(13-10')
07 01 14 44	LMP	Just up over this little ridge here.	(13-10')
07 01 14 46	CDR	Right by that big rock.	(13-10')
07 01 14 50	CC	Okay, we're looking for in the sampling here, those vesicular basalts that you both described in the area. And also we - -	(13-10')
07 01 15 04	LMP	That might be one right over there, John, it's the bluish -	(13-10')
07 01 15 17	CC	- - and to make a triangle with the other double core and the deep core.	(13-10')
		- - -	
07 01 15 40	LMP	We're stopped and we're just about directly north of the ALSEP.	(10')
		- - -	
07 01 16 20	LMP	We're 180, 188, 11.1, .1, 30.	(10')
		- - -	
07 01 17 18	LMP	Okay, and I'm starting out with frame count 80, magazine Foxtrot. You want me to get a pan, Tony?	(10')
07 01 17 25	CC	Yeah, pan will be good. And after that we'll go on with rake soil at this site.	(10')(PHO 117 18801-23)
		- - -	
07 01 19 42	LMP	Okay, just a minute. I'm halfway through a pan here. Take me just a second.	(10')(PHO 117 18801-23)
		- - -	
07 01 20 35	LMP	Tony, a double core here too?	(10')
		- - -	
07 01 20 44	CC	Yes, we would like a double core. The rake soil is first priority and then the double core.	(10')

		- - -	
07 01 22 03	LMP	Dropped a gnomon right where I wanted to sample. The big eye is looking the wrong way. Boy, I just can't see anything when I get this camera in my shadow.	(10')(SAMP RAKE 60610-79)(PHO 117 18824-25; 116 18681-84)
07 01 22 24	CDR	That's a good place, Charlie.	(10')(SAMP RAKE 60610-79)
07 01 22 29	LMP	There's the down-sun, at 4, f:8, cross-sun.	(10')(SAMP RAKE 60610-79)(PHO 117 18824)
		- - -	
07 01 23 00	LMP	Look at that regolith. We've got some glass-coated frags here, Tony - - in the rake. I don't see anything that looks like -	(10')(SAMP RAKE 60610-79)
07 01 23 19	CDR	Get another.	(10')(SAMP RAKE 60610-79)
07 01 23 20	LMP	Okay, that was about half a bag full. One scoop.	(10')(SAMP RAKE 60610-79)
07 01 23 30	CDR	Bag's full.	(10')(SAMP RAKE 60610-79)
07 01 23 33	LMP	Okay, Tony, out of that scoop we lost the two biggest rocks. I poured too fast.	(10')(SAMP RAKE 60610-79)
		- - -	
07 01 24 10	CDR	Okay, that's in bag number 347.	(10')(SAMP RAKE 60610-79)
07 01 24 20	LMP	Okay, get an after, John.	(10')(SAMP RAKE 60610-79)(PHO 116 18683-84)
07 01 24 23	CDR	Yeah I'll get it.	(10')(SAMP RAKE 60610-79)(PHO 116 18683-84)
07 01 24 25	LMP	Okay. After. Old after.	(10')(SAMP RAKE 60610-79)(PHO 116 18683-84)
07 01 24 38	CC	Right, we're going to want a rake soil, over in the area of the old Station 10, also. So it's up to you whether it's easiest to go get it now or to get the double core now. After you're through with this one.	(10')
07 01 24 51	CDR	Let's get the soil, Charlie.	(10')(SAMP RAKE SOIL 60600-04)(PHO 117 18824-25; 116 18681-84)

07 01 24 52	LMP	We'll get the soil. I think it would be easier to go get it John because I've got to do the double core -	(10')(SAMP RAKE SOIL 60600-04)
		- - -	
07 01 25 14	LMP	Yep. Okay, there's a scoop.	(10')(SAMP RAKE SOIL 60600-04)
07 01 25 21	CDR	Okay, and that's going into bag 348.	(10')(SAMP RAKE SOIL 60600-04)
07 01 25 38	LMP	That's just right over the ridge there, about 50 meters isn't it?	(10')
		- - -	
07 01 25 43	LMP	At old Station 10.	(10')
		- - -	
07 01 25 52	LMP	Okay, get an after of that John, and scoop. How about swapping, I'll bag and you rest.	(10')(SAMP RAKE SOIL 60600-04)(PHO 116 18684)
07 01 26 01	LMP	Okay, I'll get the gnomon.	(10')
07 01 26 04	CDR	Why don't you let me get the gnomon, I'll drop it over there, cause I can get down a lot easier.	(10')
07 01 26 06	LMP	Okay, go ahead.	(10')
		- - -	
07 01 26 29	CDR	Look at these neat little craters, you just run right through them. There's a lot of tracks around there, Charlie. That must be the old Station 10 right there.	(10'-10)
07 01 26 47	LMP	It's right over here, it is, yeah. This is where we took the double. Do you want it where we had the double core, Tony?	(10'-10)
07 01 26 55	CC	The double core will be at this rake site, but while you've got the rake on there - - we might as well get the rake at the old double core.	(10'-10)
07 01 27 05	LMP	This is the old double core site, we'll rake here.	(10)(SAMP RAKE 60510-35)(PHO 117 18826-27; 116 18685-88)

07 01 27 13	CC	That's exactly what we want.	(10)(SAMP RAKE 60510-35)
07 01 27 17	LMP	Okay, we're within three meters of it.	(10)(SAMP RAKE 60510-35)
07 01 27 23	LMP	Yeah. I think any of these places is a good place around here. Man that's a beautiful vehicle. Down-sun.	(10)(SAMP RAKE 60510-35) (PHO 117 18826)
07 01 27 44	CDR	Okay, you locating it, Charlie?	(10)(SAMP RAKE 60510-35)(PHO 117 18827)
07 01 27 53	LMP	Yeah. Okay, we're sacking it 349.	(10)(SAMP RAKE 60510-35)(PHO 117 18827)
07 01 28 20	LMP	John's got 2 scoops - 2 rakes full. Not nearly as productive over here.	(10)(SAMP RAKE 60510-35)
07 01 28 29	CC	Okay, you're probably on a different part of the ray, then. That's good.	(10)(SAMP RAKE 60510-35)
07 01 28 39	LMP	Two scoops and we got 3 little frags. One of them just dropped out.	(10)(SAMP RAKE 60510-35)
07 01 28 44	CDR	Three is all we got?	(10)(SAMP RAKE 60510-35)
07 01 28 46	LMP	Two, 1 of them dropped out.	(10)(SAMP RAKE 60510-35)
		- - -	
07 01 29 03	CDR	Here's a couple more.	(10)(SAMP RAKE 60510-35)
07 01 29 16	CDR	Okay, let me get 1 more, Charlie.	(10)(SAMP RAKE 60510-35)
07 01 29 36	LMP	He had about 20 pounds of soil, Tony, and he came up with 1 little frag. And we just dropped it.	(10)(SAMP RAKE 60510-35)
07 01 29 45	LMP	That's enough.	(10)(SAMP RAKE 60510-35)
07 01 29 47	CC	Yeah, let's just call that our rake sample.	(10)(SAMP RAKE 60510-35)
07 01 29 48	LMP	Okay, we got about 4 frags in 349. Hey we need a soil sample, John.	(10)(SAMP RAKE 60510-35)
07 01 30 26	CDR	Okay, let me get 1 more scoopful.	(10)(SAMP RAKE SOIL 60500-04)(PHO 117 18826-27; 116 18685-88)
07 01 30 42	CDR	Get a little after here.	(10)(SAMP RAKE SOIL 60500-04)(PHO 116 18687-88)

07 01 30 51	LMP	Hold that one and put it in my bag while I zee this one up. Okay, I think we got about 10 bags left and that's it.	(10)
07 01 31 13	CC	Okay, was that bag 350, we didn't get a number.	(10)(SAMP RAKE SOIL 60500-04)
07 01 31 22	LMP	Yeah, 350, Tony. It was.	(10)
07 01 31 30	LMP	What are you supposed to be doing while I do the double core?	(10)
07 01 31 32	CDR	I'm supposed to be sampling.	(10)
07 01 31 34	CC	Right. Be looking around for exotics - - especially things like that vesicular basalt you described.	(10)
07 01 31 45	LMP	That's why I'm whacking on this one.	(10)(SAMP 60018)(PHO 117 18827; 116 18689-93)
07 01 31 50	LMP	That is a hard rock, right there, John.	(10)(SAMP 60018)
		- - -	
07 01 32 13	LMP	I got it with the rake. Why don't you take that and put it in my sack and I'll go over and get the double core?	(10)(SAMP 60018)
07 01 32 23	CDR	Why don't you carry this one over there and throw it in the big bag.	(10)(SAMP 60018)
07 01 32 26	LMP	Okay, I'll do it. Okay, Tony, I just whacked off one at - I thought was basaltic looking but it turns out it's glassy with the white matrix in it.	(10)(SAMP 60018)
		- - -	
07 01 33 15	LMP	Hey, come - here's another one of those glass balls.	(10)(SAMP 60130,35)(PHO 116 18694-96)
07 01 33 22	CDR	Yeah, that's a big one.	(10)(SAMP 60130,35)
		- - -	
07 01 34 46	CDR	That son of a gun, must be solid.	(10)(SAMP 60130,35)
07 01 34 51	CDR	Houston, this glass ball that've got doesn't have any give to it.	(10)(SAMP 60130,35)
07 01 35 02	CDR	Going into bag 380. (430)	(10)(SAMP 60130,35)

07 01 35 10	LMP	Okay, double core's assembled.	(10)(SAMP CORE 60013-14)(PHO 116 18697-700)
07 01 35 14	CDR	Impact? Well it's smooth on one side and has impact pits on the other.	(10)(SAMP 60130,35)
		- - -	
07 01 36 25	CDR	Okay, I'm gonna take these two big rocks and put them in the big rock bag, Charlie.	(10)(SAMP 67016; 61016)
07 01 36 29	LMP	Okay, "Muley's" got to go in there too.	(10)(SAMP 61016)
07 01 36 52	LMP	Okay, Tony, I pushed it all in - almost three-quarters of the way on the bottom core.	(10)(SAMP CORE 60013-14)
		- - -	
07 01 37 02	LMP	John, could you - - take a picture of that for me? I don't have my camera.	(10)(SAMP CORE 60013-14)(PHO 116 18697-700)
07 01 37 13	CC	And John, while you're looking around there, our number one priority is a vesicular basalt.	(10)
07 01 37 21	LMP	Yeah, I understand.	(10)
07 01 37 23	CDR	I bet we ain't going to find one.	(10)
		- - -	
07 01 38 02	LMP	Okay, John, how about spinning and taking one more picture of that in the ground. Could you?	(10)(SAMP CORE 60013-14)(PHO 116 18698)
07 01 38 11	CDR	May as well, what's the setting?	(10)(SAMP CORE 60013-14)(PHO 116 18698)
07 01 38 15	LMP	About f:11 or so.	(10)(SAMP CORE 60013-14)(PHO 116 18698)
		- - -	
07 01 38 49	CDR	I could correctly identify this rock as out of North Ray - no, I can't. It sure looks like that rock that we saw.	(10)
07 01 39 10	LMP	Hey, Tony, at the bottom of the core it looks whitish, and it's pretty coarse grained - it's not real fine. It's sort of like a crumbly, shocked rock.	(10)(SAMP CORE 60013-14)

