NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Technical Report 32-1177

Surveyor III Mission Report
Part III: Television Data

Prepared by:

The Surveyor Project Science Staff

JET PROPULSION LABORATORY

CALIFORNIA INSTITUTE OF TECHNOLOGY

PASADENA, CALIFORNIA

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Approved by:

Howard H. Haglund
Surveyor Project Manager

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Preface

This three-part document constitutes the Project Mission Report on *Surveyor III*, the third in a series of unmanned lunar soft-landing missions.

Part I of this Technical Report consists of a technical description and an evaluation of engineering results of the systems used in the *Surveyor III* mission. Part II presents the scientific data derived from the mission, and the scientific analyses conducted by the *Surveyor* Scientific Evaluation Advisory Team, the *Surveyor* Investigator Teams, and the associated Working Groups. Part III consists of selected pictures from *Surveyor III* and appropriate explanatory material.

This Part III presents 232 of the total number of television pictures transmitted to earth from the lunar surface; some mosaics composed of individual frames are also included. Appropriate information for interpreting these pictures is given in the individual sections of the report.

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Contents

I. Introduction

Robert H. Steinbacher

Surveyor III, the third in a series of lunar soft-landing spacecraft, was launched from Cape Kennedy, Florida, on April 17, 1967, and landed on the lunar surface on April 20, 1967. Spacecraft operations were conducted throughout the lunar day, providing extensive scientific and engineering data. During these operations, 6315 television pictures were transmitted to earth from the lunar surface.

This part of the *Surveyor III* Mission Report presents 232 of these pictures, considered representative of the total number, and lists the pertinent television identification for each picture. Mosaics composed of individual frames are also presented; these mosaics, which include essentially all of the lunar surface viewed by the *Surveyor III* television camera, help to provide an understanding of the spatial relations between objects visible in various pictures. Appropriate information for intepreting these pictures is given in the following sections of this report.

Individual pictures taken by *Surveyor* are best identified by the GMT day, hour, minute, and second at which they were taken. April 20, 1967, was Day 110; May 3 was Day 123.

The National Space Science Data Center at Goddard Space Flight Center, Greenbelt, Maryland, is responsible for dissemination of *Surveyor III* pictures and other scientific data. An index and copies of the pictures in various forms can be obtained from that Data Center.

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II. Television System

Melvin I. Smokler

The *Surveyor* television system consists of a survey camera capable of panoramic viewing, and a television auxiliary that serves to commutate identification signals and to provide appropriate video mixing.

A. Camera Description

The 7.6-kg slow-scan survey television camera (Figs. II-1 and II-2) consists of six major components: mirror, lens, shutter, filter wheel, vidicon, and electronic circuitry. Images of the lunar surface are provided over a 360-deg panorama. Each picture, or frame, is imaged through an optical system onto a vidicon image sensor whose electron beam scans a photoconductive surface to produce an electrical output proportional to conductivity changes which result from the varying receipt of photons. The camera is designed to accommodate scene luminance levels from about 0.008 to 2600 ft-L, using both electromechanical mode changes and iris control.

Frame-by-frame coverage of the lunar surface provides a 360-deg azimuth view and an elevation view from approximately +40 deg above the plane normal to the camera Z axis to −67 deg below this same plane. Commandable operation allows each frame to be generated by sequencing the shutter with appropriate lens setting and mirror azimuth and elevation positioning to obtain adjacent pictures of the lunar view. Camera operation is totally dependent on receiving the correct commands from earth. The camera provides a designed resolution capability of approximately 1 mm at 4 m and can focus from 1.23 m to infinity.

The mirror assembly, such as shown in Fig. II-3 without hood extension, is composed of a 10.5- by 15-cm elliptical mirror supported at its minor axis by trunnions. This mirror is formed by vacuum-depositing a layer of Kanogen, and finishing with an overcoat of silicon monoxide. The mirrored surface is flat over the entire surface to less than ¼ wavelength at $\lambda = 550$ mμ and exhibits an average specular reflectivity in excess of 86%. This mirror is positioned by means of two drive mechanisms, one for azimuth and the other for elevation. The drive mechanisms consist of stepper motors that provide, through appropriate gear reduction, a mirror step size of 2.48 ±0.1 deg in elevation and 3.0 ±0.1 deg in azimuth. Angular step positions of both axes are sensed by position potentiometers, the outputs of which are digitized and transmitted to earth in pulse code modulation form.

To reduce the possibility of direct sunlight striking the camera lens (through the filter elements), a newly designed hood extension was used on the *Surveyor III* television camera. This hood extension reduced the number of cases in which image glare could be caused by multiple reflections within the lens assembly.

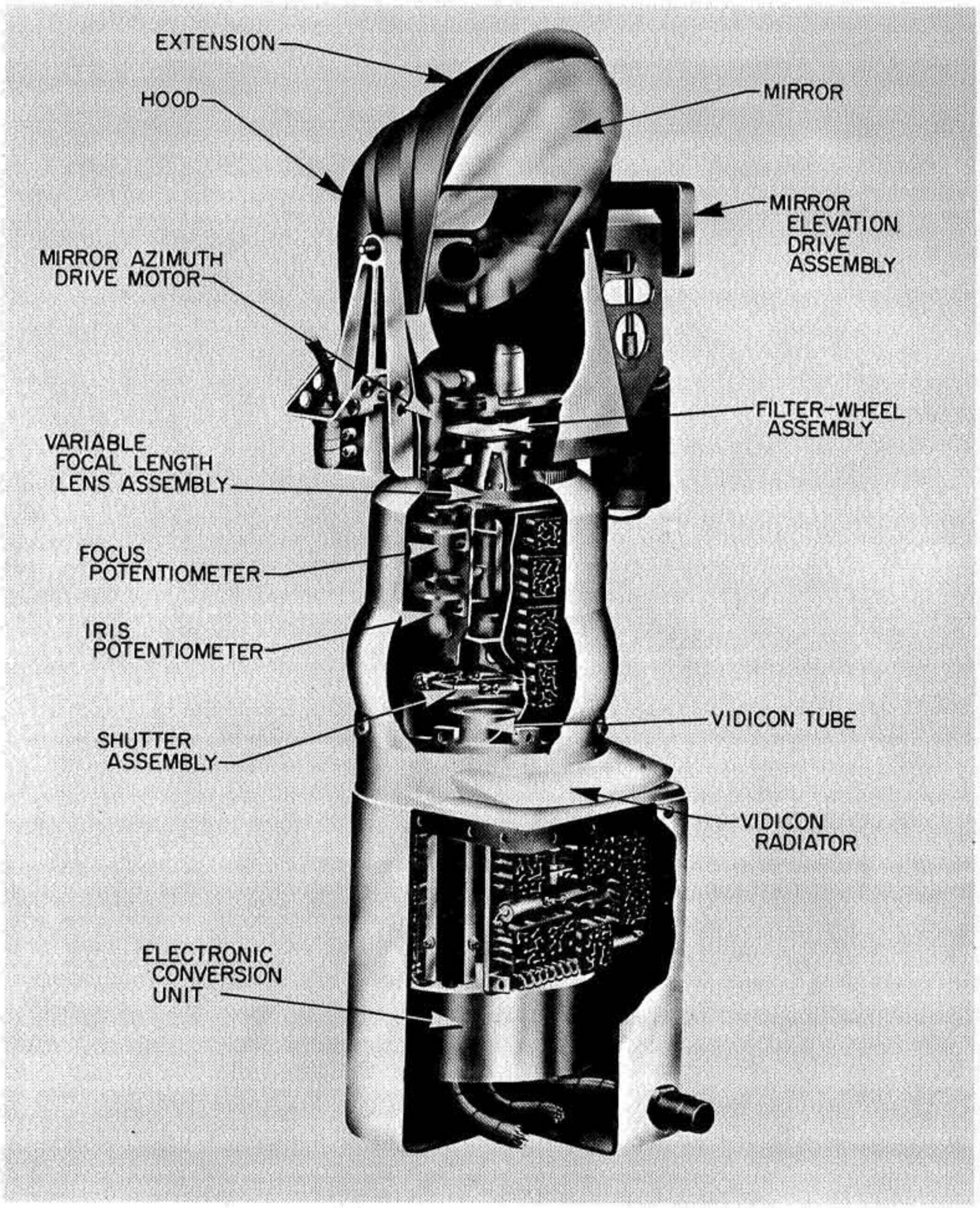

Fig. II-1. Cutaway view of survey camera

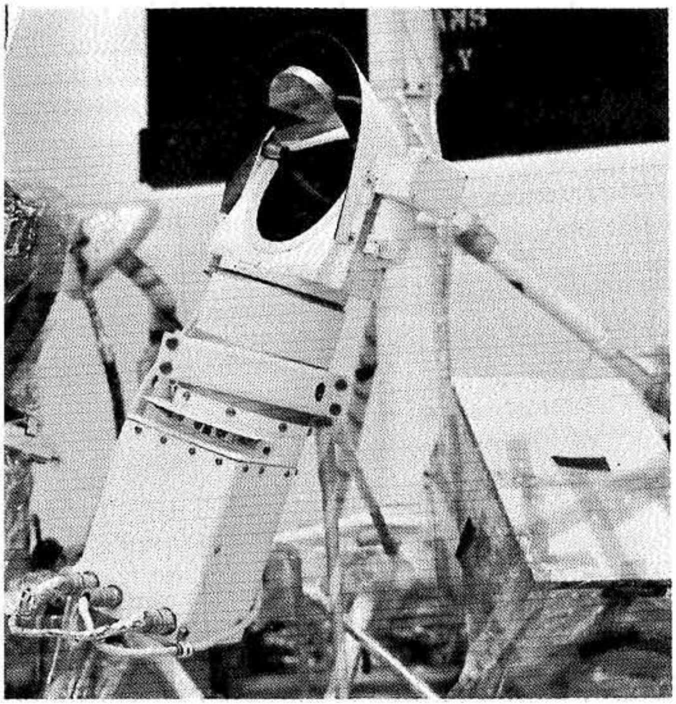

Fig. II-2. Survey camera on Surveyor spacecraft

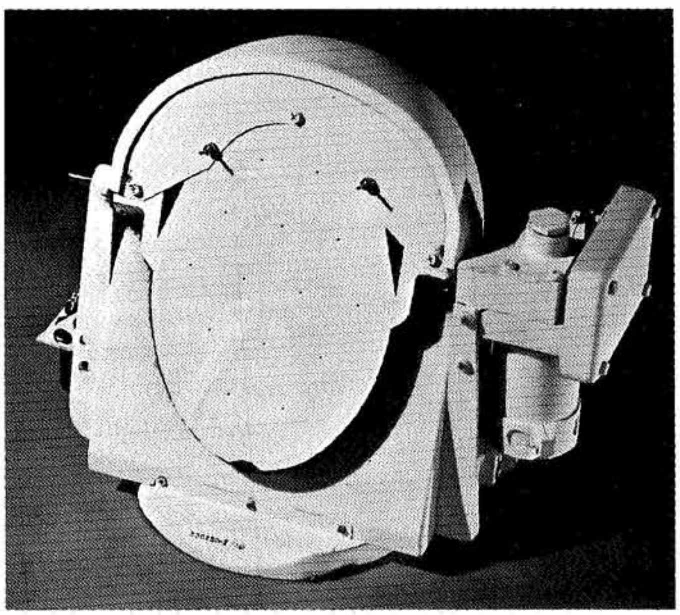

Fig. II-3. Mirror assembly

The rotation of the mirror in the azimuth direction, while providing the azimuth coverage capability to the camera, creates an image rotation proportional to the angular azimuth position of the mirror, since the image plane and the scanning raster of the image sensor (the vidicon) are stationary with respect to the mirror azimuth axis.

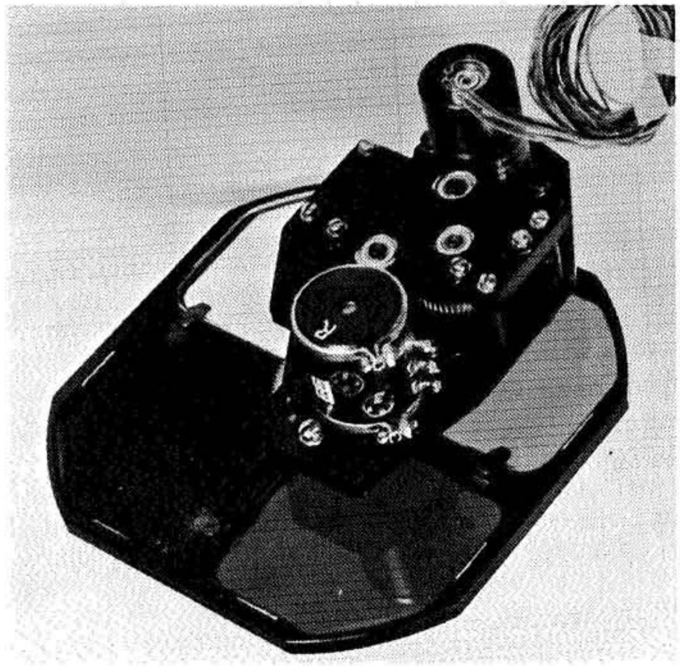

Fig. II-4. Filter-wheel assembly

In addition to the mirror itself, the mirror assembly contains a commandable filter-wheel mechanism (Fig. II-4) that accommodates four separate sections of optical-quality glass filters. Color pictures of a scene can be reproduced on earth after three video transmissions, each with a different color-filter element in the field of view. The *Surveyor III* filter wheel contained red, green, and blue filters; the fourth section contained a clear element for non-monochromatic observations. Segments of the filter wheel were placed sequentially in the field of view of the camera, following receipt of the correct earth-oriented command. Response curves for typical color-filter elements used on *Surveyor III* are shown in Fig. II-5.

The optical formation of the image was performed by means of a variable focal length assembly between the vidicon image sensor and the mirror assembly. Each lens (Fig. II-6) was capable of either a 100- or a 25-mm focal length, providing optical fields of view of approximately 6.43 and 25.3 deg, respectively. Additionally, the lens assembly could vary its focus by means of a rotating focus cell from near 1.23 m to infinity, while an adjustable iris provided effective aperture changes of $f/4$ to $f/22$ in increments that resulted in an aperture-area change of 0.5. While the most effective iris control is accomplished by command operation, a servo-type automatic iris was

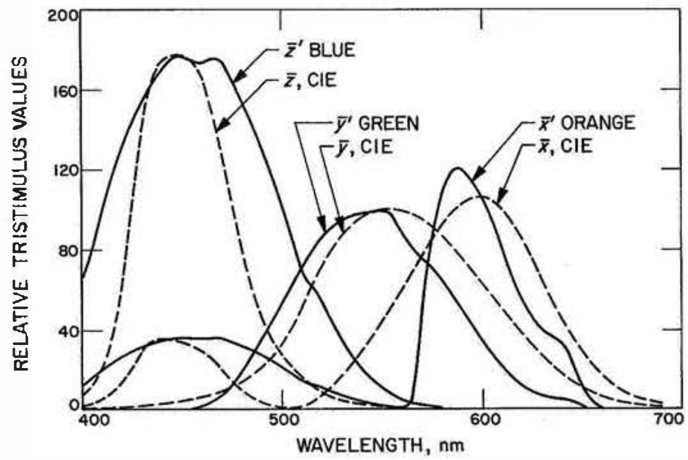

Fig. II-5. Camera-filter spectral response functions of *Surveyor III* camera, compared with CIE (Commission Internationale d'Eclairage 1931)

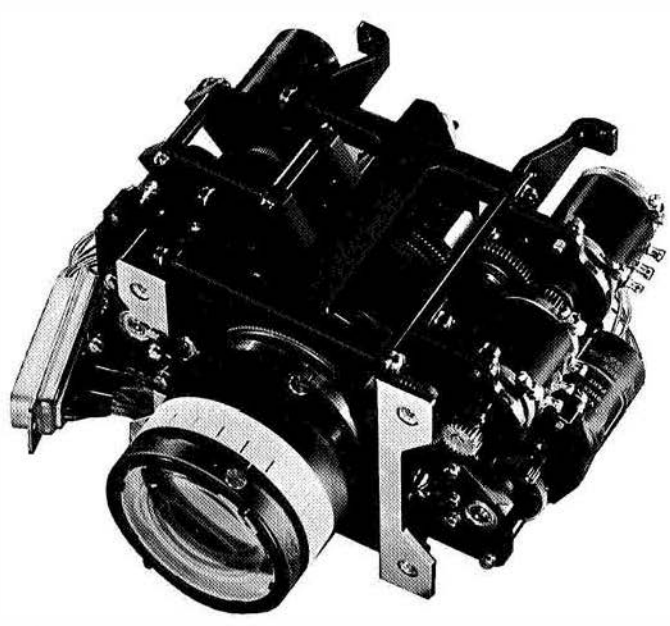

Fig. II-6. Variable-focal-length lens assembly

available to control the aperture area in proportion to the average scene luminance. As in the mirror assembly, potentiometers were geared to the iris, focal length, and focus elements to allow ground determination of these functions. A beam splitter, integral to the lens assembly, provided a light sample for operation of the automatic iris.

Three modes of exposure control are afforded the camera by means of a mechanical focal plane shutter (Fig. II-7) located between the lens assembly and the

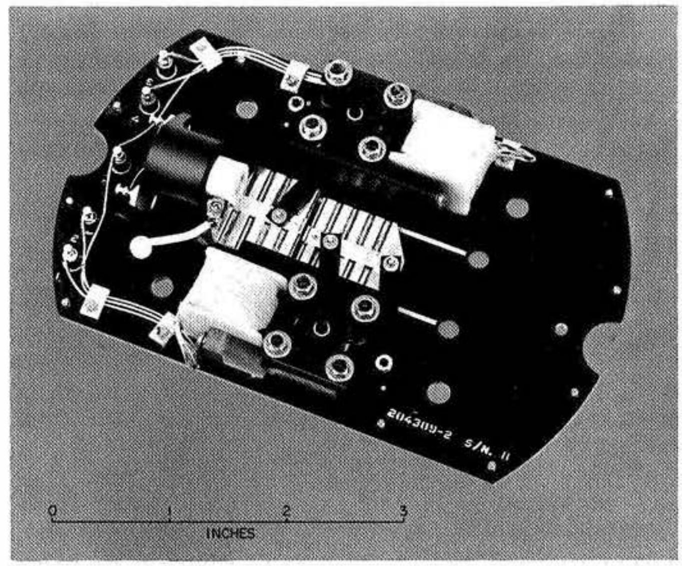

Fig. II-7. Shutter assembly

vidicon image sensor. In the normal shutter mode, upon earth command, the shutter blades are sequentially driven by solenoids across an aperture in the shutter base plate, thereby allowing light energy to reach the image sensor. The time interval between the initiation of each blade determines the exposure interval, nominally 150 msec.

In the second shutter mode (open-shutter mode), the blades are positioned to leave the aperture open, thereby providing continuous light energy to the image sensor. This mode of operation is useful in the imaging of scenes exhibiting extremely low luminance levels, including star patterns.

A third exposure mode, used for stellar observations and lunar surface observation under earthshine illumination conditions, is referred to as the integrate mode. This mode is implemented by turning off the vidicon electron beam, opening the shutter, and then closing it after the desired exposure time. Scene luminance on the order of 0.008 ft-L is reproduced in this mode of operation, thereby permitting pictures under earthshine conditions.

The transducing process of converting light energy from the camera view to an equivalent electrical signal in the image plane is accomplished by the vidicon tube (Fig. II-8) using electrostatic focus and electromagnetic deflection. The principle by which the video signal is produced from the photoconductive surface is illustrated in Fig. II-9. A low-velocity scanning beam strikes one side of the surface; the other receives illumination through a signal plate from which the video signal is taken. When

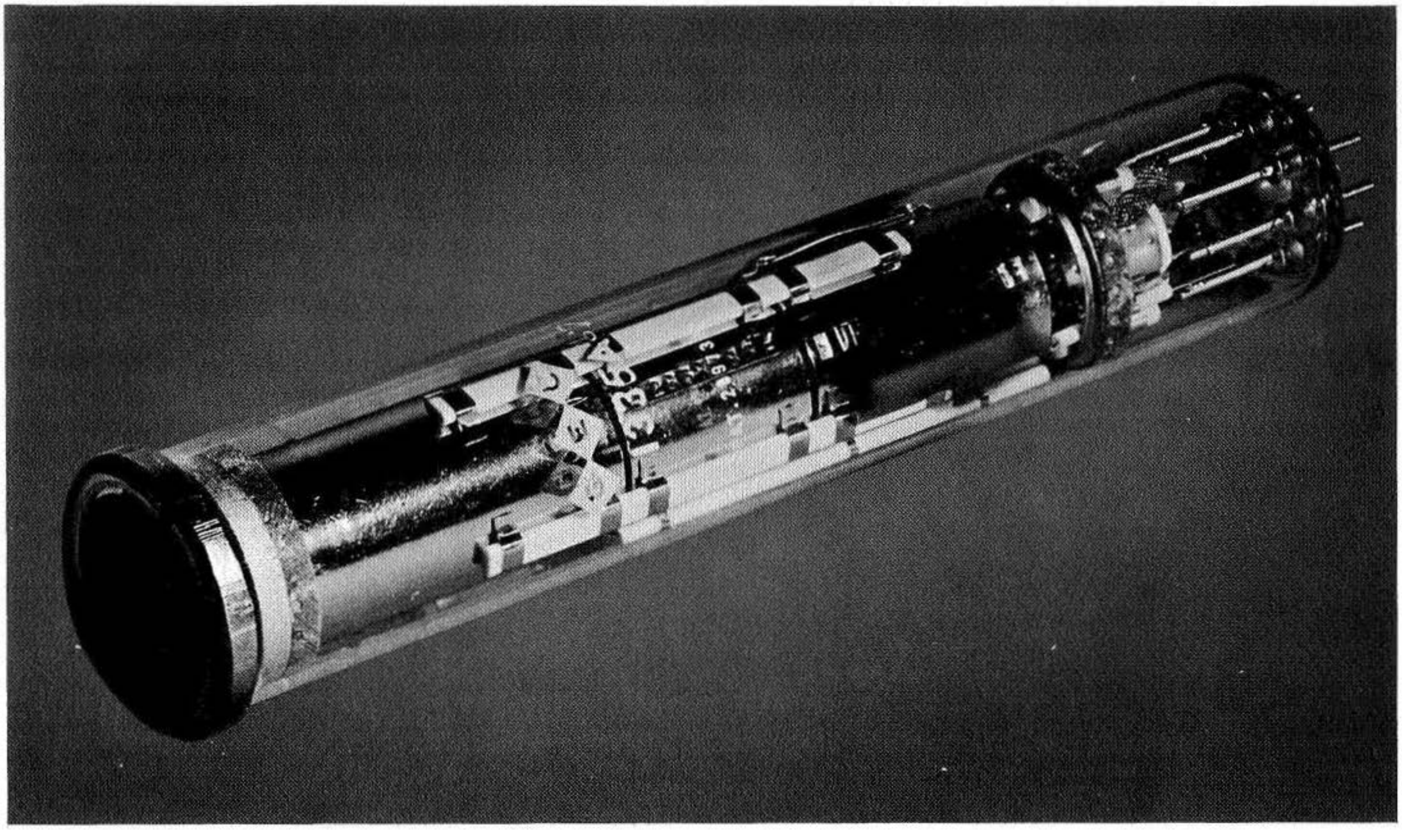

Fig. II-8. The 2.58-cm vidicon for survey camera

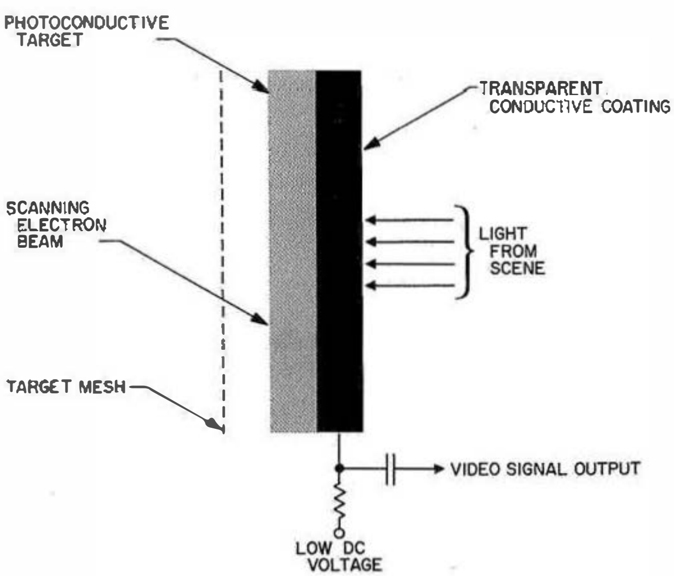

Fig. II-9. Vidicon functional diagram

the photoconductive surface is scanned in darkness, electrons deposited from the scanning beam reduce the potential to zero. The conductivity becomes so low under these conditions that very little current flows across the surface, and the scanned surface becomes more and more positive in the interval between successive scans. The beam then deposits sufficient numbers of electrons to neutralize the accumulated charge, thereby generating the video signal.

The photoconductor incorporated in the vidicon sensor consists of a selenium derivative. Integral to the photoconductor surface is a 5 by 5 matrix of dots comprising a reseau that can be used to correct the image information for nonlinearities and distortions. A reference mark is included in each corner of the scanned format to provide, in the video signal, an electronic level representing optical black for photometric reference.

Electronic circuitry for timing, power, and amplification functions of the camera is constructed of solid-state components and packaged in module form, as shown in Fig. II-10. This circuitry is composed of five functional groups:

(1) Drive circuits for lens and mirror mechanical positioning.

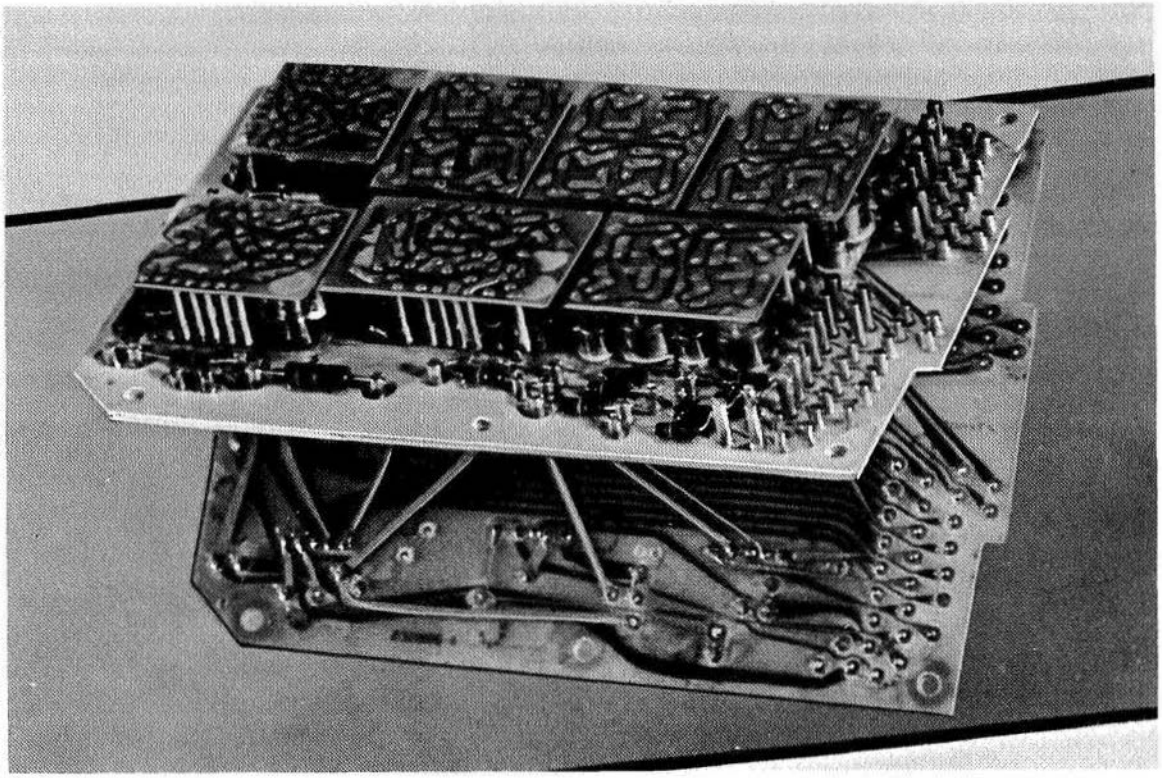

Fig. II-10. Electronic module configuration

(2) Video amplifier.

(3) Horizontal- and vertical-sweep circuits that create the scanning raster.

(4) Synchronization circuitry for ground recording and reproduction purposes.

(5) Electronic conversion unit to provide voltages and regulation from the spacecraft central power source for camera operation.

Thermal control devices are within the camera, surrounding the vidicon faceplate; on selected electronic modules; and within the mirror assembly for providing and maintaining operational temperatures when the camera experiences low transit and lunar temperature conditions.

Functionally, the camera operated in a slow-scan mode, in contrast to the standard scan used in commercial television. Such a reduced scan rate requires less information bandwidth from the spacecraft communications system for a given picture quality, and thus reduces the RF power requirements for the lunar distance involved.

In the normal scan mode of operation, the camera provides one 600-line frame each 3.6 sec. Each frame requires 1 sec to be read from the vidicon; the transmission of lens- and mirror-position information, plus several temperature measurements, require 200 msec. The remaining 2.4 sec are used in erasing the image from the vidicon, in preparation for the next exposure. The vidicon bandwidth required is 220 kHz.

A second scan mode of operation in the camera provides one 200-line frame each 60.8 sec. Each frame requires 20 sec to complete the video transmission, and uses a bandwidth of 1.2 kc. This 200-line mode is used in instances of omnidirectional antenna transmission from the spacecraft. The 600-line mode can be used only when the directional antenna is oriented toward the earth.

Integral to the spacecraft, and within the viewing capability of the camera, are two photometric/colorimetric targets. These targets are located on an omnidirectional antenna and on a spacecraft leg adjacent to the footpad, so that the line of sight of the camera in viewing each target is normal (±3 deg) to the target plane. The targets are identical; each has a series of 13 gray wedges arranged circumferentially. In addition, three color wedges (with known CIE[1] chromaticity coordinates) are located

[1]Commission Internationale d'Eclairage (International Commission on Illumination, formerly ICI).

ially from the target center. A series of radial lines is incorporated to provide a gross estimate of camera resolution. Finally, each target contains a center post to help determine solar angles, by means of the shadow information, after the lunar landing. Before launch, the targets were calibrated gonio-photometrically to allow an estimate of the post-landing camera dynamic range.

B. Camera Calibration

To derive maximum scientific information from a picture, it is necessary to have precise quantitative information on the camera that obtained the picture in terms of those parameters that describe the quality of the image. To ensure such precise information, a calibration was performed on *Surveyor III* with the camera mounted on the spacecraft. To include those factors of the modulator, transmitter, etc., which influenced overall image-transfer characteristics, each calibration used the entire telecommunication system of the spacecraft. This calibration was performed at the launch complex on February 22 through 25, 1967.

Calibration information was used before the mission and during the post-mission data analysis period. Before launch, the entire television ground data handling system (TV-GDHS) was adjusted and calibrated, using the prerecorded spacecraft/camera video signal derived during the calibration of the camera. This allowed the ground equipment to be optimized for the particular spacecraft in terms of real-time receipt and processing of image information. With respect to the post-mission analysis, camera calibration could be used to correct the image for geometric nonlinearities and distortions, falloff of spatial frequency response, photometric nonuniformities, and coherent noise.

Digital computer techniques, developed and used in conjunction with the *Ranger* and *Mariner* photographic experiments and applied to *Surveyor* imagery, allowed correction factors to be applied to any selected frame of video in a pre-programmed manner. An example of spatial frequency falloff correction by the use of digital techniques is shown in pictures 2a, 2b, and 2c of Section VIII. The first of these three pictures depicts original film data; the second is a digitized picture before sine-wave correction; and the third is the result after sine-wave correction. The correction shown in this instance represents a flat response out to the 38% relative response point on the spatial frequency falloff response curve.

Those factors, or parameters, of the camera that control the first-order effects in the resulting images are:

(1) Dynamic range or light-transfer characteristic.

(2) Modulation transfer or spatial frequency response.

(3) Geometric distortion.

(4) Shading.

(5) Vignetting of the lens/vidicon combination.

These parameters are calibrated extensively on the *Surveyor* camera.

Calibration stimuli for the television camera system consist of test slides accurately calibrated and configured for placement in a special light source. Representative samples of these test slides are shown in Figs. II-11 and II-12. Figure II-11 is a sine-wave target for determining the modulation transfer or spatial frequency response of the system. It should be noted that the true sine wave is used in contrast to the more frequently used square wave, thus enabling a determination of the true Fourier representation of the camera response. Figure II-12 has a series of gray-scale wedges that determine the vidicon erasure characteristics, thereby enabling a correction to be applied as a function of latent image level resulting from previous exposures. Finally, there is a grid pattern which, by means of either manual or computer techniques, permits nonlinearities and distortions to be removed from each image. Light-transfer characteristics and shading measurements are obtained by exposing the camera to a series of uniform light fields, each progressively brighter, until a saturation point is reached.

Data of the type obtained during camera calibration are presented in Figs. II-13 through II-16. The ordinate in these graphs is scaled in frequency units at the input of the TV-GDHS demodulators with sync tip frequency set to the nominal values of 5.25 MHz for the 600-line scan mode and 75.0 kHz for the 200-line scan mode. The ordinate scale can, therefore, be viewed as a measure of relative video voltage. Figures II-13 through II-15 indicate light-transfer characteristics of the camera in various modes of operation. They are based on actual lunar scene brightness, as determined through appropriate correction-factor calculations. These correction-factor calculations involve the spectra of the camera, standard-eye, measuring photometer, light source, lunar light, and a separate National Bureau of Standards calibration light source. Figure II-16 shows the modulation transfer response characteristic in terms of a relative response (normalized to the DC component) with respect to spatial frequency in television lines per picture height.

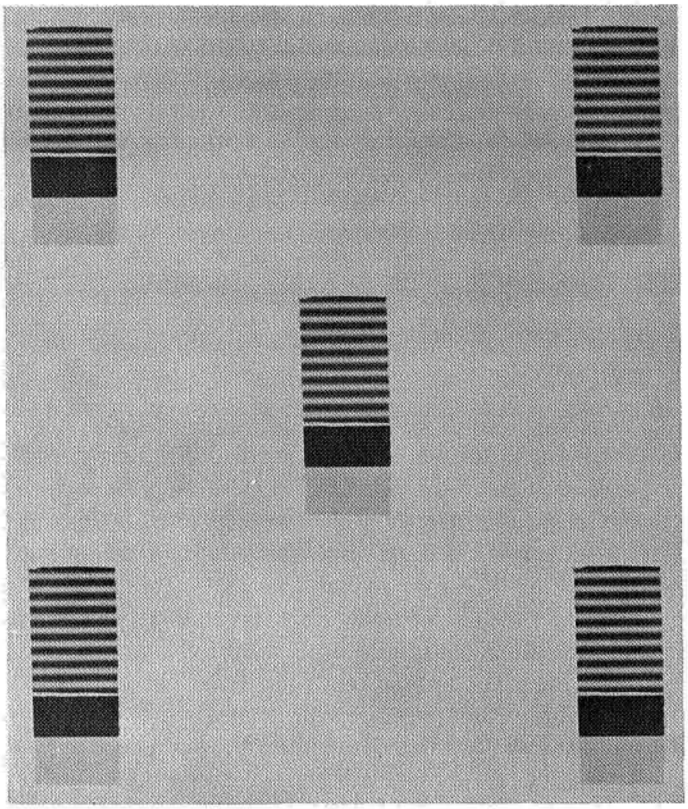

Fig. II-11. Sine-wave target used to determine spatial frequency response of camera during calibration

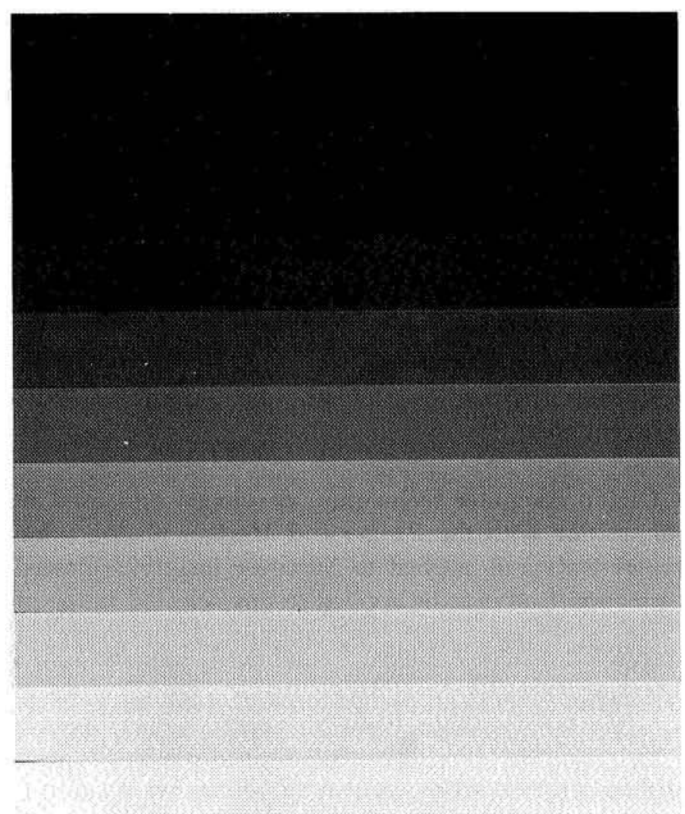

Fig. II-12. Gray-scale calibration target for erasure-characteristic calibration

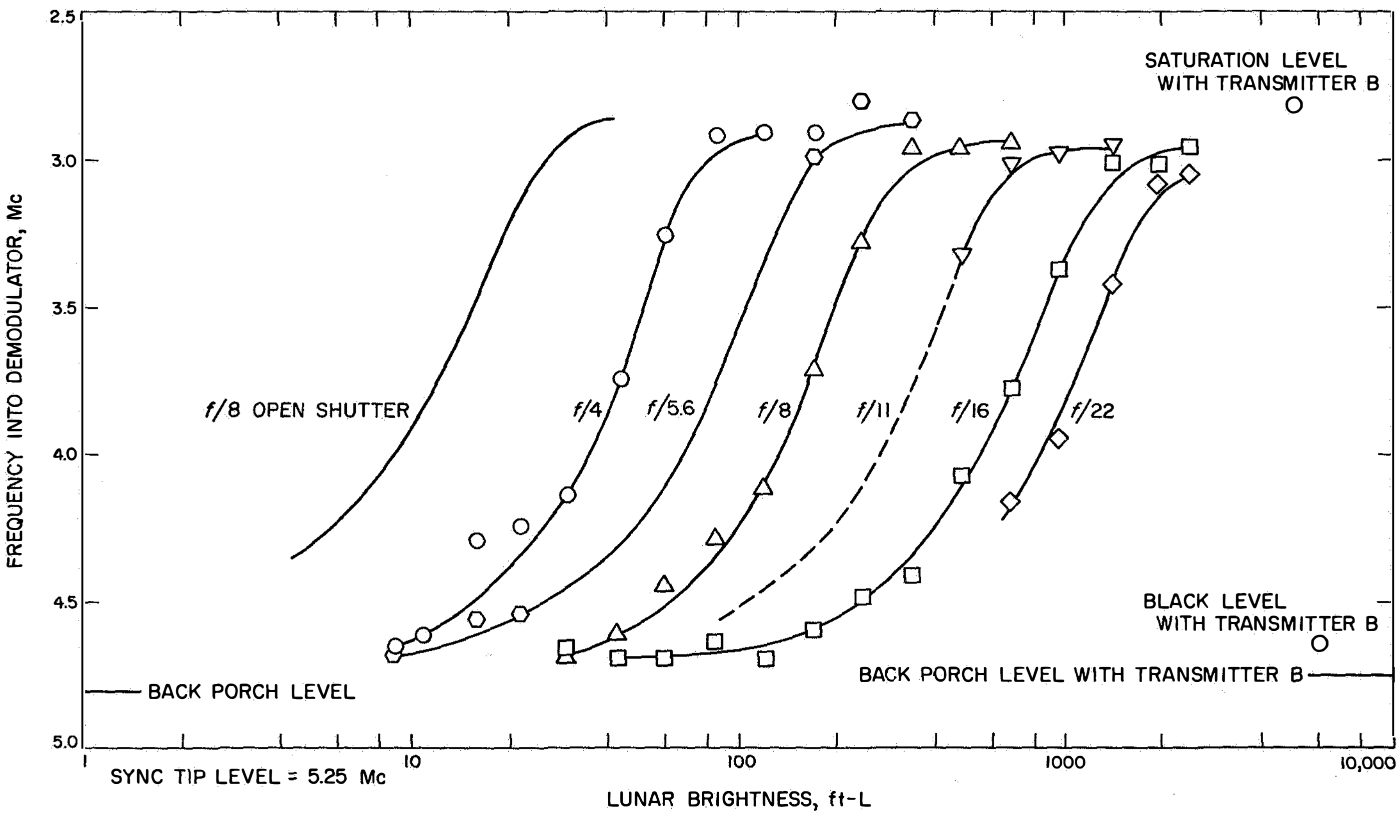

Fig. II-13. ***Surveyor III*** **camera light-transfer characteristic: 600-line mode**

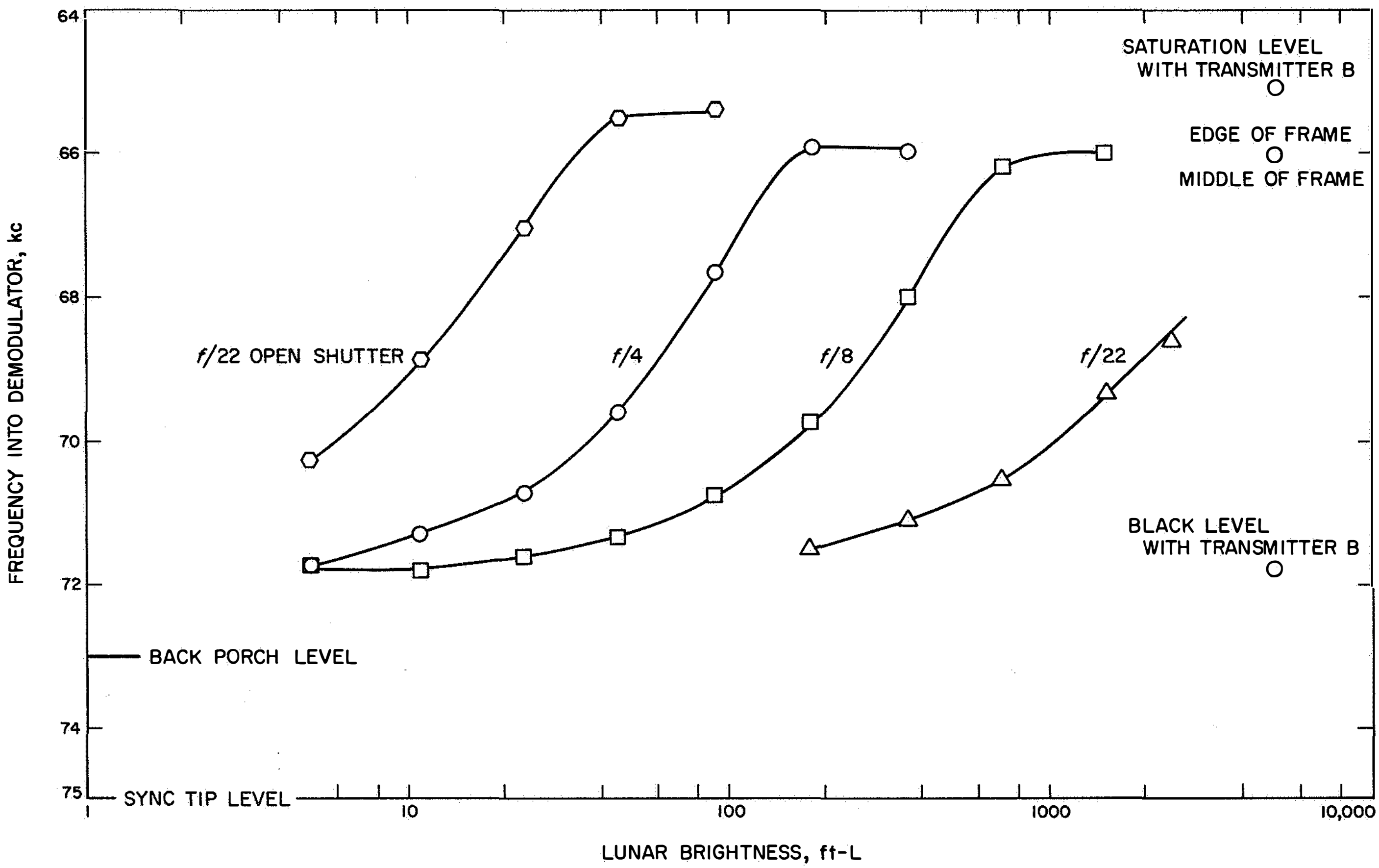

Fig. II-14. Surveyor *III* camera light-transfer characteristic: 200-line mode

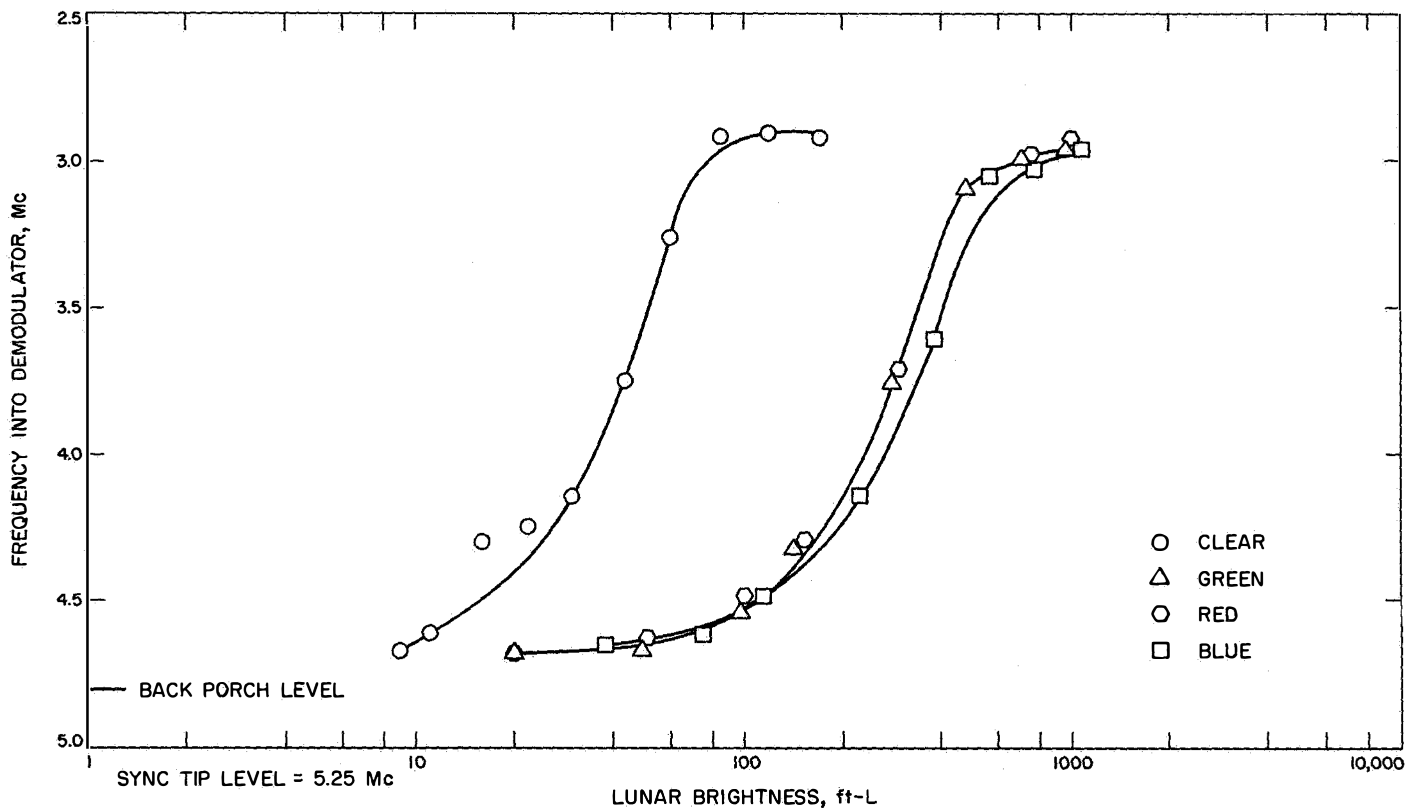

Fig. II-15. ***Surveyor III*** **camera *f*/4 light-transfer characteristic for all filter-wheel positions: 600-line mode**

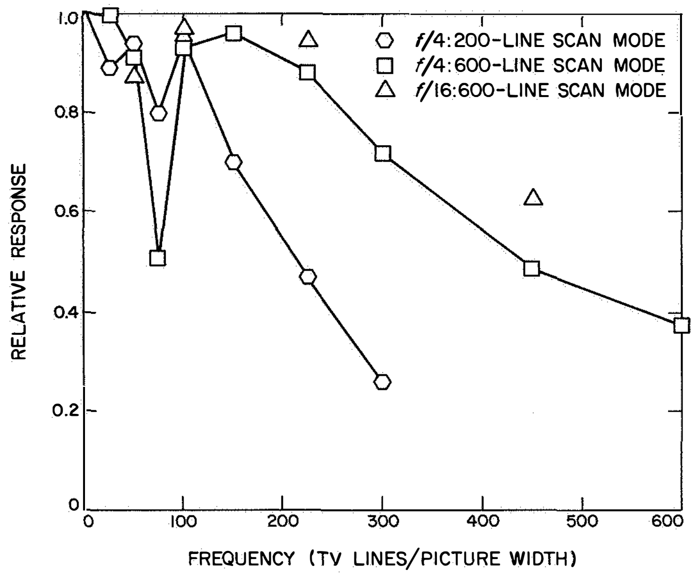

Fig. II-16. Frequency response

The data in Fig. II-15 show that the light-transfer characteristics for the three color filters are almost identical. This results from an improvement in filter design to provide the capability of taking a set of color pictures without changing the iris position. Reduction of the color data is then independent of accuracy or repeatability limitations in iris control. The design improvement consists of adding neutral density coatings to the blue and green filters. The coating transmission for each filter was controlled to obtain equal camera response for all three filters.

C. Mission Performance

During lunar operations, the camera returned 6315 pictures, including spacecraft and lunar surveys and views of the soil mechanics surface sampler and of the earth during solar eclipse.

III. Orientation of Camera With Lunar Surface and Sun

Robert H. Steinbacher

The *Surveyor III* landing site was estimated from post-touchdown radio positioning data to be 2.99°S latitude, 23.37°W longitude. The position was later determined, from physical features viewed by the spacecraft's television camera and then correlated with *Lunar Orbiter* photographs, to be 2.94°S latitude and 23.34°W longitude on ACIC lunar chart AIC 76 A (Fig. III-1; for more detailed information, see Part II of this Technical Report).

Surveyor III landed in a crater approximately 200 m in diameter (Figs. III-2 and III-3). The spacecraft location is east–southeast of the center of the crater and about half the radius from the center. The mean local slope near the spacecraft is about 10 deg; the angle of spacecraft tilt is 12.5 ± 2 deg in a direction 6 deg north of west. The camera Z axis is skewed with respect to the spacecraft vertical axis at an angle of 16 deg along an angle 36 deg clockwise to the $-X$ axis, which, as projected in the local horizontal plane, is 47 deg west of north. The resulting camera position is a 23.5-deg tilt of the Z axis with respect to the local vertical in a direction 43 deg west of north. Because the spacecraft landing site is within a crater, the local horizon is closest in the southeastern direction and farthest in the northwestern direction at 7 and 2 deg, respectively, above the local horizontal.

At touchdown (00:04 GMT on April 20, 1967), the sun was 10 deg above the local eastern horizontal. The subsolar point varied from 0.25°S to 0.3°N latitude during the lunar day (April 19 to May 3). Local noon was at 12:51 on April 26, 1967. Figure III-4 and Table III-1 give the sun elevations during the periods of the first lunar day.

An eclipse of the sun occurred on April 24 between 09:48 and 14:06 GMT, as observed from the landing site. Because *Surveyor* is below the crater rim, apparent sunset on the spacecraft preceded, by several hours, the local sunset at 22:01 GMT on May 3. As the western rim eclipsed the sun, the shadow of the rim was observed as it proceeded up the eastern slope during the final hours of operation on May 3 (see pictures 221 through 232 of Section VIII).

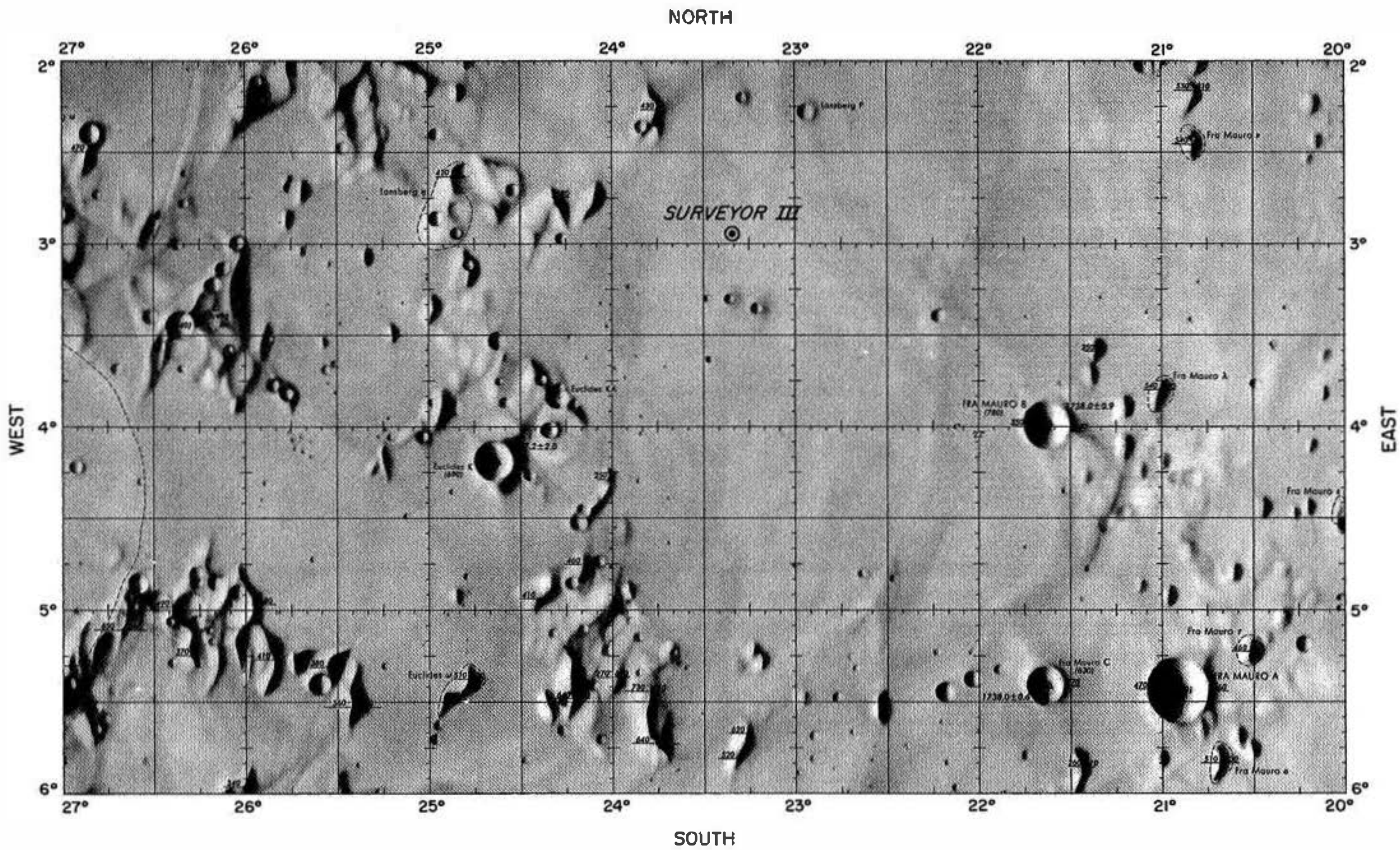

Fig. III-1. Enlargement of part of ACIC Chart AIC 76 A showing Surveyor III landing site

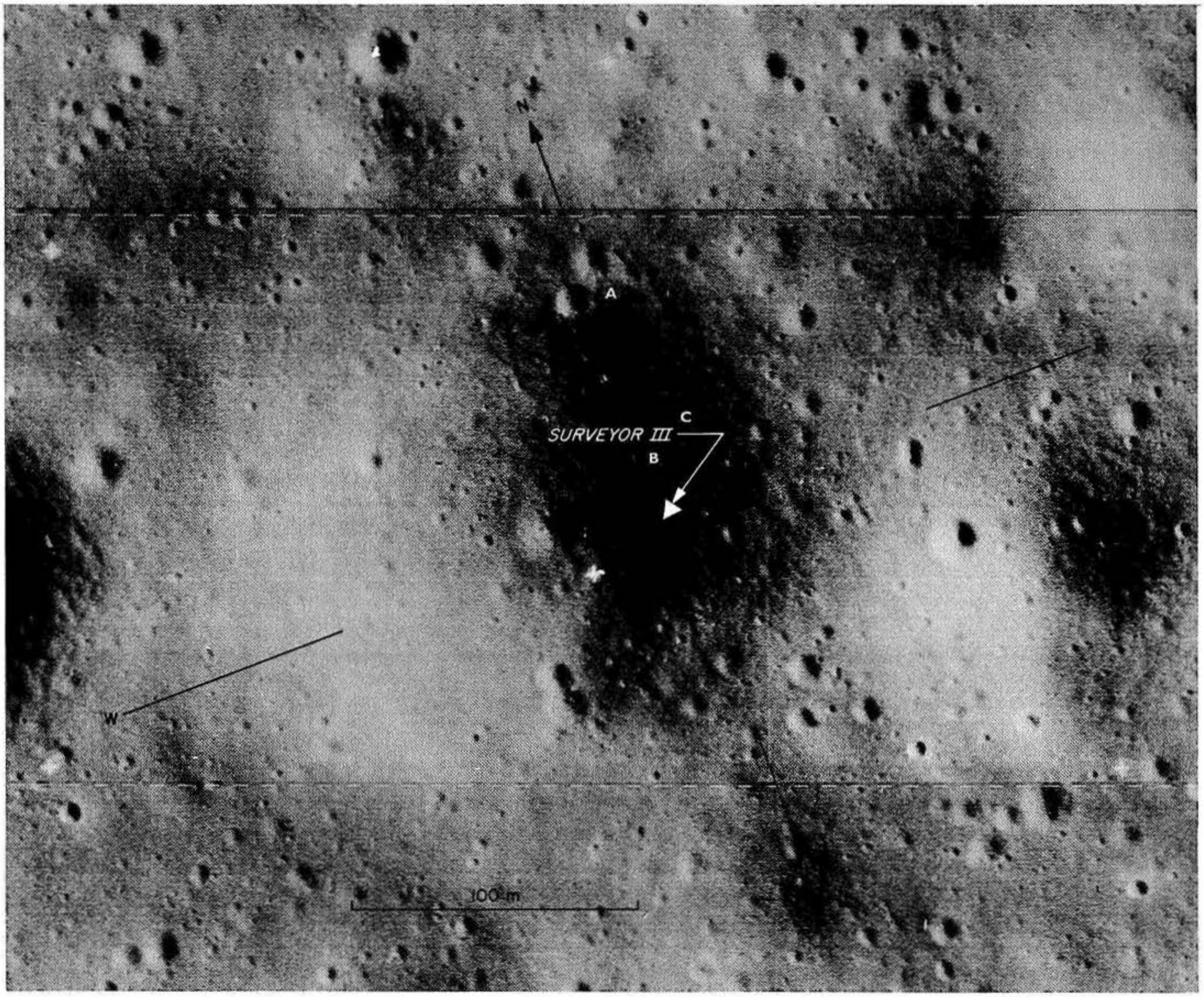

Fig. III-2. *Lunar Orbiter III* photograph showing the crater in which Surveyor *III* landed. More than 17 crater features visible in the *Lunar Orbiter* photographs have been identified in pictures taken from Surveyor *III*. Three of the most prominent features are shown here

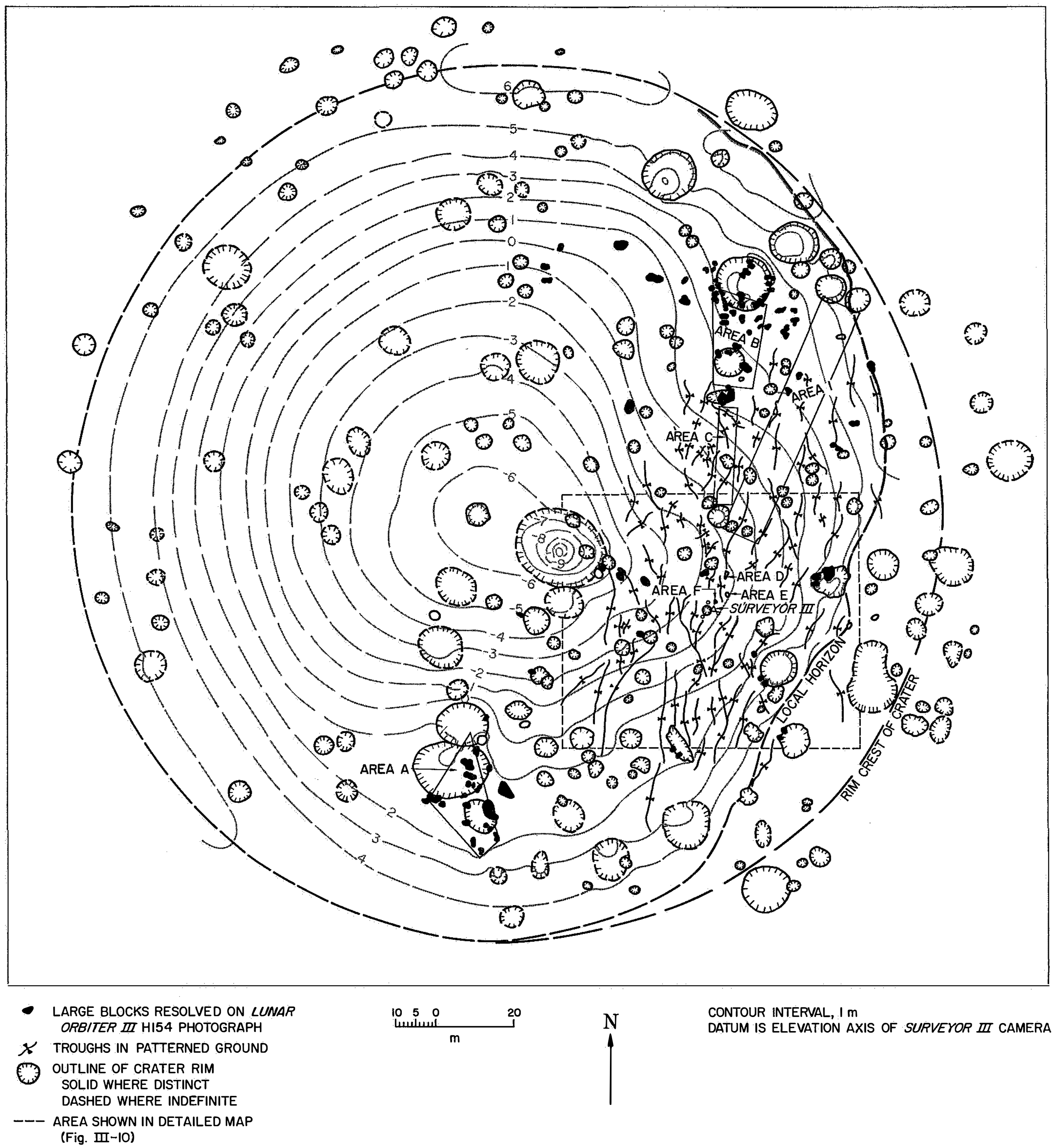

Fig. III-3. Contour map of *Surveyor III* landing site. Contours were plotted using information obtained from *Lunar Orbiter III* photographs and *Surveyor III* pictures (topography and geology by the Branch of Astrogeology, U.S. Geological Survey, Flagstaff, Arizona).

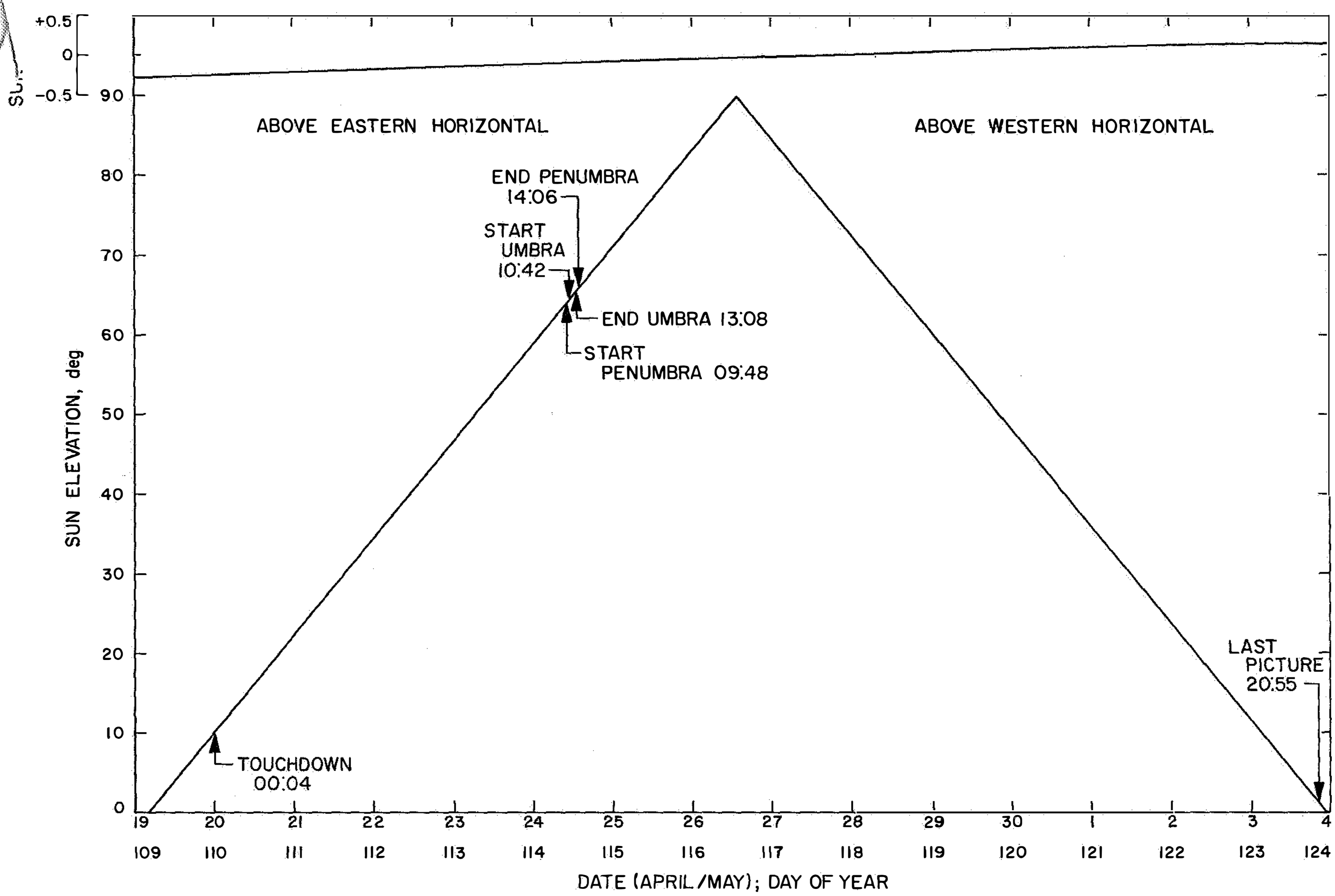

Fig. III-4. Sun elevation and latitude position plotted vs time for the period of April 19 through May 3, 1967, the first lunar day

Table III-1. Sun angle position above eastern/western horizon for 23.34°W longitude

	Greenwich Mean Time												
Day	00:00	02:00	04:00	06:00	08:00	10:00	12:00	14:00	16:00	18:00	20:00	22:00	00:00
	Sun angle, deg												Subsolar latitude (+, north)
110	10.42	11.43	12.45	13.46	14.48	15.49	16.51	17.52	18.54	19.55	20.57	21.58	−0.25
111	22.60	23.61	24.63	25.64	26.66	27.67	28.69	29.70	30.72	31.73	32.75	33.76	−0.21
112	34.77	35.78	36.80	37.81	38.83	39.84	40.86	41.87	42.89	43.90	44.92	45.93	−0.18
113	46.94	47.95	48.97	49.98	51.00	52.01	53.03	54.04	55.06	56.07	57.09	58.10	−0.14
114	59.11	60.12	61.14	62.15	63.17	64.18	65.20	66.21	67.23	68.24	69.26	70.27	−0.10
115	71.28	72.29	73.31	74.32	75.34	76.35	77.77	78.39	79.41	80.42	81.43	82.44	−0.07
116	83.45	84.46	85.48	86.49	87.51	88.52	89.54	90.55	Above eastern horizontal				−0.03
116	Above western horizontal						90.46	89.45	88.43	87.41	86.40	85.39	−0.03
117	84.38	83.36	82.35	81.33	80.31	79.30	78.29	77.27	76.26	75.24	74.23	73.21	+0.01
118	72.20	71.18	70.17	69.15	68.13	67.12	66.10	65.09	64.07	63.06	62.04	61.03	+0.04
119	60.01	59.00	57.98	56.97	55.95	54.94	53.92	52.91	51.89	50.88	49.86	48.84	+0.07
120	47.82	46.80	45.79	44.77	43.75	42.74	41.72	40.71	39.69	38.67	37.65	36.64	+0.09
121	35.62	34.60	33.59	32.57	31.56	30.54	29.52	28.51	27.49	26.47	25.46	24.44	+0.02
122	23.42	22.40	21.38	20.36	19.35	18.33	17.31	16.30	15.28	14.26	13.24	12.23	+0.14
123	11.21	10.19	9.17	8.16	7.14	6.12	5.10	4.09	3.07	2.05	1.03	0.01	+0.16

IV. Ground Photo Recording

Richard Bideaux

Television data transmitted by *Surveyor III* were recorded by the Tracking Stations of the Deep Space Network. By using a calibrated flying spot scanner at the Goldstone, California, Tracking Station, the television image was recorded on 70-mm film. On a single frame, the image is recorded in a square format of 48 mm, with the remaining space occupied by time, camera parameters, and recording information. The pictures reproduced in Section VIII of this report are from the lunar scenes recorded; the camera parameter information is included in the figure captions.

The original 70-mm film recordings were developed by personnel of the television ground data handling system (TV-GDHS) at the Jet Propulsion Laboratory (JPL). The developed film was then taken to Goddard Space Flight Center, Greenbelt, Maryland; under JPL direction, a master positive was generated. The negatives used to prepare prints for this publication were made from this master positive film. The gamma for the 70-mm film recording system ranged from 0.5 to 1.1, with a density range from 0.12 to 0.55. For publication purposes, the printing negatives were developed to match the paper printing processing. Other than by computer processing of indicated pictures, there has been no intentional image alteration.

In addition to film recording, the received video signal was recorded on magnetic tape. The computer-processed pictures were prepared from these magnetic-tape recordings by Image Processing Laboratory personnel at JPL. A more complete description of the TV-GDHS is included in Part I of this Technical Report.

V. Camera Parameter Information

Stephen Z. Gunter

Camera parameter data, which serve as the captions for the pictures shown in Section VIII of this report, are derived from the telemetry transmitted with each picture. The camera mechanical functions were monitored by position-sensing devices whose measurements were telemetered to the ground receiving stations. By use of pre-launch calibration data, the telemetry value was converted to engineering units by mathematical fitting of a fifth-order polynomial to the best curve through the calibration points. Telemetry word length and ground processing limit the data accuracy to 0.1%. The data in the figure captions have been validated by editing, by using mission sequence logs, data quality indicators, and the mosaics as reference sources. (Camera parameter data for the selected lunar pictures are given in Table VI-1 of this report.) The data given are:

Time

Greenwich Mean Time, given as day of year, hour, minute, second, of picture received by Tracking Station.

Azimuth

Camera-mirror azimuth in camera coordinates. The range is +132.0 to −222.0 deg in nominal 3-deg increments.

Elevation

Camera-mirror elevation in camera coordinates. The range is +36.46 to −67.70 deg in nominal 4.96-deg increments.

Focus

Distance to the plane of principal focus, in meters. The range of the calibration curve used is 1.23 to 27.4 m.

Iris

Camera iris setting expressed as *f*/number. The range is *f*/4.0 to *f*/22.0.

Lens focal length

Focal length of the camera lens is 25.0 mm for wide angle and 100.0 mm for narrow angle.

Filter

Filter-wheel position can be clear, green, blue, or red. For verification, the color sector lightest in tone on the picture of the photometric target corresponds to the color filter used. In order, clockwise from the white step on the outer gray scale of the target, the color sectors are gray, red, green, and blue.

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VI. Selected Lunar Pictures

Robert H. Steinbacher

Individual pictures and mosaics from *Surveyor III,* chosen to be representative of the television capability, are presented in Section VIII. Captions consist of camera parameters and descriptive information when appropriate. The pictures are best identified by the day and time listed in these camera parameters. A list of the pictures included in this report is given in Table VI-1. The difference in recorded time between the various Tracking Stations of the Deep Space Network may cause time variations of ± 1 sec for a picture. Since the interval between successive pictures is at least 3.6 sec, this difference should cause no ambiguity.

Orientation of the spacecraft, visible in some of the pictures, may be clarified by referring to Figs. VI-1 and VI-2, which show the spacecraft in a landed configuration. Terrain features may be referenced to the *Lunar Orbiter* photographs of the landing site and the contour map (Figs. III-2 and III-3, respectively). The television system produces a picture in which the lunar view rotates 360 deg as the camera azimuth is panned through 360 deg. The pictures in this report are presented with the lunar view aligned within ± 45 deg of the report view. The box and arrow that accompany each picture in Section VIII indicate, respectively, the picture for the report view and the direction of local vertical of the lunar view. For those readers interested in knowing the camera format, the enlarged, black reference mark in the corner of each picture is clearly identified by a white circle.

The pictures that pertain to the same subject matter at various times during the lunar day, or that represent a sequence of activity, are listed in Table VI-3 for the reader's convenience.

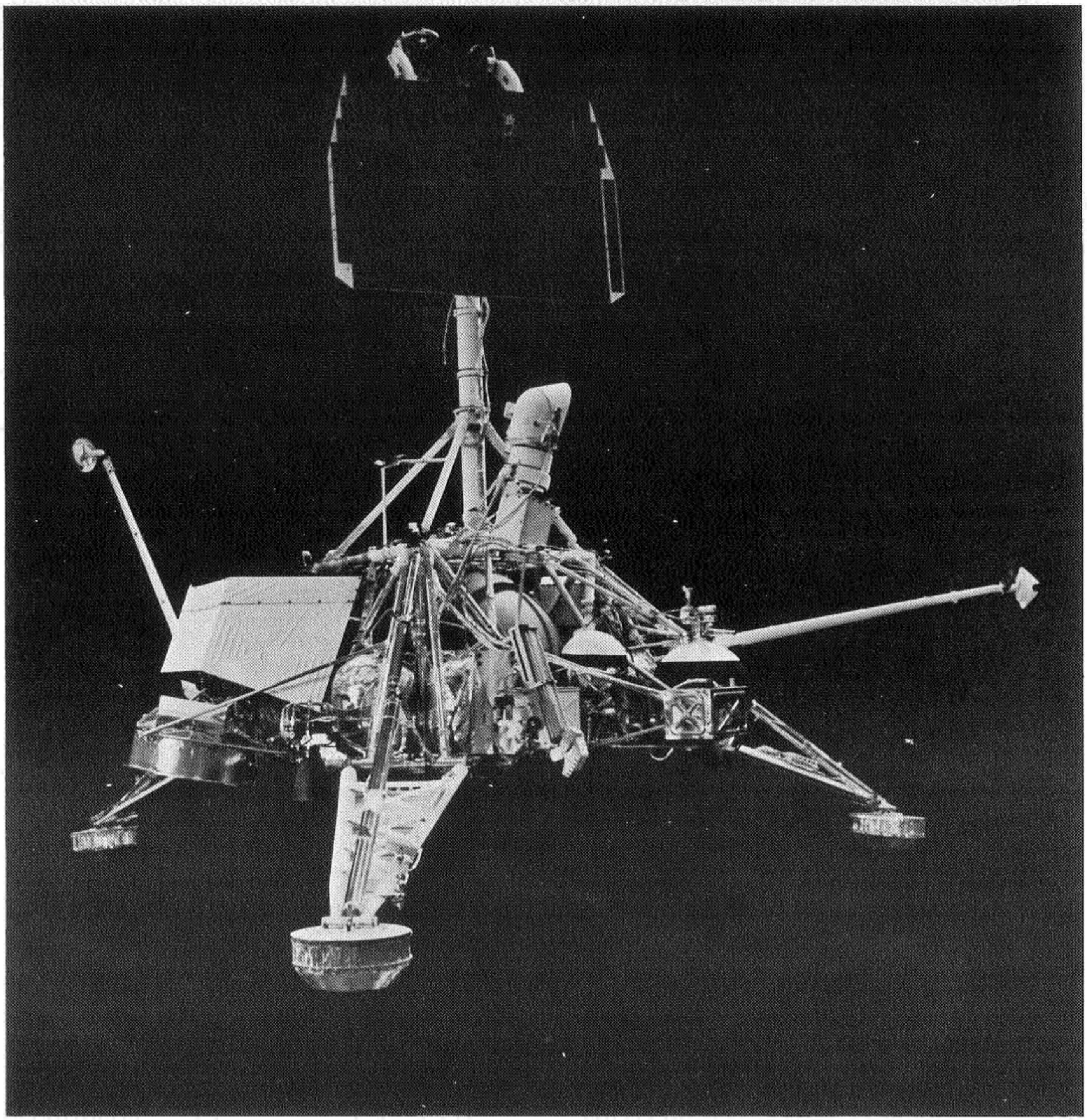


Fig. VI-1. *Surveyor III* spacecraft. Footpad 2 is in foreground

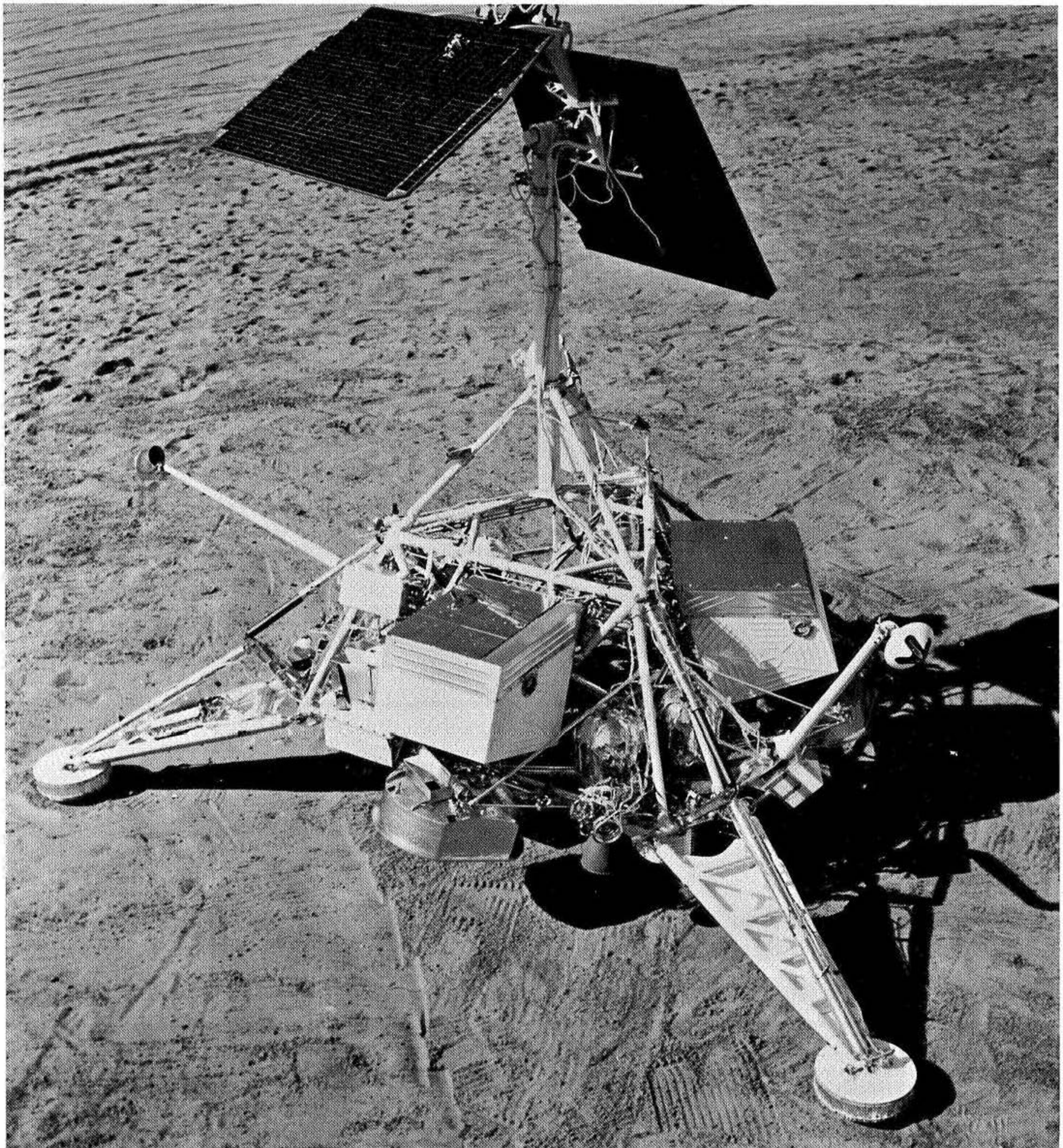


Fig. VI-2. *Surveyor III* spacecraft in landed configuration. Leg 1 is in foreground

Table VI-1. Selected lunar pictures

Picture	GMT Day	Hour	Minute	Second	Azimuth	Elevation	Focus distance, m	Iris setting	Lens focal length[a]	Filter	Remarks
1	110	01	06	54	78	−23.06	2.8	f/10.2	W	Clear	200-line scan
2a	110	09	05	17	−72	−47.86	2.5	f/21.2	W	Clear	Original
2b	110	09	05	17	−72	−47.86	2.5	f/21.2	W	Clear	Digitized
2c	110	09	05	17	−72	−47.86	2.5	f/21.2	W	Clear	Processed
3	110	09	11	45	54	−32.98	2.5	f/13.9	W	Clear	
4	110	09	12	27	72	26.54	2.5	f/7.9	W	Clear	
5	110	09	37	21	18	11.66	29.9	f/8.1	W	Clear	
6	110	09	37	43	15	16.62	30.2	f/8.1	N	Clear	
7	110	09	37	48	21	16.62	30.2	f/8.1	N	Clear	
8	110	09	37	52	27	16.62	30.2	f/8.1	N	Clear	
9	110	09	37	56	30	21.58	30.2	f/8.1	N	Clear	
10	110	09	47	25	36	21.58	30.0	f/11.3	N	Clear	
11	111	02	25	40	−57	−52.82	1.5	f/21.5	N	Clear	
12	111	02	29	33	−57	−57.78	2.5	f/21.6	N	Clear	
13	111	02	30	37	−60	−57.78	2.5	f/21.7	N	Clear	
14	111	02	32	02	−60	−52.82	2.5	f/21.5	N	Clear	
15	111	02	39	32	−72	−47.86	2.4	f/17.0	W	Clear	
16	111	02	41	19	−54	−47.86	2.4	f/19.8	W	Clear	
17	111	02	43	48	36	−32.98	2.4	f/10.6	W	Clear	
18	111	02	44	50	72	−18.10	2.4	f/19.9	W	Clear	
19	111	05	14	55	63	6.70	15.5	f/10.7	N	Clear	
20	111	05	15	03	75	6.70	15.7	f/10.7	N	Clear	
21	111	05	59	07	36	11.66	30.2	f/10.8	N	Clear	
22	111	05	59	25	51	16.62	30.2	f/10.8	N	Clear	
23	111	05	59	43	48	21.58	30.2	f/10.8	N	Clear	Processed
24	111	07	39	59	−57	−57.78	2.5	f/7.8	N	Blue	
25	111	07	43	38	−54	−57.78	2.5	f/7.8	W	Red	
26	111	08	16	43	36	−52.82	2.5	f/22.2	W	Red	
27	111	08	24	20	−60	−42.90	2.5	f/5.5	W	Red	
28	111	10	43	30	33	−37.94	2.6	f/5.9	W	Red	
29	112	00	49	30	−72	−47.86	2.6	f/14.0	W	Clear	
30	112	00	57	44	0	11.66	2.5	f/16.8	W	Clear	
31	112	01	02	21	72	−18.10	2.5	f/21.3	W	Clear	
32	112	05	07	01	3	−42.90	2.6	f/4.3	W	Red	
33	112	05	14	11	3	−42.90	2.6	f/4.3	W	Red	
34	112	05	17	27	3	−42.90	2.6	f/4.3	W	Red	
35	112	06	12	39	3	−42.90	2.5	f/4.3	W	Red	
36	112	07	02	29	3	−42.90	2.6	f/4.3	W	Red	
37	112	07	07	40	3	−42.90	2.5	f/6.5	W	Red	
38	112	07	22	49	3	−42.90	2.6	f/4.3	N	Red	Processed
39	112	07	25	10	3	−47.86	2.5	f/4.3	N	Red	Processed
40	112	07	28	48	0	−47.86	2.5	f/4.3	N	Red	Processed
41	112	08	29	31	−3	−52.82	2.4	f/6.5	N	Red	Processed
42	112	08	30	06	−3	−47.86	2.5	f/6.5	N	Red	Processed
43	112	08	32	45	−3	−42.90	2.6	f/6.6	N	Red	Processed
44	112	08	33	28	−6	−42.90	2.6	f/6.6	N	Red	Processed
45	112	09	17	53	15	−42.90	1.9	f/6.5	W	Red	Processed
46	112	10	20	29	15	−42.90	1.9	f/6.5	W	Red	Processed
47	112	10	25	21	18	−42.90	1.9	f/8.7	W	Red	Processed
48	112	10	31	43	15	−42.90	1.8	f/6.5	W	Red	
49	112	10	33	46	15	−42.90	3.4	f/4.3	N	Blue	Processed
50	112	11	18	00	15	−42.90	2.5	f/4.3	N	Blue	Processed
51	112	11	18	52	15	−42.90	2.4	f/4.3	N	Blue	
52	112	11	24	42	15	−52.82	2.3	f/4.3	N	Blue	Processed
53	112	11	25	25	15	−47.86	2.4	f/4.3	N	Blue	Processed

[a]W = wide angle, 25 mm; N = narrow angle, 100 mm.

Table VI-1 (Cont'd)

Picture	GMT Day	GMT Hour	GMT Minute	GMT Second	Azimuth	Elevation	Focus distance, m	Iris setting	Lens focal length[a]	Filter	Remarks
54	112	11	25	59	15	−42.90	2.5	f/4.3	N	Blue	Processed
55	112	11	33	27	15	−42.90	2.5	f/4.3	N	Blue	Processed
56	112	11	34	06	15	−42.90	2.5	f/4.3	W	Blue	
57	112	11	34	29	15	−47.86	2.5	f/4.3	W	Blue	
58	113	01	51	43	15	−52.82	2.3	f/6.6	N	Red	Processed
59	113	01	52	19	15	−47.86	2.4	f/6.6	N	Red	Processed
60	113	01	52	51	15	−42.90	2.5	f/6.6	N	Red	Processed
61	113	06	39	01	15	−57.78	2.3	f/6.6	N	Red	Processed
62	113	06	40	05	15	−52.82	2.3	f/6.6	N	Red	Processed
63	113	06	40	38	15	−47.86	2.4	f/6.6	N	Red	Processed
64	113	06	41	08	15	−42.90	2.5	f/6.6	N	Red	Processed
65	113	07	21	20	15	−42.90	2.5	f/6.6	W	Red	
66	113	07	22	04	15	−47.86	2.4	f/6.6	N	Red	
67	113	07	22	55	15	−57.78	2.3	f/6.6	N	Red	
68	113	07	49	47	15	−42.90	2.5	f/6.6	N	Red	
69	113	08	17	56	15	−42.90	2.5	f/6.6	W	Red	
70	113	09	32	41	15	−42.90	2.5	f/6.6	W	Red	
71	114	05	19	23	15	−47.86	2.5	f/6.6	N	Red	
72	114	06	14	55	15	−57.82	2.5	f/6.6	N	Red	
73	114	11	23	06	−63	35.5[b]	30.1	f/3.9	W	Green	Processed
74	114	11	24	01	−63	35.5[b]	30.1	f/3.9	W	Blue	Processed
75	114	11	31	40	−63	35.5[b]	30.2	f/3.9	W	Red	Processed
76	114	12	02	10	−63	35.7[b]	29.9	f/5.8	W	Red	Processed
77	114	12	02	44	−63	35.3[b]	30.3	f/5.8	W	Blue	Processed
78	114	12	03	20	−63	35.7[b]	29.9	f/5.8	W	Green	Processed
79	116	05	48	17	−54	−57.78	2.5	f/17.0	W	Clear	
80	116	05	53	57	−63	−47.86	2.5	f/17.0	W	Clear	
81	116	05	54	53	−66	−47.86	2.5	f/17.0	W	Clear	
82	116	06	05	55	−54	−52.82	2.7	f/5.8	N	Blue	Processed
83	116	07	06	46	−69	−62.74	2.5	f/17.9	N	Clear	
84	116	07	07	25	−69	−52.82	2.7	f/17.0	N	Clear	
85	116	07	19	02	−66	−57.78	2.5	f/16.9	N	Clear	
86	116	07	23	17	−60	−47.86	2.7	f/17.0	N	Clear	
87	116	07	30	04	−60	−52.82	2.5	f/21.6	N	Clear	
88	116	07	39	03	−54	−8.18	30.4	f/15.2	N	Clear	
89	116	07	41	57	−54	−47.86	2.5	f/15.1	N	Clear	
90	116	07	46	56	−54	−57.78	2.4	f/21.7	N	Clear	
91	116	08	31	47	−51	−62.74	2.4	f/21.7	N	Clear	
92	116	08	34	15	−51	−13.14	18.5	f/21.7	N	Clear	
93	116	08	37	03	−48	−8.18	30.1	f/7.4	N	Red	
94	116	08	37	36	−48	−18.10	11.4	f/7.4	N	Red	
95	116	08	39	18	−45	−13.14	18.5	f/7.4	N	Red	
96	116	08	39	53	−42	−8.18	30.1	f/7.4	N	Red	
97	116	08	40	01	−42	−18.10	11.2	f/7.4	N	Red	
98	116	08	41	23	−39	−13.14	18.5	f/7.4	N	Red	
99	116	08	41	29	−39	−3.22	29.7	f/7.4	N	Red	
100	116	08	42	27	−36	−8.18	30.0	f/7.4	N	Red	
101	116	08	43	32	−36	−18.10	11.4	f/7.4	N	Red	
102	116	08	48	49	−33	−3.22	30.2	f/21.7	N	Red	
103	116	08	50	24	−30	−8.18	30.1	f/21.6	N	Clear	
104	116	08	50	33	−30	−18.10	11.3	f/21.5	N	Clear	
105	116	08	55	40	−24	−18.10	11.3	f/21.6	N	Clear	Processed
106	116	09	07	06	−6	1.74	29.7	f/21.5	W	Clear	
107	116	09	11	55	−3	−42.90	2.9	f/18.4	N	Clear	
108	116	09	20	16	0	−8.18	30.1	f/21.8	N	Clear	

[b]Elevation at an end stop.