07 01 39 48	CDR	I'm looking, but I'm not seeing any vesicular basalt.	(10)
07 01 39 52	CC	Okay, after you get this core packed up, why don't you drive on back to the LM, to the normal closeout position, and we'll let you sample around there - see if you can find one around there. You described something in a crater behind the LM.	(10)
07 01 40 53	LMP	Okay, the bottom was 32, Tony. Top is 27.	(10)(SAMP CORE 60013-14)
07 01 42 07	CC	Sounds to me like you fellows are going to have your rock quota.	(10)
07 01 42 17	LMP	I think we'll do alright.	(10)
07 01 42 20	CDR	I just picked up another breccia, but it was interesting because - it had some very dark clasts in it, and it was primarily a white matrix.	(10)(SAMP 60019)(PHO 116 18701-04)
07 01 42 38	CDR	The clasts were very dark.	(10)(SAMP 60019)
07 01 42 47	CDR	You want this to go in your bag, Charlie?	(10)(SAMP 60019)
07 01 42 49	LMP	Yeah, why don't you - - stick it in mine. I think we have plenty of room in mine.	(10)(SAMP 60019)
		- - -	
07 01 43 38	LMP	Okay. How much time do we have here, Tony?	(10)
07 01 43 42	CC	You have plenty of time here, but we'd like you to drive on back to the LM.	(10)
07 01 43 51	LMP	Okay, I'm going to run over, Tony, and look around and see if I can find what you want.	(10-LM)
		- - -	
07 01 45 49	CDR	I just got a spectacular white rock. But it's kinda dust coated. It's so fine grained, that I can't see any crystalline structure associated with it. It's sorta covered with zap, you can see plenty of zap pits. That's going in bag 13.	(10)(SAMP 60210,15)(PHO 116 18705-07)
07 01 46 17	CC	Okay, was that bag 113?	(10)(SAMP 60210,15)

07 01 46 22	CDR	Thirteen.	(10)(SAMP 60210,15)
07 01 47 29	LMP	Hey, Tony, I just picked up one that is in bag 15, that has a black matrix, bluish black matrix with lath-like either clasts or phenocryst in it. And it's right behind the LM here. I don't know whether that's what we're looking for or not.	(LM)(SAMP 60230,35)(PHO 117 18828-29)
07 01 47 51	LMP	There are a lot of the rocks that I call vesicular basalts around here, but I don't know whether what I really call was correct or not. That might have led you all astray.	(LM)(SAMP 60230,35)
07 01 48 09	LMP	That might have been just the glass coating on the rock.	(LM)(SAMP 60230,35)
07 01 48 12	CC	We've got about 10 more minutes of sampling, so why don't you just pick up what looks interesting to you there and then we'll start closing out.	(LM)
		- - -	
07 01 48 34	LMP	I got my hands full of bags and rocks.	(LM)
07 01 49 28	LMP	Okay, Tony, I've picked up a rock here that has an aphanitic matrix with perhaps 30 percent of it - whitish millimeter size clasts or phenocrysts and it doesn't look glassy to me.	(LM)(SAMP 60250,55)(PHO 117 18830-32)
07 01 49 49	LMP	It's about half of a grapefruit size.	(LM)(SAMP 60250,55)
		- - -	
07 01 50 57	LMP	Okay, and it's going in bag 17.	(LM)(SAMP 60250,55)
07 01 51 05	CDR	I don't think we need the gnomon any more Charlie.	(LM)
07 01 51 07	LMP	No, we sure don't, John.	(LM)
		- - -	
07 01 51 29	LMP	Would you say my SCB's about full, John?	(LM)
07 01 51 32	CDR	Definitely.	(LM)

07 01 51 33	LMP	Okay, let me get yours off your back right now so I can go use it to sample with.	(LM)
		- - -	
07 01 55 23	CC	And Charlie, you can continue sampling for about 5 more minutes and then we'll have to load up.	(LM)
07 01 55 31	LMP	Okay. That's about 3 samples. I'll be out of bags then anyway.	(LM)
		- - -	
07 01 56 01	LMP	Tony, I'll say one thing that the character of the regolith has really changed between here and Stone mountain and -	(LM)
		- - -	
07 01 56 25	LMP	There's a grab sample in 18.	(LM)(SAMP 60270,75)(PHO 117 18833-35)
07 01 56 33	LMP	Well, it is partially documented I should say, not a grab sample.	(LM)(SAMP 60270,75)
		- - -	
07 01 56 44	LMP	There's a neat rock. Right there. Doesn't look like a breccia.	(LM)(SAMP NOT RETURNED)
		- - -	
07 01 57 03	CC	Okay, Charlie, after this rock we'd like you to start closing out.	(LM)(SAMP NOT RETURNED)
07 01 57 10	LMP	Bag number 19, Tony. (dropped?)	(LM)(SAMP NOT RETURNED)
07 01 57 31	LMP	And, Tony the last one I pick up is an igneous rock, no breccia.	(LM)(SAMP 60310,15)(PHO 117 18836-38)
07 01 57 38	LMP	And it's got lath crystals in it and a black matrix but it is not basaltic.	(LM)(SAMP 60310,15)
07 01 58 01	LMP	Well, it was going in bag 19, it's not anymore.	(LM)(SAMP 60310,15)
		- - -	

07 01 58 05	LMP	In bag number 20, Tony.	(LM)(SAMP 60310,15)
		- - -	
07 01 58 21	CDR	Okay. Okay, I guess we're through with those samples.	(LM)
		- - -	
07 01 59 28	LMP	Okay, Tony, the core tubes are going in bag number 7.	(LM)(SAMP CORE 60013-14)
07 01 59 47	LMP	And it's hardly got any rocks in it.	(LM)
		- - -	
07 02 01 00	CC	And John you might try to keep a hold of the sample bags for when you go out and park the Rover. We may have to pick up a rock and put it on the LPM.	(LM)
07 02 01 20	CDR	I'll take my camera with me too.	(LM)
07 02 01 22	CDR	Charlie's camera one. You got any pictures left?	(LM)
07 02 01 28	LMP	Yeah, have you?	(LM)
07 02 01 29	CDR	Nope.	(LM)
07 02 01 30	LMP	You out completely?	(LM)
07 02 03 31	CDR	No, no I'm on frame 150 I guess I've got enough to cover it.	(LM)
		- - -	
07 02 05 50	LMP	Okay. All the film that we brought out, except the two mags - the mag on the DAC and the 2 mags on the camera - magazine F and magazine Echo are still on the cameras. John's seat bag is empty of film.	(LM)
		- - -	
07 02 14 20	CDR	Okay, Charlie, I put the big rock bag on the ladder hook.	(LM)
		- - -	

07 02 14 35	LMP	Did you get the big rock out of the footpad?	(LM)(SAMP 61016)
07 02 14 38	CDR	Yeah.	(LM)(SAMP 61016)
07 02 14 39	LMP	Did you get ol' "Muley" out of there?	(LM)(SAMP 61016)
		- - -	
07 02 15 07	LMP	Okay. This bag is pretty full. We got 2 full rock bags and one that is partially full, John. We got - 4 and 6 are full, and 7 has got 2 core tubes.	(LM)
		- - -	
07 02 15 35	CDR	Are those core tubes? - they got anything in them?	(LM)
07 02 15 37	LMP	Yeah.	(LM)
07 02 15 47	LMP	Let me get one more picture of you dirty.	(LM)
07 02 16 01	LMP	Okay, Tony, got the magazine from the -	(LM)
07 02 16 11	LMP	Got the DACs, all the mags.	(LM)(PHO DAC)
07 02 16 20	LMP	Only thing we don't have in the ETB that I see is the CRE, and that's going in right now.	(LM)
07 02 16 30	LMP	Hey, John, you're taking a camera with a magazine out with you?	(LM)
07 02 16 37	CDR	Yes sir.	(LM)
07 02 16 50	CDR	I got one more rock here that I was looking at out of the window of the Lunar Module, I got plenty of pictures of it for you.	(LM)(SAMP 60016)(PHO 113 18298,302-303)
07 02 16 58	LMP	Put it in the big rock bag - it'll go in that ETB -	(LM)(SAMP 60016)
07 02 17 04	CDR	It's not all that big.	(LM)(SAMP 60016)
07 02 17 25	LMP	Okay, I'm going to put magazine Foxtrot into the ETB, and it's got 130 frames exposed.	(LM)
		- - -	

07 02 17 43	CC	Charlie, you should have a 70 Hasselblad and 3 DAC magazines - - actually there will be 6 in there right now, one's still on John's camera.	(LM)
		- - -	
07 02 19 03	LMP	We got 1, 2, 3, 4, 5, 6, Hasselblads, 3 DACs, a SWC and a CRE, the maps, and various other things.	(LM)
		- - -	
07 02 19 35	LMP	Your mags go in there, John, and that's it.	(LM)
		- - -	
07 02 23 18	LMP	Hey, Tony, I'm going to be taking SCBs up onto the porch.	(LM)
		- - -	
07 02 25 30	LMP	Okay, I bag is up, Tony.	(LM)
07 02 25 32	CC	Okay, was there - did you see the number on that? Don't go back to look - -	(LM)
07 02 25 40	LMP	I'm sorry, I didn't. 6 or 7, we got 6 and 4 down here.	(LM)
07 02 25 46	CC	Okay, it must have been 7.	(LM)
		- - -	
07 02 26 14	CC	And Charlie, I understand you got the "Muley" rock and put it in the big rock bag.	(LM)(SAMP 61016)
		- - -	
07 02 26 20	LMP	John did. Rog.	(LM)(SAMP 61016)
07 02 27 09	CDR	Okay, Houston, I'm parked on a slope of about 10 degrees, or 5 or 6 or 7 degrees, towards the Lunar Module, - and I'm about a 100 yards directly aft of the Lunar Module.	(LM)
07 02 27 44	CC	Okay, it's heading 165.	(LM)