Table VI-1 (Cont'd)

Picture	GMT				Azimuth	Elevation	Focus distance, m	Iris setting	Lens focal length[a]	Filter	Remarks
	Day	Hour	Minute	Second							
109	116	10	46	13	0	−52.82	3.1	f/14.7	W	Clear	
110	116	11	53	26	−60	−57.78	2.3	f/7.4	W	Red	
111	116	12	00	54	−57	−57.78	2.5	f/7.4	N	Red	
112	116	12	01	27	−57	−57.78	2.5	f/7.4	N	Blue	
113	116	12	02	14	−57	−57.78	2.5	f/7.4	N	Green	
114	117	08	56	45	−33	−52.82	2.6	f/15.1	N	Clear	
115	117	09	30	12	−42	−47.86	2.7	f/15.2	N	Clear	
116	117	10	34	53	−21	−52.82	2.7	f/15.2	W	Clear	
117	117	10	40	51	−21	−52.82	2.5	f/15.1	N	Clear	
118	117	10	41	32	−21	−57.78	2.4	f/15.2	N	Clear	
119	117	10	43	07	−18	−52.82	2.5	f/15.2	N	Clear	
120	117	10	44	54	−24	−47.86	2.6	f/15.2	N	Clear	
121	117	10	45	50	−24	−47.86	2.6	f/15.1	N	Clear	
122	117	10	47	10	−24	−52.82	2.5	f/15.1	N	Clear	
123	117	10	48	37	−24	−62.74	2.4	f/15.1	N	Clear	
124	117	10	50	16	−24	−57.82	2.4	f/15.1	N	Clear	
125	117	11	17	45	−213	−37.94	3.0	f/10.1	W	Clear	
126	117	12	49	29	−186	−3.22	30.2	f/5.2	N	Green	
127	117	12	59	18	−177	−3.22	30.4	f/5.2	N	Green	Processed
128	117	13	26	34	−90	−18.10	22.0	f/5.1	N	Green	
129	118	09	48	08	−36	−42.90	2.7	f/15.1	W	Clear	
130	118	10	05	46	−12	−42.90	2.7	f/15.2	W	Clear	
131	118	10	20	10	−12	−37.94	2.7	f/15.2	N	Clear	
132	118	10	29	29	−12	−37.94	2.7	f/15.2	N	Clear	
133	118	10	45	33	−12	−37.94	2.7	f/15.2	N	Clear	
134	118	10	49	08	−12	−37.94	2.7	f/15.2	N	Clear	
135	118	11	09	55	−57	−57.78	2.6	f/7.4	W	Green	
136	118	11	29	24	−57	−57.78	2.5	f/7.4	N	Green	
137	118	12	11	42	−57	−57.78	2.5	f/7.5	N	Green	
138	118	13	21	33	−21	−52.82	2.5	f/15.2	W	Clear	
139	118	13	32	44	−21	−52.82	2.5	f/15.2	N	Clear	
140	118	13	35	22	−21	−52.82	2.5	f/15.2	N	Clear	
141	118	13	58	45	−54	−52.82	2.6	f/7.4	N	Green	
142	118	14	30	51	−138	−42.90	3.5	f/15.1	N	Clear	
143	119	09	42	02	−12	−42.90	2.7	f/14.7	N	Clear	
144	119	10	26	40	−33	−47.78	2.7	f/5.2	N	Blue	
145	119	14	48	20	−3	−42.90	2.6	f/7.4	N	Green	
146	120	09	50	00	−162	−32.98	2.4	f/15.7	W	Clear	
147	120	09	50	05	−162	−18.10	2.4	f/15.7	W	Clear	
148	120	09	50	36	−162	−3.22	2.4	f/15.6	W	Clear	
149	120	09	50	41	−180	−3.22	2.4	f/15.6	W	Clear	
150	120	09	50	44	−180	−18.10	2.4	f/15.6	W	Clear	
151	120	09	50	49	−180	−32.98	2.4	f/15.6	W	Clear	
152	120	09	51	06	−198	−32.98	2.4	f/15.6	W	Clear	
153	120	09	51	19	−198	11.66	2.4	f/15.6	W	Clear	
154	120	09	51	34	−216	−18.10	2.4	f/15.6	W	Clear	
155	120	09	52	27	−90	−62.74	2.4	f/15.7	W	Clear	
156	120	09	52	36	−54	−62.74	2.4	f/15.6	W	Clear	
157	120	10	35	58	−48	35.9[b]	30.4	f/14.7	W	Clear	
158	120	10	37	30	−48	35.9[b]	30.4	f/5.2	W	Green	
159	120	10	38	26	−48	36.3[b]	30.4	f/5.2	W	Blue	
160	120	10	39	29	−48	35.9[b]	30.4	f/5.2	W	Red	
161	120	10	47	02	−48	36.3[b]	29.8	f/15.0	W	Clear	
162	120	11	09	10	−54	−57.78	30.1	f/15.0	W	Clear	
163	120	12	47	41	−24	−18.10	5.7	f/7.5	N	Green	Processed
164	120	13	38	44	6	−47.86	2.4	f/15.1	W	Clear	
165	120	13	39	27	6	6.70	2.4	f/15.1	W	Clear	

Table VI-1 (Cont'd)

Picture	GMT				Azimuth	Elevation	Focus distance, m	Iris setting	Lens focal length[a]	Filter	Remarks
	Day	Hour	Minute	Second							
166	120	13	41	41	36	26.54	2.4	f/15.1	W	Clear	
167	120	13	41	47	54	26.54	2.4	f/15.1	W	Clear	
168	120	13	42	24	72	−18.10	2.4	f/15.1	W	Clear	
169	120	14	28	03	15	−37.94	2.5	f/15.1	N	Clear	Processed
170	120	14	28	49	18	−42.86	2.4	f/15.1	N	Clear	
171	120	14	32	01	18	−3.22	7.9	f/15.1	N	Clear	
172	120	14	32	26	18	16.62	30.1	f/15.1	N	Clear	
173	120	14	37	00	27	11.66	29.7	f/15.1	N	Clear	
174	120	14	38	37	30	−3.22	7.7	f/15.1	N	Clear	
175	120	14	38	45	30	6.70	18.5	f/15.1	N	Clear	
176	120	14	38	57	33	21.58	29.7	f/15.1	N	Clear	
177	120	14	41	04	39	21.58	30.1	f/15.1	N	Clear	
178	120	14	41	09	39	11.66	29.7	f/15.1	N	Clear	
179	120	14	45	05	45	21.58	30.0	f/15.1	N	Clear	
180	120	14	47	03	48	16.62	30.0	f/15.1	N	Clear	Processed
181	120	14	47	09	51	21.58	30.2	f/15.1	N	Clear	
182	120	14	51	59	60	−23.06	2.8	f/15.1	N	Clear	
183	120	14	52	22	63	6.70	18.5	f/15.1	N	Clear	
184	120	14	52	35	63	21.58	30.2	f/15.1	N	Clear	
185	120	14	54	23	66	6.70	18.5	f/15.1	N	Clear	
186	120	14	56	04	72	−23.06	2.8	f/15.1	N	Clear	
187	120	15	00	51	78	6.70	18.5	f/15.1	N	Clear	
188	120	15	07	16	66	26.54	30.1	f/15.1	N	Clear	
189	120	15	36	15	33	−37.94	2.7	f/15.1	N	Clear	
190	120	15	39	30	33	−37.94	2.7	f/15.1	N	Clear	
191	120	15	40	08	33	−37.94	2.7	f/15.1	N	Clear	
192	120	15	42	19	33	−37.94	2.7	f/15.1	N	Clear	
193	120	15	45	42	33	−37.94	2.7	f/15.1	N	Clear	
194	120	15	47	30	33	−37.94	2.7	f/15.1	N	Clear	
195	120	15	48	50	33	−37.94	2.7	f/15.1	N	Clear	
196	120	15	50	17	33	−37.94	2.7	f/15.1	N	Clear	
197	120	16	08	43	33	−47.86	2.6	f/15.1	W	Clear	
198	120	16	37	14	21	−37.94	2.7	f/15.1	N	Clear	
199	120	16	41	30	21	−37.94	2.7	f/15.1	N	Clear	
200	120	16	59	28	21	−37.94	2.6	f/15.2	N	Clear	Processed
201	120	17	14	20	21	−37.94	2.6	f/15.9	N	Clear	
202	121	10	53	26	57	−13.14	2.3	f/5.8	W	Green	
203	121	11	10	19	21	−32.98	2.4	f/8.2	W	Green	
204	121	12	21	12	108	26.54	2.4	f/11.3	W	Clear	
205	121	12	30	22	129	−18.10	1.8	f/16.8	N	Clear	
206	121	12	31	31	129	−13.14	2.2	f/16.8	N	Clear	
207	121	14	39	02	21	−37.94	2.6	f/5.9	N	Green	
208	121	14	54	35	21	−37.94	2.6	f/5.9	N	Green	
209	121	14	56	38	21	−37.94	2.6	f/5.9	N	Green	
210	121	14	58	13	21	−37.94	2.6	f/5.9	W	Clear	
211	121	15	18	39	24	−37.94	2.1	f/5.9	N	Red	
212	121	15	21	05	24	−37.94	2.1	f/5.9	N	Blue	
213	121	15	23	35	24	−37.94	2.1	f/5.9	N	Green	
214	121	15	32	39	15	−37.94	2.6	f/5.9	W	Clear	
215	121	15	34	25	15	−37.94	2.6	f/5.9	W	Clear	
216	121	16	14	14	15	−43.90	2.5	f/5.9	N	Blue	
217	122	11	55	24	−21	−42.90	2.7	f/5.7	W	Red	
218	122	13	05	11	−24	−42.90	2.7	f/5.5	N	Red	
219	122	13	52	27	−18	−42.90	2.7	f/5.5	N	Red	
220	122	14	17	04	−27	−37.94	2.7	f/5.5	W	Red	
221	123	17	15	38	−39	−13.14	29.9	f/5.5	W	Blue	
222	123	17	37	14	−39	−13.14	30.0	f/5.5	W	Blue	

Table VI-1 (Cont'd)

Picture	GMT				Azimuth	Elevation	Focus distance, m	Iris setting	Lens focal length[a]	Filter	Remarks
	Day	Hour	Minute	Second							
223	123	18	03	01	−39	−13.14	30.0	f/3.9	W	Blue	
224	123	18	10	30	−39	−13.14	29.9	f/3.9	W	Green	
225	123	18	12	58	−45	−13.14	30.0	f/5.8	W	Green	
226	123	18	31	59	−45	−13.14	30.0	f/3.9	W	Green	
227	123	18	48	40	−45	−13.14	22.5	f/7.9	W	Clear	
228	123	18	51	27	−39	−13.14	30.1	f/3.9	W	Red	
229	123	19	11	11	−39	−13.14	30.1	f/3.9	W	Red	
230	123	20	08	40	−39	−13.14	30.1	f/3.9	W	Red	
231	123	20	25	05	−39	−8.18	30.1	f/3.9	W	Red	
232	123	20	55	46	−39	−8.18	30.1	f/8.1	W	Blue	

Table VI-2. Camera azimuth vs lunar view rotation vs report view

Az[a]	R[b]	r[c]	Az[a]	R[b]	r[c]	Az[a]	R[b]	r[c]	Az[a]	R[b]	r[c]	Az[a]	R[b]	r[c]
132	−149	31	60	−49	41	−12	35	35	−84	88	−2	−156	135	45
129	−145	35	57	−45	−45	−15	38	38	−87	90	0	−159	138	−42
126	−141	39	54	−41	−41	−18	41	41	−90	91	1	−162	140	−40
123	−137	43	51	−37	−37	−21	43	43	−93	93	3	−165	143	−37
120	−133	−43	48	−33	−33	−24	46	−44	−96	95	5	−168	145	−35
117	−129	−39	45	−29	−29	−27	48	−42	−99	96	6	−171	148	−32
114	−125	−35	42	−25	−25	−30	51	−39	−102	98	8	−174	151	−29
111	−121	−31	39	−21	−21	−33	53	−37	−105	100	10	−177	154	−26
108	−117	−27	36	−18	−18	−36	56	−34	−108	102	12	−180	157	−23
105	−112	−22	33	−14	−14	−39	58	−32	−111	103	13	−183	160	−20
102	−108	−18	30	−10	−10	−42	60	−30	−114	105	15	−186	163	−17
99	−104	−14	27	−7	−7	−45	63	−27	−117	107	17	−189	166	−14
96	−100	−10	24	−3	−3	−48	65	−25	−120	109	19	−192	169	−11
93	−96	−6	21	0	0	−51	67	−23	−123	111	21	−195	172	−8
90	−91	−1	18	4	4	−54	69	−21	−126	113	23	−198	175	−5
87	−87	3	15	7	7	−57	71	−19	−129	115	25	−201	179	−1
84	−83	7	12	11	11	−60	73	−17	−132	117	27	−204	182	2
81	−78	12	9	14	14	−63	75	−15	−135	119	29	−207	186	6
78	−74	16	6	17	17	−66	77	−13	−138	121	31	−210	189	9
75	−70	20	3	20	20	−69	79	−11	−141	123	33	−213	193	13
72	−66	24	0	23	23	−72	81	−9	−144	126	36	−216	196	16
69	−61	29	−3	26	26	−75	83	−7	−147	128	38	−219	200	20
66	−57	33	−6	29	29	−78	84	−6	−150	130	40	−222	204	24
63	−53	37	−9	32	32	−81	86	−3	−153	133	43			

[a]Camera azimuth.
[b]Rotation of lunar view.
[c]Angle between report view and lunar view.

Table VI-3. Reference list of picture subjects

Subject	Picture
Footpad 2	2, 11–16, 24, 25, 27, 29, 80–91, 110–133, 135–137, 141, 155, 156, 162
Footpad 3	1, 18, 31, 168, 186
Compartment A	146, 151
Compartment B	154, 205, 206
Auxiliary mirrors	125, 152
Camera mirror	161
Surface-sampler instrument	28, 109, 138–140, 144, 197–203, 216–220
Surface-sampler operations	
Bearing test 1	32–34
Bearing tests 5 through 7	189–196
Trench 2	45–72
Trench 3	114–124
Rock pickup	129–135
Object pickup	207–215
Far end of trench 2	107, 145
Second landing touchdown marks	92–95, 98, 103
Surface features: rocks	6, 172; 10, 176; 19, 183, 185; 20, 187; 22, 180; 23, 181; 105, 163; 106, 108
Solar eclipse	73–78
Earth	157–160
Shadow progression	221–232

VII. Photographic Mosaics

Richard Bideaux

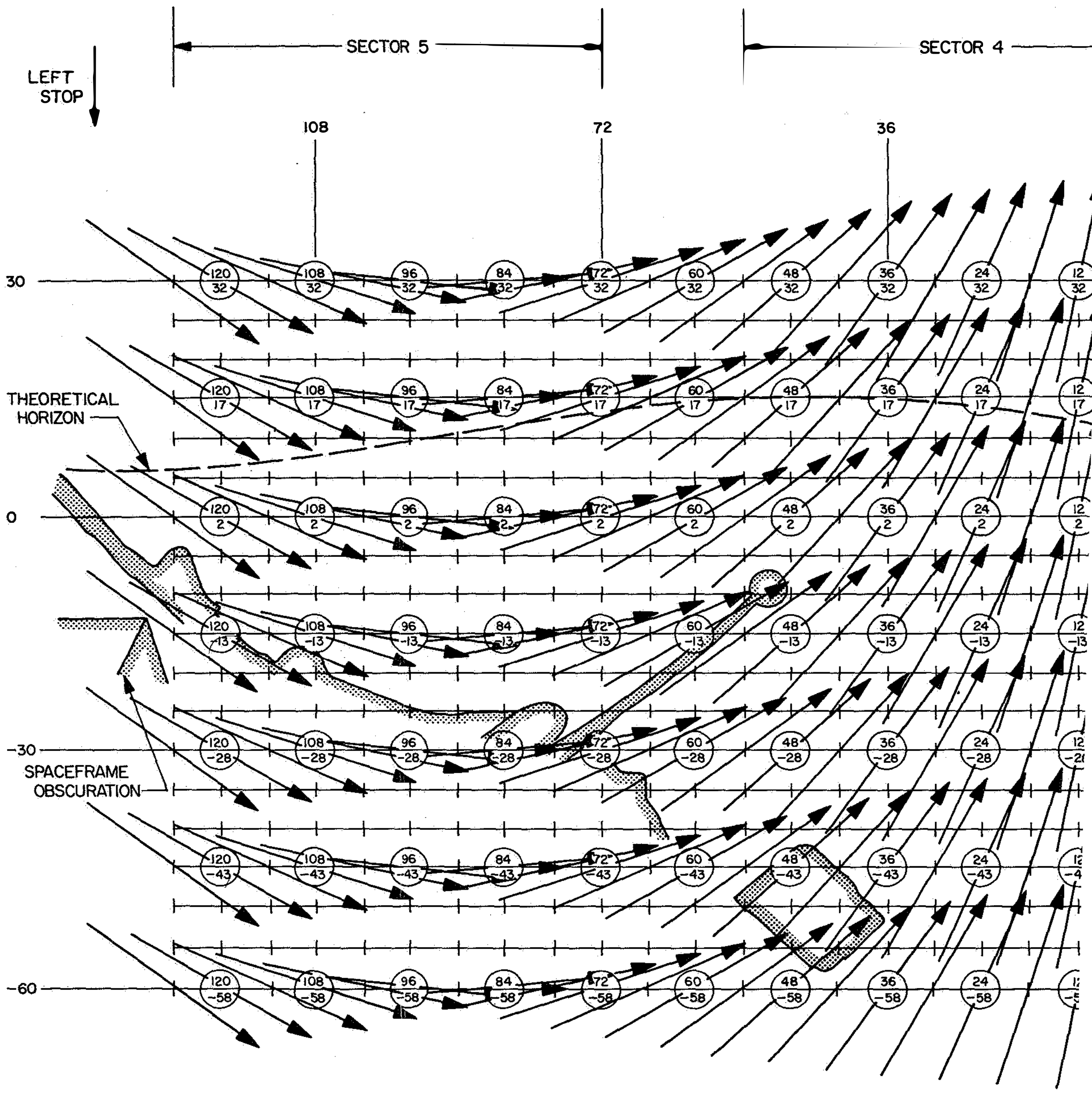
Eighteen mosaics, considered representative of the *Surveyor III* mosaic preparation, are presented in Section VIII of this report; Table VII-1 is a listing of these mosaics. Those designated as semi-improved (SI) were prepared by closely matching wet-processed prints. They were created on mosaic grids (Figs. VII-1 and VII-2) that indicate the center point of each frame, the direction of the top of each picture, and camera-mirror azimuth and elevation. To further assist orientation, spacecraft components were sketched on the grids. The dashed line across the grid center (Figs. VII-1 and VII-2) is the theoretical horizon for a spacecraft on a level surface. The left and right stop positions are the mechanical limits of mirror-azimuth motion. These *Surveyor* mosaic grids are cylindrical projections with the cylinder tangent to the central meridian of the spherical sectors. The grid parallels are modified about the 0-deg elevation parallel to provide the frame-by-frame image match as a function of frame size.

Mosaics made by, or for, members of the Surveyor Science Working Groups are generated in a variety of patterns, dependent on the information desired for interpretation. Those designated as spherical are appropriately scaled pictures mounted on spherical sections. The spatial relation of terrain features is maintained with this technique, and sections can be rephotographed to produce a rectangular format; mosaic 12 is composed of several of these photographs.

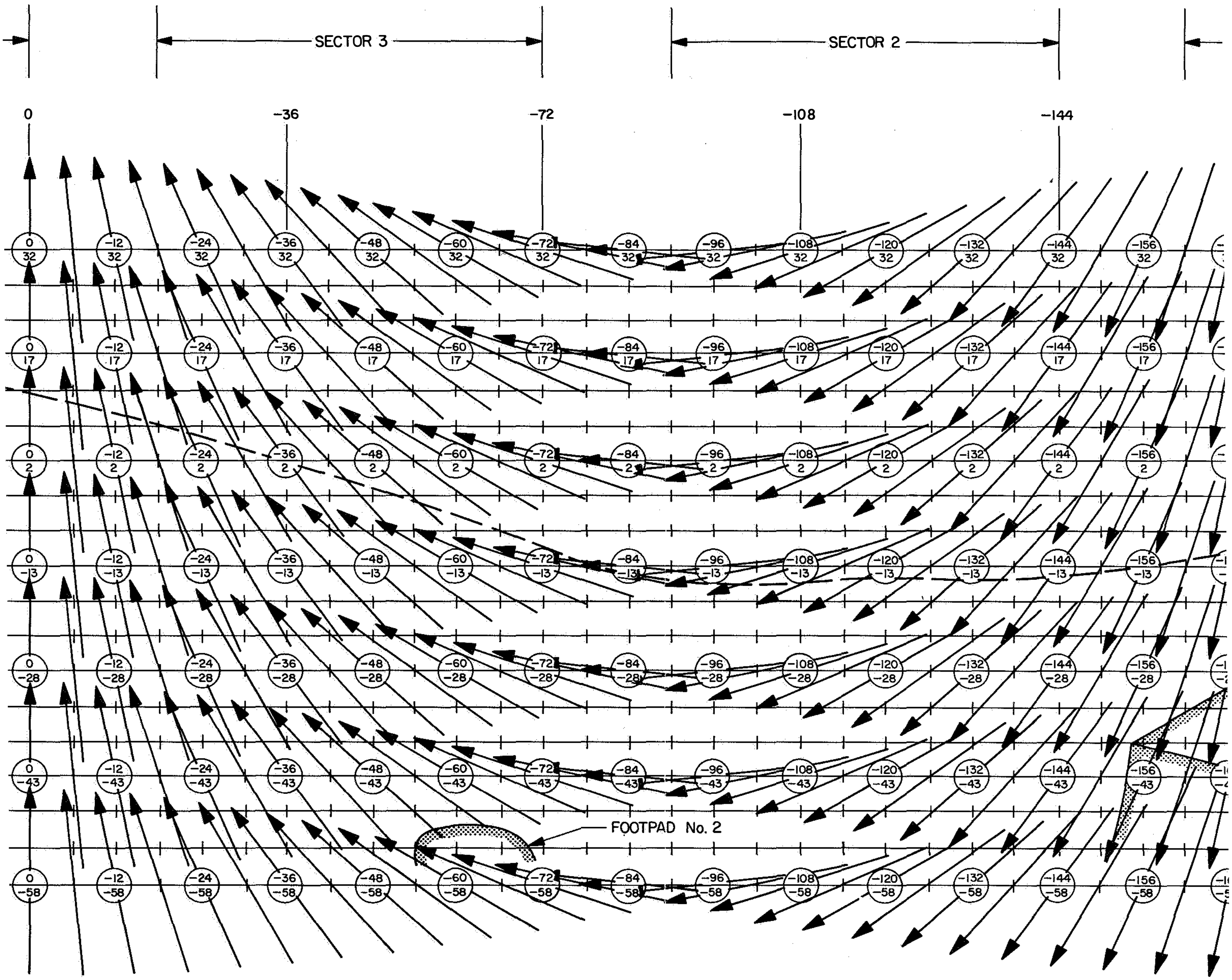
Table VII-1. Selected mosaics

Mosaic	Day	Azimuth	Lens focal length[a]	Identification
1	110	−222 to +132	W	Catalog No. 3-3-SI (USGS)[b]; semi-improved
2	117	−213 to −180	N	Catalog No. 3-32-SI (USGS); semi-improved
3	117	−180 to −144	N	Catalog No. 3-33-SI (USGS); semi-improved
4	120	−144 to −108	N	Catalog No. 3-65-SI (USGS); semi-improved
5	118	−108 to −72	N	Catalog No. 3-48-SI (USGS); semi-improved
6	117	−72 to −36	N	Catalog No. 3-37-SI (USGS); semi-improved
7	117	−36 to 0	N	Catalog No. 3-38-SI (USGS); semi-improved
8	120	0 to +36	N	Catalog No. 3-76-SI (USGS); semi-improved
9	120	+36 to +72	N	Catalog No. 3-78-SI (USGS); semi-improved
10	120	+72 to +90	N	Catalog No. 3-79-SI (USGS); semi-improved
11	111	+108 to +126	N	Catalog No. 3-14-SI (USGS); semi-improved
12		−195 to +72	N	Catalog No. 3-SE-2-SI; 3-SE-3-SI; 3-SE-4-SI; 3-SE-5-SI; 3-DSQ-6-SI; 3-SE-7-SI; 3-SE-8-SI; and 3-SE-9-SI; semi-improved Elements of spherical mosaics, rephotographed to a rectangular co-ordinate system. The horizon variation is the result of the near and far rim (above the local level) for the crater in which the spacecraft landed
13	120	0 to +72	N	Catalog No. 3-SE-1-SI; semi-improved
14	116	−48 to −30	N	Area of second bounce during landing. East of spacecraft; semi-improved
15	120	−96 to −47	N	Footpad 2 and imprint made on final bounce; semi-improved
16	120	+60 to +90	N	Footpad 3 and imprint made on final bounce; semi-improved
17	120	+3 to +36	N	Trench made by surface sampler; semi-improved
18		−180 to −159	N	Radiation thermal control mirror surface, top of compartment A; semi-improved

[a]W = wide angle, 25 mm; N = narrow angle, 100 mm.
[b]USGS denotes that the mosaic was prepared by personnel of the Branch of Astrogeology, U.S. Geological Survey, Flagstaff, Arizona.



FOLDOUT FRAME # 1


SECTOR 3
SECTOR 2
0
-36
-72
-108
-144
FOOTPAD No. 2

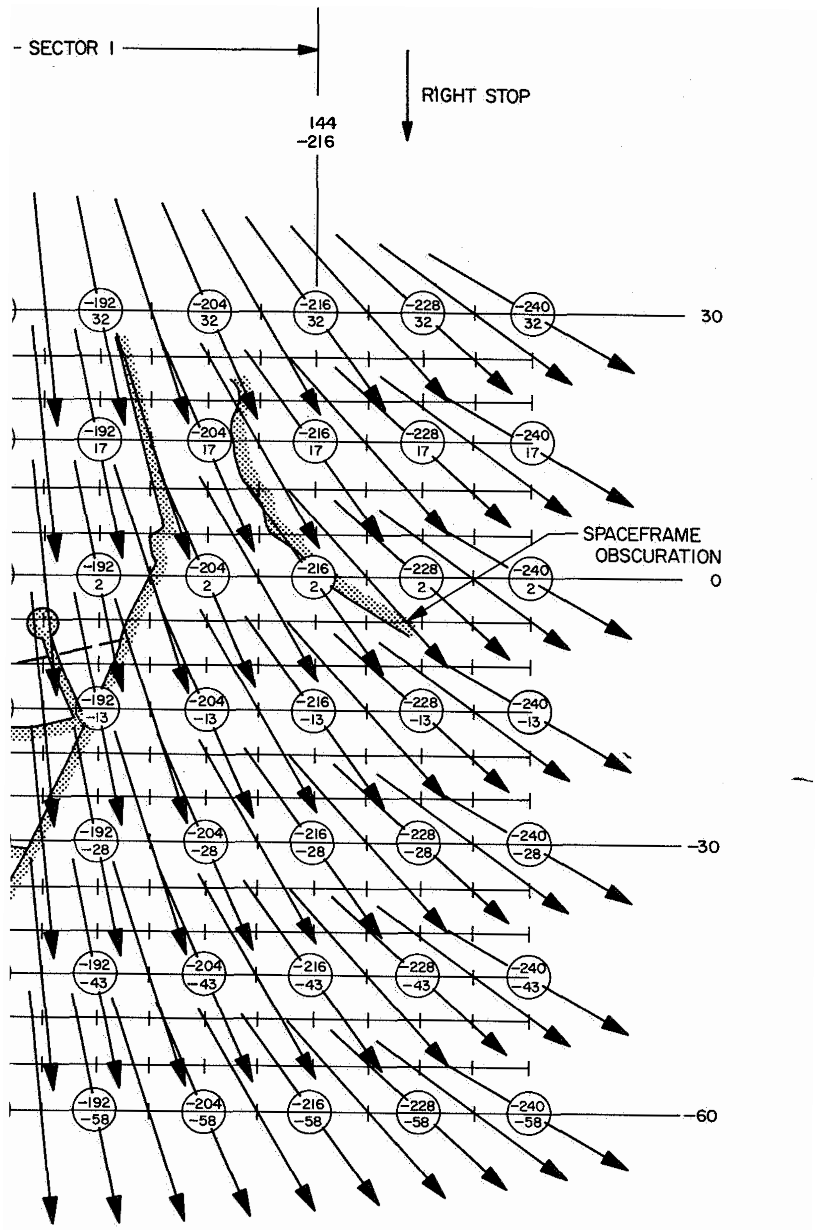
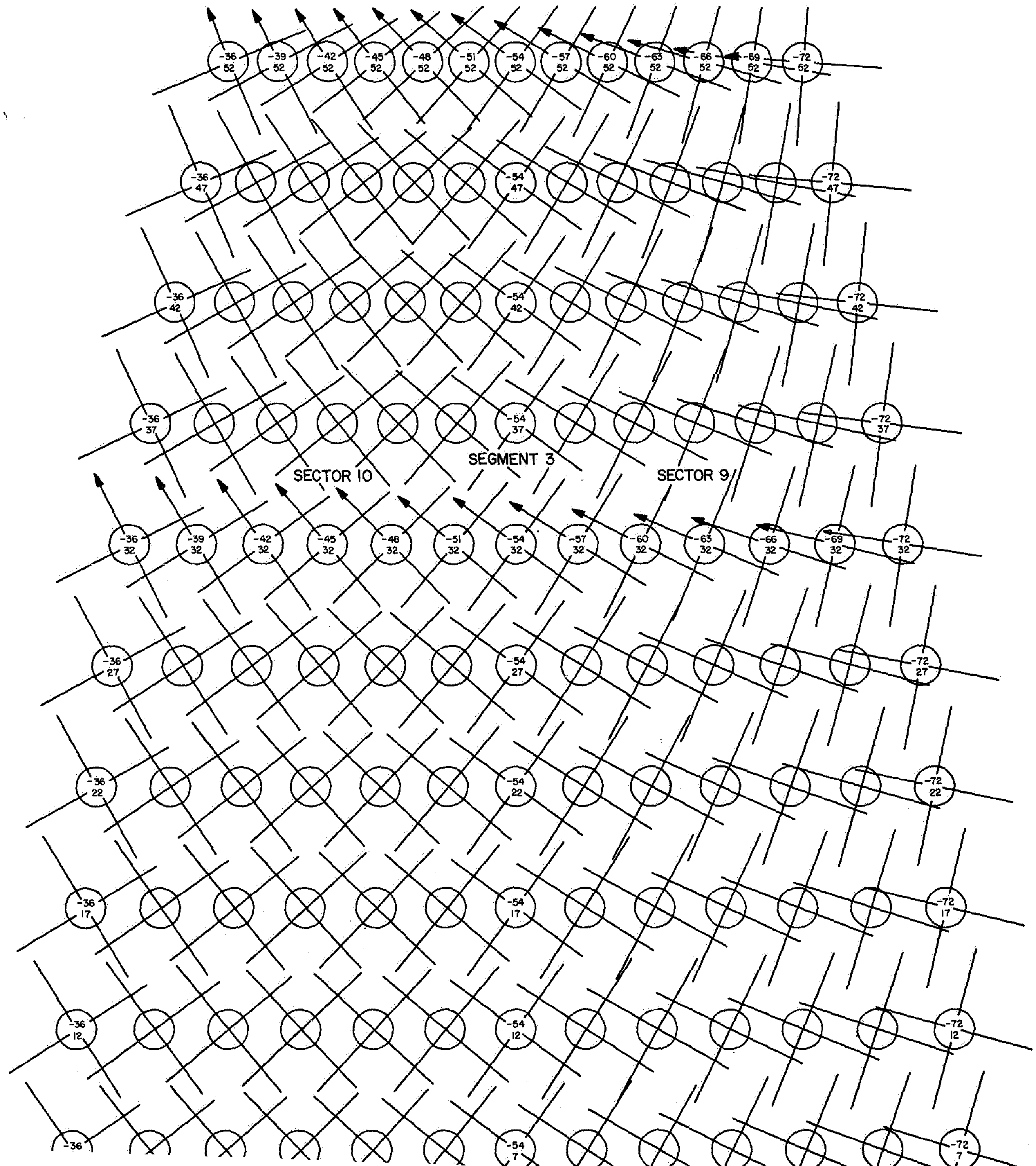


Fig. VII-1. Typical wide-angle mosaic grid

FOLDOUT FRAME

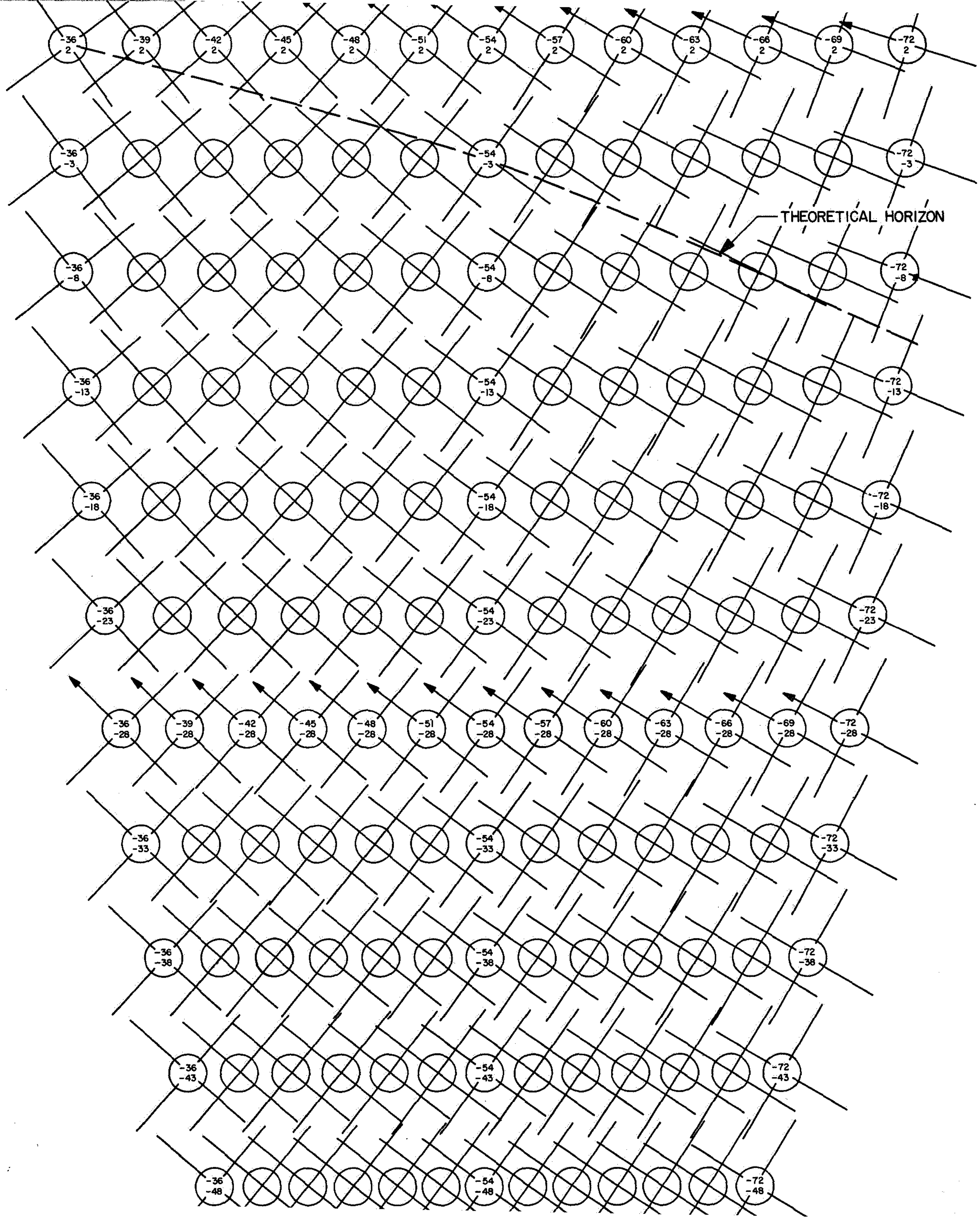
#1



FOLDOUT FRAME

#2

FOLDOUT FRAME



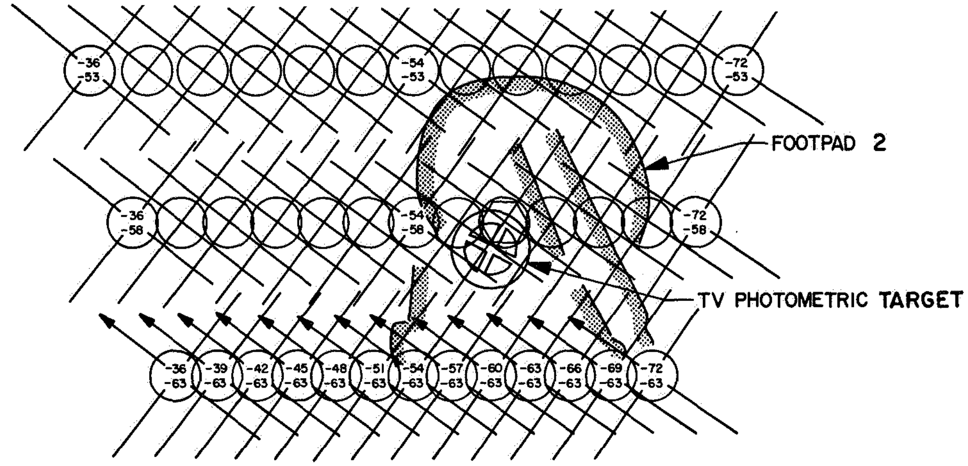


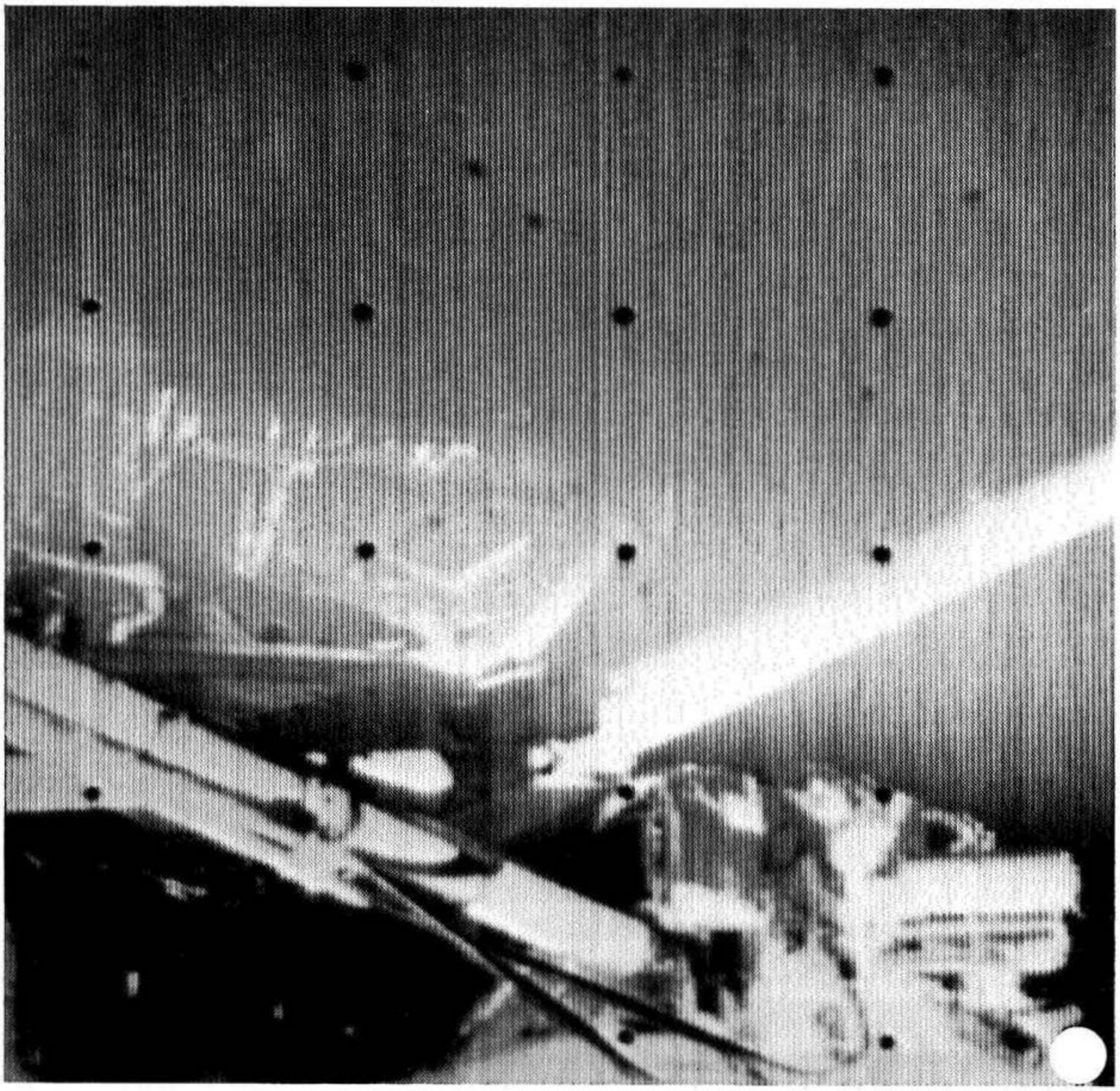
Fig. VII-2. Typical narrow-angle mosaic grid

#3

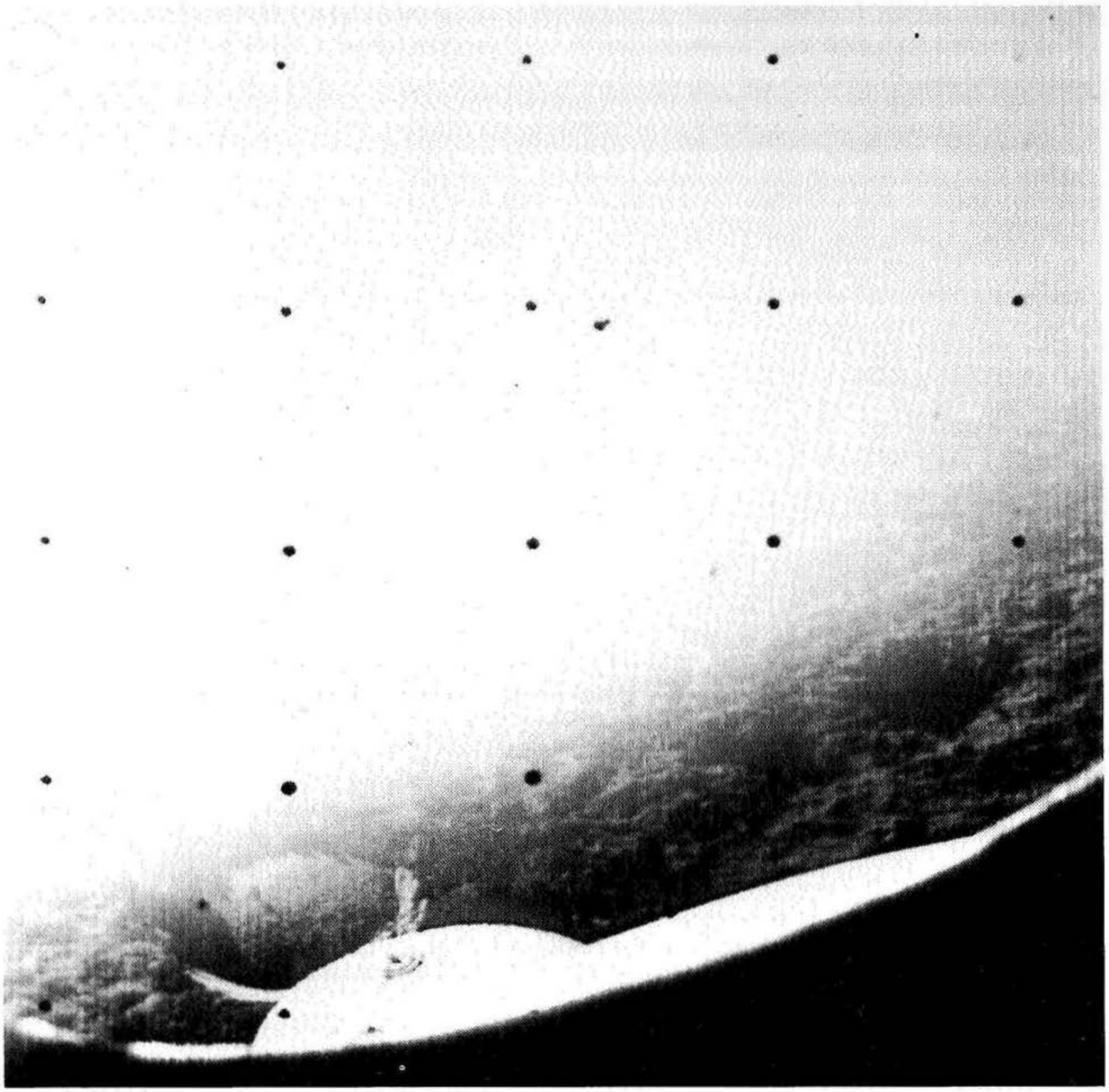
VIII. Representative *Surveyor III* Pictures and Mosaics

Robert H. Steinbacher

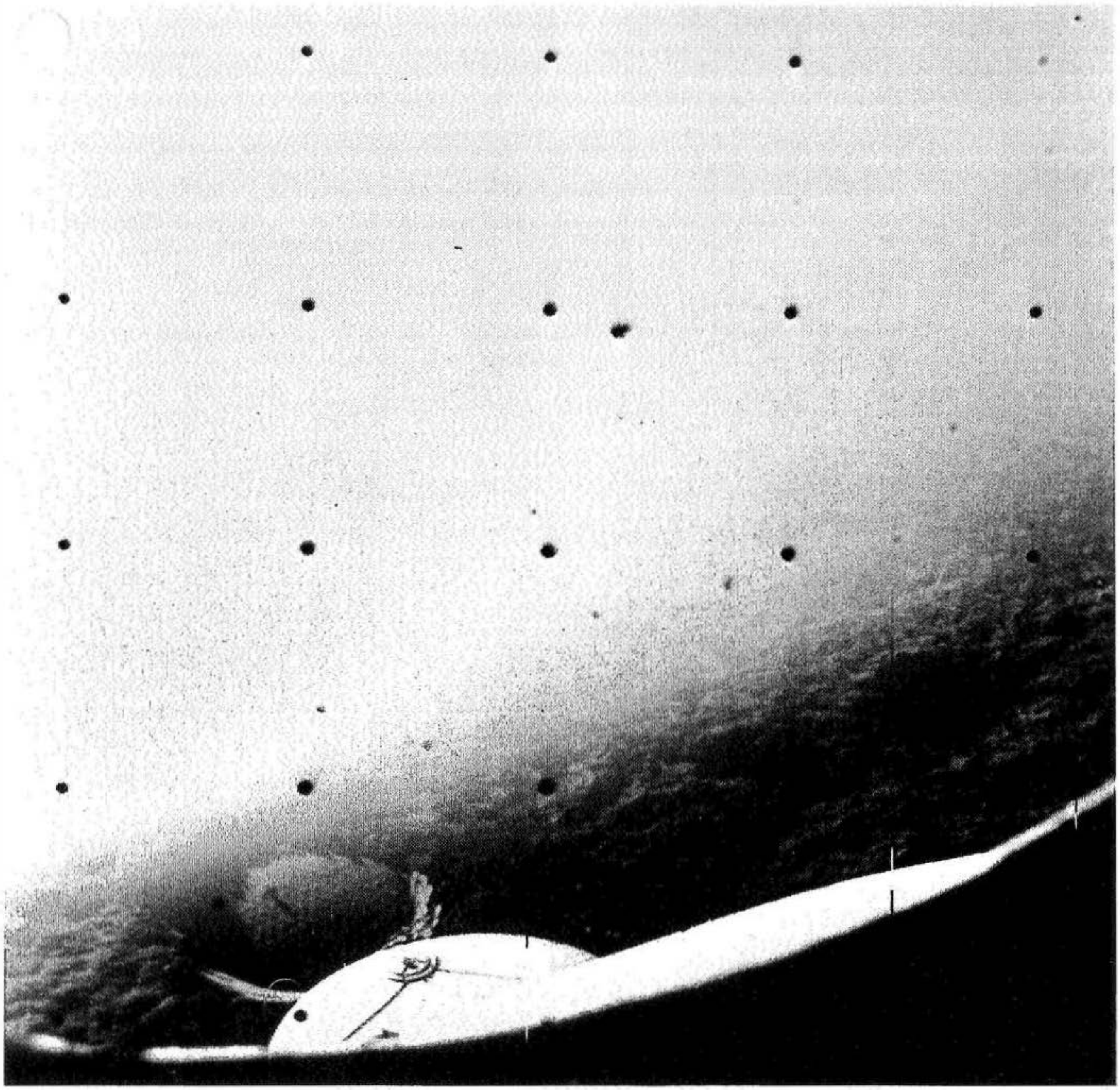
The pictures presented here were selected as most representative of the *Surveyor III* mission. The purpose of presenting these pictures is to acquaint the reader with the terrain around the spacecraft so that features of interest may be identified. Other pictures and mosaics that show these features are available through the National Space Science and Data Center, which is responsible for dissemination of *Surveyor* pictures and other scientific data. An index and copies of the pictures in various forms can be obtained from that Data Center.



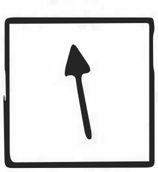
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(1)	Day 110, 01:06:54	78	—23.06	2.8	f/10.2	W	Clear	200-line scan

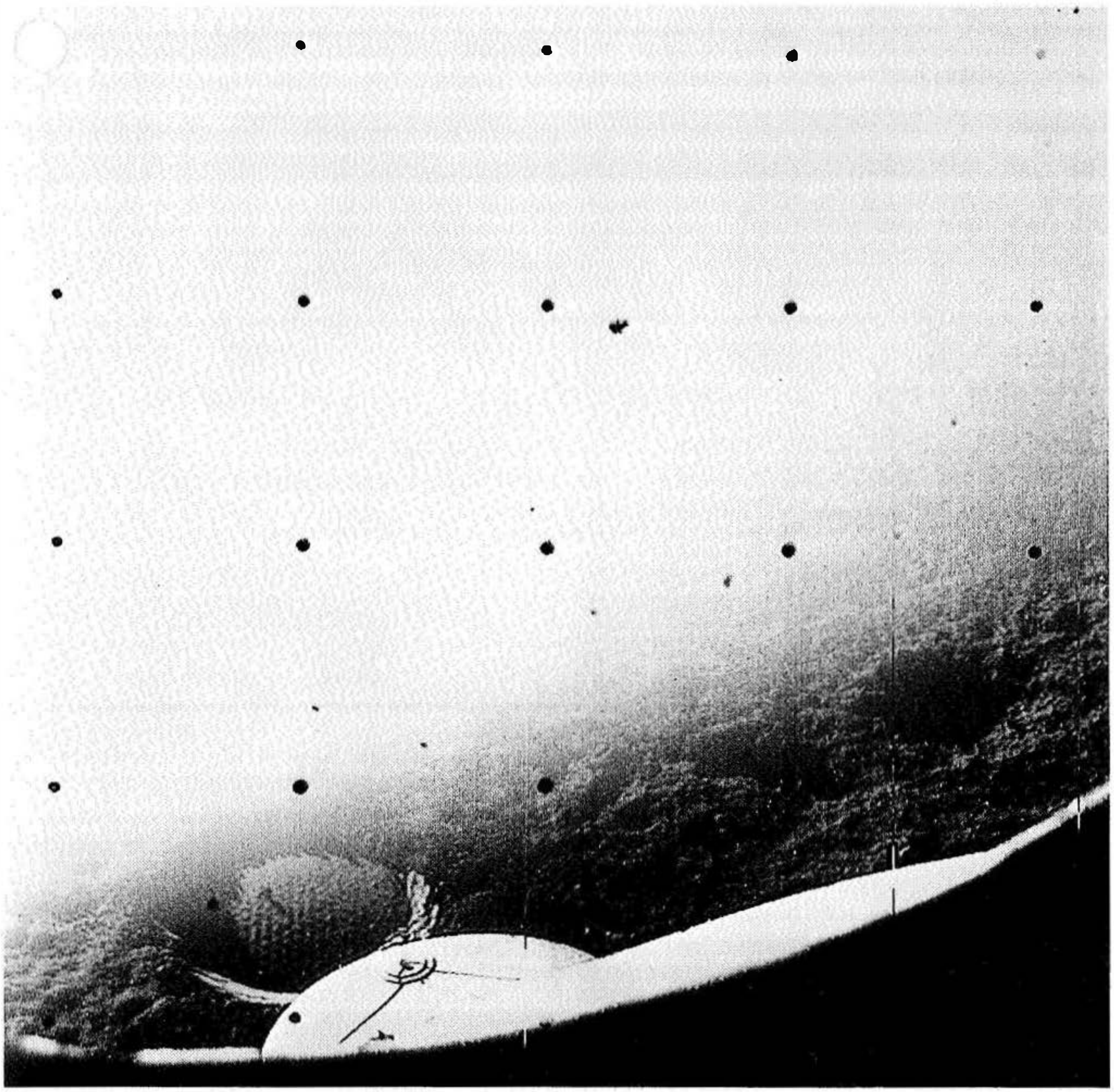


	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(2a)	Day 110, 09:05:17	—72	—47.86	2.5	*f*/21.2	W	Clear	Original



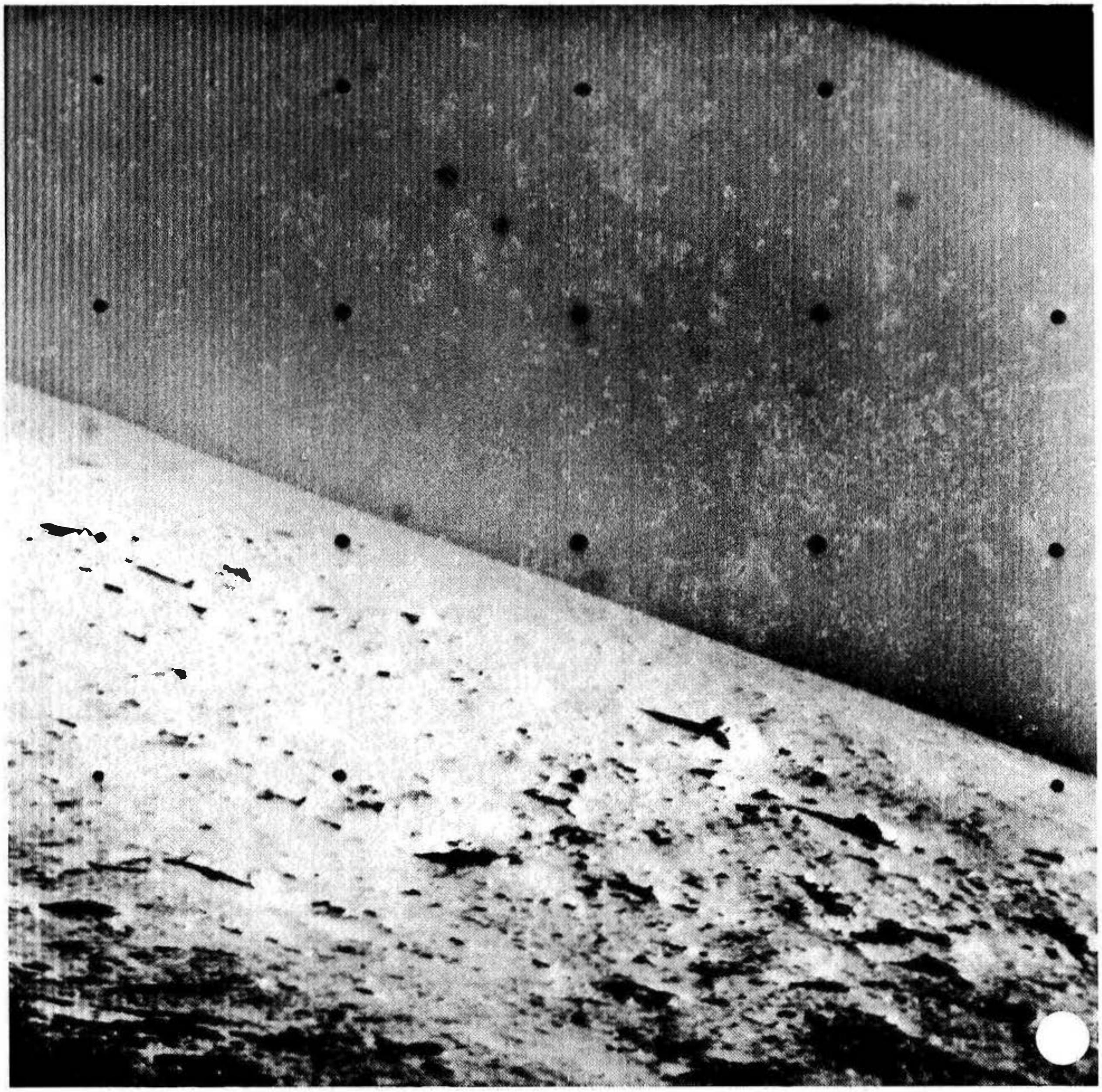
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(2b)	Day 110, 09:05:17	—72	—47.86	2.5	f/21.2	W	Clear	Digitized



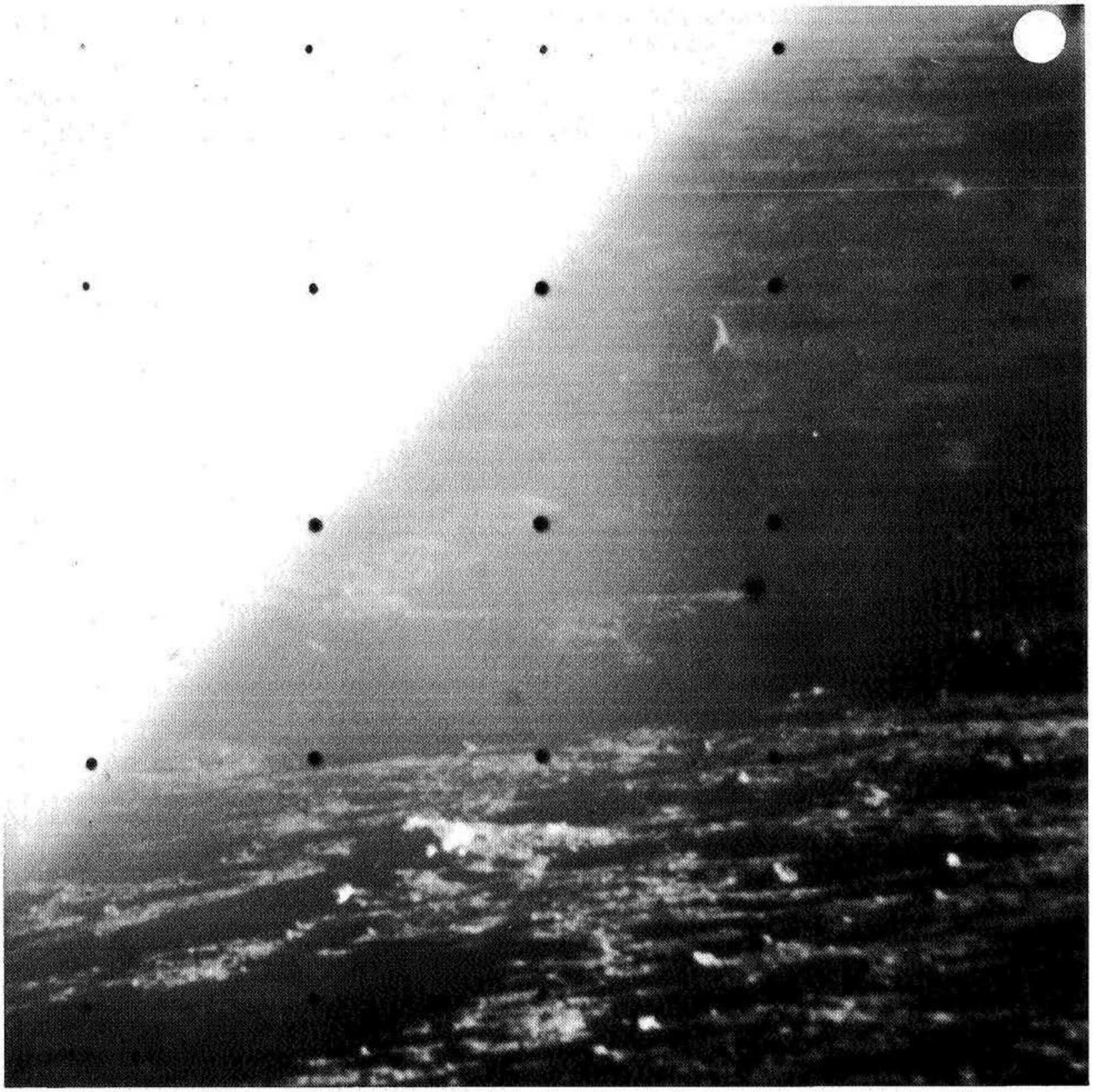


	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(2c)	Day 110, 09:05:17	—72	—47.86	2.5	f/21.2	W	Clear	Processed

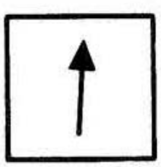
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(3)	Day 110, 09:11:45	54	—32.98	2.5	f/13.9	W	Clear

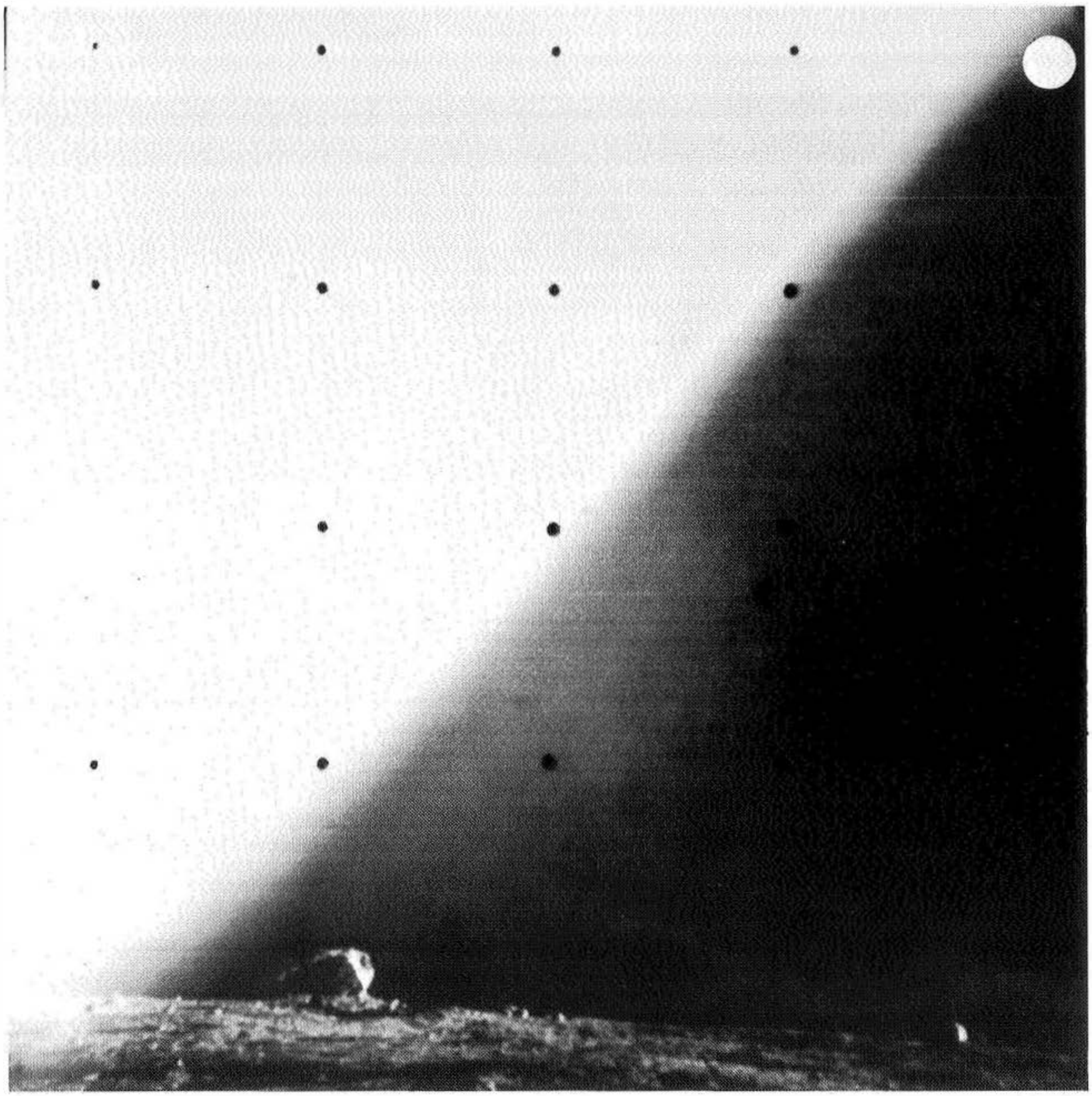


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(4)	Day 110, 09:12:27	72	26.54	2.5	f/7.9	W	Clear

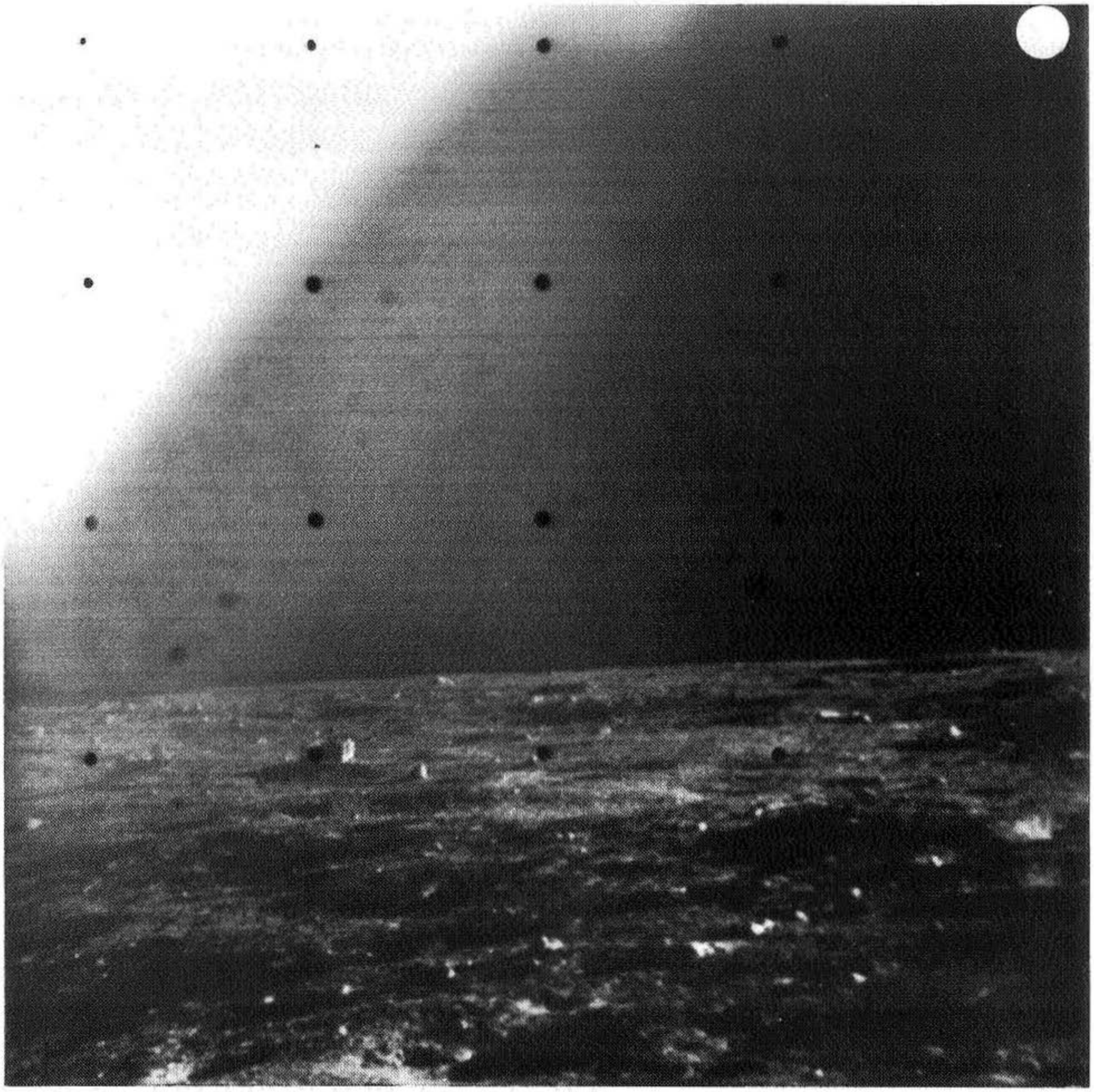


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(5)	Day 110, 09:37:21	18	11.66	29.9	f/8.1	W	Clear

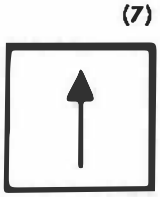


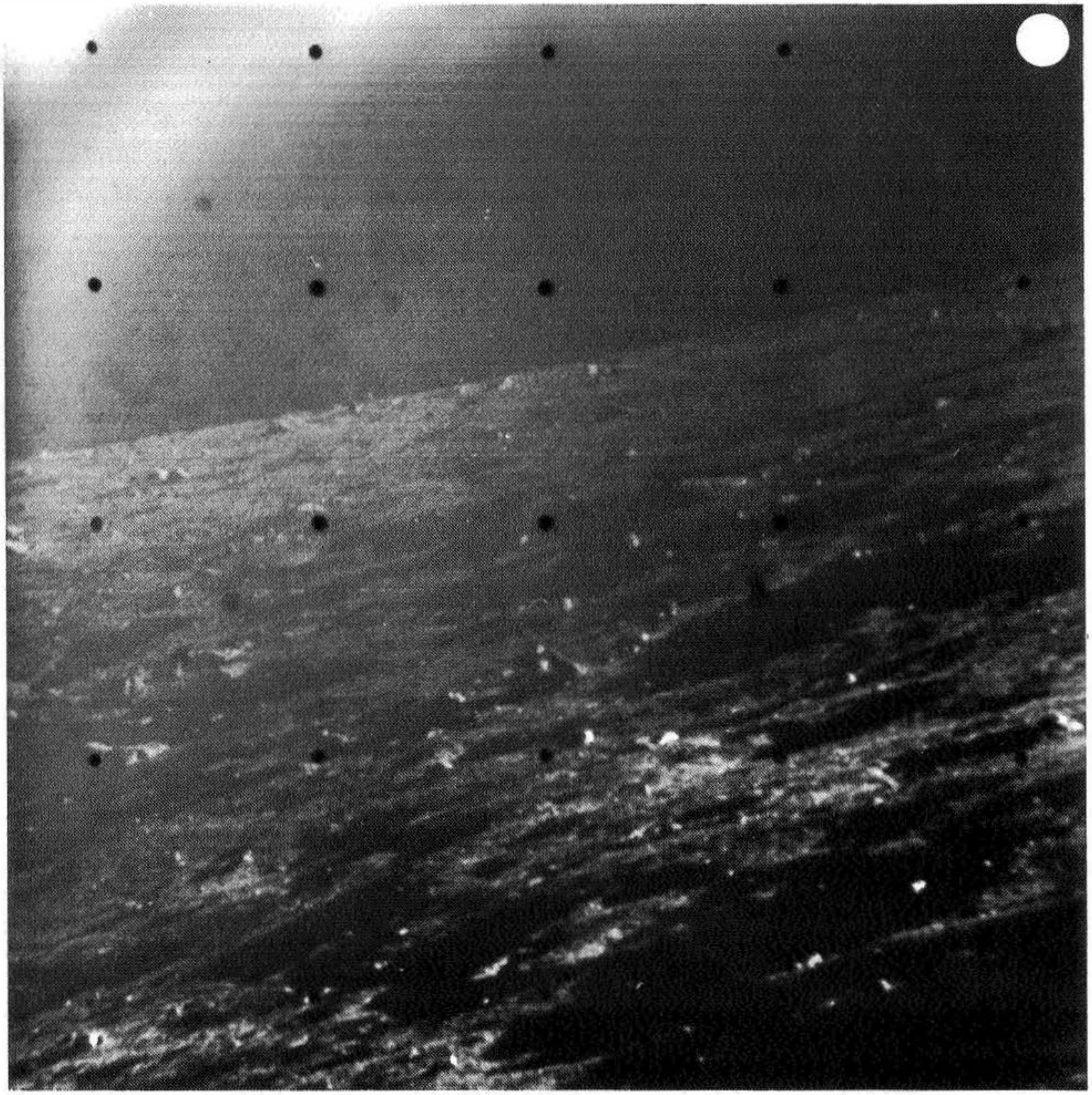


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(6)	Day 110, 09:37:43	15	16.22	30.2	$f/8.1$	N	Clear

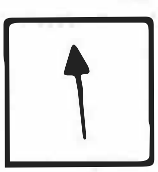


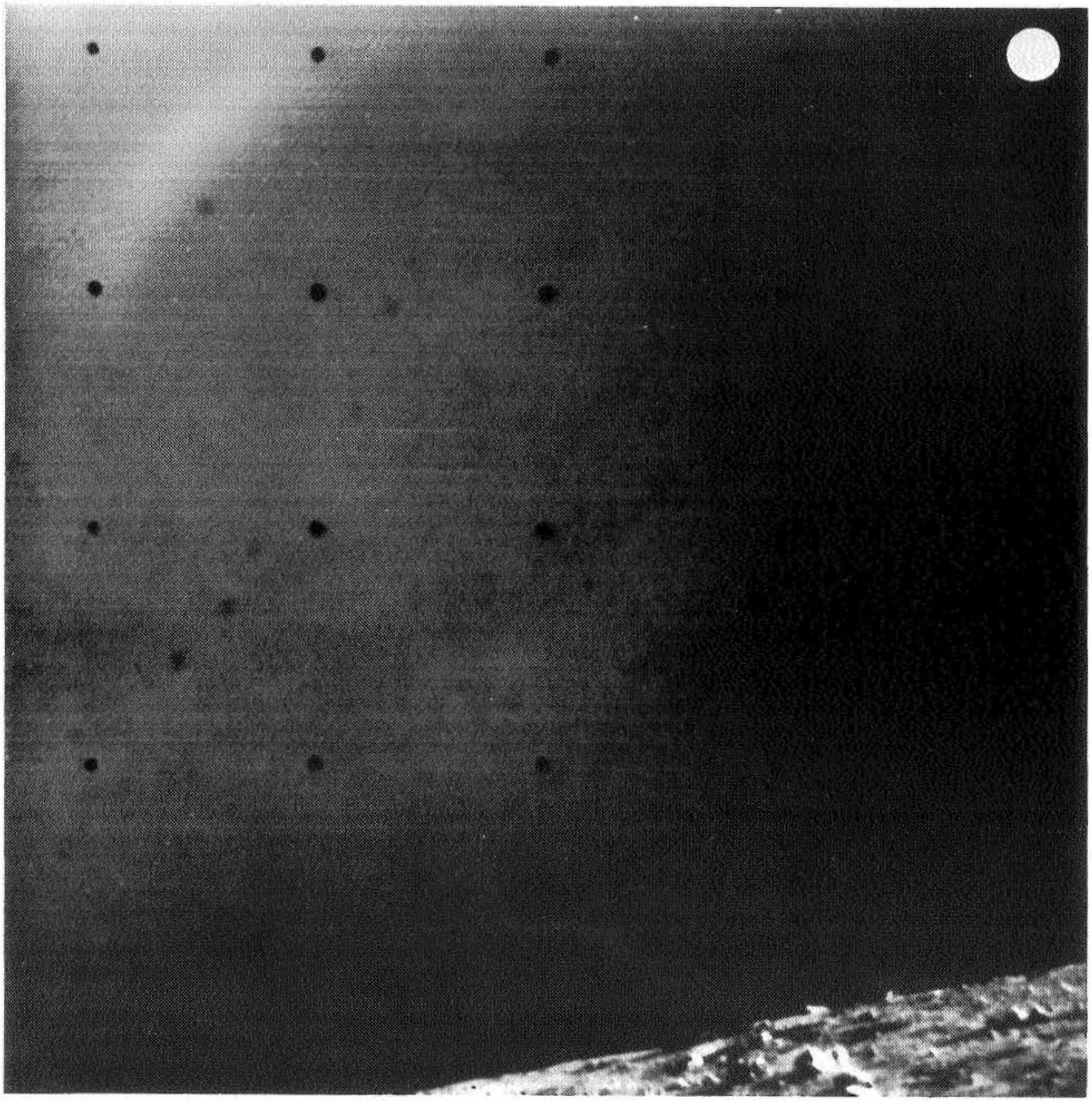
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(7)	Day 110, 09:37:48	21	16.62	30.2	f/8.1	N	Clear



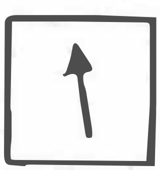


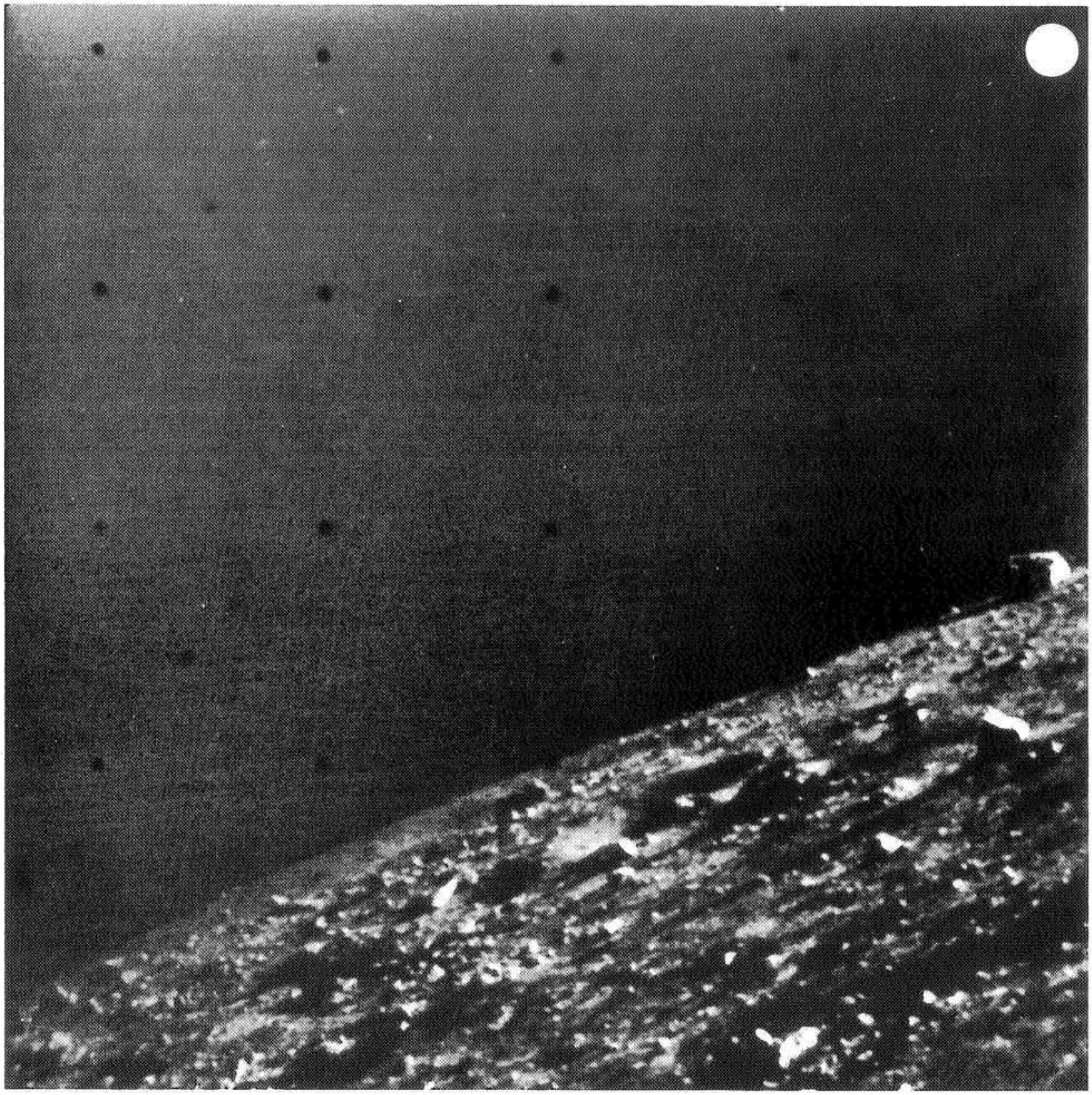
	GMT	Az	El	Focus, m	h's	Lens	Filter
(8)	Day 110, 09:37:52	27	16.62	30.2	f/8.1	N	Clear



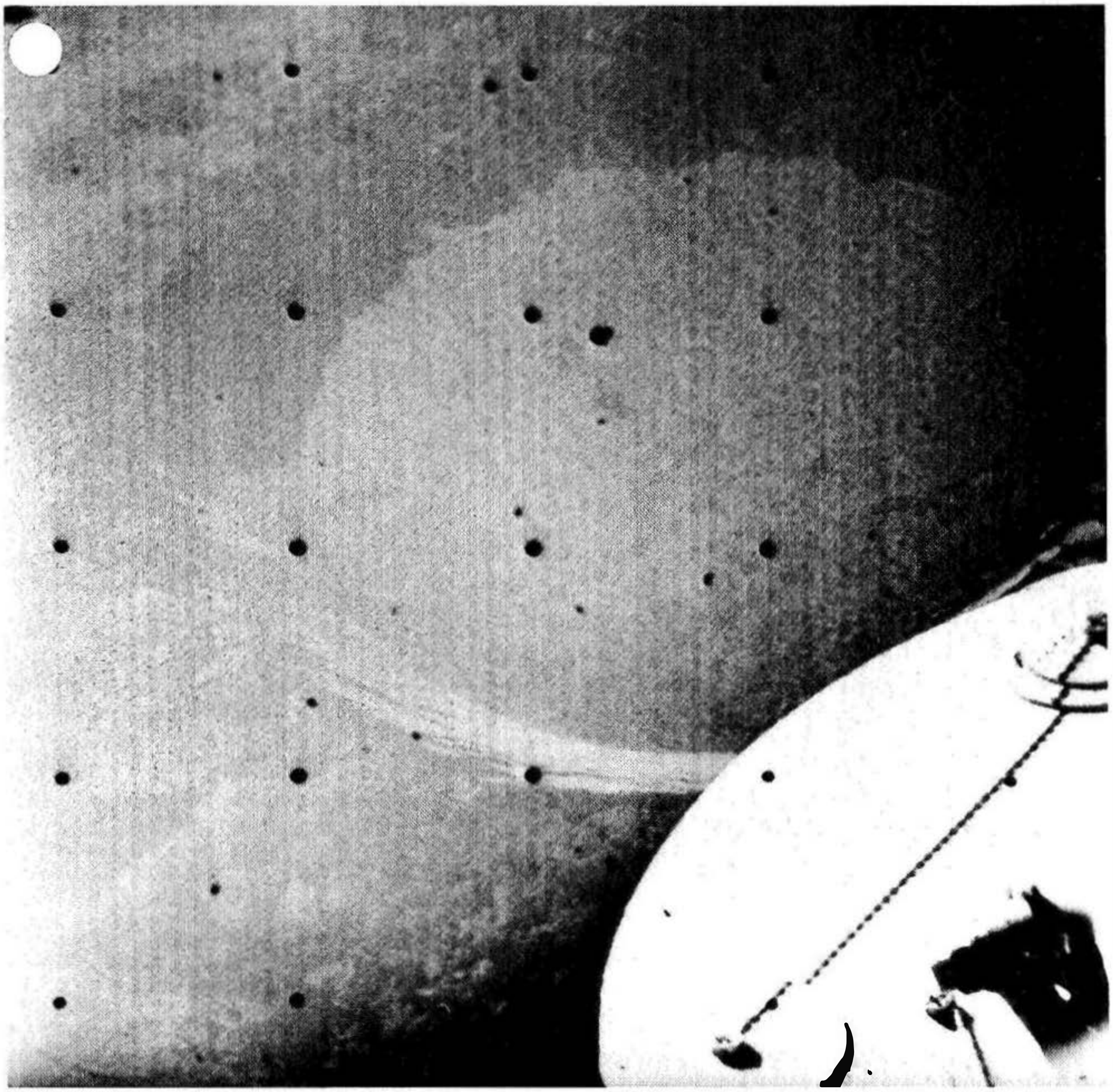


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(9)	Day 110, 09:37:56	30	21.58	30.2	f/8.1	N	Clear

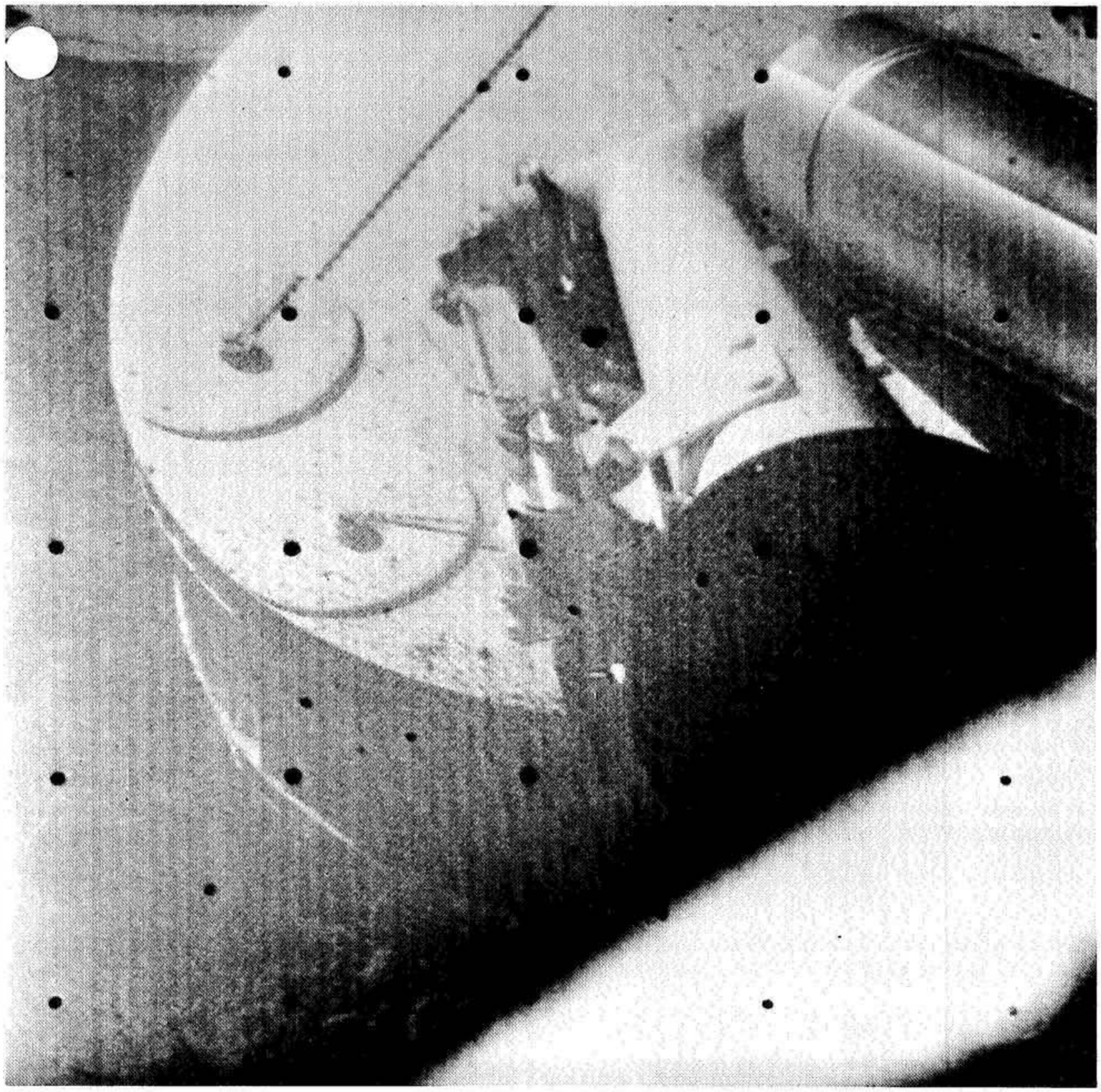




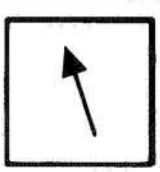
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(10)	Day 110, 09:47:25	36	21.58	30.0	f/11.3	N	Clear

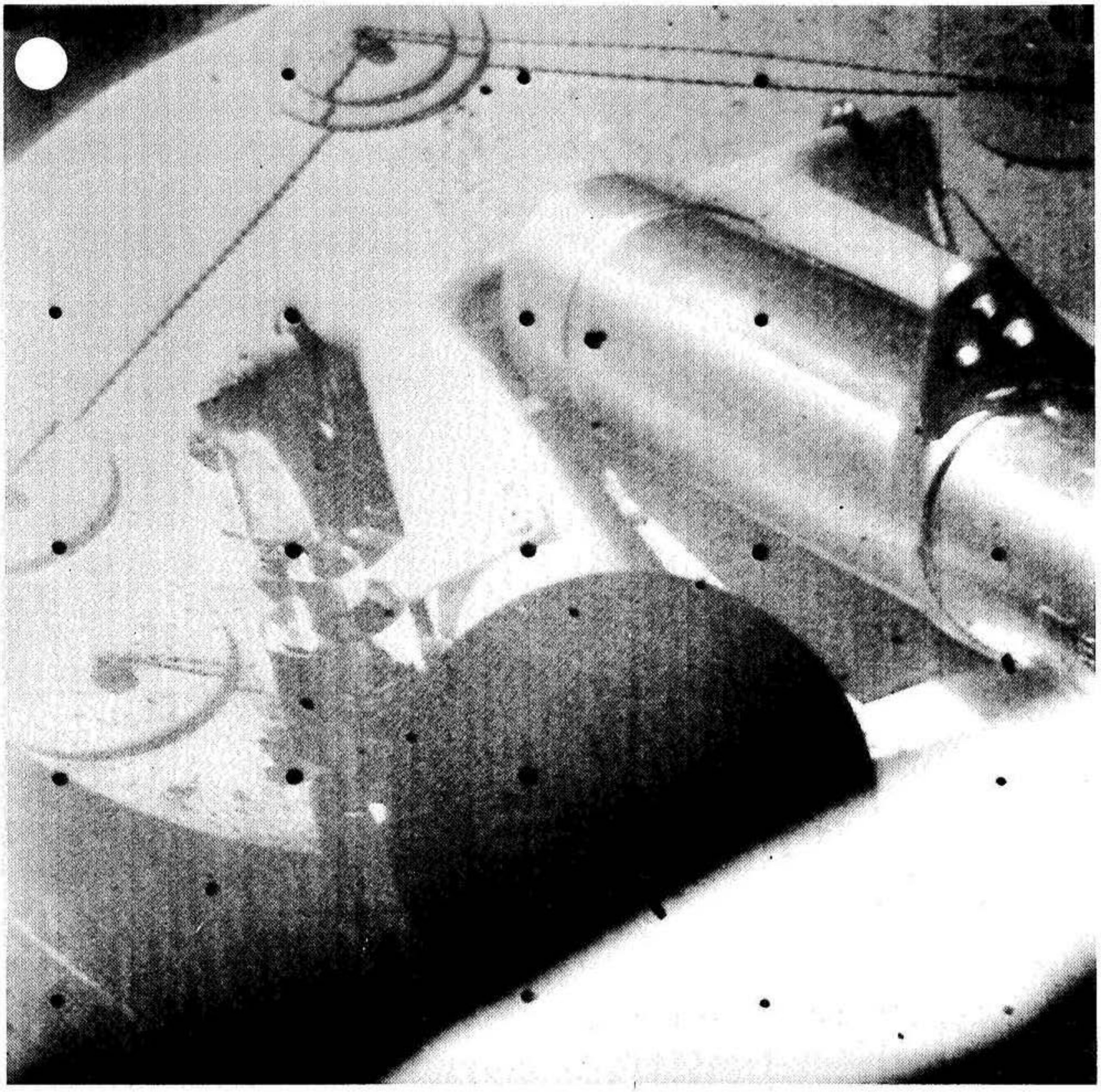


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(11)	Day 111, 02:25:40	—57	—52.82	1.5	f/21.5	N	Clear

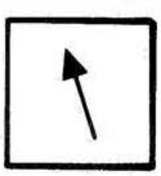


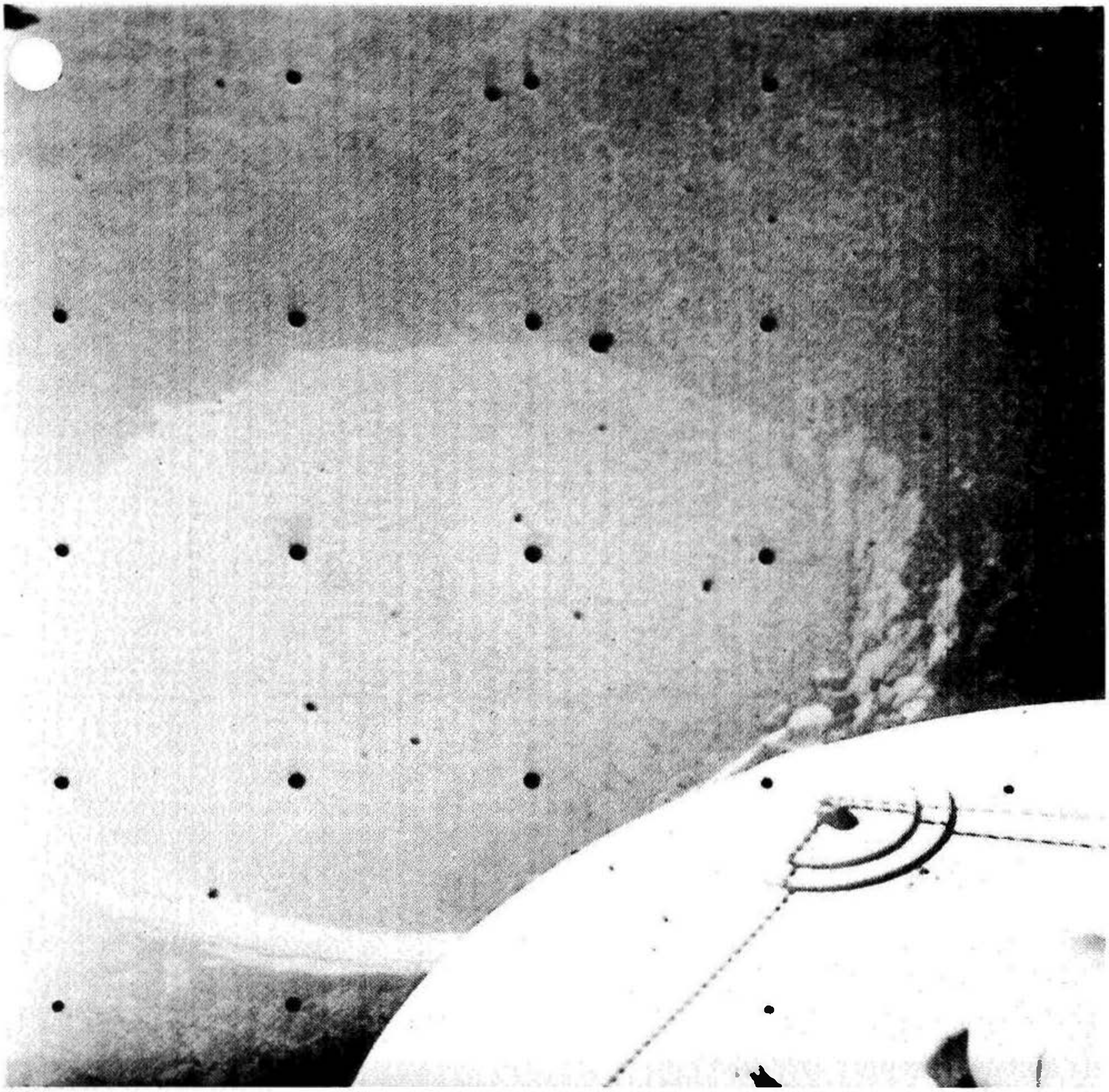
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(12)	Day 111, 02:29:33	—57	—57.78	2.5	f/21.6	N	Clear



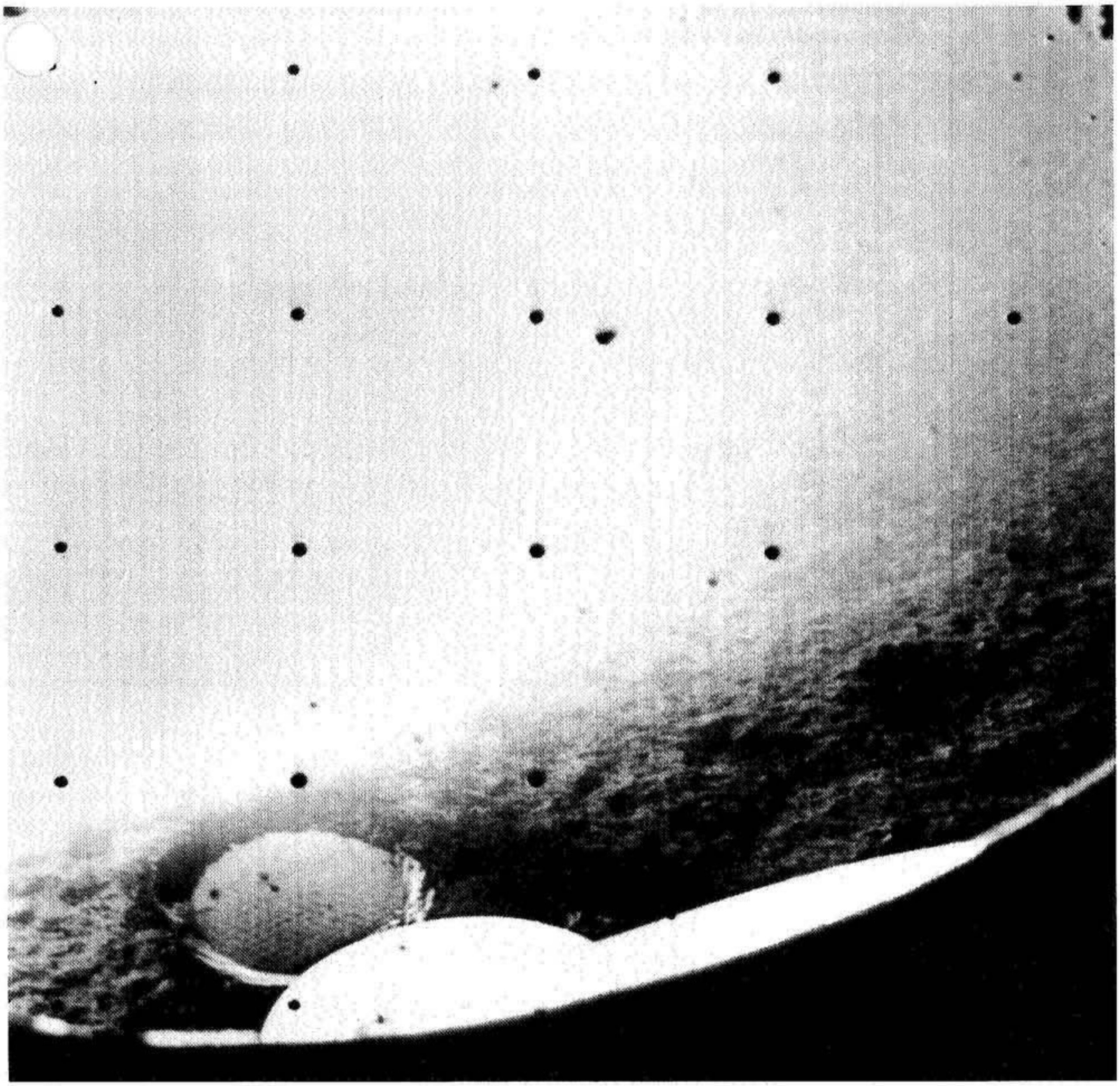


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(13)	Day 111, 02:30:37	—60	—57.78	2.5	f/21.7	N	Clear

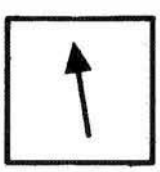


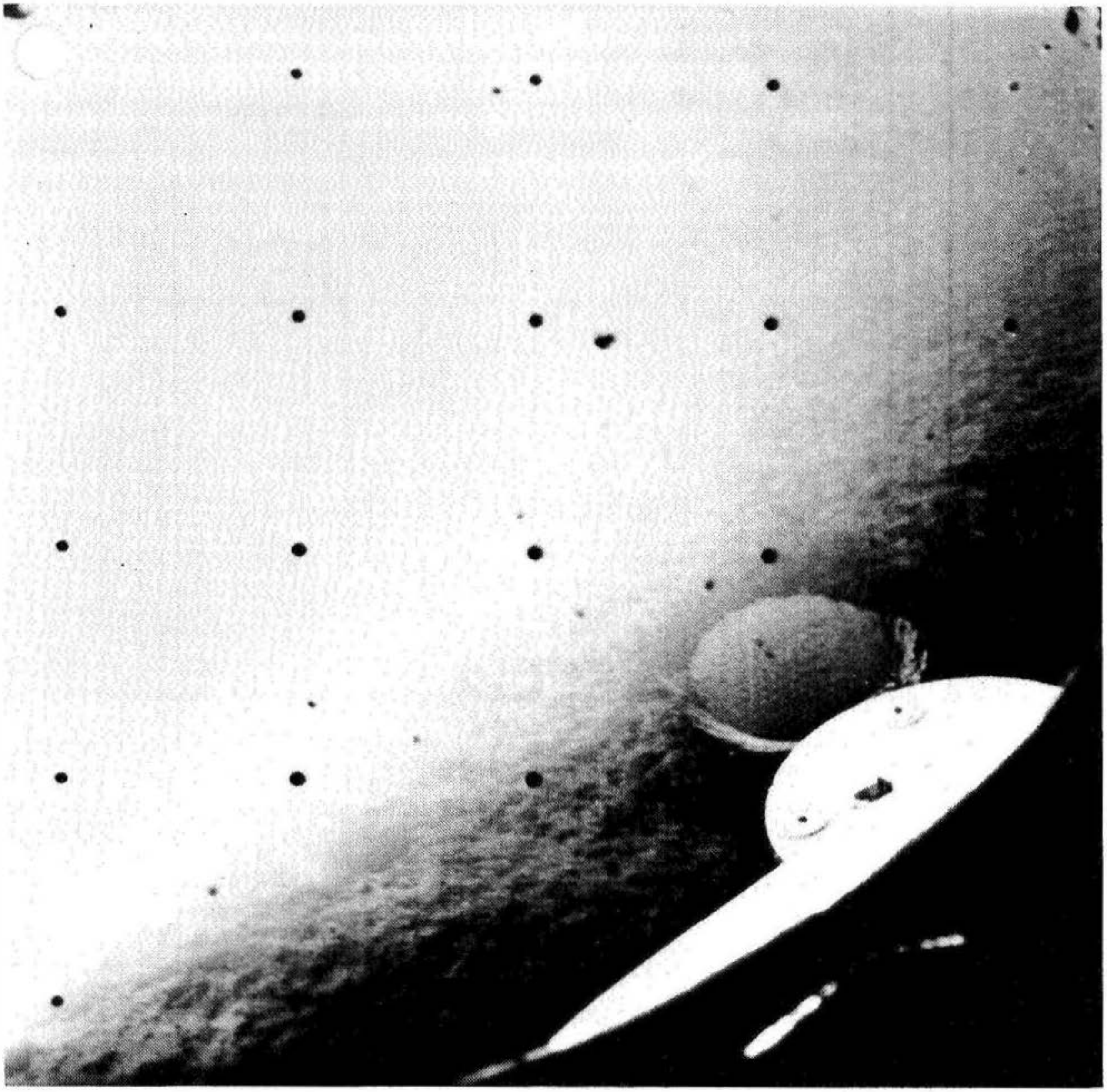


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(14)	Day 111, 02:32:02	—60	—52.82	2.5	f/21.5	N	Clear

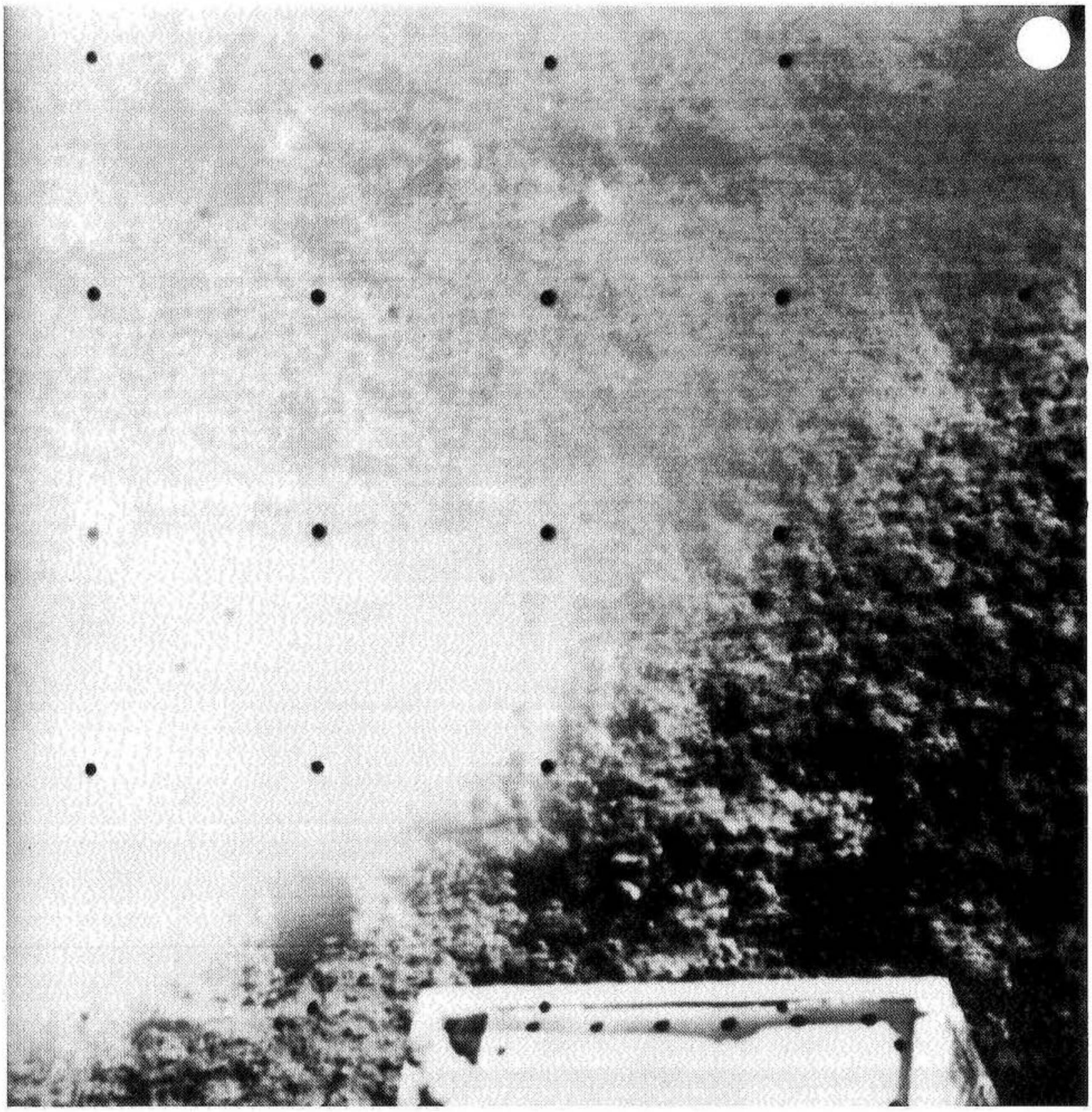


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(15)	Day 111, 02:39:32	—72	—47.86	2.4	f/17.0	W	Clear

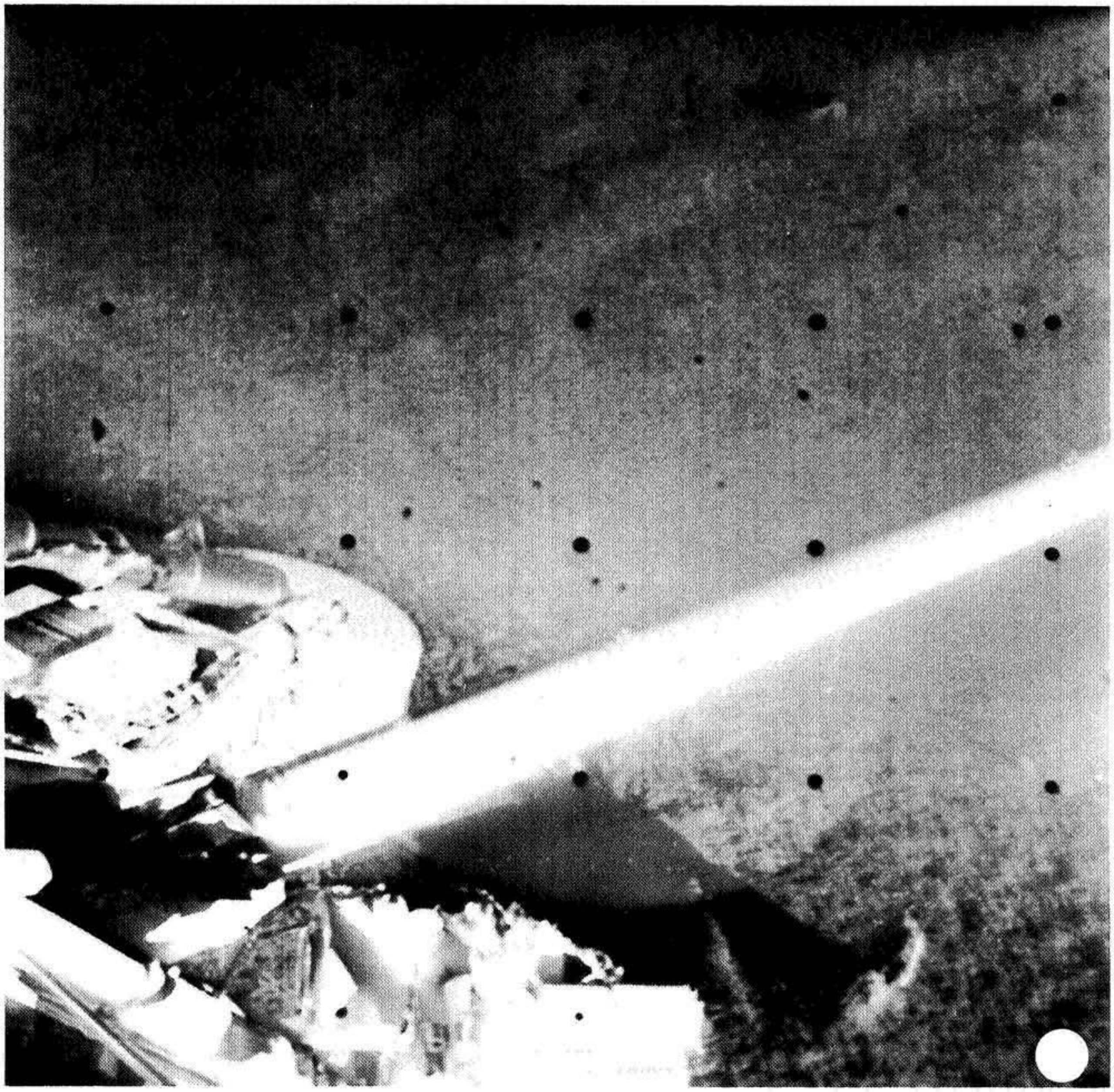




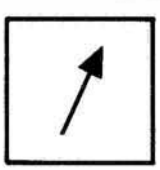
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(16)	**Day 111, 02:41:19**	**—54**	**—47.86**	**2.4**	**f/19.8**	**W**	**Clear**

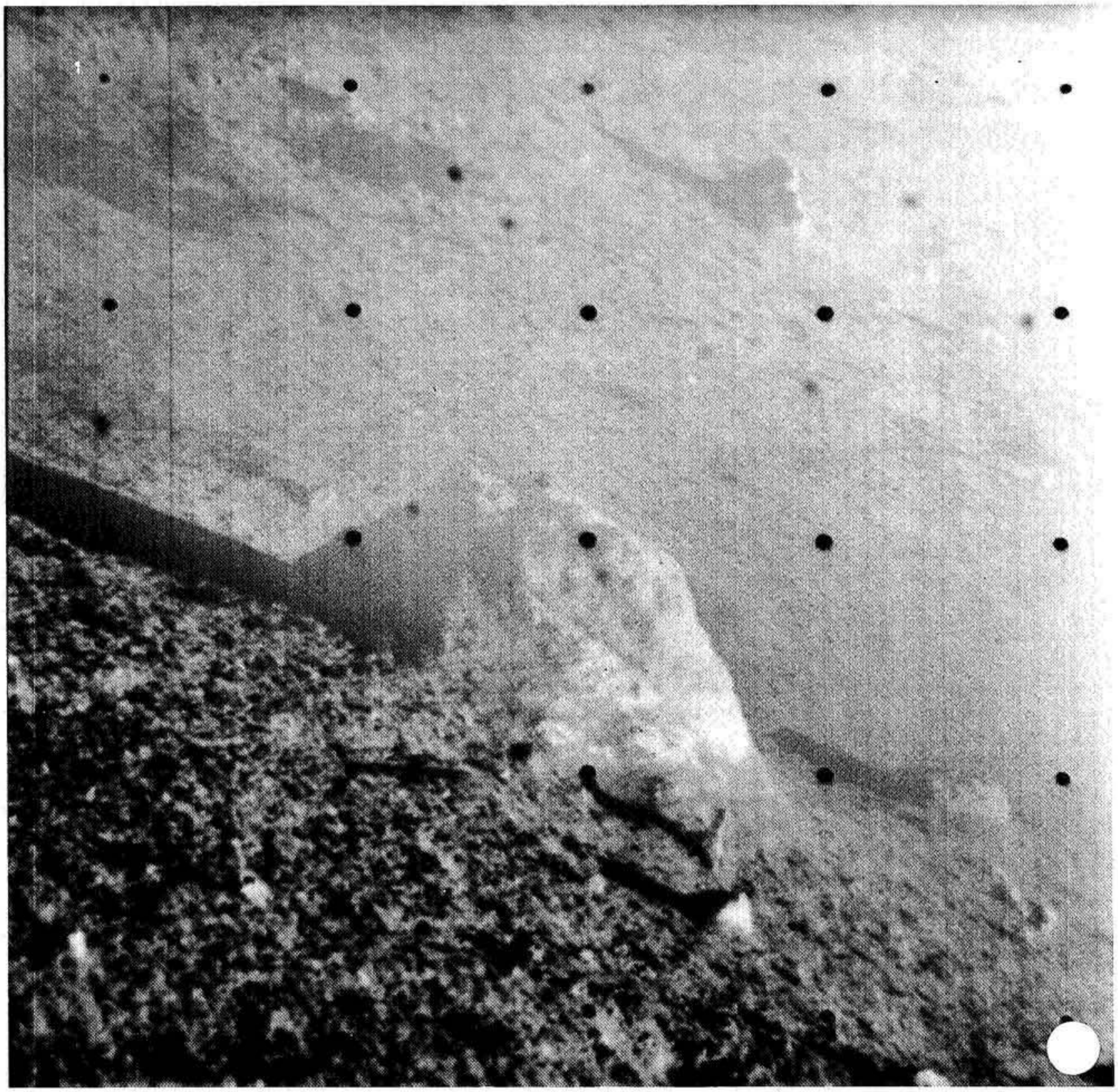


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(17)	Day 111, 02:43:48	36	—32.98	2.4	*f*/10.6	W	Clear

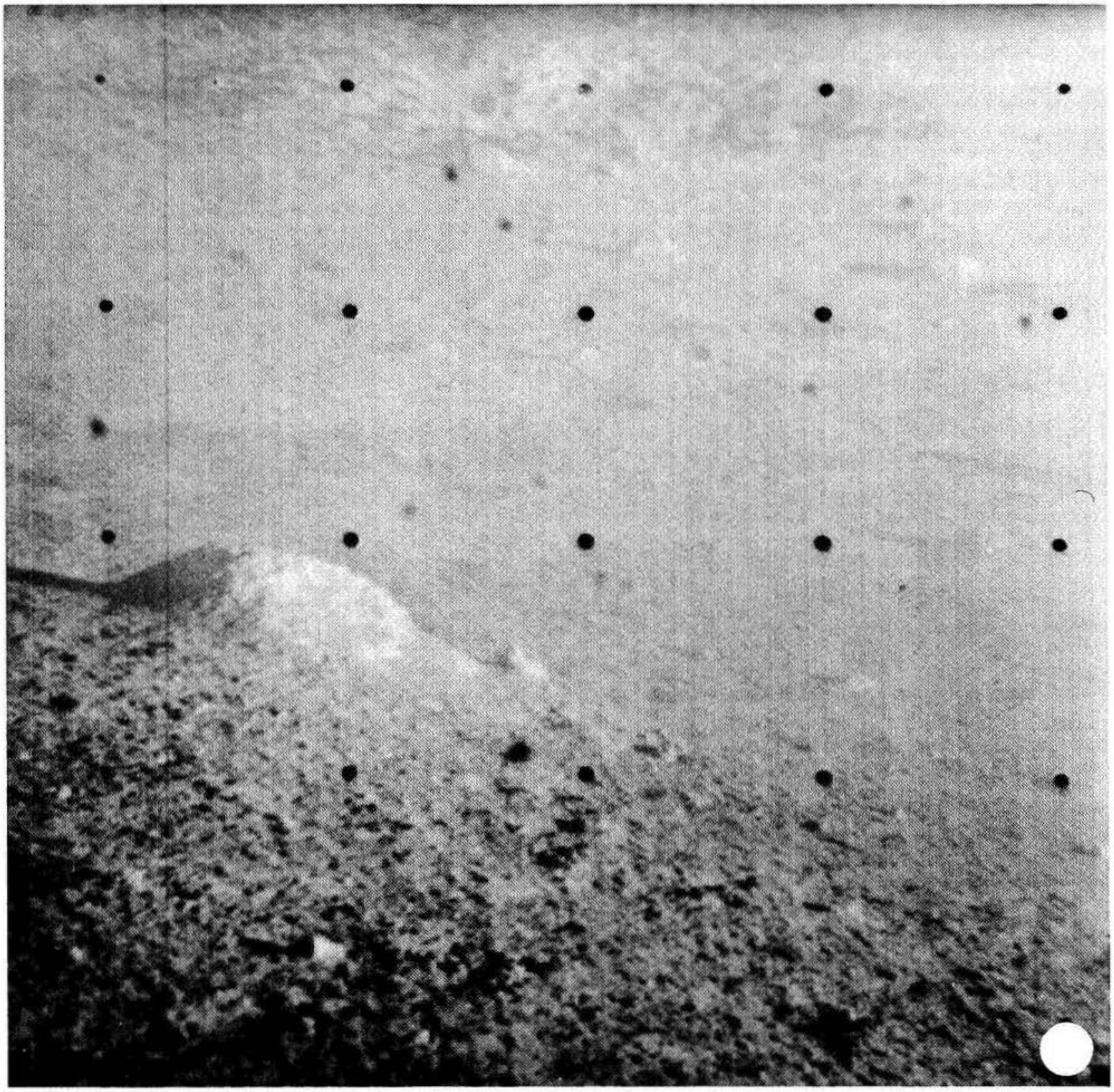


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(18)	**Day 111, 02:44:50**	**72**	**—18.10**	**2.4**	**f/19.9**	**W**	**Clear**

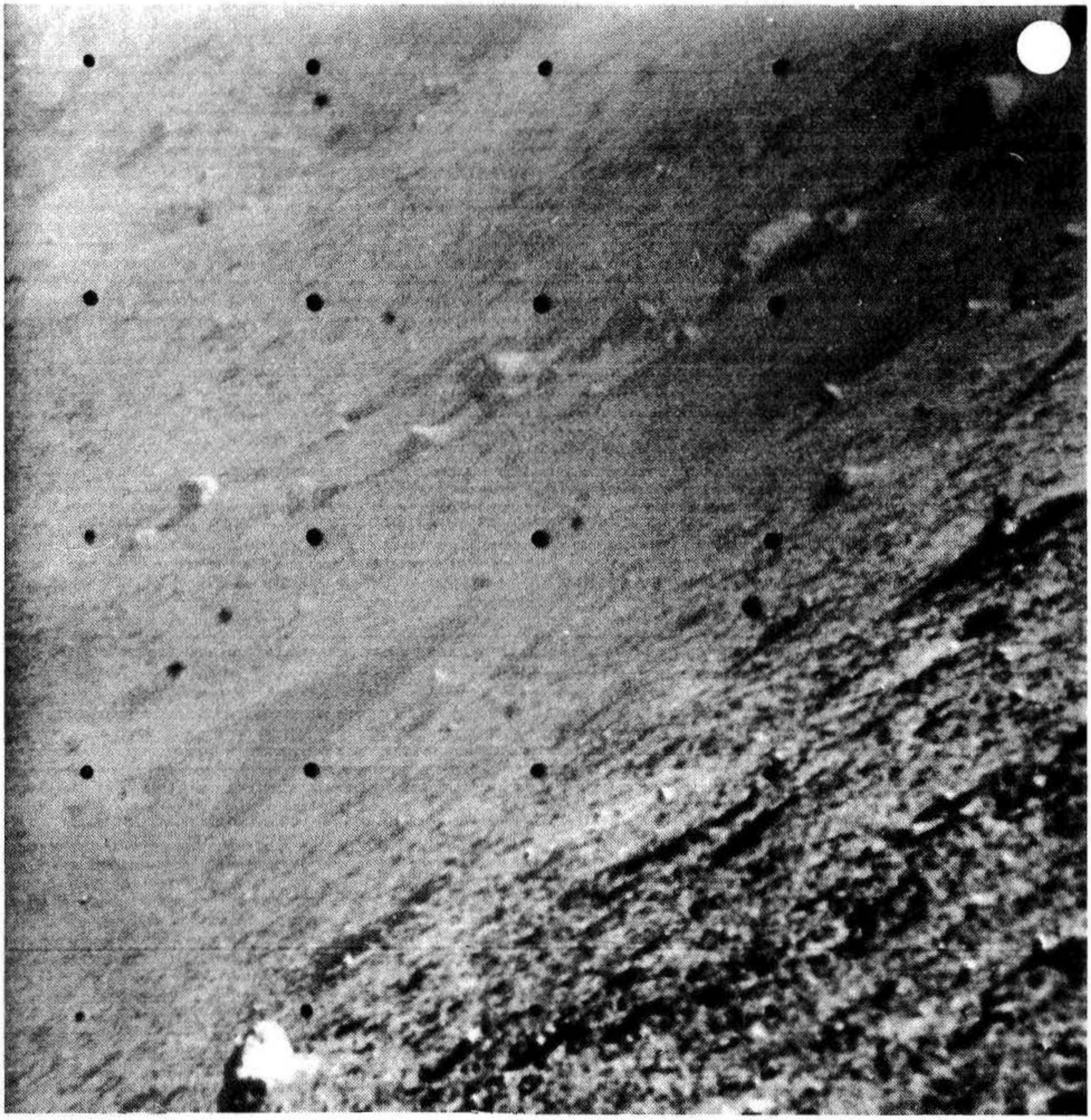




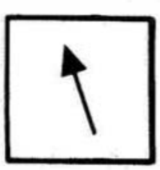
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(19)	Day 111, 05:14:55	63	6.70	15.5	f/10.7	N	Clear

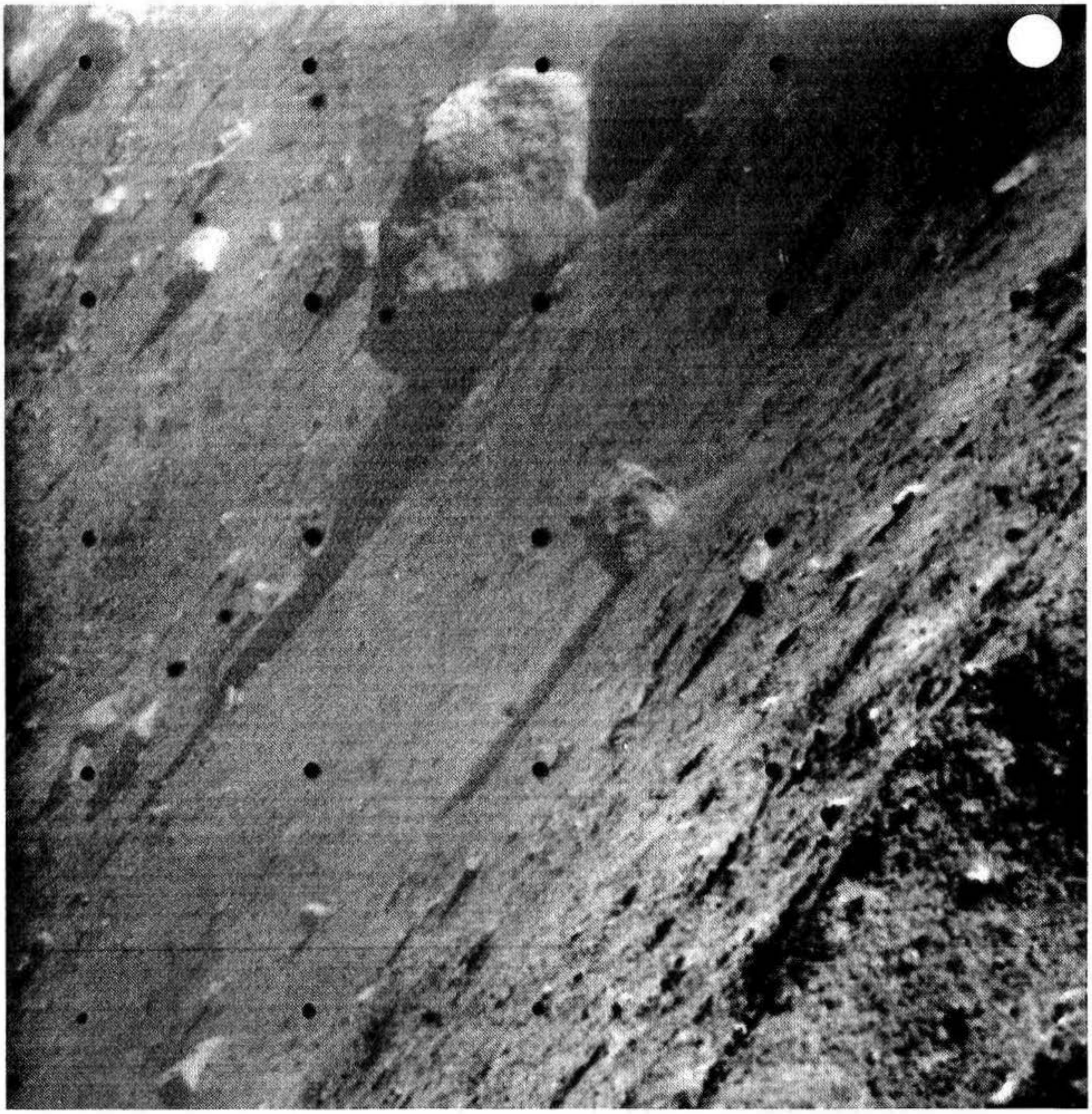


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(20)	Day 111, 05:15:03	75	6.70	15.7	$f/10.7$	N	Clear

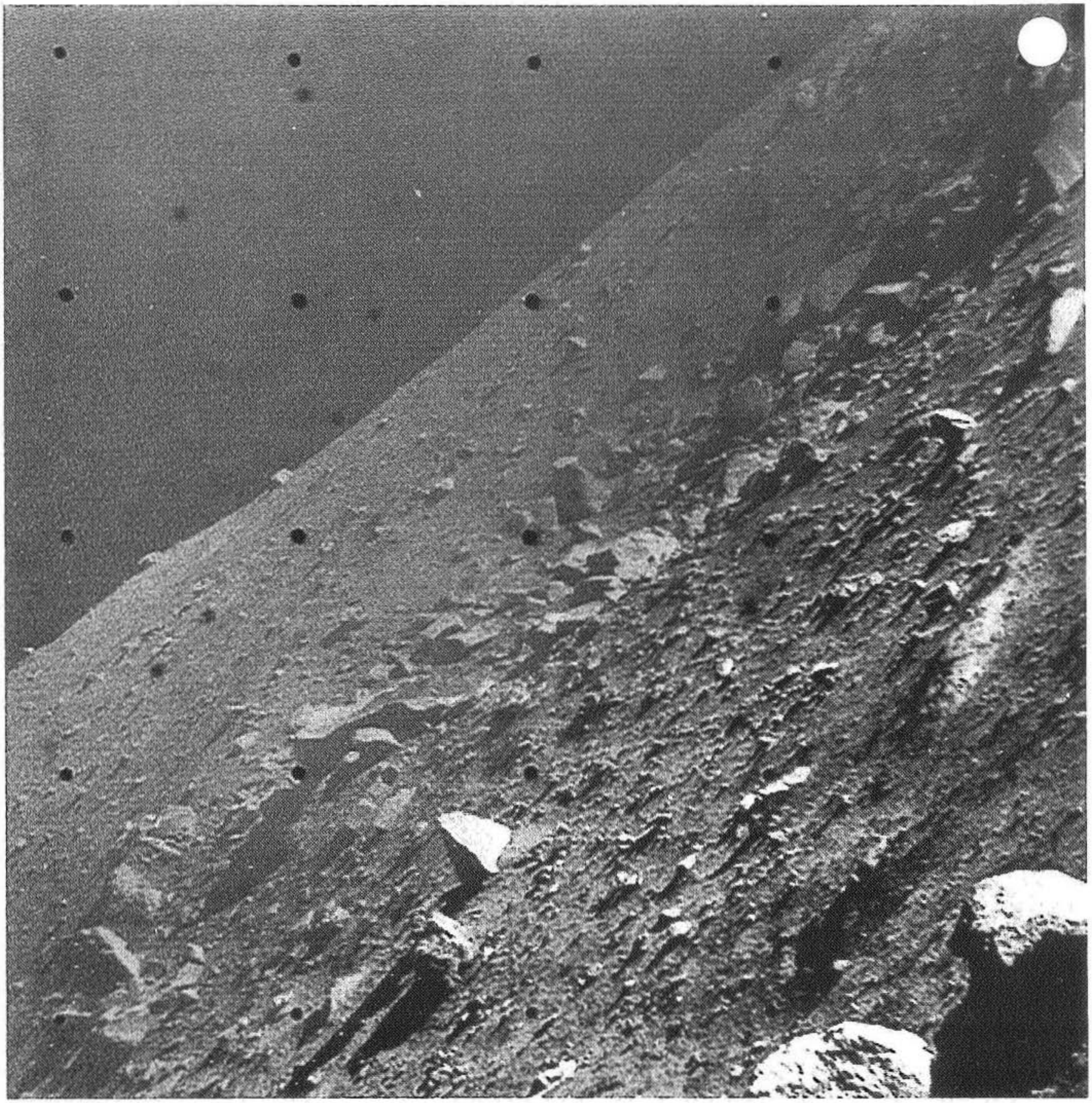


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(21)	Day 111, 05:59:07	36	11.66	30.2	f/10.8	N	Clear

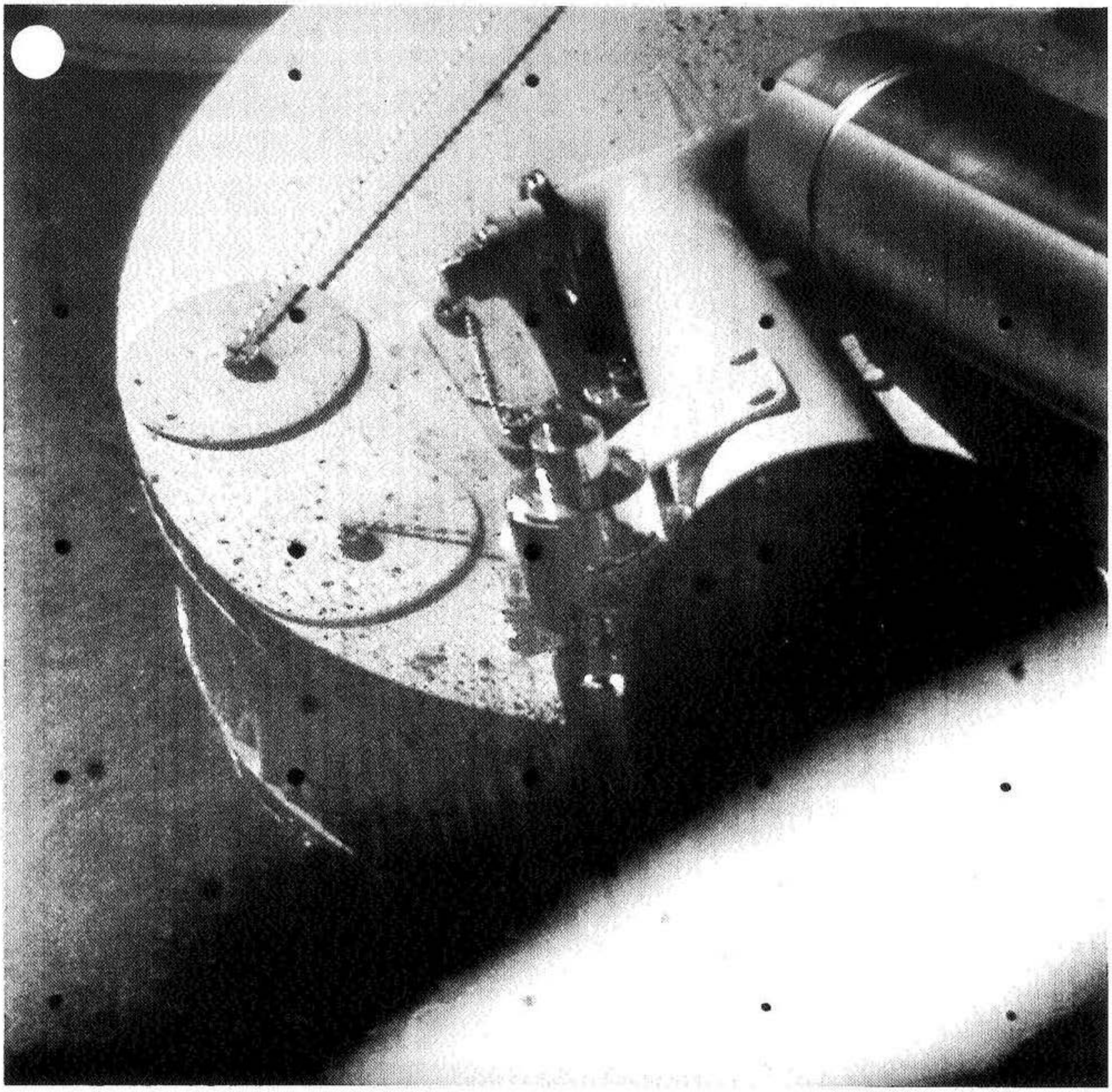




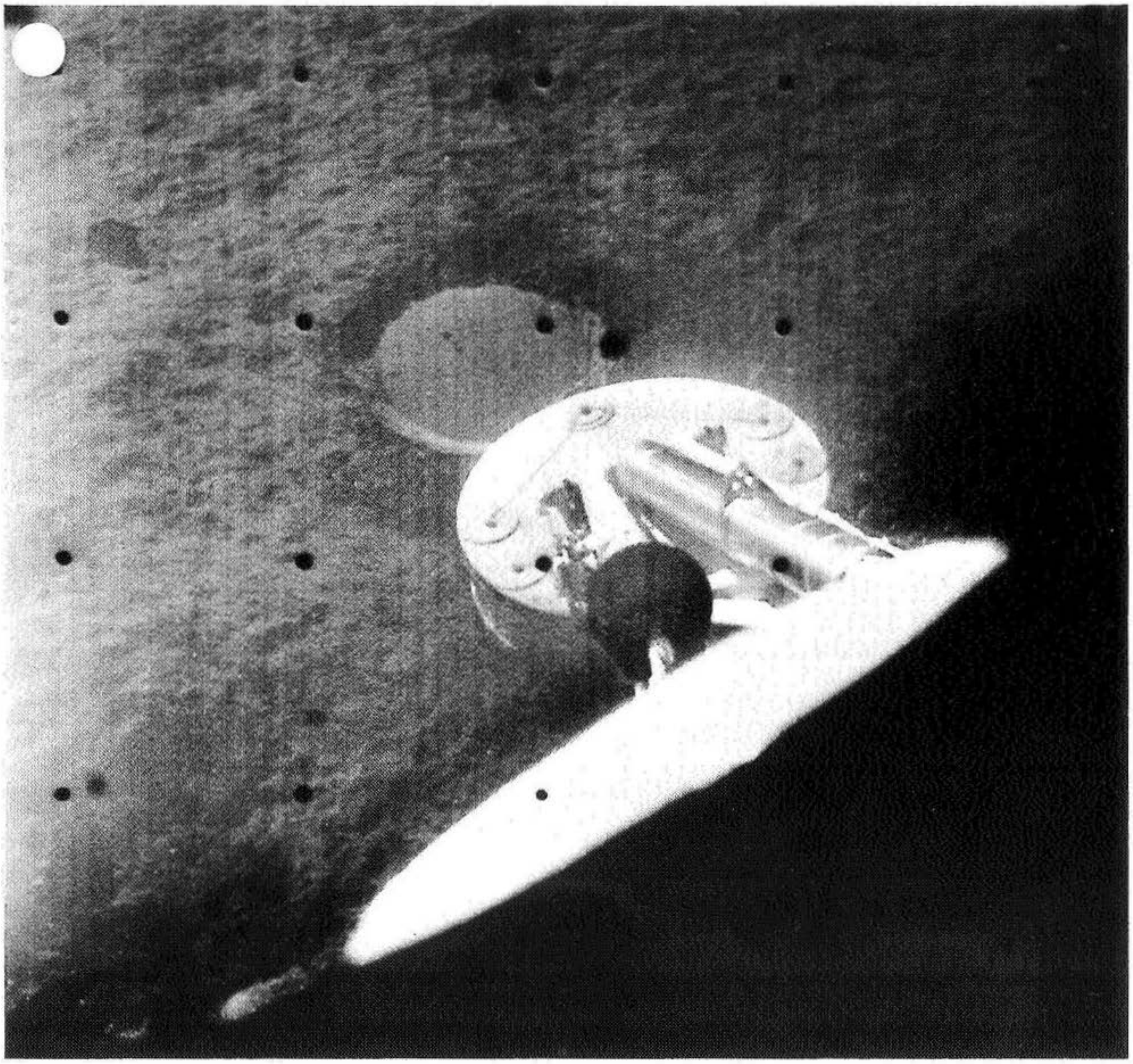
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(22)	Day 111, 05:59:25	51	16.62	30.2	f/10.8	N	Clear



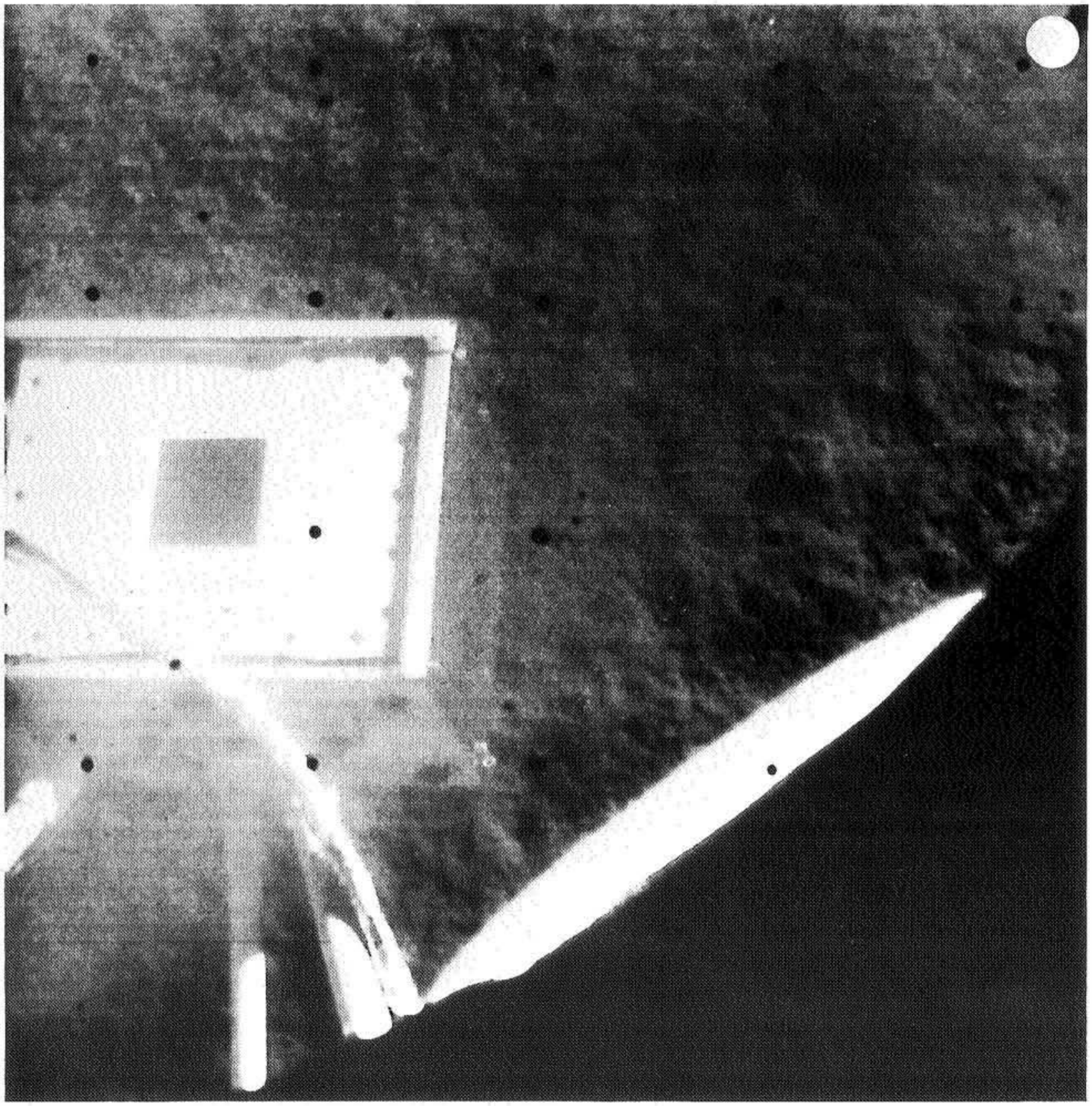
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(23)	Day 111, 05:59:43	48	21.58	30.2	f/10.8	N	Clear	Processed



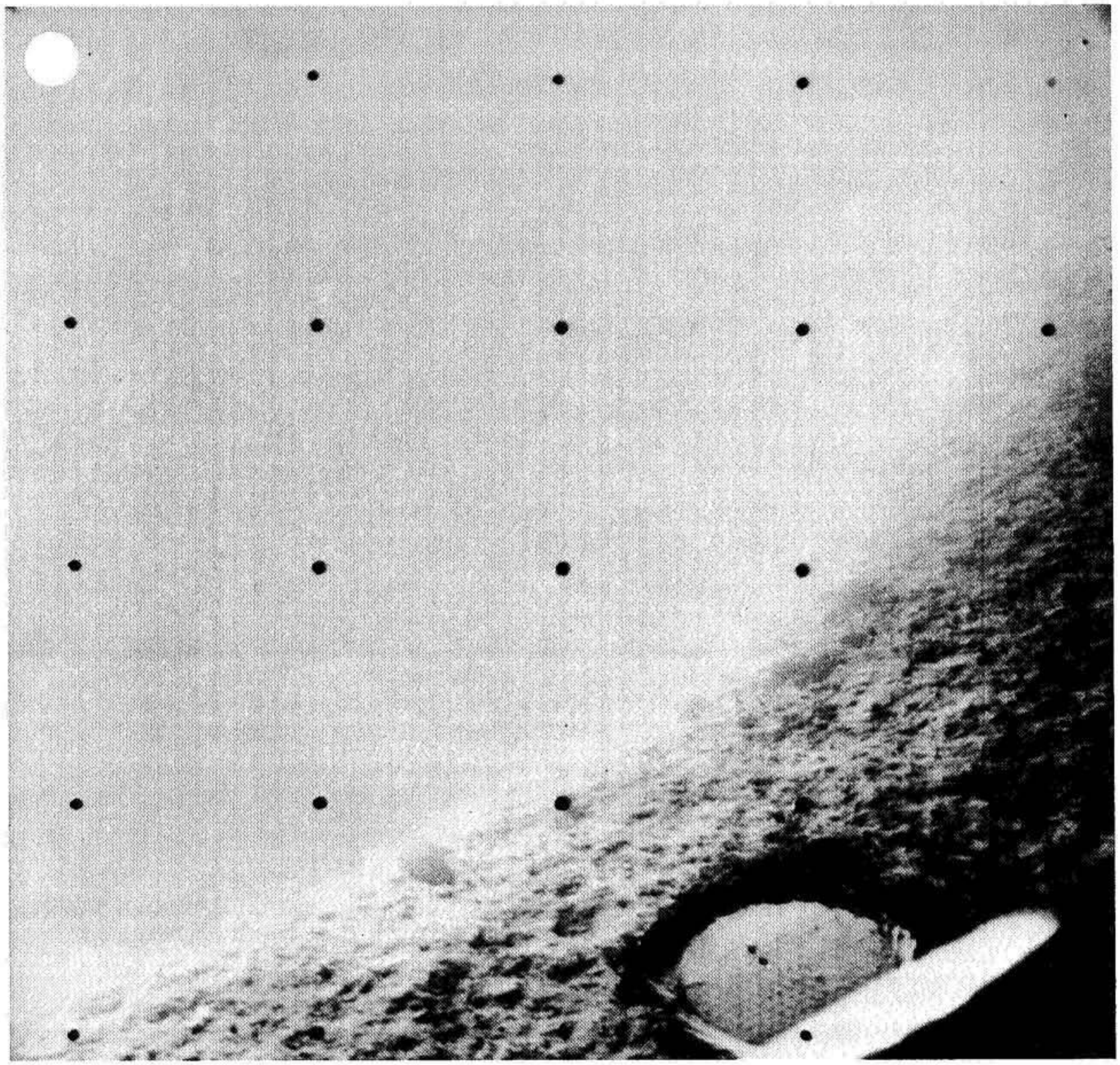
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(24)	Day 111, 07:39:59	—57	—57.78	2.5	f/7.8	N	Blue



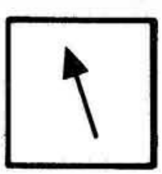
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(25)	Day 111, 07:43:38	—54	—57.78	2.5	f/7.8	W	Red

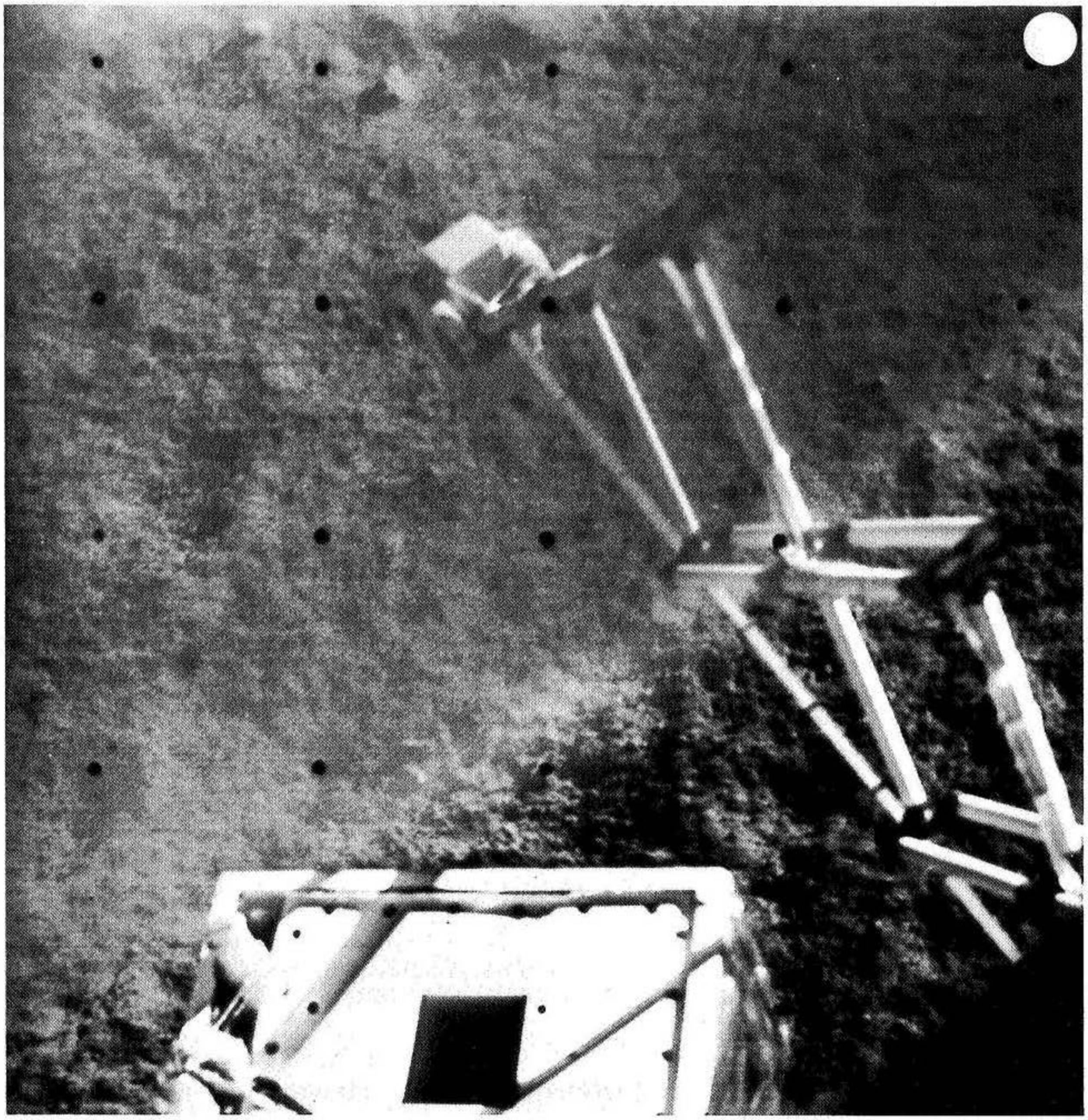


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(26)	Day 111, 08:16:43	36	—52.82	2.5	f/22.2	W	Red

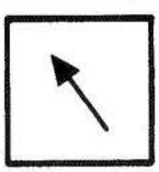


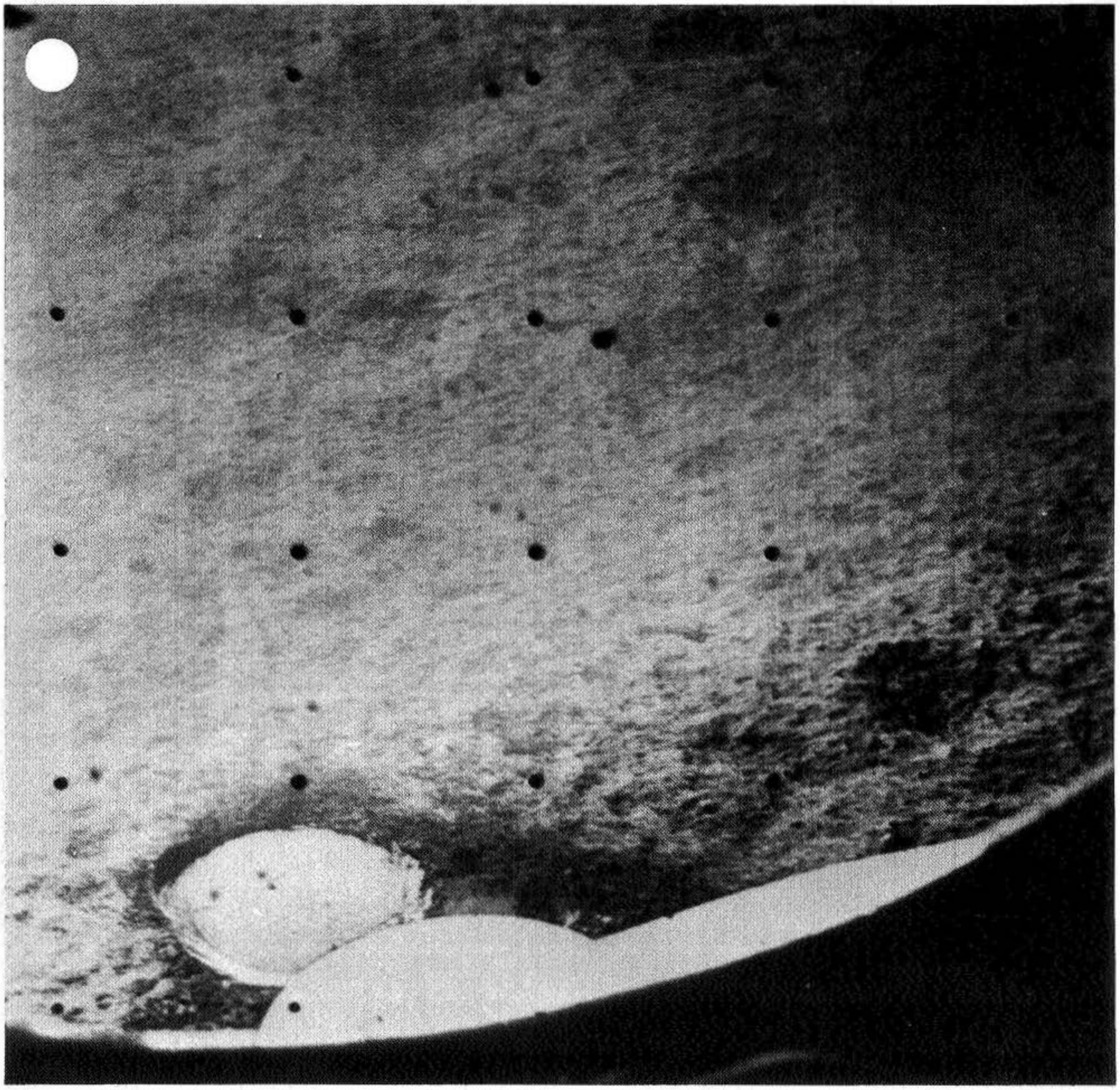
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(27)	Day 111, 08:24:20	—60	—42.90	2.5	f/5.5	W	Red



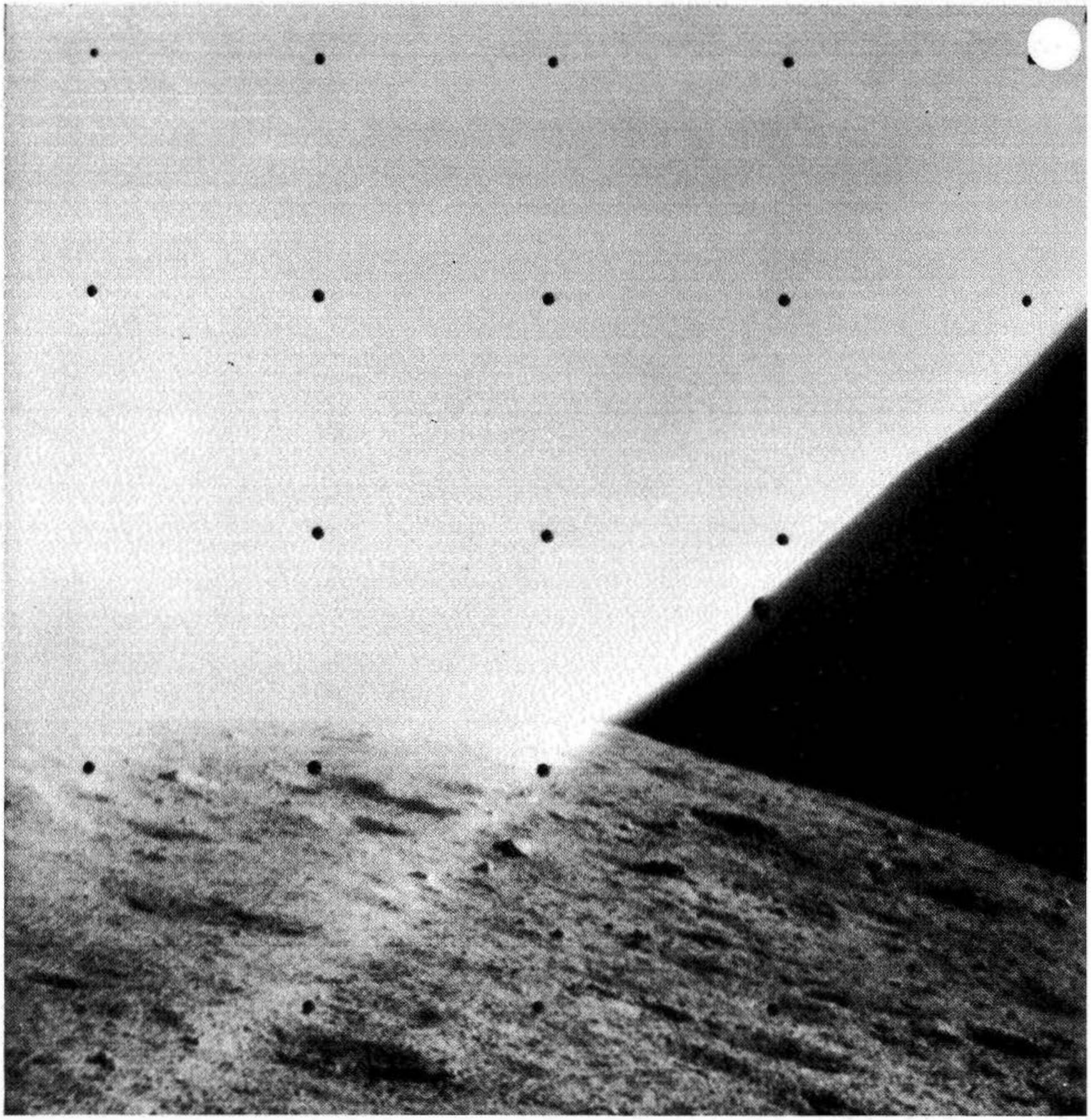


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(28)	Day 111, 10:43:30	33	−37.94	2.6	f/5.9	W	Red

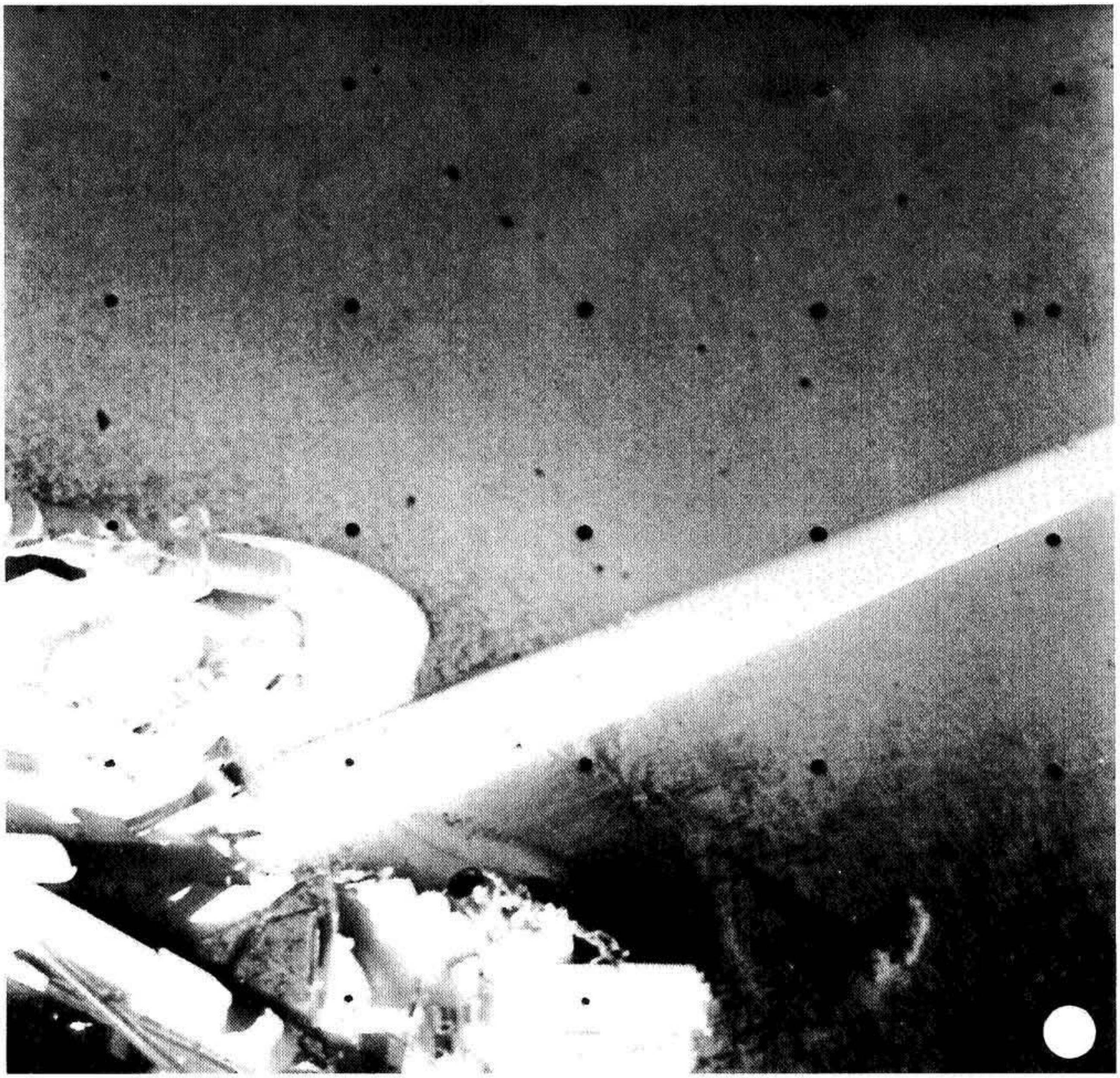




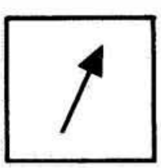
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(29)	Day 112, 00:49:30	—72	—47.86	2.6	f/14.0	W	Clear

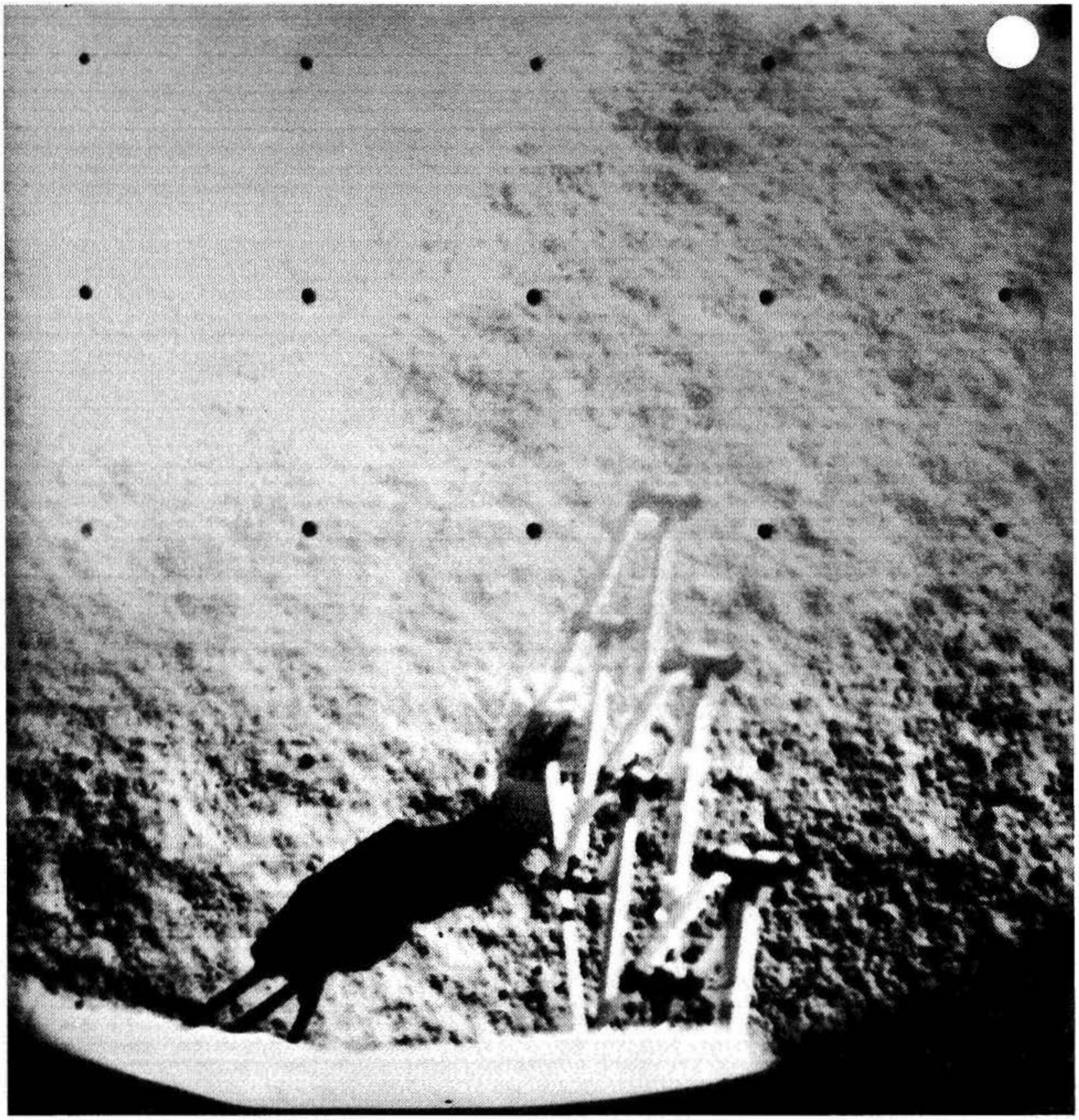


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(30)	Day 112, 00:57:44	0	11.66	2.5	$f/16.8$	W	Clear

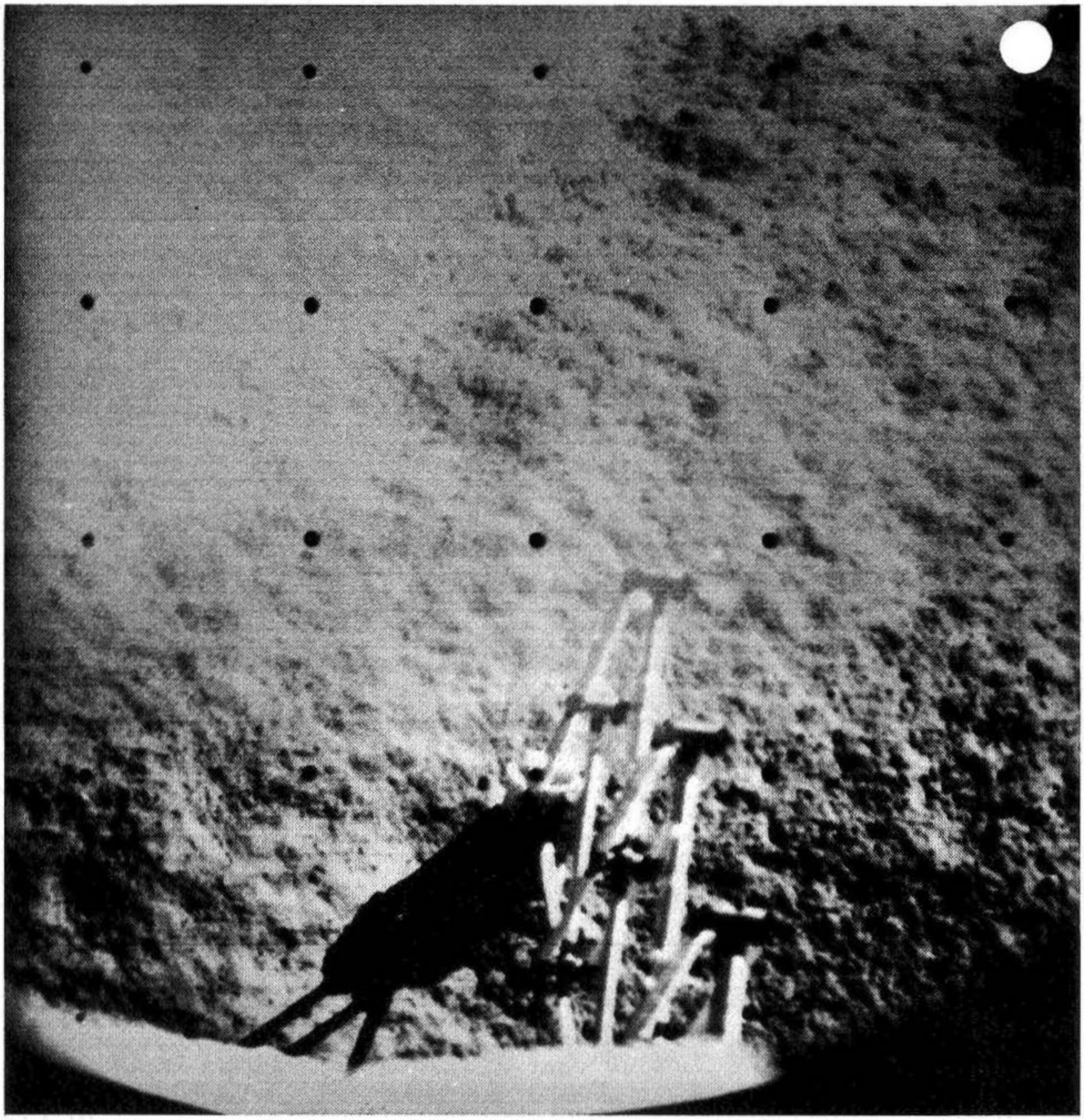


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(31)	Day 112, 01:02:21	72	−18.10	2.5	f/21.3	W	Clear

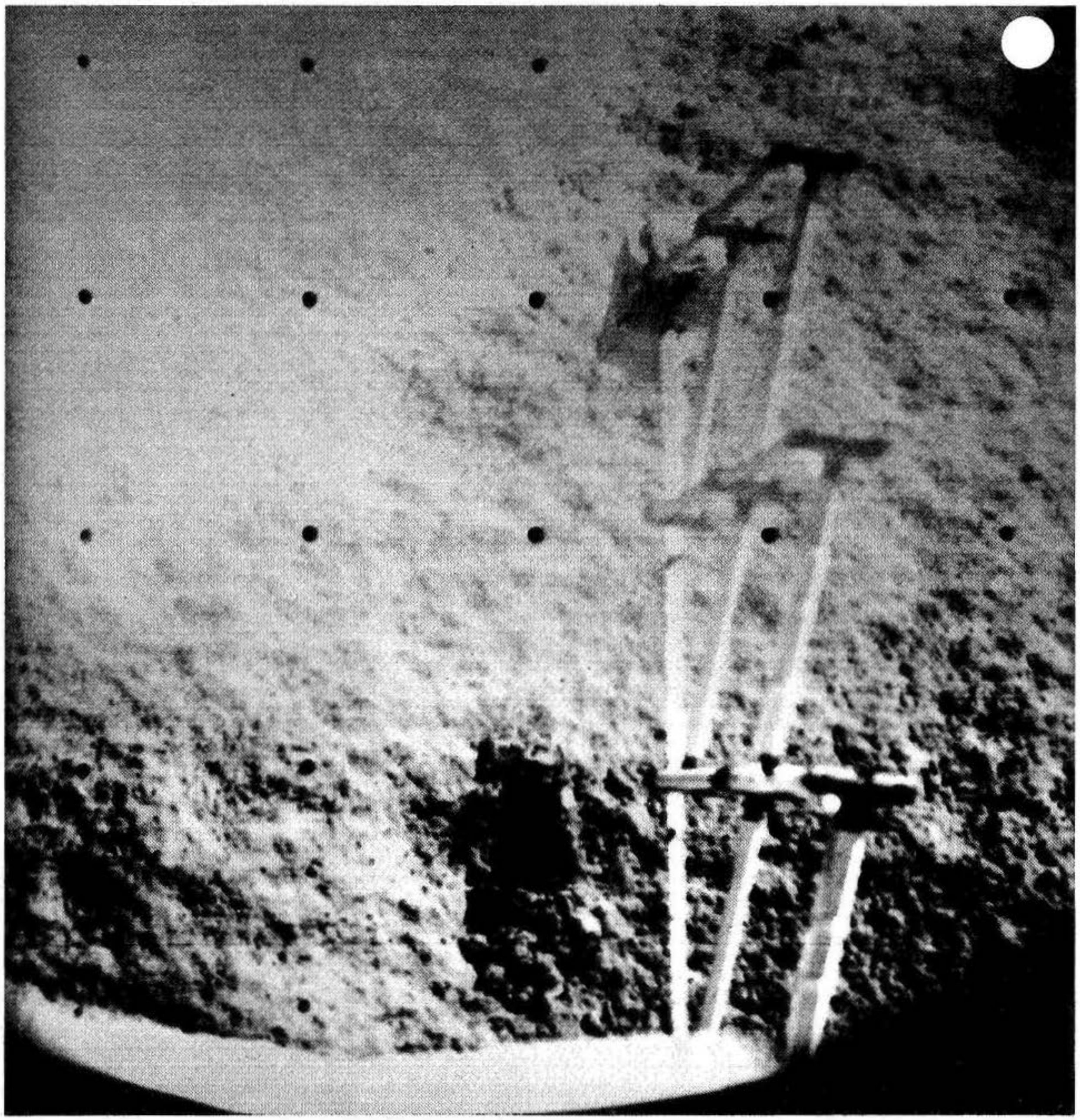




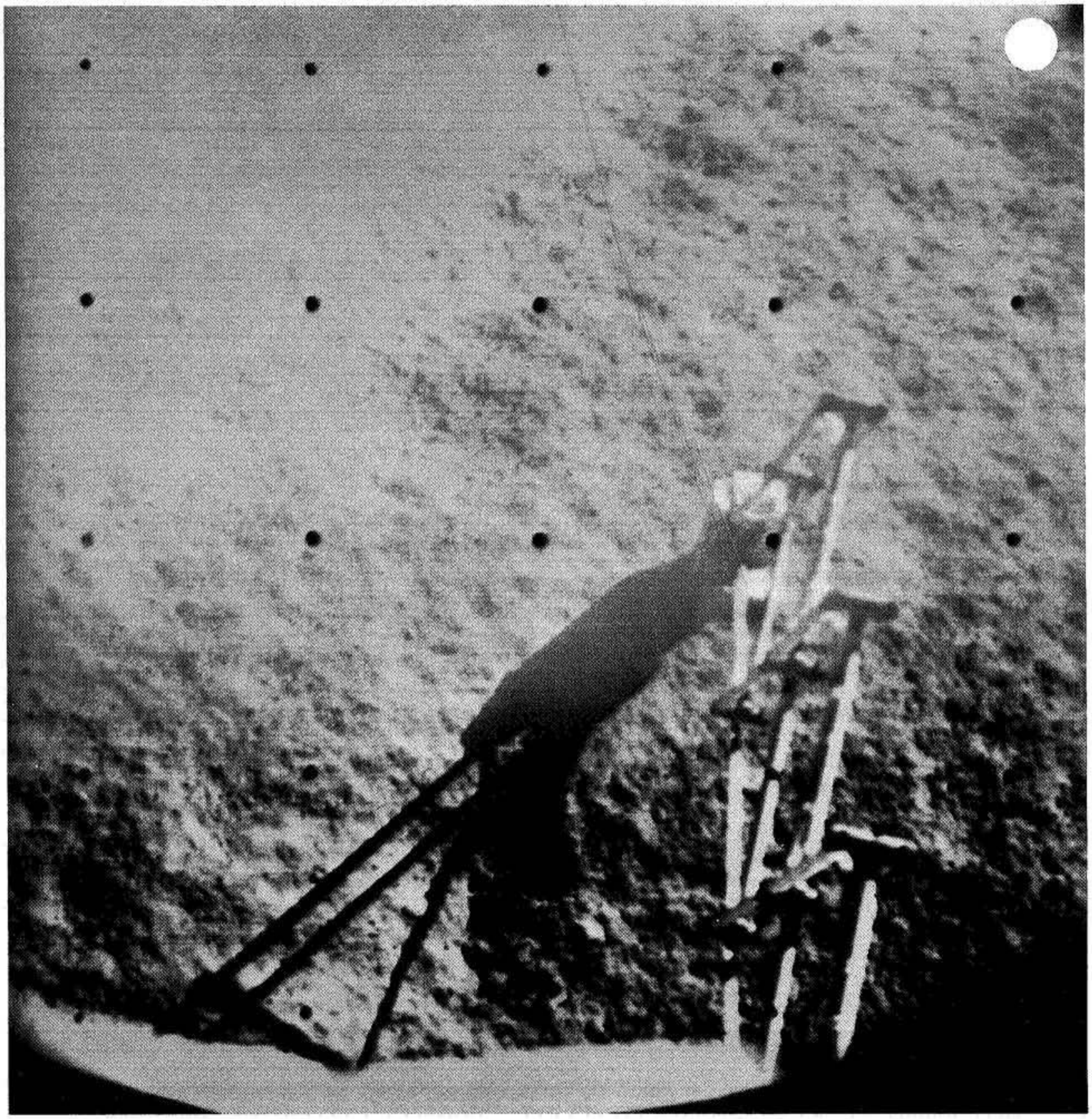
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(32)	**Day 112, 05:07:01**	**3**	**—42.90**	**2.6**	***f*/4.3**	**W**	***Red***



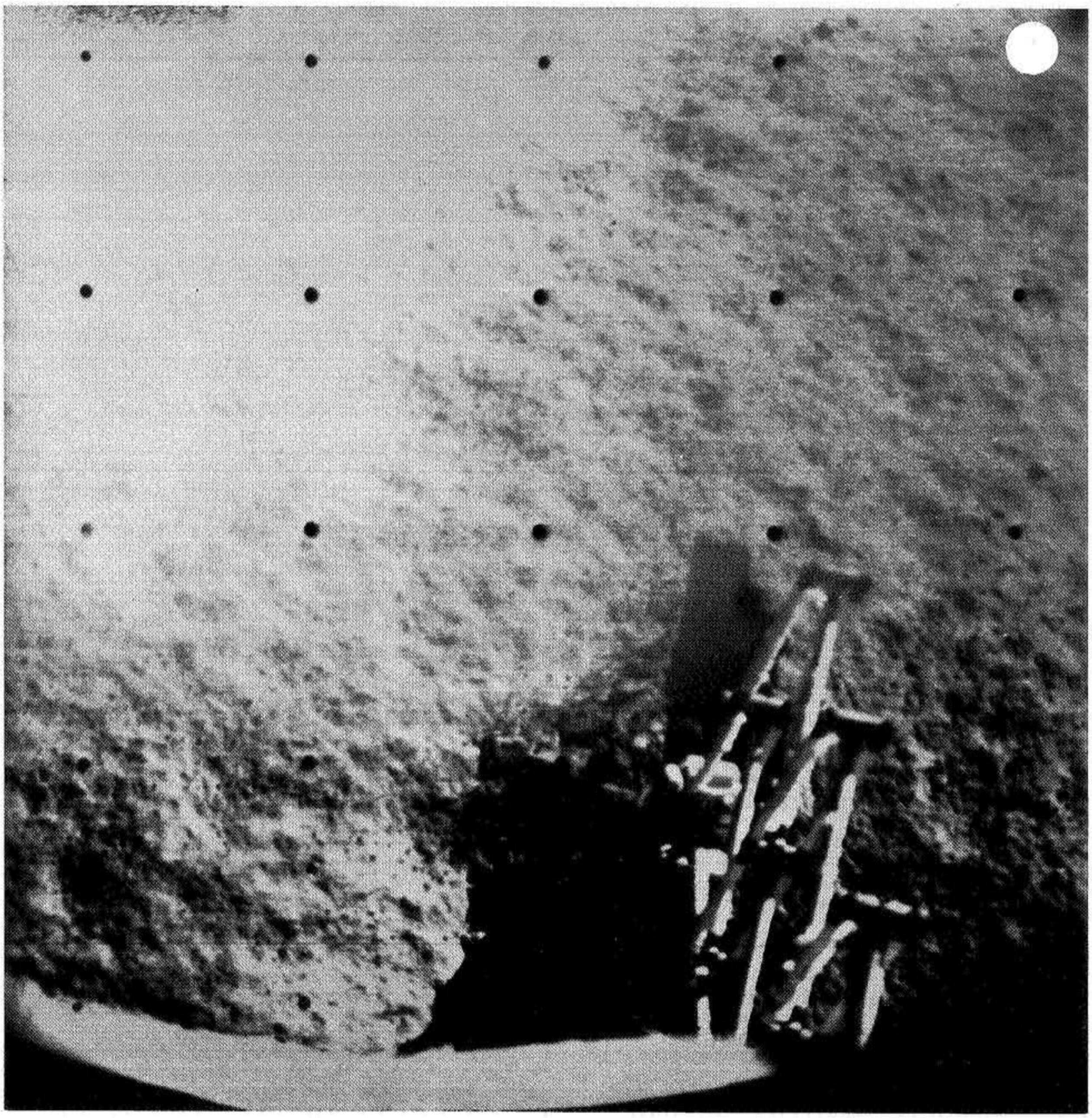
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(33)	Day 112, 05:14:11	3	—42.90	2.6	f/4.3	W	Red



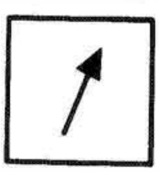
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(34)	Day 112, 05:17:27	3	−42.90	2.6	f/4.3	W	Red

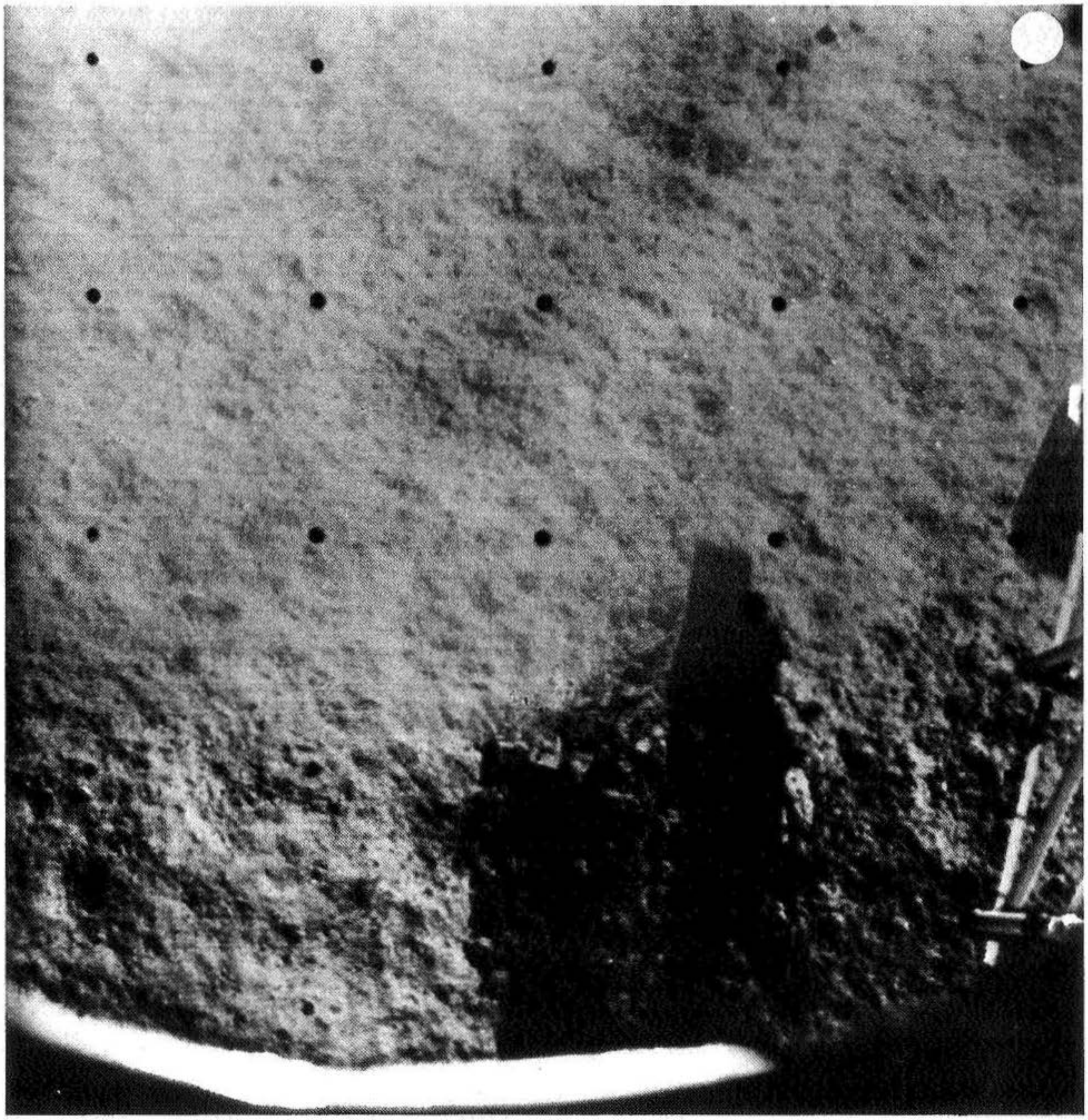


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(35)	Day 112, 06:12:39	3	—42.90	2.5	f/4.3	W	Red

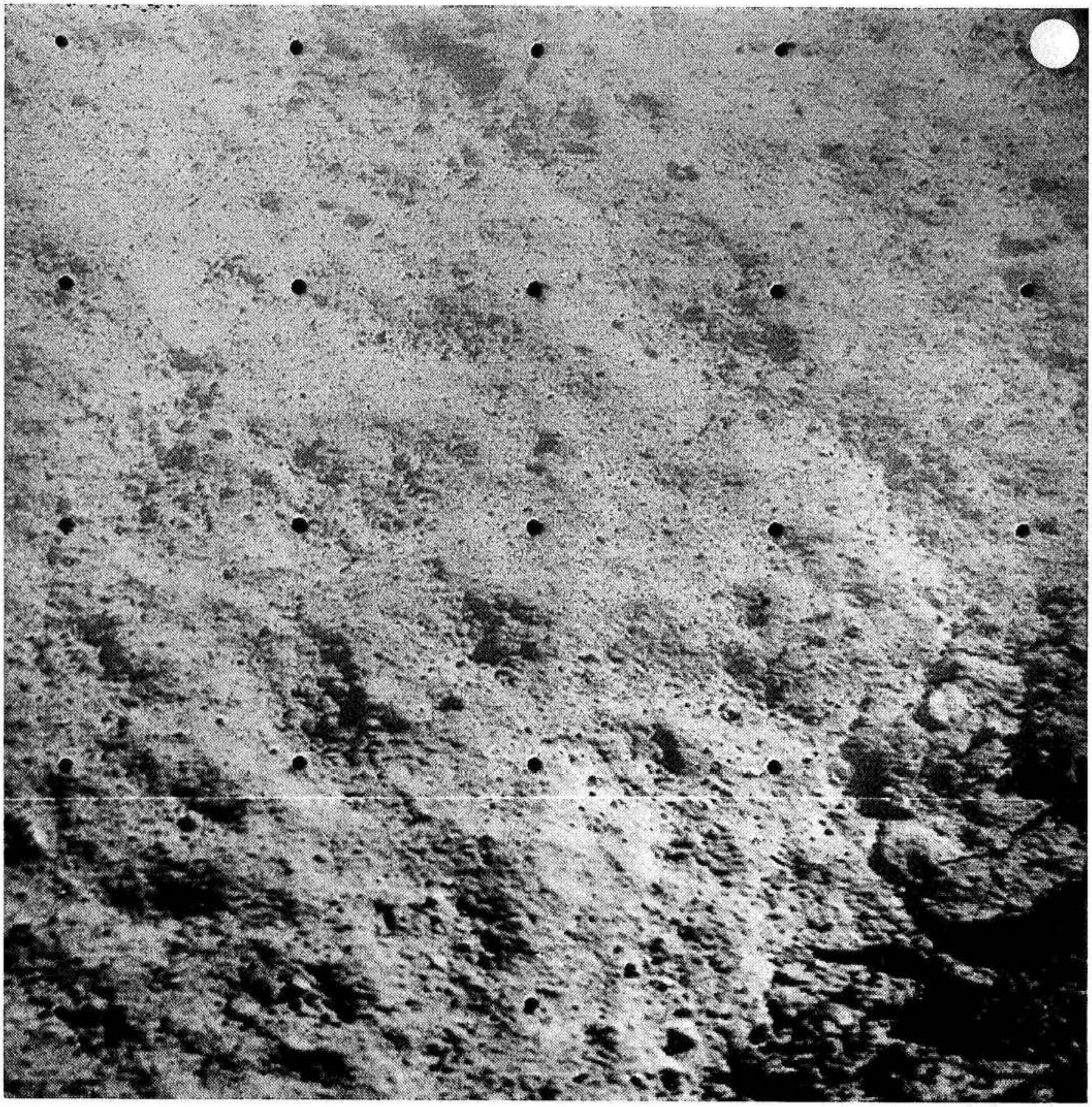


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(36)	Day 112, 07:02:29	3	—42.90	2.6	f/4.3	W	Red

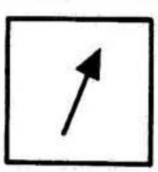


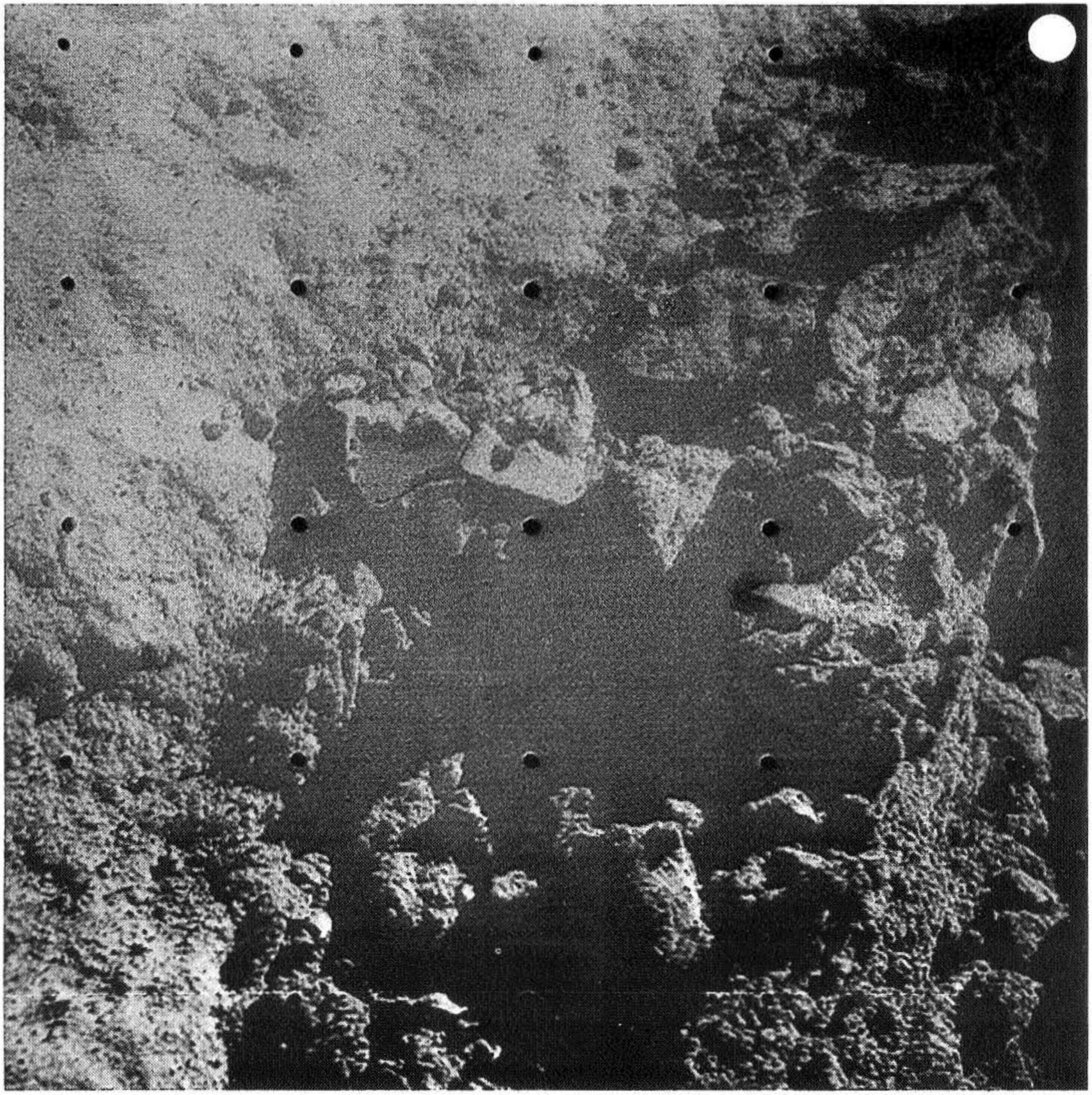


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(37)	Day 112, 07:07:40	3	−42.90	2.5	f/6.5	W	Red

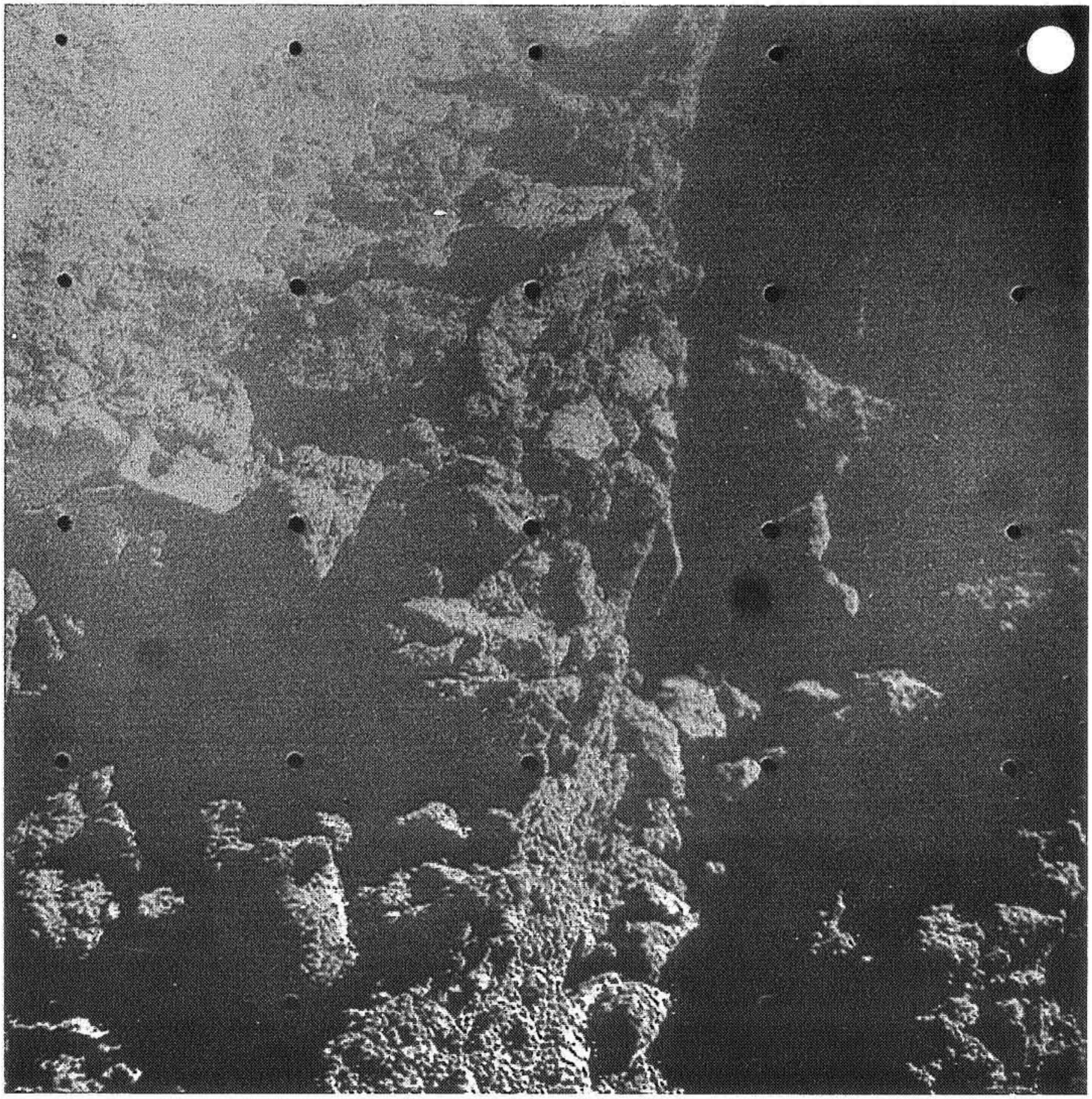


	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(38)	Day 112, 07:22:49	3	—42.90	2.6	f/4.3	N	Red	Processed

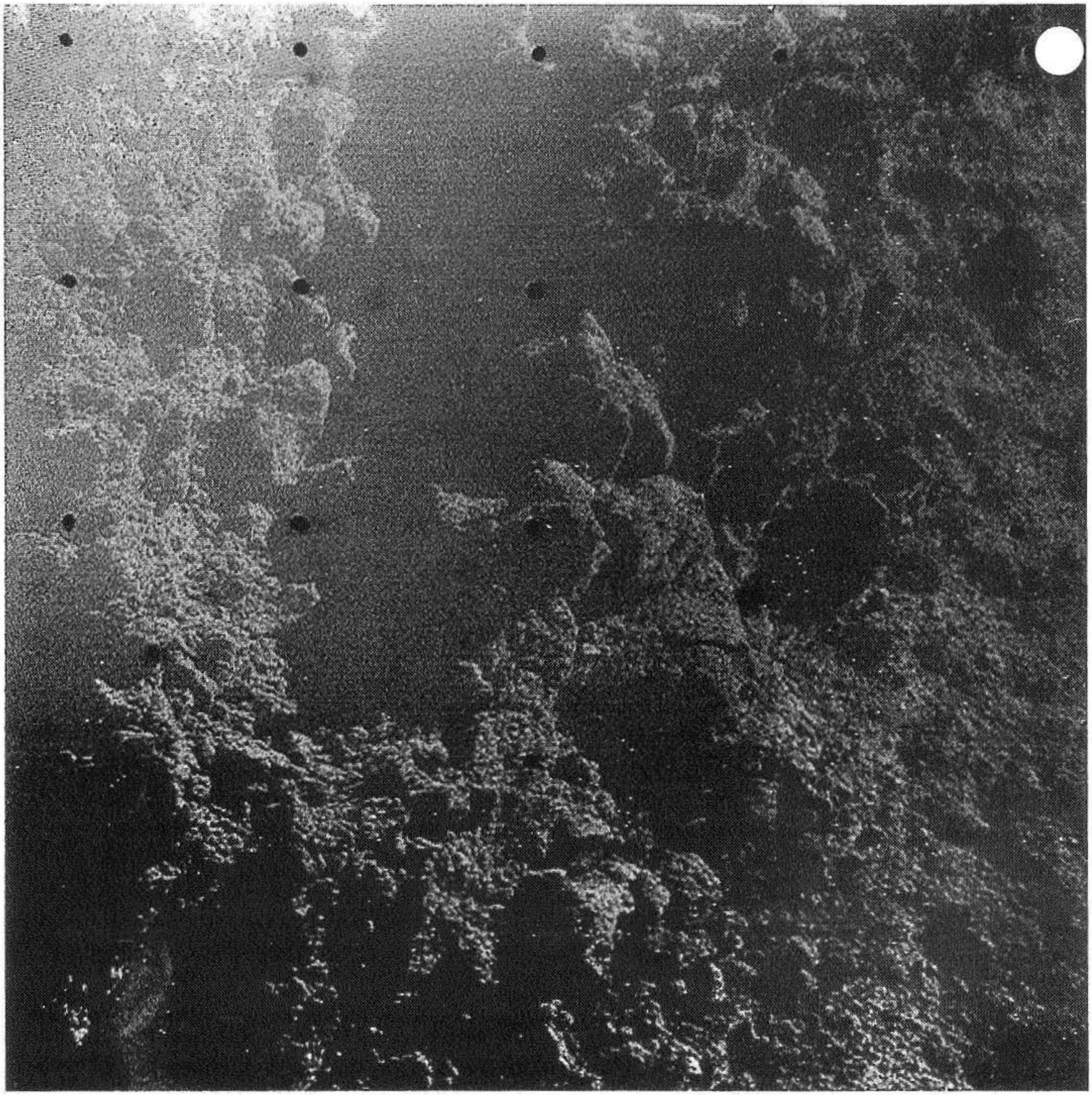




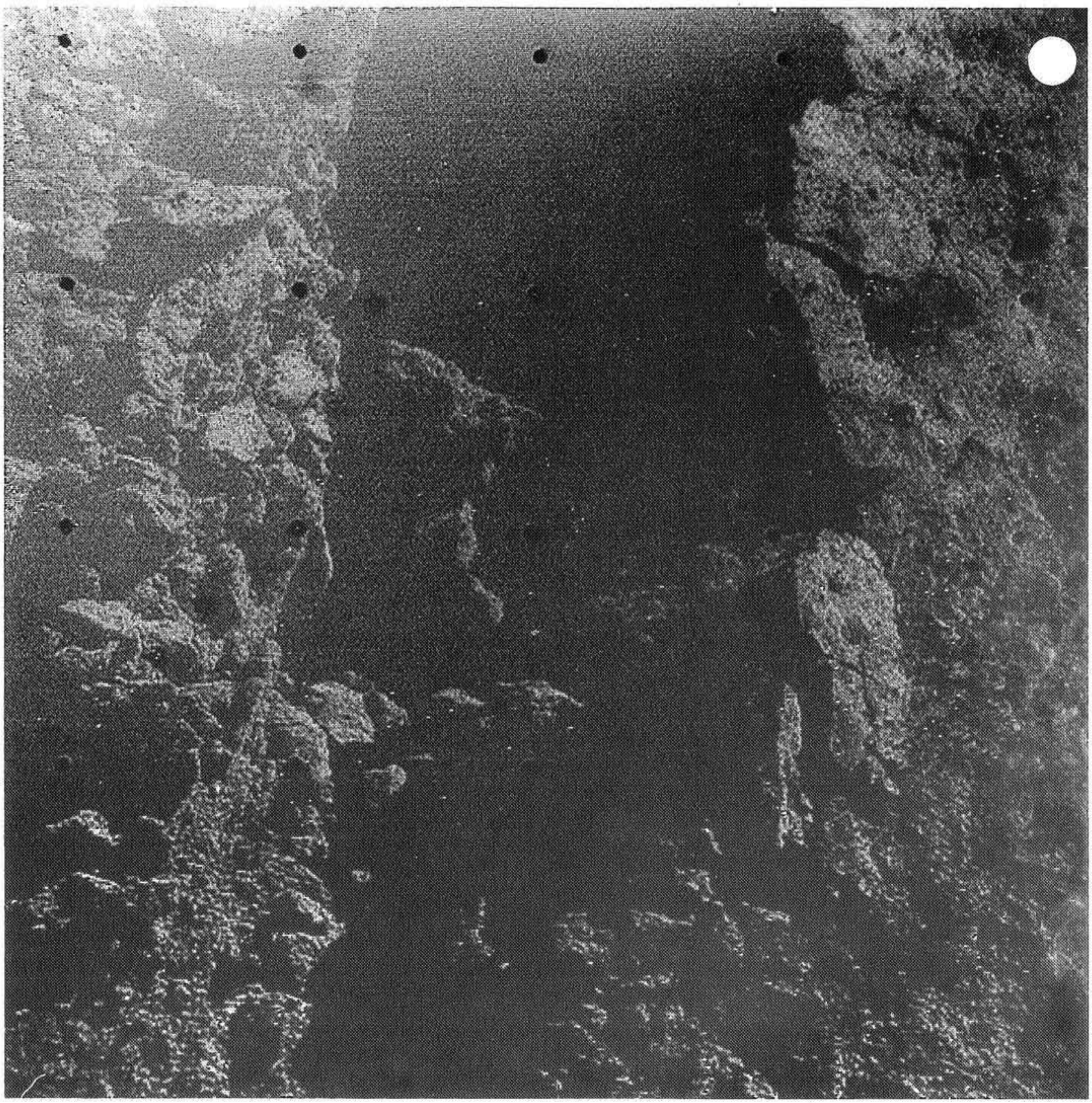
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(39)	Day 112, 07:25:10	3	—47.86	2.5	f/4.3	N	Red	Processed