07 02 27 49	CDR	Yep, heading is 165.	(LM)
		- - -	
07 02 28 23	CDR	Bearing is 243, which can't be right. Distance is 11.4, range 210.	(LM)
		- - -	
07 02 29 54	LMP	I got two bags up and I'm going to have to wait and let John take in the rest.	(LM)
		- - -	
07 02 32 05	CC	Okay, Charlie, why don't you go on out where John is and see if you can find an igneous or a hard breccia to put on top of that LPM. Use his camera to document it.	(LM)(SAMP 60330,35)(PHO 116 18712-13,20-21)
07 02 32 18	LMP	I don't have a camera though now, Tony.	(LM)
		- - -	
07 02 34 03	LMP	Where's your camera John?	(LM)
07 02 34 05	CDR	Right here, Charlie.	(LM)
07 02 34 22	LMP	Okay, a hard breccia or igneous rock.	(LM)(SAMP 60330,35)
		- - -	
07 02 35 20	LMP	Do you want this rock brought back, Tony - that is that I'm going to - LPM.	(LM)(SAMP 60330,35)
07 02 35 25	CC	Rog. We'd like you to document it before you touch it and when you get the LPM first measurement, we'll put it on the LPM, take a picture of it on the LPM, and then we'll get an LPM measurement of it, and then we'll pack it and bring it back.	(LM)(SAMP 60330,35)(PHO 116 18710-11)
07 02 35 46	LMP	Okay. It's a pretty good one, but it's too big to sack, unfortunately *** - -	(LM)(SAMP 60330,35)
07 02 35 51	CC	Do you have a smaller one around that we can get in the sack?	(LM)(SAMP 60330,35)

07 02 35 57	LMP	Yeah, let me look.	(LM)(SAMP 60330,35)
		- - -	
07 02 36 16	LMP	How about one a half-an-orange size, Tony?	(LM)(SAMP 60330,35)
07 02 36 21	CC	That would be great. Really great.	(LM)(SAMP 60330,35)
07 02 36 27	LMP	Okay. I'm going to get a close - a couple of cross-sun stereos is all. Is that all right?	(LM)(SAMP 60330,35)(PHO 116 18712-13)
07 02 36 32	CC	That's fine. We've got the location on TV.	(LM)(SAMP 60330,35)
		- - -	
07 02 36 56	LMP	Okay, Tony. It's an igneous rock, not a breccia.	(LM)(SAMP 60330,35)
07 02 37 04	LMP	And it's got that sugary texture to it.	(LM)(SAMP 60330,35)
		- - -	
07 02 37 39	LMP	Yeah. Okay, Tony. That's frame count 156 and 157 -	(LM)(SAMP 60330,35)
07 02 37 46	LMP	- - 155 and 156 for the - that rock.	(LM)(SAMP 60330,35)(PHO 116 18712-13)
07 02 37 53	LMP	I'm not sure we got - we got a bag left, John?	(LM)(SAMP 60330,35)
07 02 37 56	CDR	Yeah, I put a bag under the seat.	(LM)(SAMP 60330,35)
07 02 41 01	CDR	Do you want a picture of that - you want a picture of it, don't you, Houston?	(LM)(SAMP 60330,35)(PHO 116 18720-21)
07 02 41 04	CC	Yeah, it'd be a good idea.	(LM)(SAMP 60330,35)
		- - -	
07 02 41 40	LMP	Well, I hope we got all the rocks, Tony, that are here.	(LM)
07 02 41 45	CDR	We got all the rock types that look different from any other rock type.	(LM)
		- - -	

07 02 43 32	CC	- - and when you put the rock on, we'd like a couple of cross-suns of it - -	(LM)(SAMP 60330,35)(PHO 116 18720-21)
07 02 43 35	CDR	Okay. We'll start with a rock.	(LM)(SAMP 60330,35)
		- - -	
07 02 43 42	LMP	Here's the rock. I'll get the camera for you. And I guess I'll go on back and take the brush. Okay?	(LM)(SAMP 60330,35)
		- - -	
07 02 46 39	CC	Did you get a picture of it while you were out there?	(LM)(SAMP 60330,35)(PHO 116 18720-21)
07 02 46 44	CDR	Yeah, two - a stereopair.	(LM)
		- - -	
07 02 47 16	CDR	I just got a picture of one of the great moments in history, Houston.	(LM)(PHO 116 18723-24)
07 02 47 21	CC	How's that?	(LM)(PHO 116 18723-24)
07 02 47 23	CDR	Charlie looking down into a crater that's 10 feet - 10 feet -	(LM)(PHO 116 18723-24)
07 02 47 37	CDR	- - 10 feet to the rear footpad, and 25 foot deep -	(LM)(PHO 116 18723-24)
		- - -	
07 02 49 03	CC	And, John, when you bag that, we'll need a bag number.	(LM)(SAMP 60330,35)
07 02 49 15	CDR	Charlie, this is a pretty good rock.	(LM)(SAMP 60330,35)
07 02 49 16	LMP	It is, isn't it?	(LM)(SAMP 60330,35)
07 02 49 18	CDR	It's got a spectacular little zap pit in it. It's lined and it's all silvery and glassy. Fred Horz will appreciate this rock.	(LM)(SAMP 60330,35)
07 02 49 30	CC	We'll appreciate them all.	(LM)(SAMP 60330,35)
07 02 49 33	LMP	You can see those sugary-textured ones.	(LM)(SAMP 60330,35)

07 02 49 38	CDR	Okay, Charlie, bag 331.	(LM)(SAMP 60330,35)
		- - -	
07 02 51 27	LMP	That's right. There. Okay. Yeah, I'll put the rock - you take the camera off - I'll put the rock in the - in this SCB over here.	(LM)
		- - -	
07 02 51 46	CDR	Okay, Houston. I'm up to frame count 168 on magazine E.	(LM)
		- - -	
07 02 52 24	CDR	Just shot 169 of the old Rover sitting there. Boy, that's a good machine.	(LM)(PHO 117 18852-53)

* * * * PRE LIFTOFF * * * *

07 03 43 30	LMP	Okay. We've got some weights for you, if you're ready to copy.	(PRE LIFTOFF)
07 03 43 37	LMP	Okay. The BSLSS rock bag, the big rocks will weigh 40 pounds; bag 7, SCB number 7 is 33; SCB number 4 is 25; SCB number 6 is 20. I get a total out of that of about 118. Over.	(PRE LIFTOFF)
		- - -	
07 03 49 52	CC	Hey, fellows, you have 245 pounds of rocks. That's not including the weights or the SRCs.	(PRE LIFTOFF)
07 03 50 05	CDR	Okay, has some got to go back?	(PRE LIFTOFF)
07 03 50 09	CC	No, I think we're going to be able to find a way.	(PRE LIFTOFF)
		- - -	
07 03 50 29	CC	We'll probably have to throw away that big one.	(PRE LIFTOFF)
07 03 50 43	LMP	Well, we don't want to throw away any - any that don't need to be thrown away. That's for sure.	(PRE LIFTOFF)
		- - -	
07 04 05 59	CC	Okay, Orion. We're go with the rocks you've got.	(PRE LIFTOFF)
07 04 06 07	CDR	Outstanding! Thank you very much.	(PRE LIFTOFF)
		- - -	
07 06 06 55	LMP	Jim, pass on to the backroom that that "Muley" rock weighs 40 pounds.	(PRE LIFTOFF)(SAMP 61016)
		- - -	
07 06 54 07	CC	Orion, this is Houston. For your information, your total EVA time was 20 hours 14 minutes and 55 seconds. Over.	(PRE LIFTOFF)

08 11 35 42	LMP	Hey, Tony. I was sitting here today thinking about those rocks we got, and the thing that really strikes me is that there was - I really don't think we got any volcanic rocks to speak of. Maybe some of those little black clasts were volcanics, but otherwise - I don't think we got any. There wasn't any there. There was one other point that could have been - those ones we were calling shocks could have been a tuff breccia, since they were so friable. But - that might prove to be the case; but to us, they looked shocked due to the other features that we saw that - applied a shocked metamorphism. Over.	(TRANSEARTH COAST)
08 11 36 37	CC	Right. From your description, we had thought there was a good chance that you might have gotten a tuff breccia there. I think, also, the fact that a lot of the breccias were one-rock breccias would mean that you may have your basalts or gabbroic anorthosites or whatever, and that they're just broken up. If they're one-rock breccias or two-rock breccias, it still has most of the information of the rocks we're looking for. It's not like a - if you remember, it's not like a soil breccia, where everything is lost. So we're very happy with what you found. Also did anyone brief you on the newest on the x-ray results?	(TRANSEARTH COAST)
08 11 37 17	LMP	No. Go ahead.	(TRANSEARTH COAST)
08 11 37 18	CC	Okay. You remember the first look I gave - the first look that I reported to you indicated that the aluminun-to-silicon ratio was sort of intermediate. Well, they've gone back; and with the newer data and a better analysis, it turns out that Descartes has one of the highest ratios on the Moon. The only place we've seen like it right now is on the east side of Smythii. We don't really have a good comparison yet with the east of Crisium. But anyway, it indicates that if any place has anorthosites, you've found them.	(TRANSEARTH COAST)

08 11 37 56	LMP	I tell you, Tony, some of those rocks that we picked up - I was leaning, with the color and the crystalline structure that we had - I didn't want to call it that, but they were certainly crystalline rocks; and there was no question in my mind. They had a sugary texture - the whitish ones. That big - one on the - rim of North Ray, there, with the shatter cone that had - a bluish tint to it in the crystalline structure. Though, it might have been just the - I say crystalline structure, or it might have been an aphanitic matrix; but y'all are gonna sort all of that out when you get bagged ones. I tell you, it really wasn't what - I thought we were going to find up there. I imagined a lot of volcanics; and frankly, if these shocked rocks turn out to be tuff breccias, that will be the only volcanics we found.	(TRANSEARTH COAST)
08 11 39 02	CC	Right. Understand. I think - - the fact that you recovered from the picture we had given you before you went and went ahead and found out what was there and sampled it so well - I think that's - a good indication that the training was good and you guys are really on the ball.	(TRANSEARTH COAST)
08 11 39 26	LMP	Well, we tried hard, anyway, Tony; and I think we got - a piece of every rock that was up there. I really do. They were - and that's, I think, because we were lucky, and the rocks were identifiable.	(TRANSEARTH COAST)
08 11 39 46	CC	You know, the - - difference between a rock being identifiable and not being identifiable is the level of training. That just says you guys were well trained.	(TRANSEARTH COAST)
08 11 39 58	LMP	Well, you guys tried to beat it into us long enough, I'll tell you that. Hope we did a good job.	(TRANSEARTH COAST)
08 11 40 08	CC	I just got a set of questions that the geology team - - would like to send up to you sometime. Maybe sometime during the transearth coast, we'll have a chance. I haven't really read through them, so I don't know what they're all about yet.	(TRANSEARTH COAST)