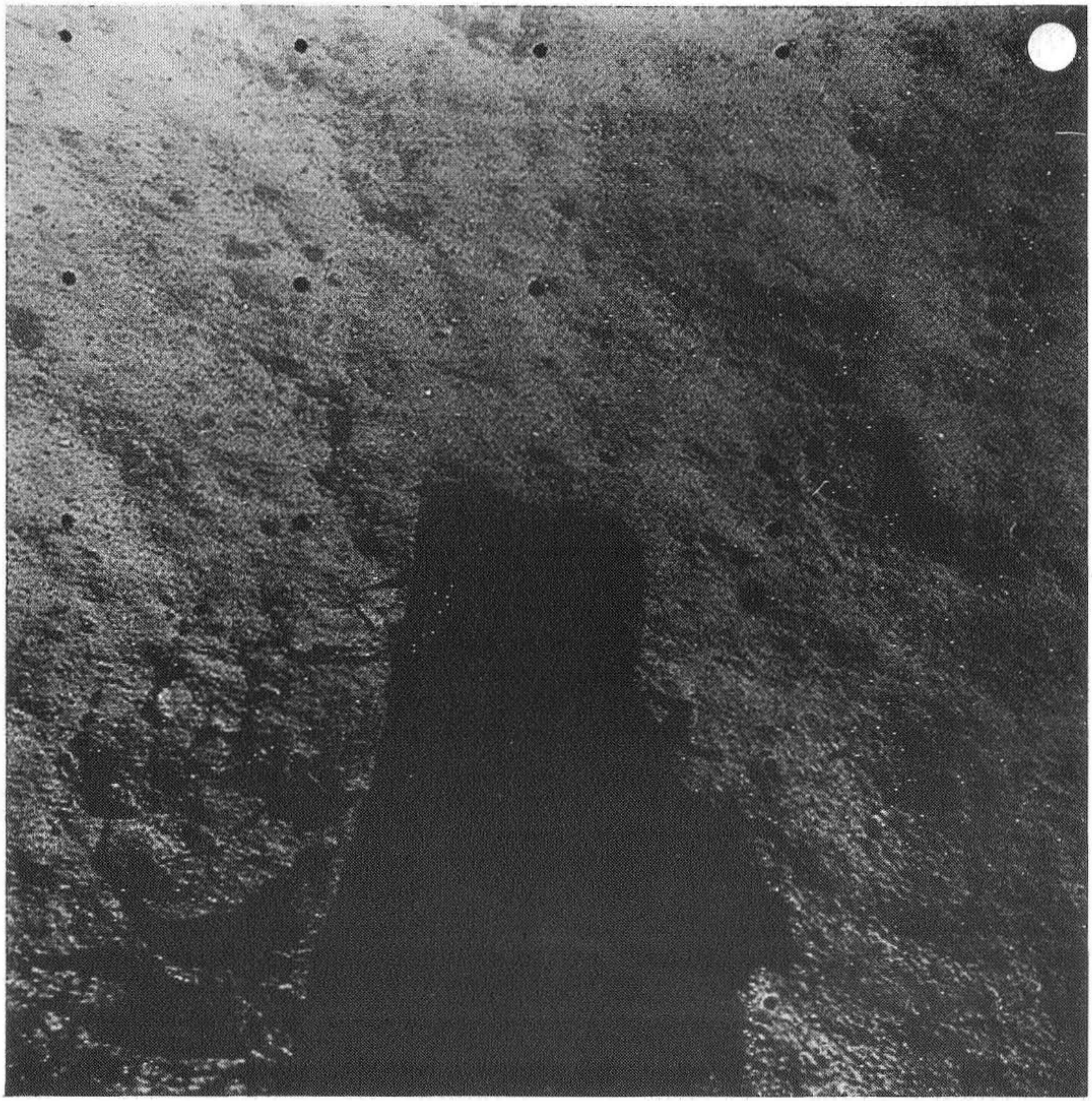
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(40)	Day 112, 07:28:48	0	−47.86	2.5	f/4.3	N	Red	Processed



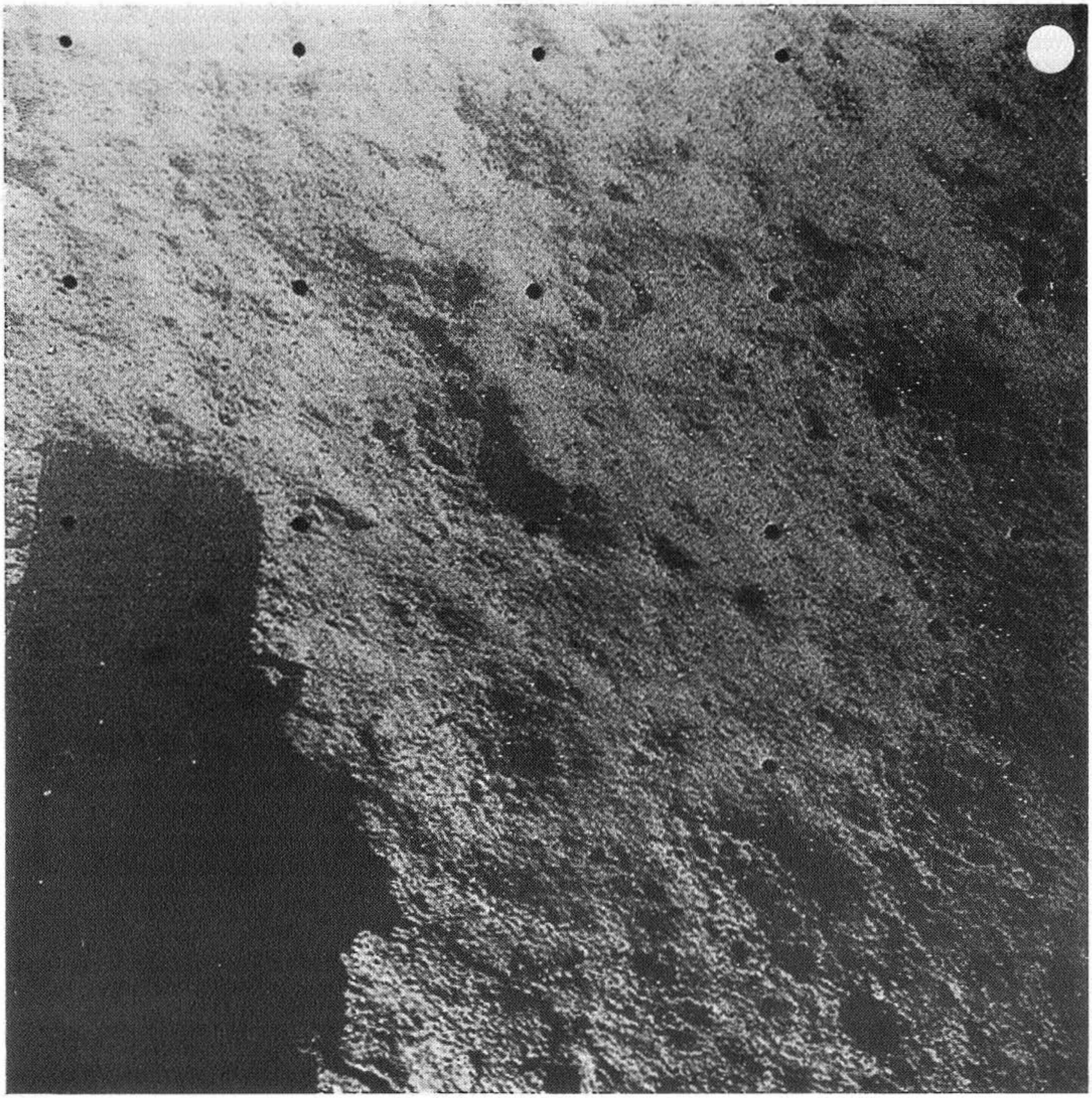
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(41)	**Day 112, 08:29:31**	**—3**	**—52.82**	**2.4**	**f/6.5**	**N**	**Red**	**Processed**



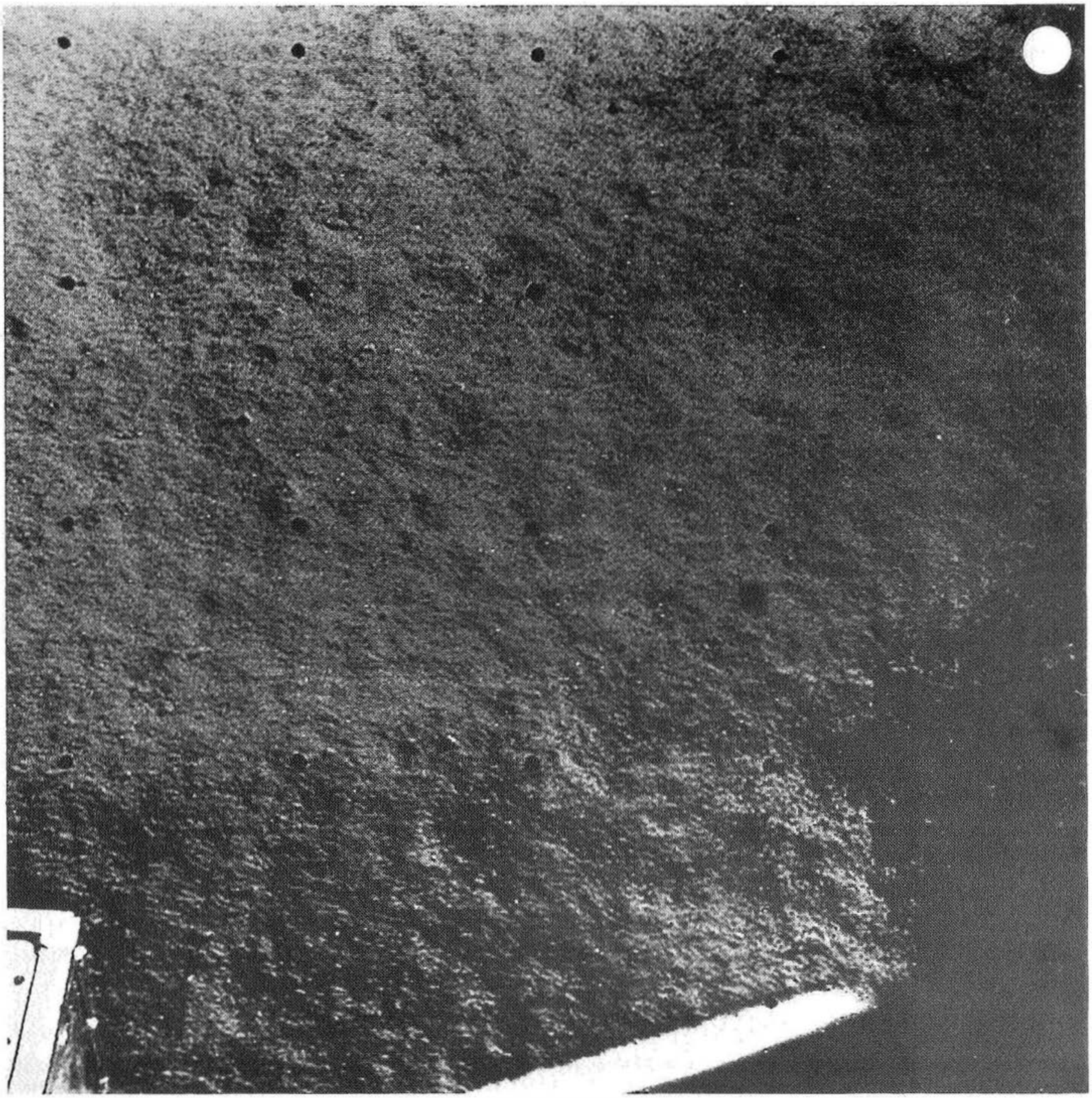
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(42)	Day 112, 08:30:06	—3	—47.86	2.5	f/6.5	N	Red	Processed



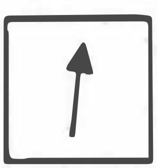
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(43)	Day 112, 08:32:45	—3	—42.90	2.6	f/6.6	N	Red	*Processed*



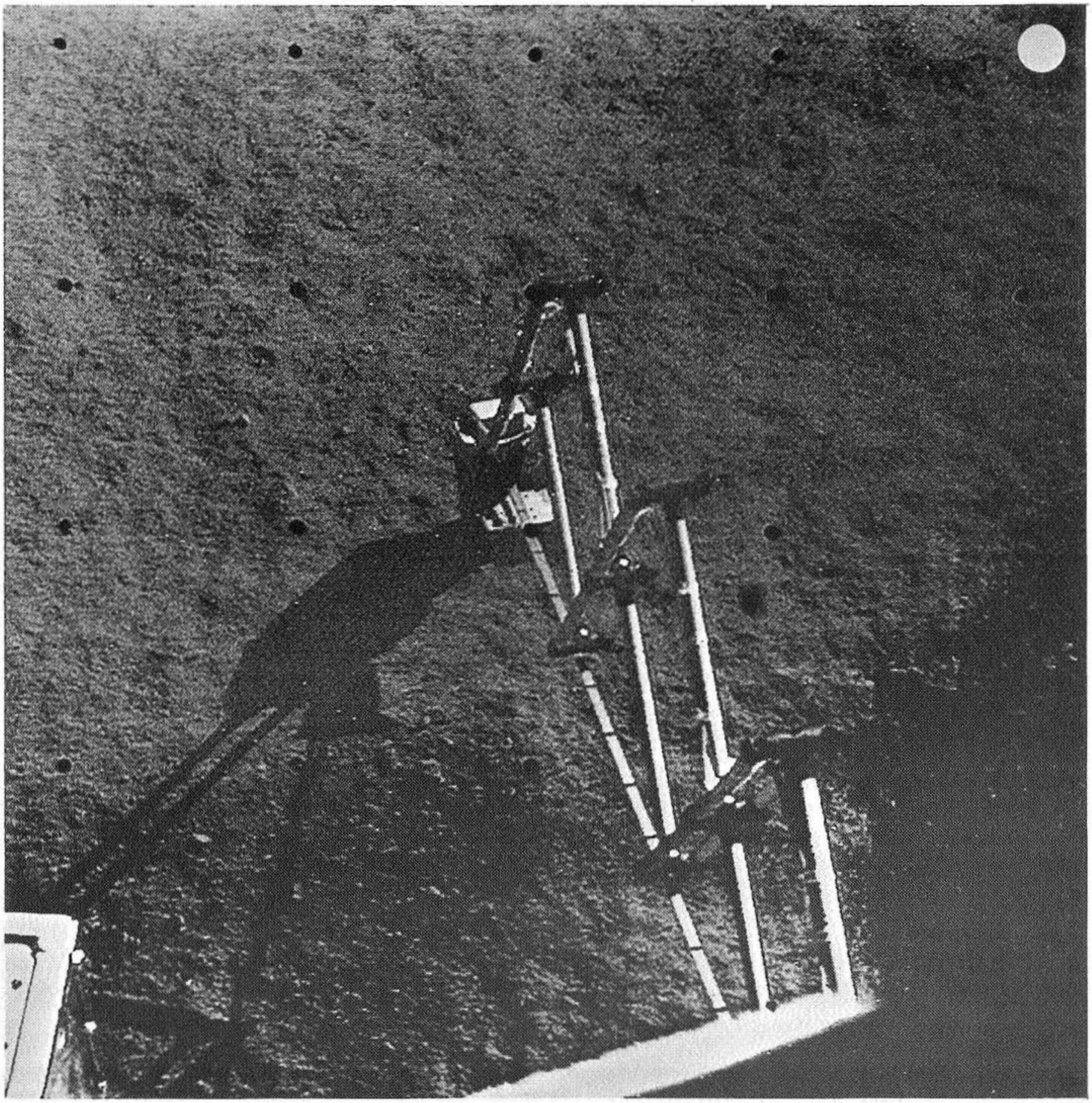
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(44)	Day 112, 08:33:28	—6	—42.90	2.6	f/6.6	N	Red	Processed



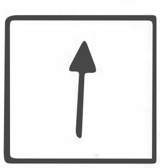
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(45)	Day 112, 09:17:53	15	—42.90	1.9	f/6.5	W	Red	Processed

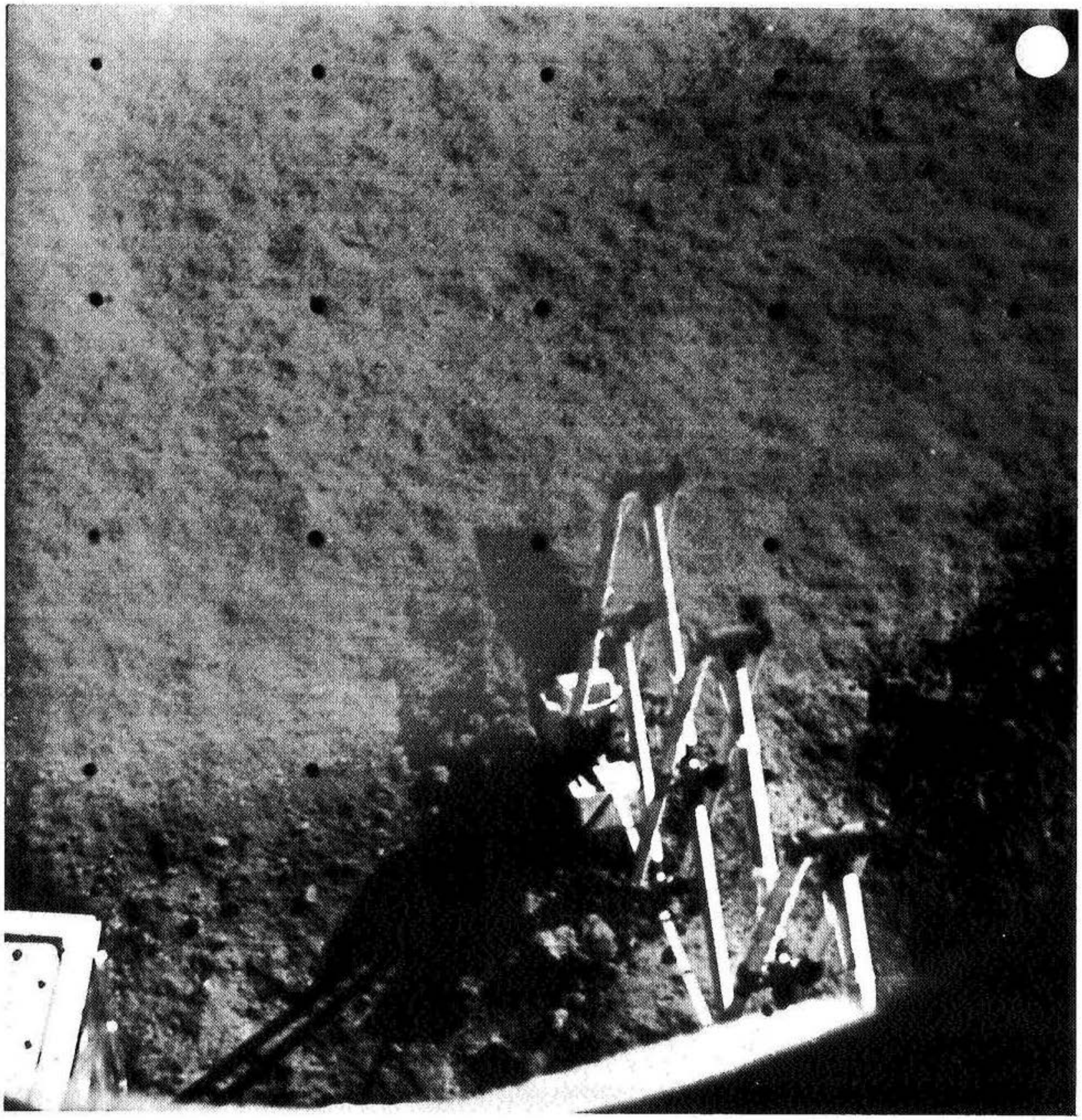


	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(46)	Day 112, 10:20:29	15	−42.90	1.9	f/6.5	W	Red	Processed



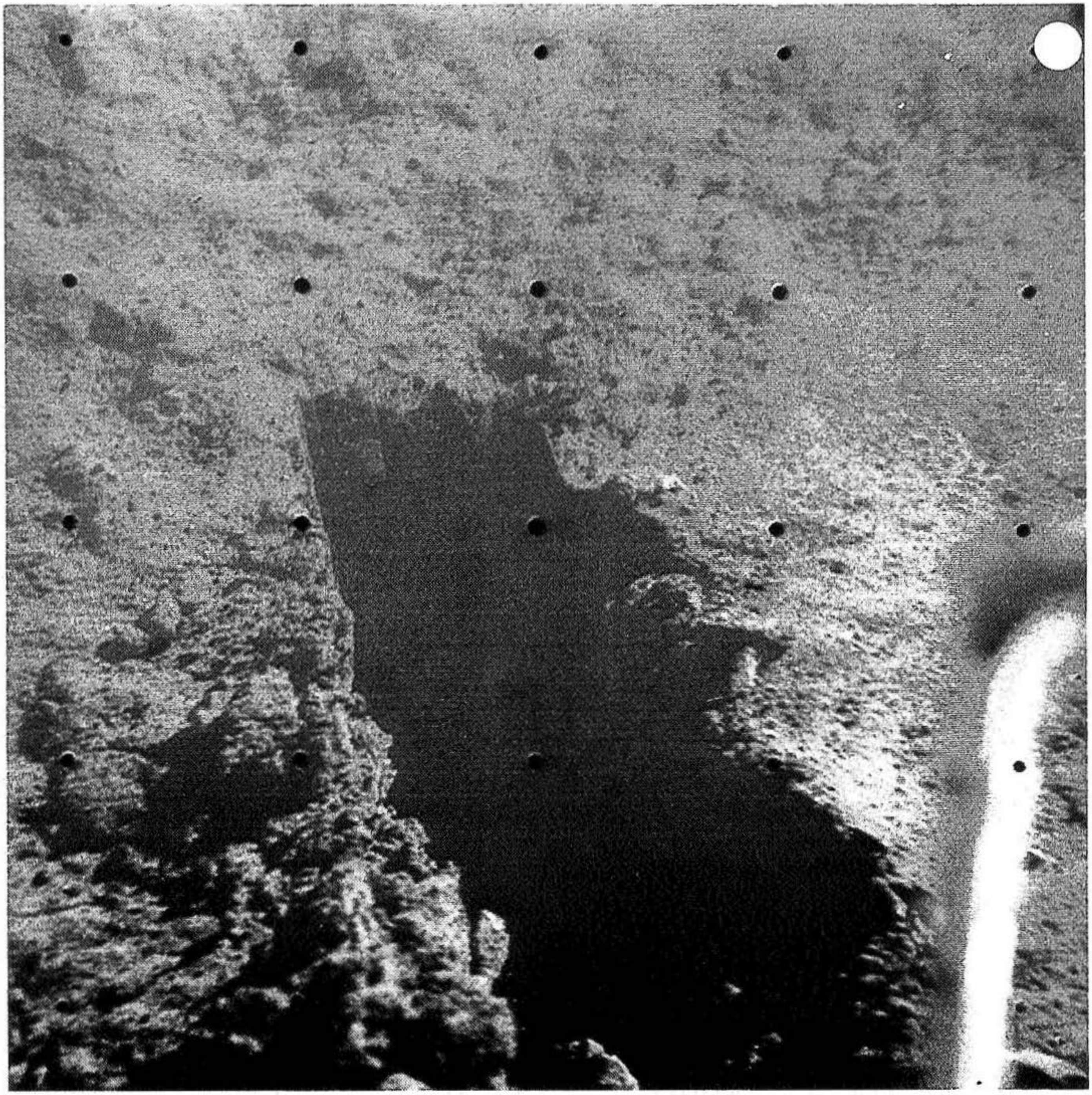
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(47)	Day 112, 10:25:21	18	—42.90	1.9	f/8.7	W	Red





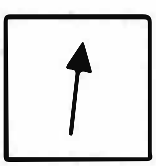
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(48)	Day 112, 10:31:43	15	—42.90	1.8	*f*/6.5	W	Red

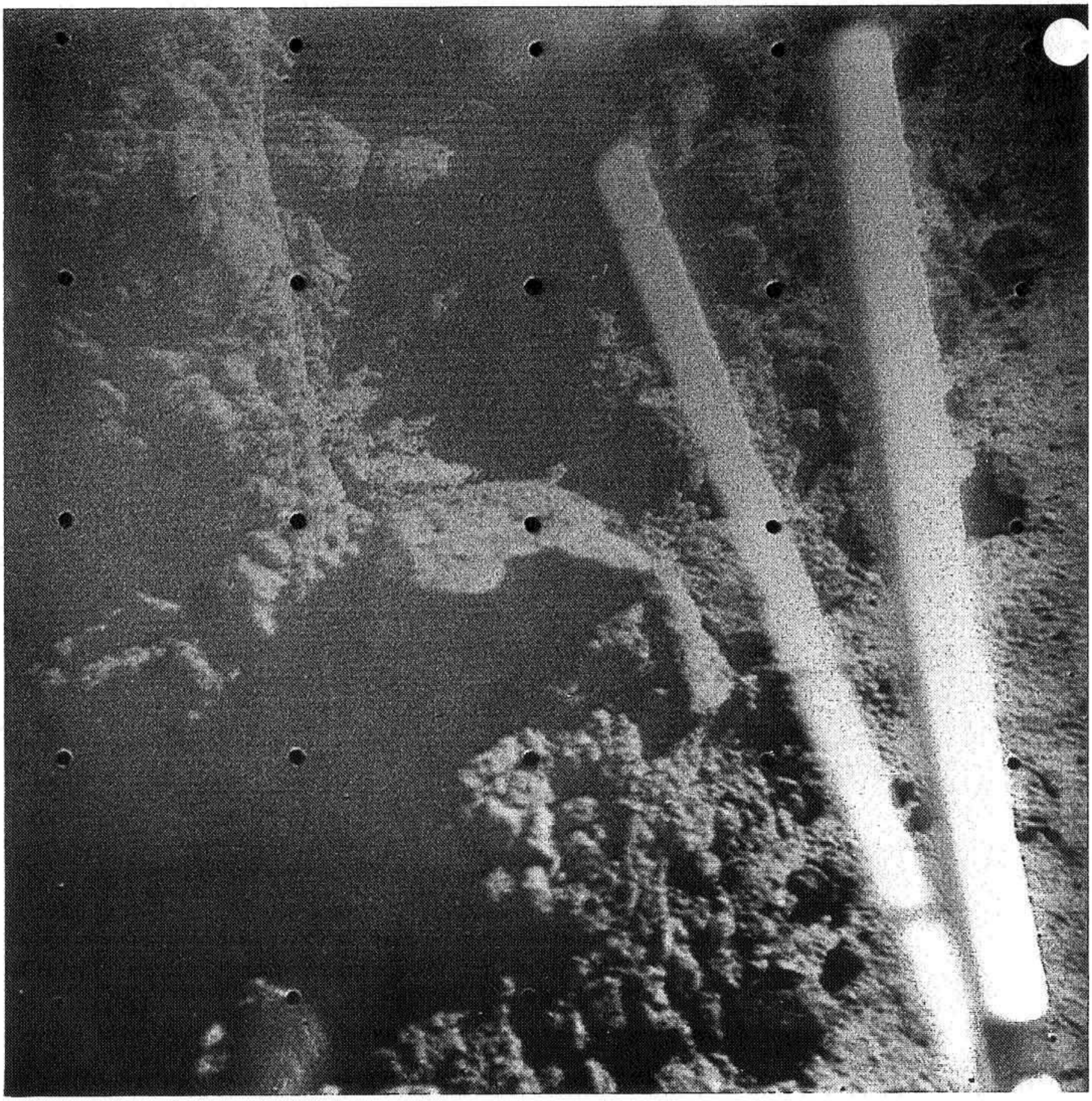
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(49)	Day 112, 10:33:46	15	—42.90	3.4	f/4.3	N	Blue	Processed



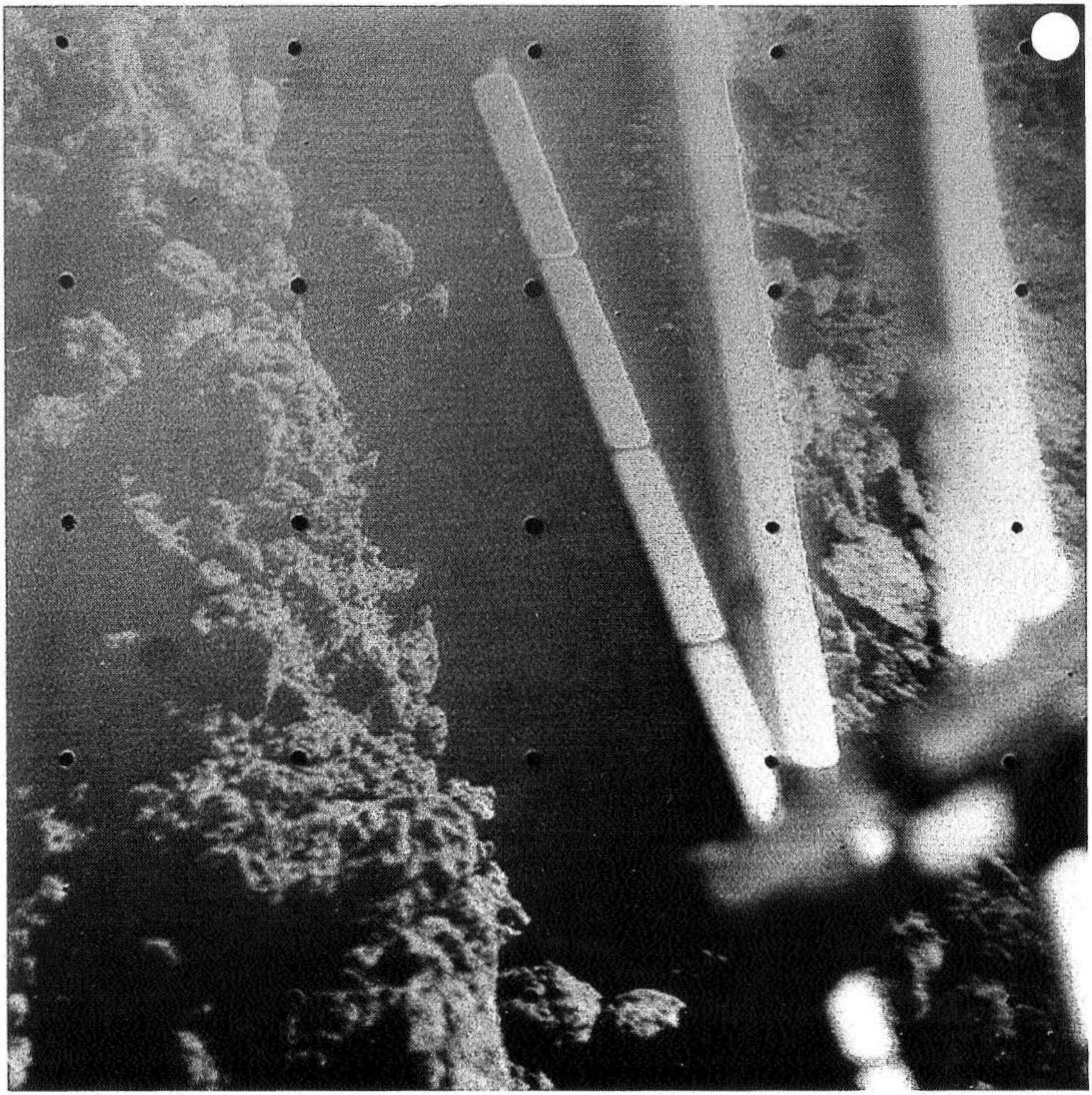
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(50)	Day 112, 11:18:00	15	—42.90	2.5	*f*/4.3	*N*	Blue	Processed

	GMT	Az	El	Focus, m	Iris	Lens	Filter
(51)	Day 112, 11:18:52	15	—42.90	2.4	f/4.3	N	Blue

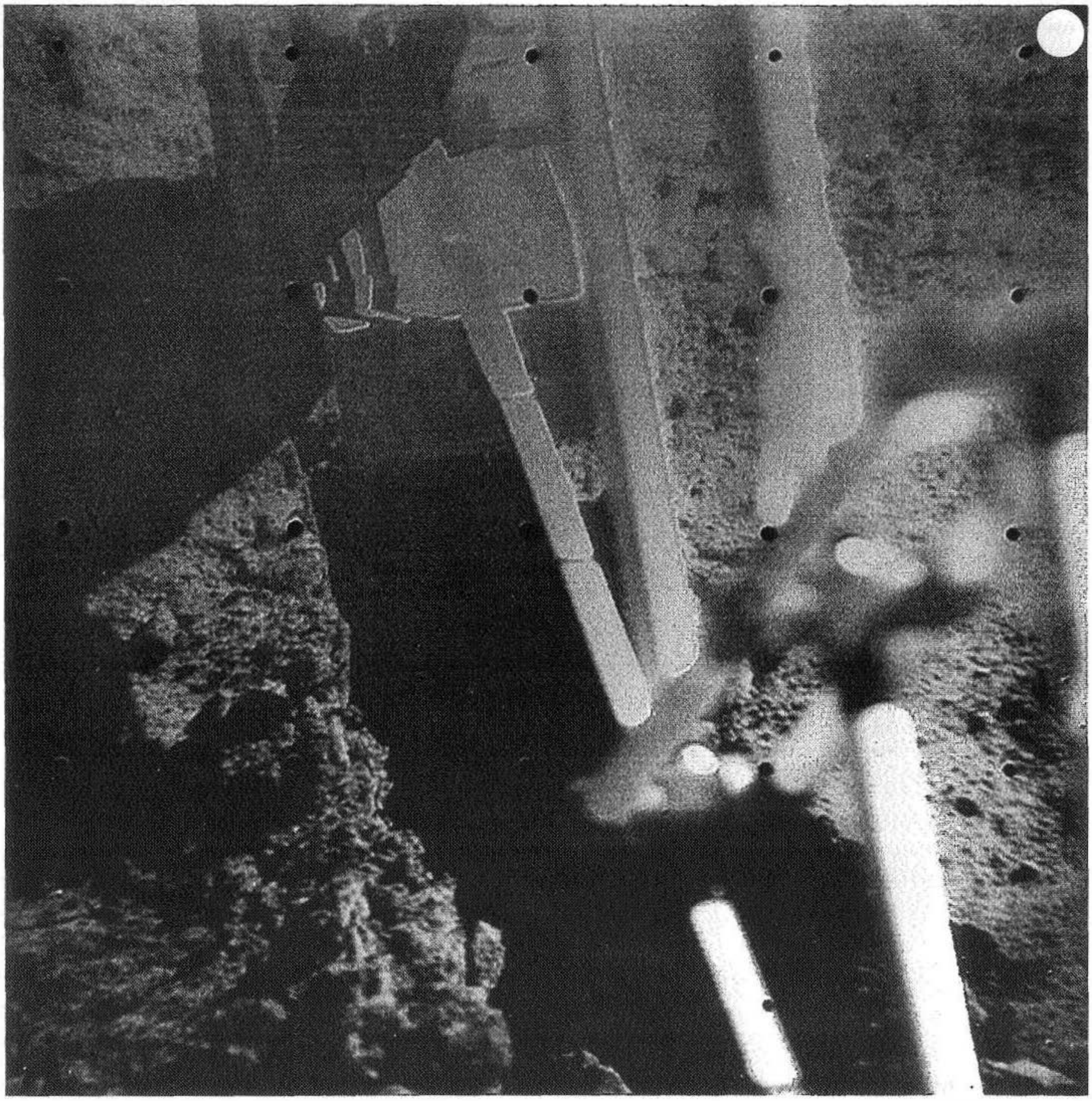




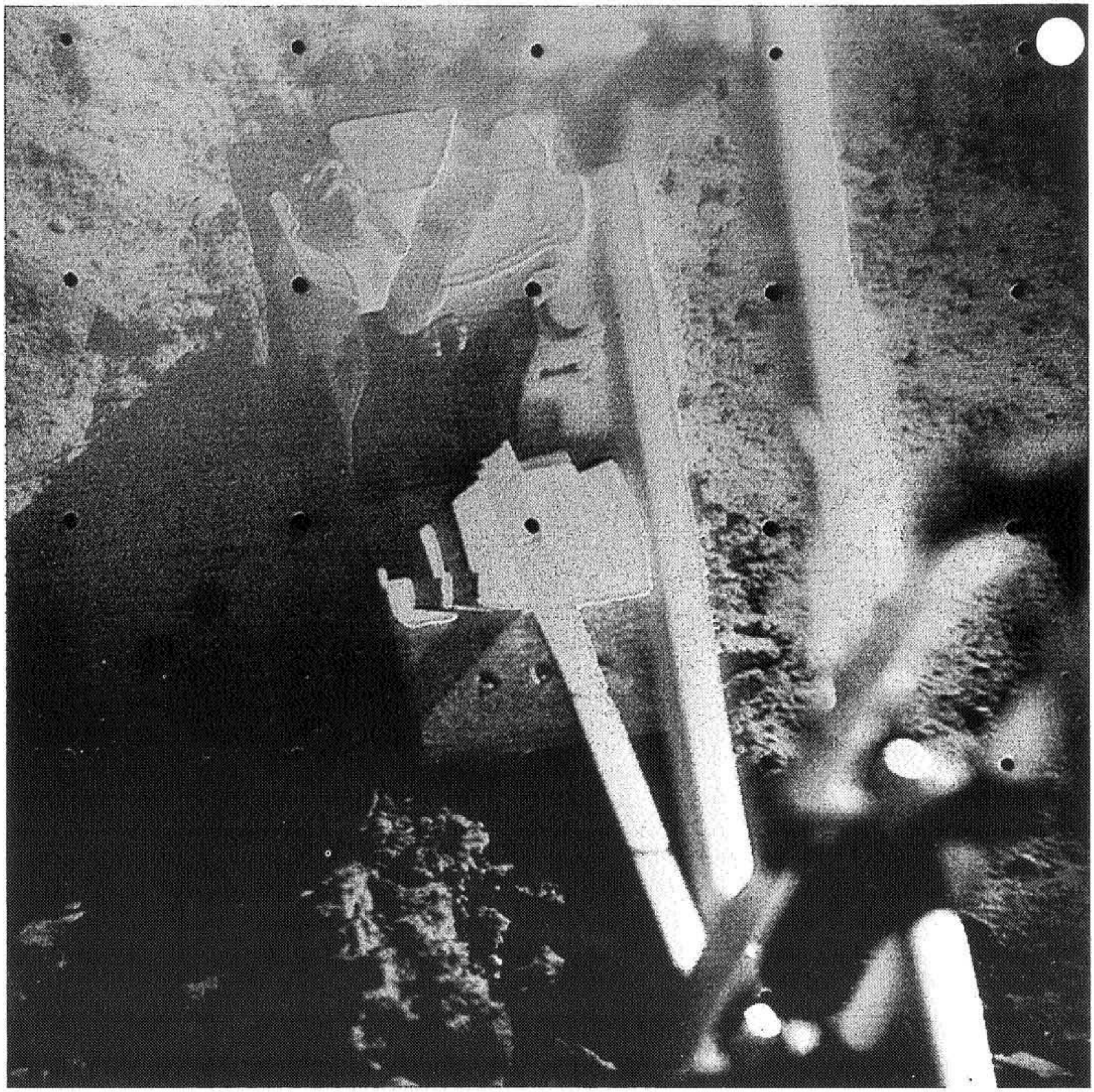
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(52)	Day 112, 11:24:42	15	—52.82	2.3	$f/4.3$	N	Blue	Processed



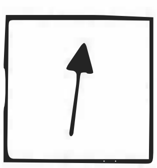
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(53)	Day 112, 11:25:25	15	—47.86	2.4	f/4.3	N	Blue	Processed

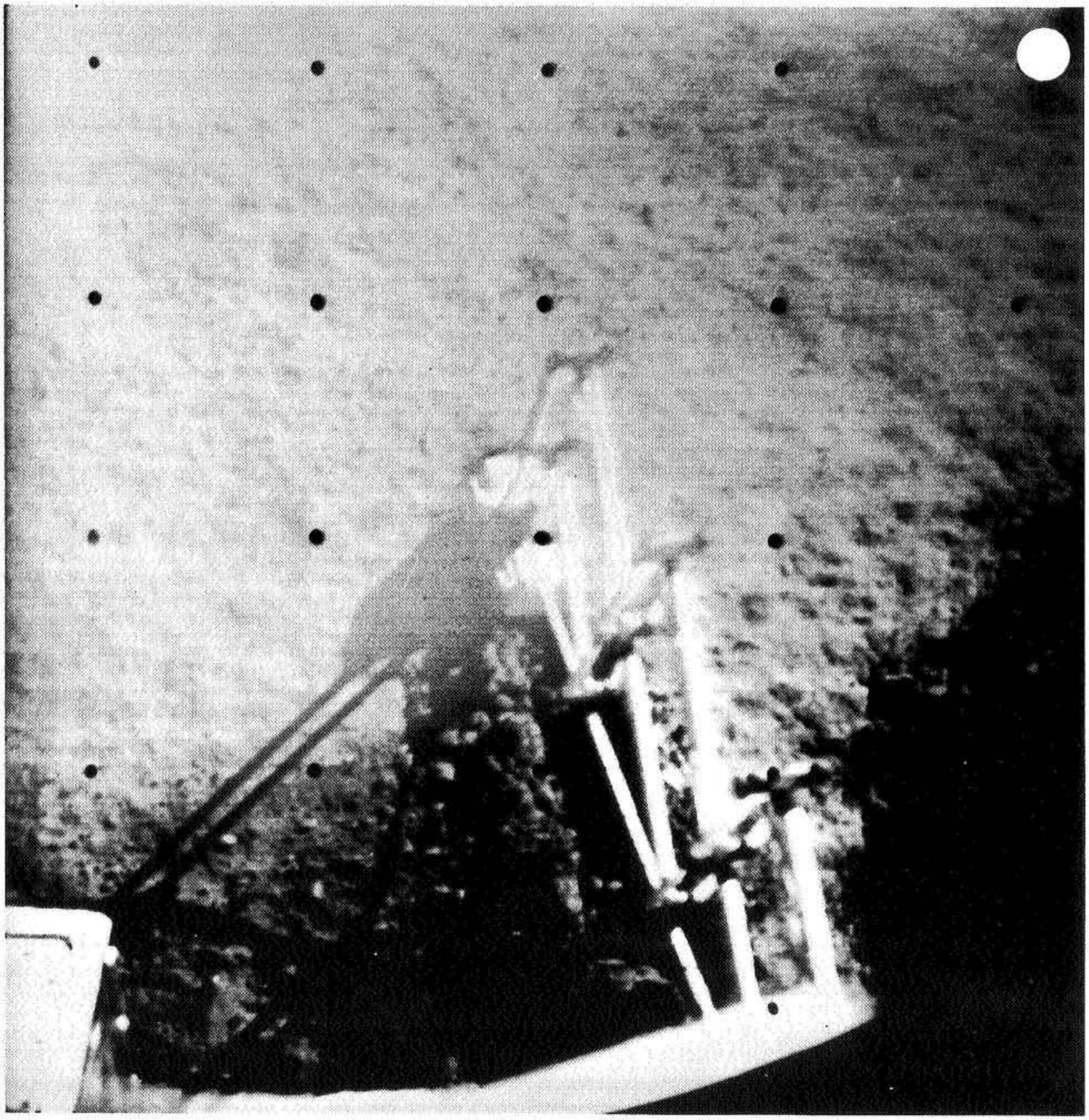


	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(54)	Day 112, 11:25:59	15	—42.90	2.5	*f*/4.3	N	Blue	Processed

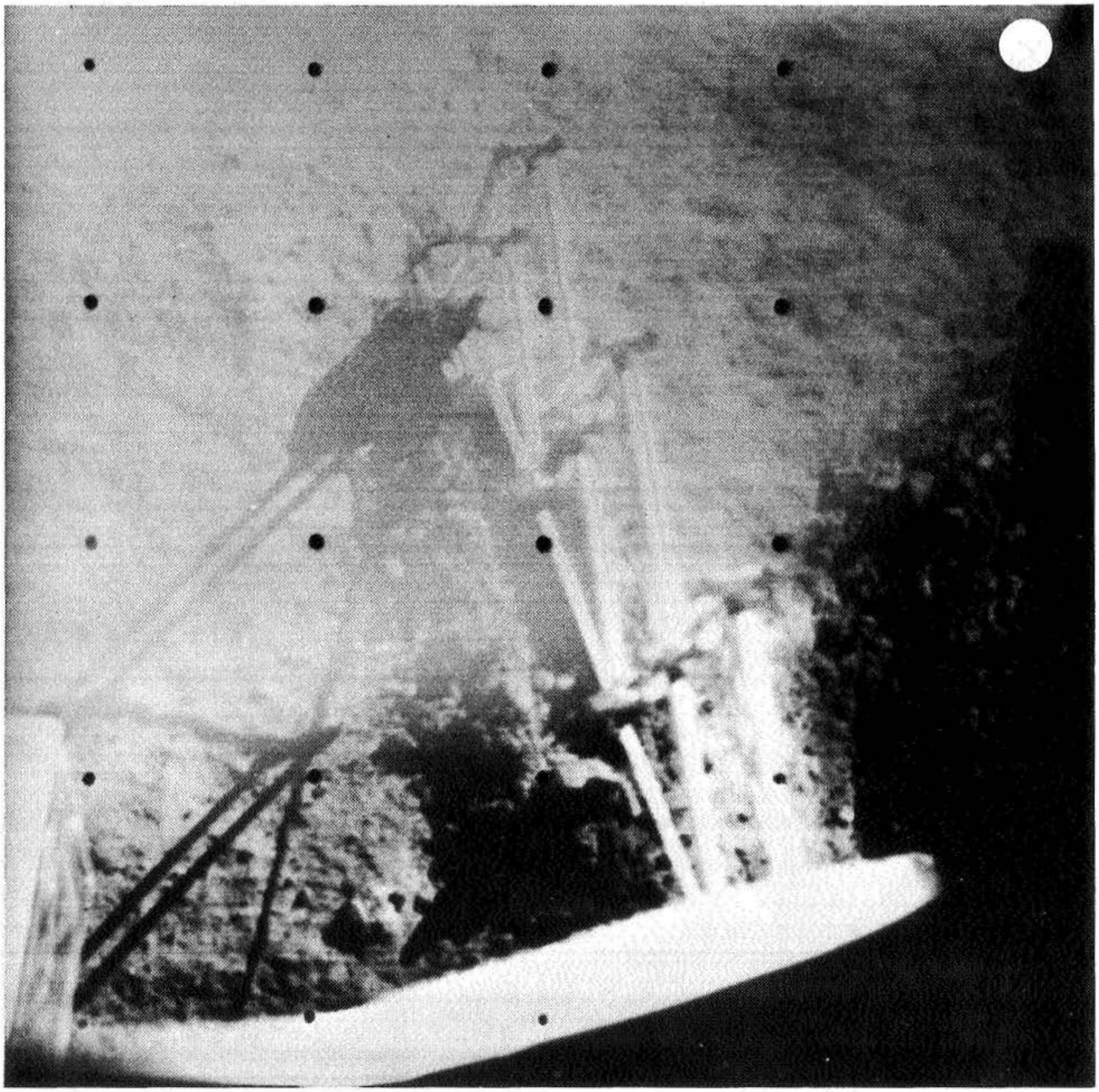


	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(55)	**Day 112, 11:33:27**	**15**	**—42.90**	**2.5**	***f*/4.3**	**N**	**Blue**	***Processed***

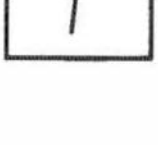


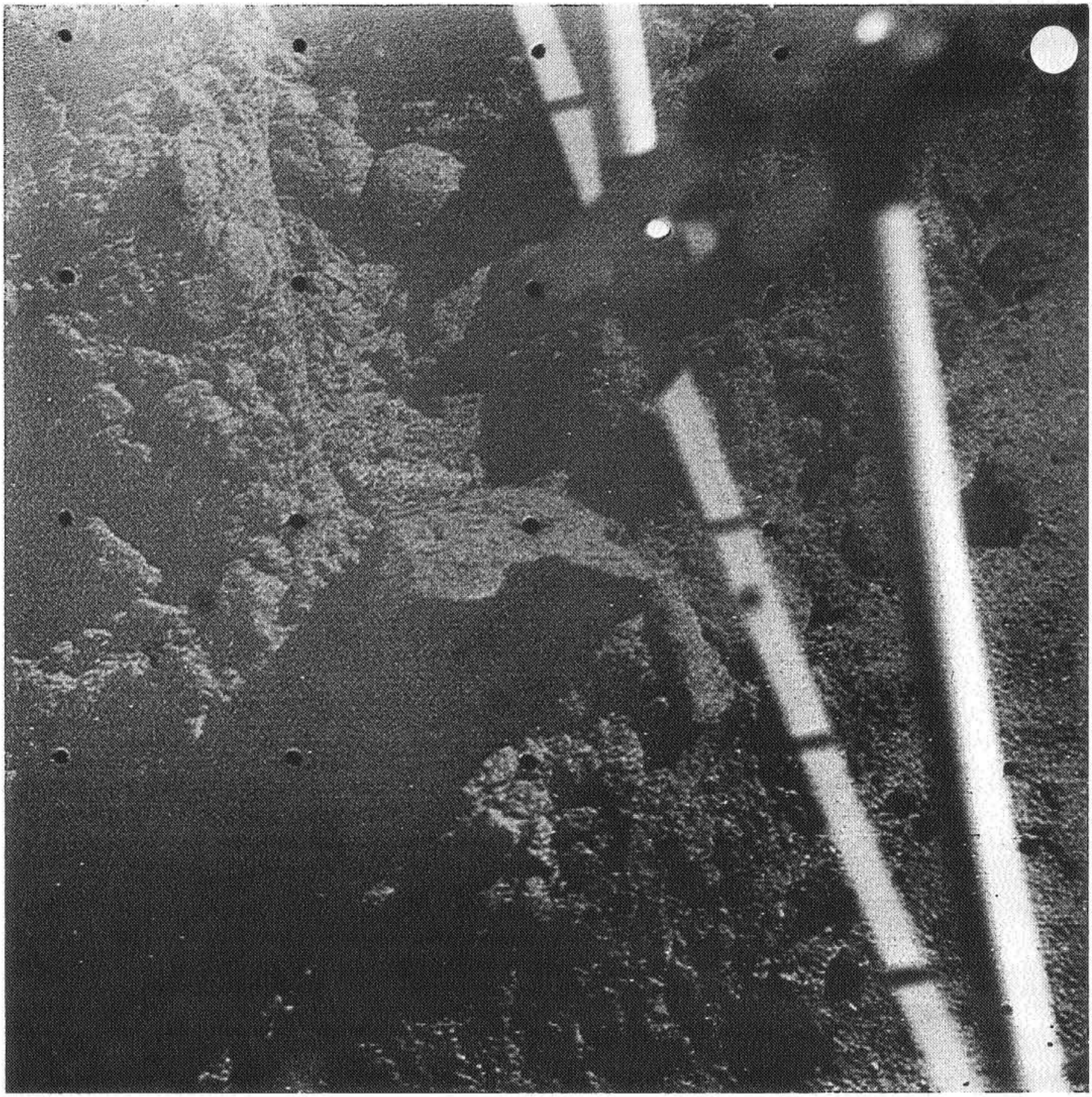


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(56)	Day 112, 11:34:06	15	—42.90	2.5	$f/4.3$	W	Blue

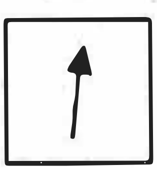


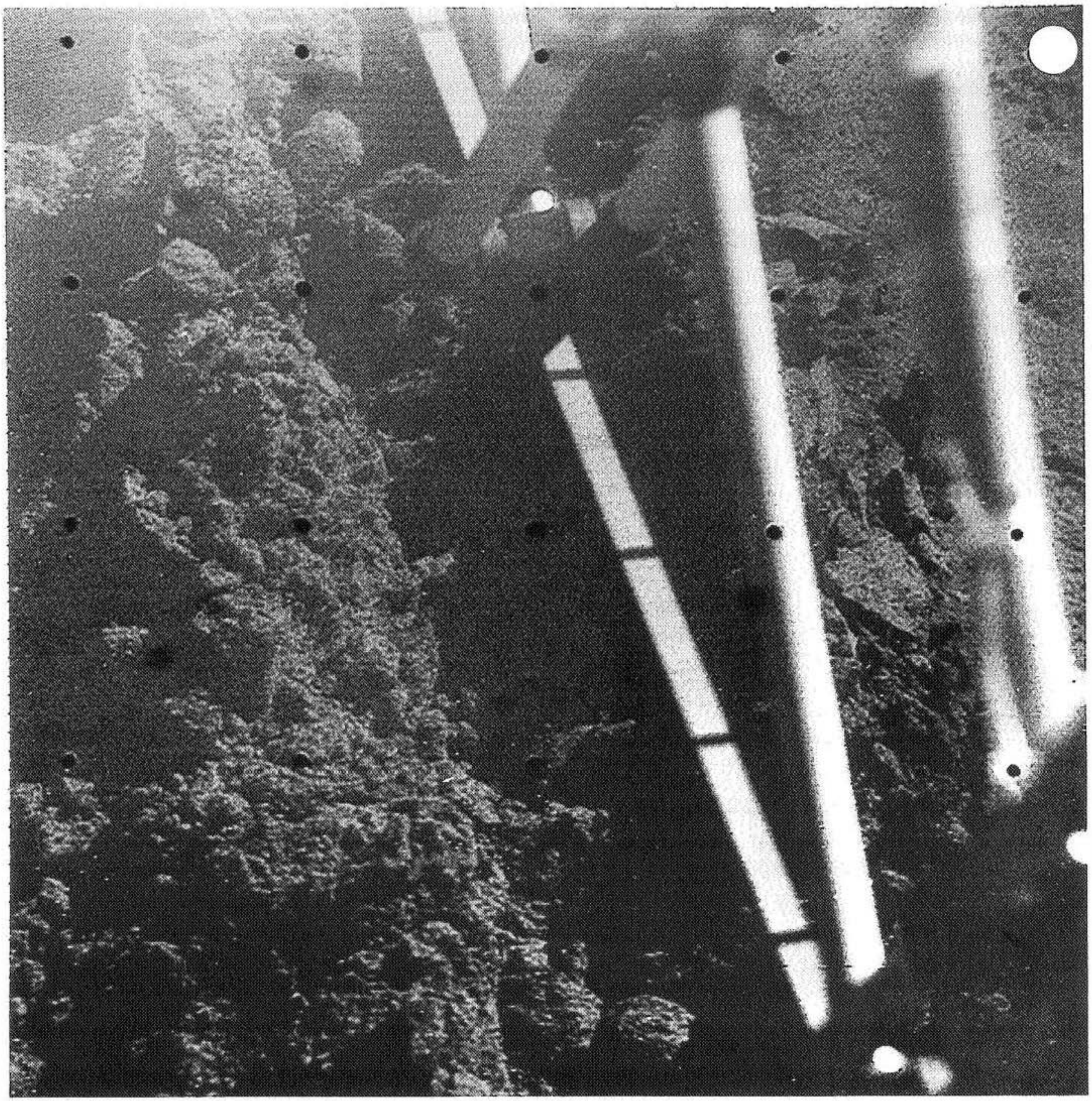
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(57)	Day 112, 11:34:29	15	—47.86	2.5	f/4.3	W	Blue



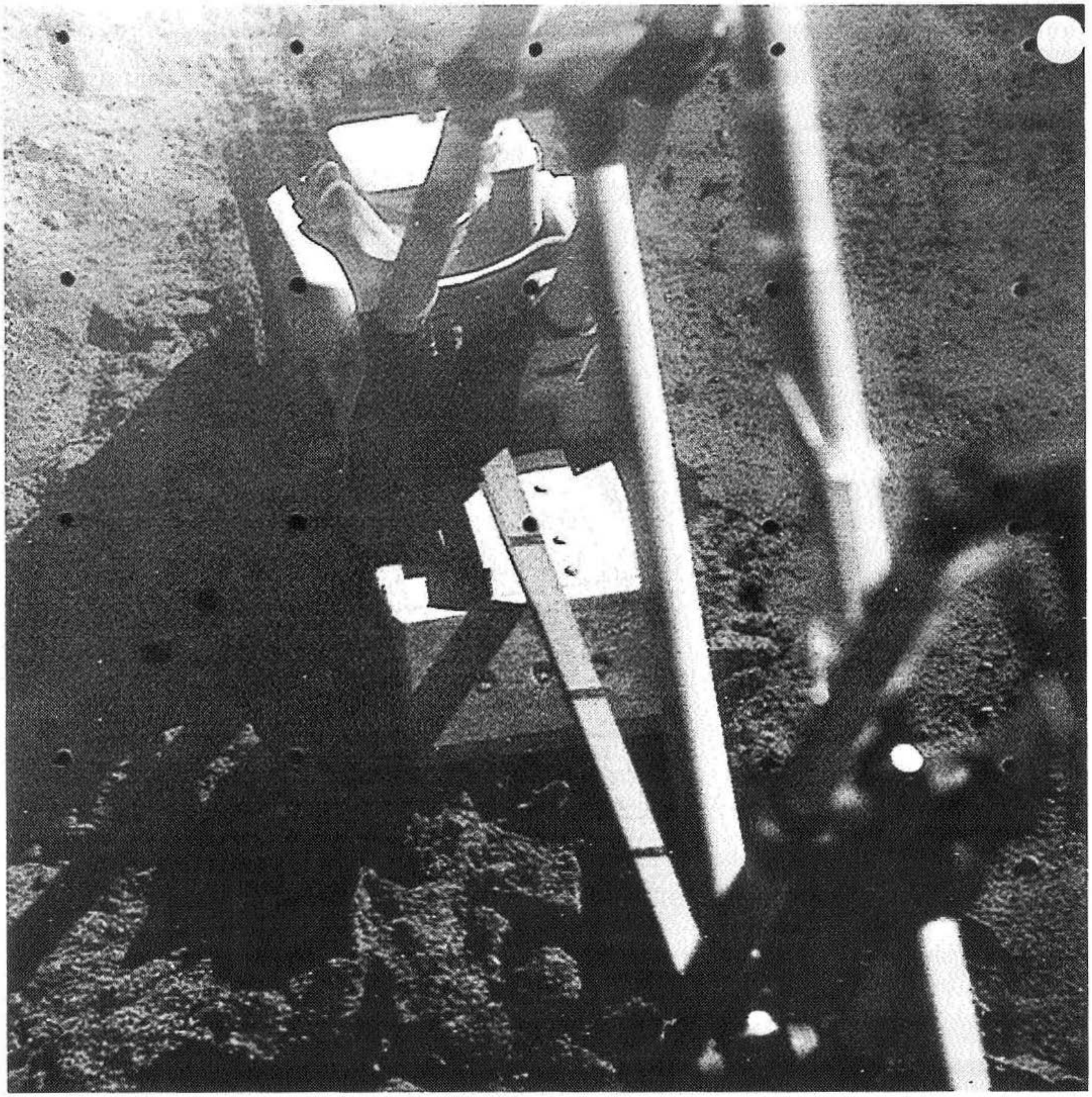


	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(58)	Day 113, 01:51:43	15	—52.82	2.3	f/6.6	N	Red	Processed

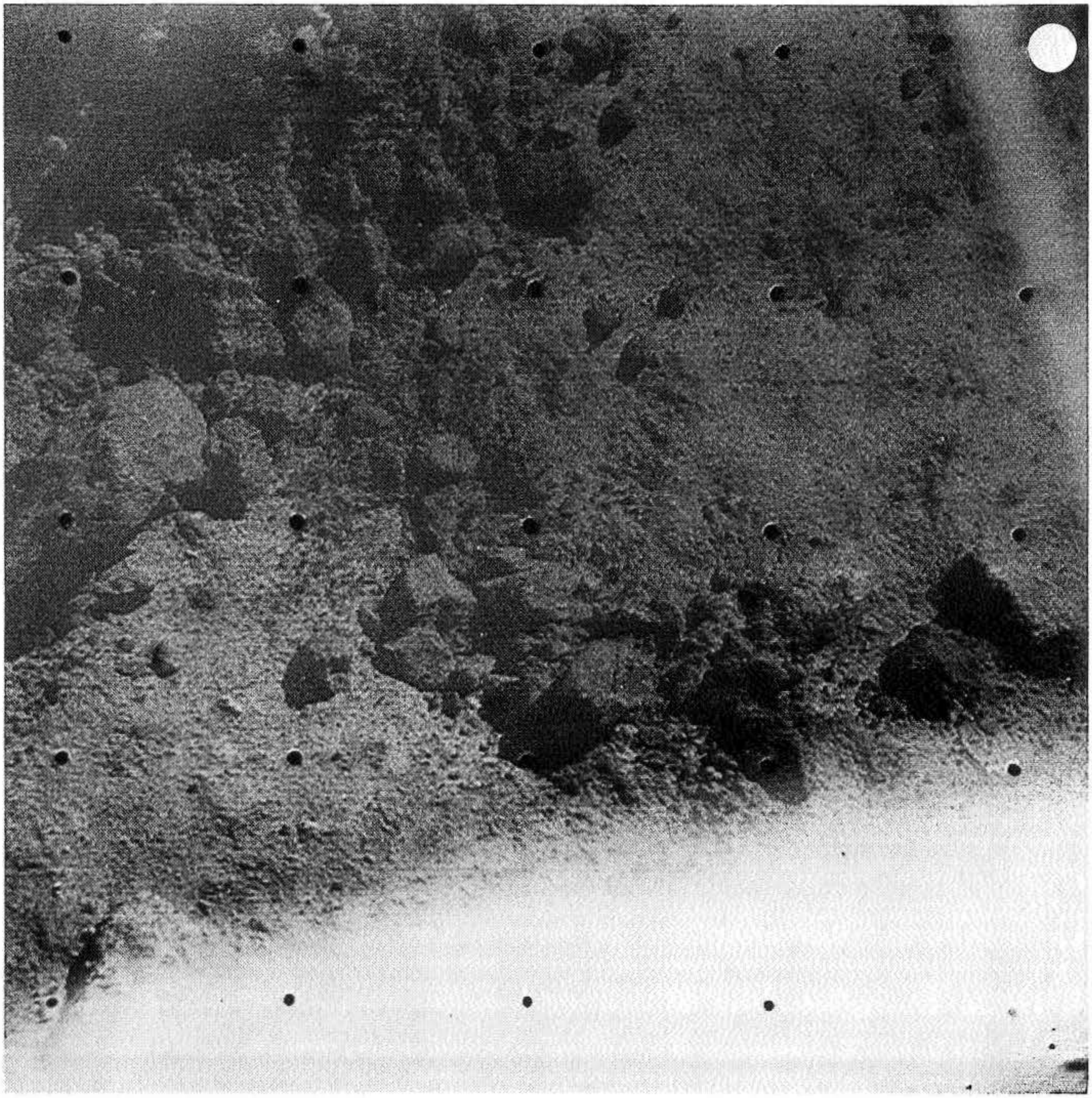




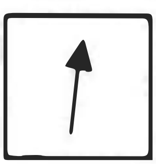
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(59)	**Day 113, 01:52:19**	**15**	**−47.86**	**2.4**	***f*/6.6**	**N**	**Red**	**Processed**

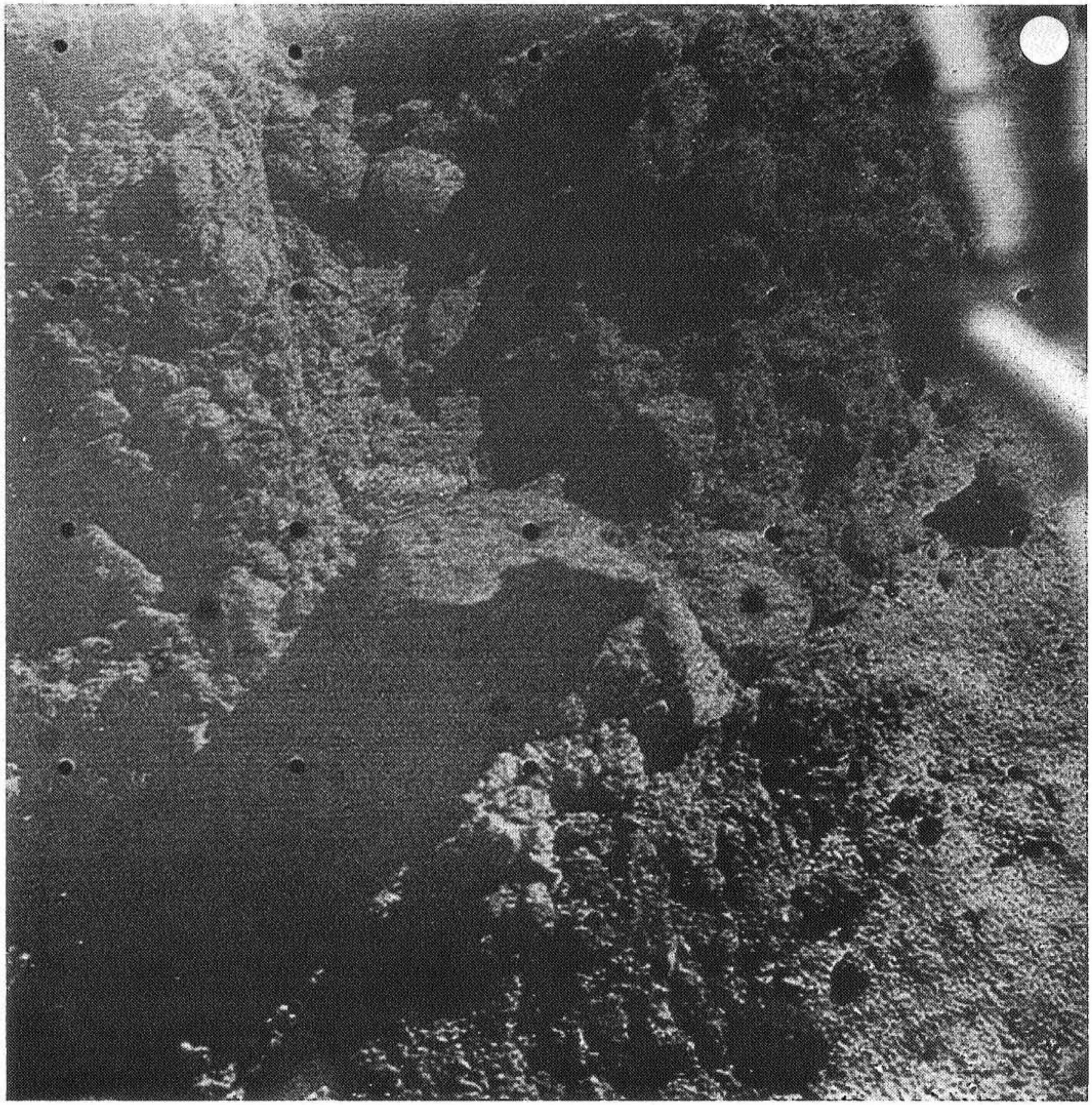


	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(60)	Day 113, 01:52:51	15	—42.90	2.5	f/6.6	N	Red	Processed

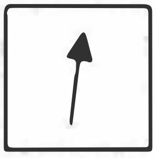


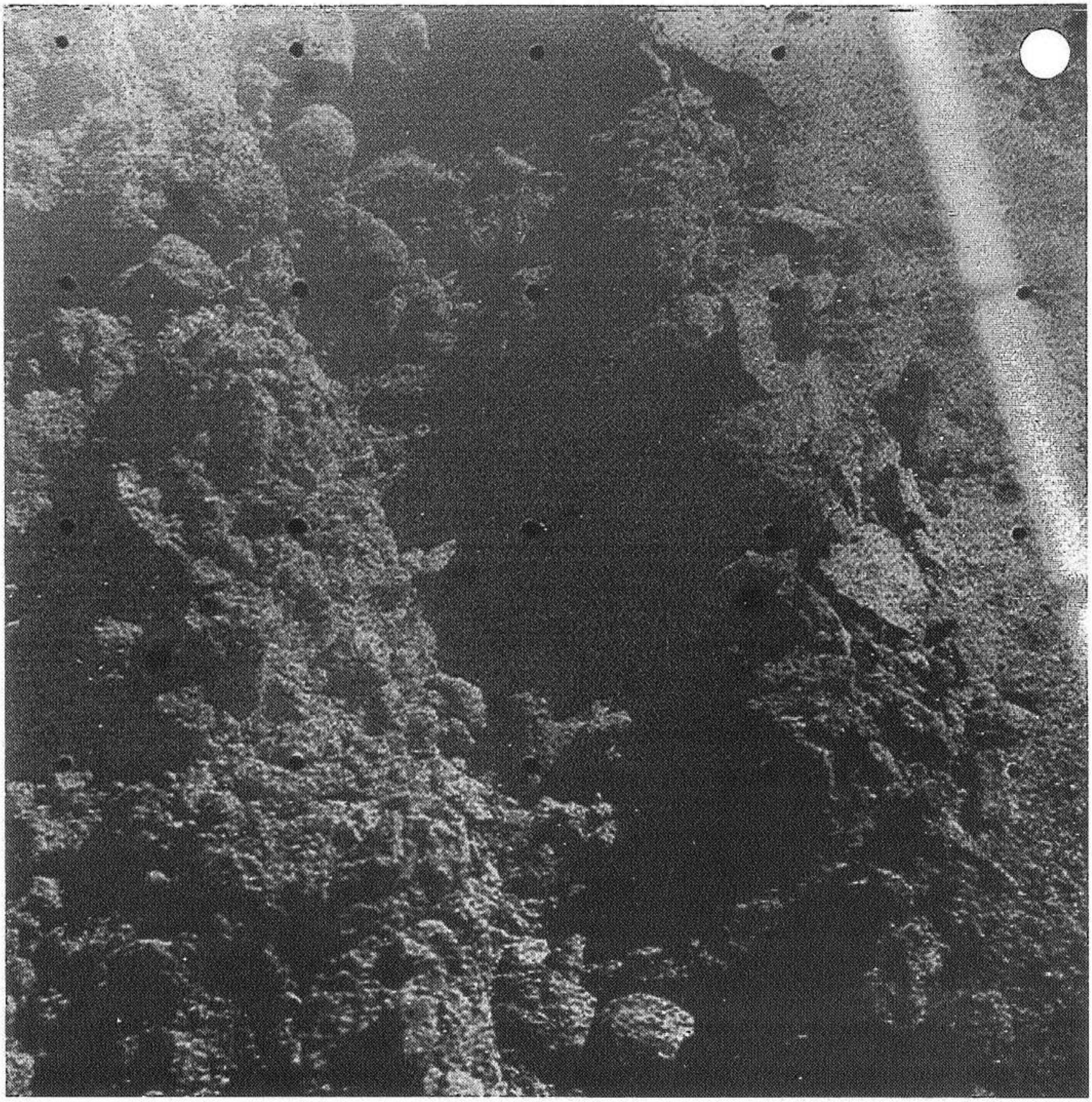
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(61)	Day 113, 06:39:01	15	—57.78	2.3	f/6.6	N	Red	Processed



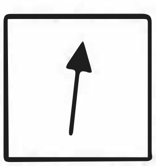


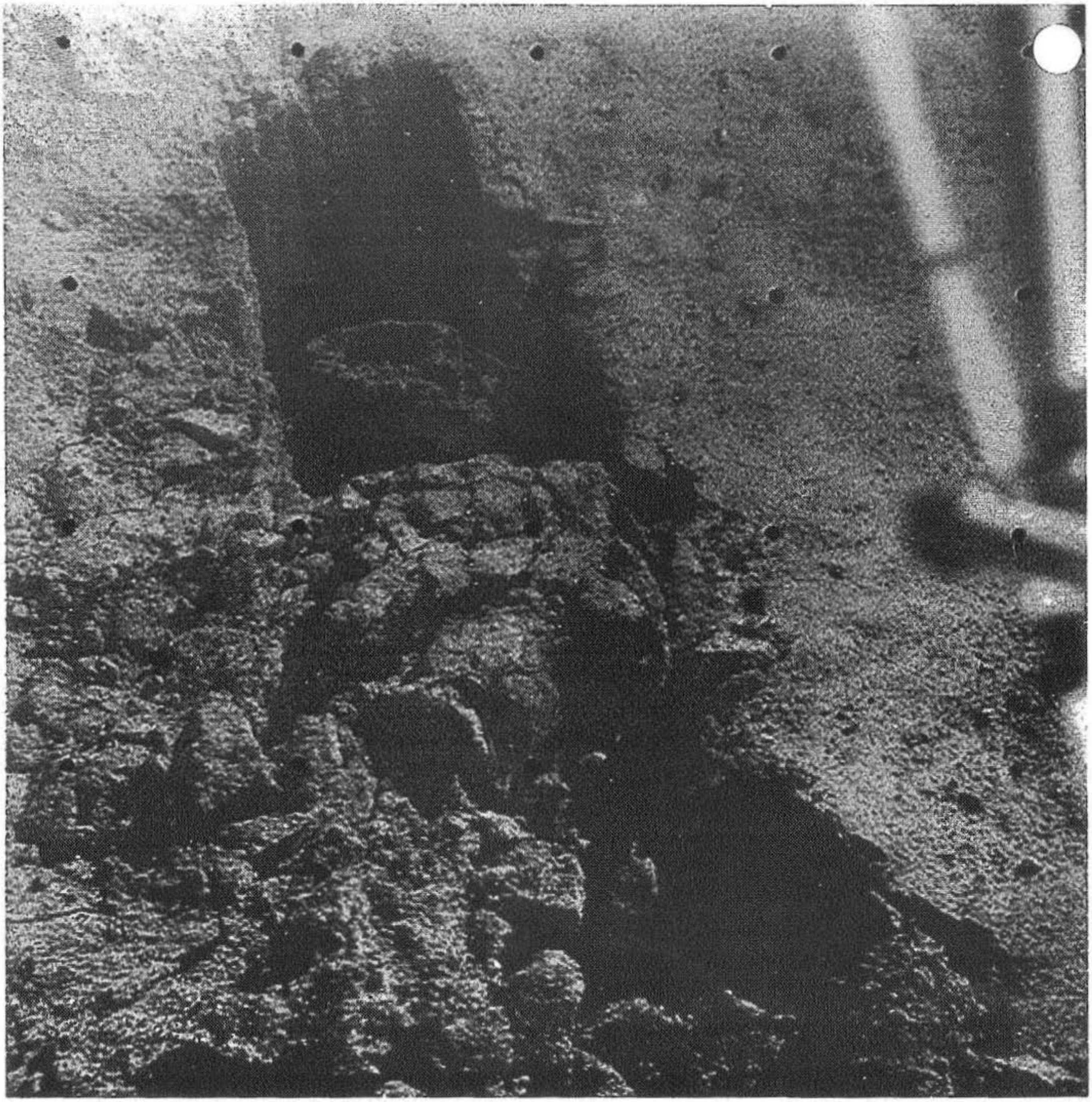
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(62)	Day 113, 06:40:05	15	—52.82	2.3	f/6.6	N	Red	Processed



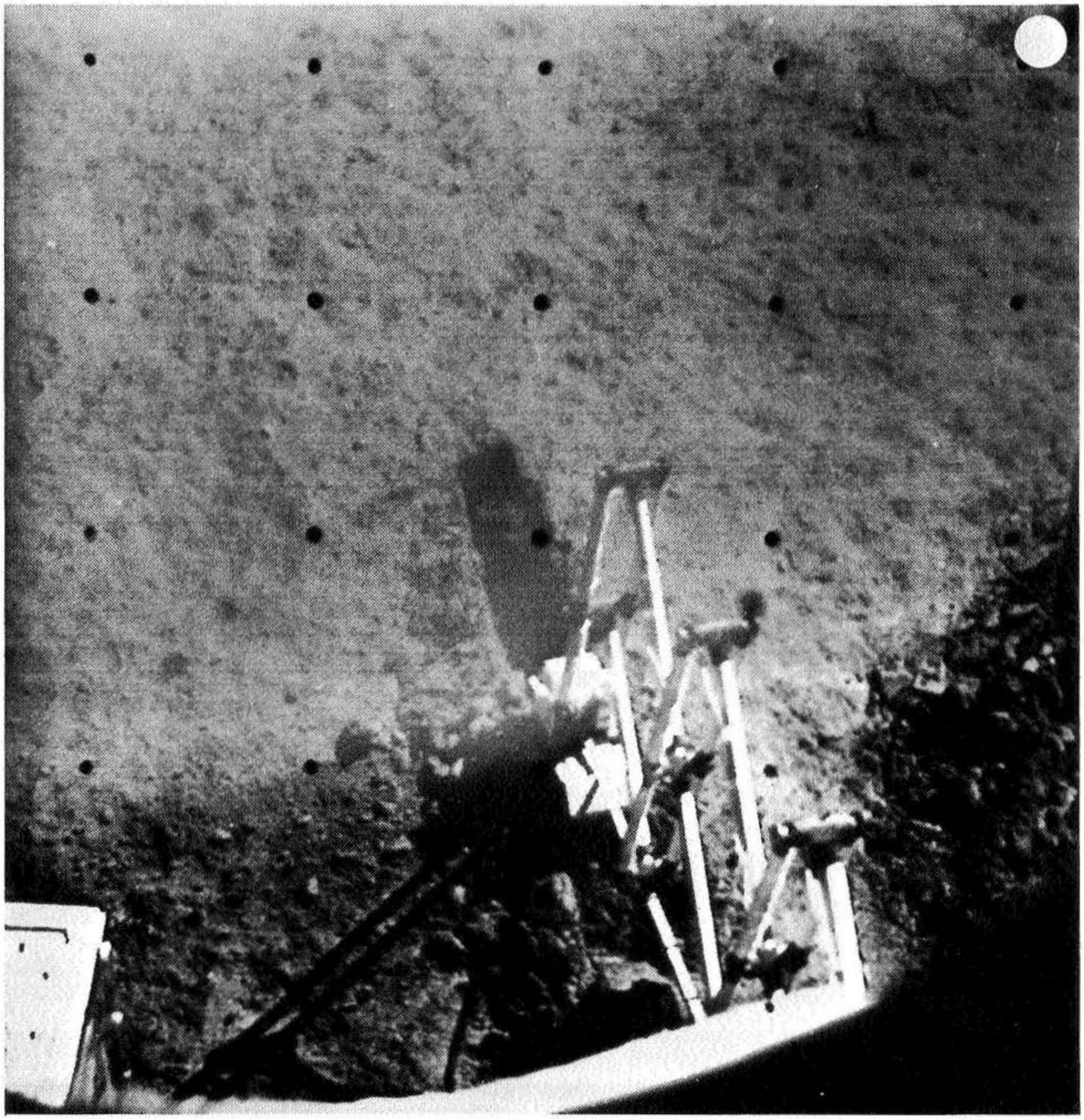


	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(63)	Day 113, 06:40:38	15	—47.86	2.4	f/6.6	N	Red	Processed

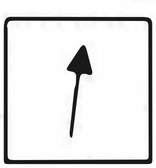


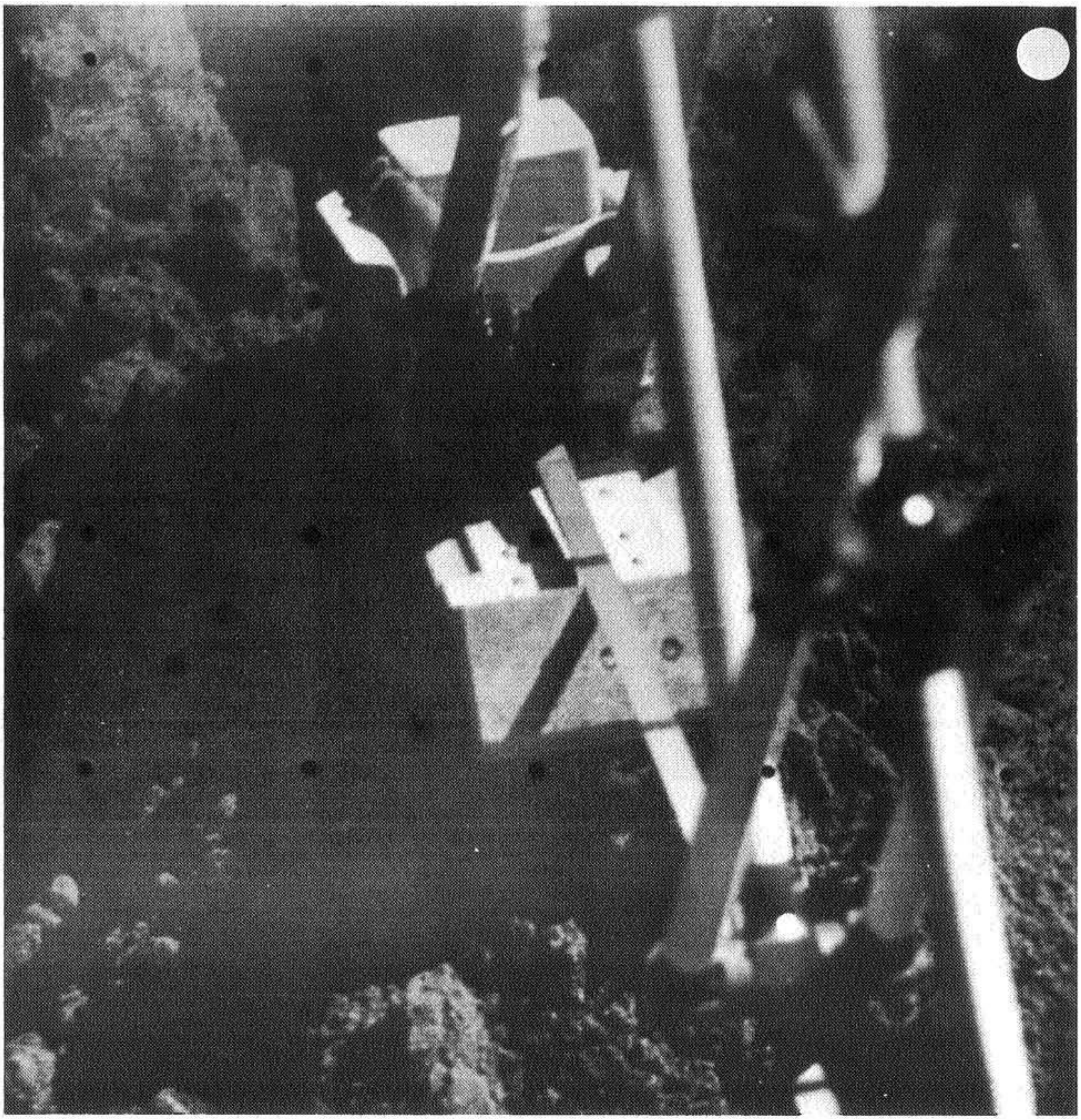


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(64)	Day 113, 06:41:08	15	—42.90	2.5	f/6.6	N	Red

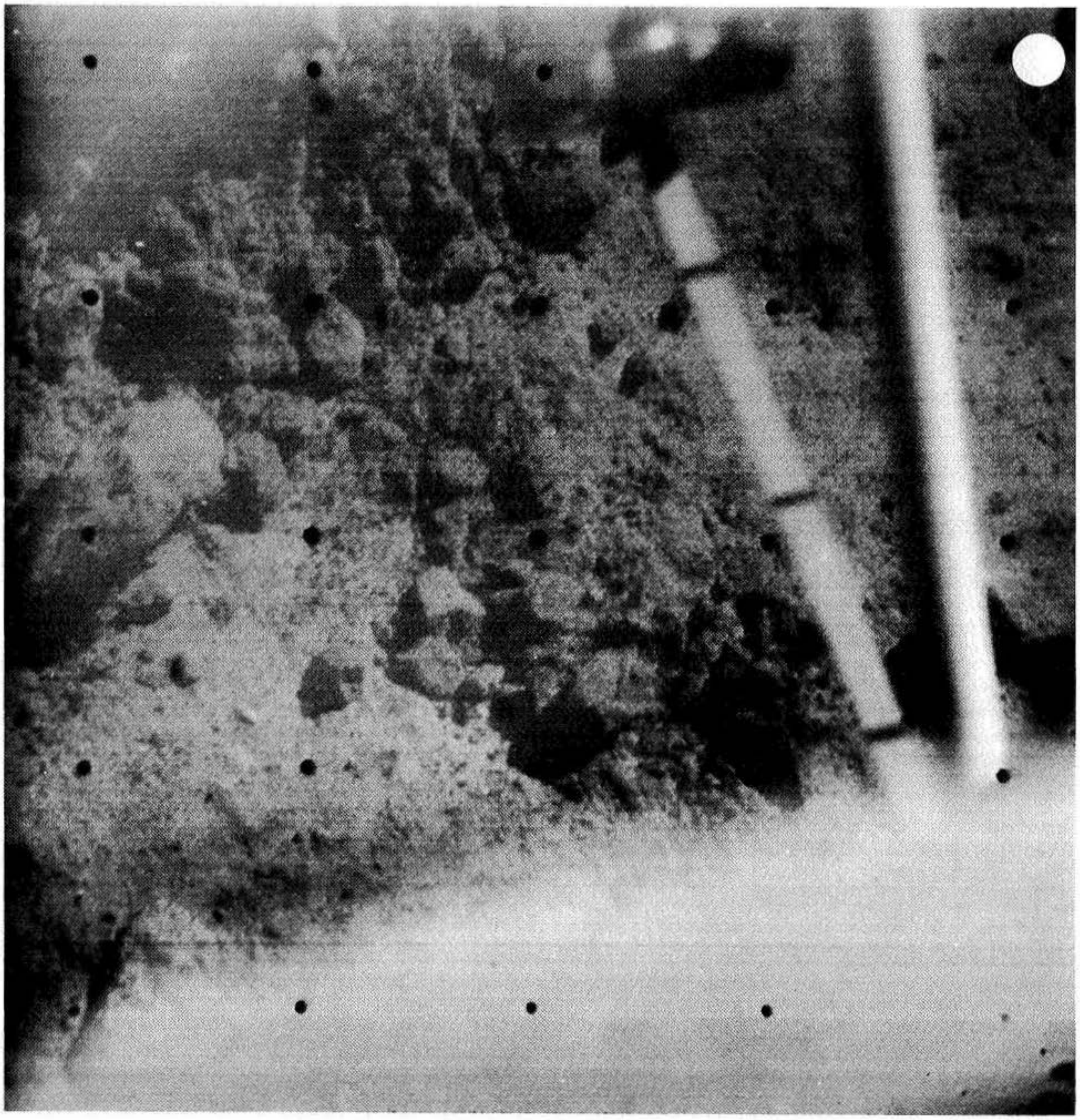


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(65)	Day 113, 07:21:20	15	—42.90	2.5	f/6.6	W	Red

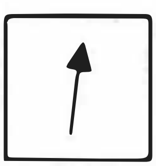


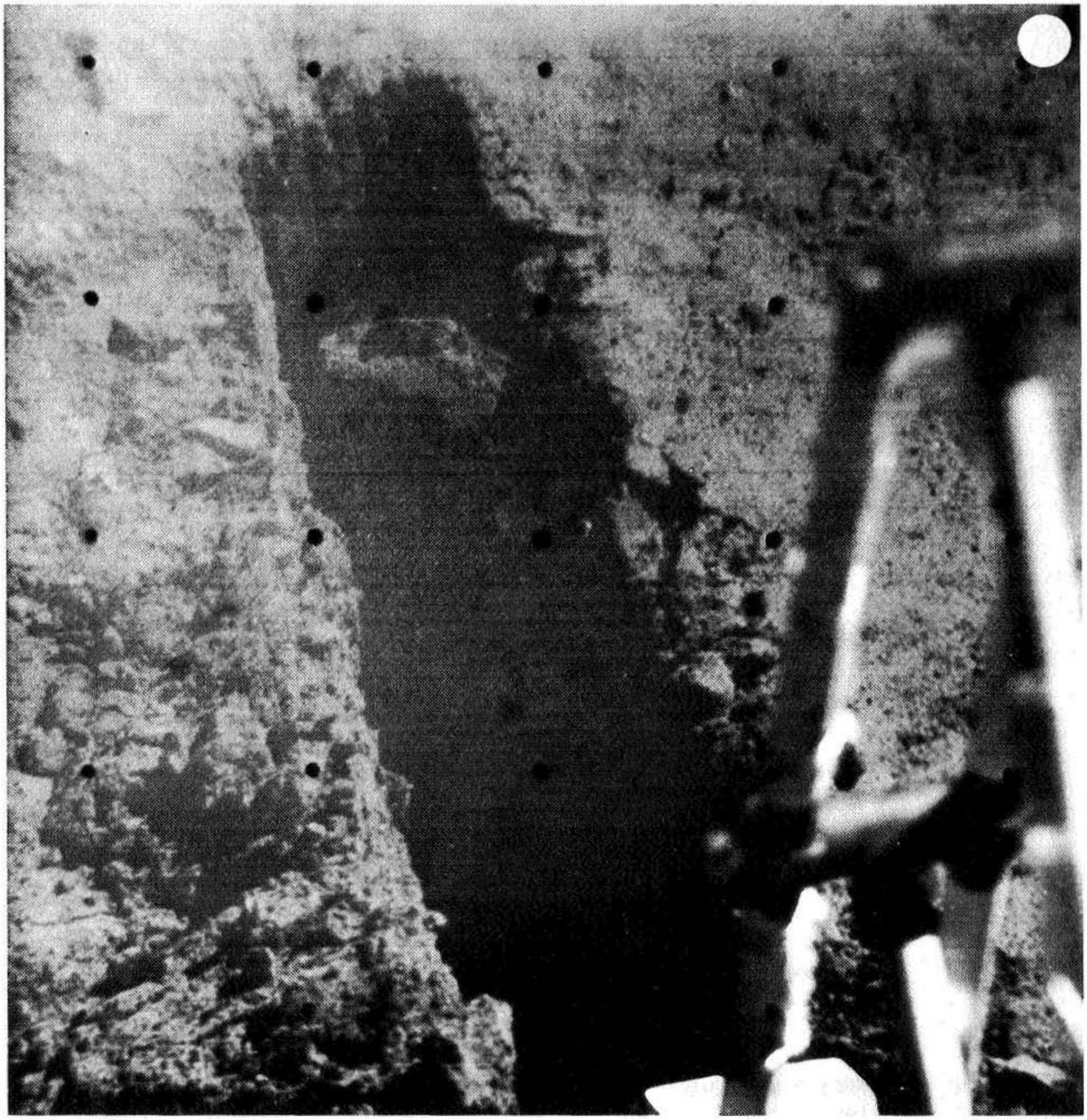


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(66)	**Day 113, 07:22:04**	**15**	**—47.86**	**2.4**	***f*/6.6**	**N**	**Red**

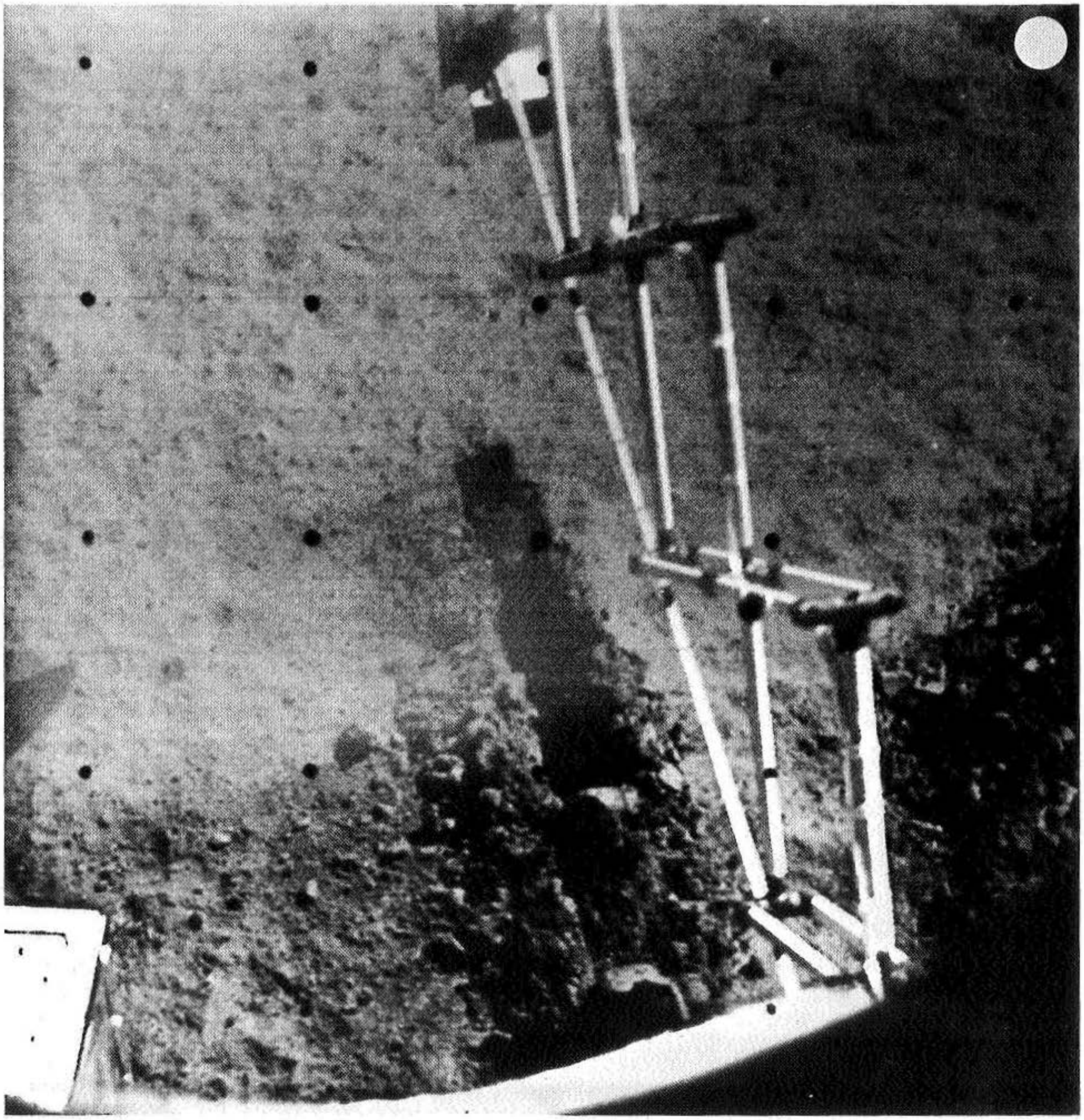


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(67)	Day 113, 07:22:55	15	—57.78	2.3	f/6.6	N	Red

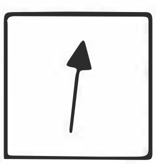


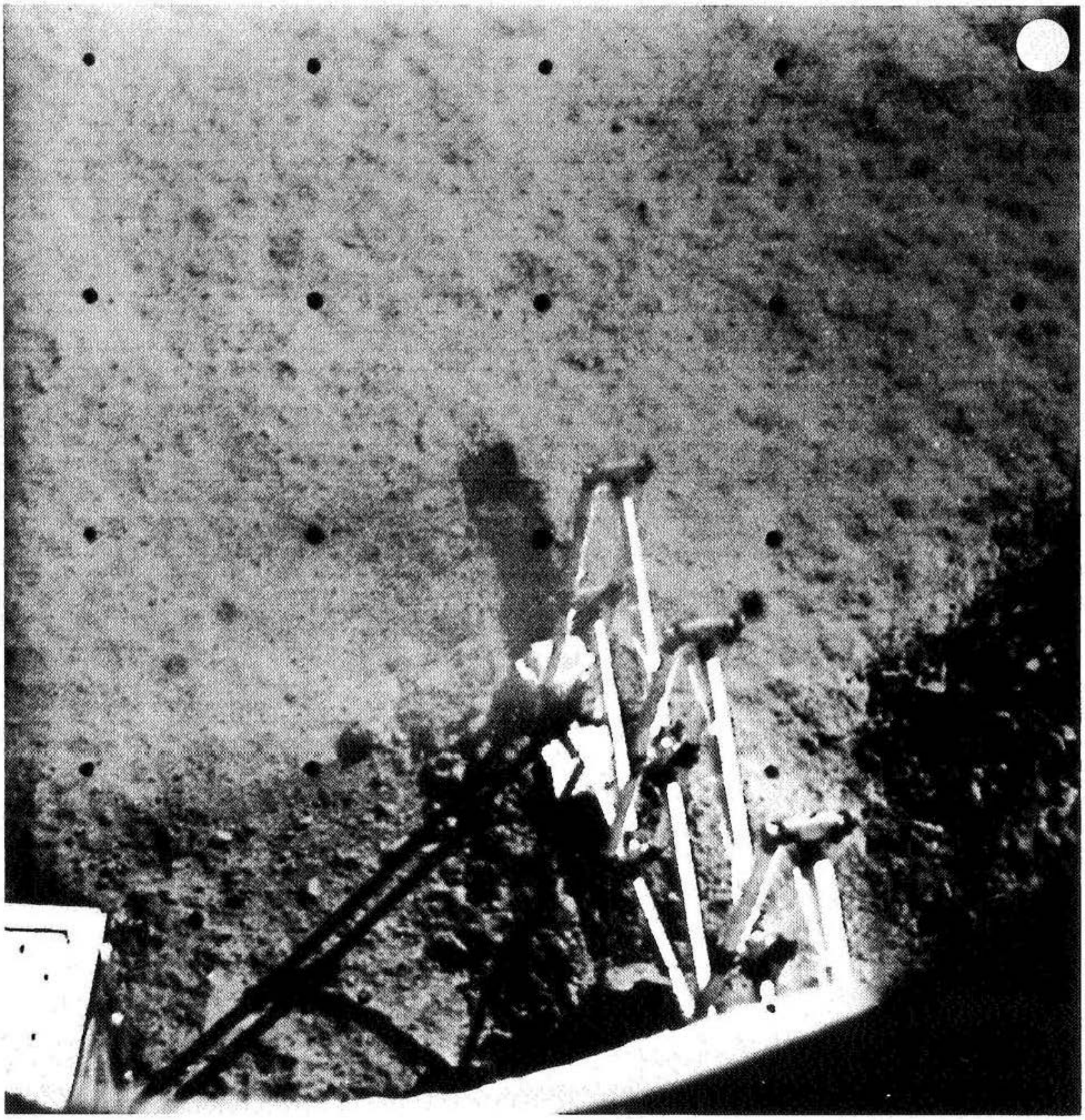


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(68)	Day 113, 07:49:47	15	—42.90	2.5	f/6.6	N	Red

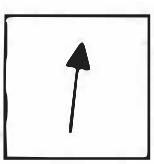


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(69)	Day 113, 08:17:56	15	—42.90	2.5	f/6.6	W	Red

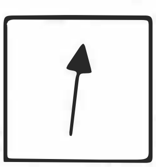


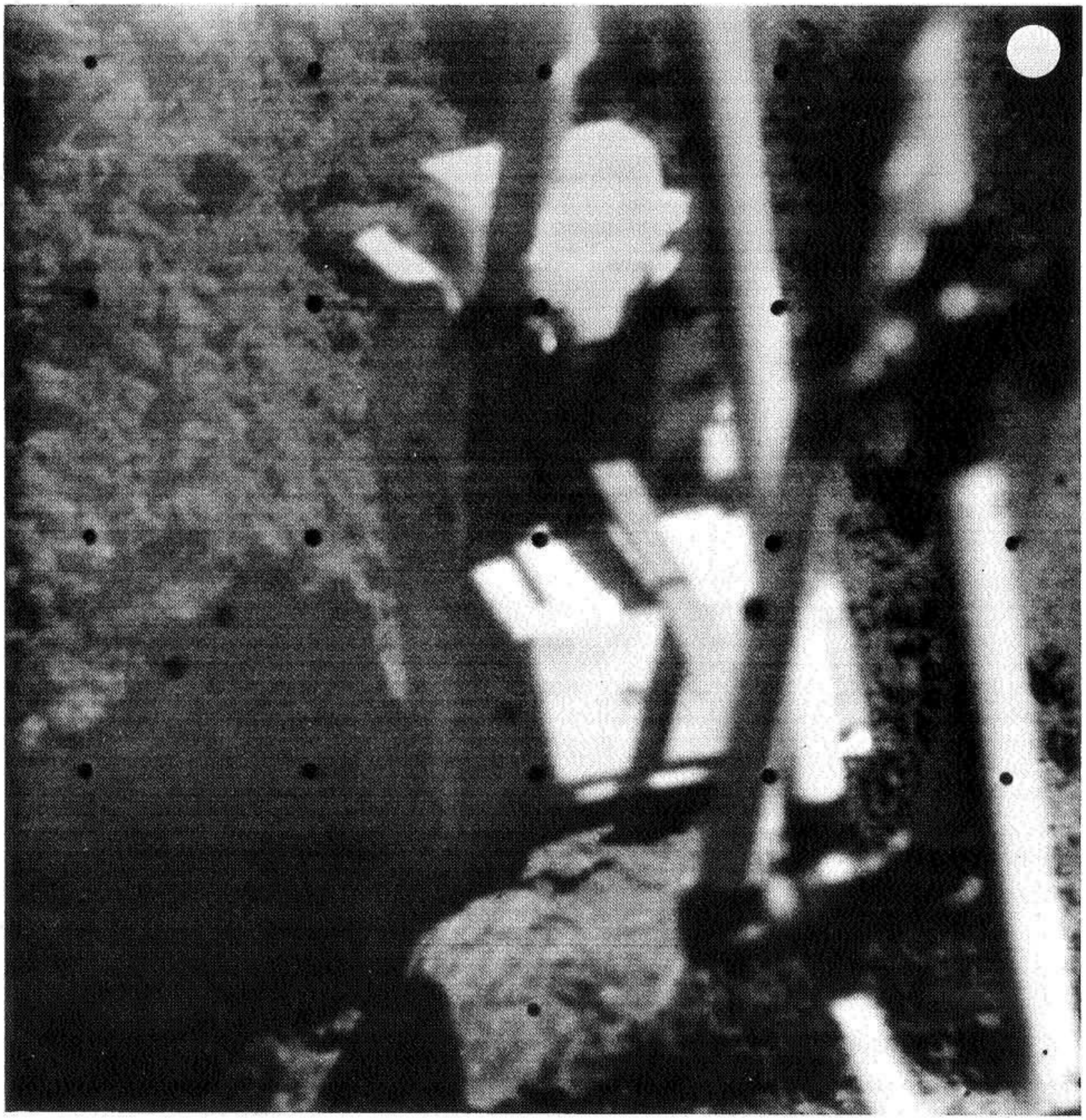


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(70)	Day 113, 09:32:41	15	−42.90	2.5	f/6.6	W	Red

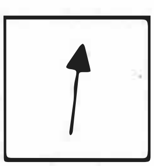


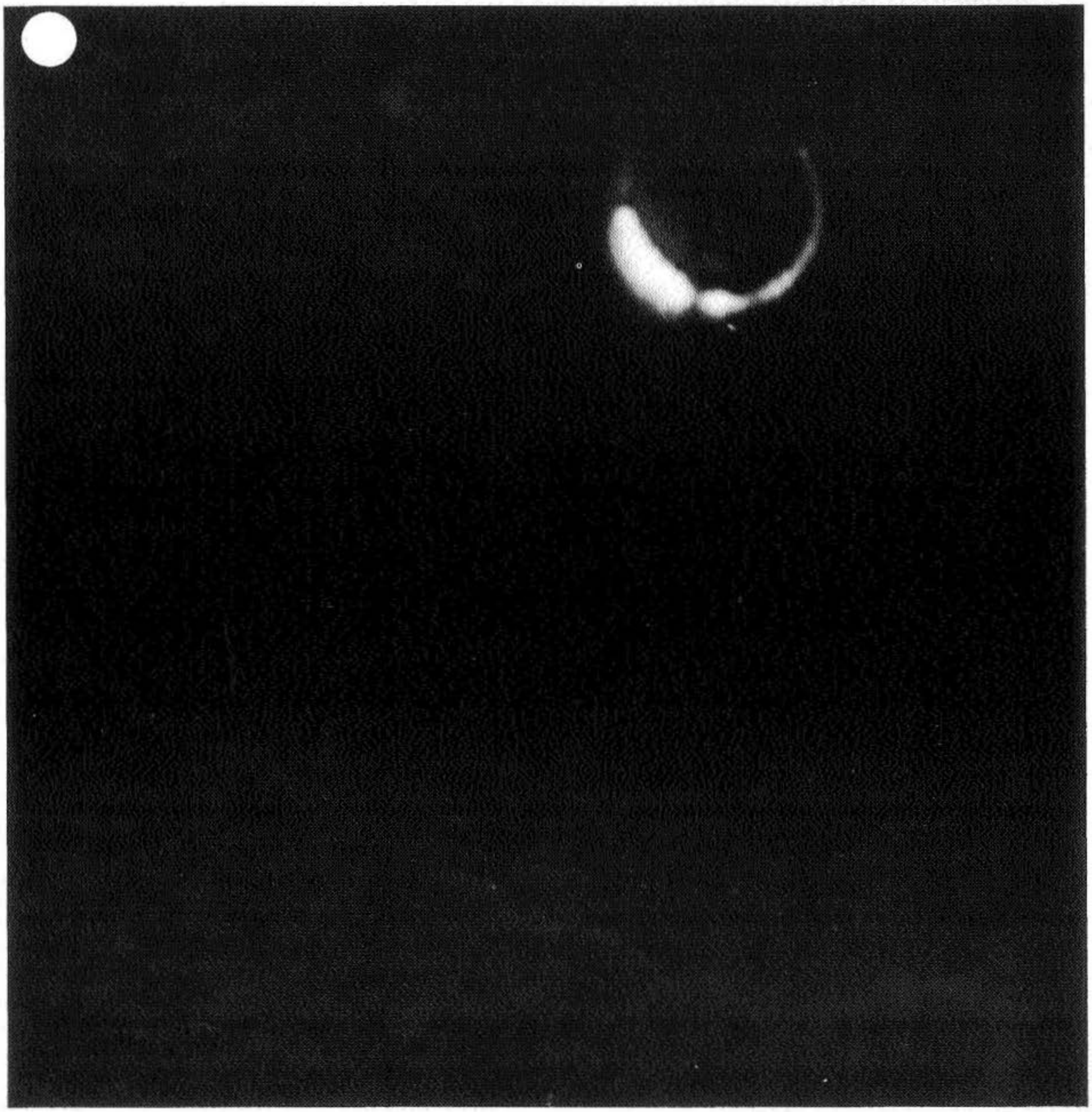
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(71)	Day 114, 05:19:23	15	—47.86	2.5	f/6.6	N	Red



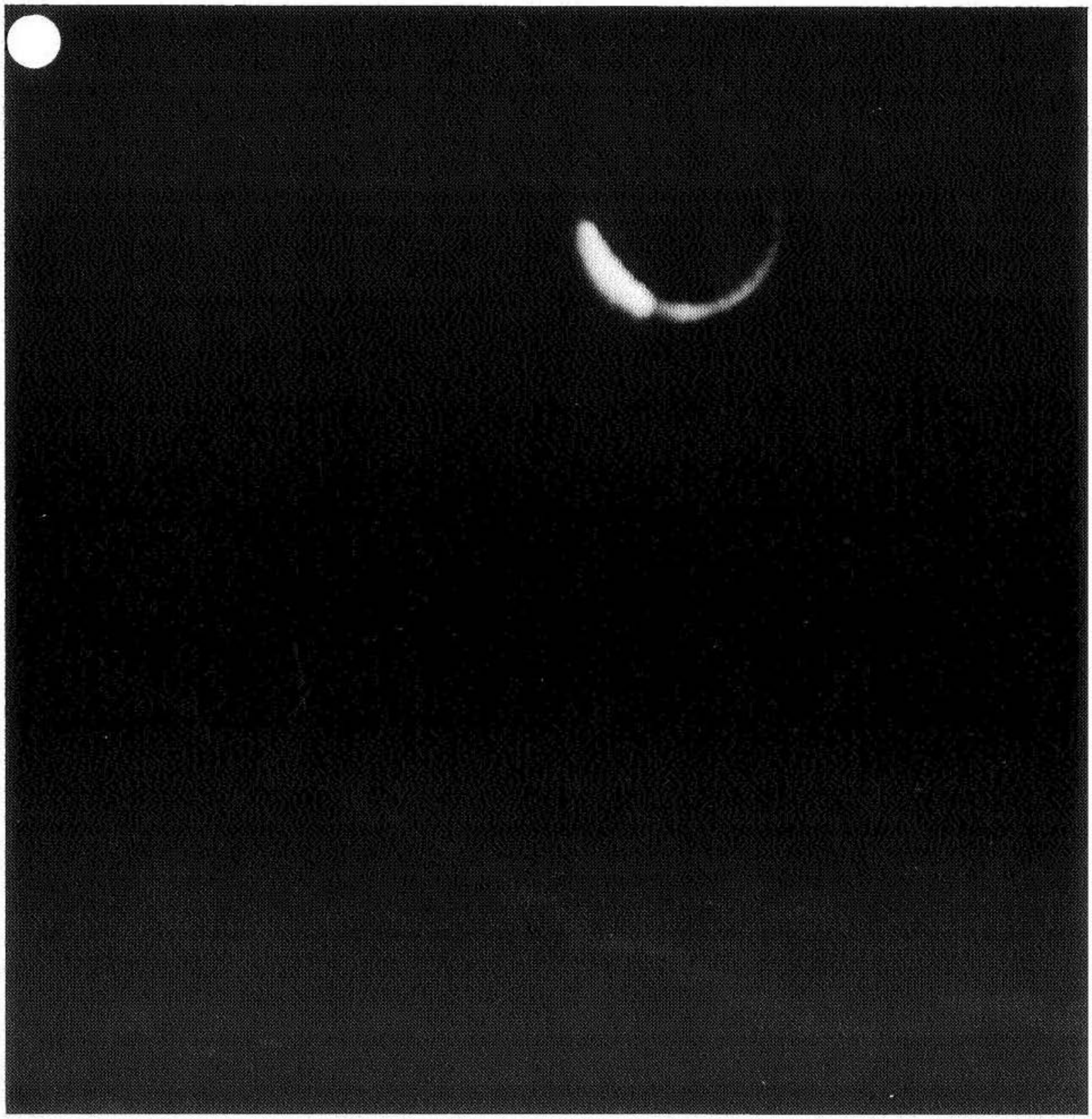


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(72)	Day 114, 06:14:55	15	—52.82	2.5	f/6.6	N	Red

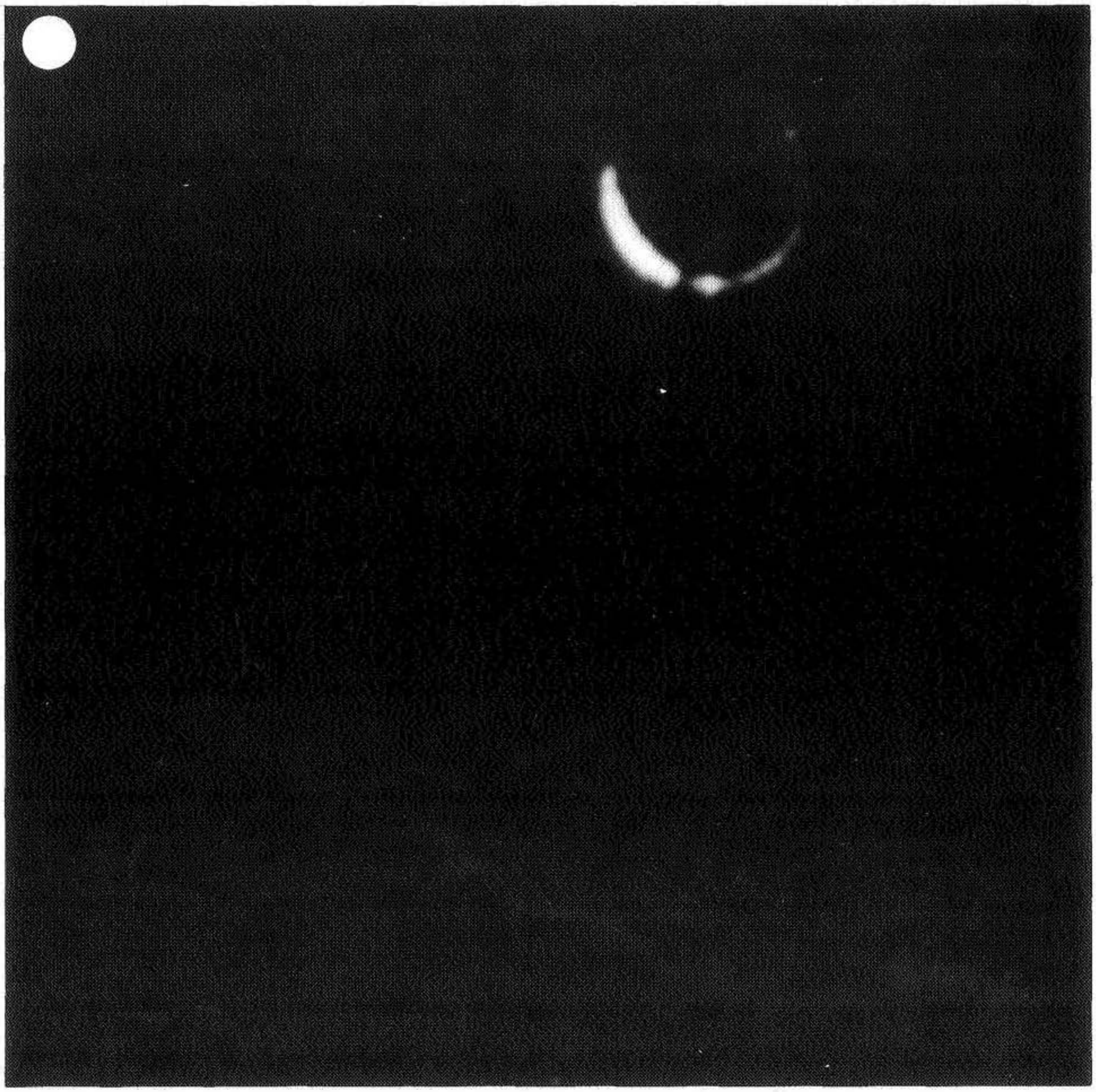




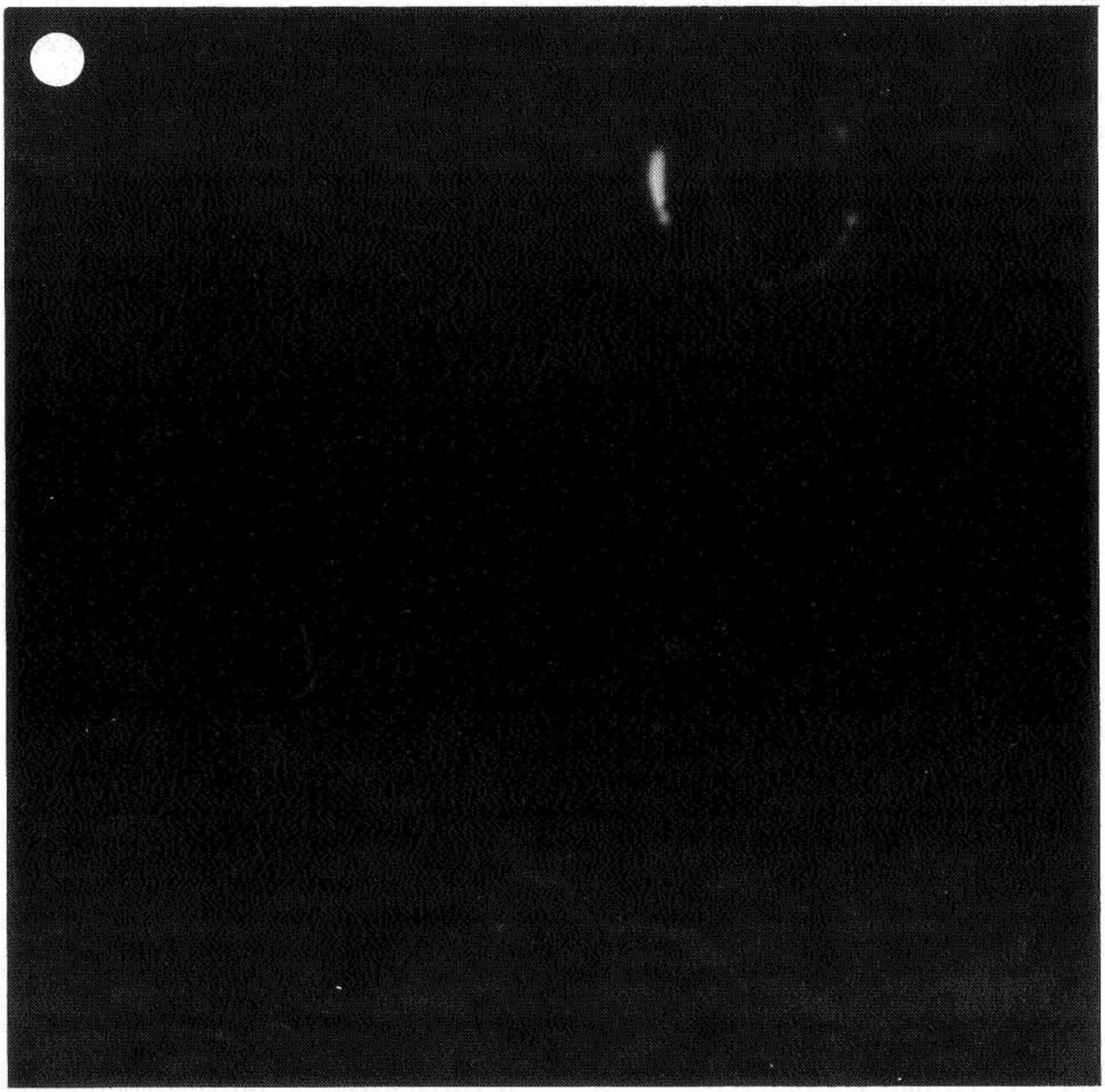
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(73)	Day 114, 11:23:06	—63	35.5	30.1	f/3.9	W	Green	Processed



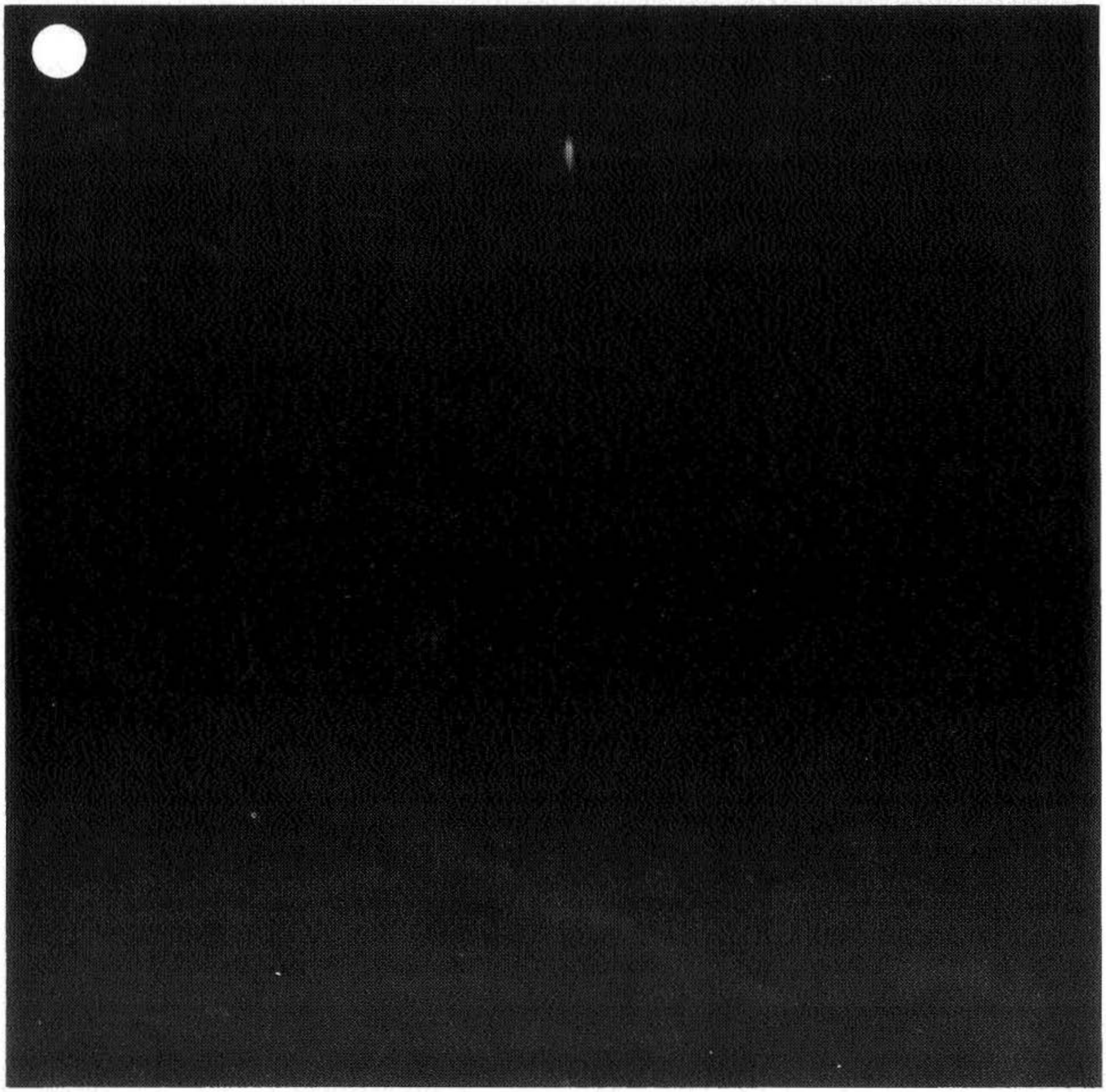
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(74)	Day 114, 11:24:01	—63	35.5	30.1	f/3.9	W	Blue	Processed



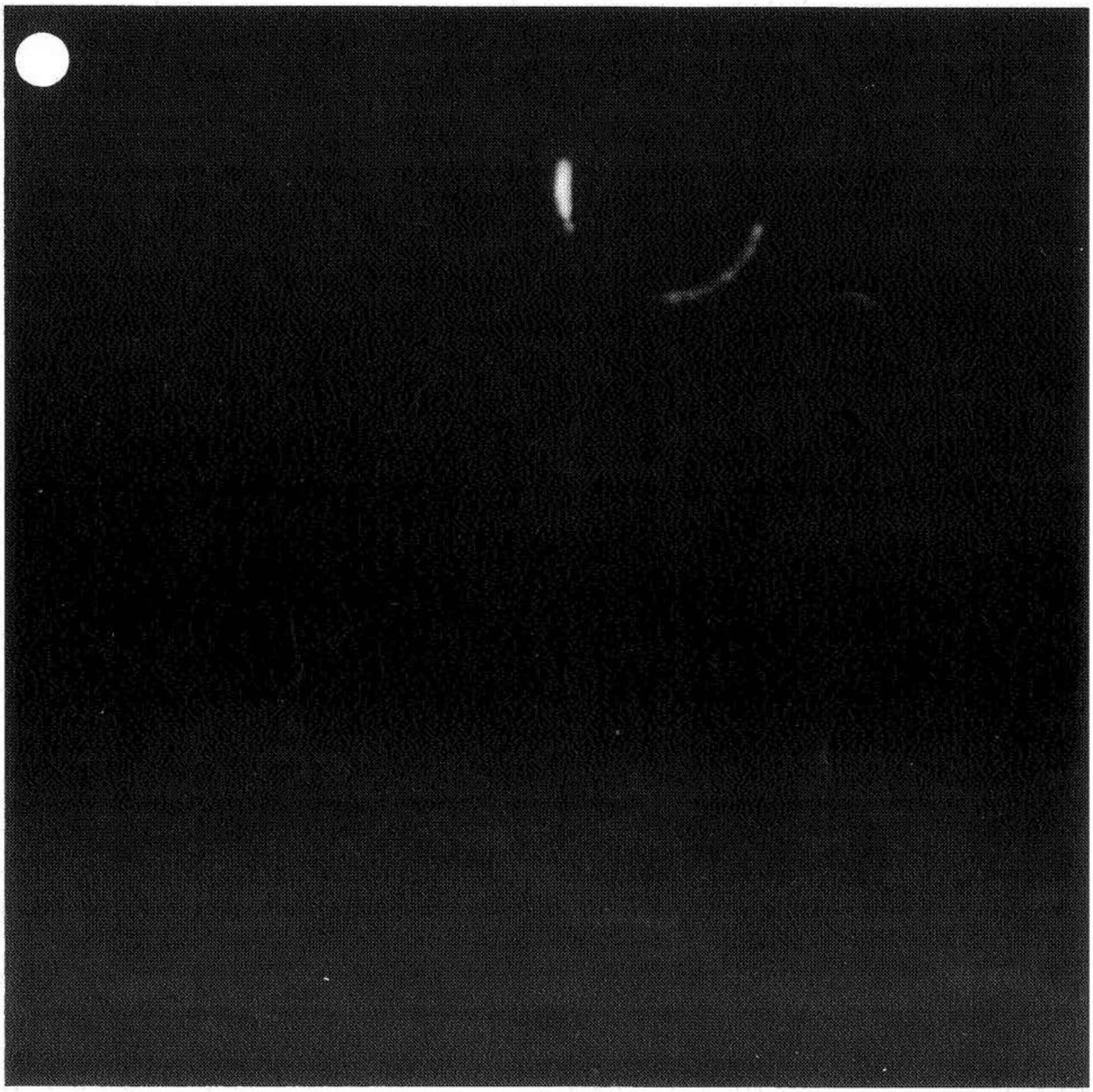
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(75)	Day 114, 11:31:40	—63	35.5	30.2	f/3.9	W	Red	Processed



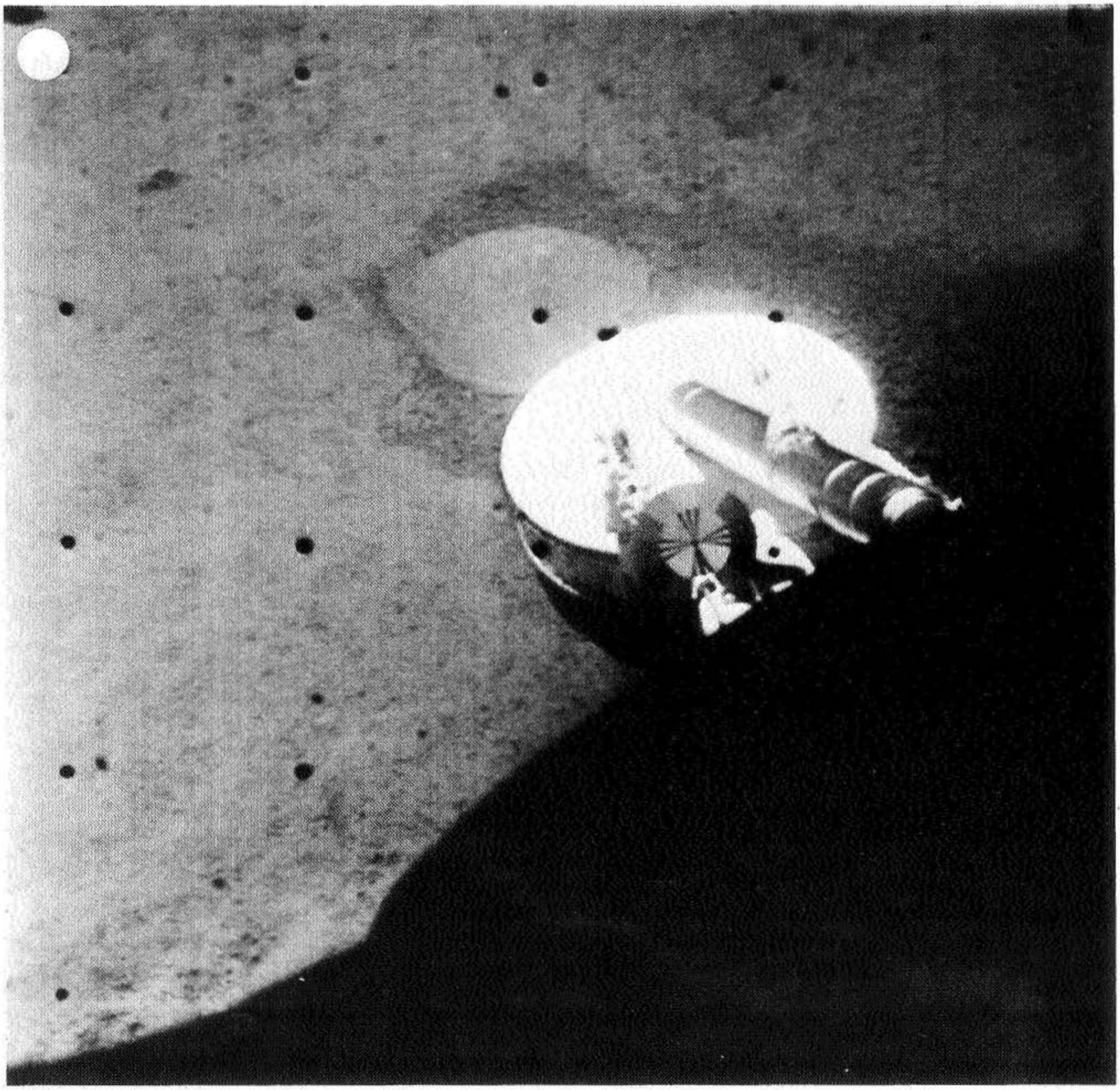
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(76)	Day 114, 12:02:10	—63	35.7	29.9	f/5.8	W	Red	Processed



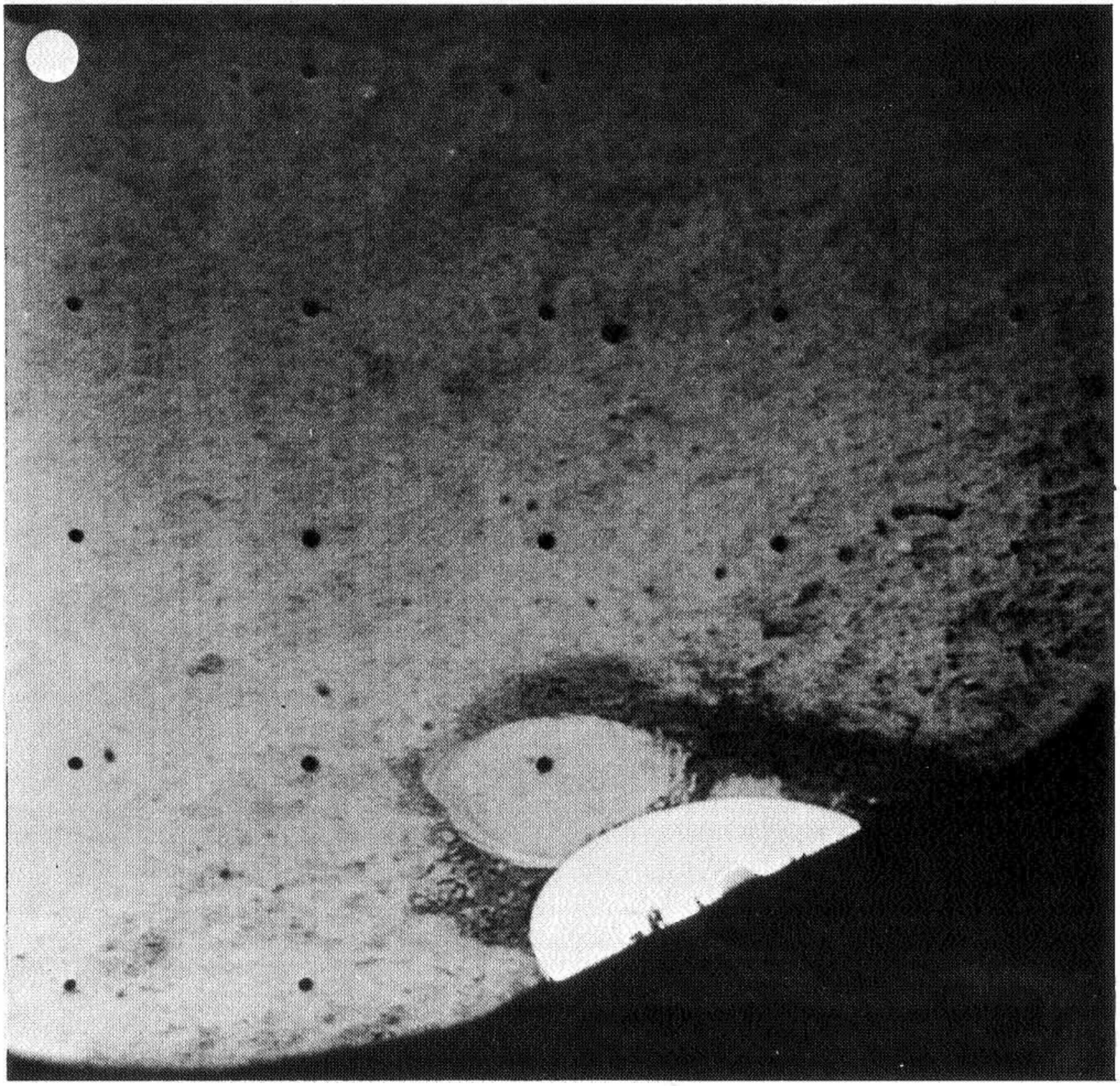
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(77)	Day 114, 12:02:44	—63	35.3	30.3	f/5.8	W	Blue	Processed



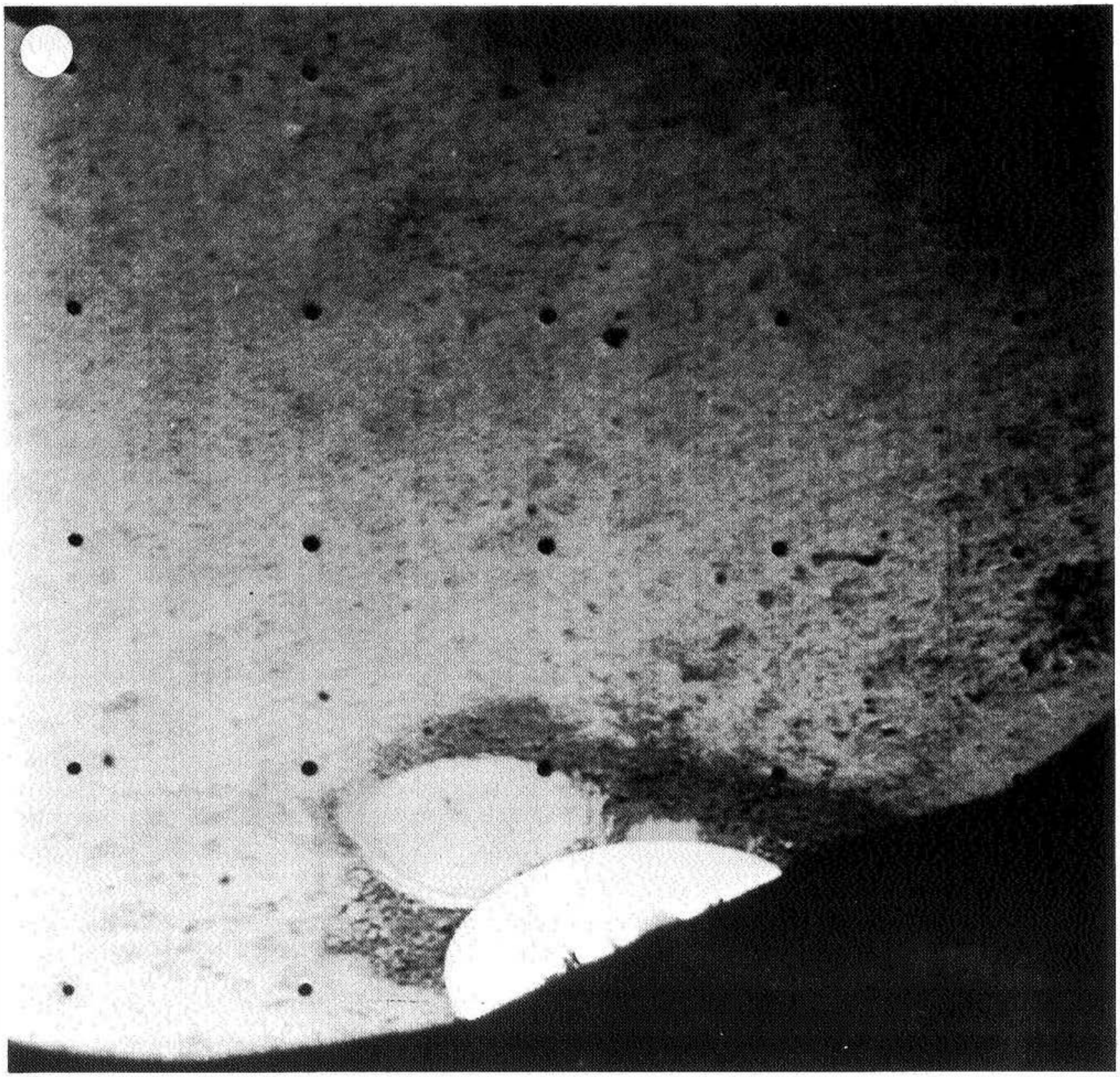
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(78)	Day 114, 12:03:20	—63	35.7	29.9	*f*/5.8	W	Green	Processed



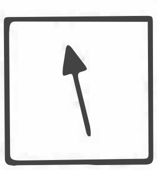
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(79)	Day 116, 05:48:17	—54	—57.78	2.5	f/17.0	W	Clear

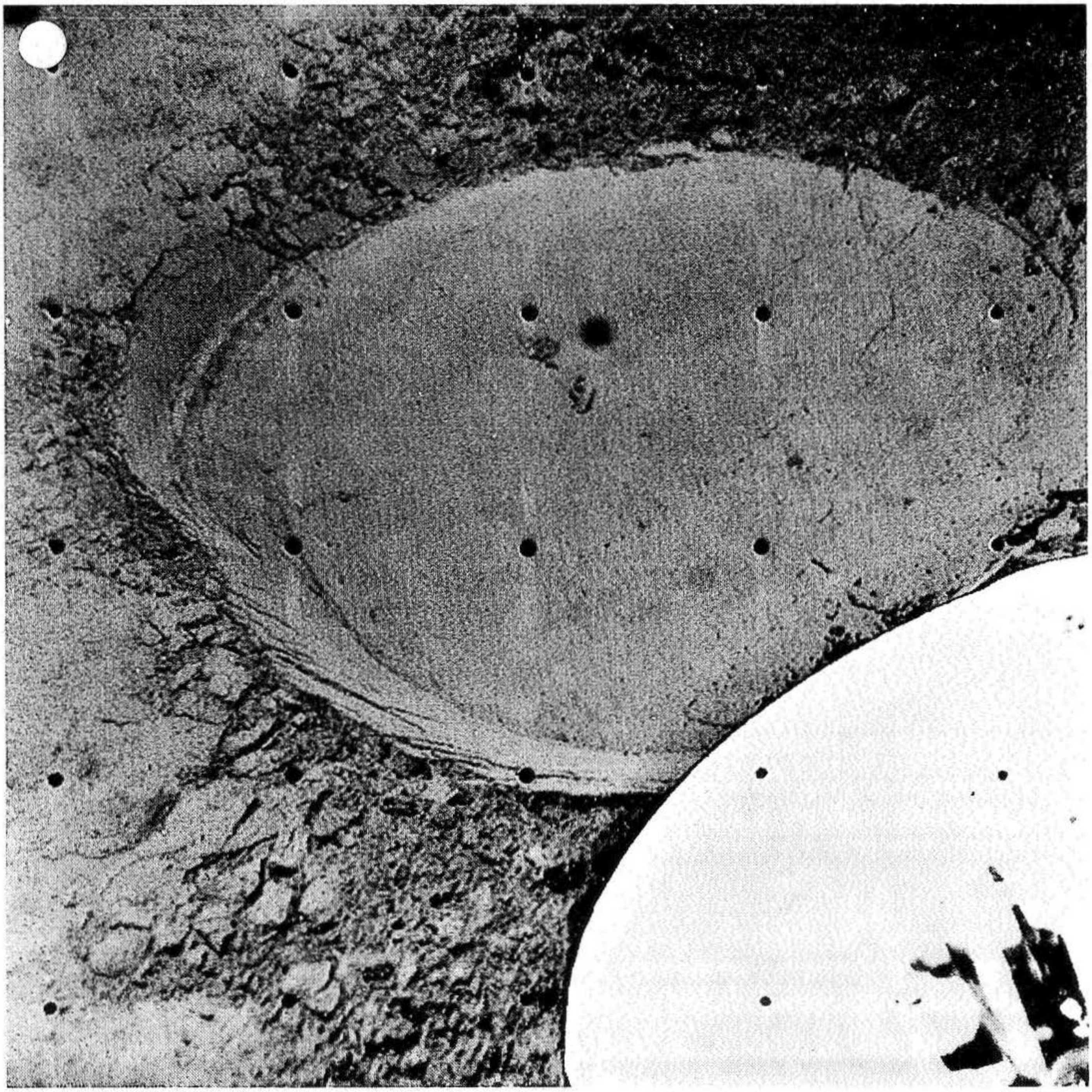


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(80)	Day 116, 05:53:57	−63	−47.86	2.5	f/17.0	W	Clear

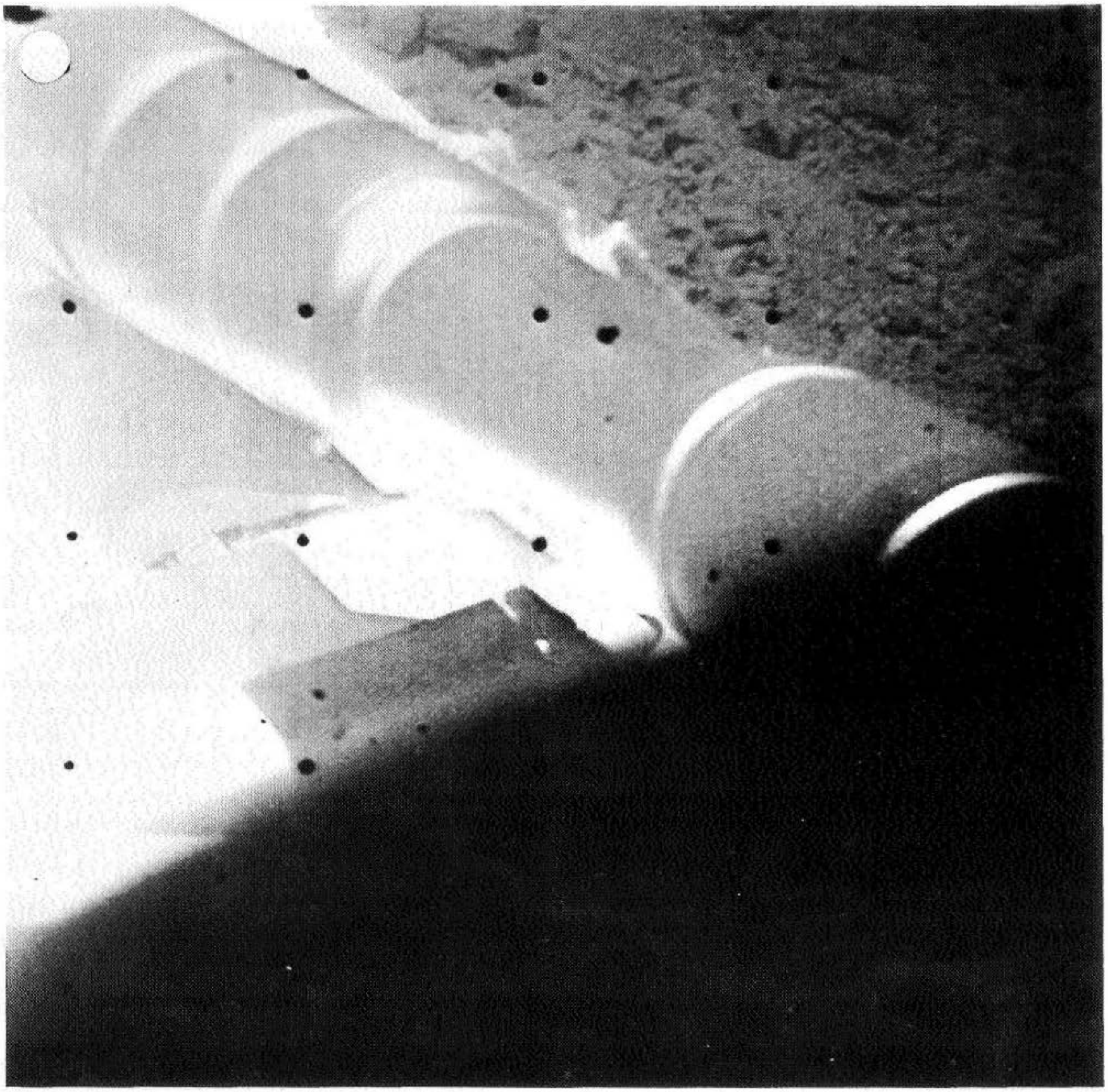


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(81)	Day 116, 05:54:53	—66	—47.86	2.5	f/17.0	W	Clear

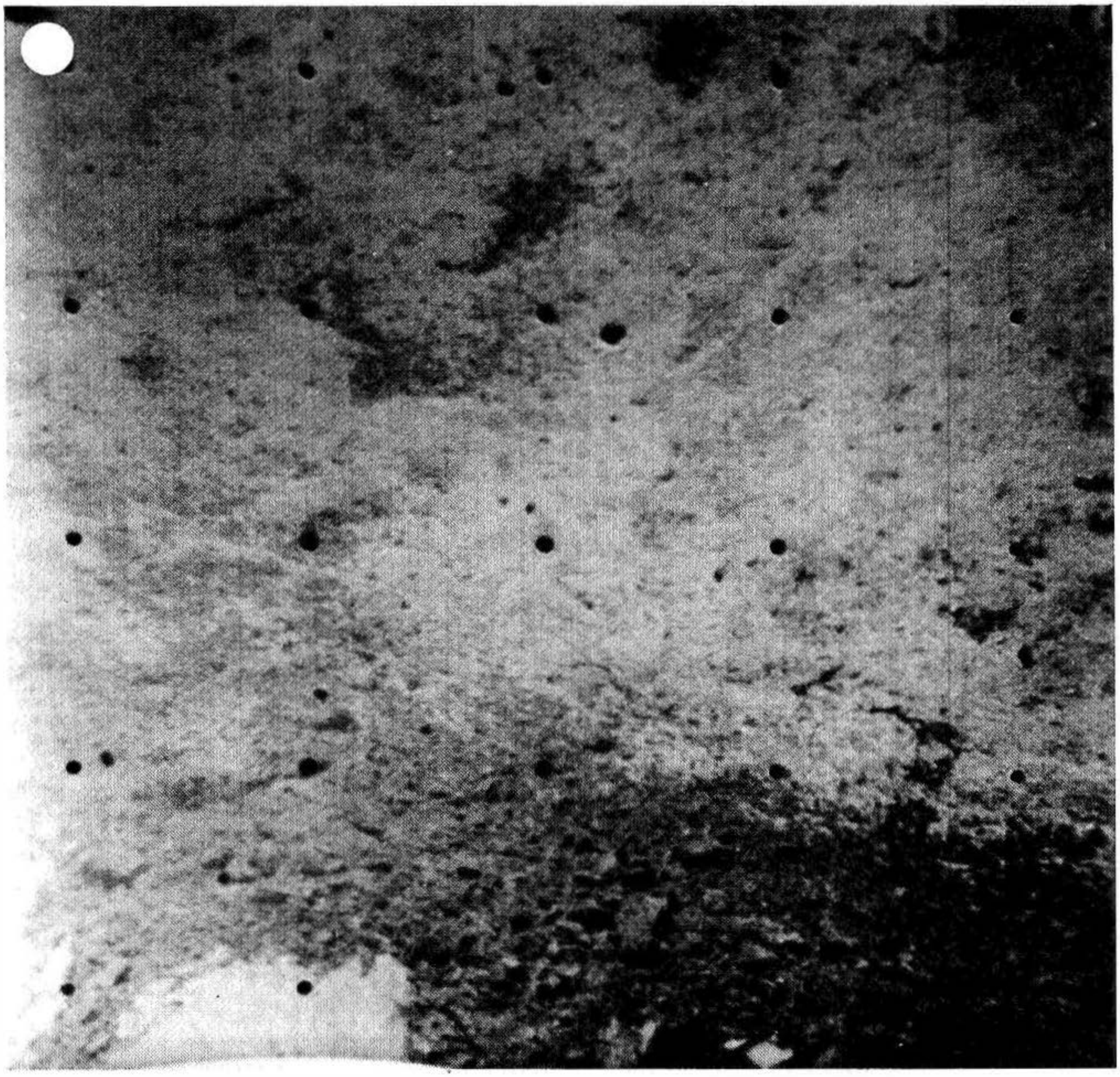




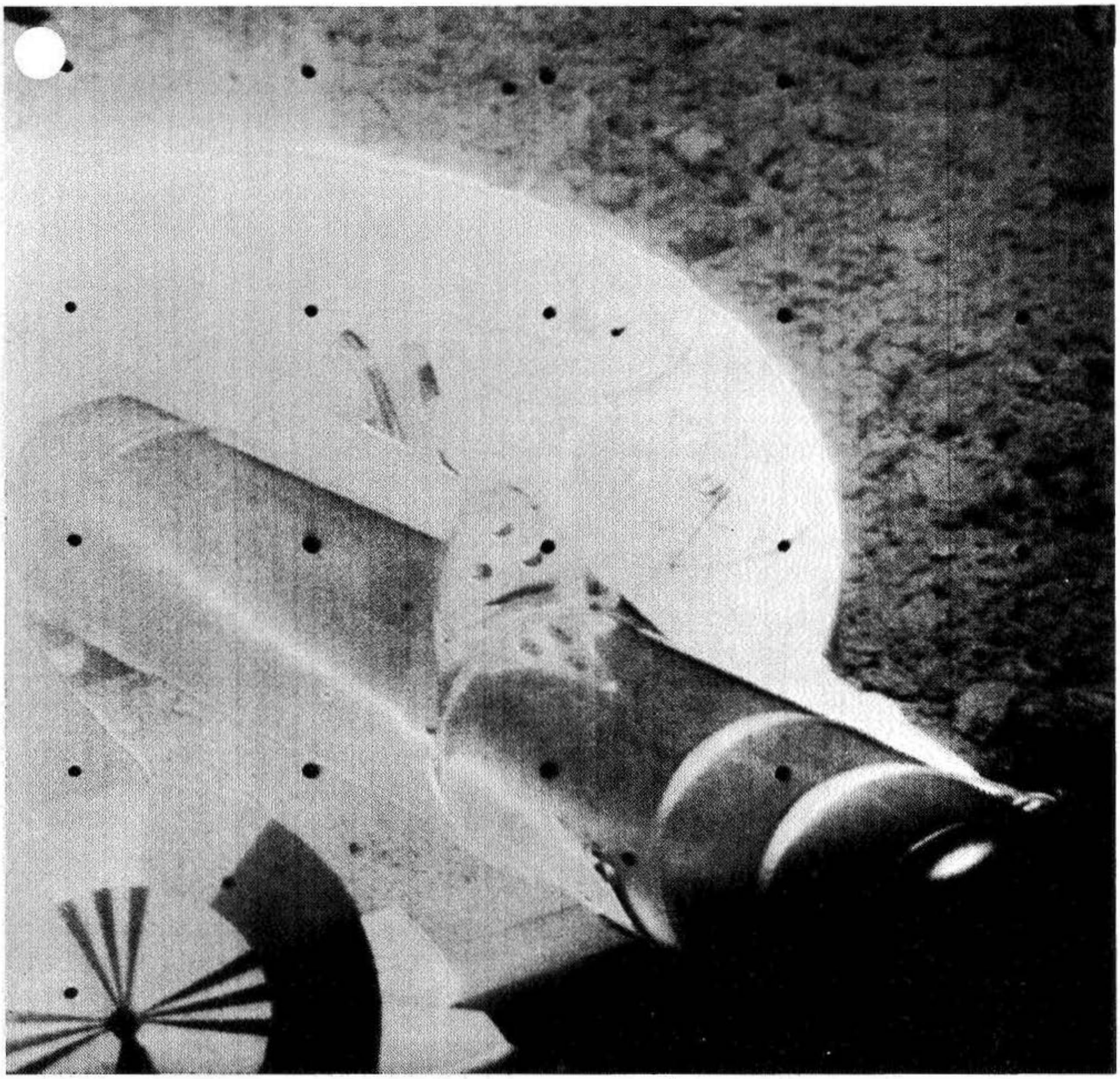
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(82)	Day 116, 06:05:55	—54	—52.82	2.7	f/5.8	N	Blue	Processed



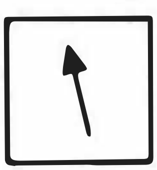
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(83)	Day 116, 07:06:46	—69	—62.74	2.5	f/17.9	N	Clear

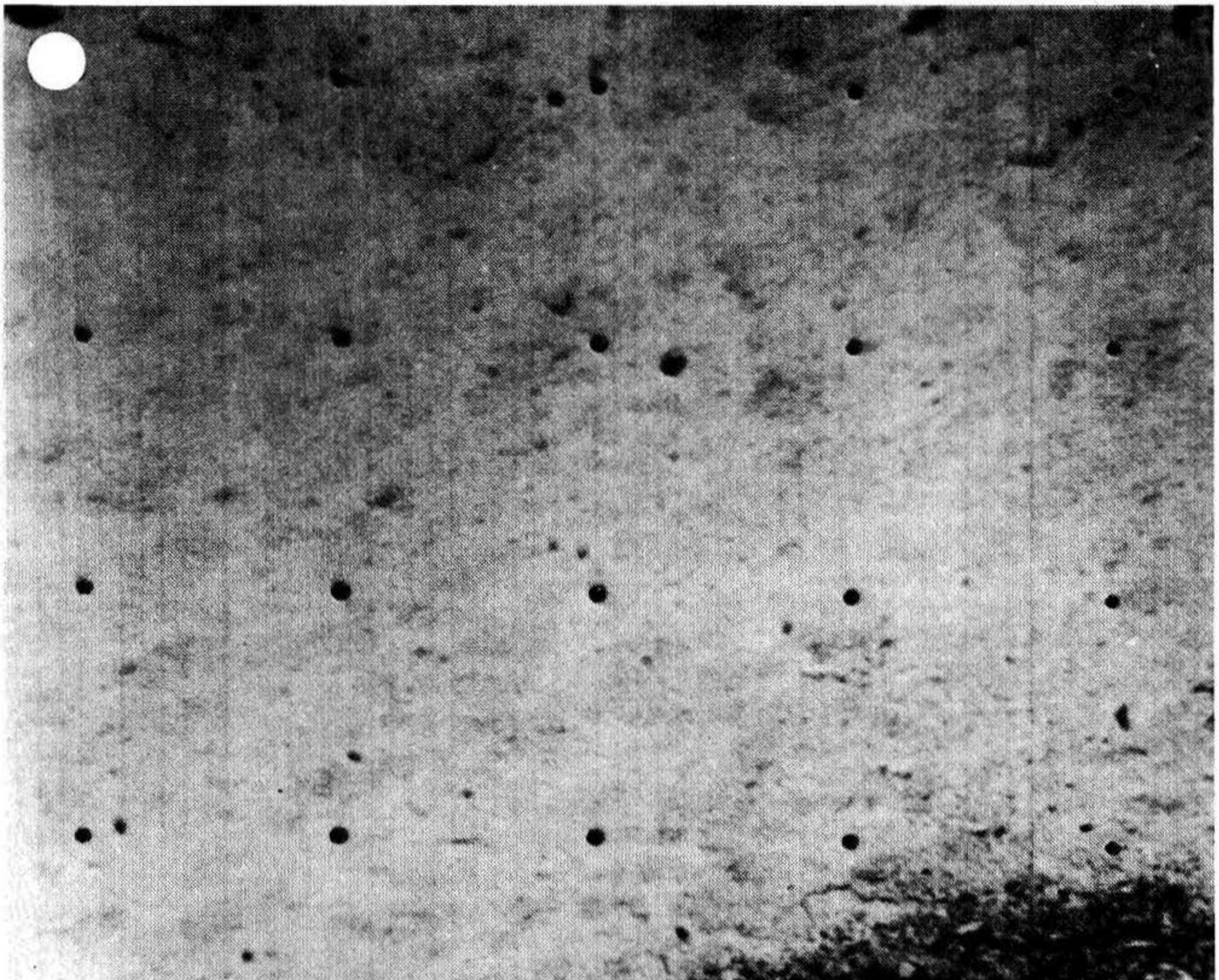


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(84)	Day 116, 07:07:25	—69	—52.82	2.7	f/17.0	N	Clear

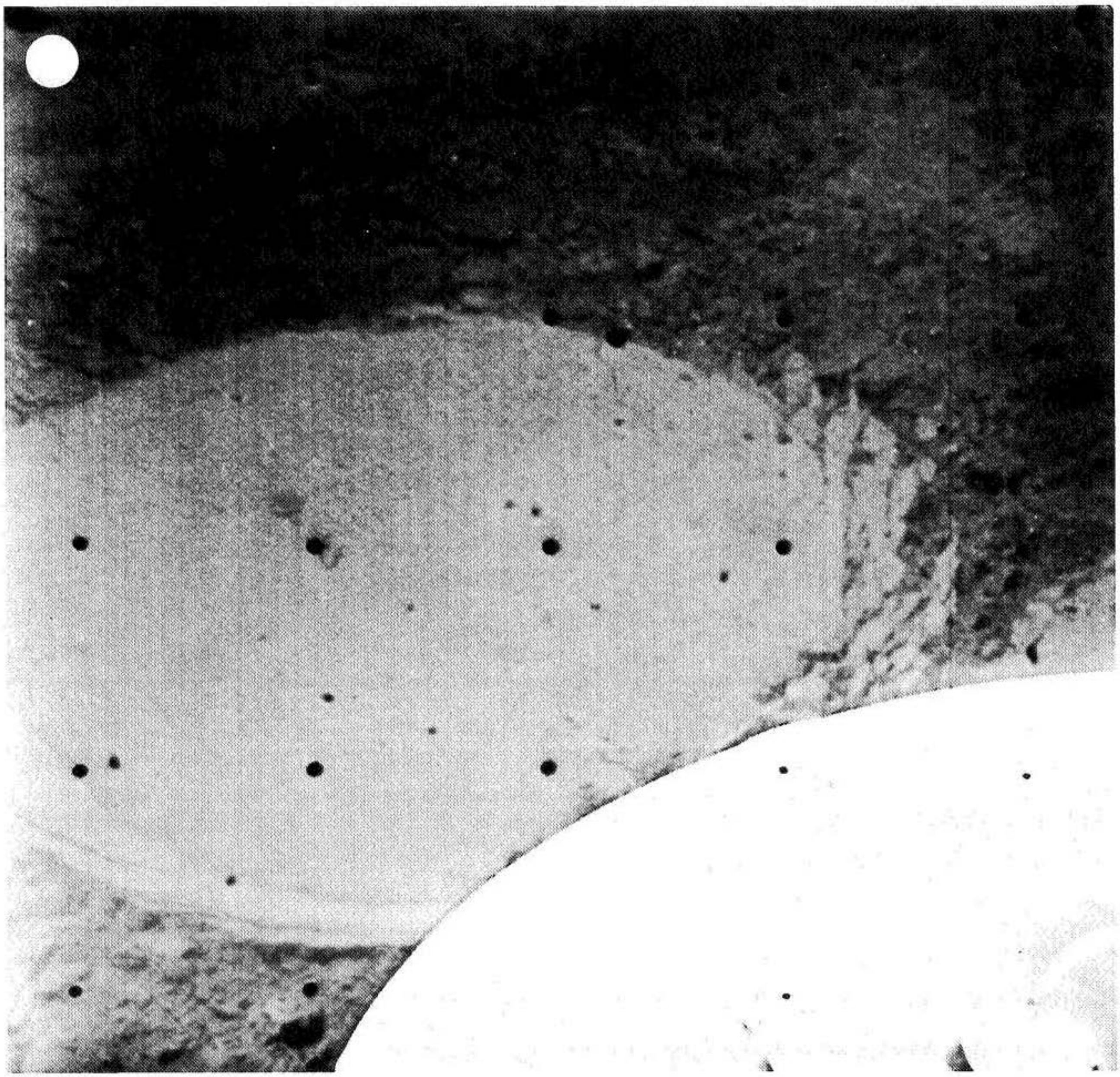


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(85)	Day 116, 07:19:02	−66	−57.78	2.5	f/16.9	N	Clear

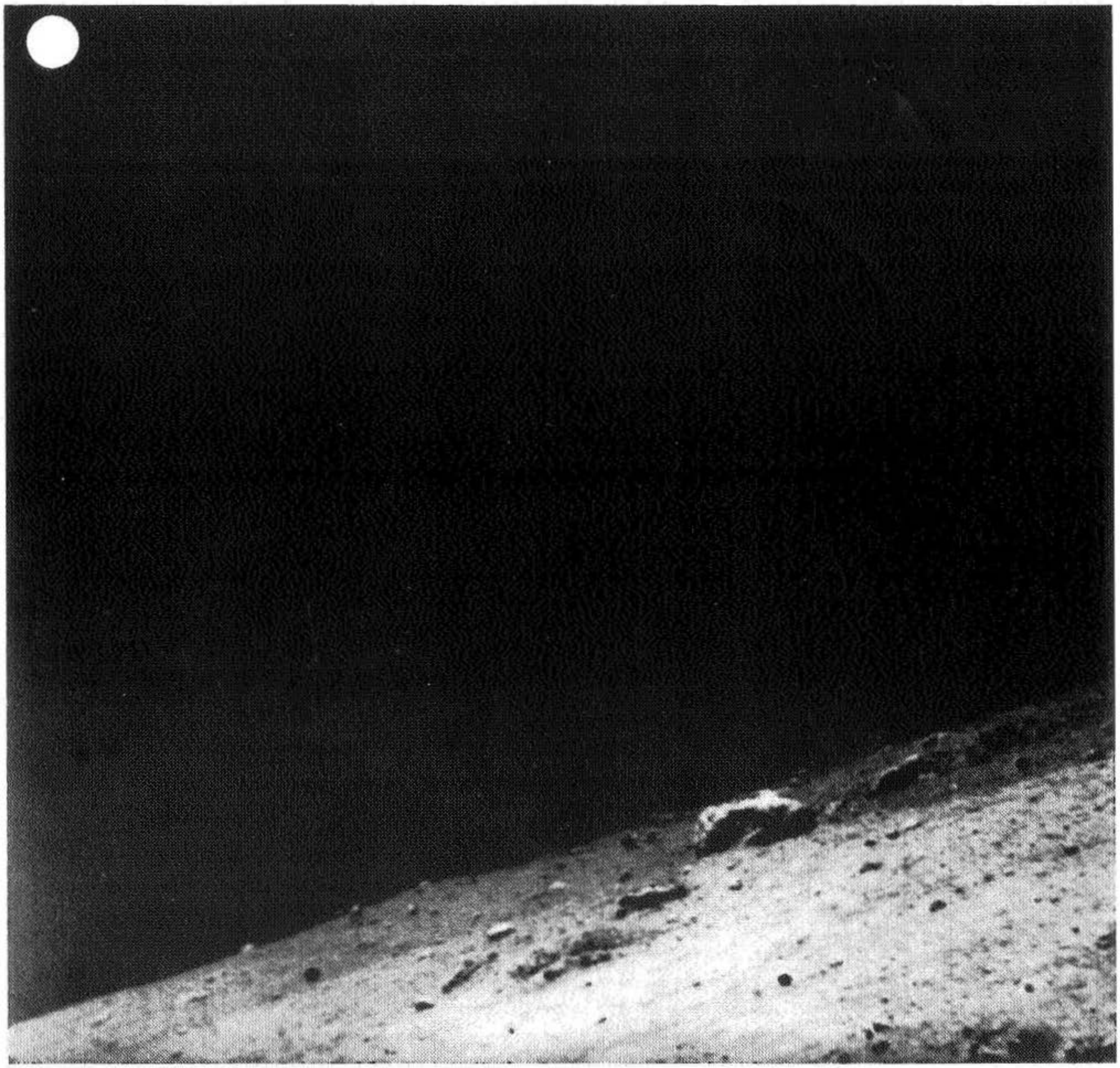




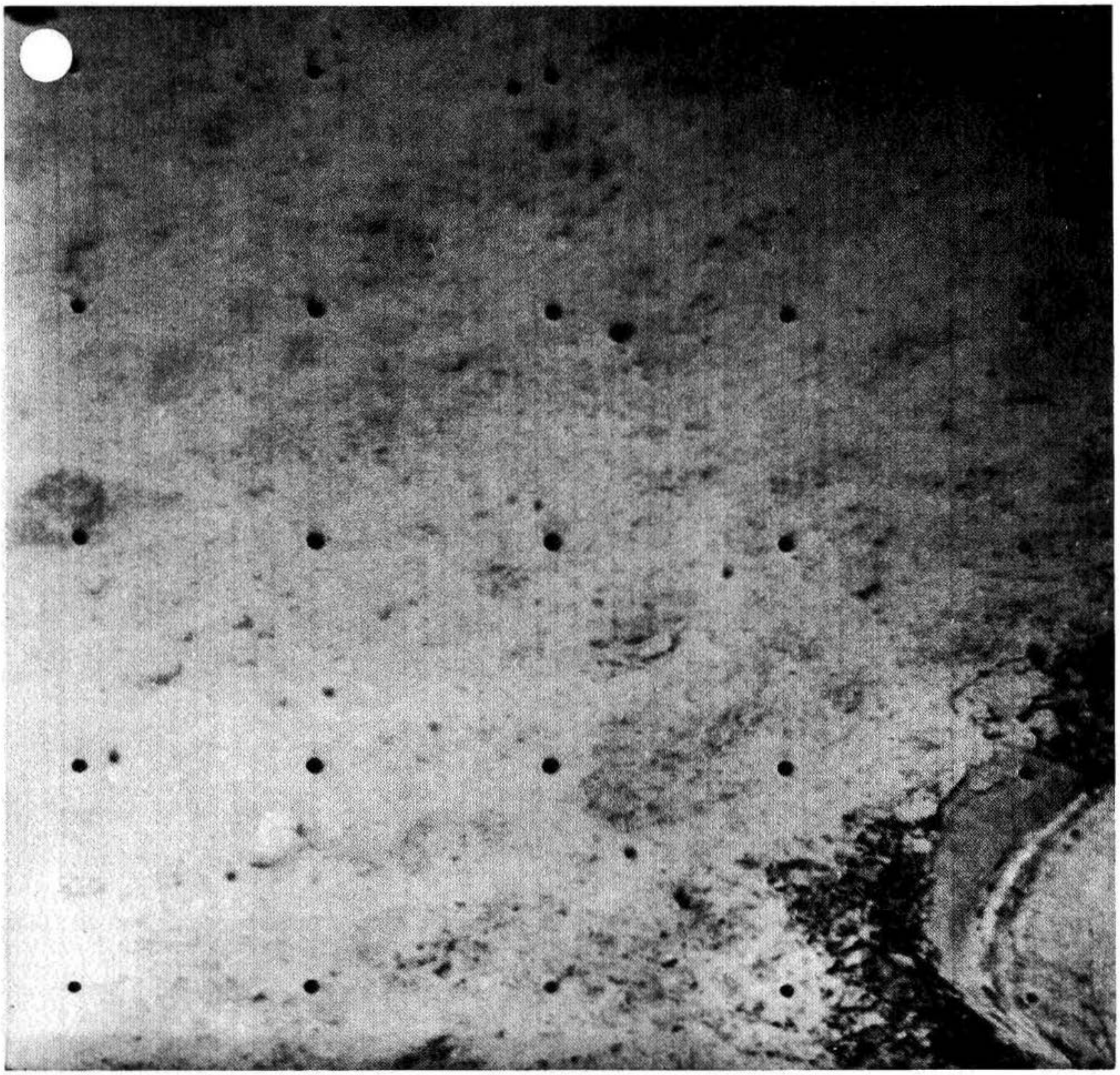
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(86)	Day 116, 07:23:17	—60	—47.86	2.7	f/17.0	N	Clear



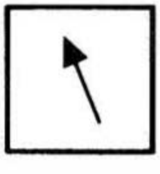
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(87)	Day 116, 07:30:04	—60	—52.82	2.5	f/21.6	N	Clear

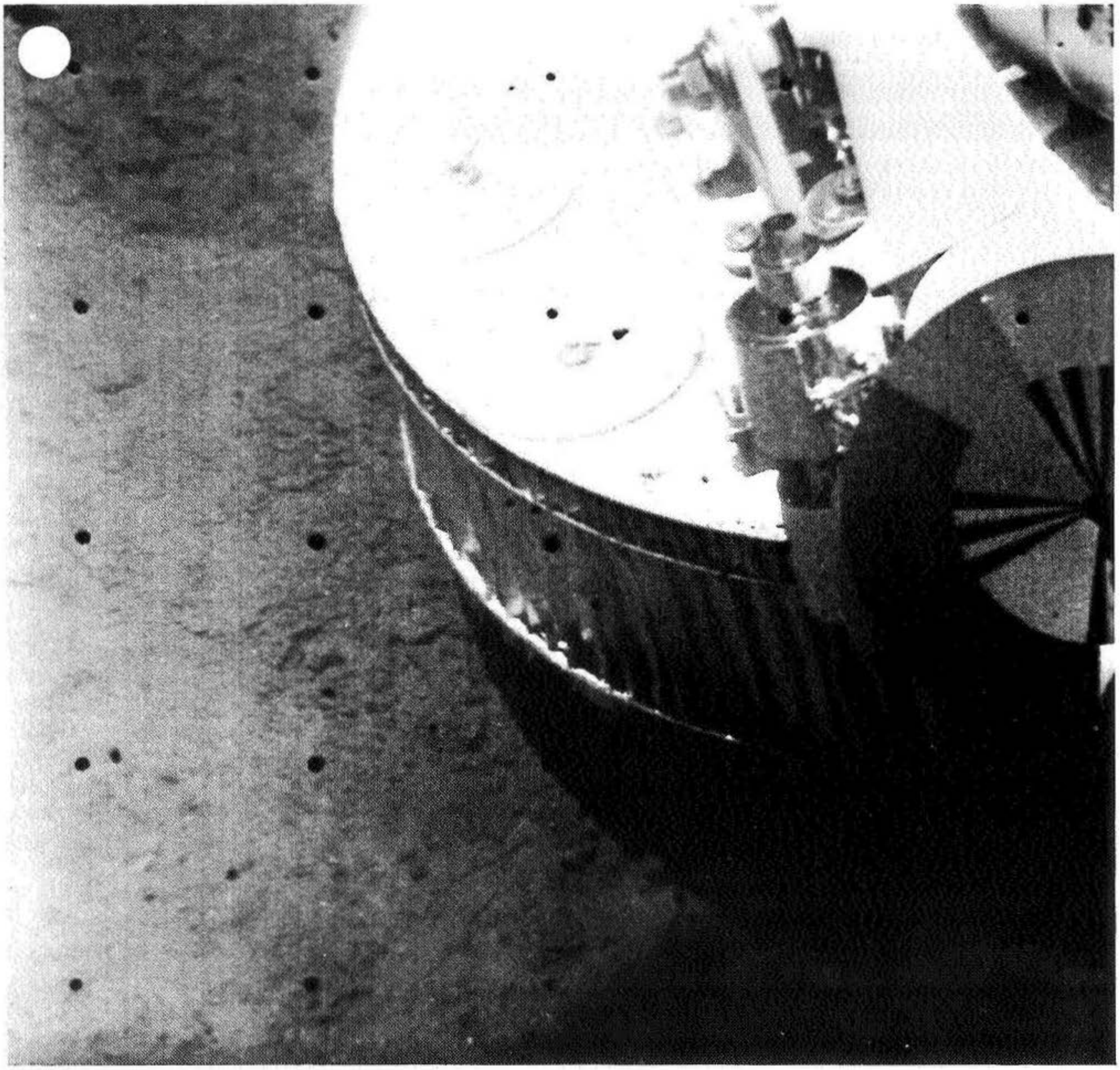


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(88)	Day 116, 07:39:03	—54	—8.18	30.4	f/15.2	N	Clear

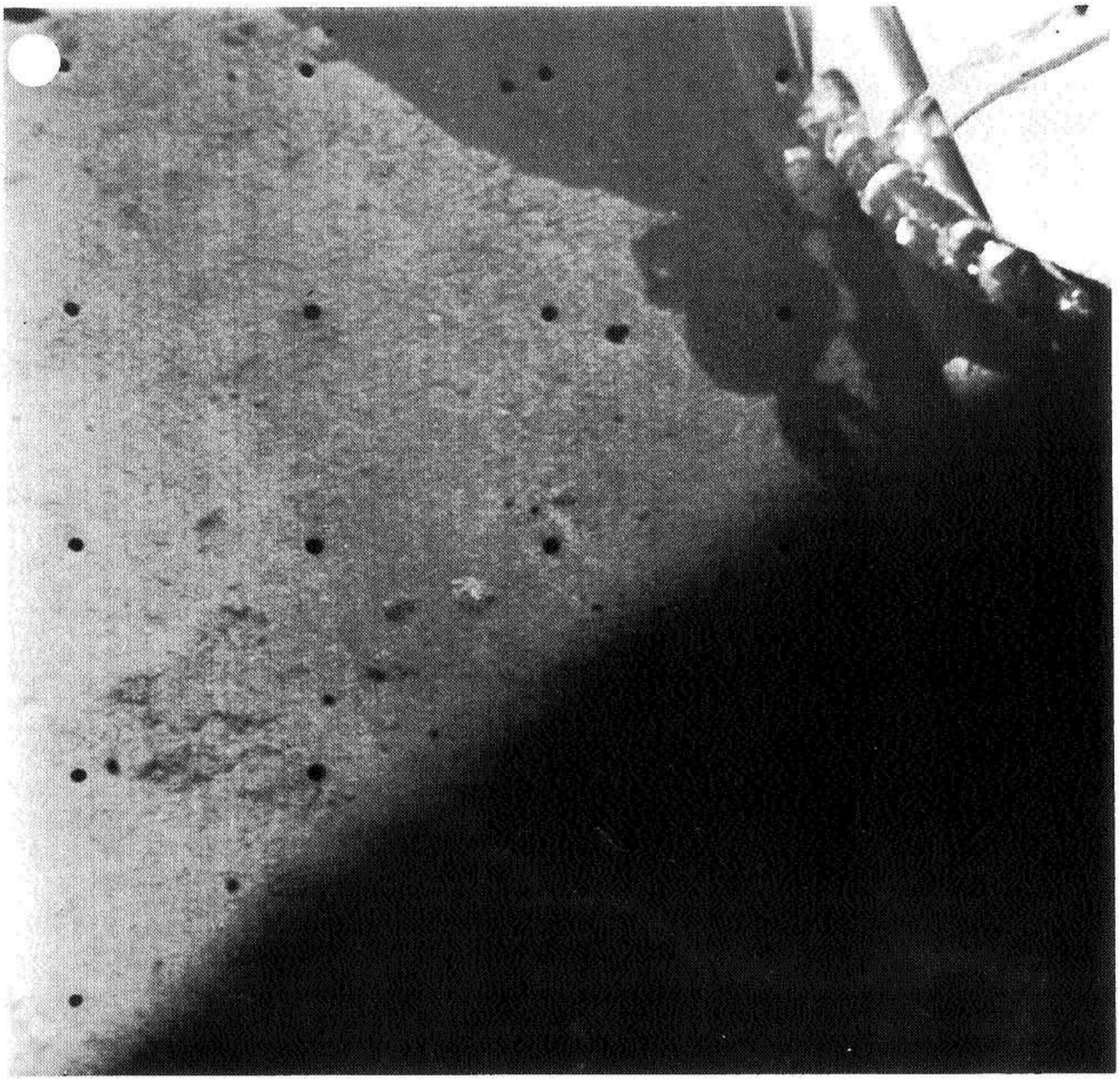


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(89)	Day 116, 07:41:57	—54	—47.86	2.5	f/15.1	N	Clear

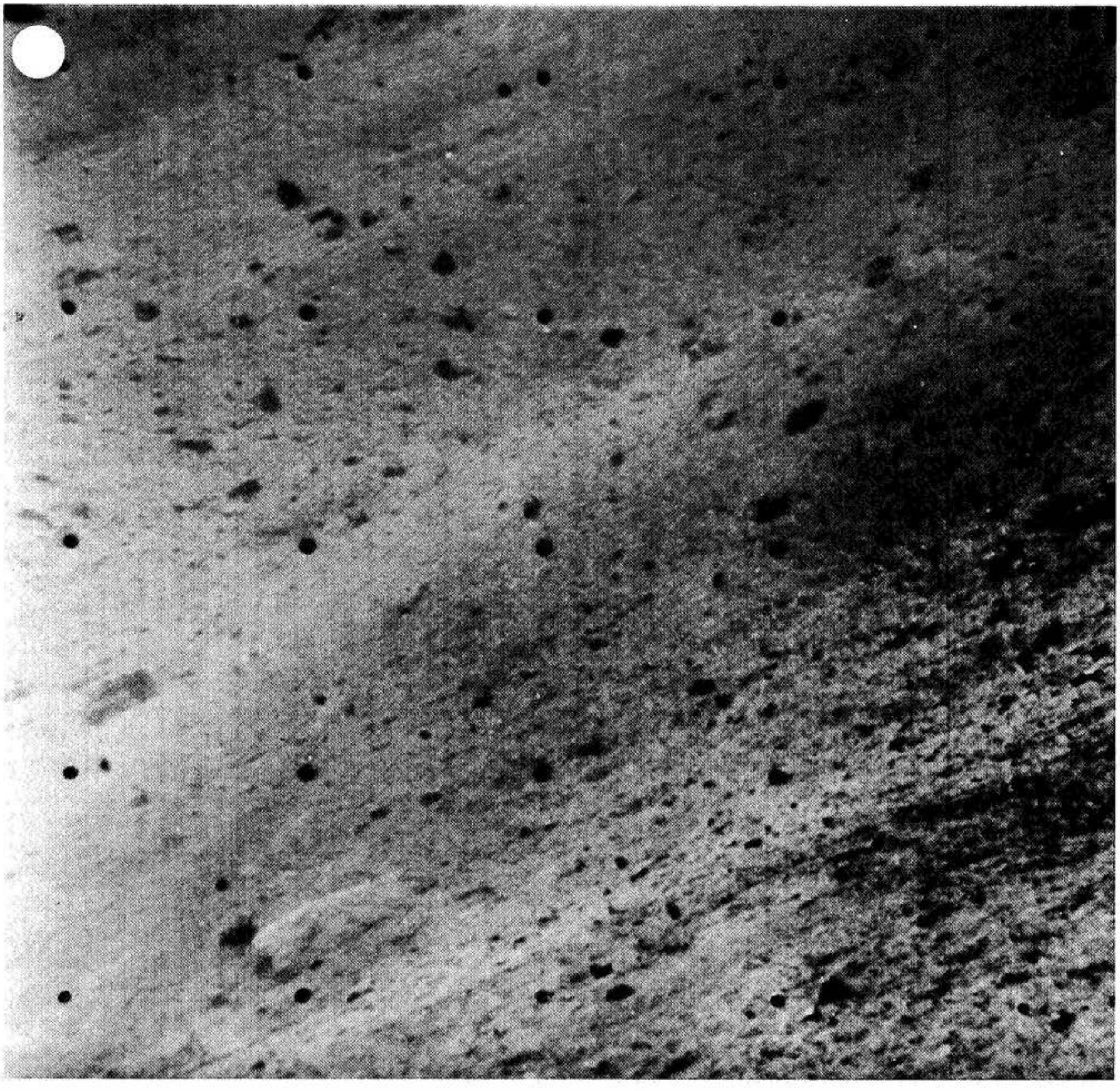




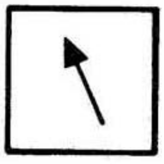
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(90)	Day 116, 07:46:56	—54	—57.78	2.4	f/21.7	N	Clear

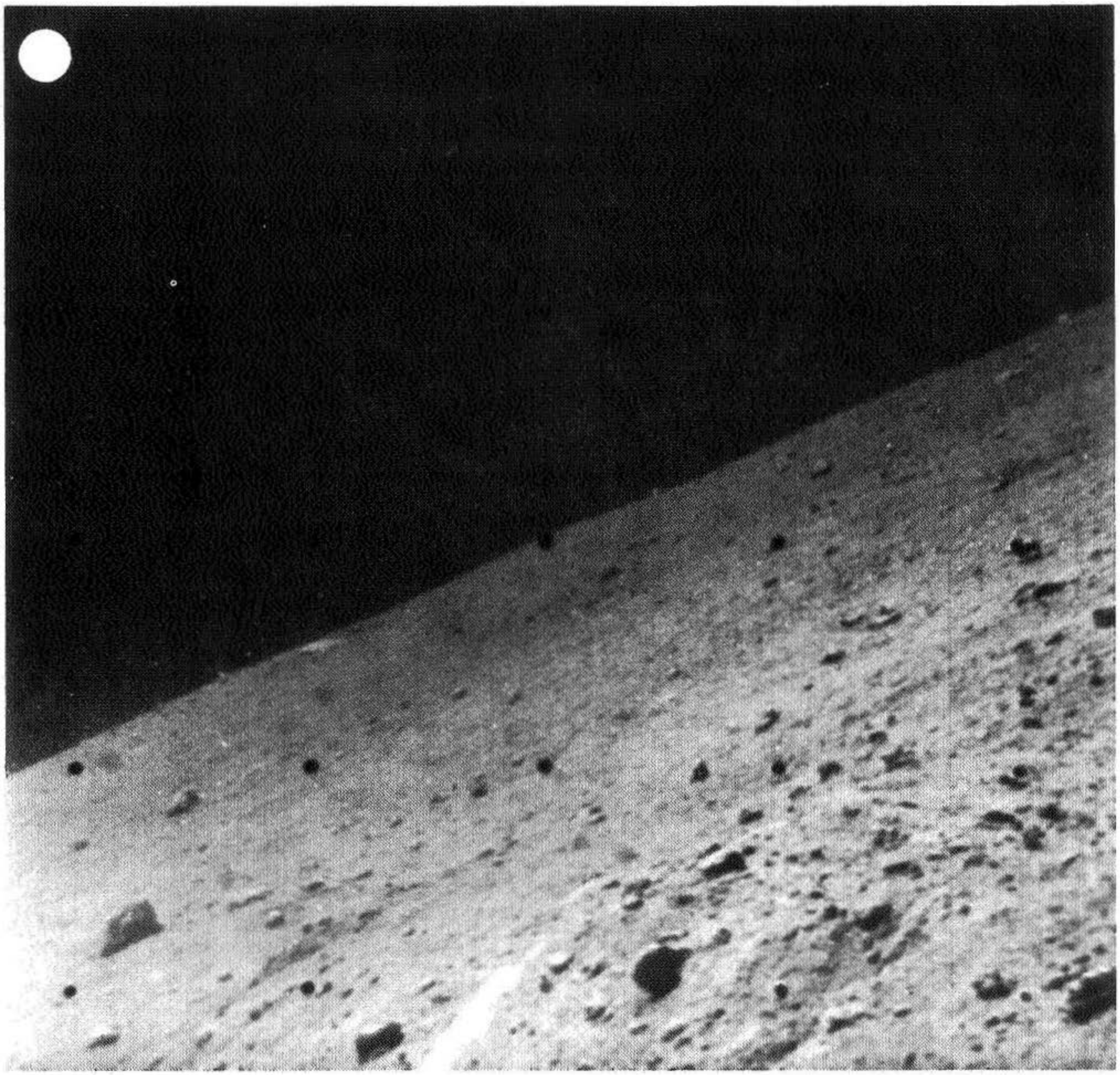


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(91)	Day 116, 08:31:47	—51	—62.74	2.4	f/21.7	N	Clear

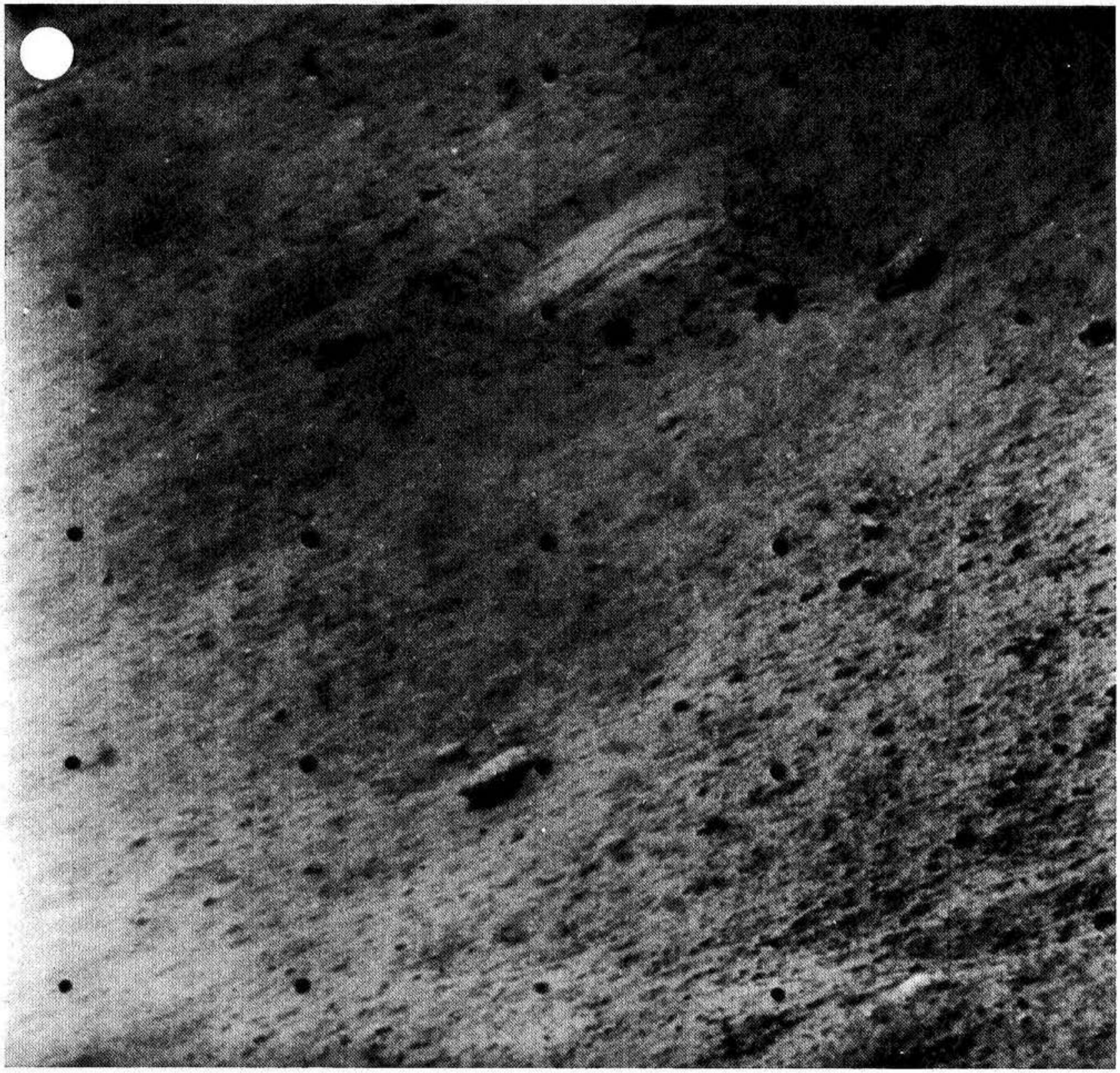


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(92)	Day 116, 08:34:15	—51	—13.14	18.5	f/21.7	N	Clear

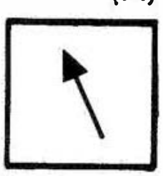


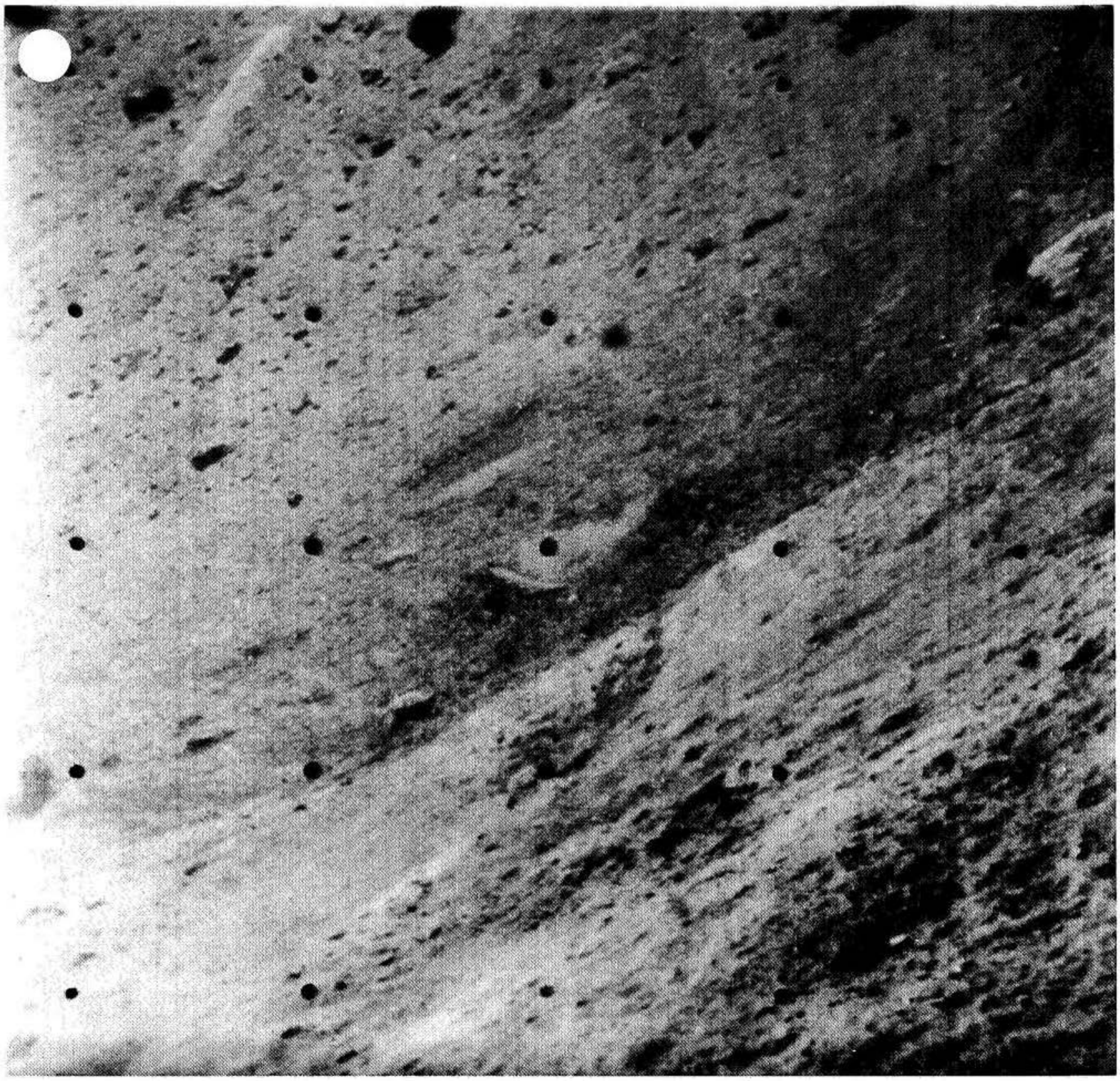


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(93)	Day 116, 08:37:03	−48	−8.18	30.1	$f/7.4$	N	Red

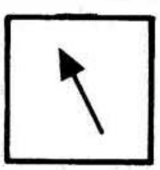


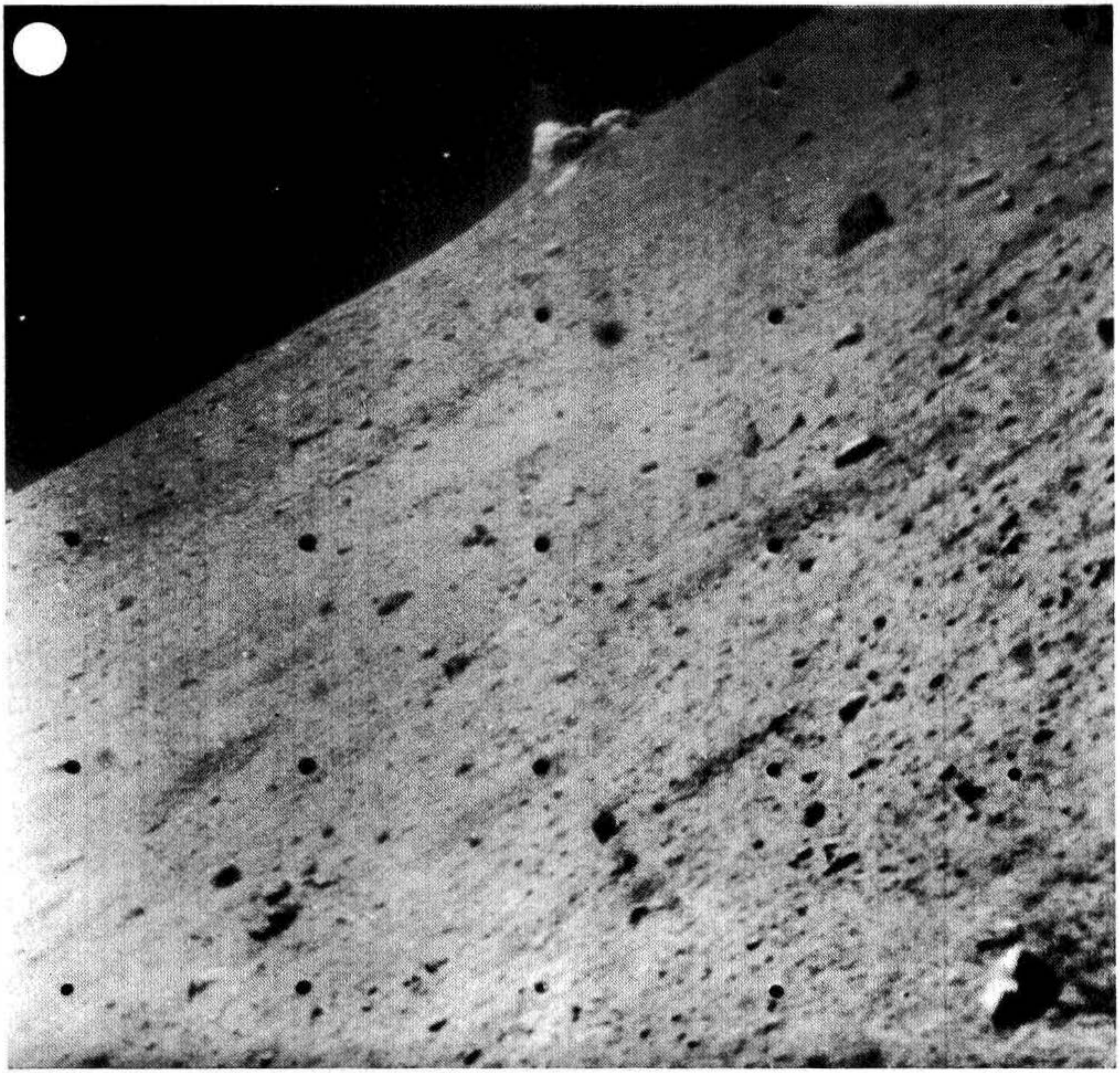
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(94)	Day 116, 08:37:36	—48	—18.10	11.4	f/7.4	N	Red