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08 11 42 23	LMP	And, Tony, the only - on the rocks, back to one other little point, there. You know, we called the whitish rocks tuff breccias - I mean, shocked rocks. But - at least, I'm personally convinced that there are at least two endogenic craters that we passed, and - the big one on the way to North Ray and the big one coming back from stop 8. And so, that might have been a source of a tuff - if that's what they turn out to be.	(TRANSEARTH COAST)
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08 11 43 12	CC	Right. I understand. I just think it was outstanding, maybe serendipity, that we probably - your landing there at Descartes probably sampled the most differentiated place we could find on the front side of the Moon. I think that's really outstanding.	(TRANSEARTH COAST)
08 11 43 34	LMP	That's the feeling I got when we started seeing those rocks. That basalt that I called under the engine bell there, I think, might end up to be that blackish-bluish rock that we sampled up at North Ray, and so - but we'll see. We couldn't get any of what I call real basalt in rocks. Maybe some of the clasts will be, though.	(TRANSEARTH COAST)
08 11 44 24	CC	Yeah, I sure could. It reminded me of a dune area.	(TRANSEARTH COAST)
08 11 44 30	CDR	Yeah. That's what it sort of looked like, sort of a dunes plains.	(TRANSEARTH COAST)
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08 11 45 06	LMP	Tony, that crater at - the endogenic one that we described coming back from North Ray and going out, it - I was guessing 80 meters, John said about 50, but it was really deep; and I'm surprised that we didn't - I sure had no feel for that before we started.	(TRANSEARTH COAST)
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09 21 16 48	CC	Apollo 16, Houston. Whenever you're ready for the geology, we'll press on with that.	(TRANSEARTH COAST)
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09 21 18 06	CC	The next question we'll get when we get the rocks back, but I think - well, maybe the best way to do this is to describe a theory that's coming up as a result of the rocks - that you saw there. A possibility is that an older theory that was discarded a few years ago may be the right one, that the Cayley is an outer fluidized ejecta from Imbrium. Fra Mauro would be an inner ring, and then Imbrium sculpture would be outside of that, and then the Cayley would be sort of slosh that filled up all the valleys farther on out. But answers to some of these questions will help the geologists define that. Something that might help them define that. And a lot of it is that they're just - can't wait for the rocks to get back. But anyway, at Station 11, you described some rocks you thought to be tuff. Looking back at Station 5 and 6, after seeing these at 11, do you think you might have seen the same kind of rock there? What we're thinking about is where you described - the square crystals and the needlelike crystals in clasts. And also, in the same question, were these crystals by themselves or were these - I mean, were the clasts single crystals or were the crystals in clasts?	(TRANSEARTH COAST)
09 21 19 38	LMP	Recalling Station 11, - the rocks - that big rock in particular was a two-rock breccia, - I feel. And - within the bluish-black matrix, which made up one clast - one of the rock types - there were needlelike crystals in that. And the white matrix also had crystals in it.	(TRANSEARTH COAST)
09 21 20 19	CC	Okay. And how - did those rocks compare to what you saw at Station 5 and 6?	(TRANSEARTH COAST)
09 21 20 40	CDR	Tony, I'm afraid I'm not gonna do any better with the answer to these questions than I do on an average field geology trip where you got 10 stations.	(TRANSEARTH COAST)
09 21 20 49	CC	Understand.	(TRANSEARTH COAST)
09 21 20 50	CDR	And the rocks - you know, the rocks that we're picking up at 5 and 6 - that was a long time before Station 11 and -	(TRANSEARTH COAST)

09 21 21 01	CDR	And I can't remember what the dang rocks looked like, to be honest with you.	(TRANSEARTH COAST)
09 21 21 34	CC	Okay. I'll try to stick here to questions that were impressions, and we're going to get the rocks back anyway. I don't really think there's any point in pressing with questions where we'll get the answers in a few days. Outbound on EVA 3, you noted 1- to 5-meter craters. And then, 10-meter craters going north and you called them secondaries. We're wondering what evidence there was - if any, that they came from North Ray. Do you think you saw any secondaries from North Ray? And if so, where would they be? And could you compare them to the size and character of the South Ray secondaries?	(TRANSEARTH COAST)
09 21 22 21	LMP	There was out around Palmetto. There were a couple of craters, if I recall - I don't know exactly whether it was Palmetto or not, but as you're going out that way, there were some craters with some blocks in them. And that's the reason I called it secondary. They were not as fresh - in fact, craters going toward North Ray were a lot more subdued than the craters going down to Stone mountain. The North Ray had - something had - either they're older or something, but they were a lot more subdued and there was less blocks around. But we did have one or two that had some blocks in them, and that's why I called them secondaries.	(TRANSEARTH COAST)
09 21 23 13	CC	Okay. Were the blocks as angular as the ones you described from South Ray?	(TRANSEARTH COAST)
09 21 23 23	LMP	In general, our impressions were no.	(TRANSEARTH COAST)
09 21 23 26	CC	Okay. As you were coming off of - and going up into North Ray area, could you give a guess at the relative proportions of - and the size and shapes of the white and the dark rocks?	(TRANSEARTH COAST)
09 21 23 51	CC	In other words, was there a change - radially outward from North Ray?	(TRANSEARTH COAST)
09 21 24 04	CDR	Yeah, this is just an impression, Tony. But I'd say that the dark rock was less prevalent as you went outbound, generally speaking - as you went away from the crater.	(TRANSEARTH COAST)

09 21 24 22	CDR	I could be 100 percent wrong on that. But we sure drove over a lot of - in the regolith there in particular. The upper layer in regolith, which contained these - I mean the upper layer in the ejecta blanket contained a lot of boulders with just their heads sticking through, and those were the ones I was looking at because I was trying to go around them. And I don't ever remember seeing a dark breccia-like rock in those boulders.	(TRANSEARTH COAST)
09 21 25 01	CC	Okay, sounds good. And that very large rock you sampled up there, Charlie, you mentioned there was white and dark rock in the one rock. Could you describe the contact? Was one contained in the other, or did the contact meander through the whole rock?	(TRANSEARTH COAST)
09 21 25 18	LMP	Just sort of meandered through, Tony. It was a - again I'll say a two-rock breccia, where it was a white and the black. And the clasts were very large, up to a meter size. I think the predominant rock was black. At least, the overall color gave you a black, but when you looked closely, you could see white clasts in it. So the - and the contact just meandered. I think we've got a couple of closeups of how the contact just meandered through. It was sort of an angular clast in this predominantly blackish matrix.	(TRANSEARTH COAST)
09 21 26 03	CC	Okay. The white rock, that was in this big boulder - was it like the white rock that you sampled to the southwest of where you parked the Rover?	(TRANSEARTH COAST)
09 21 26 14	LMP	Yes, it was all - yes, uh-huh.	(TRANSEARTH COAST)
09 21 26 17	CC	Okay. Incidentally, that shatter cone that you saw on the big boulder - did it - did the surface on the cone go right through the clasts, or did the clasts poke out kind of like nodules on the cone?	(TRANSEARTH COAST)
09 21 26 35	LMP	Well, they - no, it didn't. The shatter cone - was fortunately, or unfortunately, depending on your point of view, in the black matrix. And it was - a crystalline rock where the shatter cone occurred.	(TRANSEARTH COAST)

09 21 26 50	CC	Okay. Understand. Okay. Now that you've seen both North and South Ray ejecta blocks, could you say - a little bit about the ray material in the area from the LM to Flag? Do you feel that all that material is characteristic of the bigger ray blocks that you identified near either North Ray or South Ray?	(TRANSEARTH COAST)
09 21 27 27	CDR	I guess my impression might be that - at some places, we had some of each but most of it was from South Ray. And around the LM, once we got going toward North Ray, that material around the LM, by gosh, the breccia - and I collected several of them at that last station - in hand specimens - some of them were like the material we got out of South Ray, clear of South Ray blanket, but several of them were from North Ray. At least, that was my impression.	(TRANSEARTH COAST)
09 21 28 14	CC	Okay. Understand. We always had the feeling - -	(TRANSEARTH COAST)
09 21 28 17	CDR	I'd say the most of them - from South Ray.	(TRANSEARTH COAST)
09 21 28 19	CC	Okay. We seem to have the feeling that the rocks you were describing in the LM area were just somehow just a little bit different than what you were picking up either down South or up North. I guess we'll get that all straight when the rocks get home.	(TRANSEARTH COAST)
09 21 28 36	LMP	Tony, I think - that the breccias were different. Maybe I'm going way on a limb when I say this, but - we've been collecting little fragments that have been floating around the cockpit here and looking at them, and they're crystalline - crystalline fragments that - with little white powdery exterior on part of it, and it - chalky appearance. And to me, this - was characteristic of - some of the rocks around the Cayley, which - now I'm really leading to a tuff breccia - but the matrix being the ash with these crystalline frags, and the crystalline frags looked just like - the crystalline rocks around North Ray. At least, the black ones - at least, the couple I found here floating around. Now that's not to say that the fragments are - there are some fragments from whitish rocks, but they were a little bit - more difficult to see in this white matrix of what looks like tuff now, because it's very powdery.	(TRANSEARTH COAST)

09 21 30 03	CC	Okay. Understand. I wonder if you could describe - those vesicles in that rock at Station 13.	(TRANSEARTH COAST)
09 21 30 15	LMP	Well, they looked like - I call them drill holes. Let's see if John has a different word for it.	(TRANSEARTH COAST)
09 21 30 37	CDR	They look like those pipes that you see in rocks. Like Charlie says, they just look like drill holes.	(TRANSEARTH COAST)
09 21 30 49	CDR	And they were about a couple of - up to 2 to 3 centimeters across in diameter, and perfectly circular. It appeared to me to be.	(TRANSEARTH COAST)
09 21 31 04	CC	And how deep did they go? Could you tell - I mean, did they go straight in, or did they seem to meander around?	(TRANSEARTH COAST)
09 21 31 12	CDR	They seemed to go straight in, and I couldn't tell how deep they were, because they only go in a - they disappear from sight. I didn't try reaching into any of them.	(TRANSEARTH COAST)
09 21 31 22	LMP	Tony, there wasn't anything in them. You could just look in - and they looked clean, and - just like somebody drilled out the rock.	(TRANSEARTH COAST)
09 21 31 34	CC	How about the orientation? Were they all perpendicular to the surface, or did they all have a preferred orientation?	(TRANSEARTH COAST)
09 21 31 49	LMP	I got the impression that they were parallel - to the surface. As you stood and faced the rock, you could see these little holes sticking out at you - with most of them parallel to the regolith.	(TRANSEARTH COAST)
09 21 32 13	CC	Okay. How about when you went around on the other side? Did they poke out at you there, or were the - what I'm trying to get a feeling is - did it indicate a top and bottom in the rock, or did it just poke out all over the rock?	(TRANSEARTH COAST)
09 21 32 33	LMP	I'm - we only remember seeing them on one side, Tony. And that was the south side or the east side of the rock. The rock was facing - the side we saw them on was away from North Ray.	(TRANSEARTH COAST)