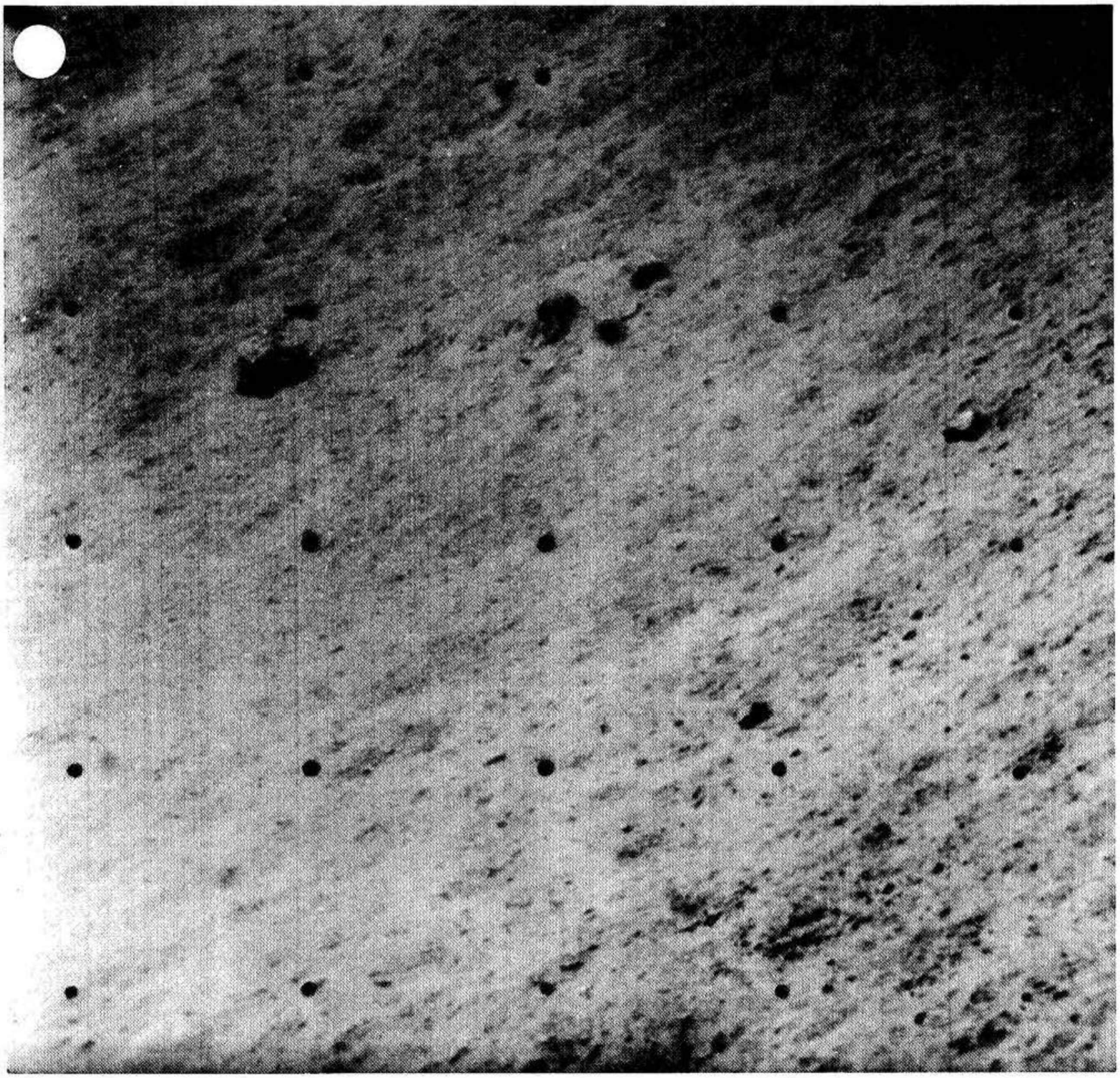


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(95)	Day 116, 08:39:18	—45	—13.14	18.5	f/7.4	N	Red

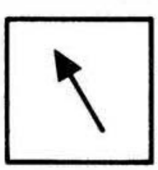


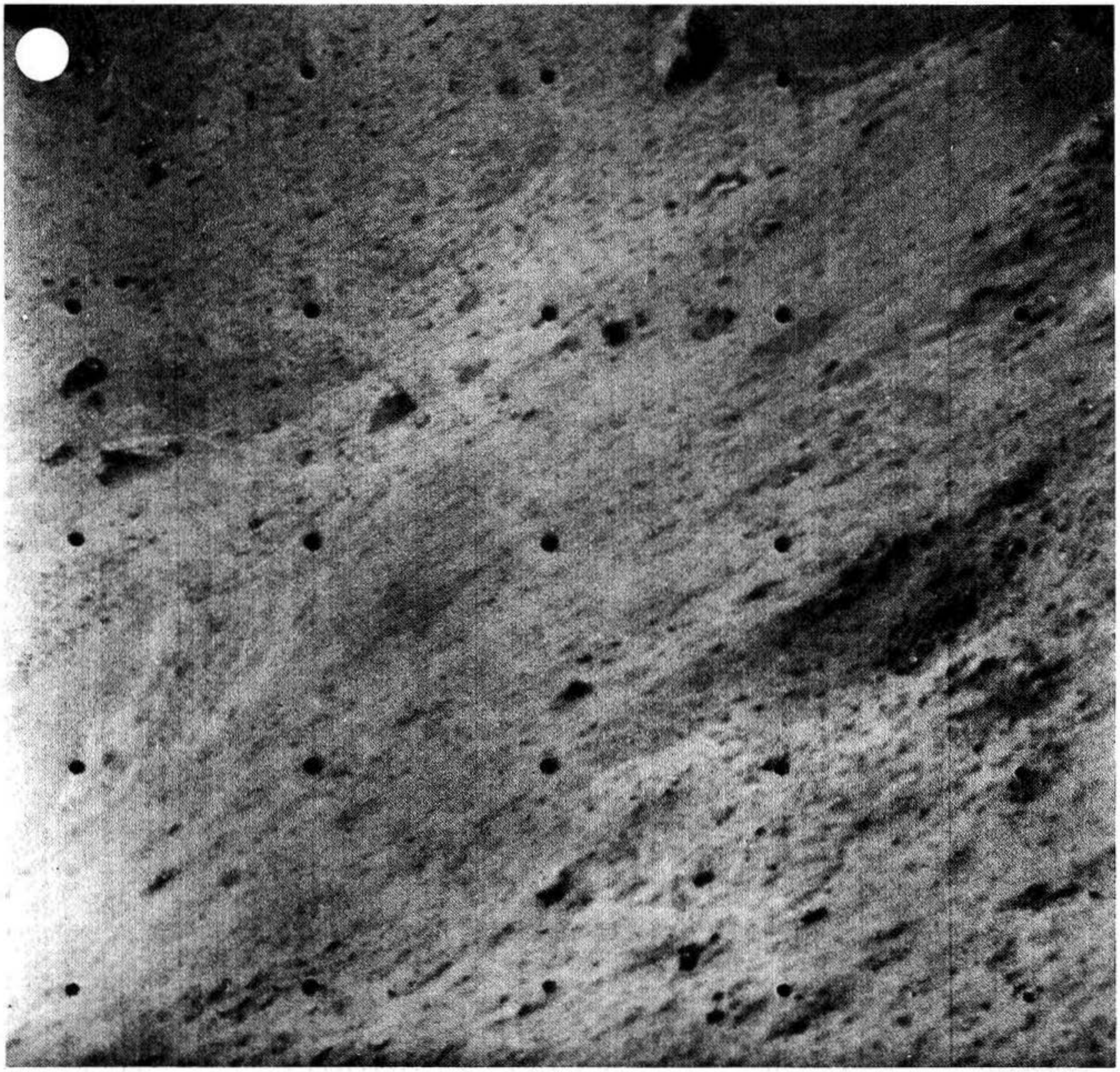


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(96)	Day 116, 08:39:53	—42	—8.18	30.1	f/7.4	N	Red

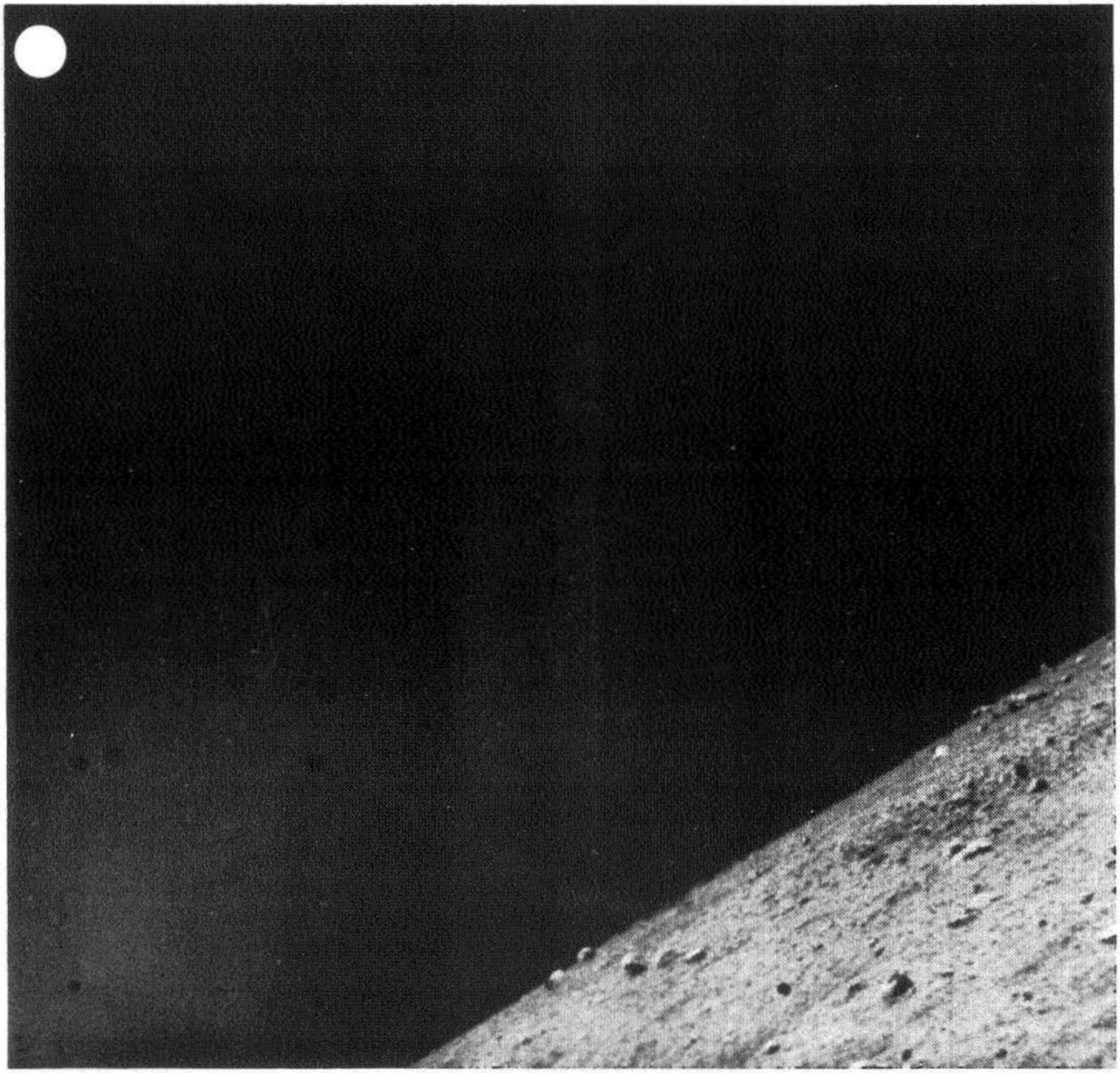


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(97)	Day 116, 08:40:01	—42	—18.10	11.2	f/7.4	N	Red

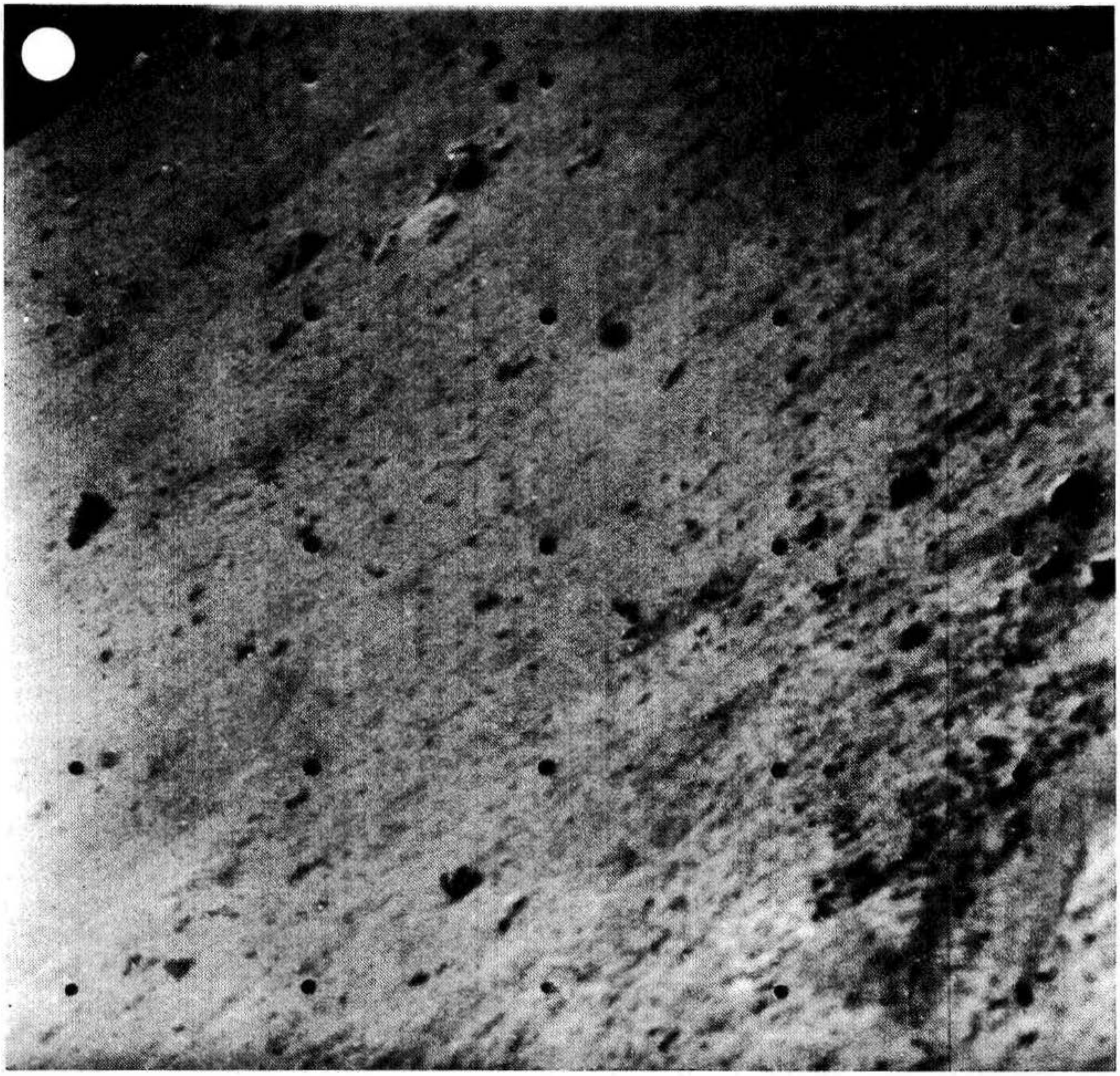




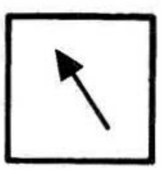
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(98)	Day 116, 08:41:23	—39	—13.14	18.5	f/7.4	N	Red

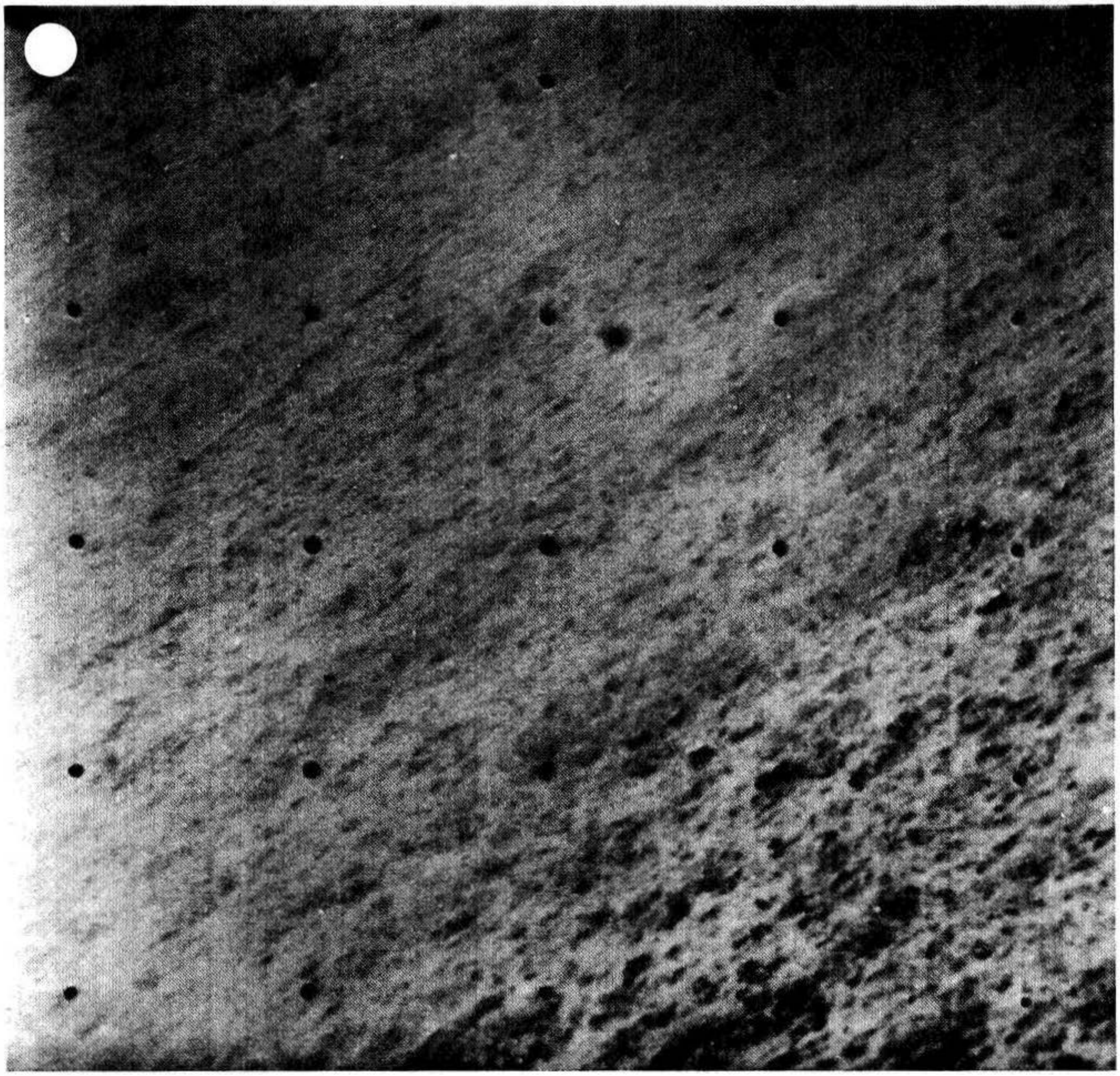


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(99)	**Day 116, 08:41:29**	**—39**	**—3.22**	**29.7**	***f*/7.4**	**N**	**Red**

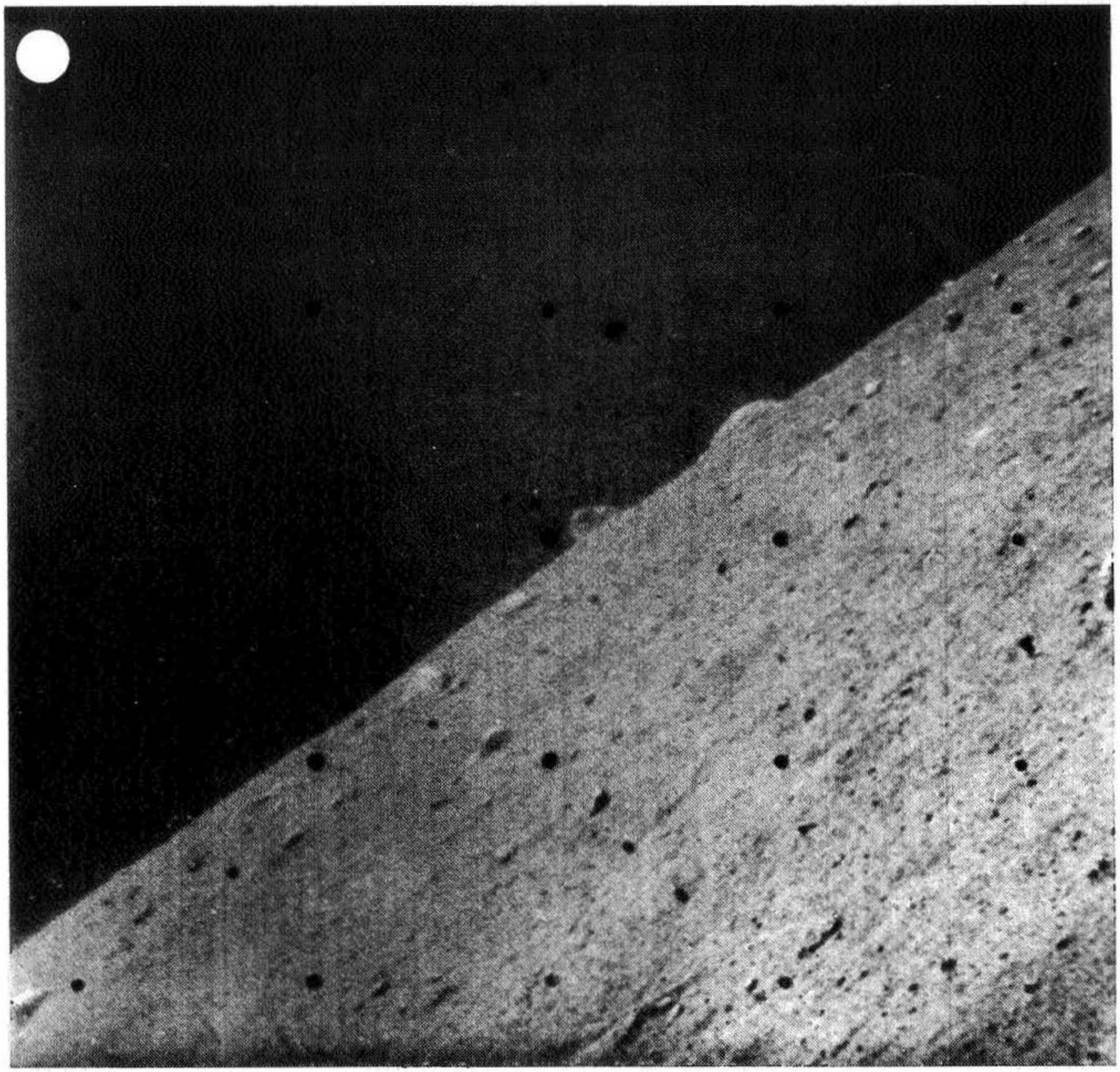


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(100)	Day 116, 08:42:27	—36	—8.18	30.0	f/7.4	N	Red

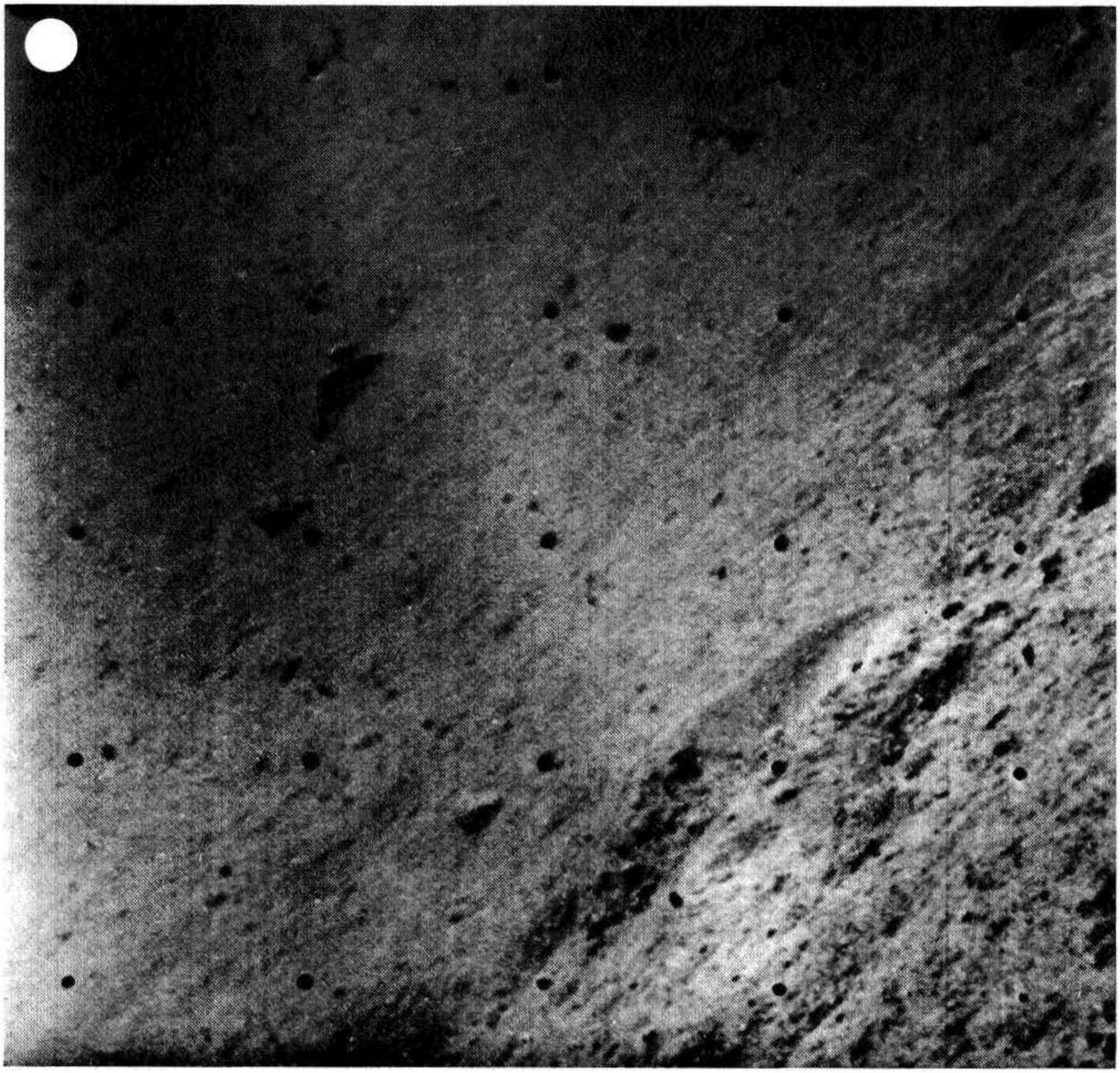




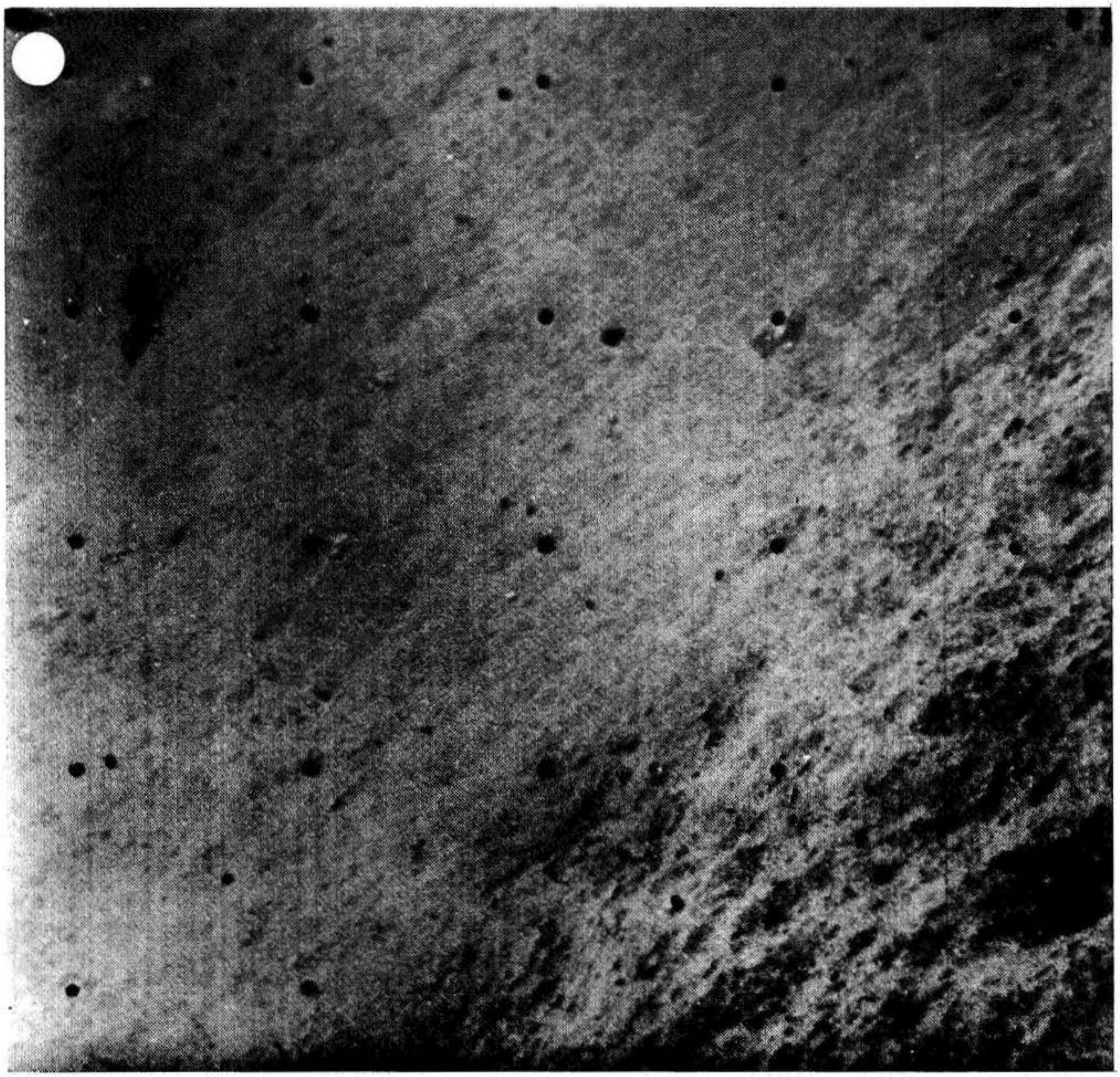
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(101)	Day 116, 08:43:32	—36	—18.10	11.4	f/7.4	N	Red



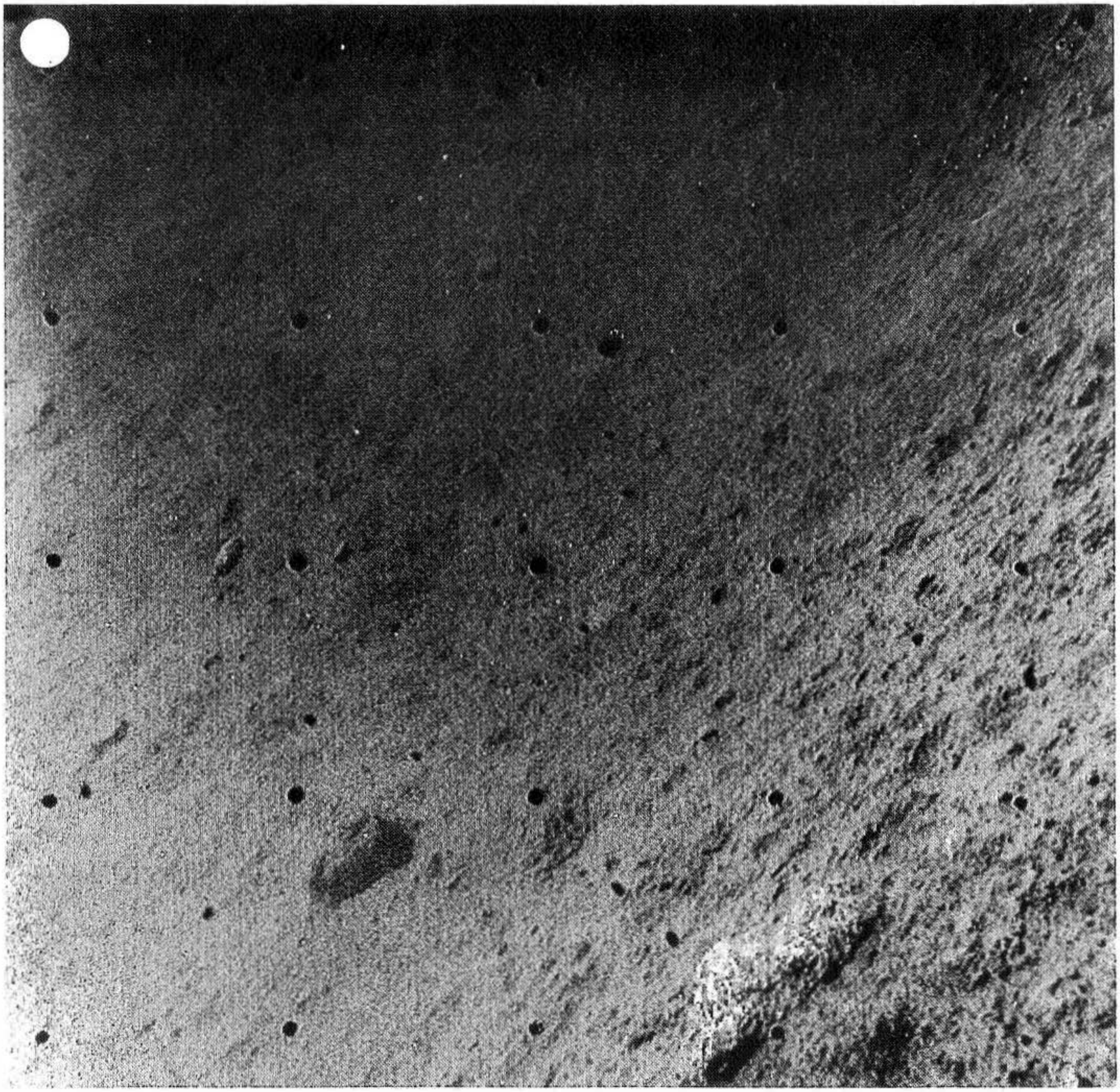
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(102)	Day 116, 08:48:49	—33	—3.22	30.2	f/21.7	N	Red



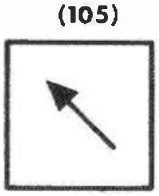
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(103)	Day 116, 08:50:24	—30	—8.18	30.1	f/21.6	N	Clear

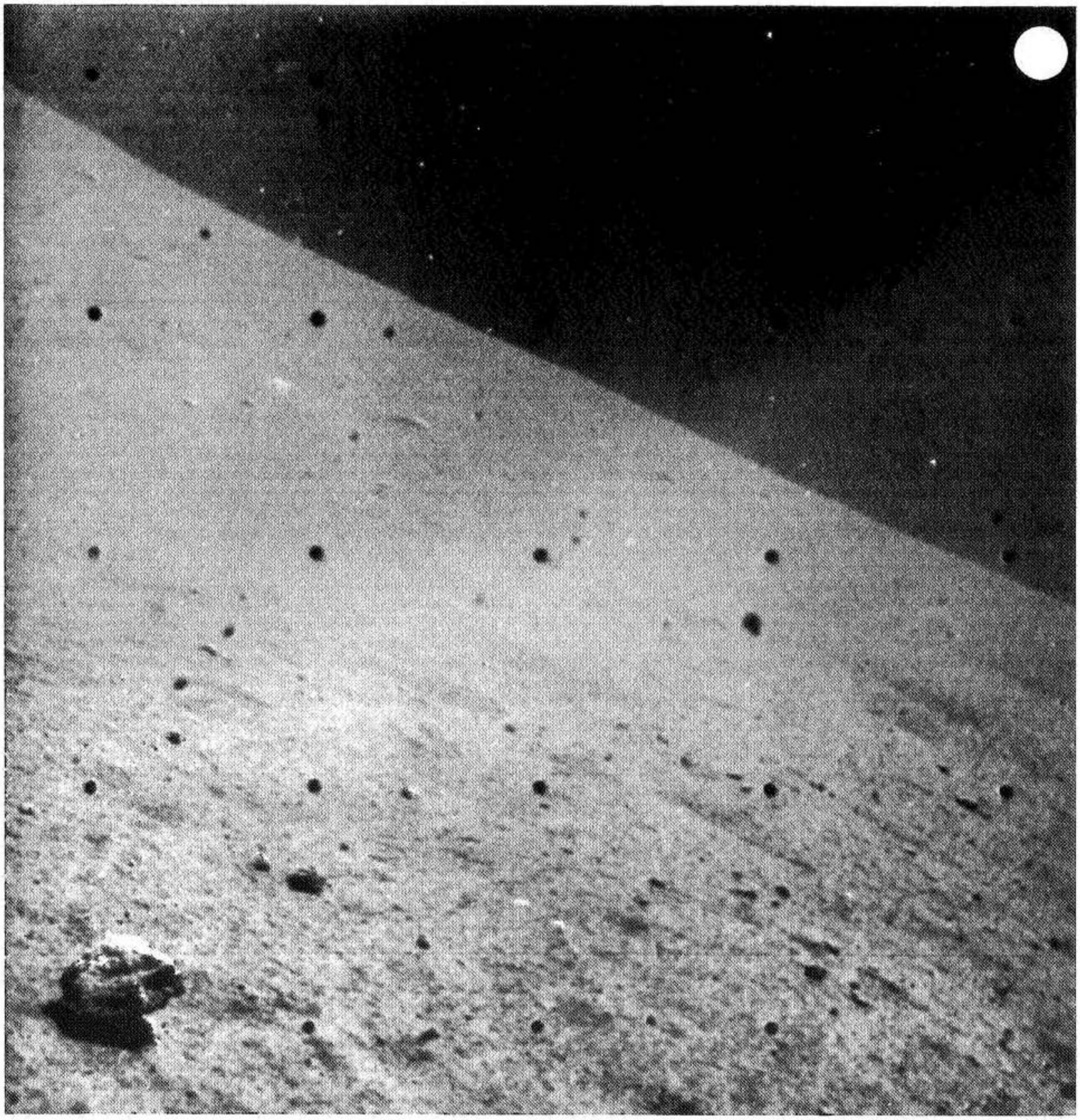


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(104)	Day 116, 08:50:33	—30	—18.10	11.3	f/21.5	N	Clear

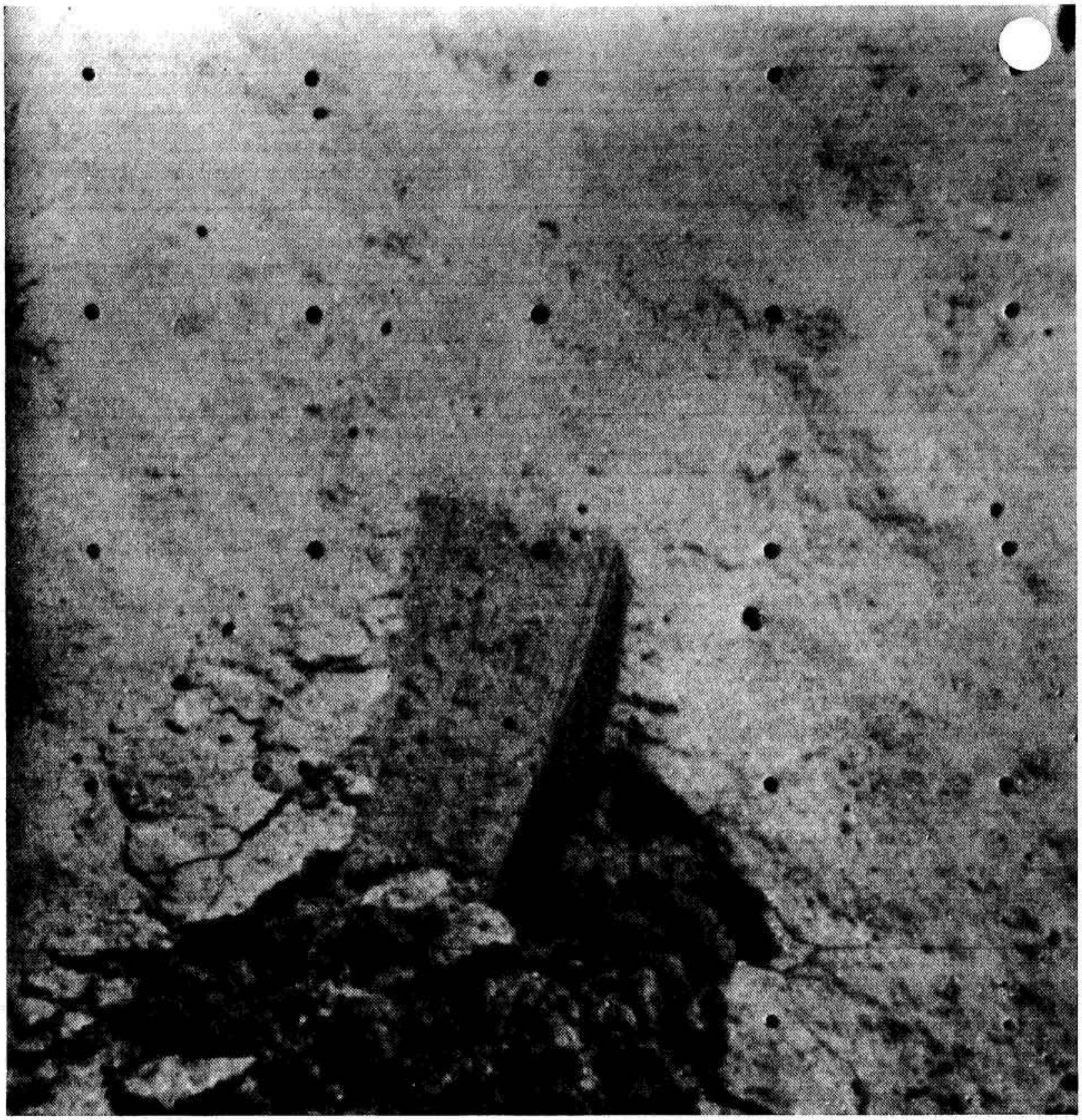


	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(105)	Day 116, 08:55:40	—24	—18.10	11.3	f/21.6	N	Clear	Processed

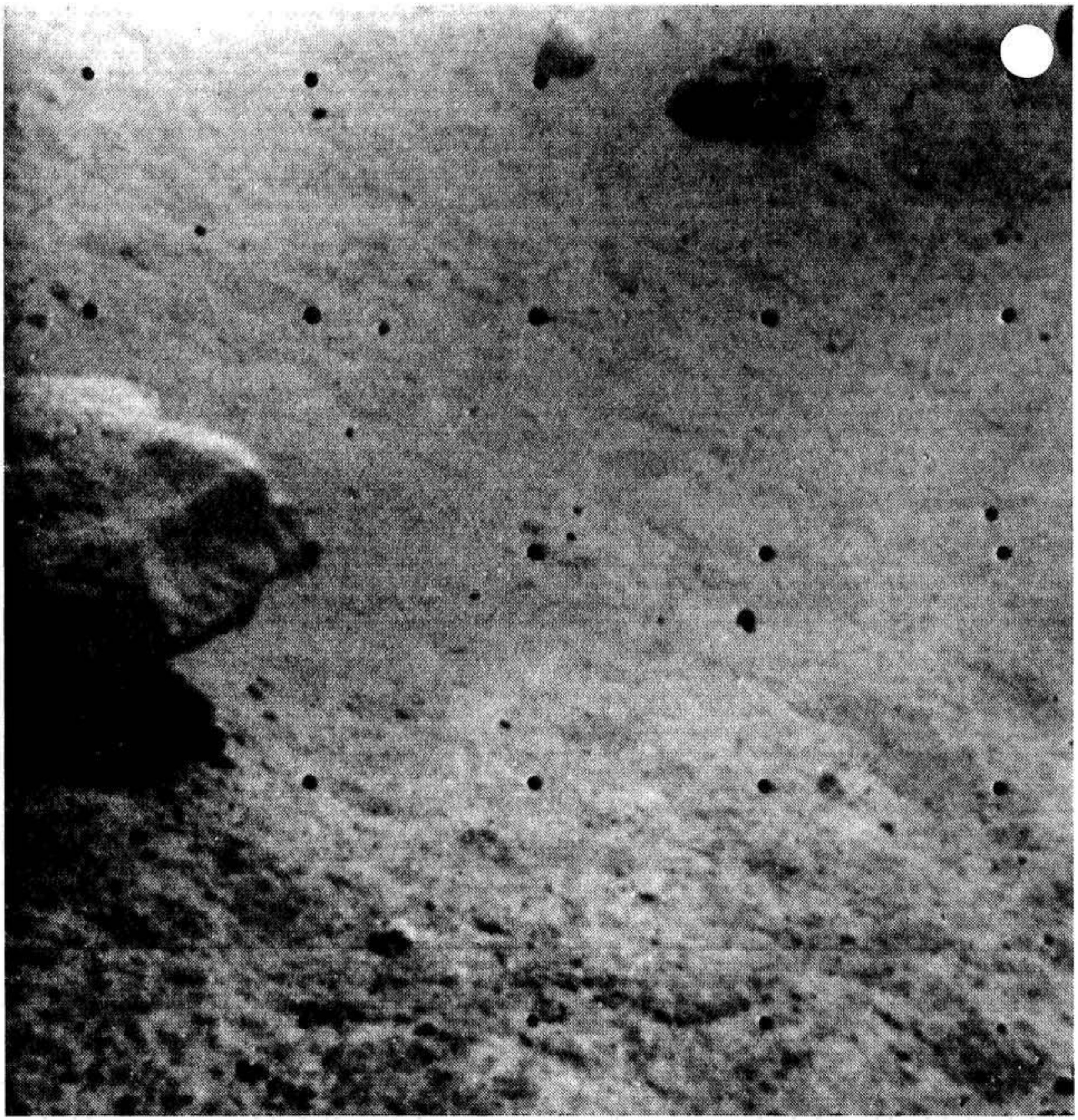




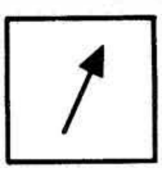
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(106)	Day 116, 09:07:06	—6	1.74	29.7	f/21.5	W	Clear

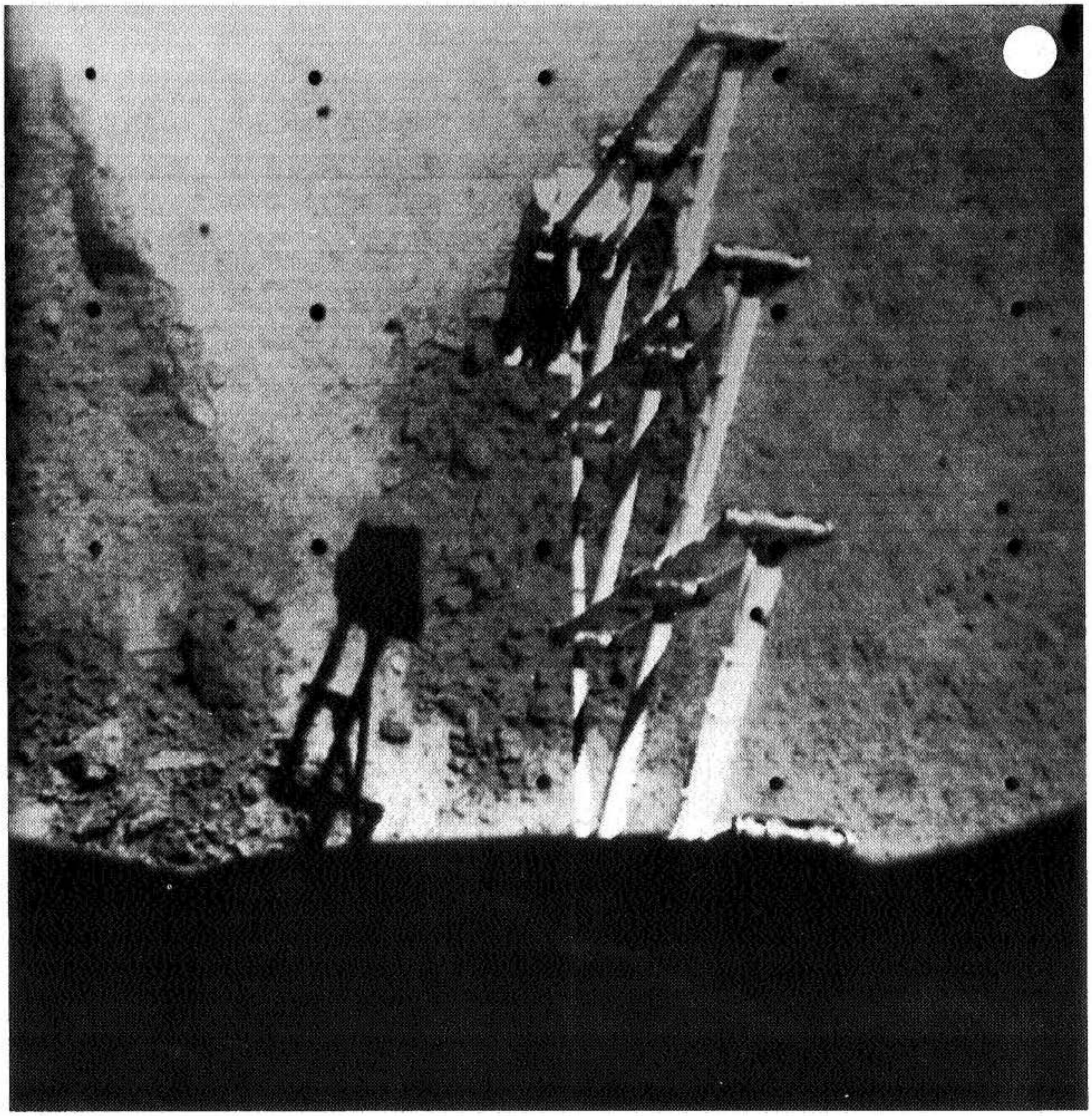


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(107)	Day 116, 09:11:55	—3	—42.90	2.9	f/18.4	N	Clear

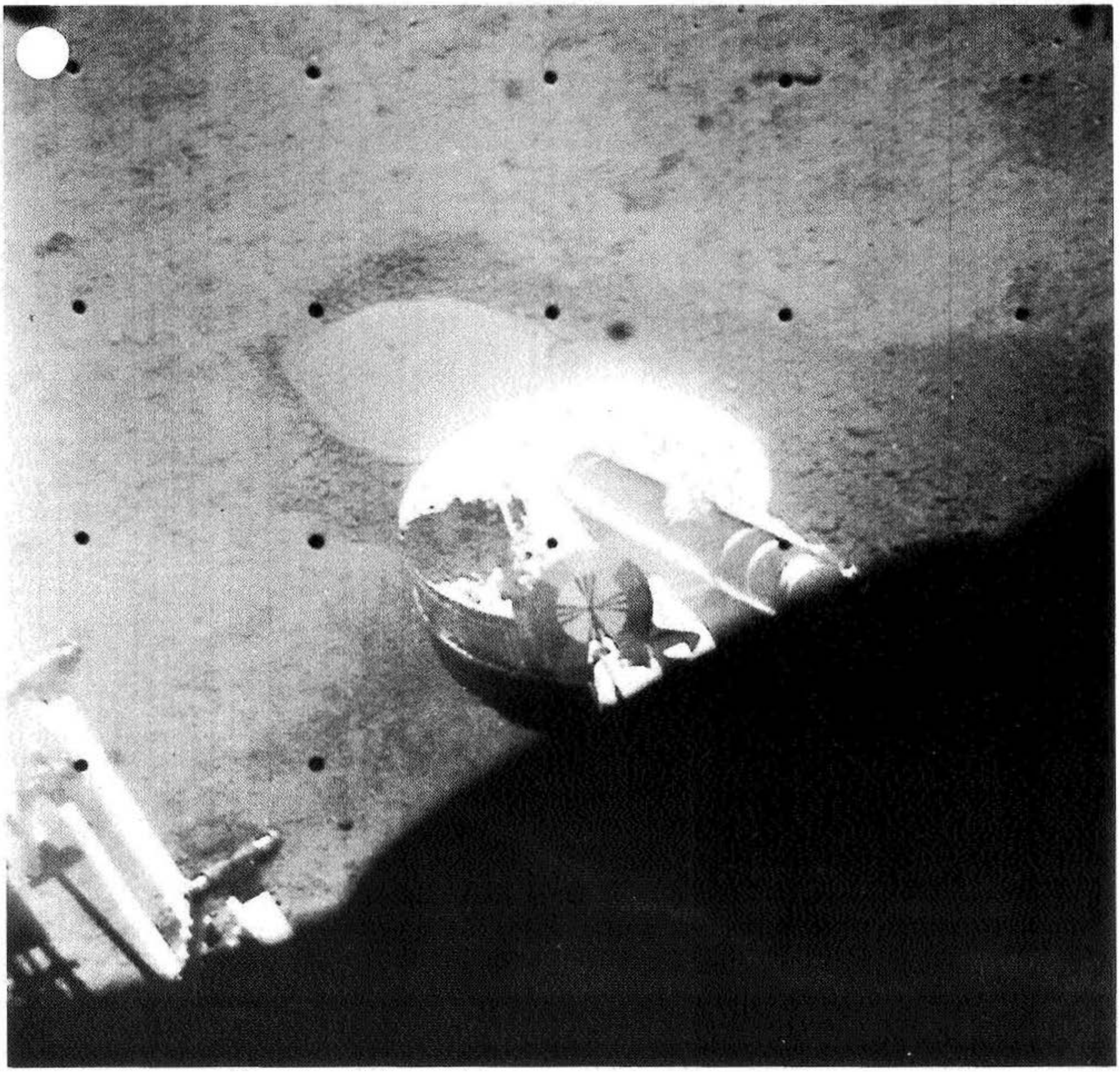


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(108)	Day 116, 09:20:16	0	—8.18	30.1	f/21.8	N	Clear

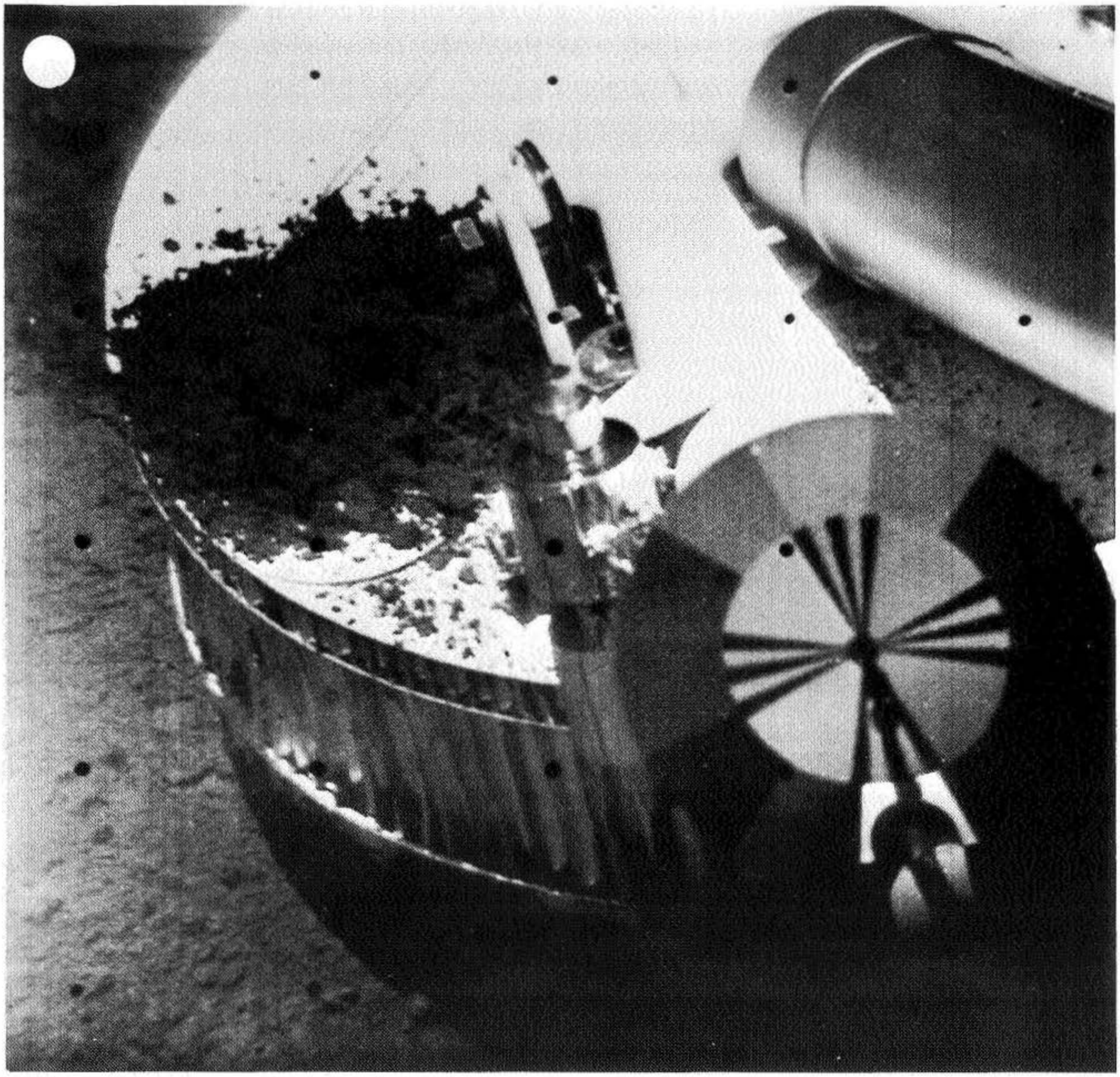




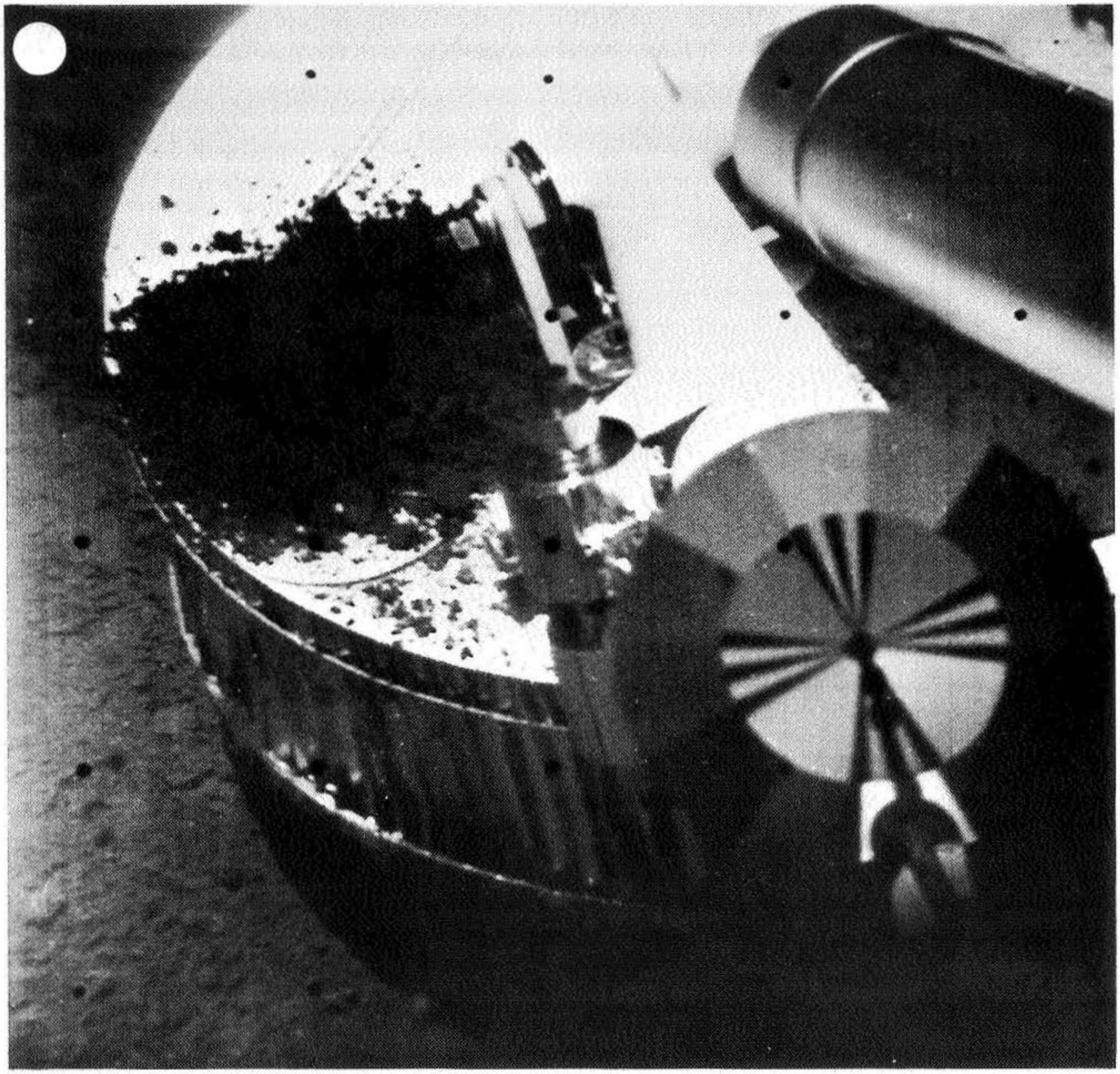
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(109)	Day 116, 10:46:13	0	—52.82	3.1	f/14.7	W	Clear



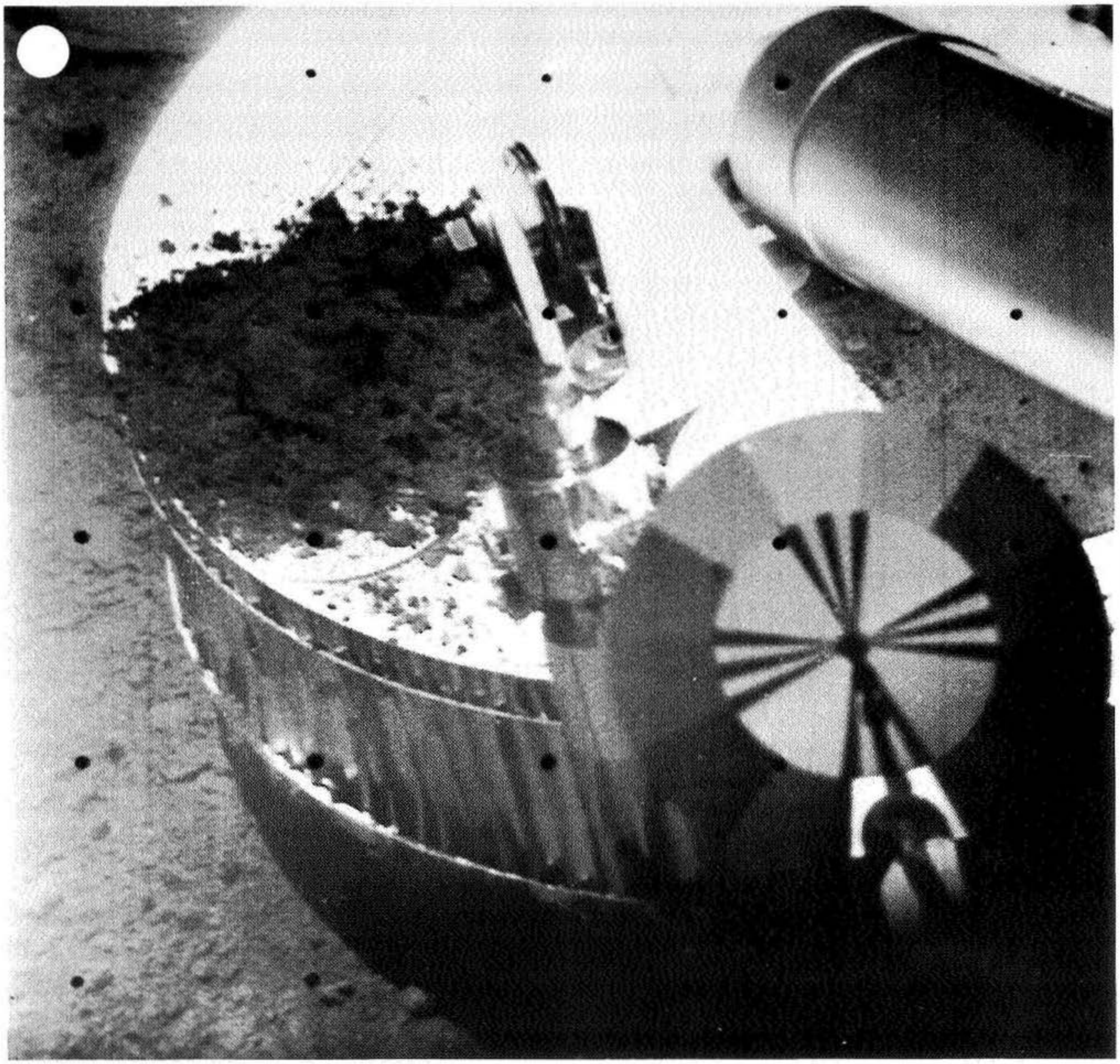
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(110)	Day 116, 11:53:26	—60	—57.78	2.3	f/7.4	W	Red



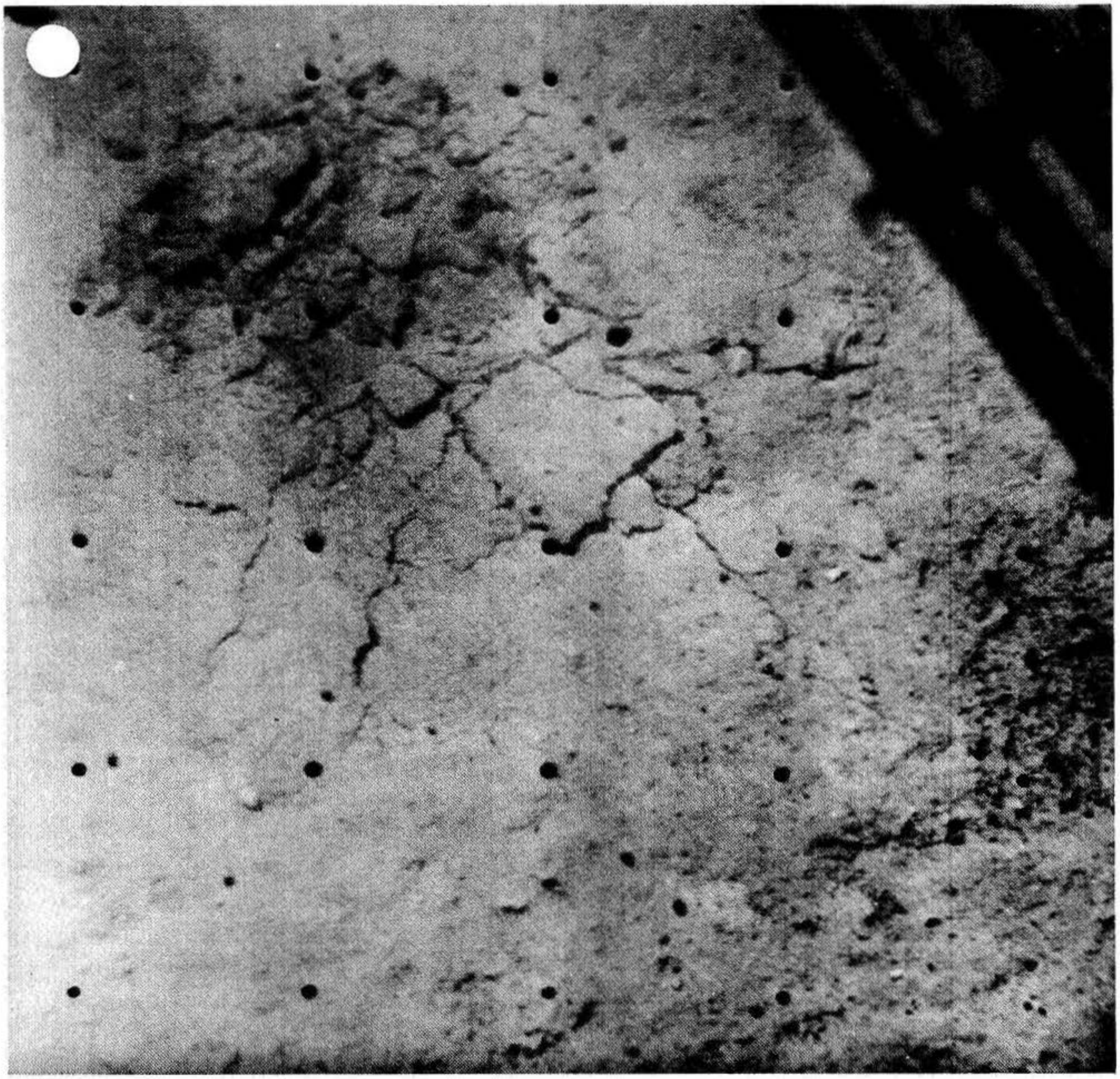
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(111)	Day 116, 12:00:54	—57	—57.78	2.5	f/7.4	N	Red



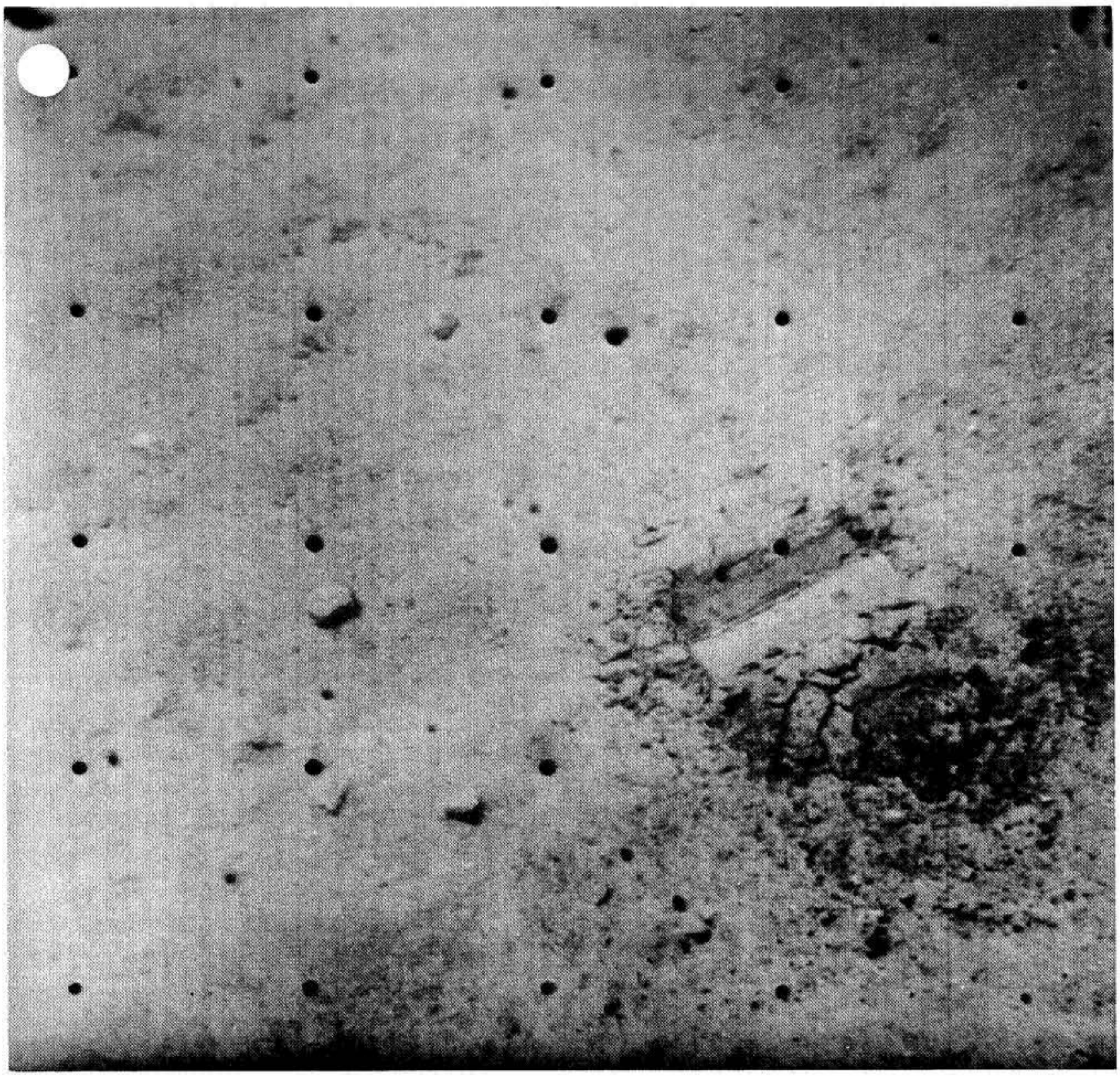
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(112)	Day 116, 12:01:27	—57	—57.78	2.5	f/7.4	N	Blue



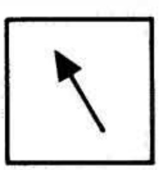
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(113)	Day 116, 12:02:14	—57	—57.78	2.5	*f*/7.4	N	Green

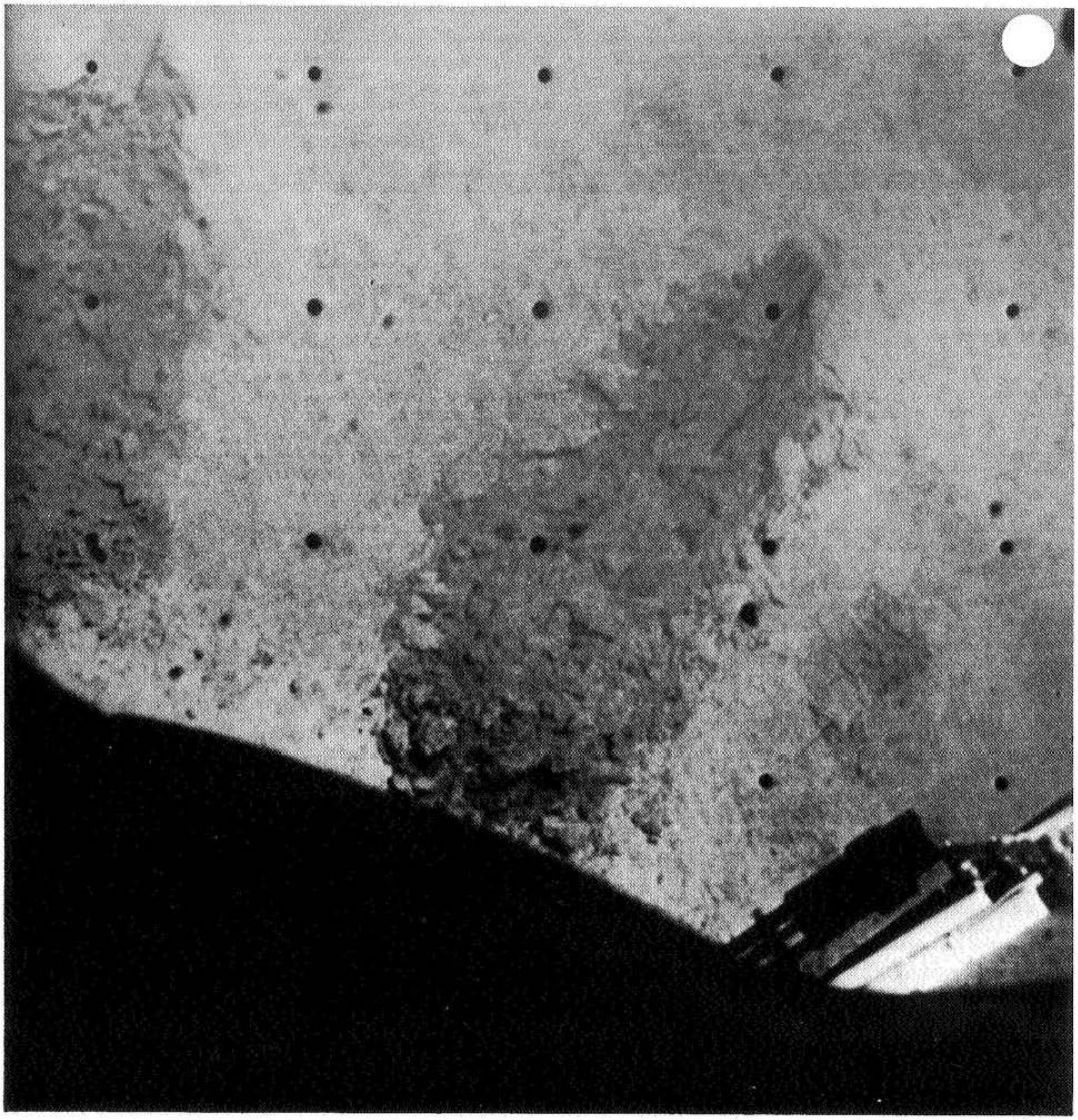


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(114)	Day 117, 08:56:45	—33	—52.82	2.6	f/15.1	N	Clear



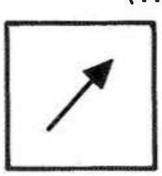
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(115)	Day 117, 09:30:12	—42	—47.86	2.7	*f*/15.2	N	Clear



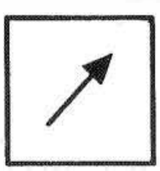


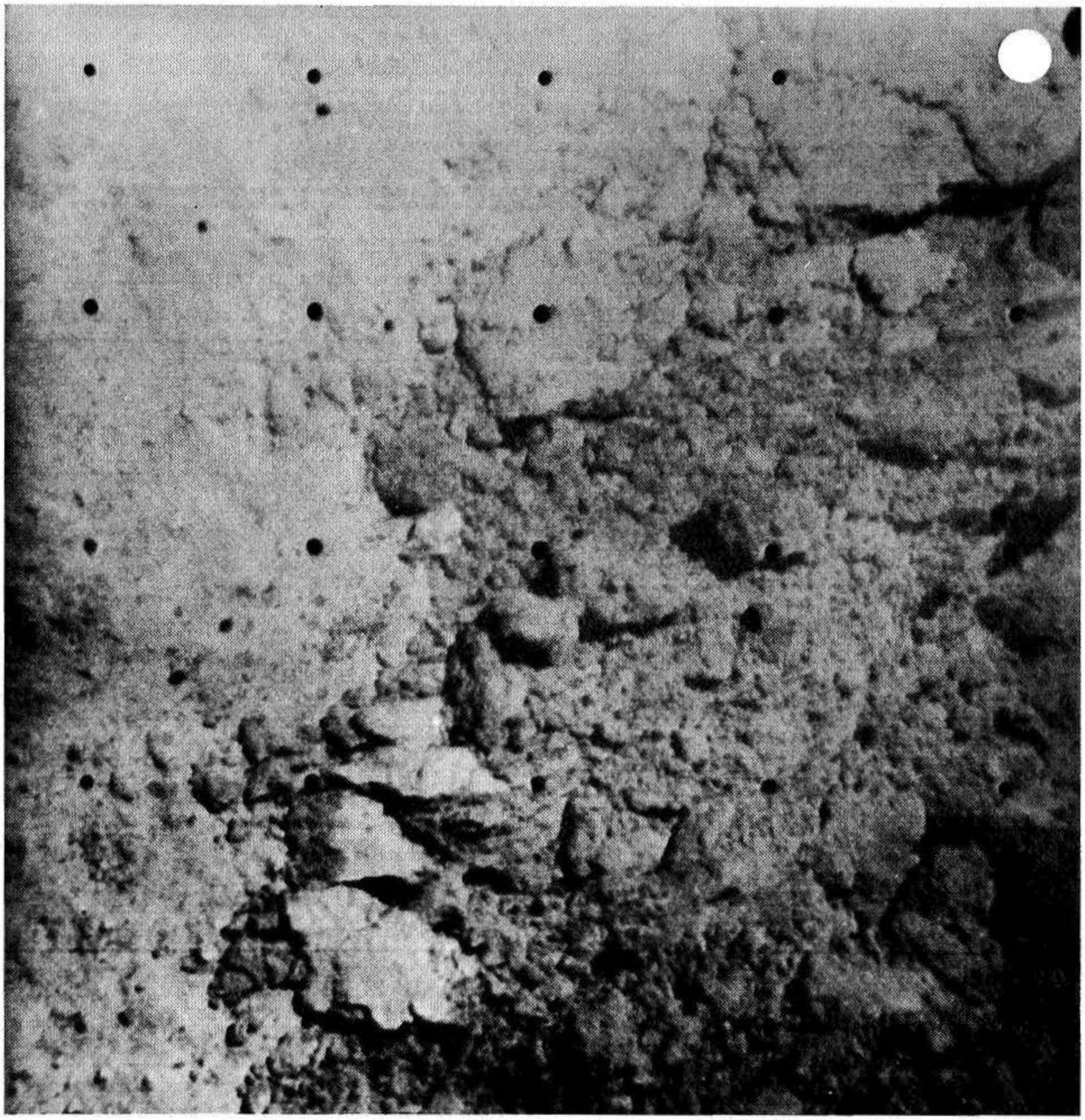
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(116)	Day 117, 10:34:53	—21	—52.82	2.7	f/15.2	W	Clear

	GMT	Az	El	Focus, m	Iris	Lens	Filter
(117)	Day 117, 10:40:51	—21	—52.82	2.5	f/15.1	N	Clear

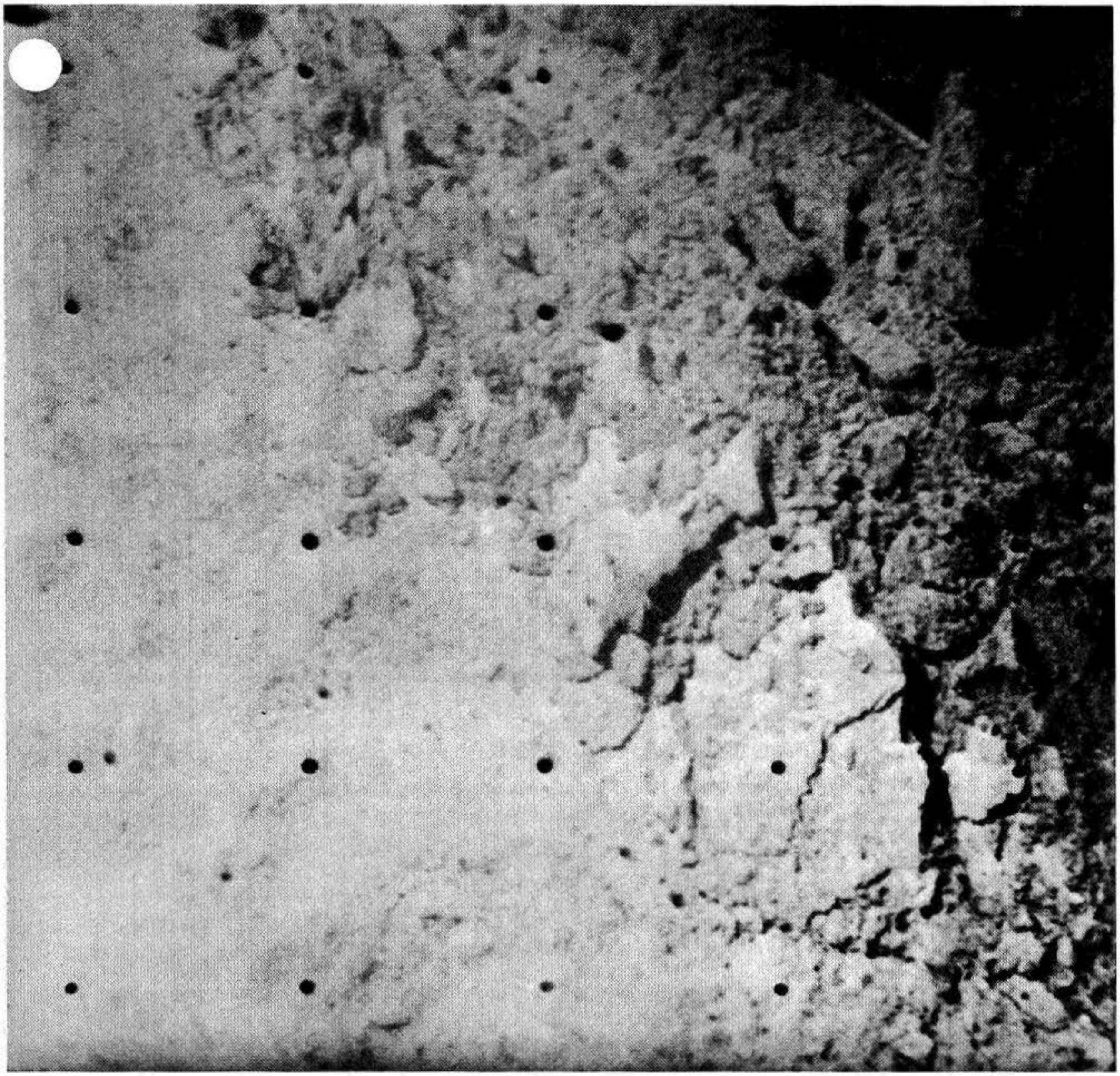


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(118)	Day 117, 10:41:32	—21	—57.78	2.4	f/15.2	N	Clear

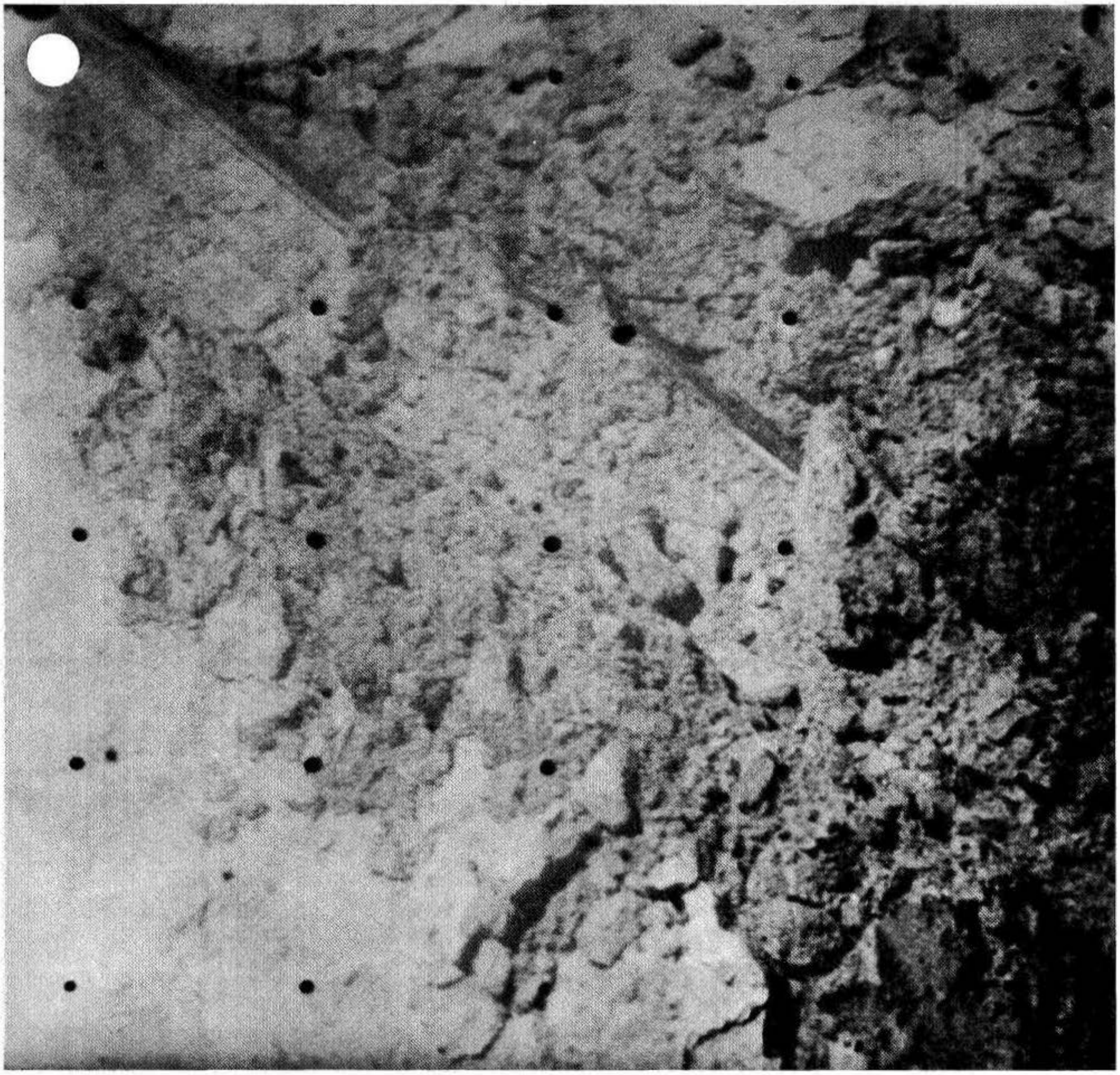




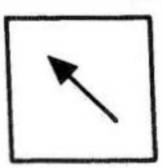
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(119)	Day 117, 10:43:07	—18	—52.82	2.5	$f/15.2$	N	Clear



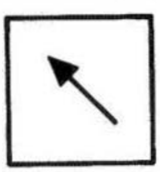
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(120)	Day 117, 10:44:54	—24	—47.86	2.6	f/15.2	N	Clear

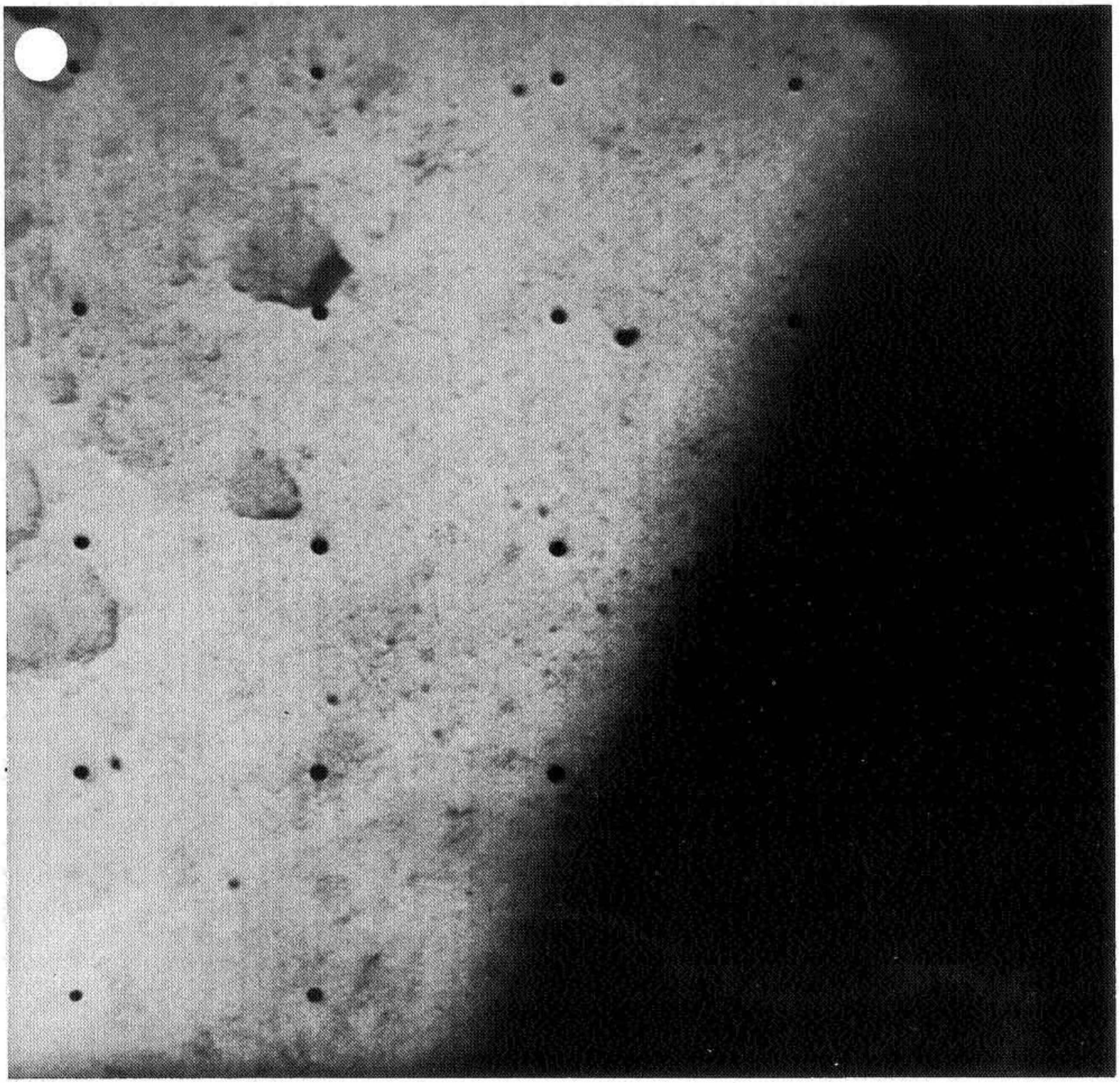


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(121)	Day 117, 10:45:50	—24	—47.86	2.6	f/15.1	N	Clear



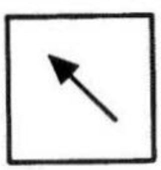
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(122)	Day 117, 10:47:10	—24	—52.82	2.5	f/15.1	N	Clear

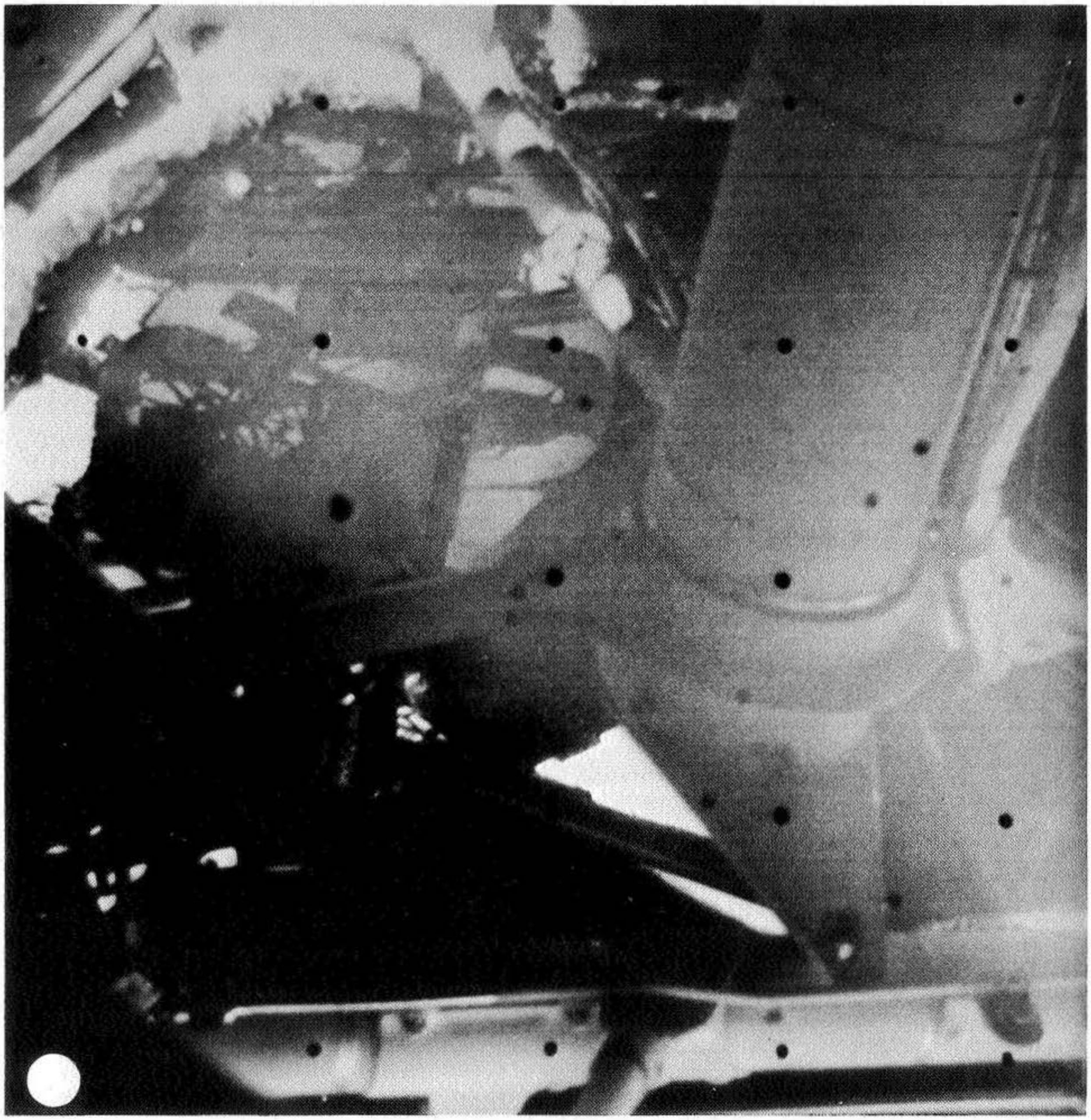




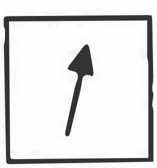
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(123)	Day 117, 10:48:37	—24	—62.74	2.4	f/15.1	N	Clear

	GMT	Az	El	Focus, m	Iris	Lens	Filter
(124)	Day 117, 10:50:16	—24	—57.82	2.4	f/15.1	N	Clear

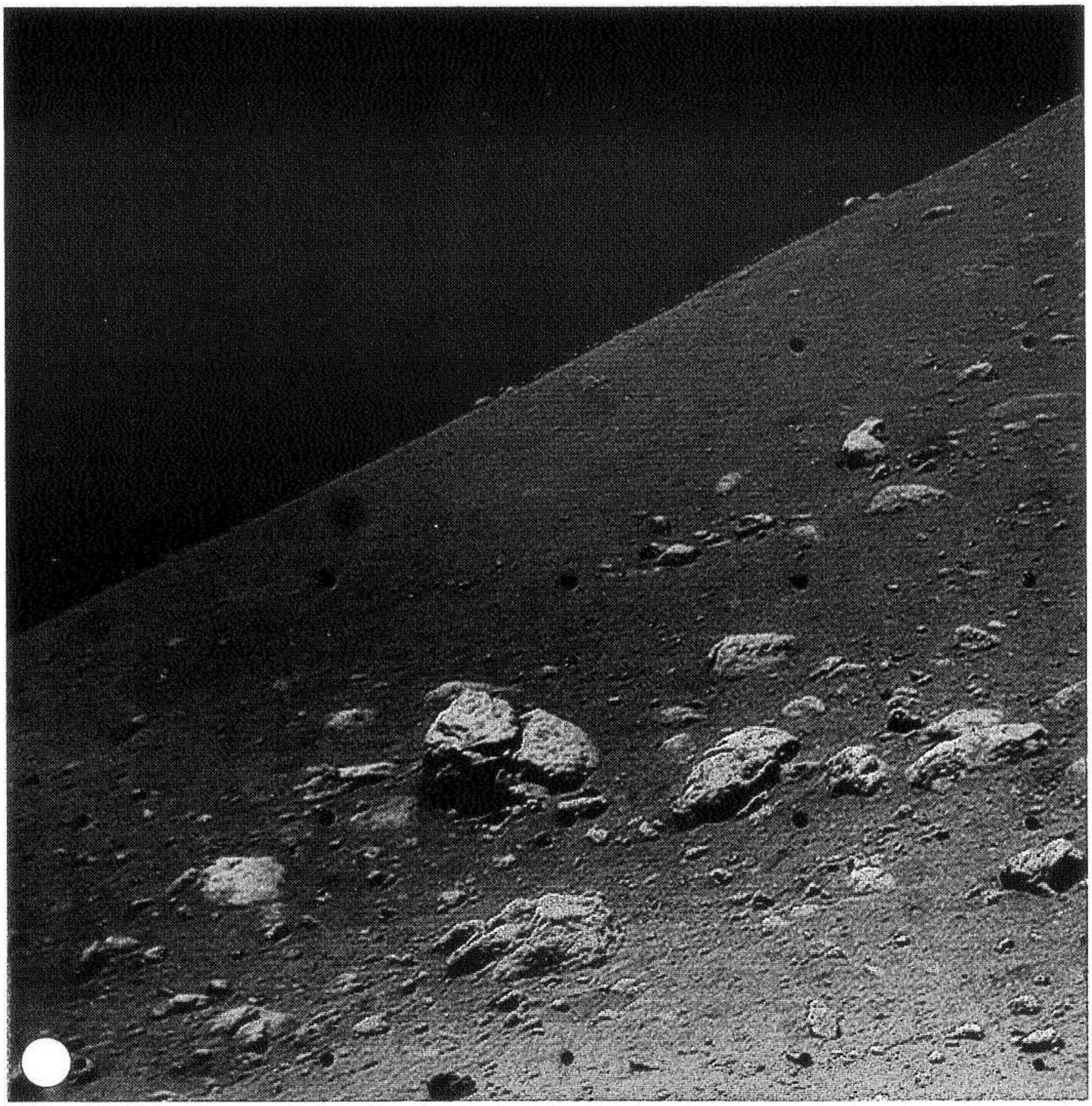




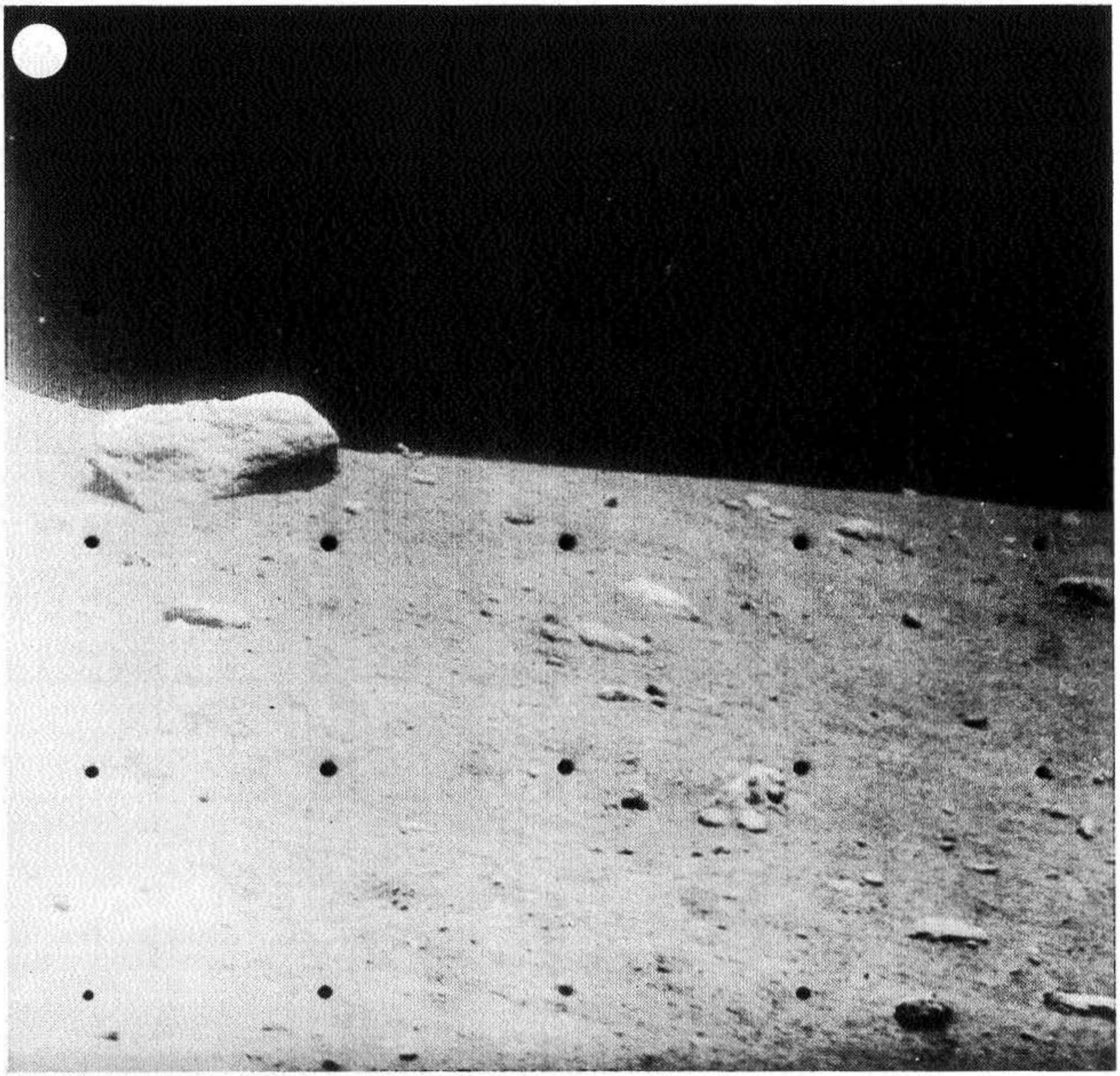
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(125)	Day 117, 11:17:45	—213	—37.94	3.0	f/10.1	W	Clear



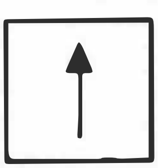
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(126)	Day 117, 12:49:29	—186	—3.22	30.2	f/5.2	N	Green



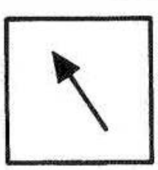
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(127)	Day 117, 12:59:18	—177	—3.22	30.4	f/5.2	N	Green	Processed



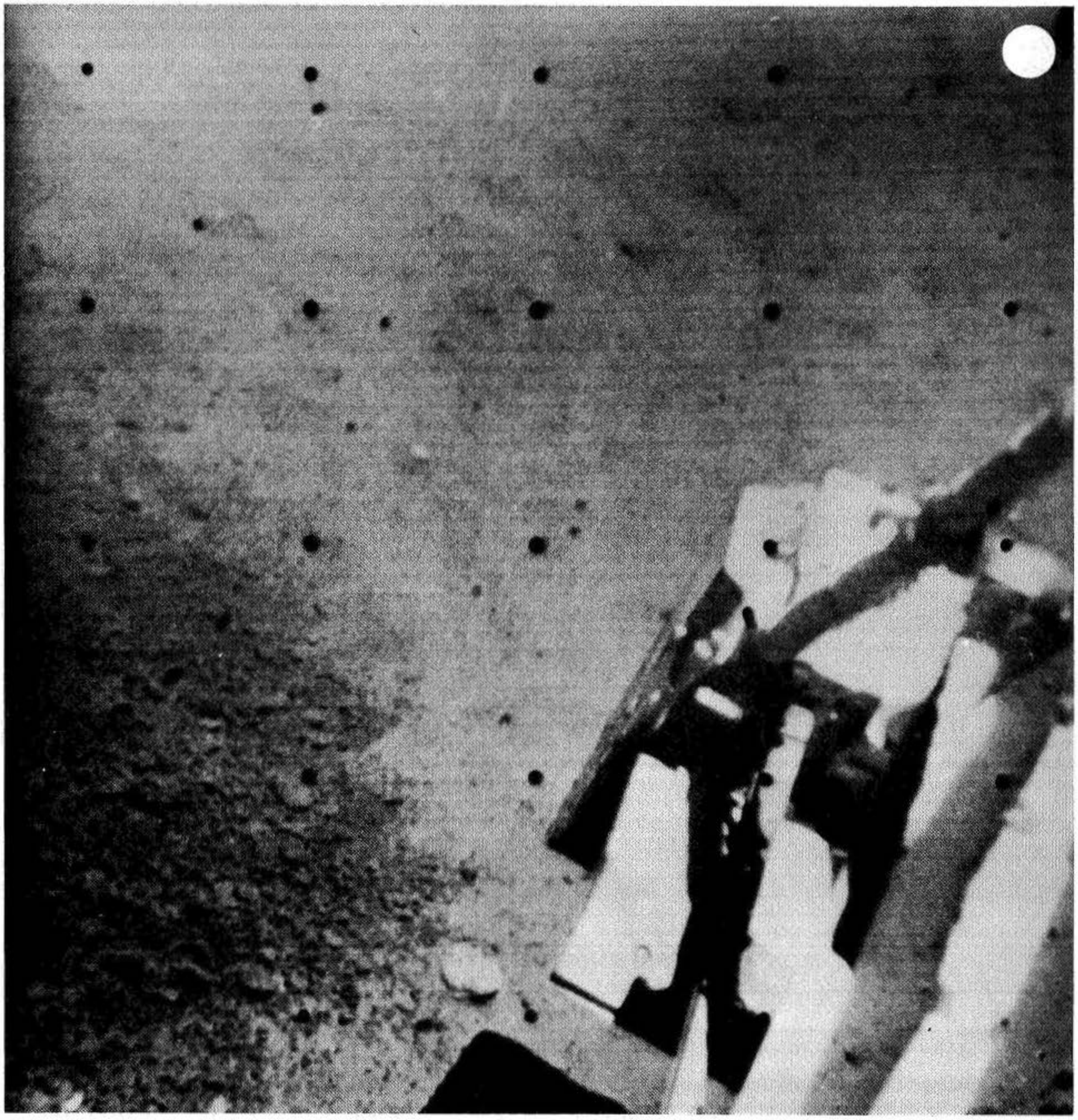
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(128)	Day 117, 13:26:34	—90	—18.10	22.0	f/5.1	N	Green



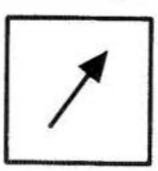
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(129)	Day 118, 09:48:08	—36	—42.90	2.7	f/15.1	W	Clear

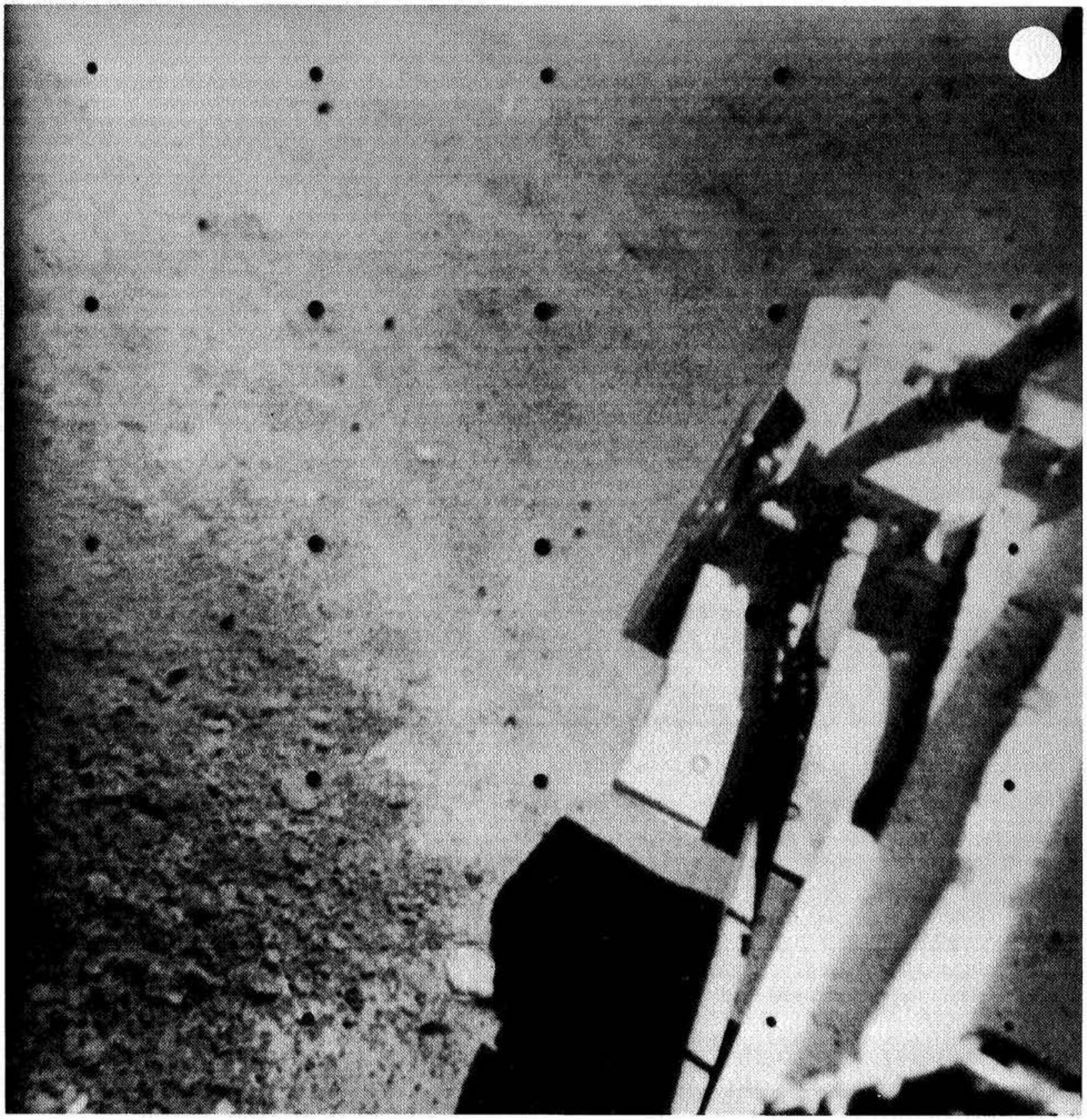


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(130)	Day 118, 10:05:46	—12	—42.90	2.7	f/15.2	W	Clear

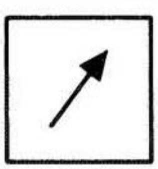


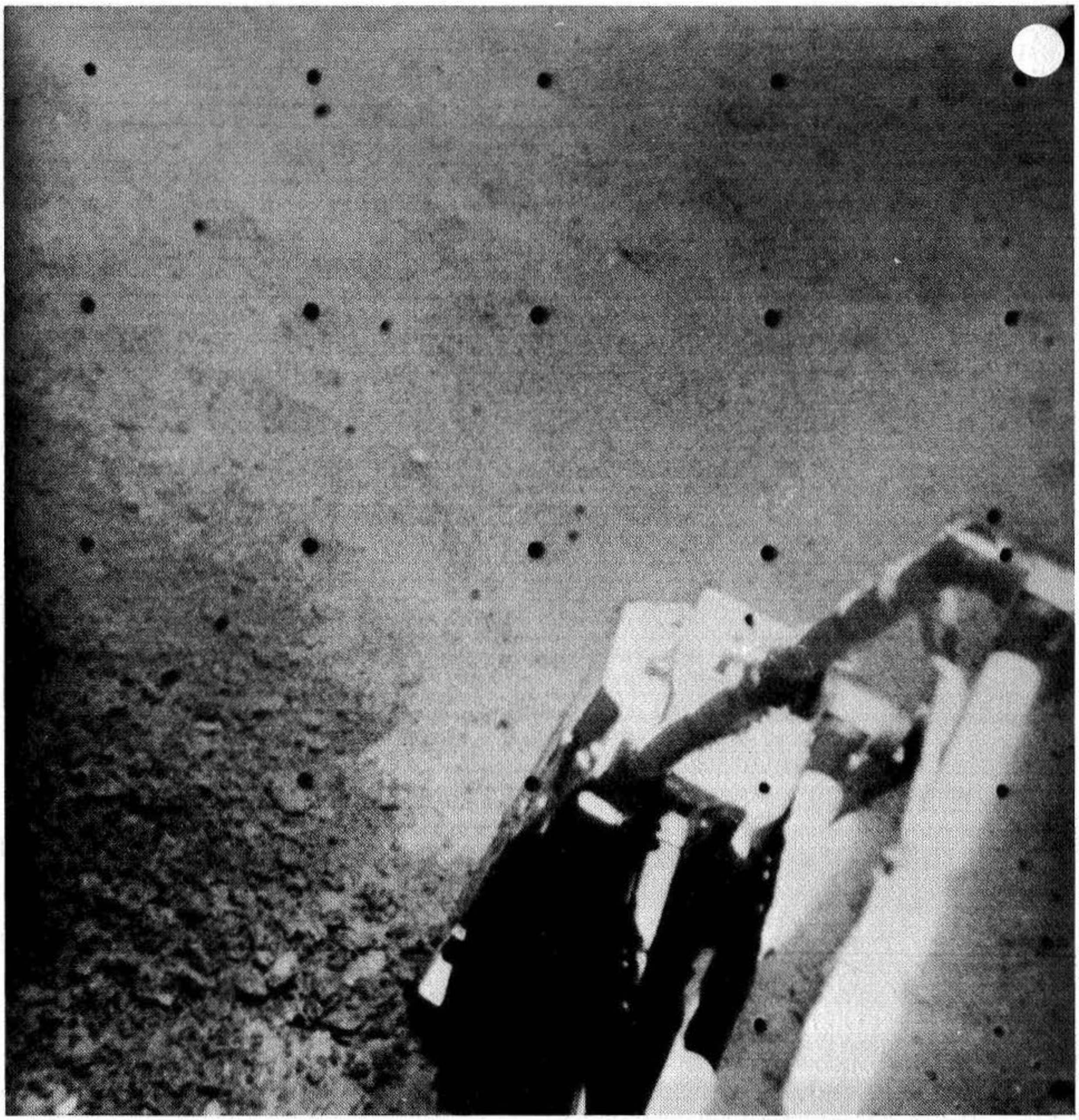
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(131)	Day 118, 10:20:10	—12	—37.94	2.7	*f*/15.2	N	Clear



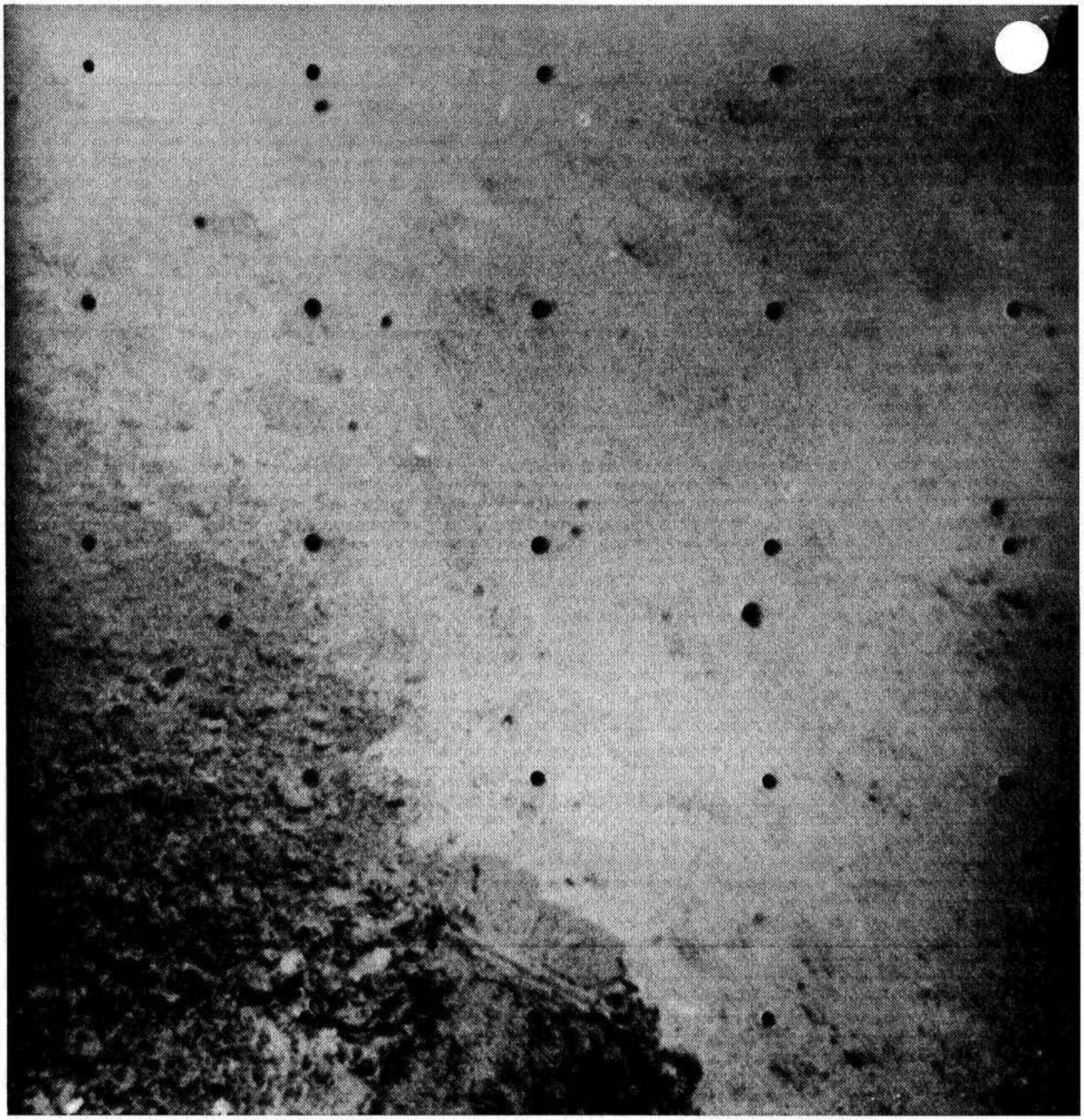


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(132)	Day 118, 10:29:29	—12	—37.94	2.7	f/15.2	N	Clear

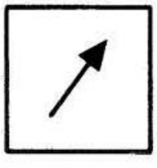


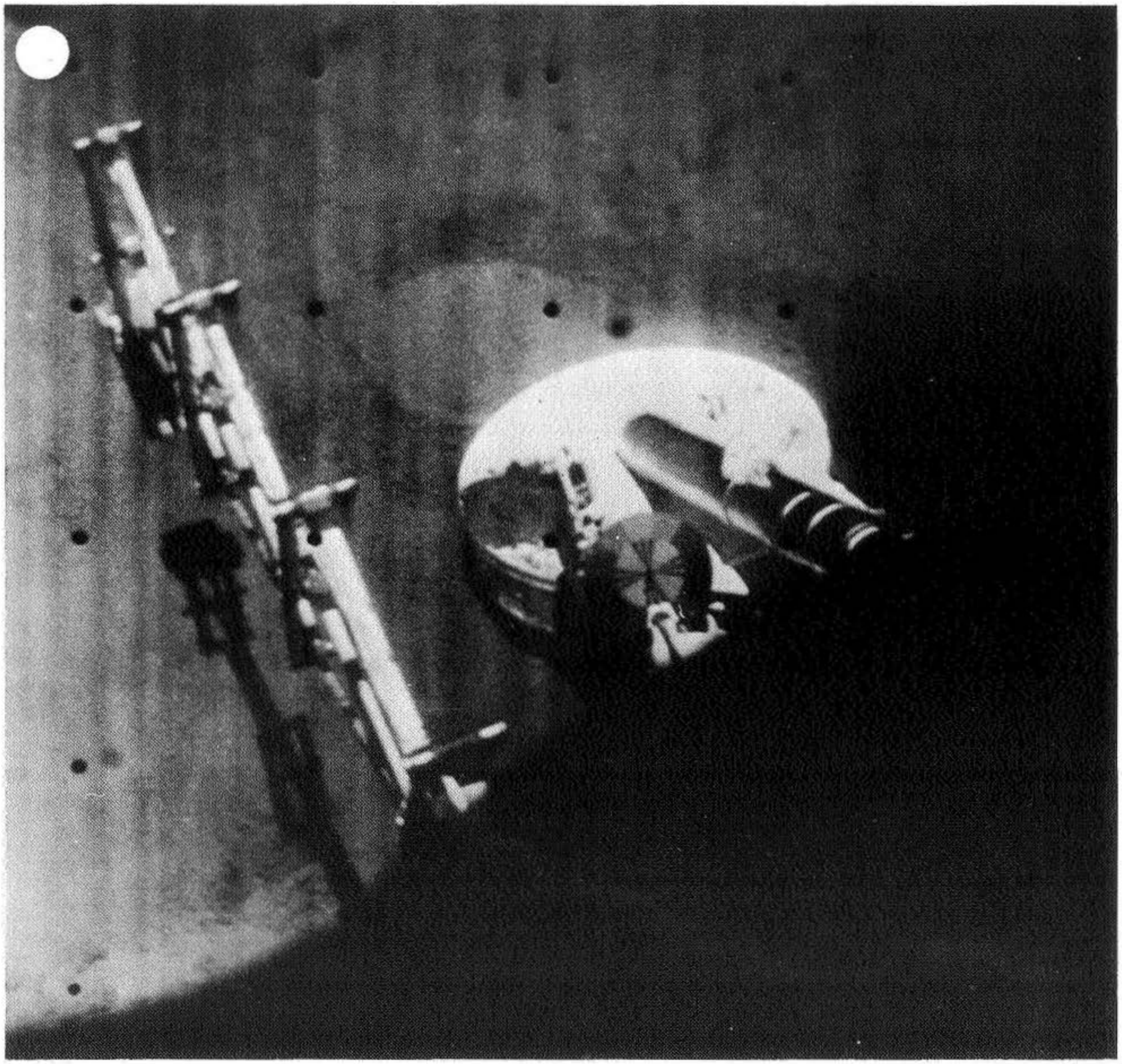


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(133)	Day 118, 10:45:33	—12	—37.94	2.7	f/15.2	N	Clear

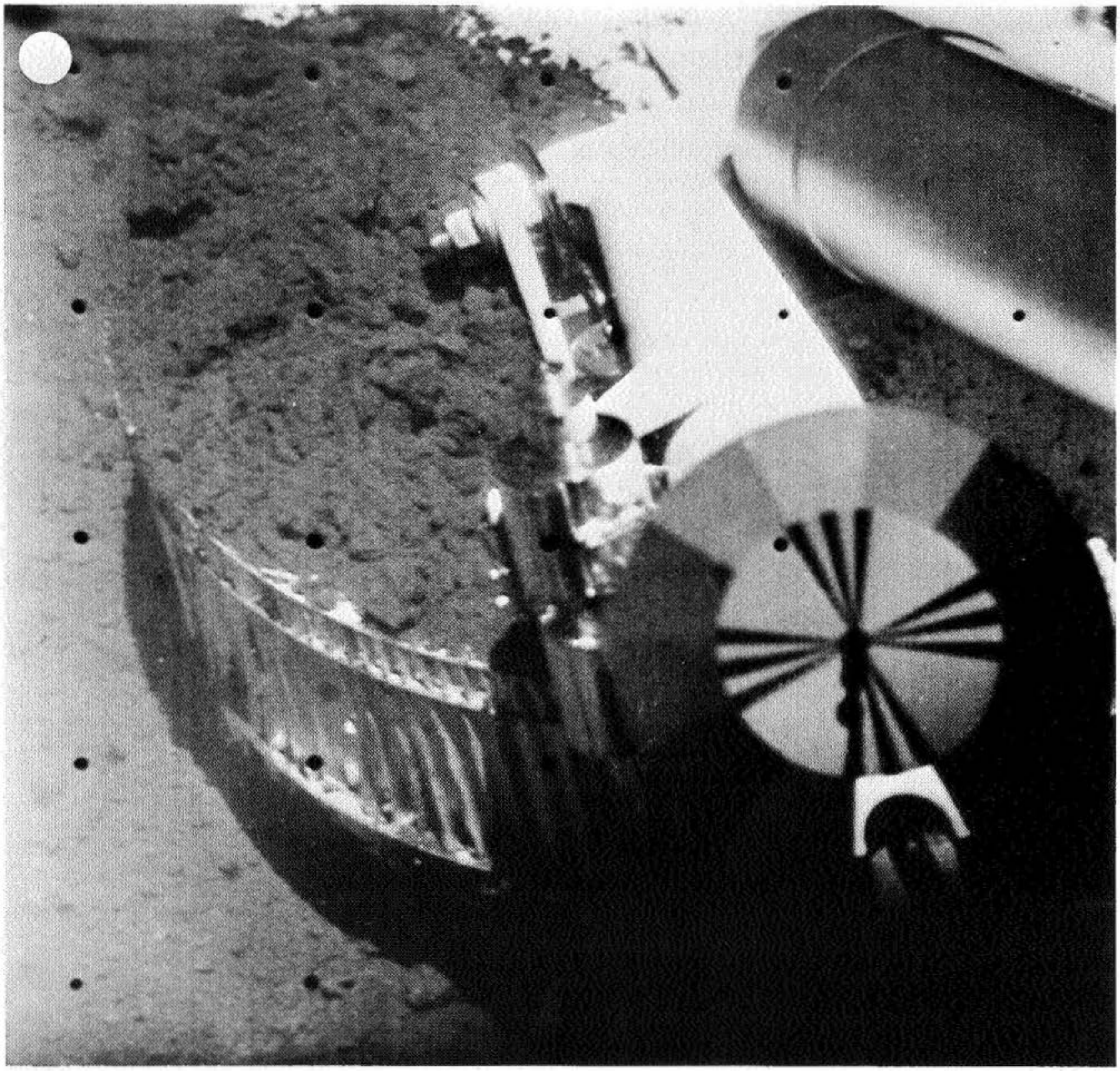


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(134)	Day 118, 10:49:08	—12	—37.94	2.7	f/15.2	N	Clear

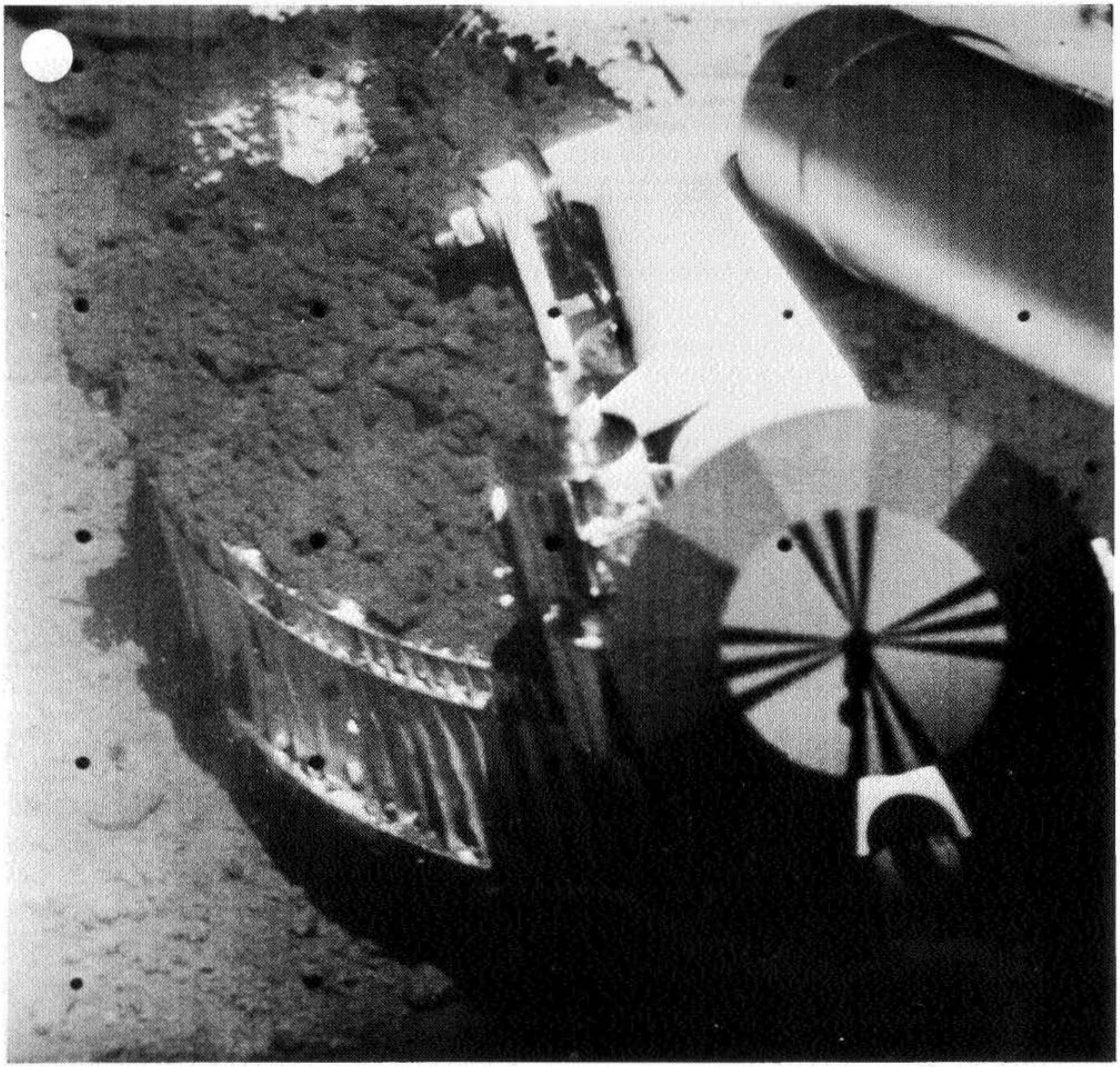




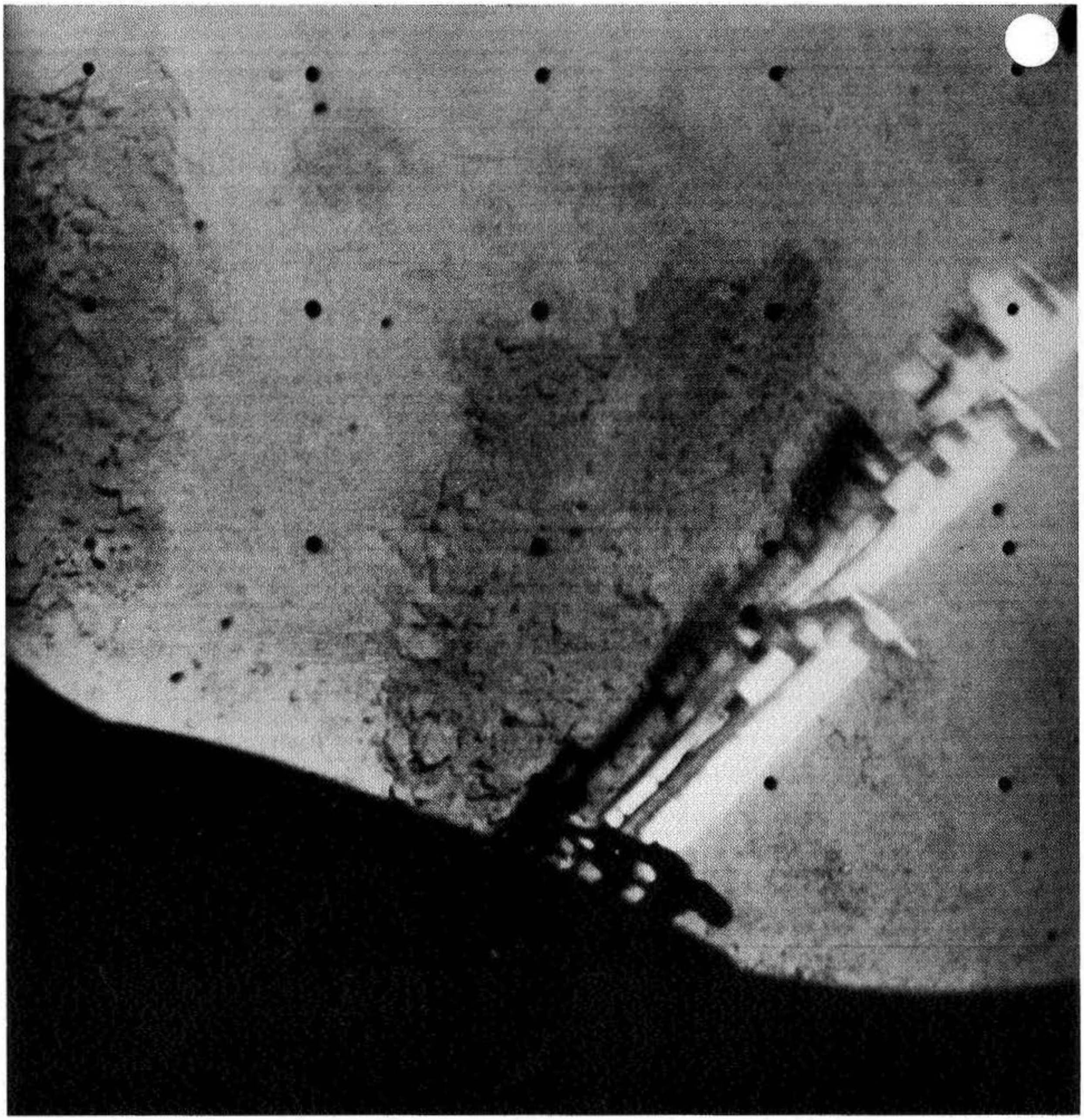
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(135)	Day 118, 11:09:55	—57	—57.78	2.6	f/7.4	W	Green



	GMT	Az	El	Focus, m	Iris	Lens	Filter
(136)	Day 118, 11:29:24	—57	—57.78	2.5	f/7.4	N	Green

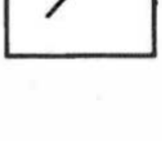


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(137)	Day 118, 12:11:42	—57	—57.78	2.5	f/7.5	N	Green

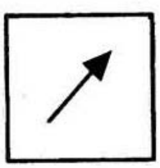


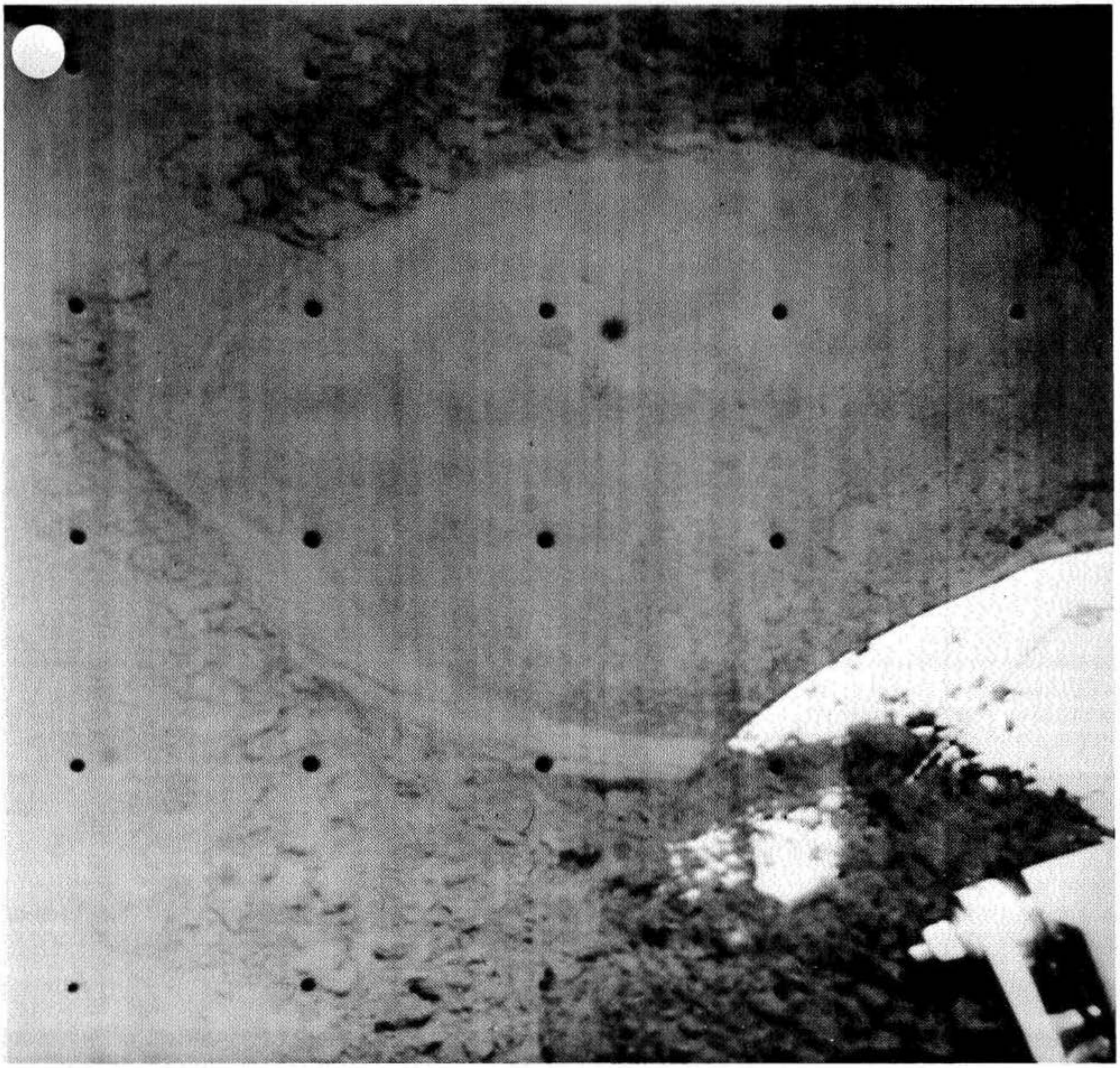
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(138)	Day 118, 13:21:33	—21	—52.82	2.5	f/15.2	W	Clear

	GMT	Az	El	Focus, m	Iris	Lens	Filter
(139)	Day 118, 13:32:44	—21	—52.82	2.5	f/15.2	N	Clear

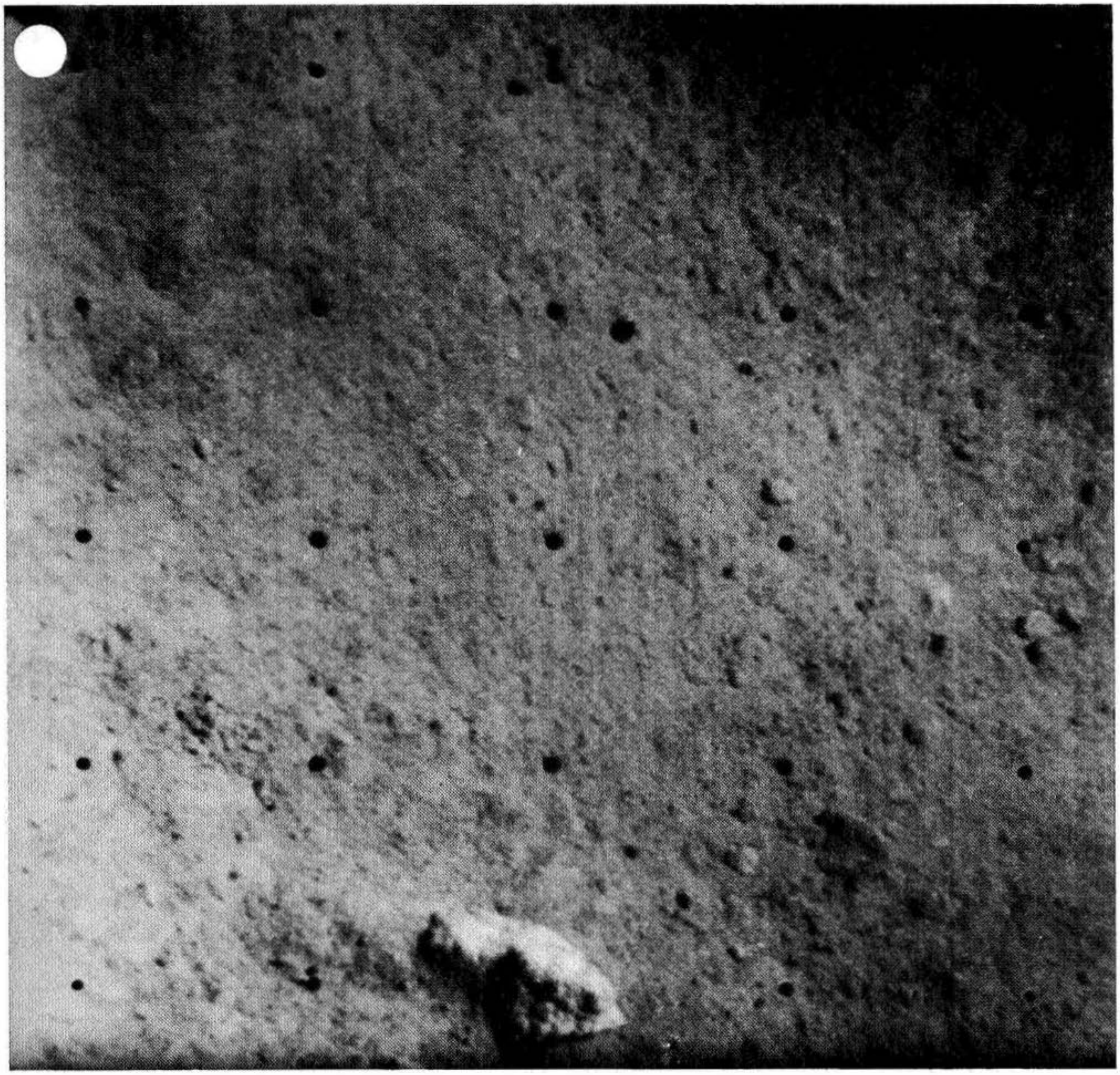


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(140)	Day 118, 13:35:22	—21	—52.82	2.5	f/15.2	N	Clear

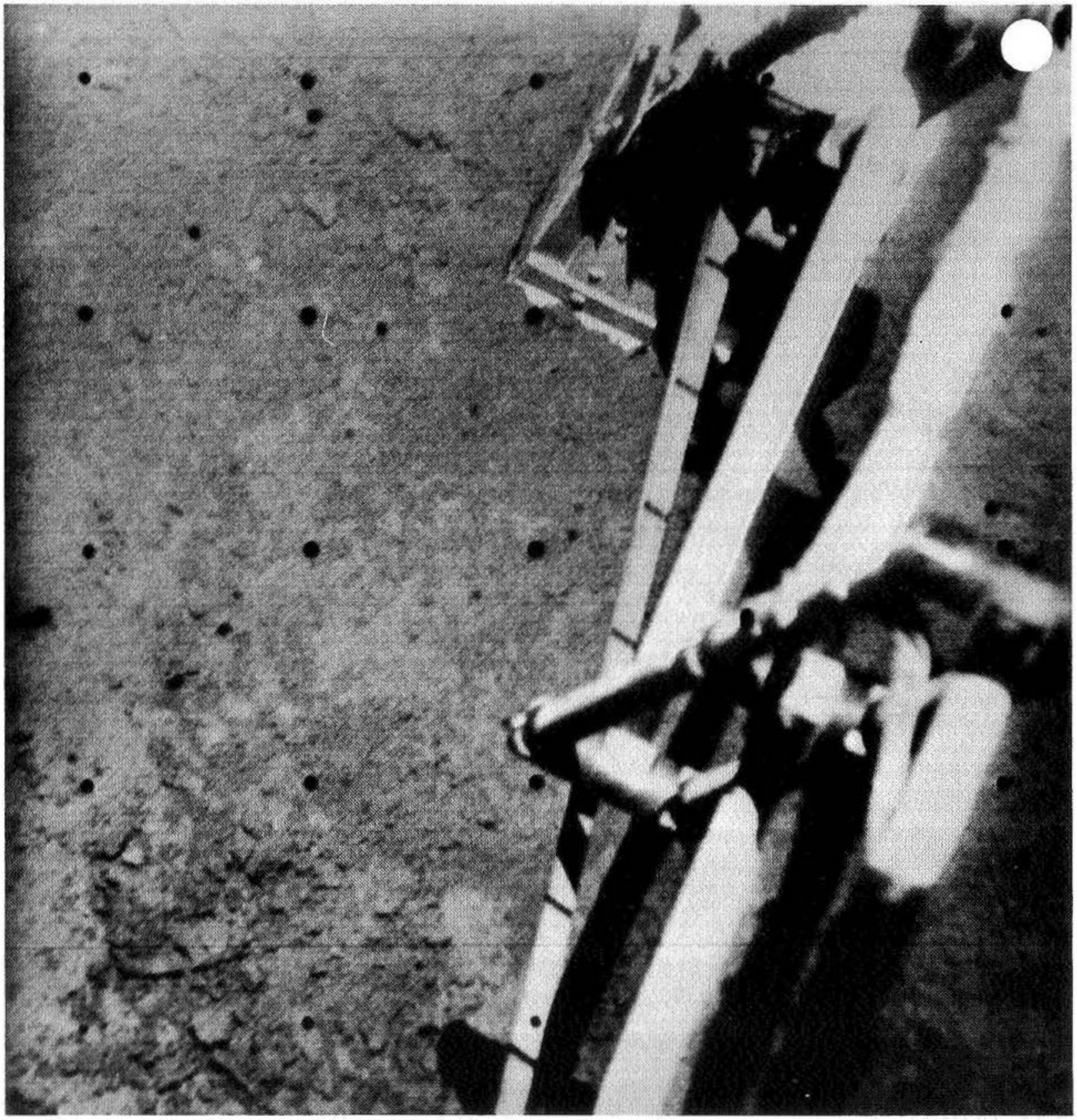




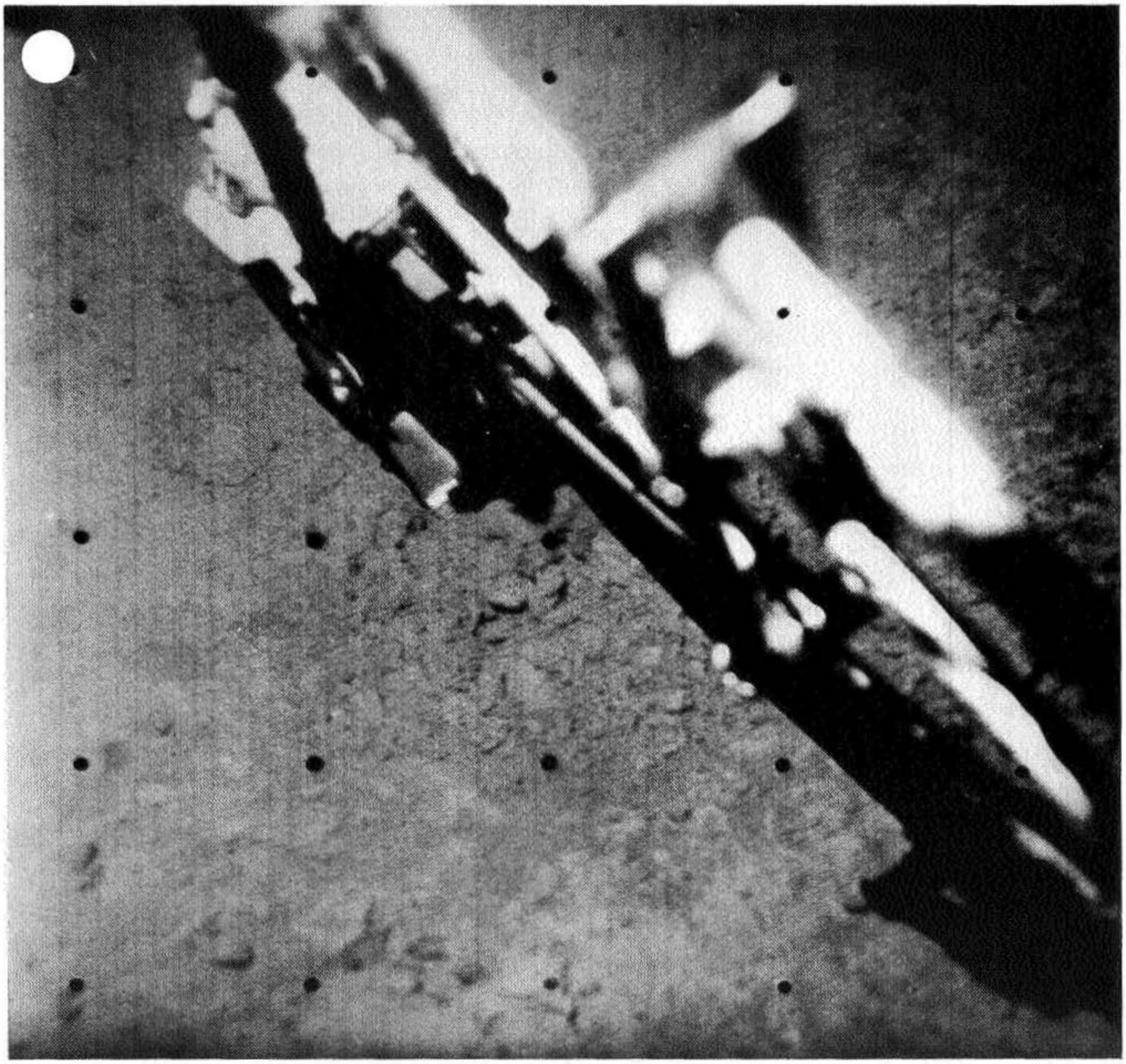
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(141)	Day 118, 13:58:45	−54	−52.82	2.6	f/7.4	N	Green



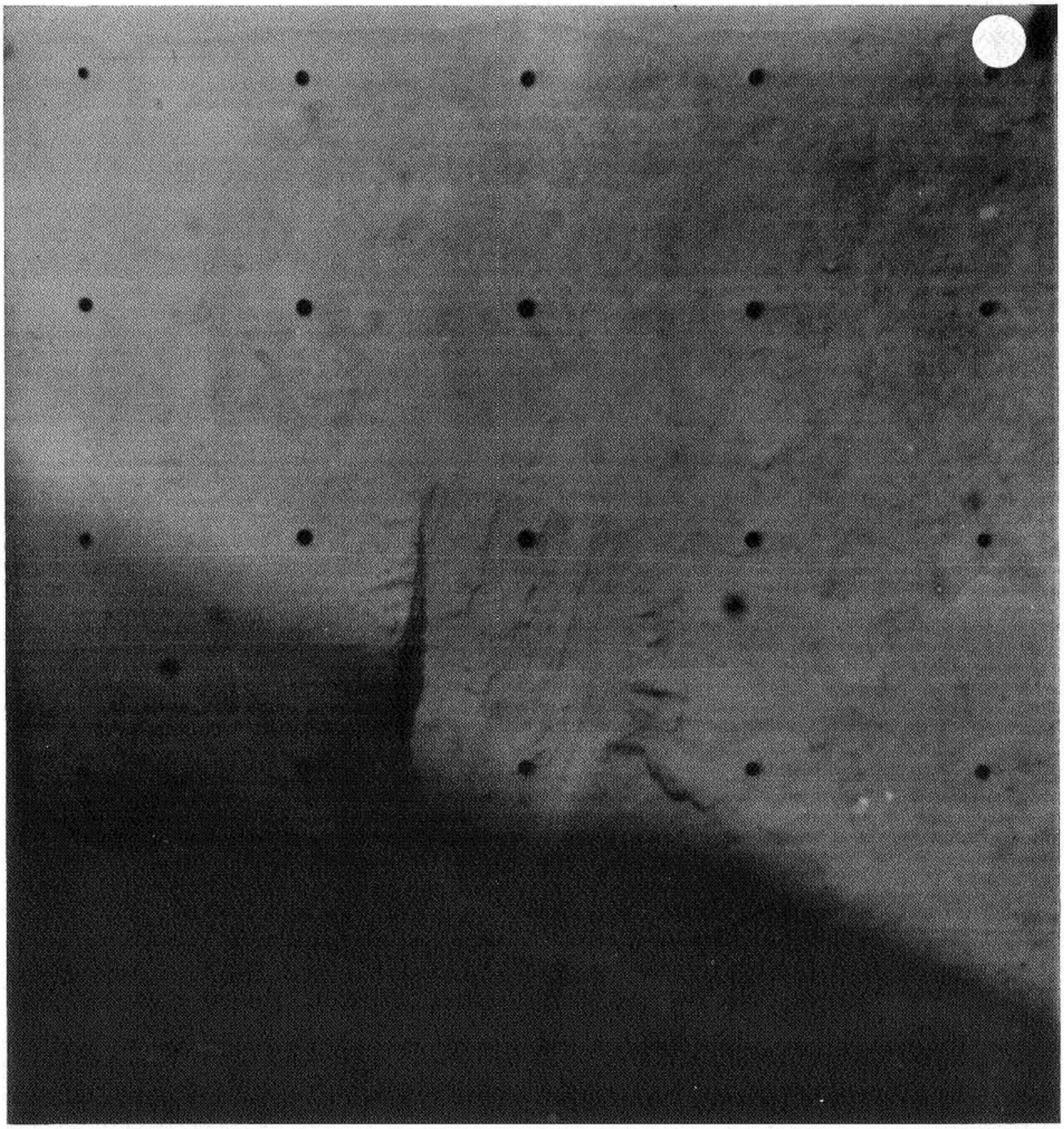
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(142)	Day 118, 14:30:51	−138	−42.90	3.5	f/15.1	N	Clear



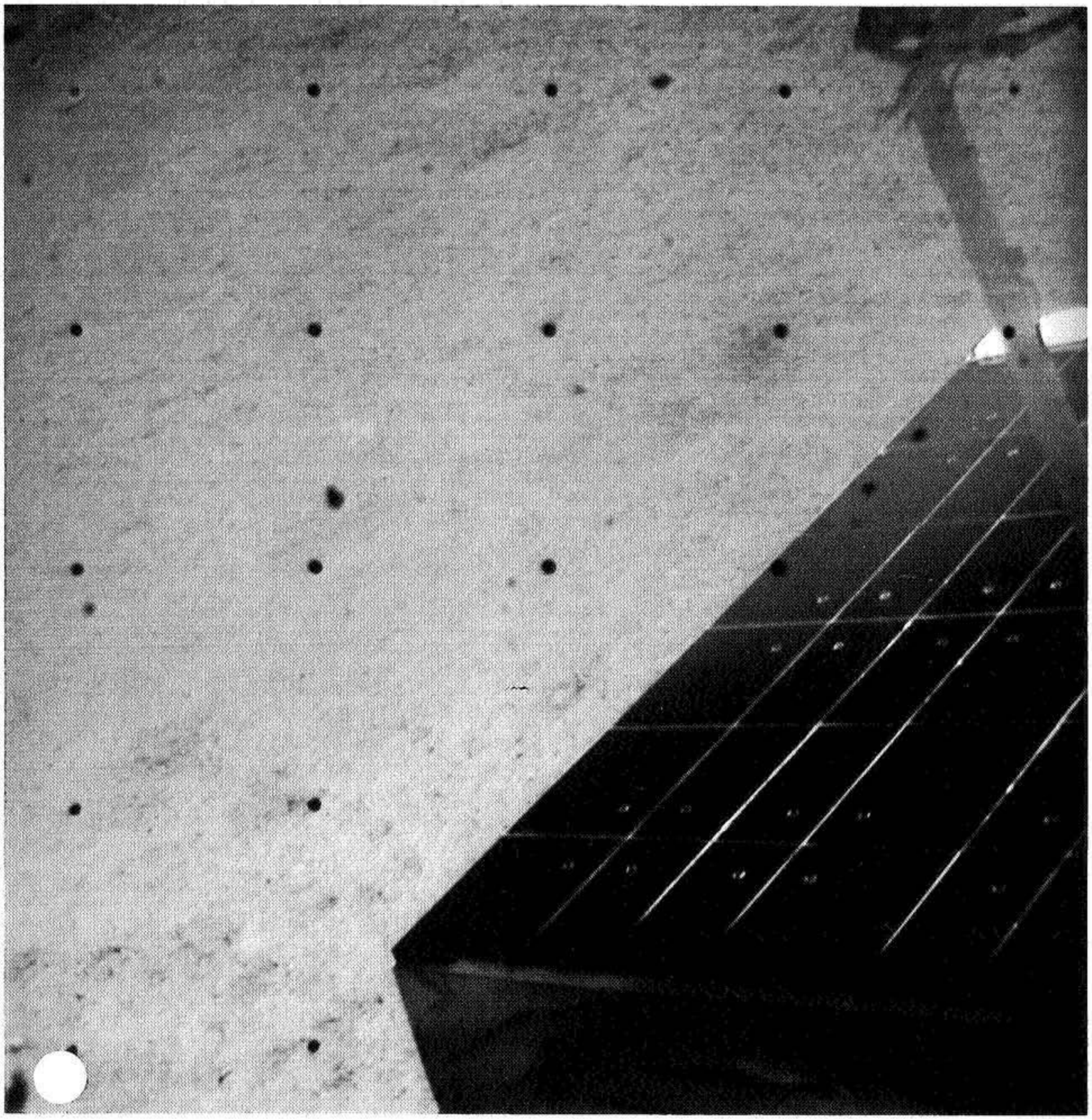
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(143)	Day 119, 09:42:02	—12	—42.90	2.7	f/14.7	N	Clear



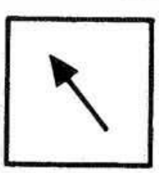
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(144)	Day 119, 10:26:40	—33	—47.78	2.7	f/5.2	N	Blue



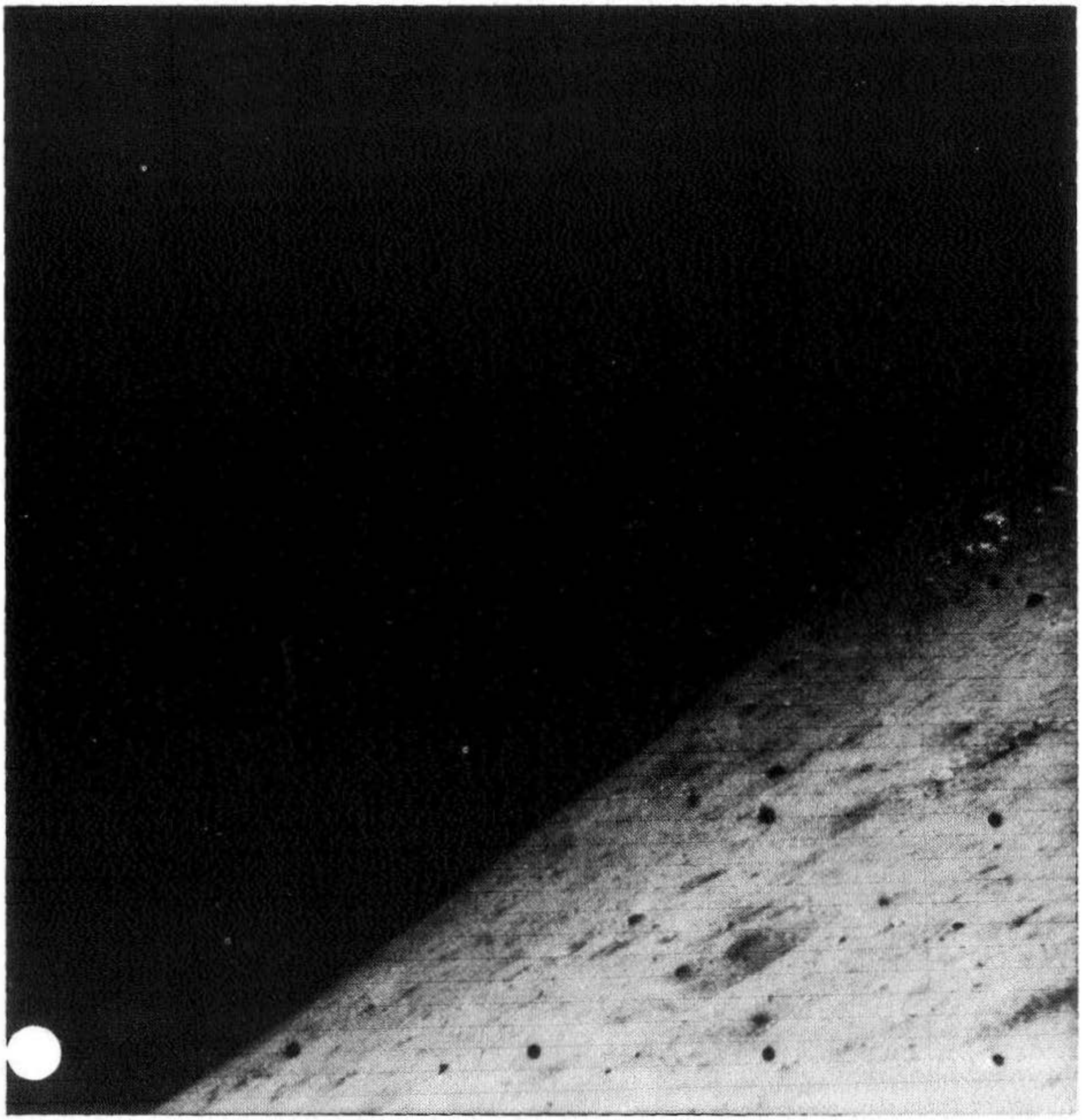
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(145)	Day 119, 14:48:20	—3	—42.90	2.6	f/7.4	N	Green



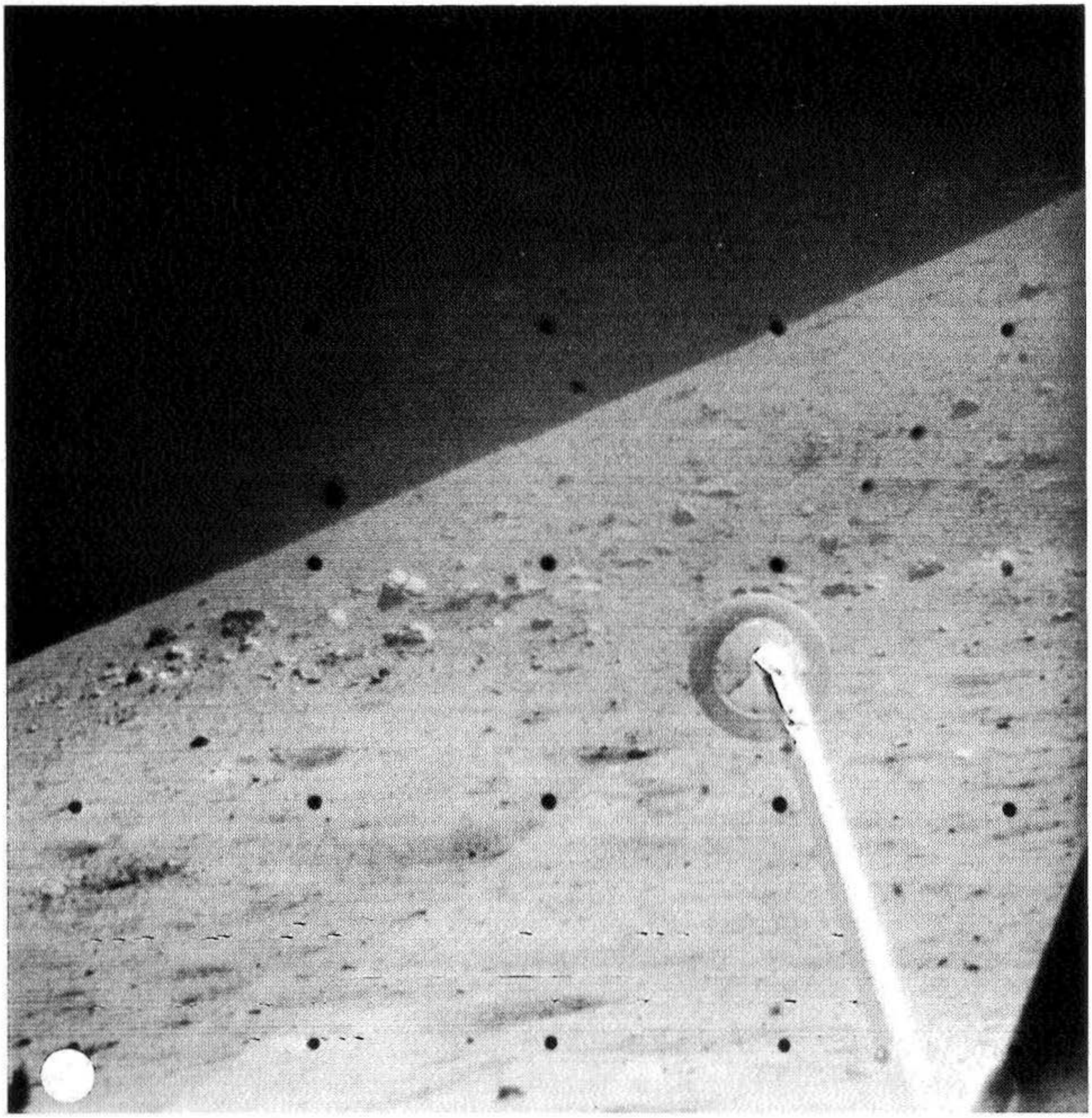
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(146)	Day 120, 09:50:00	—162	—32.98	2.4	f/15.7	W	Clear



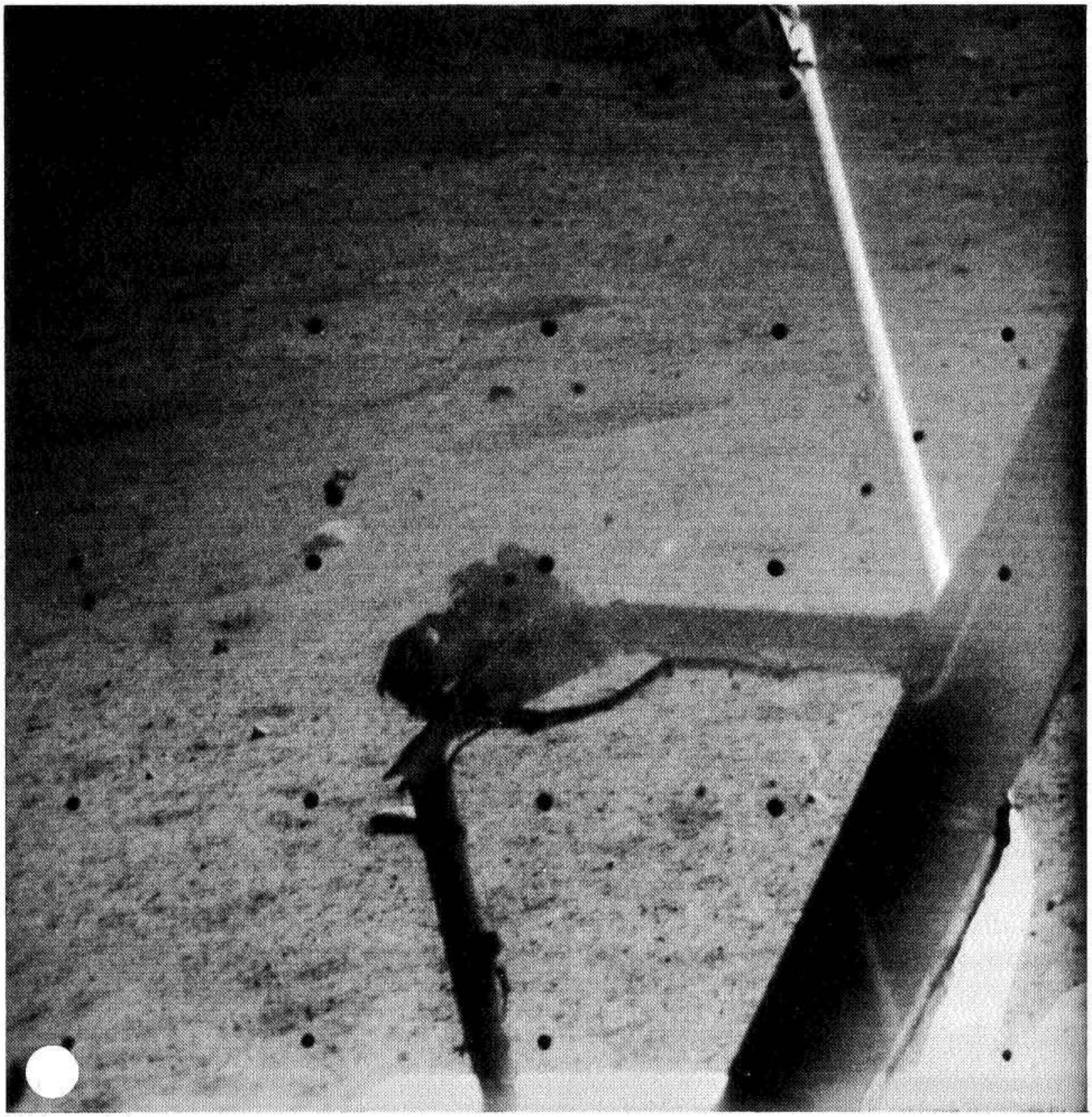
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(147)	Day 120, 09:50:05	—162	—18.10	2.4	f/15.7	W	Clear



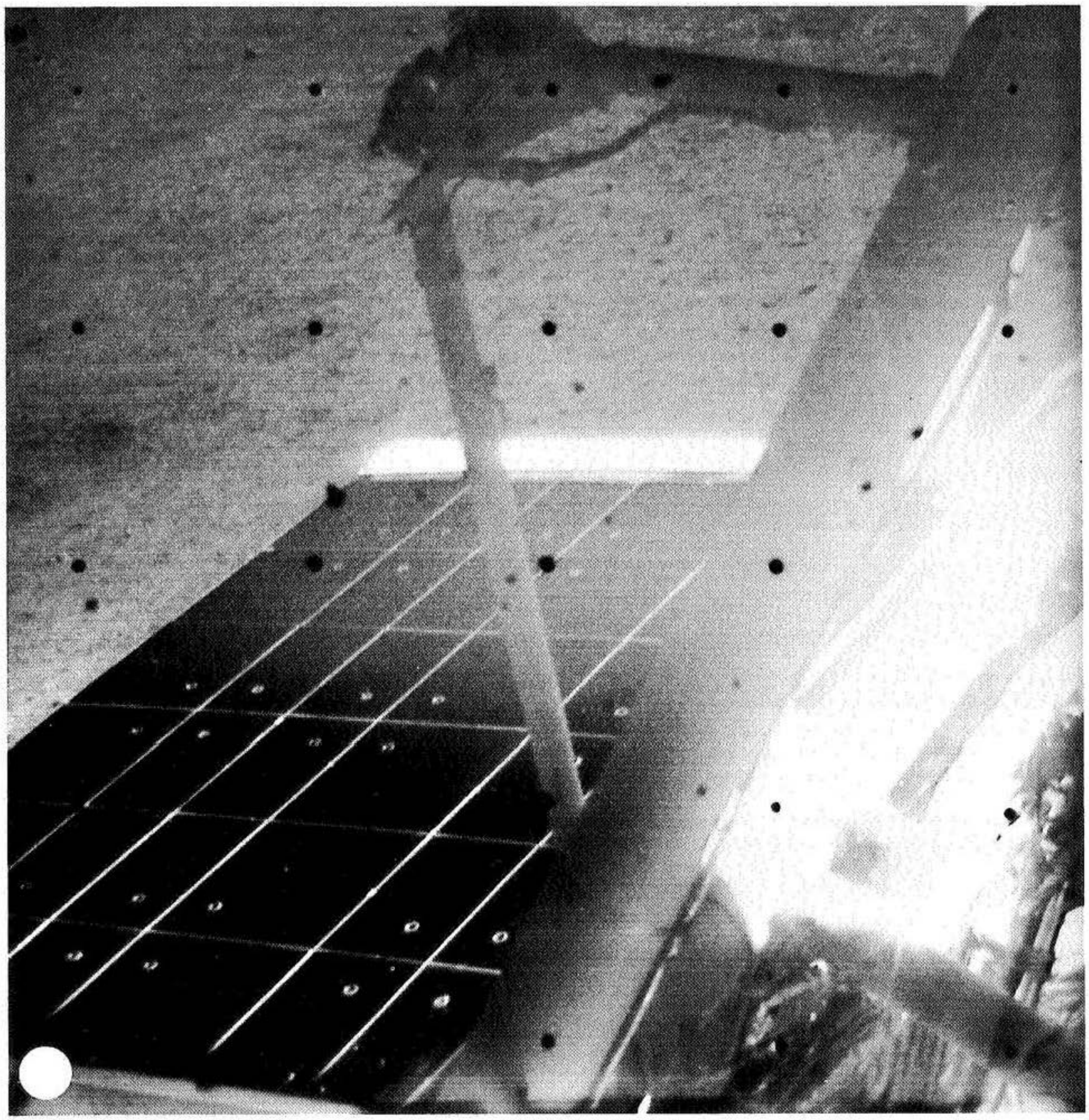
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(148)	**Day 120, 09:50:36**	**—162**	**—3.22**	**2.4**	***f*/15.6**	**W**	**Clear**



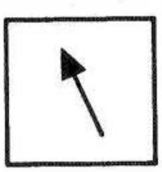
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(149)	Day 120, 09:50:41	—180	—3.22	2.4	f/15.6	W	Clear

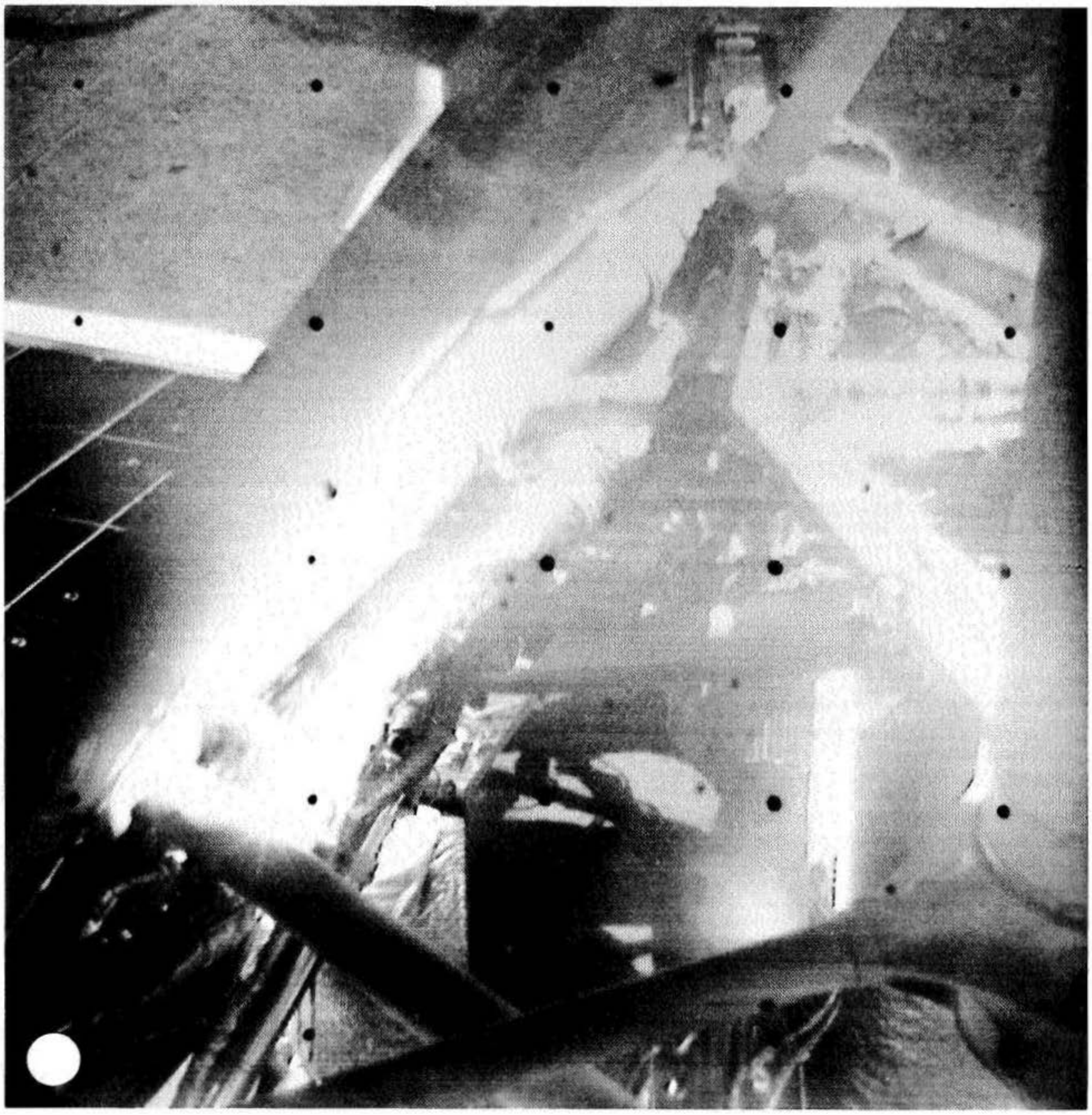


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(150)	Day 120, 09:50:44	—180	—18.10	2.4	f/15.6	W	Clear

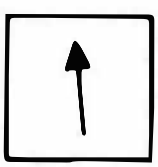


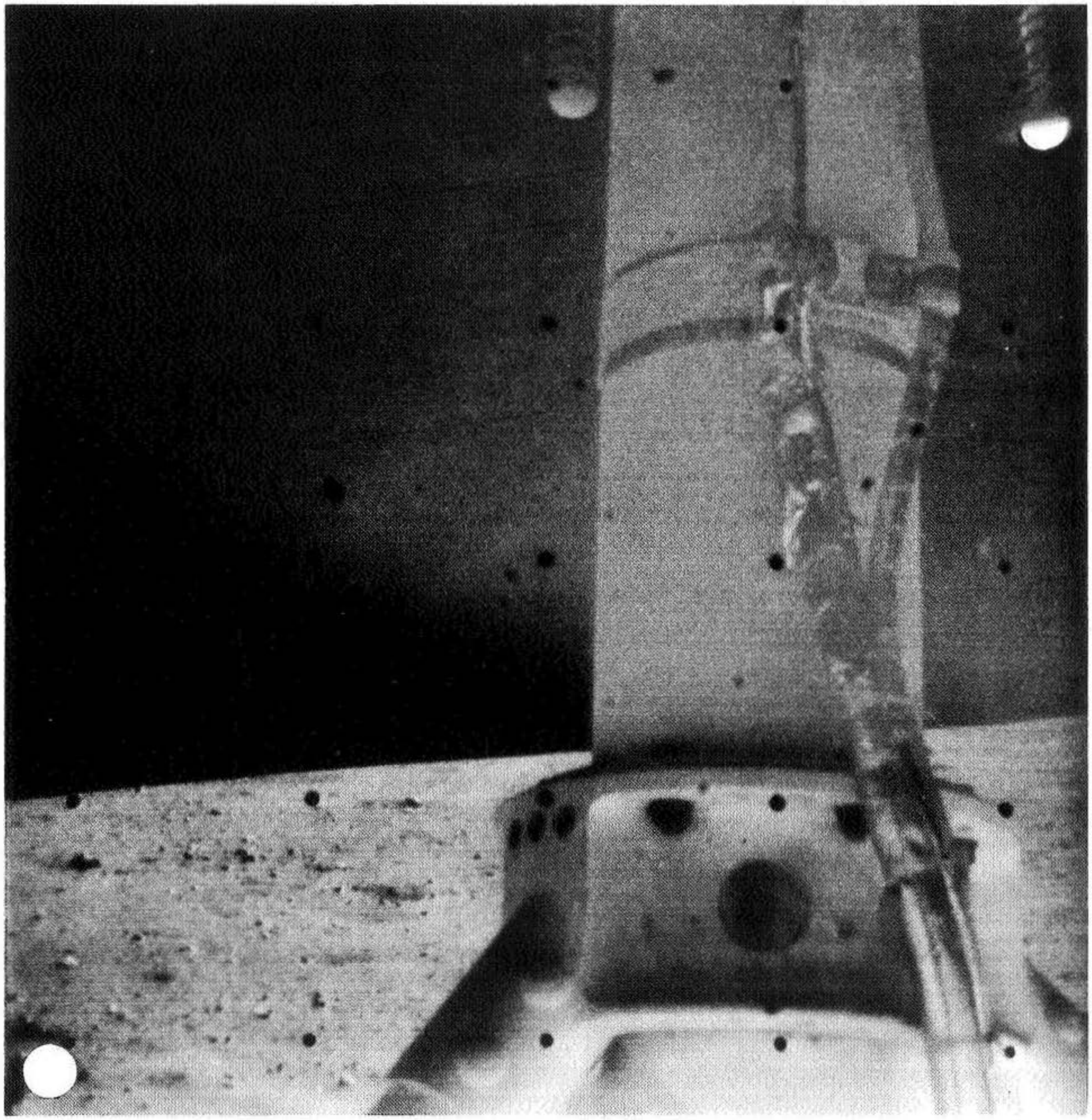
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(151)	Day 120, 09:50:49	—180	—32.98	2.4	f/15.6	W	Clear



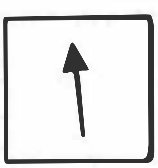


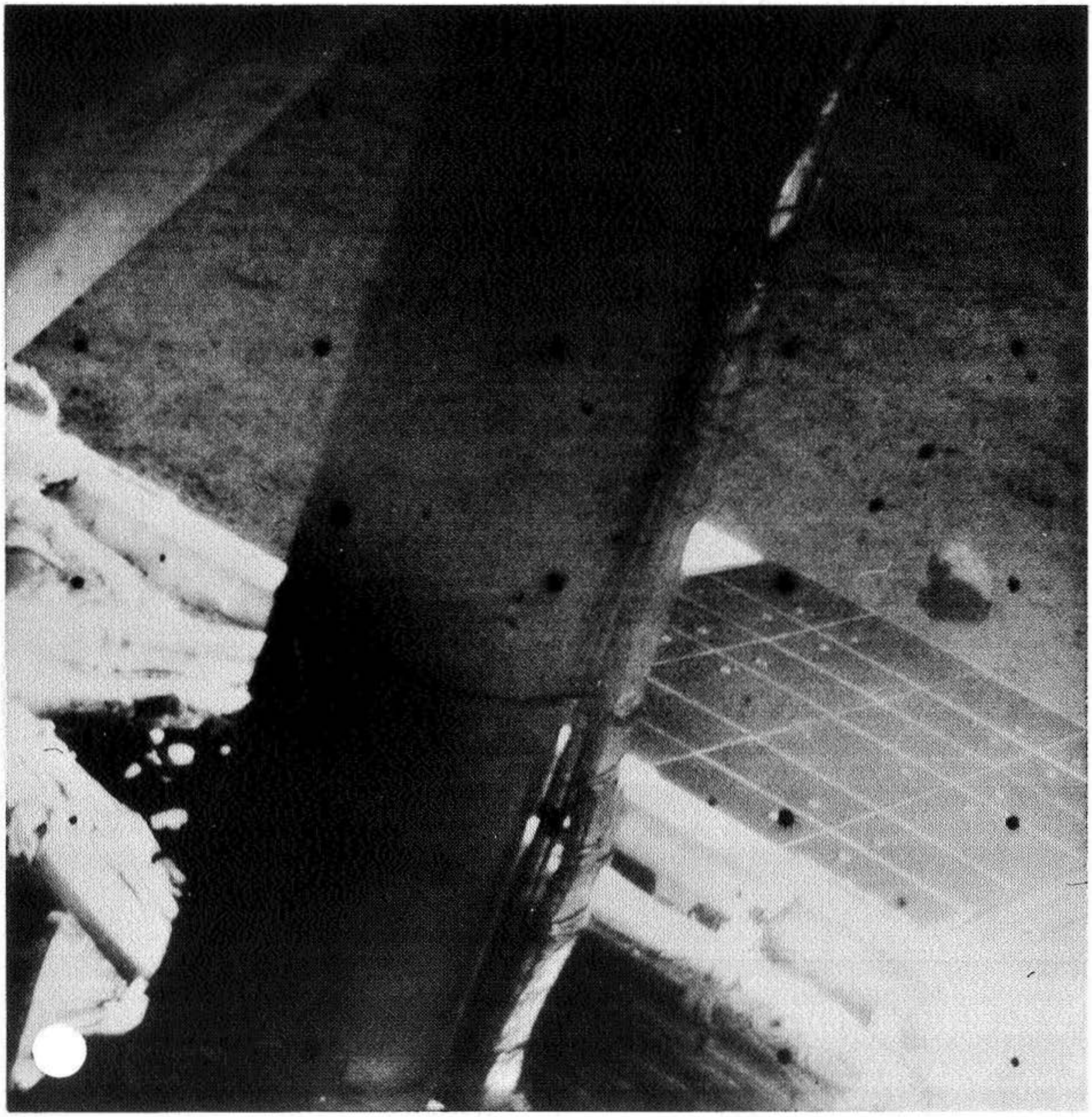
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(152)	Day 120, 09:51:06	—198	—32.98	2.4	f/15.6	W	Clear



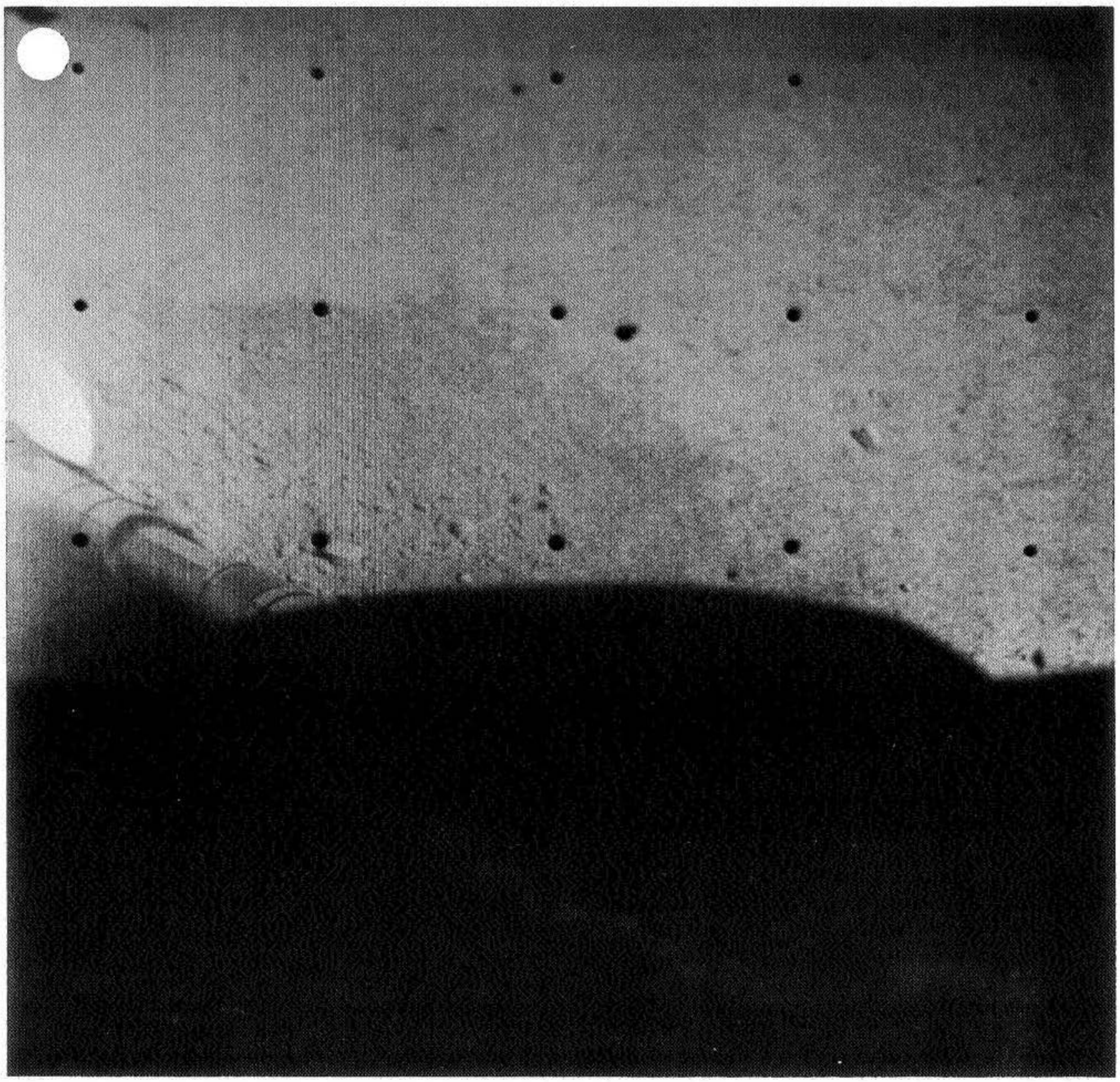


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(153)	Day 120, 09:51:19	—198	11.66	2.4	f/15.6	W	Clear

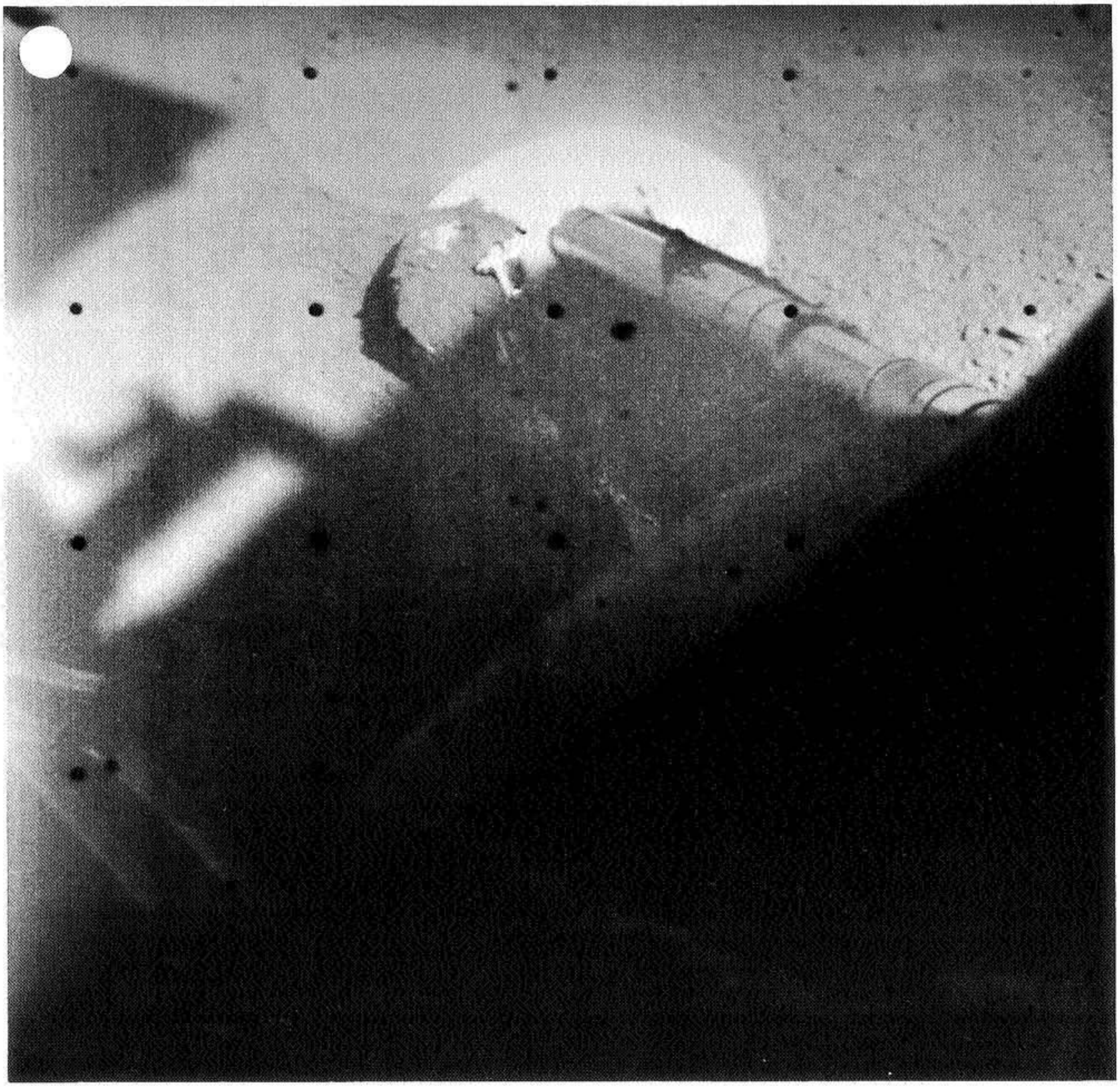




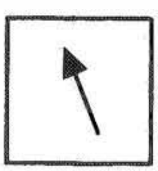
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(154)	Day 120, 09:51:34	—216	—18.10	2.4	f/15.6	W	Clear