09 21 33 51	CC	Okay. Charlie, during the LM closeout time, you started to make a remark about the change in character between the regolith - between the LM area and Stone mountain, and somehow we got interrupted there and you didn't finish your statement. I wonder if you could finish what you were going to say - if you happen to remember? Can you characterize the difference in regolith between the LM area and Stone mountain?	(TRANSEARTH COAST)
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09 21 35 22	LMP	Tony, we're just sitting here trying to recall, and - right now the only impression is that you tended to sink in more up on Stone mountain, which could be downslope movement of particles, and - it was - just very loosely consolidated up there. Everywhere you'd step, you'd sink in a couple of inches. And on the slopes around the LM, it was the same way. And even, in fact, where we landed. Up around the ALSEP site, it was very loosely consolidated, and as you walked - your foot would leave quite an imprint. And once we had pretty well turned over the surface around the LM and up on Stone, it would look like freshly raked ground - to me. North Ray, wasn't like that at all. It was very thin regolith and as we commented, we had a tough time raking because it was so rocky right up - within a couple of centimeters, at the top of the regolith. Over.	(TRANSEARTH COAST)
09 21 36 47	CC	Okay. Understand. I think your downslope movement there on Stone was - probably right. Although that wouldn't explain why it was harder at 5 and 6 than at 4. Well, anyway. Next question here - on that half-orange-sized rock that you put on the LPM, wonder if you could estimate how common that type rock was around.	(TRANSEARTH COAST) (SAMP 60335)
09 21 37 22	LMP	Well, John picked up one just like it up on - it was a grab sample up on Stone mountain. And it was one of the crystalline rocks with that sugary crystalline texture to it. Huh? Yeah. And it was one of those whitish rocks that was a little dusty. I think it's fairly common. We'll just have to see when we get the samples back, but it was my impression it was one of the three predominant rock types there.	(TRANSEARTH COAST)

09 21 37 56	CC	Okay. Understand. And the soil at Station 8 - was it white underneath the top surface like you described up at Station 4 and a lot of other stations?	(TRANSEARTH COAST)
09 21 38 27	CDR	We kicked some of that, and I can't remember whether it was or not at Station 8.	(TRANSEARTH COAST)
09 21 38 37	CDR	I think it - anyway, we sampled the soil sample there, and it's in the box somewhere. But - I certainly can't remember whether it was - white underneath or not.	(TRANSEARTH COAST)
09 21 38 51	CC	Okay. Understand. And just subjectively, could you compare - now that you've been up fairly close to Smoky and on Stone - could you compare the two structures?	(TRANSEARTH COAST)
09 21 39 09	CDR	They looked the same to us.	(TRANSEARTH COAST)
09 21 39 15	CDR	Okay, I wouldn't be surprised but what they aren't the same. When Ken and I and Charlie looked at it in this real low sun angle, I guess that's - as far as geometric form, it certainly looked - it was the hummocky material from the Descartes region is the way it looked. Right across Smoky - right through that whole region, it looked like a single unit, and - I guess that would be my interpretation of it at this point. But it's pure speculation, but I would guess that tonight. I wouldn't be surprised but that we don't find a lot of these rock types on one region very close to another region being about the same.	(TRANSEARTH COAST)
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09 21 40 09	LMP	Tony - I was just going - - to add to that I had the same impression. Looking at - the South Ray, with the black and white streaks up the wall - up on the interior of the crater, and also at Baby Ray, being very stark in contract. And then in North Ray, having that same impression but more subdued. And the rock appearing to be very similar - I think there's a good lateral - and you guys can demolish this when you analyze the rocks, but right now my impression is that - the two craters penetrated very	(TRANSEARTH COAST)

			similar - or two very similar rock units. The white and the bluish black.	
09 21 41 11	CC		Okay. Understand. The reason for a lot of these questions - and we know the answers are in the rock boxes and bags there and we'll all get when you get home. But there's a lot of interest since - the model that we have of the whole area is being changed because of the high aluminum-to-silicon ratios and because of all of your rock descriptions there. There's a lot of push here to reformulate a new model. The press is kind of pushing, and you'll probably get some questions this afternoon in your press conference. I was wondering if there's anything you wanted to ask the geology team about - this new model, since I don't think you've ever been briefed on it.	(TRANSEARTH COAST)
09 21 42 09	LMP		No, I'd sure never heard it was slosh from the Imbrium at the Cayley.	(TRANSEARTH COAST)
09 21 42 14	CDR		I'd say it's premature to be making those kind of statements, Tony. And I would like to wait until we get all that data in and take a look at it. It's just too soon to be - on hearsay - and not having the real evidence and not having - all the data analyzed. It's too soon to be making any major conclusions about the region. I can't see how you could do that.	(TRANSEARTH COAST)
09 21 42 38	CC		I sure agree with you, John. But, you know, everybody's - excited and trying to press with it. But, anyway, I thought you might want - to hear a little bit about that, if you're going to be asked on it this afternoon. Now, of course, that isn't to say anyone's saying that Kant Plateau or Descartes Highlands are slosh. It's just the Cayley part. Anyway, that's all we have here, if you just want to press on there.	(TRANSEARTH COAST)
09 21 43 11	CDR		No, I just don't see how you can come to that conclusion this quick without any evidence, Tony. It'd be nice to do that, but i - I would not press for that sort of thing this early in the game. And I wouldn't answer questions to anybody to amount to anything on that kind of stuff because that's too speculative.	(TRANSEARTH COAST)

09 21 43 31	CDR	In other words, it ain't good science.	(TRANSEARTH COAST)
09 21 43 35	CC	Yeah, John. I think you're right on, and I hope they heard you in the backroom, because - I think I said the same thing this morning.	(TRANSEARTH COAST)
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10 03 26 56	CC	Question number 3 in three parts. Were you surprised at the rocks and other formations at the Cayley site?	(TRANSEARTH COAST)(PRESS CONFERENCE)
10 03 27 10	LMP	I think we were. The original impression had been mostly volcanics to look for, and I don't think we found the highest percentage of volcanics as we had originally anticipated. So the rocks that we found were unique, that we had never seen before in any of the lunar samples, we feel, and so it was a surprise.	(TRANSEARTH COAST)(PRESS CONFERENCE)
10 03 27 39	CC	Do you think your geological training properly prepared you to describe them?	(TRANSEARTH COAST)(PRESS CONFERENCE)
10 03 27 50	CDR	I think so, under the circumstances. You see, most of the rocks - were dust covered apparently by the two impacts, North Ray and South Ray. It had just thrown a big blanket of dust out across there, and we saw very few rocks that were clean until we cut into them. And you don't want to take too much time to stop and whack off a piece of rock, because it's pretty hard to do in a pressure suit. So we were just describing them more by shape and softness and friability and things like that. And that really doesn't take a lot of training, but I think we've had adequate training to do this kind of a job.	(TRANSEARTH COAST)(PRESS CONFERENCE)
10 03 28 40	CC	Did you see anything specifically volcanic?	(TRANSEARTH COAST)(PRESS CONFERENCE)
10 03 28 50	LMP	As far as craters go, Hank, we think we saw two that had the shape we called endogenic that had the shape of very subdued old cinder cones or something of that nature. In other words, they - look more like, well, sink holes, really, with the surrounding topography. They had no rim on them; and, to us, it looked like it might have been a source for some - volcanic activity way, way back.	(TRANSEARTH COAST)(PRESS CONFERENCE)

10 03 29 27	CC	Question 4: Several times at North Ray you mentioned, "Don't get too close to the edge." Did you think that if you had fallen in, you wouldn't have been able to get out?	(TRANSEARTH COAST)(PRESS CONFERENCE)
10 03 29 39	CDR	That's affirmative.	(TRANSEARTH COAST)(PRESS CONFERENCE)
10 03 29 43	LMP	You bet.	(TRANSEARTH COAST)(PRESS CONFERENCE)
10 03 29 44	CDR	If we had fallen in, we would not have been able to get out. That's correct.	(TRANSEARTH COAST)(PRESS CONFERENCE)
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10 03 31 37	CC	Question 7 for Ken: Your observations of the landing site. Did you see the Lunar Module or the Rover, and did you see any differences between Cayley and Descartes?	(TRANSEARTH COAST)(PRESS CONFERENCE)
10 03 31 51	CMP	Okay. That's two distinct questions. First thing, did I see it? We never pointed the sextant at the landing site according to the Flight Plan because of the alterations we had. And there were two occasions, once when I thought I caught a glint of light, which I could not recognize as the LM but which came from the location where I think the LM probably was sitting. And that was very close to the position on my map that you folks read up to me. And once, as Rover was starting up on Stone mountain, I just happened to be looking as they went by, and I think you were on the shift, Hank, and told me that they were hitting Stone mountain, and I looked over there, and about that time I got another little flash of light, which is about all, with the 10-power optics we have, that I think you could expect to see. At no time could you see something you could identify.	(TRANSEARTH COAST)(PRESS CONFERENCE)
10 03 32 46	CC	The second part of that question was: Did you see any differences between Cayley and Descartes?	(TRANSEARTH COAST)(PRESS CONFERENCE)

10 03 32 54	CMP	Yes, I think there's a distinctly different morphology involved in these two units. Our preflight training is a little different in impression than what I think I saw; and, again, we have, like I say, a 10-power resolution. I think the real answer of what this material is, is going to lay in analyzing the data postflight. We have some good film records, and I think - when you put that together with the rocks we picked up, we'll have a pretty powerful story that'll explain a lot of things we don't know now. But I think that there are sections of material we called Descartes, particularly the material that makes up Stone and Smoky, and that stuff runs all the way south down to the old Descartes crater for which the region is named. And that does look texturally entirely different from the Cayley formation.	(TRANSEARTH COAST)(PRESS CONFERENCE)
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10 03 44 15	CDR	Well, let me just say one thing, Hank, and that is - Mr. Descartes said it. He said, "There's nothing so far removed from us as to be beyond our reach, or so hidden that we cannot discover it." And you all know Descartes was a French mathematician and philosopher for whom the region was named. And I guess, really, the story of our mission so far is we've been out testing his theory. My personal assessment of where we are right now, as soon as we get the rocks back in the LRL, we'll be making headway toward proving he was right.	(TRANSEARTH COAST)(PRESS CONFERENCE)

* * * SEPARATE COMMUNICATIONS BETWEEN COMMAND MODULE PILOT AND MISSION CONTROL * * * *

05 00 13 39	CMP	I have the landing site in the binoculars now. I can look down into South Ray, and it really is a jumbled thing. I can see one bright layer, then a dark layer, then a bright layer, and then a dark layer on the west side. And on the south, it looks like some of the same. And I can't see into the shadows very well to the north. I've got Double Spot in the binoculars; and let's see if I can see anything in that area.	(ORBIT)
05 00 14 40	CC	Can you see the LM?	(ORBIT)
05 00 14 48	CMP	Well, I was hoping I could say yes, but I don't think I do. It looks like there is one little ridgeline that goes around a - it'd be that first crater that they come up to. It's Flag or Spook. I've got the Cinco craters and - those terraces that we talked about that were over in Stone mountain don't stand out very well from here. Looks to me like you've got a lot of the same lineations that we've seen in the other places - looks like some slumping further around than where they're going to be going up. I don't think they'll be able to recognize terraces as such.	(ORBIT)
05 00 15 49	CMP	The northwest - I mean northeast - correction - side of that extension of Stone mountain has what I would have called slumping if it were on the inside of a crater.	(ORBIT)
05 02 09 40	CMP	Boy, I'll tell you. That little sun-angle change - old North and South Ray really stand out now. You couldn't miss those for anything.	(ORBIT)
		- - -	
05 02 10 49	CMP	Okay. With the binocs on the area now, I'm looking down into North Ray crater and South Ray and the interior structures of those two don't look quite the same. There's a lot more light and dark material in the South Ray; but that may be caused by the fact that it's just a - it really has been a fresher-appearing crater all around. The areas - trying to see if I can see any shadows or anything - there's a bright spot down there, but I think that's just a Double Spot itself. I don't see anything	(ORBIT)

with the binocs that I could say I could see - I can't stablize them quite that well. Coming down the traverse route from - where they're going across Survey Ridge - I don't think Survey is going to be easy to spot. And when you get down - there is one definite terrace - looks like Stone mountain is formed with one, two, three terraces, but they are much larger than the kind of things that we were drawing on the map. The rest of that is very fine subtle lineations. The area around North Ray, particularly up along the area that they were going on the EVA - I can see it now, and it almost looks like that little pile of material that runs up to the south of their track and I'll give you some coordinates on that. I'm looking at my chart A - let's see, 9 Charlie - yes, let's look at chart 9 Charlie. And - this is a pretty lousy picture, but if you'll remember at a point about CY by 79, if you'll draw a line there and then draw a line down to about CU and 81, that represents a ridge, which shows up in the photographs. And looking down on it vertically, that looks like sort of a flow of material that runs up over the lip of North Ray and down into it. And it shows some craters on it, but it almost looks like a flow that runs up and down into North Ray rather than being some of the other kinds of things we've talked about. And I didn't have much time, I'll try to concentrate on that on the next rev.

05 04 09 20 CC Ken, for your information, John and Charlie are at Flag now. (ORBIT)

- - -

05 04 10 13 CMP Okay, I'm going to concentrate on North Ray as I distinctly believe that the area that the traverse is drawn on that goes up on the North Ray comes up on material that looks like it has flowed around and is part of the basic furrowed Descartes unit that's mapped back further to the east. And it looks to me like it runs down around the crater and straight into it. (ORBIT)

05 04 11 04	CMP	I can see evidence of stratigraphy in North Ray, and lots of it in South Ray. And as we come across - the general topography down there looks about the same all the way across the board.	(ORBIT)
05 06 10 38	CC	And Ken, the guys are back inside. I don't know whether you heard me a while ago or not, but EVA 1 was a total success. They had a 7 hour and 11 minute EVA.	(ORBIT)
		- - -	
05 06 11 02	CMP	Did they have any surprises in the things they saw or that they didn't expect?	(ORBIT)
05 06 11 30	CC	I guess the big thing, Ken, was they found all breccia. They found only one rock that possibly might be igneous.	(ORBIT)
		- - -	
05 06 11 46	CMP	Well, that ought to call for a session with the - yeah, yeah. Well it's back to the drawing boards or wherever geologists go.	(ORBIT)
05 07 57 13	CC	Okay, Ken, this is just sort of a general question about the terraces in Stone mountain and if you get a chance, why, look down around the south end of that EVA-2 traverse, down around Station 5, and just might look in the area and see if you can give any hints on how definite those terraces are. They're going to try to establish at Station 5 on the first terrace. And if you think it looks definite enough, why, that's a no-sweat operation or how easy it looks to determine between first, second terrace, and so forth.	(ORBIT)
05 07 57 58	CMP	Okay. I kind of looked for that and let me take another look specifically at that. It appeared to me that - probably on the ground you wouldn't know you're on the first terrace. But let me take another look at that - I'll check it out this time. And again we're only trying to guess what it would look like if you - indeed were that far down.	(ORBIT)
		- - -	

05 08 06 14	CMP	I'll tell you, the old landing site stands out now. You couldn't miss that for anything. And it wasn't that obvious at the lower sun. Unfortunately, I'm a little too far south to be able to give you a good answer on those terraces, but I'll give a hack at it.	(ORBIT)
		- - -	
05 08 08 04	CMP	Yes. I think that they will be able to recognize that they're on the first terrace.	(ORBIT)
05 08 08 15	CMP	Oh, I don't know, over by Cinco they're not that obvious. They are further around to the west, but I'm not sure they'll recognize the first terrace. They might recognize Cinco.	(ORBIT)
		- - -	
05 08 09 51	CMP	You'd swear that you ought to be able to see the LM with these binoculars. I think if you knew where to look exactly, you might be able to see it. But you couldn't hold anything in your hand any more sensitive. I'll tell you, the Cinco craters stand out very nicely and the crest crater is very obvious from up here. But it looks like the path you've drawn that goes from Station 5 to 6 and 4 - that path looks to me like it runs down sort of a tongue of material. That you can drive up it - and that those white lines we've got drawn on chart 9 Charlie - really aren't obvious at all. When you get over around more in the South Ray side you start to see these things, but it's just not at all obvious that they're going to see anything - down that path.	(ORBIT)
		- - -	
05 08 11 10	CC	Okay. Now I heard earlier that you could see Double Spot with binocs. Does that sound right, Ken?	(ORBIT)
05 08 11 18	CMP	That's affirmative.	(ORBIT)
05 08 11 27	CC	Okay. And I'm sure that they passed on to you that the LM should be 200 meters northwest of Double Spot.	(ORBIT)

05 08 11 35	CMP	Yeah. I just - every time I've gone over, I've been looking for something that I thought was probably more worthwhile than just the gee whiz of my saying I saw the LM.	(ORBIT)
05 08 11 52	CMP	I really wish we'd gotten into North Ray - maybe they'll still get a chance, because it looks to me like a - that's a pretty interesting path up there. Interesting from the fact that it looks like it's constructional - the ridge that runs up to North Ray crater.	(ORBIT)
		- - -	
05 11 51 54	CC	Hey, Ken. How did we make out in our discussion on North Ray low altitude there as far as being able to see the white albedo or not? Or, were you too far to the south?	(ORBIT)
05 11 52 10	CMP	It depends which rev you want to talk about. I looked at her on the first day, right after DOI, there was two craters, but no rays. When I went back and looked at him on landing morning, there's a slight ray. But North Ray still doesn't stand out as being the bright guy that South Ray does.	(ORBIT)
		- - -	
05 12 11 06	CMP	Couldn't pass up a chance to watch the landing site one more time, and so I took a quick break from chow and went and watched it. And had a couple of questions in mind and only got two of them answered. One of them is that counting the layers in North and South Ray and South Ray looks different than North in that South Ray shows three distinct light and dark sequences. I suspect they're slumps, but there's at least three bands. North Ray doesn't have any of that sort of thing. It's obvious from this altitude. I took another look for their terraces and the whole area - the thing that we thought looked so distinctly different in the photographs - looked like Stone mountain and Smoky mountain were two different things and something came in the middle of it and - it doesn't look that way to me at all today. It looks to me like it's really all - almost all part of the same material.	(ORBIT)

		And I've drawn another little mark on my map. It's just about where you folks said you thought the LM was, except a little farther over to the north. It turns out that there's one little bright speckle there that doesn't look like craters. I don't see anything except the speckle.	
05 12 12 41	CC	Okay, I'm looking there. Now, go straight north of the LM and a little to the west, there's three small craters there that are covered with what looks like a ray, now. Where are you talking from that?	(ORBIT)
05 12 13 48	CMP	You were looking in the right area. And, let me see what I can give you for coordinates on that.	(ORBIT)
05 12 14 21	CMP	How about CB 5 and 80?	(ORBIT)
05 12 14 34	CMP	Okay, and you know I'm not overhead long enough to be sure that that's what I'm looking at, but it looked to me like it had a different kind of glint to it.	(ORBIT)
06 00 02 22	CMP	I guess you probably didn't get my comment about the glint over on Stone mountain?	(ORBIT)
06 00 02 31	CC	Negative.	(ORBIT)
06 00 02 38	CMP	I had just gotten in a position as I passed overhead the - area, and I was taking a look - over towards the terraces and see how they look today, and - when I looked over towards the terraces, it was kind of strange because I was looking out - and I'd say maybe you can see - at this sun angle looks like there might be a terrace out there. And you can see Crest (?) crater very plainly. And the Cincos, I have to be on top of the landing site to see it, and by the time I got around to that, I was downstream a ways; but I got a flash of light right at the base of Stone mountain; just a glint, like a piece of metal flashed in the sunlight. And I'll bet you anything I got a reflection off the Rover if at about that time they were right at the base of Stone.	(ORBIT)
06 00 04 12	CC	That's about where they were, Ken.	(ORBIT)

- - -

06 00 07 15	CMP	One other thing I wanted to tell you about the - in the Descartes area. You remember the little cone-shaped thing that we looked at on the plotter?	(ORBIT)
06 00 07 30	CMP	Just to the north and mostly to the west of Canoe?	(ORBIT)
06 00 07 40	CMP	I've looked for it on four revs now, and I've identified the feature that it looked like it was, and it doesn't look like that at all. It's just a little soft mound with a crater in it, and it doesn't look any different than all the other craters when you look at it from here.	(ORBIT)
06 00 08 00	CC	Well, that's interesting, but disappointing.	(ORBIT)
06 00 08 07	CMP	Yeah, I was, too. And, actually, that's about the same score for the one that's out here by Lassell.	(ORBIT)
06 00 08 34	CC	Well, in the photograph for that one there northwest of North Ray, it sure does look like it had a lot darker material around it.	(ORBIT)
06 00 08 45	CMP	Yeah, I know it does, and I haven't had a chance to look at it straight down, from an oblique, it sure looks the same as all the rest of the things around there.	(ORBIT)
		- - -	
06 00 31 27	CMP	I think I told you yesterday that it appears to me that the interior of North and South Ray are significantly different.	(ORBIT)
06 00 31 47	CMP	South Ray shows a great deal of dark and light splotches and North Ray just doesn't show that real dramatic difference.	(ORBIT)
06 01 53 51	CMP	And I got North and South Ray again and -	(ORBIT)
06 01 53 57	CC	John and Charlie are at Station 5 now, Ken.	(ORBIT)
		- - -	
06 01 54 20	CMP	I can see one, two, three distinct layers and it looks like several streams of material that go from the interior of South Ray - one of them points out, goes in South Ray and over the lip and down the	(ORBIT)

		outside. And it points over towards Baby Ray. All those things we said we could see, all those lineaments and things that we looked at back in the furrow of Descartes just don't show.	
06 01 54 58	CMP	My first impression at the lower sun was that the material of Stone and Smoky were the same and that the Descartes furrowed material was also part of the same thing. As the sun angle comes up, it starts to change its character a little bit, and and it's looking more like the plotter photos.	(ORBIT)
06 03 52 21	CMP	Boy, as the sun angle comes up now, the features in the landing area are really fading out.	(ORBIT)
06 03 52 55	CMP	There's more evidence of terracing and banding in Smoky mountain than there is in Cone, it looks like.	(ORBIT)
06 03 53 13	CMP	On this sun angle, I can see one, two - say again.	(ORBIT)
06 03 53 18	CC	I was just curious to how close they were going to get those bands on their trip to North Ray.	(ORBIT)
06 03 53 27	CMP	Yeah. Well, the other thing is that they were going to go down to Ravine, and it looks to me like the material at Ravine is about the same material that's around North Ray. If they get there and come up the way they're scheduled to, it looks like they're going to be on the same unit that they would have gotten down at Ravine.	(ORBIT)
		- - -	
06 03 54 12	CMP	It sure looks like North Ray was blasted into a piece of Smoky mountain - what it really looks like. And that the Smoky mountain and the stuff out to the east of there is really probably all from the same stuff.	(ORBIT)
06 05 50 56	CMP	In this higher sun, it sure appears that the bright things that run down into - come out of the Descartes bright spot and run north, seem to be centered around - that's Dollond - I guess that's Dollond B or a - whatever that thing is. I tried to trace the boundaries and all this material that's in what we call the furrowed Descartes that runs up and it becomes part of Smoky mountain. That material	(ORBIT)

		looks just exactly like most of that stuff on the back side, except it may be a little bit darker, and I think that's the sun angle. That whole area has that same characteristic to me.	
06 05 52 12	CC	You remember that northwest-southeast trending we saw in the vicinity of North Ray that looked like it was some offsets in those grabens? Can you see any of that in there?	(ORBIT)
06 05 52 27	CMP	I'm not sure about that. But it does appear to me as if the floor that the LM has landed on is indeed a different unit that sticks in, and it's more part of this Cayley material that's farther out to the west. And it does go back just about the way we had drawn the boundaries. Say again your question?	(ORBIT)
06 05 52 53	CC	I just remember on a plotter, we looked at what appeared to be some graben that came across Smoky mountain and down to the southeast of it and going back up the northwest. And they were all offset like there may have been some faulting in that area.	(ORBIT)
06 05 53 12	CMP	Okay. Well, I'm not sure what that all is, Hank. That same texture that has many patterns and linear lines and they make a kind of a hash, but that same thing appears all over the surface when you look at it in detail. I think I can probably take a picture of most any one of these places down here and analyze it in depth and come up with a very similar picture. And especially the things on the back side look exactly like that Descartes area. It's just that Descartes area is a very small place. And you see so much on the back side that covers that same kind of thing.	(ORBIT)

* * * * END OF TRANSCRIPT * * * *

TABLE I. APOLLO 16 SAMPLE LISTING CROSS-REFERENCED TO APOLLO ELAPSED TIMES

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIMES (AET)		
60001	CORE BIT	05 01 25 36	05 04 59 41	
60002-07	CORE STEMS	05 01 25 36	05 04 59 41	
60009	CORE 54 LOWER	06 04 57 47		
60010	CORE 45 UPPER	06 04 57 47		
60013	CORE 32 LOWER	07 01 35 10	07 01 36 52	07 01 59 28
60014	CORE 27 UPPER	07 01 35 10	07 01 36 52	07 01 59 28
60015	ROCK - CRYSTALLINE	05 05 08 40	05 05 31 26	05 23 28 31
60016	ROCK - BRECCIA	07 02 16 50		
60017	ROCK - BRECCIA	07 00 40 49		
60018	ROCK - BRECCIA	07 01 31 45		
60019	ROCK - BRECCIA	07 01 42 20		
60020	FINES - SCB 3 RESIDUE			
60025	ROCK - ANORTHOSITE	05 23 13 08		
60030	DOC BAG RESIDUE	05 02 37 02	05 03 04 23	
60035	ROCK - ANORTHOSITE GABBRO	05 02 37 02	05 03 04 23	
60040	FINES - SCB 5 RESIDUE			
60050-59	FINES & CHIPS	05 02 44 15	05 03 04 23	
60070	DOC BAG RESIDUE	05 02 45 33	05 02 50 40	05 03 04 23
60075	ROCK - BRECCIA	05 02 45 33	05 02 50 40	05 03 04 23
60090	DOC BAG RESIDUE	05 01 53 19	05 04 09 40	
60095	CHIP - GLASS	05 01 53 19	05 04 09 40	

TABLE I. CONTINUED

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIMES (AET)
60110	DOC BAG RESIDUE	06 05 11 36
60115	ROCK - BRECCIA	06 05 11 36
60130	DOC BAG RESIDUE	07 01 33 15
60135	ROCK - CRYSTALLINE	07 01 33 15
60210	RESIDUE	07 01 45 49
60215	ROCK - ANORTHOSITIC CATACLASITE	07 01 45 49
60230	DOC BAG RESIDUE	07 01 47 29
60235	ROCK - CRYSTALLINE	07 01 47 29
60250	DOC BAG RESIDUE	07 01 49 28
60255	ROCK - BRECCIA	07 01 49 28
60270	DOC BAG RESIDUE	07 01 56 25
60275	ROCK - BRECCIA	07 01 56 25
60310	DOC BAG RESIDUE	07 01 57 31
60315	ROCK - CRYSTALLINE	07 01 57 31
60330	RESIDUE	07 02 32 05
60335	ROCK - BRECCIA	07 02 32 05 09 21 36 47
60500-04	FINES - RAKE SAMPLE	07 01 30 26
60510	DOC BAG RESIDUE - RAKE SAMPLE	07 01 27 05
60515-19	CHIPS - RAKE SAMPLE	07 01 27 05
60525-29	CHIPS - RAKE SAMPLE	07 01 27 05
60535	CHIP - BRECCIA - RAKE SAMPLE	07 01 27 05

TABLE I. CONTINUED

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIMES (AET)
60600-04	FINES - RAKE SAMPLE	07 01 24 51
60610	DOC BAG RESIDUE - RAKE SAMPLE	07 01 22 03
60615-19	CHIPS - RAKE SAMPLE	07 01 22 03
60625-29	CHIPS - RAKE SAMPLE	07 01 22 03
60635-39	CHIPS - RAKE SAMPLE	07 01 22 03
60645-49	CHIPS - RAKE SAMPLE	07 01 22 03
60655-59	CHIPS - RAKE SAMPLE	07 01 22 03
60665-69	CHIPS - RAKE SAMPLE	07 01 22 03
60675-79	CHIPS - RAKE SAMPLE	07 01 22 03
61010	RESIDUE - SRC 1	
61015	ROCK - BRECCIA	05 04 03 24
61016	ROCK - ANORTHOSITE - "BIG MULEY"	05 04 07 30 05 05 24 53 05 08 24 07 05 22 47 35 07 01 36 29 07 02 14 35 07 02 26 14 07 06 06 55
61017	CHIP	
61130	DOC BAG RESIDUE	05 03 45 28
61135	ROCK - BRECCIA	05 03 45 28
61140-44	FINES	05 03 39 25
61150	DOC BAG RESIDUE	05 03 36 00
61155-58	CHIPS	05 03 36 00
61160-64	FINES	05 03 42 31
61170	DOC BAG RESIDUE	05 03 40 45
61175	ROCK - BRECCIA	05 03 40 45

TABLE 1. CONTINUED

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIMES (AET)
61180-84	FINES	05 03 50 01
61190	DOC BAG RESIDUE	05 03 47 44
61195	ROCK - MICROBRECCIA	05 03 47 44
61220-26	FINES & CHIPS	05 03 54 21
61240-49, 55	FINES & CHIPS	05 03 50 59
61280-84	FINES	05 04 01 05
61290	CHIP?	05 03 55 47 05 04 01 11 05 08 23 45 05 08 29 41
61295	ROCK - BRECCIA	05 03 55 47 05 04 01 11 05 08 23 45 05 08 29 41
61500-05	FINES	05 03 34 15
61510	DOC BAG RESIDUE - RAKE SAMPLE	05 03 28 28
61515-19	CHIPS - RAKE SAMPLE	05 03 28 28
61525-29	CHIPS - RAKE SAMPLE	05 03 28 28
61535-39	CHIPS - RAKE SAMPLE	05 03 28 28
61545-49	CHIPS - RAKE SAMPLE	05 03 28 28
61555-59	CHIPS - RAKE SAMPLE	05 03 28 28
61565-69	CHIPS - RAKE SAMPLE	05 03 28 28
61575-77	CHIPS - RAKE SAMPLE	05 03 28 28
62230-38	FINES, CHIPS, & ROCK - BASALT	05 04 32 38
62240-49	FINES & CHIPS	05 04 36 20
62250	DOC BAG RESIDUE	05 04 37 08
62255	ROCK - BRECCIA	05 04 37 08

TABLE I. CONTINUED

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIMES (AET)
62270	DOC BAG RESIDUE	05 04 40 44 05 08 22 41 05 08 43 38
62275	ROCK - BRECCIA	05 04 40 44 05 08 22 41 05 08 43 38
62280-89	FINES & CHIPS	05 04 45 18
62290	DOC BAG RESIDUE	05 04 44 07
62295	ROCK - CRYSTALLINE	05 04 44 07
62305	CHIP WITH 62280-89	05 04 45 18
62315	CHIP WITH 62240-49	05 04 36 20
63010	RESIDUE FROM SCB 6	
63320-24	FINES	07 00 28 00
63335	ROCK - BRECCIA	07 00 38 16
63340-44	FINES	07 00 32 21
63350	UNKNOWN - BAG 429	07 00 38 16
63355	ROCK - BRECCIA	07 00 38 16
63500-09	FINES & CHIPS - RAKE SAMPLE	07 00 26 46
63515	CHIP - RAKE SAMPLE	07 00 26 46
63520	DOC BAG RESIDUE - RAKE SAMPLE	07 00 23 58
63525-29	CHIPS - RAKE SAMPLE	07 00 23 58
63535-39	CHIPS - RAKE SAMPLE	07 00 23 58
63545-49	CHIPS - RAKE SAMPLE	07 00 23 58
63555-59	CHIPS - RAKE SAMPLE	07 00 23 58
63565-69	CHIPS - RAKE SAMPLE	07 00 23 58

TABLE I. CONTINUED

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIMES (AET)
63575-79	CHIPS - RAKE SAMPLE	07 00 23 58
63585-89	CHIPS - RAKE SAMPLE	07 00 23 58
63595-98	CHIPS - RAKE SAMPLE	07 00 23 58
64001	CORE 38	06 00 37 23
64002	CORE 43	06 00 37 23
64420-25	FINES & CHIP	06 00 35 31 06 00 37 43
64430	DOC BAG RESIDUE	06 00 17 19
64435	ROCK - BRECCIA	06 00 17 19
64450	UNKNOWN - DOC BAG RESIDUE?	06 00 29 08
64455	ROCK - ANORTHOSITE	06 00 29 08
64470	DOC BAG RESIDUE	06 00 25 57 06 00 32 15
64475-78	ROCKS & CHIPS - BRECCIAS	06 00 25 57 06 00 32 15
64500-09	FINES & CHIPS? - RAKE SAMPLE	06 00 23 22
64515-19	CHIPS - RAKE SAMPLE	06 00 23 22
64525	CHIP? - RAKE SAMPLE	06 00 23 22
64530	DOC BAG RESIDUE - RAKE SAMPLE	06 00 19 56
64535-39	ROCKS & CHIPS - RAKE SAMPLE	06 00 19 56
64540-49	CHIPS - RAKE SAMPLE	06 00 19 56
64555-59	CHIPS - RAKE SAMPLE	06 00 19 56
64565-69	CHIPS - RAKE SAMPLE	06 00 19 56
64575-79	CHIPS - RAKE SAMPLE	06 00 19 56

TABLE I. CONTINUED

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIMES (AET)
64585-89	CHIPS - RAKE SAMPLE	06 00 19 56
64800-04	FINES - RAKE SAMPLE	06 00 45 09
64810-19	FINES & CHIPS - RAKE SAMPLE	06 00 50 56
64825-29	CHIPS - RAKE SAMPLE	06 00 50 56
64835-37	CHIPS - RAKE SAMPLE	06 00 50 56
65010	SCB I RESIDUE	
65015	ROCK - CRYSTALLINE	06 01 47 08
65016	GLASS SPHERE	06 01 18 18 06 05 35 13
65030	DOC BAG RESIDUE	06 01 30 34
65035	ROCK - BRECCIA	06 01 30 34
65050	DOC BAG RESIDUE	06 01 49 32
65055	ROCK - CRYSTALLINE	06 01 49 32
65056	ROCK - GLASS AGGLUTINATE	06 01 49 32
65070	DOC BAG RESIDUE	06 01 27 51
65075	ROCK - BRECCIA	06 01 27 51
65090	DOC BAG RESIDUE	06 01 44 35
65095	ROCK - BRECCIA	06 01 44 35
65310	DOC BAG RESIDUE - RAKE SAMPLE	06 01 32 33
65315	ROCK - BRECCIA	06 01 32 33
65325-29	CHIPS - RAKE SAMPLE	06 01 32 33
65335-39	CHIPS - RAKE SAMPLE	06 01 32 33

TABLE I. CONTINUED

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIMES (AET)
65345-49	CHIPS - RAKE SAMPLE	06 01 32 33
65355-59	CHIPS - RAKE SAMPLE	06 01 32 33
65365-66	CHIPS - RAKE SAMPLE	06 01 32 33
65500-04	FINES - RAKE SAMPLE	06 01 19 47
65510-19	FINES & CHIPS - RAKE SAMPLE	06 01 09 41
65525-29	CHIPS - RAKE SAMPLE	06 01 09 41
65535-39	CHIPS - RAKE SAMPLE	06 01 09 41
65545-49	CHIPS - RAKE SAMPLE	06 01 09 41
65555-59	CHIPS - RAKE SAMPLE	06 01 09 41
65565-69	CHIPS - RAKE SAMPLE	06 01 09 41
65575-79	CHIPS - RAKE SAMPLE	06 01 09 41
65585-88	CHIPS - RAKE SAMPLE	06 01 09 41
65700-04	FINES - RAKE SAMPLE	06 01 26 25
65710	UNKNOWN - RAKE SAMPLE	06 01 21 27
65715-19	CHIPS - RAKE SAMPLE	06 01 21 27
65725-29	CHIPS - RAKE SAMPLE	06 01 21 27
65735-39	CHIPS - RAKE SAMPLE	06 01 21 27
65745-49	CHIPS - RAKE SAMPLE	06 01 21 27
65755-59	CHIPS - RAKE SAMPLE	06 01 21 27
65765-69	CHIPS - RAKE SAMPLE	06 01 21 27
65775-79	CHIPS - RAKE SAMPLE	06 01 21 27

TABLE I. CONTINUED

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIMES (AET)
65785-89	CHIPS & ROCK - BRECCIA - RAKE SAMPLE	06 01 21 27
65795	CHIP - RAKE SAMPLE	06 01 21 27
65900-04	FINES - RAKE SAMPLE	06 01 39 04
65905-09	UNKNOWN - RAKE SAMPLE	06 01 39 04
65915-16	UNKNOWN - RAKE SAMPLE	06 01 39 04
65920	UNKNOWN - RAKE SAMPLE	06 01 34 29
65925-27	CHIPS - RAKE SAMPLE	06 01 34 29
66030-37	FINES, CHIPS, & ROCK - BRECCIA	06 02 10 59
66040-44	FINES	06 02 15 55
66050	DOC BAG RESIDUE	06 02 14 53
66055	ROCK - BRECCIA	06 02 14 53
66070	DOC BAG RESIDUE	06 02 19 46
66075	ROCK - BRECCIA	06 02 19 46
66080-86	FINES & CHIPS?	06 02 17 11
66090	DOC BAG RESIDUE	06 02 21 56
66095	ROCK - ANORTHOSITE	06 02 21 56
67010	RESIDUE	06 23 09 54
67015	ROCK - BRECCIA	06 23 09 54
67016	ROCK - BRECCIA	07 00 07 53 07 01 36 25
67020	RESIDUE	07 00 07 53?
67025	CHIP - ANORTHOSITE	07 00 07 53?

TABLE I. CONTINUED

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIMES (AET)
67030-35	FINES & ROCK - BRECCIA	06 22 52 30
67050	DOC BAG RESIDUE	06 23 02 56
67055	ROCK - BRECCIA	06 23 02 56
67070	DOC BAG RESIDUE	06 23 07 54 06 23 10 44
67075	ROCK - ANORTHOSITE	06 23 07 54 06 23 10 44
67090	DOC BAG RESIDUE	06 23 11 20
67095	ROCK - BRECCIA	06 23 11 20
67110	DOC BAG RESIDUE	06 23 15 44
67115	ROCK - BRECCIA	06 23 15 44
67215	ROCK - BRECCIA	07 00 00 51
67235	ROCK - BRECCIA	06 23 57 11
67410	DOC BAG RESIDUE	06 23 27 38
67415	ROCK - BRECCIA	06 23 27 38
67430	DOC BAG RESIDUE	06 23 17 11
67435	ROCK - BRECCIA	06 23 17 11
67450	DOC BAG RESIDUE	06 23 21 12
67455	ROCK - BRECCIA	06 23 21 12
67460-64	FINES	06 23 20 35
67475	ROCK - BRECCIA	06 23 26 00
67480-89	REFERENCE SOIL & CHIPS	06 23 28 48
67495	CHIP	06 23 28 48

TABLE I. CONTINUED

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIMES (AET)
67510 -19	FINES & CHIPS - RAKE SOIL	06 23 25 28 06 23 30 07
67525-29	CHIPS - RAKE SOIL	06 23 25 28 06 23 30 07
67535-39	CHIPS - RAKE SOIL	06 23 25 28 06 23 30 07
67545-49	CHIPS - RAKE SOIL	06 23 25 28 06 23 30 07
67555-59	CHIPS - RAKE SOIL	06 23 25 28 06 23 30 07
67565-69	CHIPS - RAKE SOIL	06 23 25 28 06 23 30 07
67575-76	CHIPS - RAKE SOIL	06 23 25 28 06 23 30 07
67600-05	FINES & CHIP - RAKE SOIL	06 23 34 41
67610	DOC BAG RESIDUE	06 23 31 35
67615-19	CHIPS - RAKE SAMPLE	06 23 31 35
67625-29	CHIPS - RAKE SAMPLE	06 23 31 35
67635-39	CHIPS - RAKE SAMPLE	06 23 31 35
67645-49	CHIPS - RAKE SAMPLE	06 23 31 35
67655-59	CHIPS - RAKE SAMPLE	06 23 31 35
67665-69	CHIPS - RAKE SAMPLE	06 23 31 35
67675-76	CHIPS - RAKE SAMPLE	06 23 31 35
67700-08	FINES & CHIPS - RAKE SOIL	06 23 39 09
67710-19	FINES & CHIPS - RAKE SAMPLE	06 23 36 53
67725-29	FINES & CHIPS - RAKE SAMPLE	06 23 36 53
67735-39	FINES & CHIPS - RAKE SAMPLE	06 23 36 53
67745-49	FINES & CHIPS - RAKE SAMPLE	06 23 36 53

TABLE I. CONTINUED

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIMES (AET)	
67755-59	FINES & CHIPS - RAKE SAMPLE	06 23 36 53	
67765-69	FINES & CHIPS - RAKE SAMPLE	06 23 36 53	
67775-76	FINES & CHIPS - RAKE SAMPLE	06 23 36 53	
67910	RESIDUE	06 23 46 15	
67915	ROCK - BRECCIA	06 23 46 15	
67930	UNSIEVED FINES	06 23 44 45	
67935-37	CHIPS	06 23 44 45	
67940-48	FINES & CHIPS	06 23 49 07	
67950	UNKNOWN - CHIP?	06 23 47 58	
67955-57	CHIPS	06 23 47 58	
67960	UNSIEVED FINES	06 23 50 52	
67970	DOC BAG RESIDUE	06 23 53 07	
67975	ROCK - BRECCIA	06 23 53 07	
68001	CORE 36	06 02 45 09	06 02 49 58
68002	CORE 29	06 02 45 09	06 02 49 58
68030	DOC BAG RESIDUE	06 02 56 13	
68035	CHIP	06 02 56 13	
68110	DOC BAG RESIDUE	06 03 09 34	
68115	ROCK - BRECCIA	06 03 09 34	
68120-24	FINES	06 03 10 11	
68410	UNKNOWN - RESIDUE?	06 03 15 32	

TABLE I. CONTINUED

LRL SAMPLE NO.	SAMPLE CLASS	APOLLO ELAPSED TIMES (AET)
68415	ROCK - CRYSTALLINE	06 03 15 32
68416	ROCK - ALLIVATITE	06 03 15 32
68500-05	FINES - RAKE SOIL	06 02 53 50
68510	CHIP	06 02 47 05 06 02 52 05
68515-19	CHIPS & ROCK - BRECCIA - RAKE SAMPLE	06 02 47 05 06 02 52 05
68525-29	CHIPS - RAKE SAMPLE	06 02 47 05 06 02 52 05
68535-37	CHIPS - RAKE SAMPLE	06 02 47 05 06 02 52 05
68810	RESIDUE	06 03 27 36
68815	ROCK - BRECCIA	06 03 24 16
68820-25	FINES & CHIP? - FILLET SOIL SAMPLE	06 03 21 30
68840-48	FINES & CHIPS - REFERENCE SOIL	06 03 24 53
69001	CORE 34 - CSVC	06 04 08 38
69003-04	SURFACE SAMPLER 1 & 2	06 03 56 45
69920-24	FINES - SKIM SOIL	06 04 06 08
69930	DOC BAG RESIDUE	06 04 09 03
69935	ROCK - BRECCIA	06 04 09 03
69940-45	FINES & CHIP - SCOOP SOIL	06 04 07 52
69950	DOC BAG RESIDUE	06 04 13 47
69955	ROCK - ANORTHOSITE	06 04 13 47
69960-65	FINES & CHIP	06 04 14 52

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