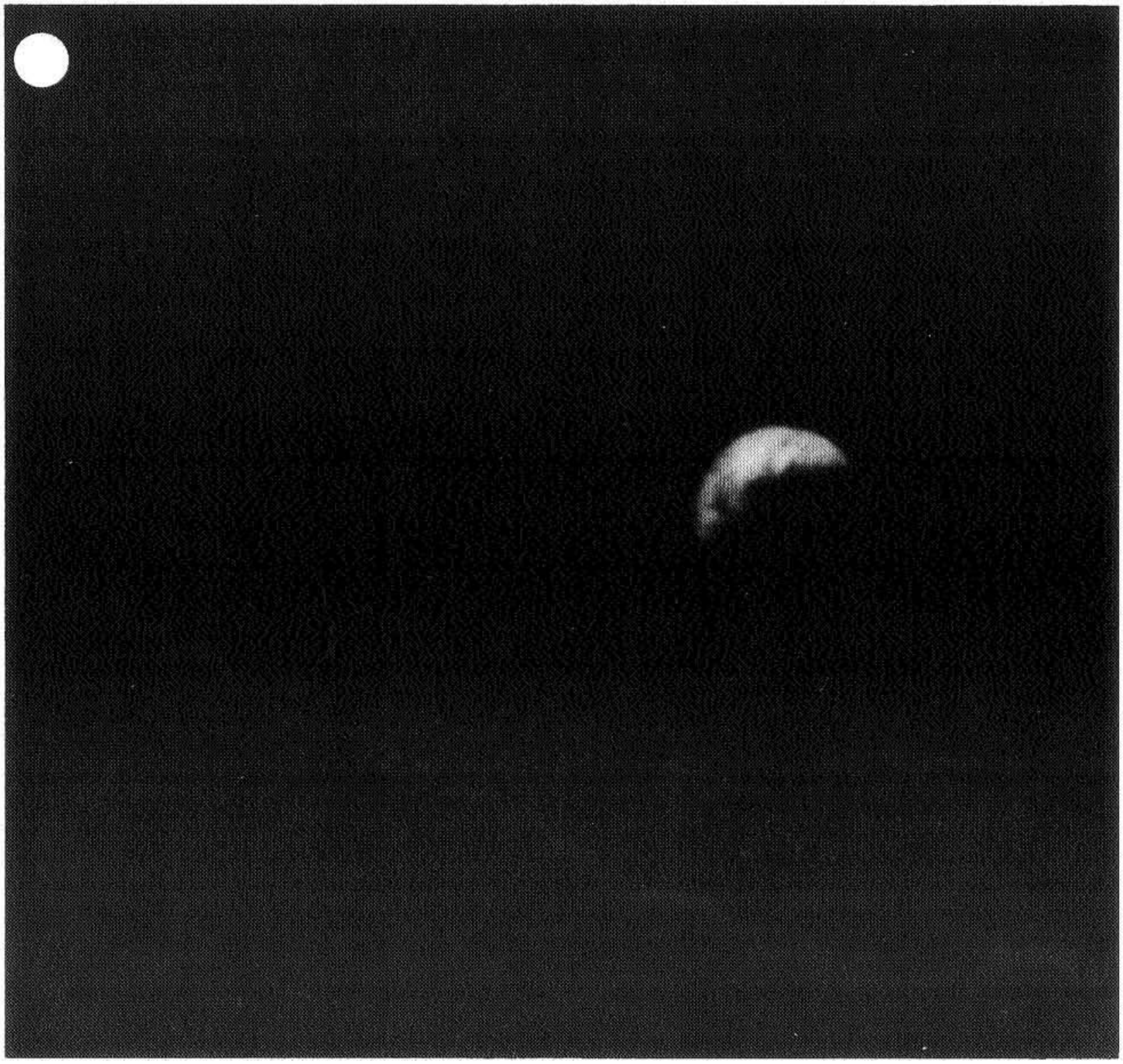
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(155)	Day 120, 09:52:27	—90	—62.74	2.4	f/15.7	W	Clear



	GMT	Az	El	Focus, m	Iris	Lens	Filter
(156)	Day 120, 09:52:36	—54	—62.74	2.4	f/15.6	W	Clear

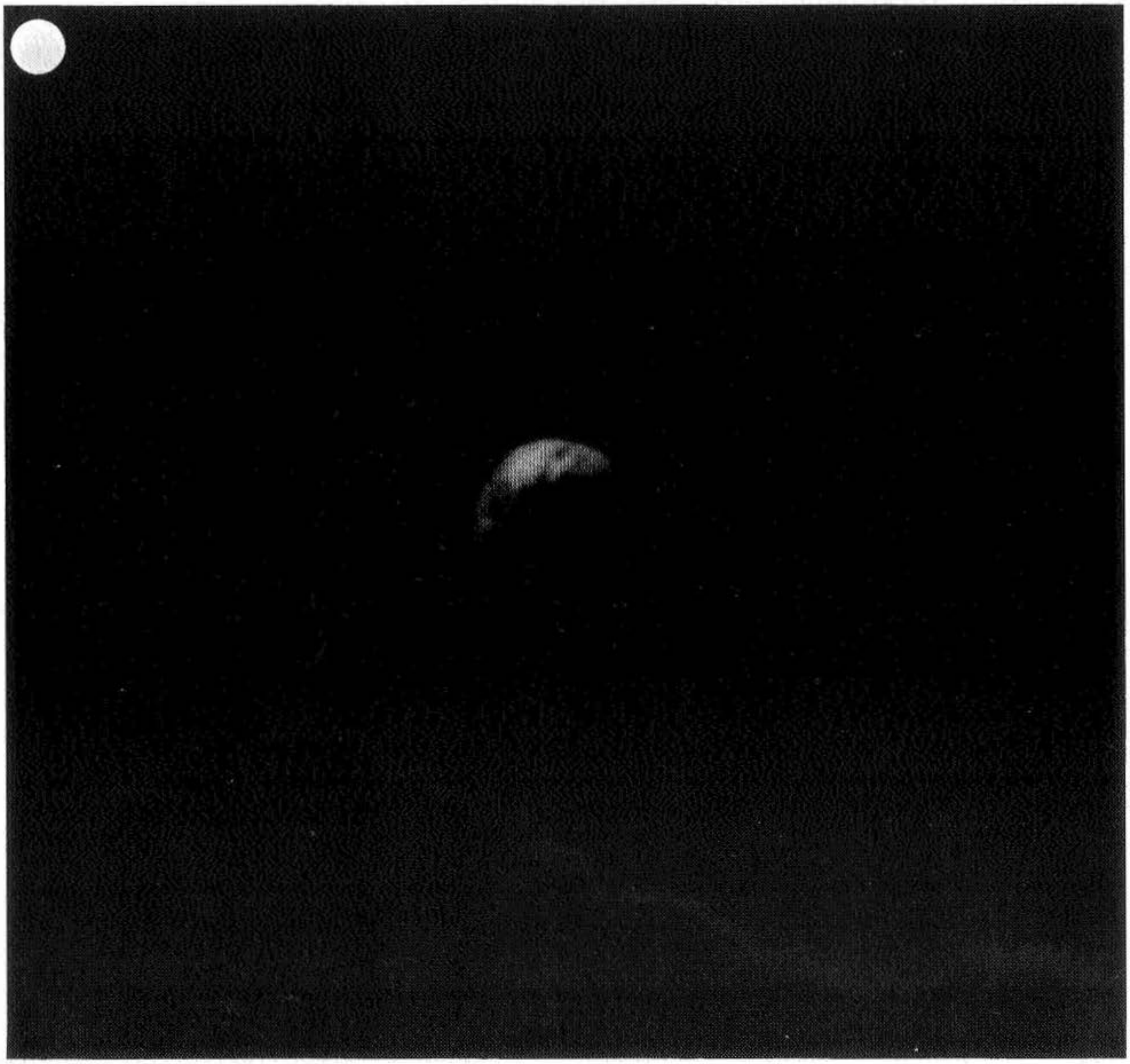


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(157)	Day 120, 10:35:58	—48	35.9	30.4	f/14.7	W	Clear

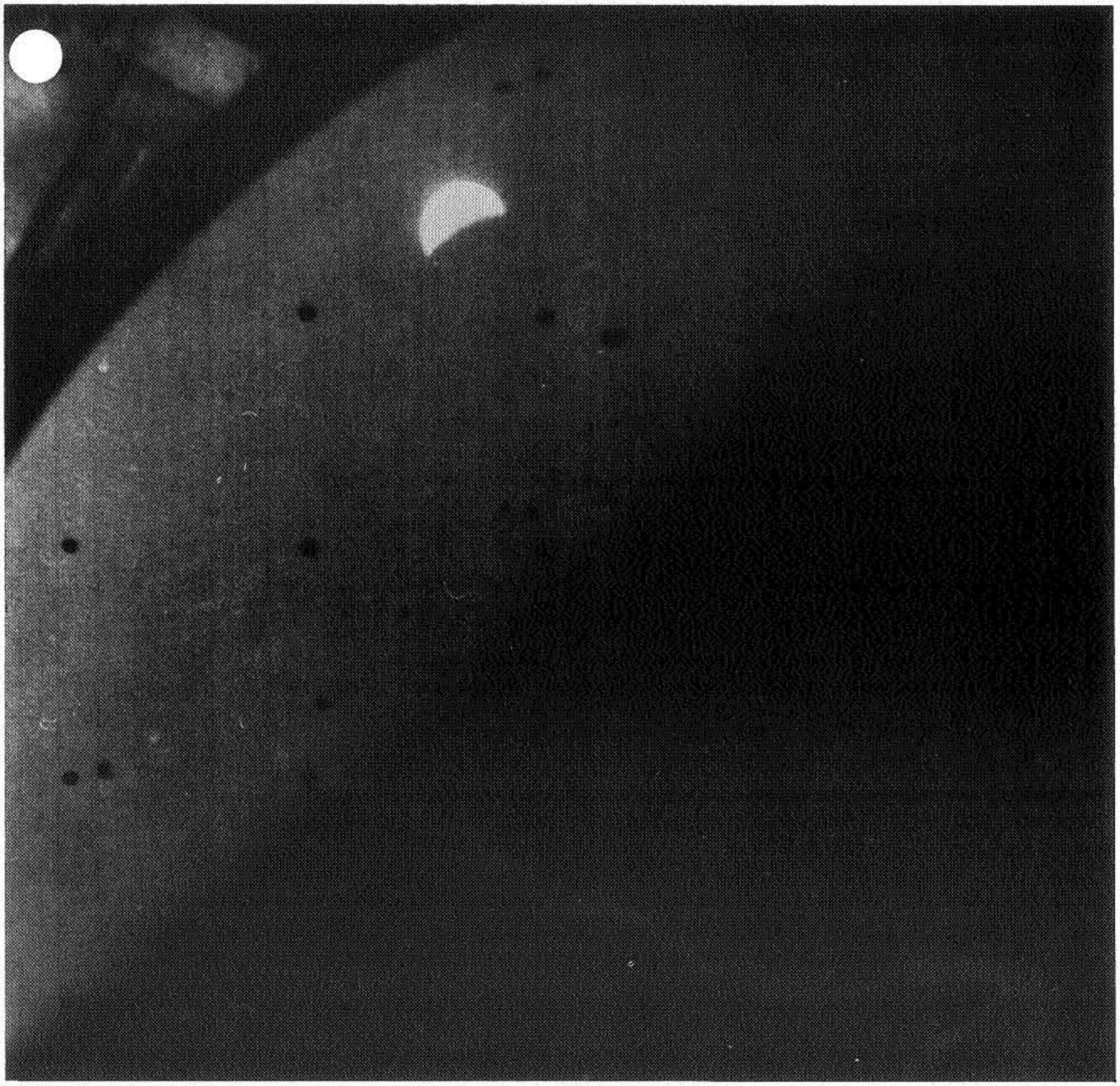


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(158)	Day 120, 10:37:30	—48	35.9	30.4	f/5.2	W	Green

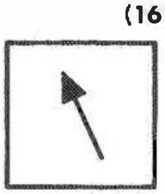
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(159)	Day 120, 10:38:26	—48	36.3	30.4	f/5.2	W	Blue

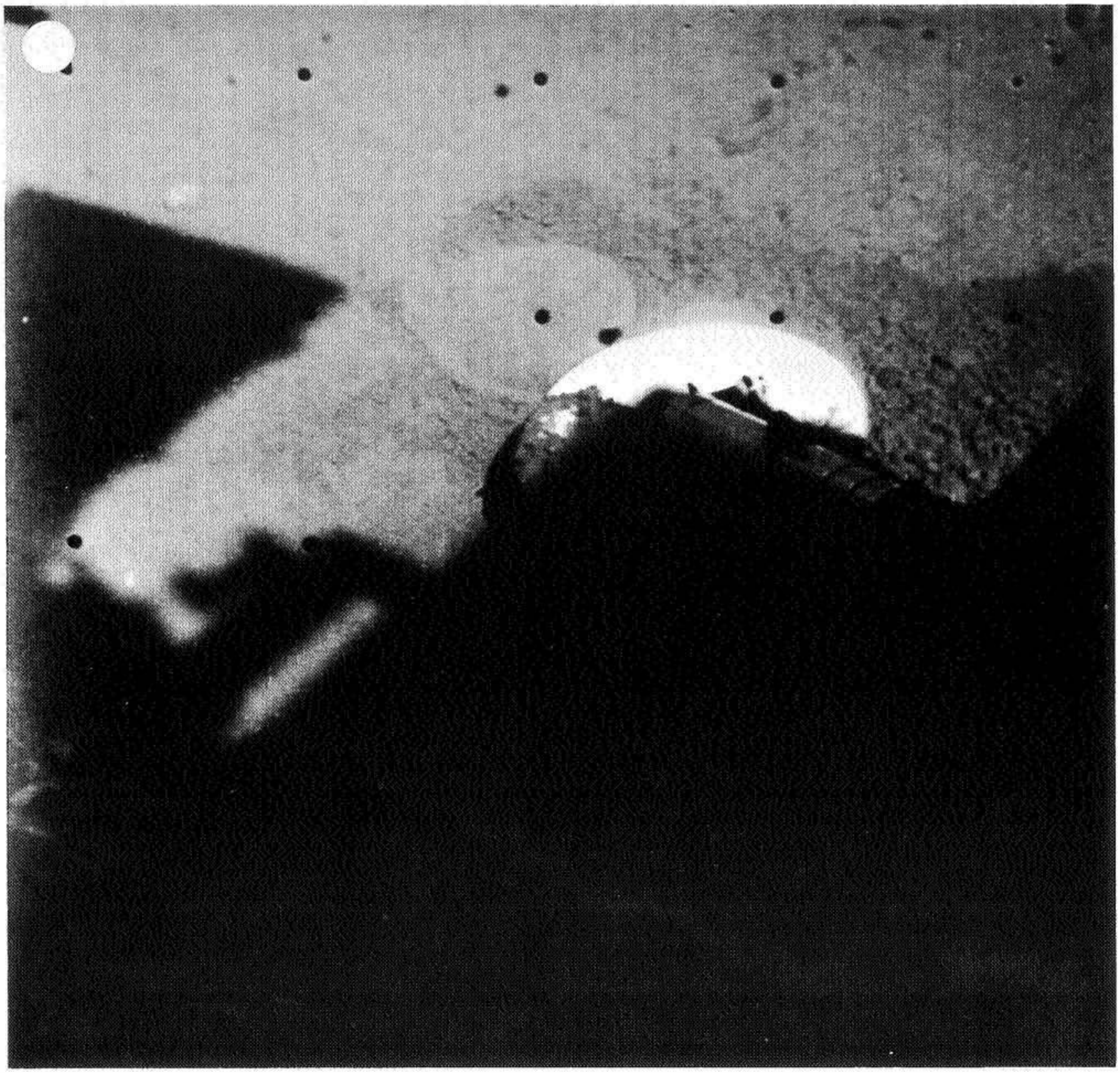


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(160)	Day 120, 10:39:29	—48	35.9	30.4	f/5.2	W	Red

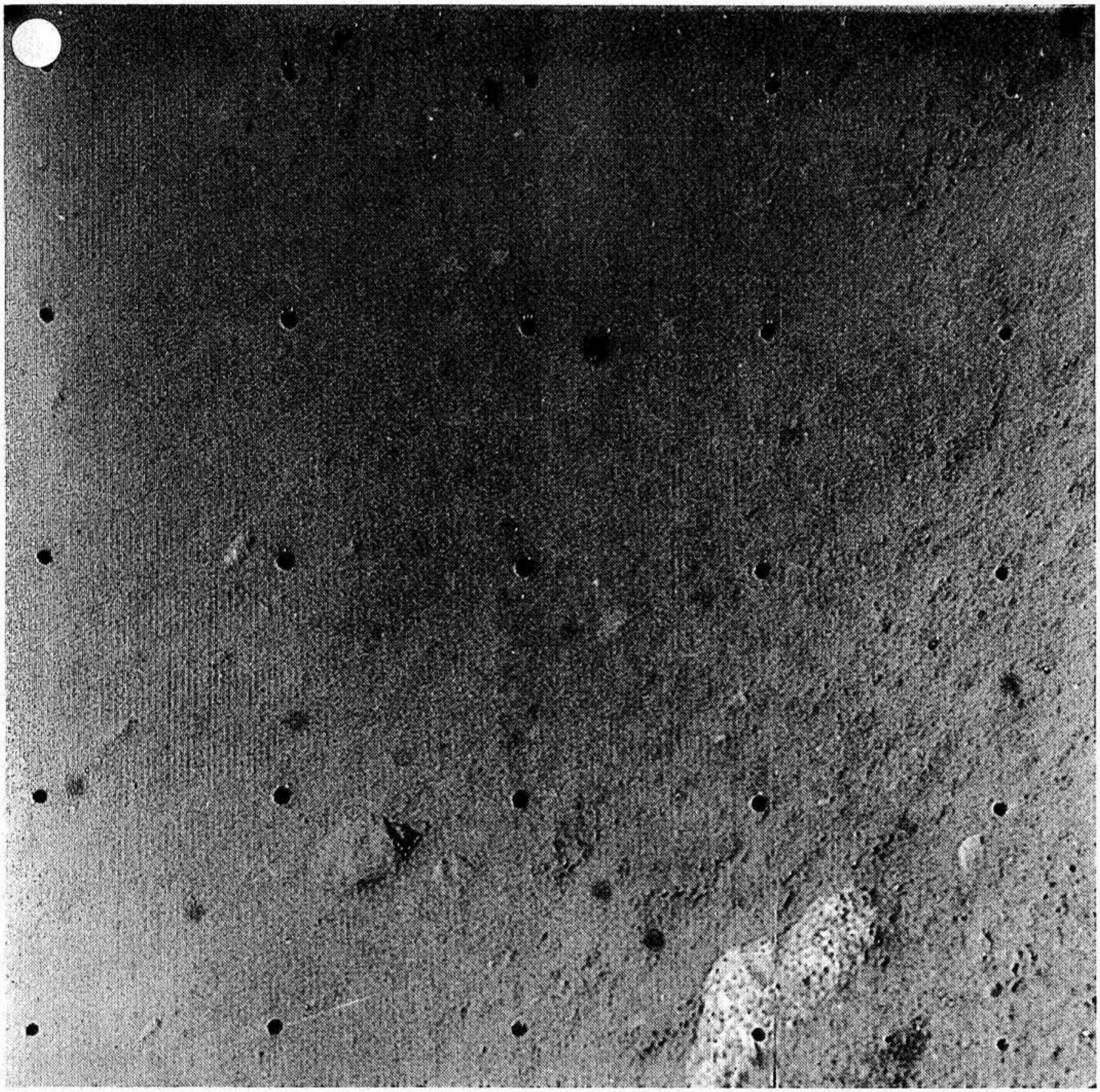


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(161)	Day 120, 10:47:02	—48	36.3	29.8	f/15.0	W	Clear

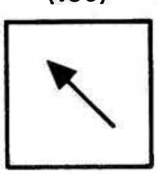


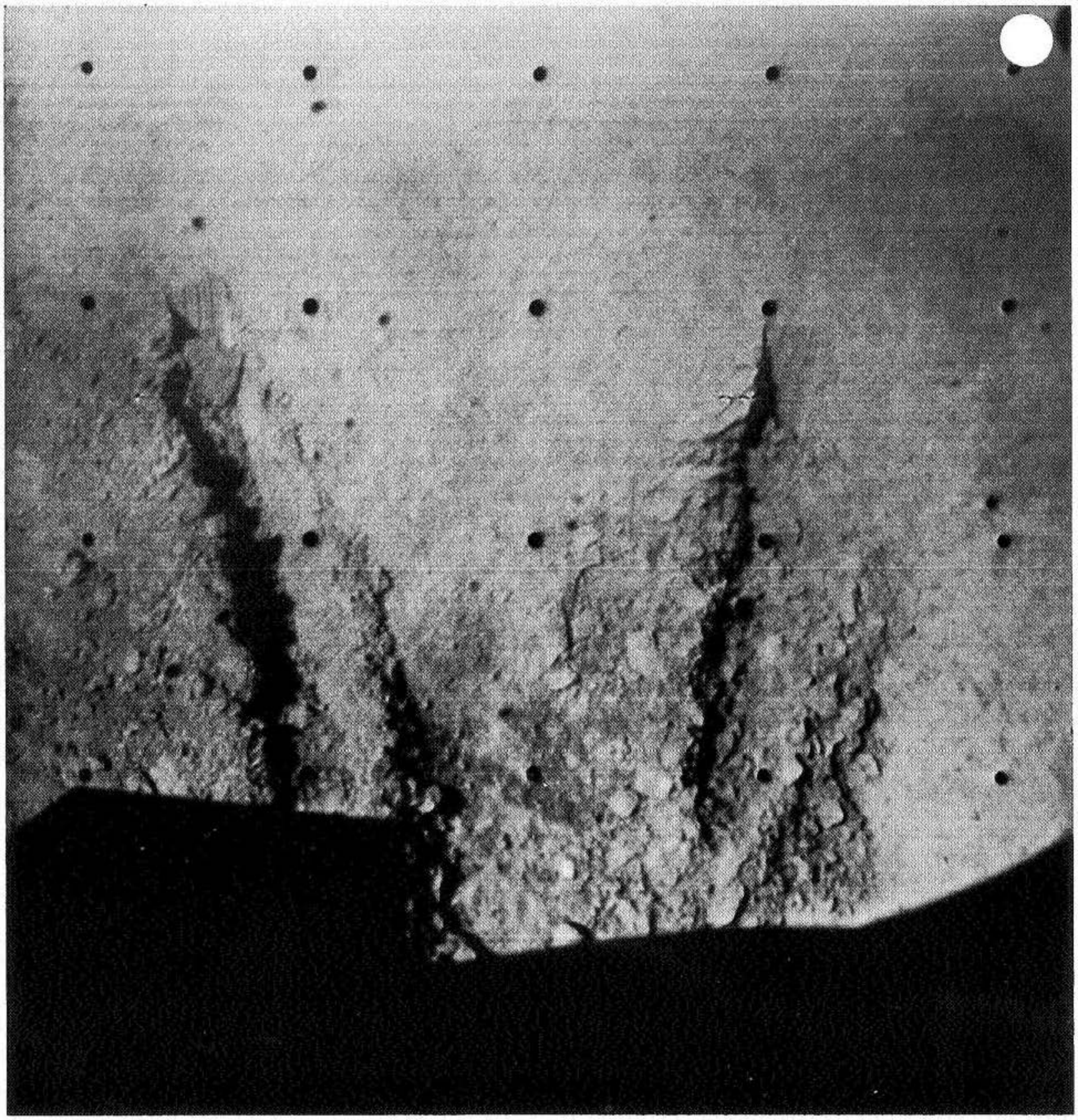


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(162)	Day 120, 11:09:10	—54	—57.78	30.1	f/15.0	W	Clear

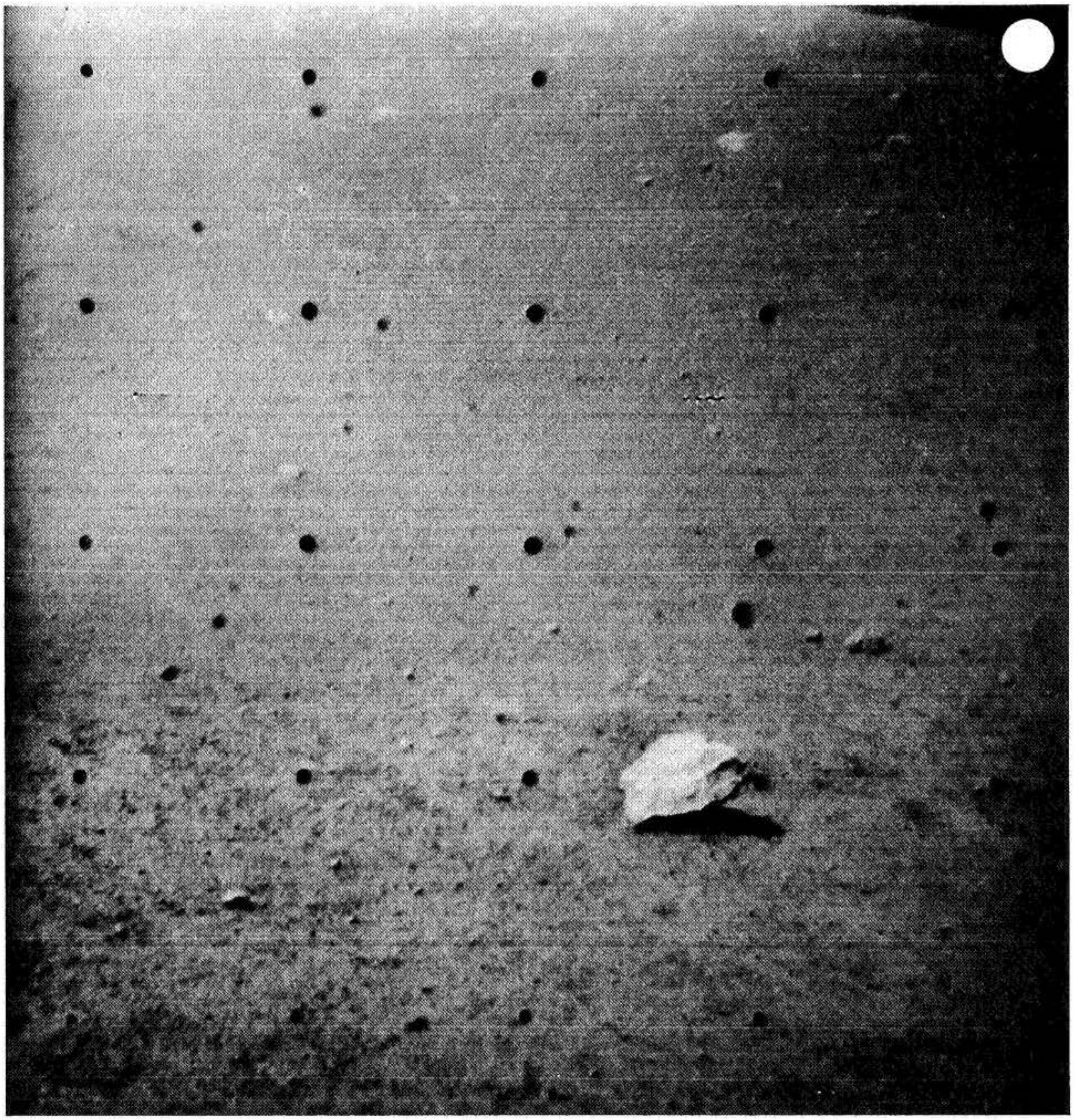


	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(163)	Day 120, 12:47:41	−24	−18.10	5.7	f/7.5	N	Green	Processed

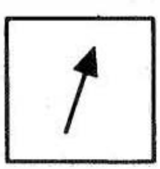


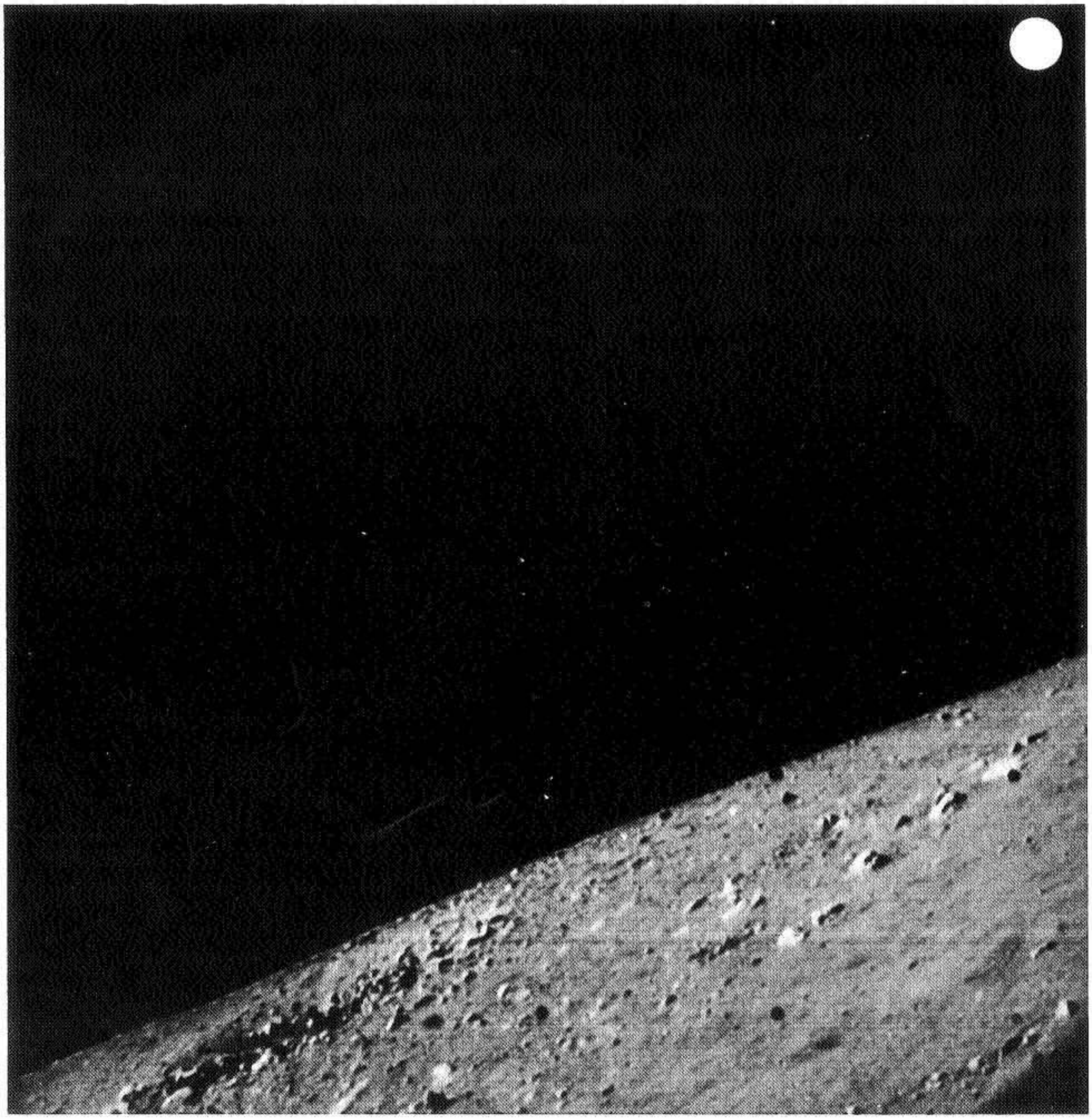


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(164)	**Day 120, 13:38:44**	**6**	**—47.86**	**2.4**	**f/15.1**	**W**	**Clear**

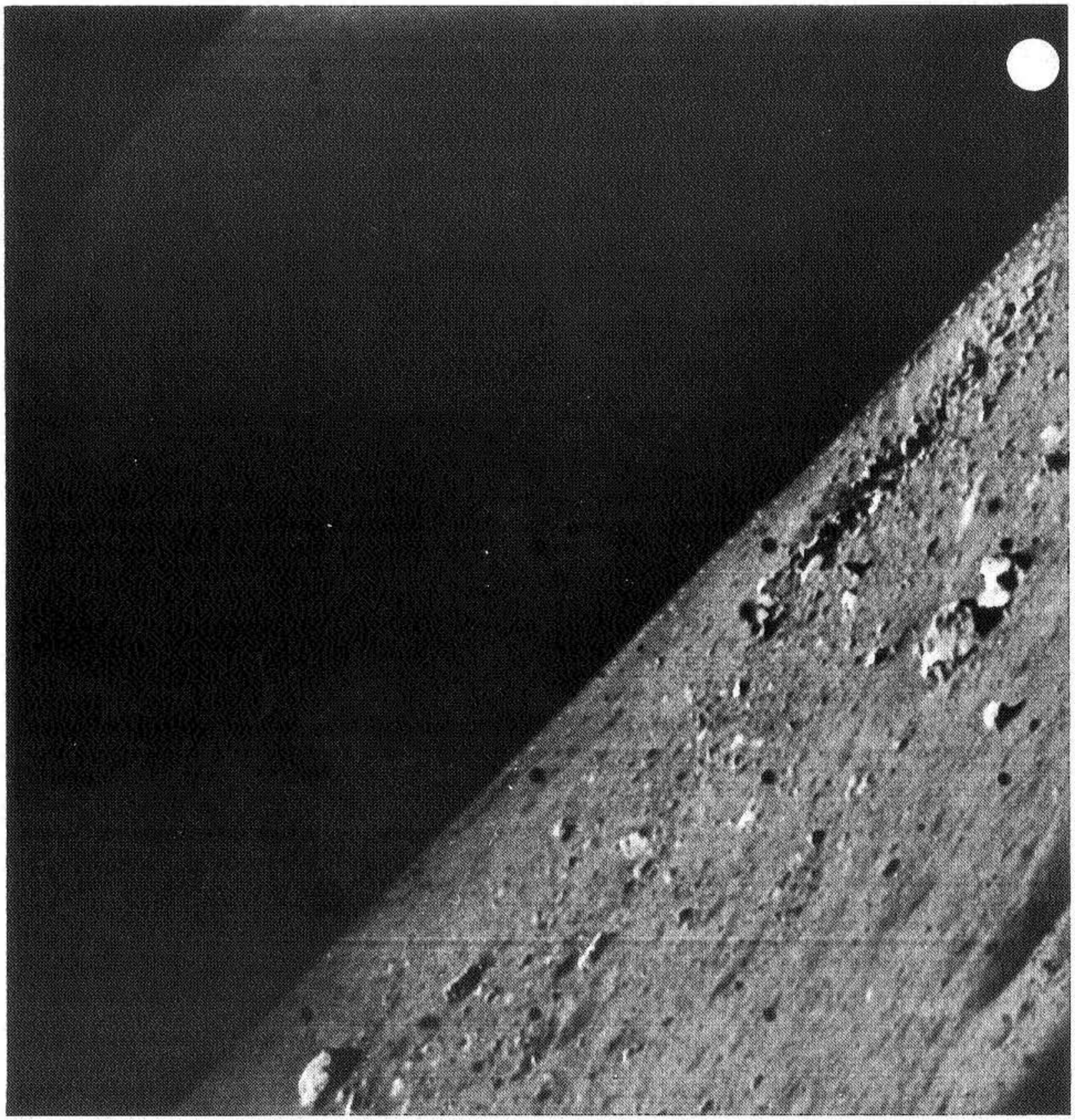


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(165)	Day 120, 13:39:27	6	6.70	2.4	*f*/15.1	W	Clear

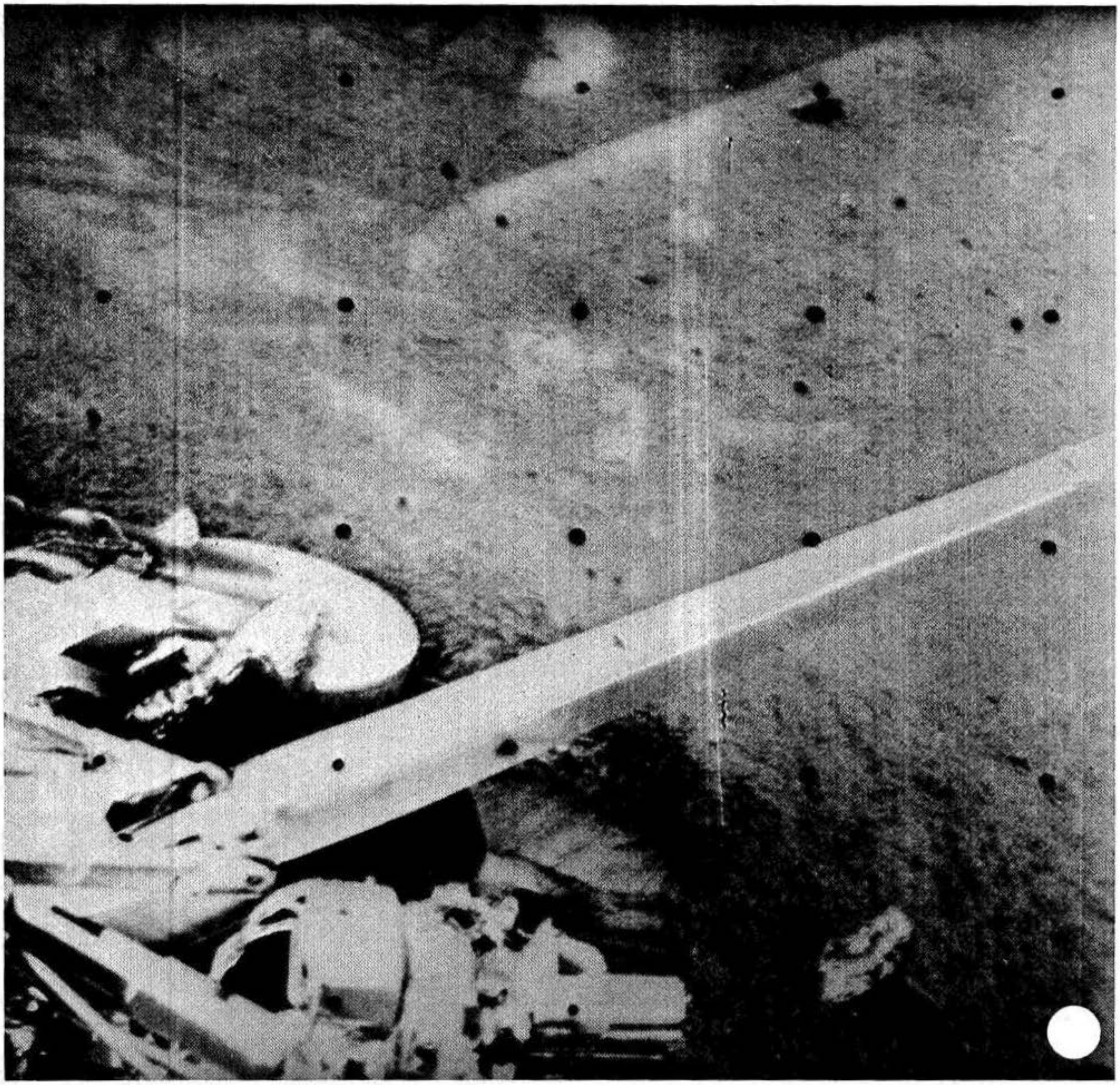




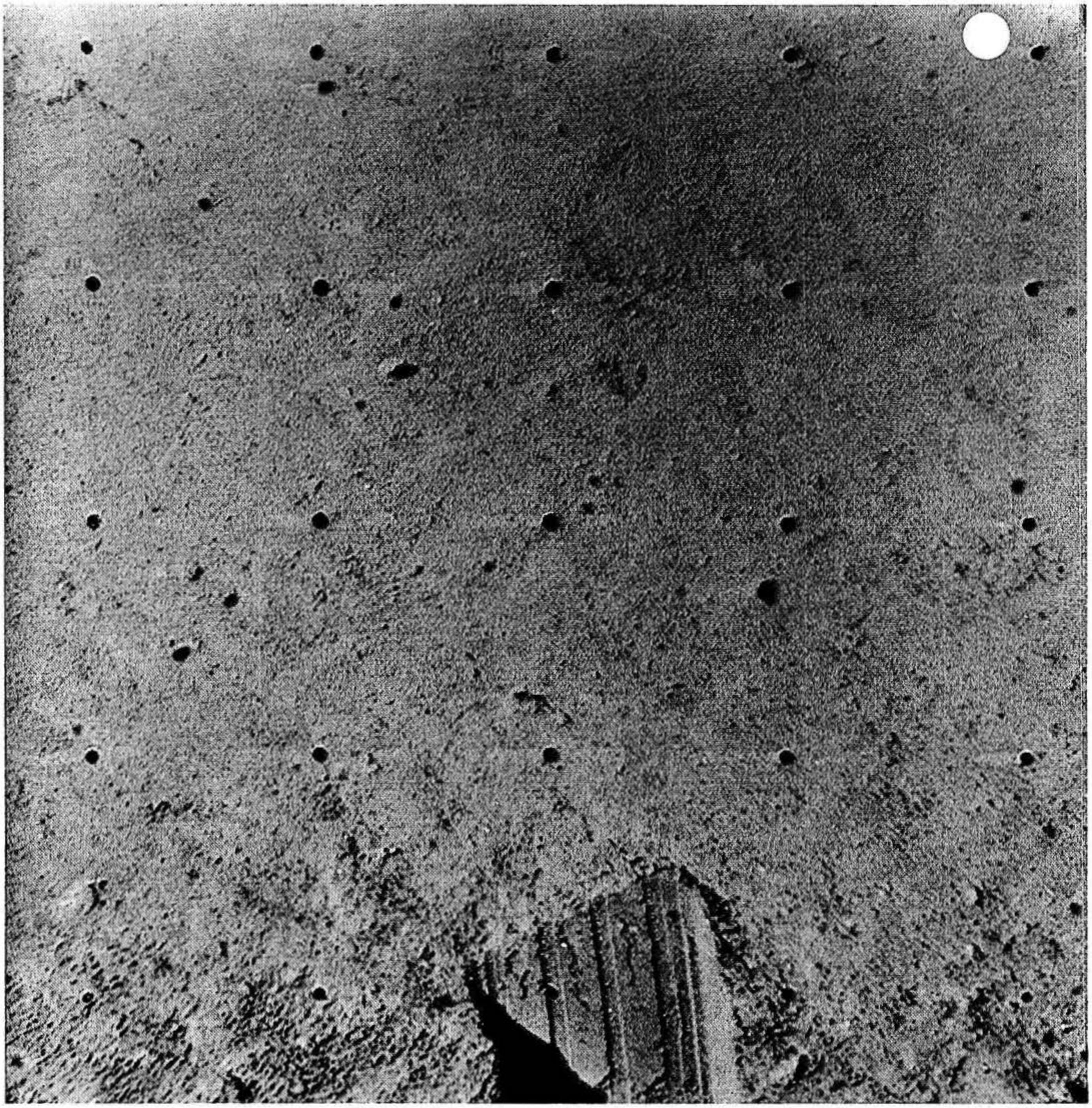
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(166)	Day 120, 13:41:41	36	26.54	2.4	f/15.1	W	Clear



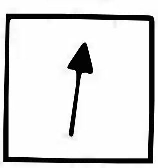
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(167)	Day 120, 13:41:47	54	26.54	2.4	f/15.1	W	Clear

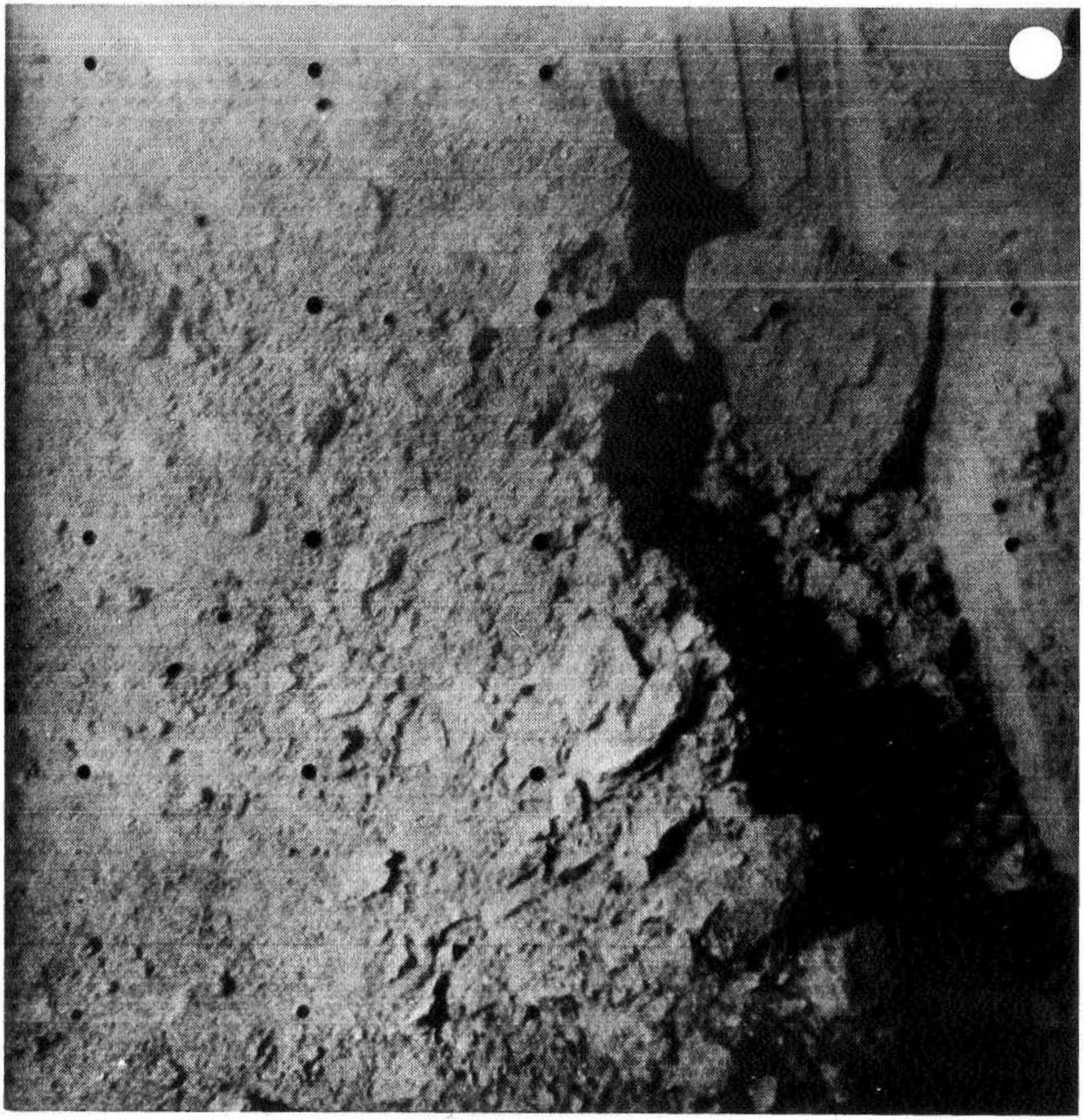


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(168)	Day 120, 13:42:24	72	—18.10	2.4	f/15.1	W	Clear

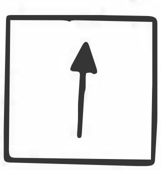


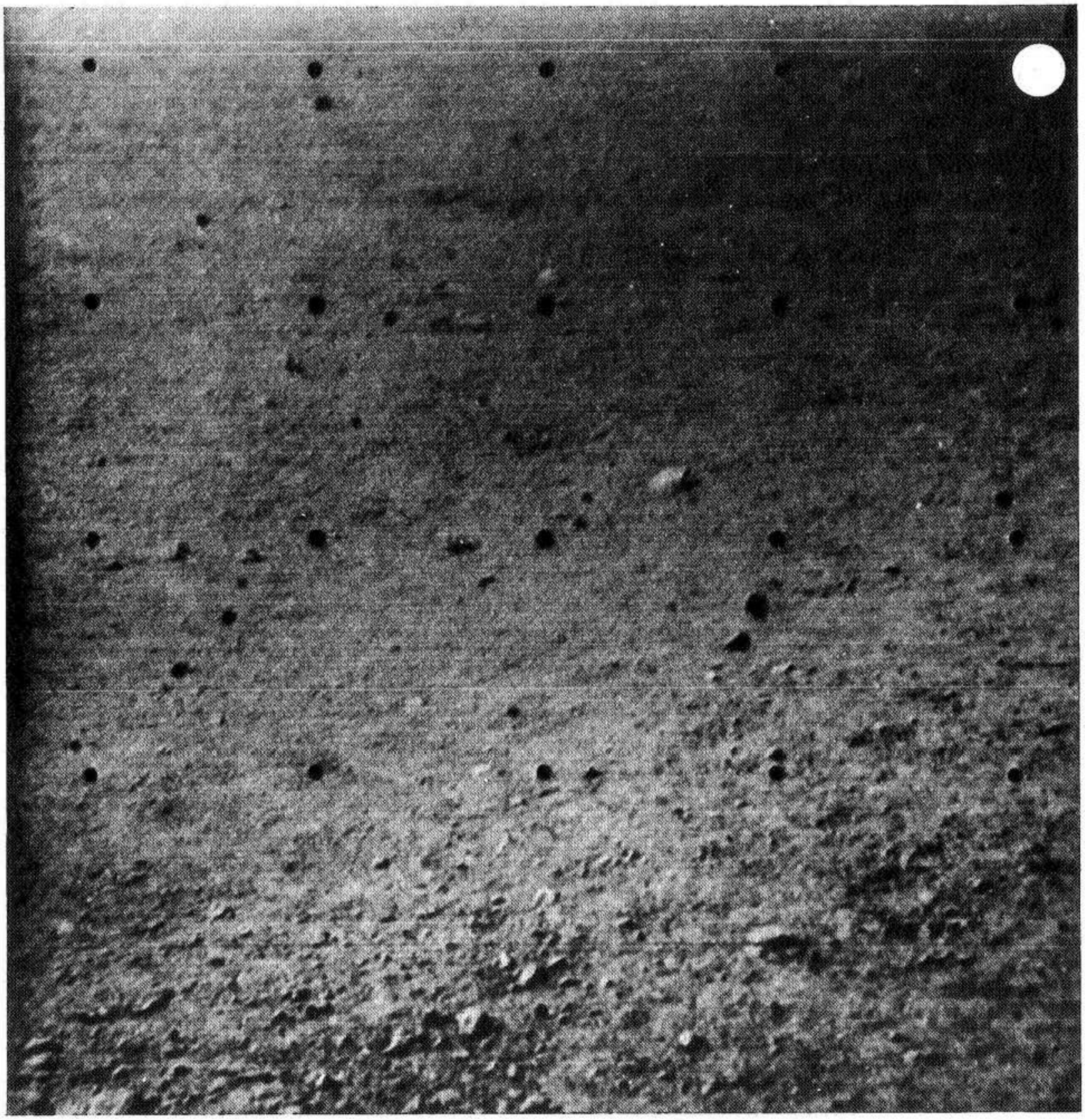
	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(169)	Day 120, 14:28:03	15	—37.94	2.5	f/15.1	N	Clear	Processed



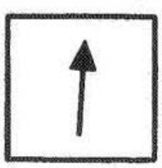


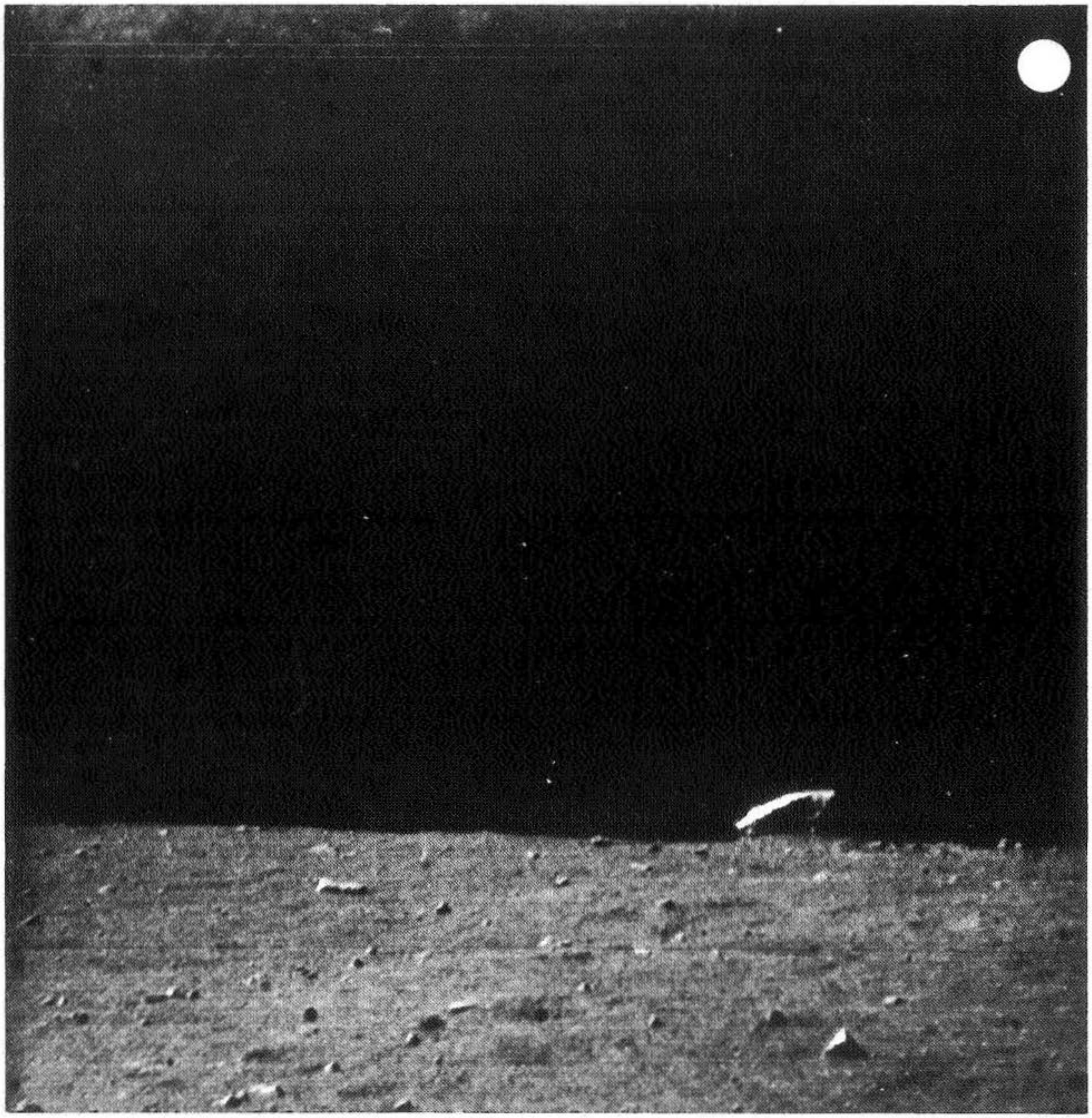
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(170)	Day 120, 14:28:49	18	—42.86	2.4	f/15.1	N	Clear



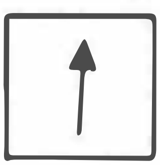


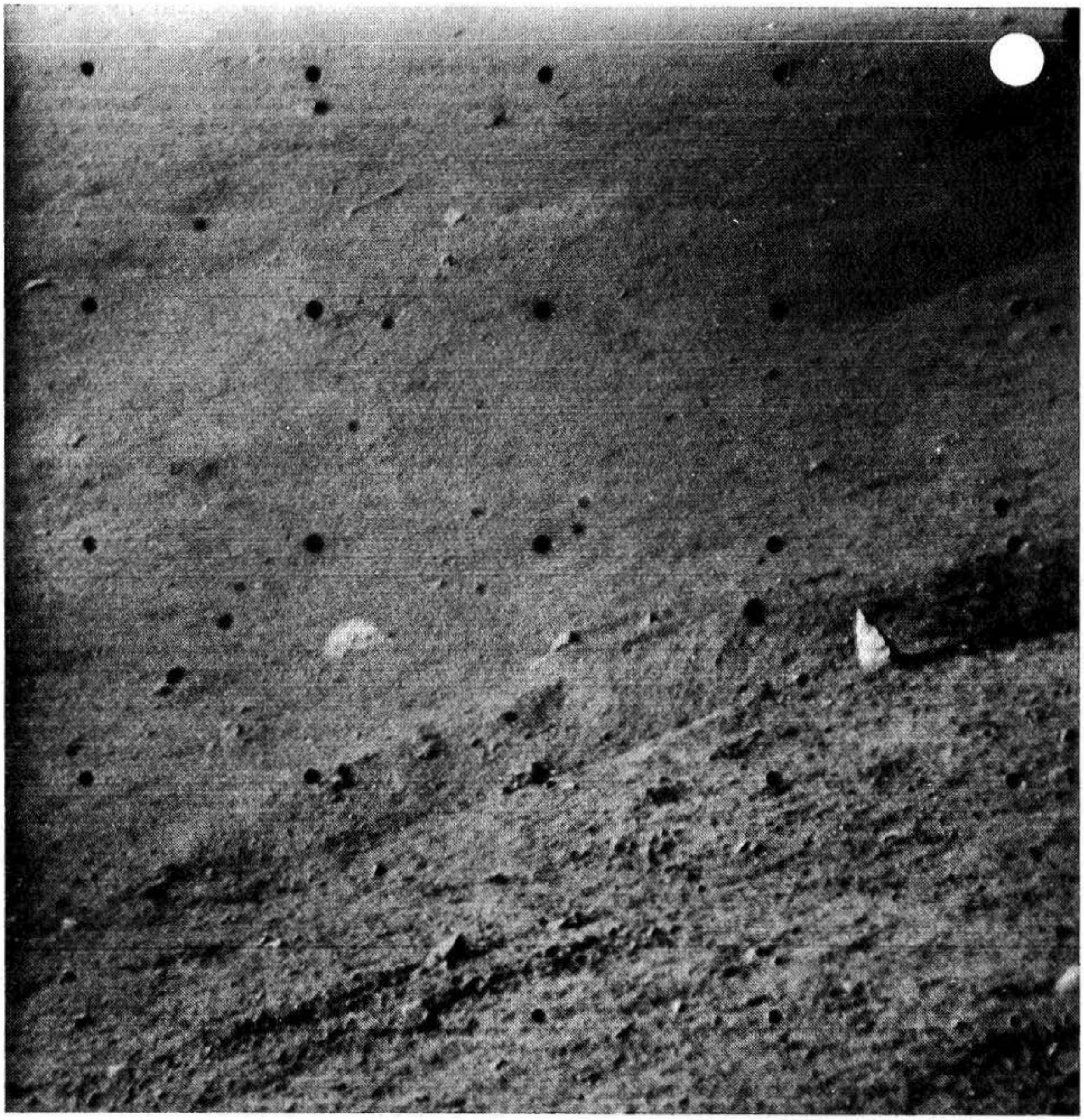
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(171)	Day 120, 14:32:01	18	—3.22	7.9	f/15.1	N	Clear



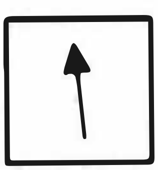


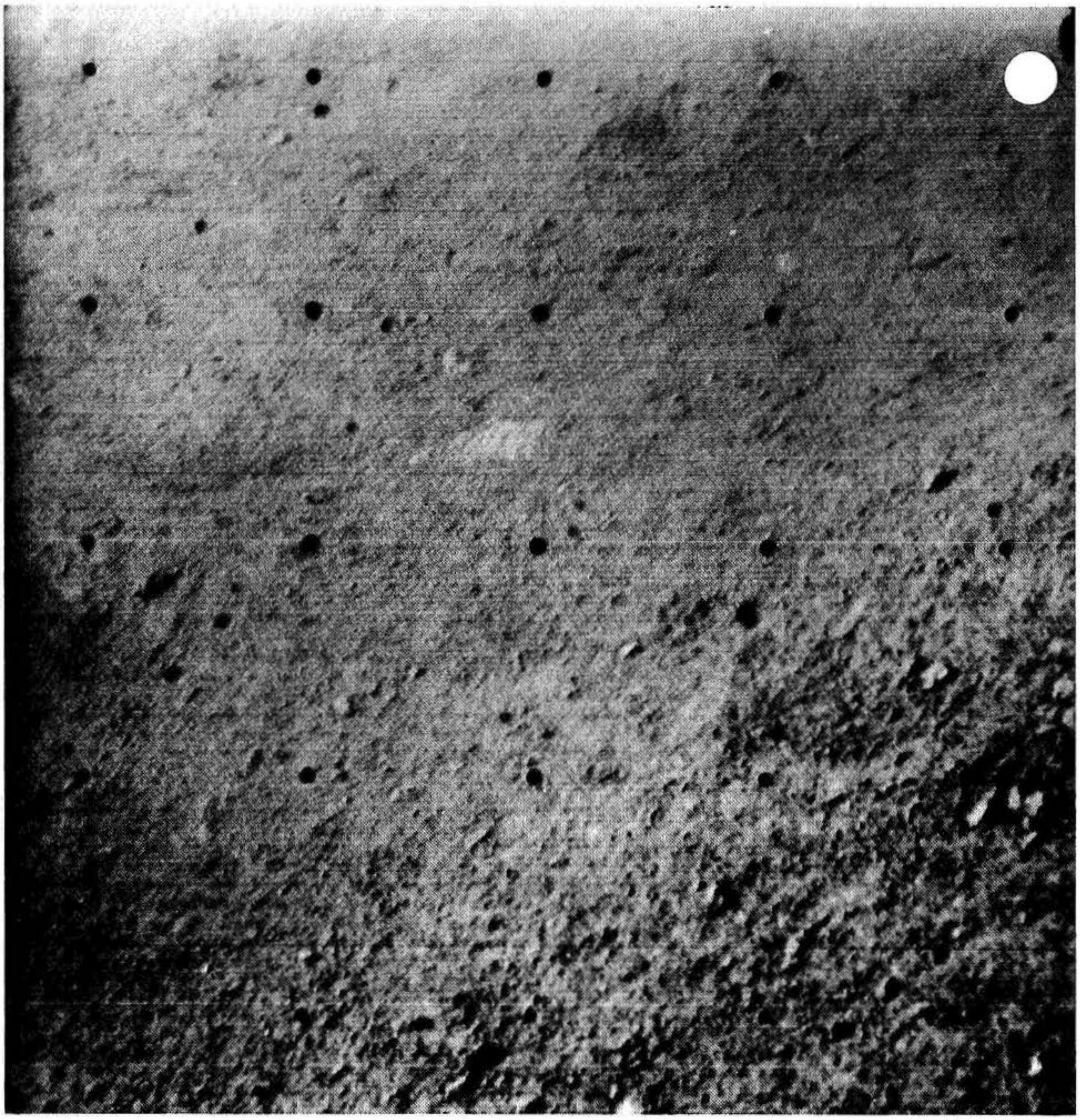
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(172)	Day 120, 14:32:26	18	16.62	30.1	f/15.1	N	Clear



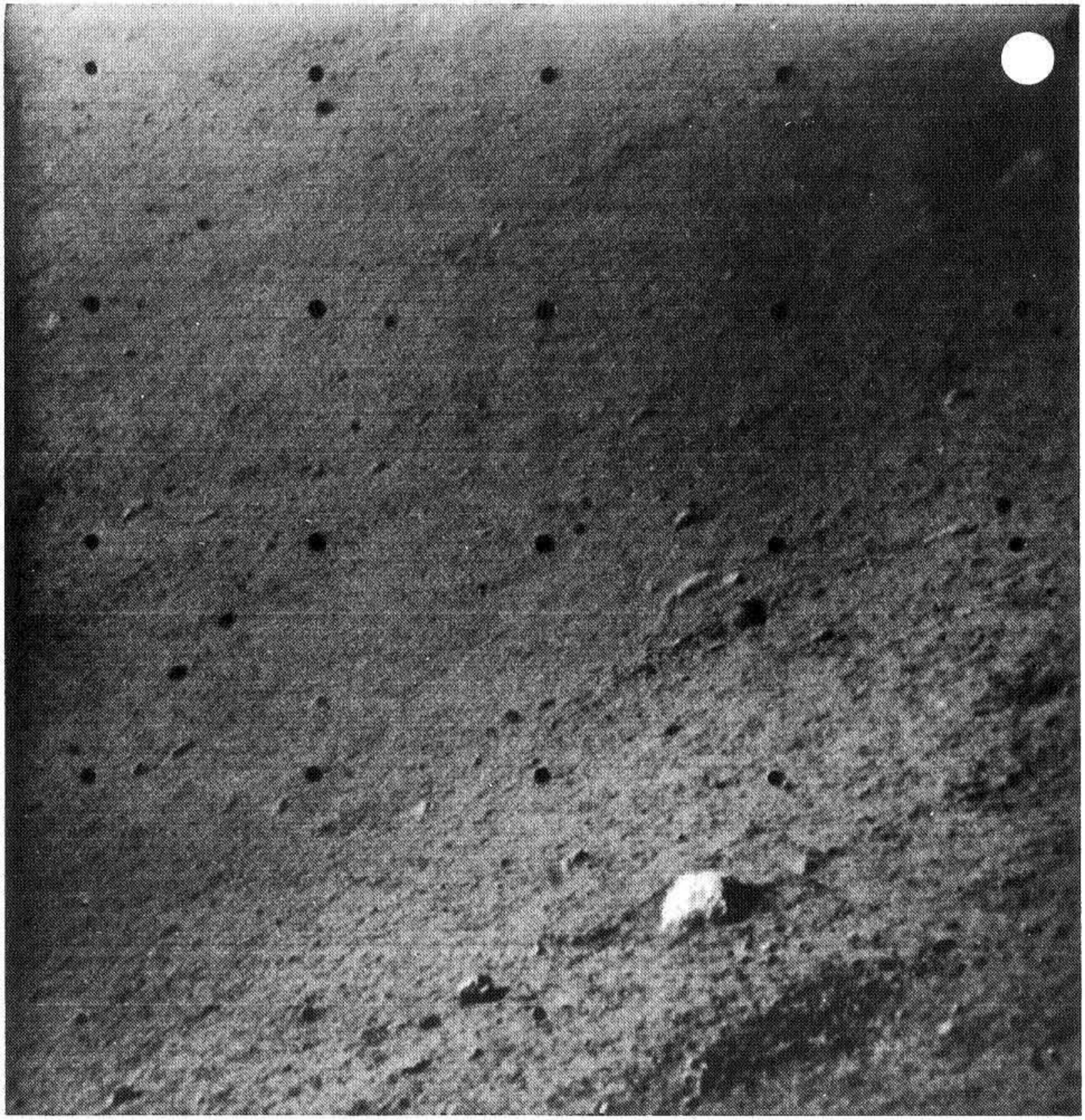


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(173)	**Day 120, 14:37:00**	**27**	**11.66**	**29.7**	***f*/15.1**	**N**	**Clear**

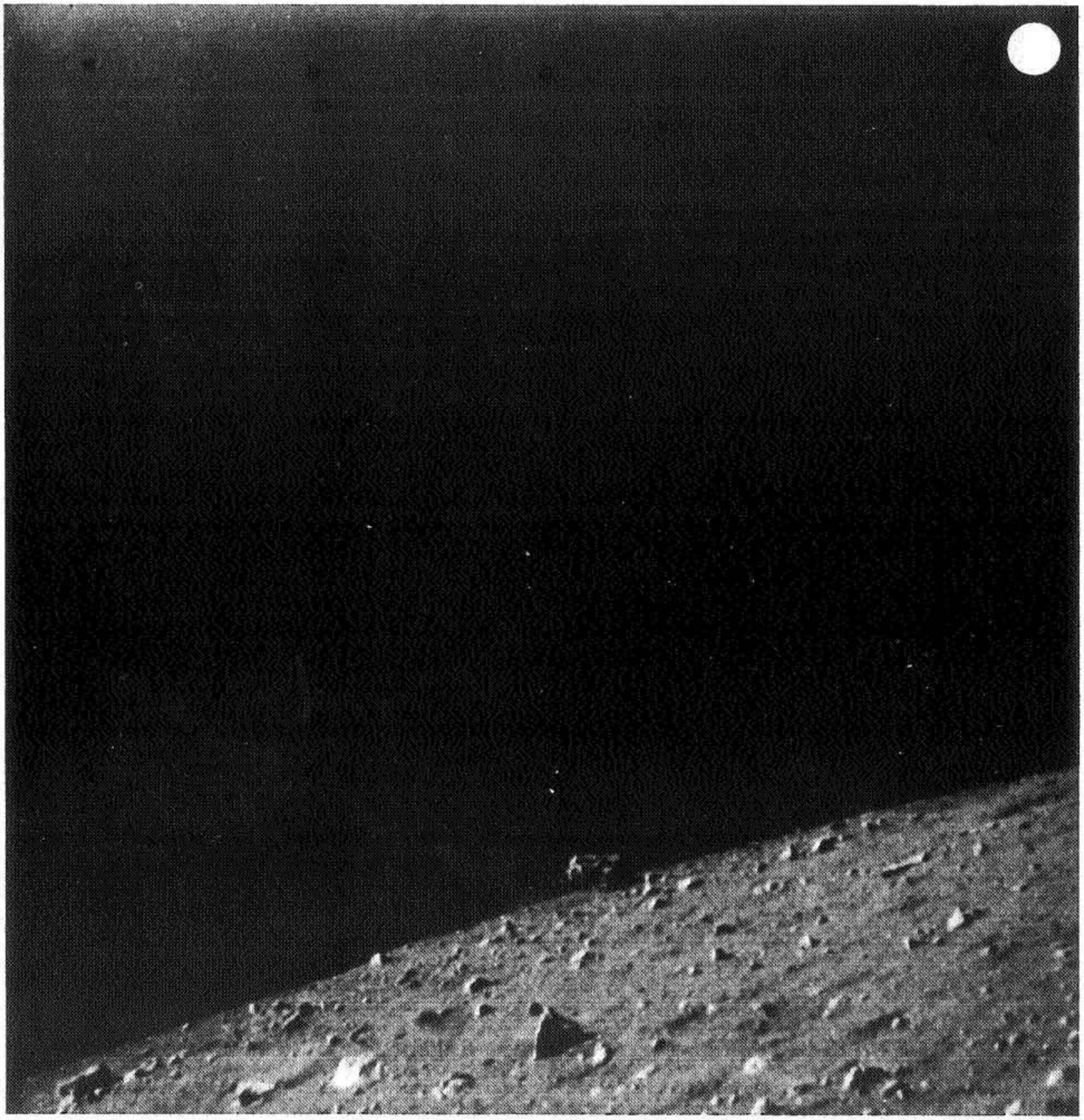




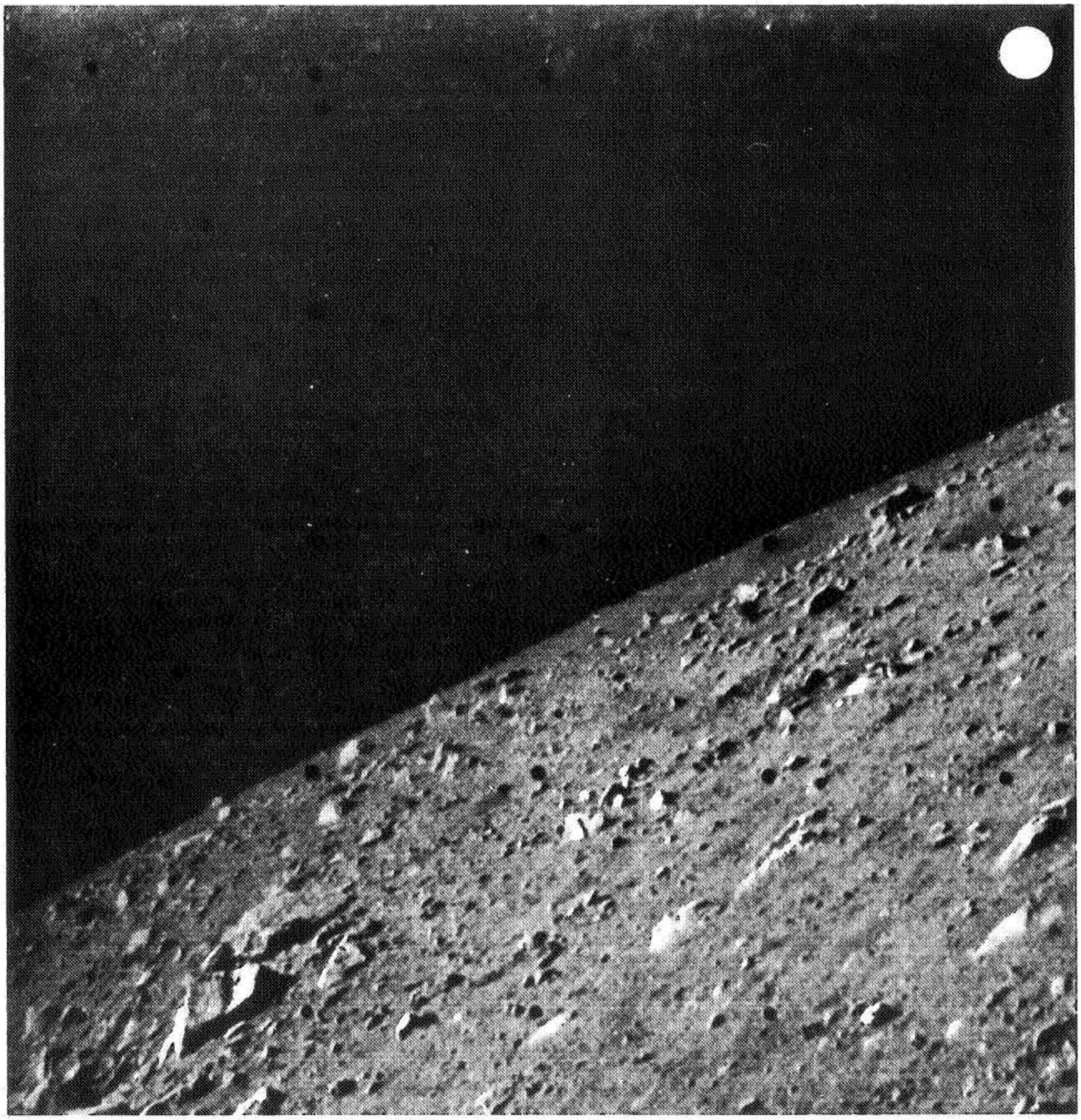
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(174)	Day 120, 14:38:37	30	—3.22	7.7	f/15.1	N	Clear



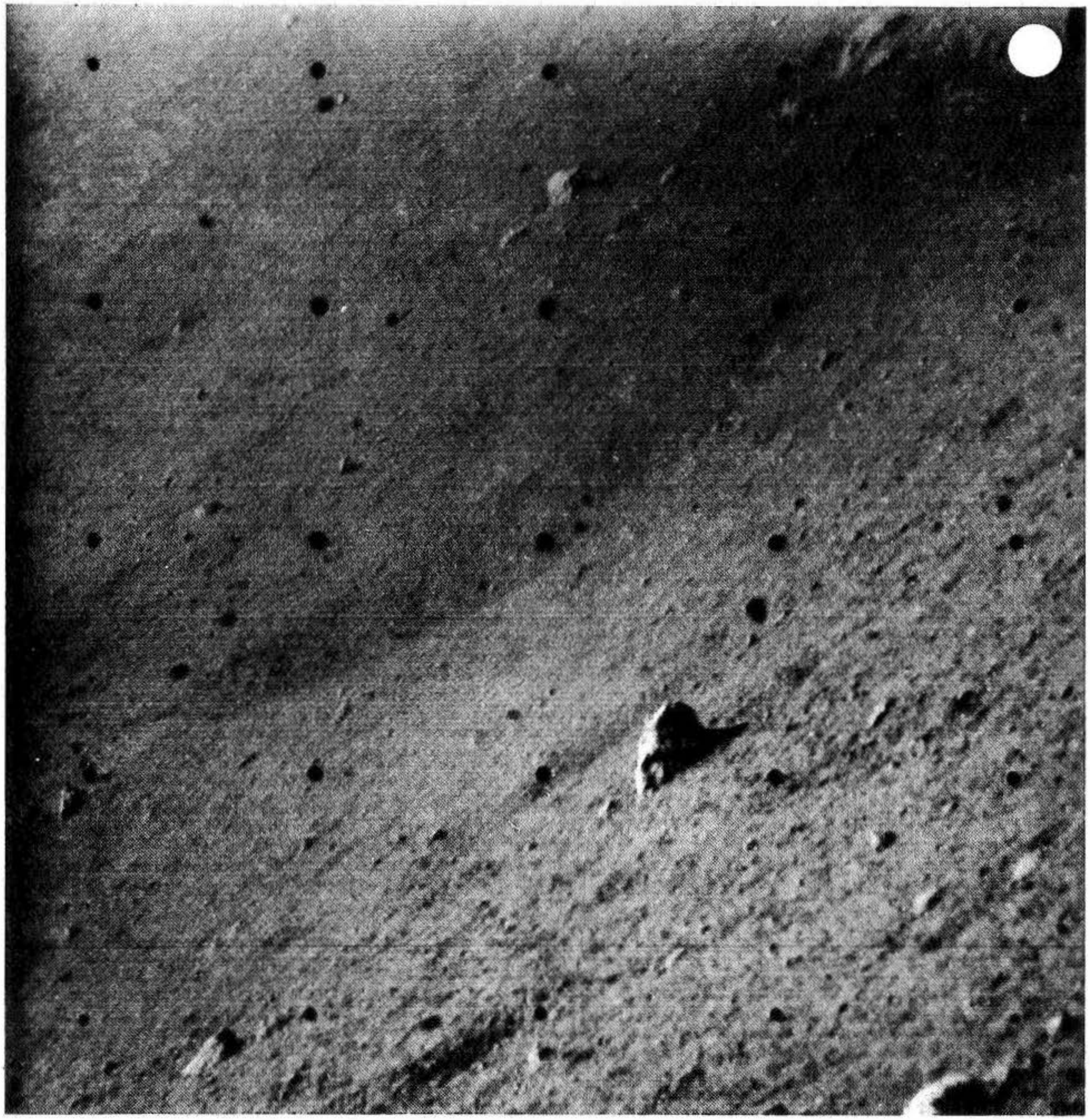
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(175)	Day 120, 14:38:45	30	6.70	18.5	$f/15.1$	N	Clear



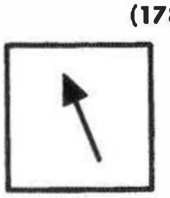
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(176)	Day 120, 14:38:57	33	21.58	29.7	f/15.1	N	Clear

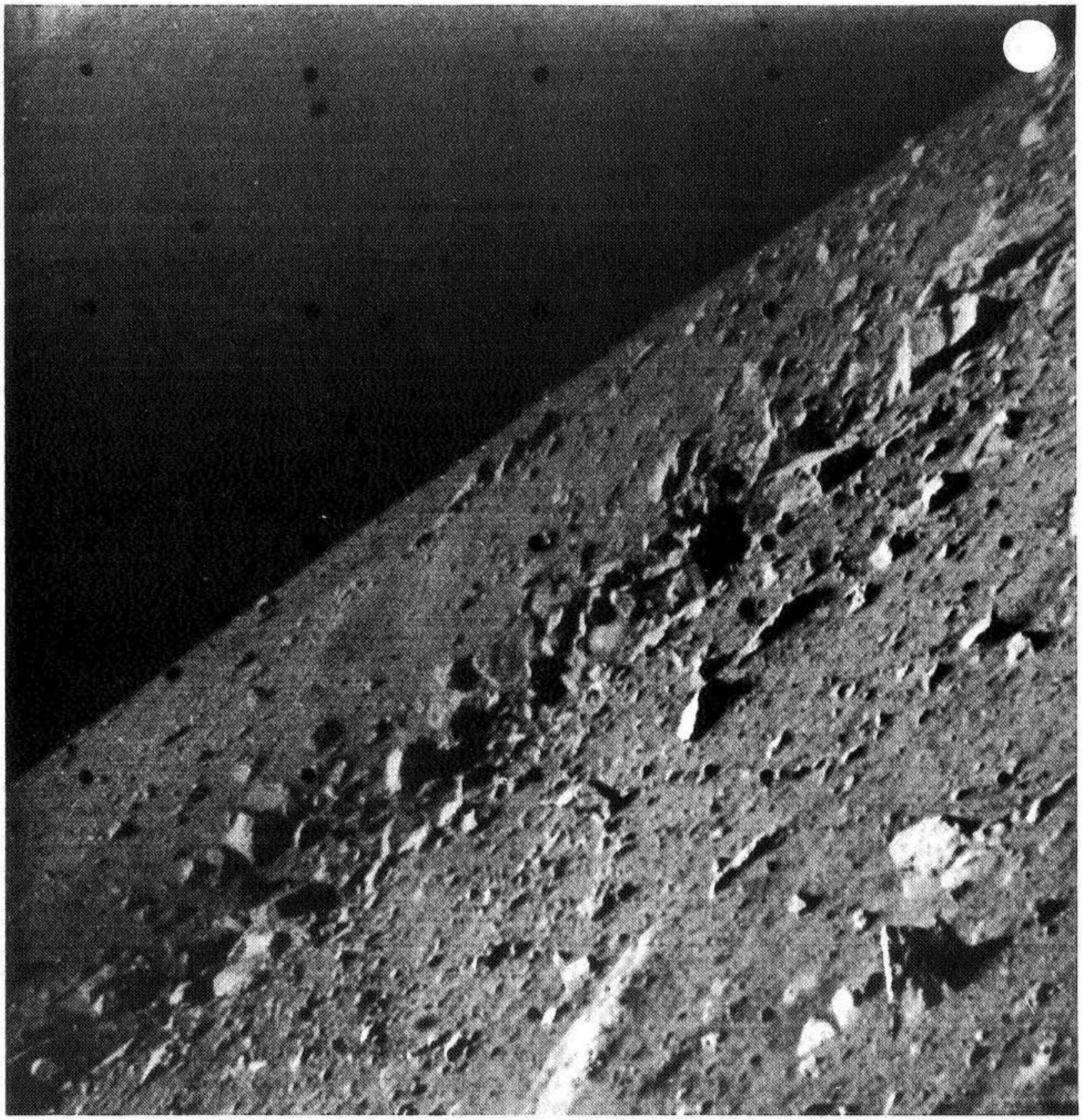


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(177)	Day 120, 14:41:04	39	21.58	30.1	f/15.1	N	Clear

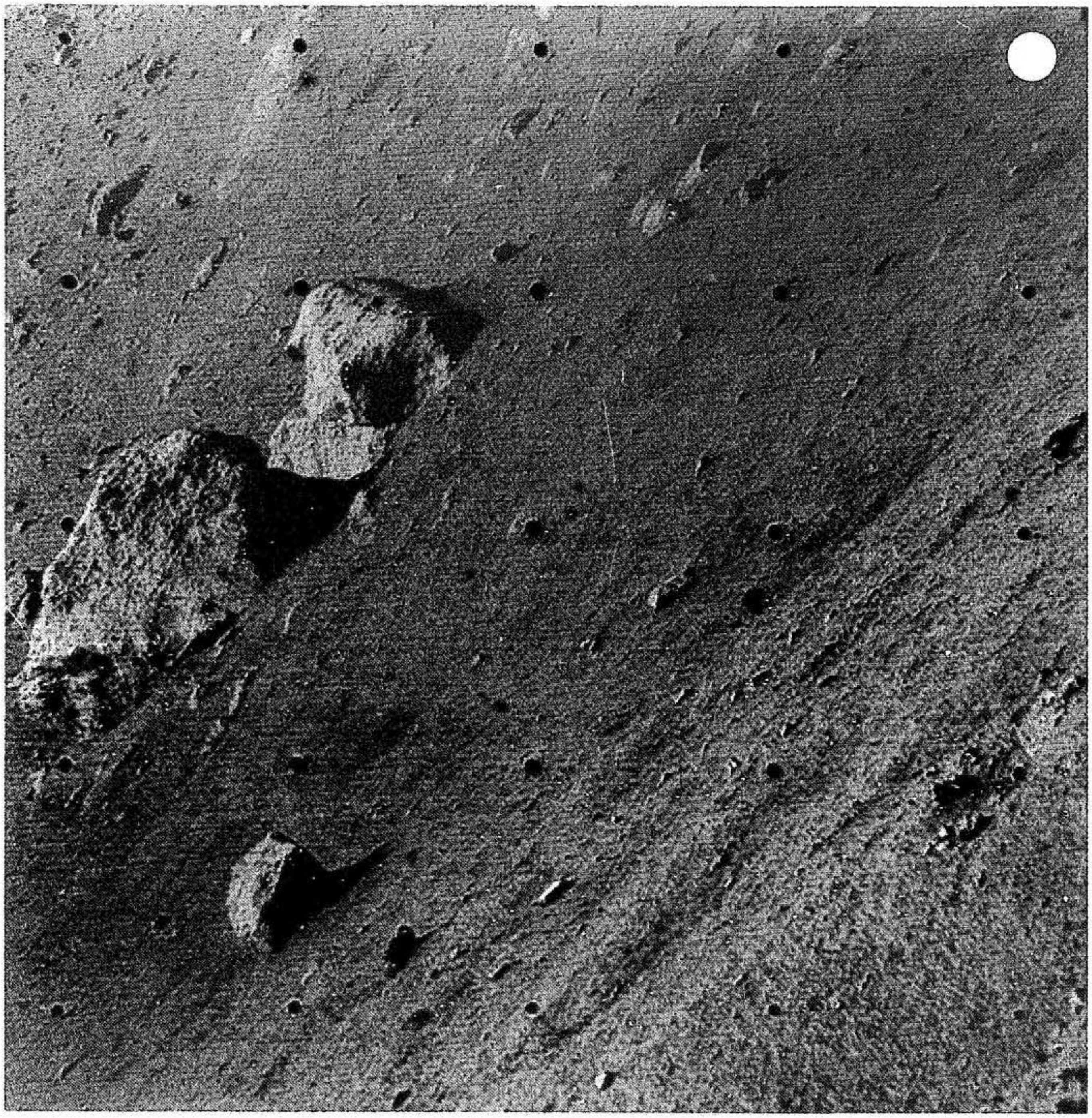


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(178)	Day 120, 14:41:09	39	11.66	29.7	f/15.1	N	Clear

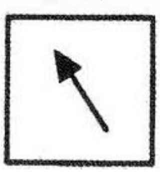


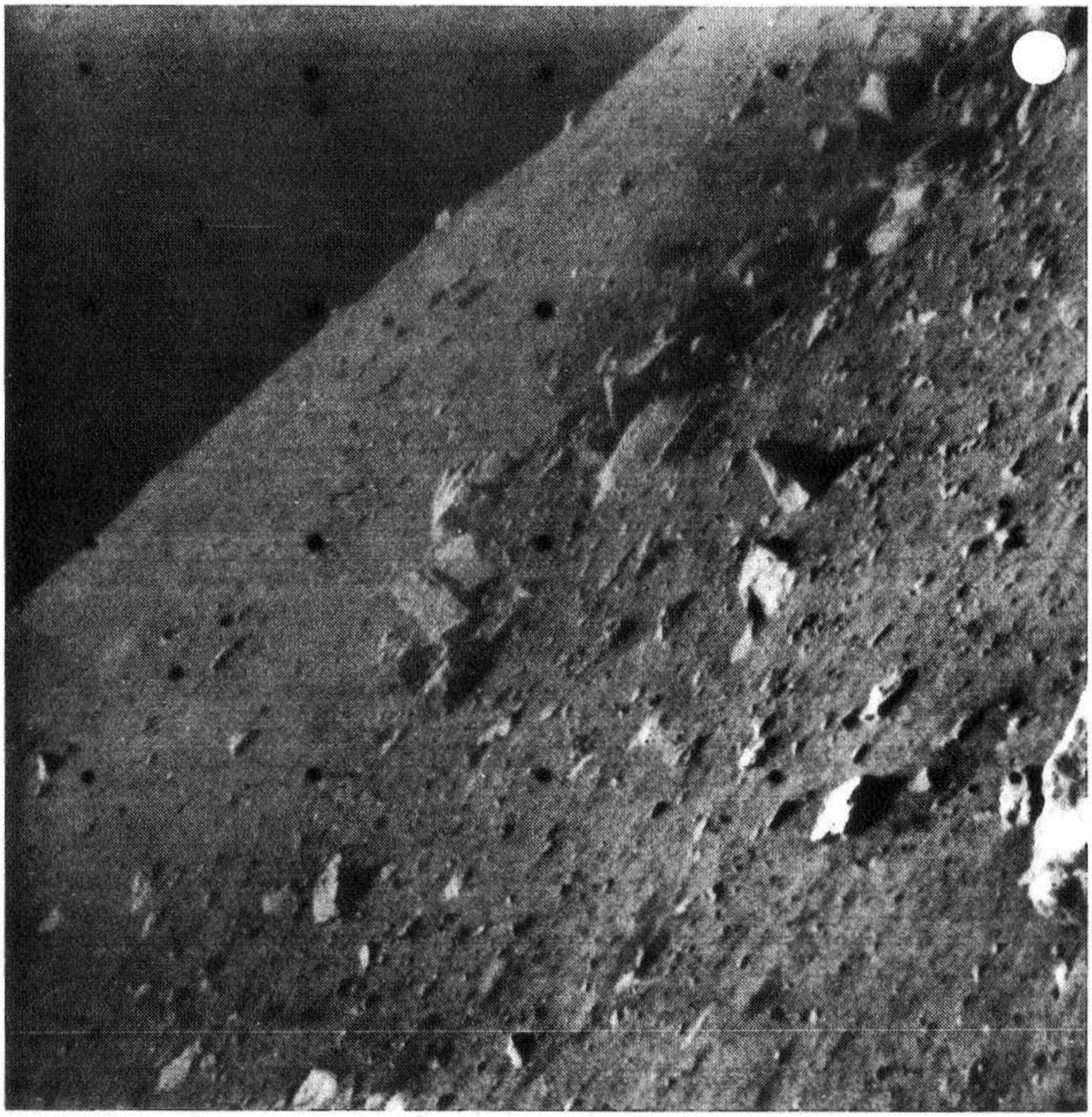


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(179)	Day 120, 14:45:05	45	21.58	30.0	f/15.1	N	Clear

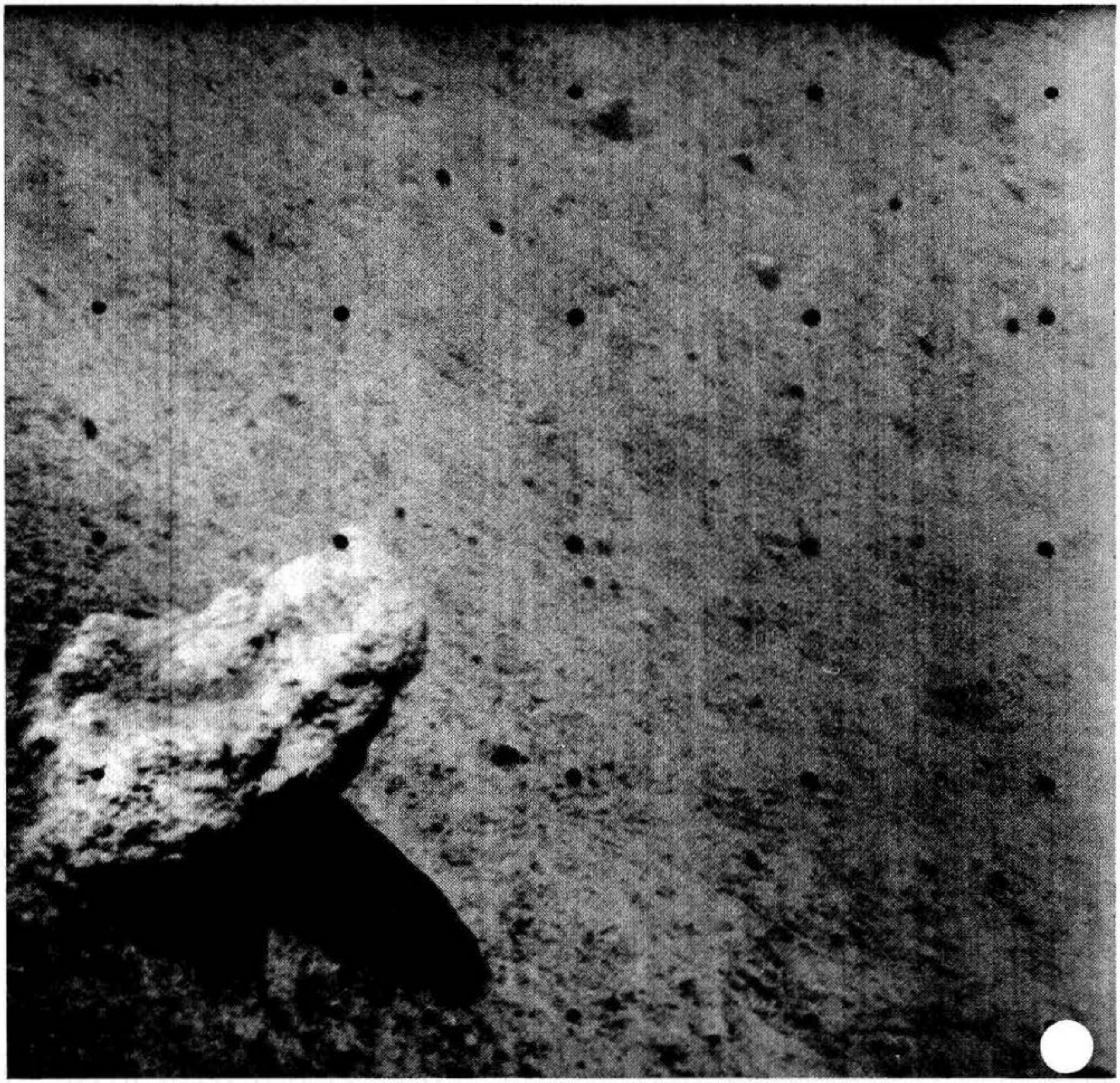


	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(180)	Day 120, 14:47:03	48	16.62	30.0	f/15.1	N	Clear	Processed

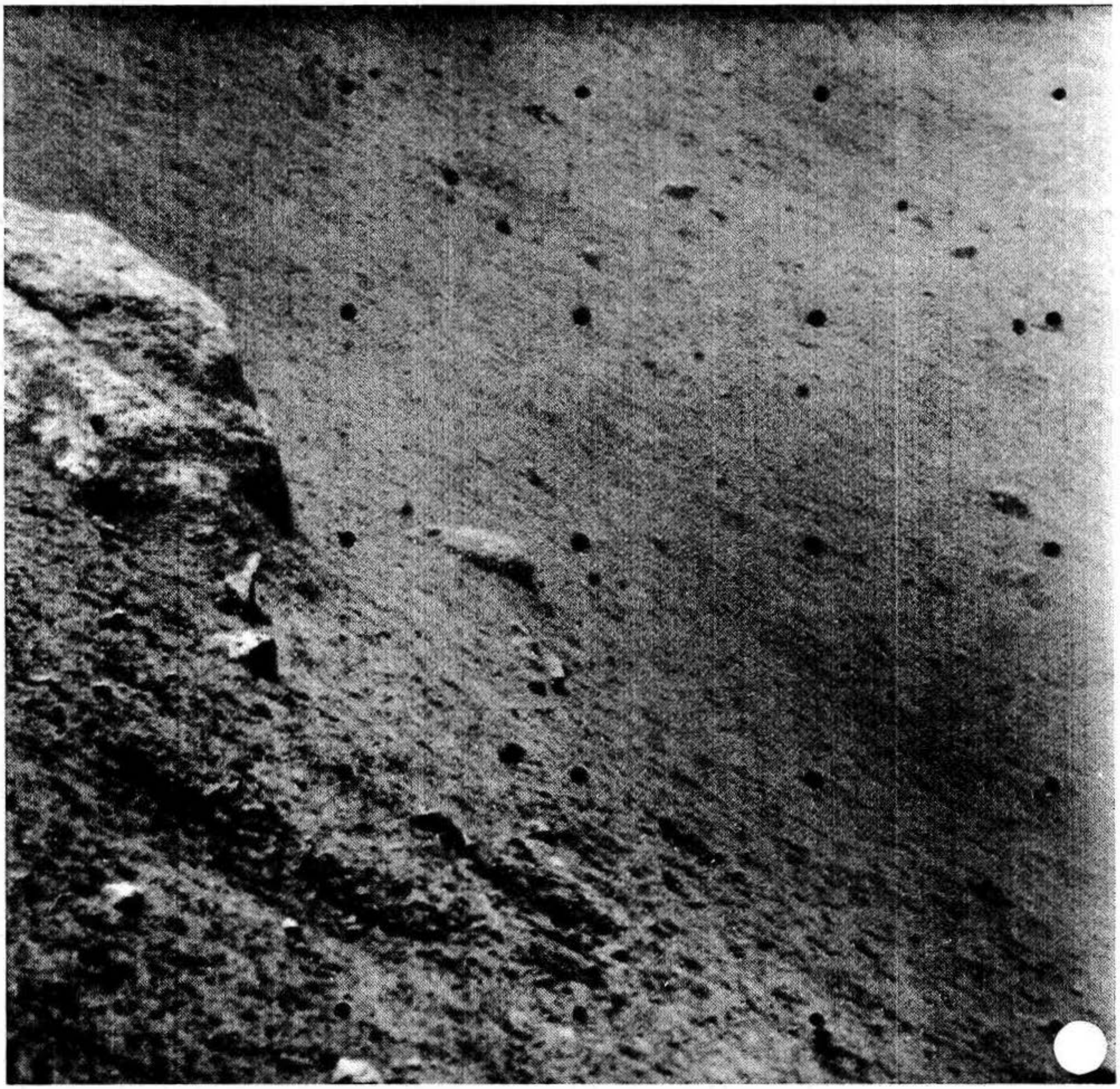




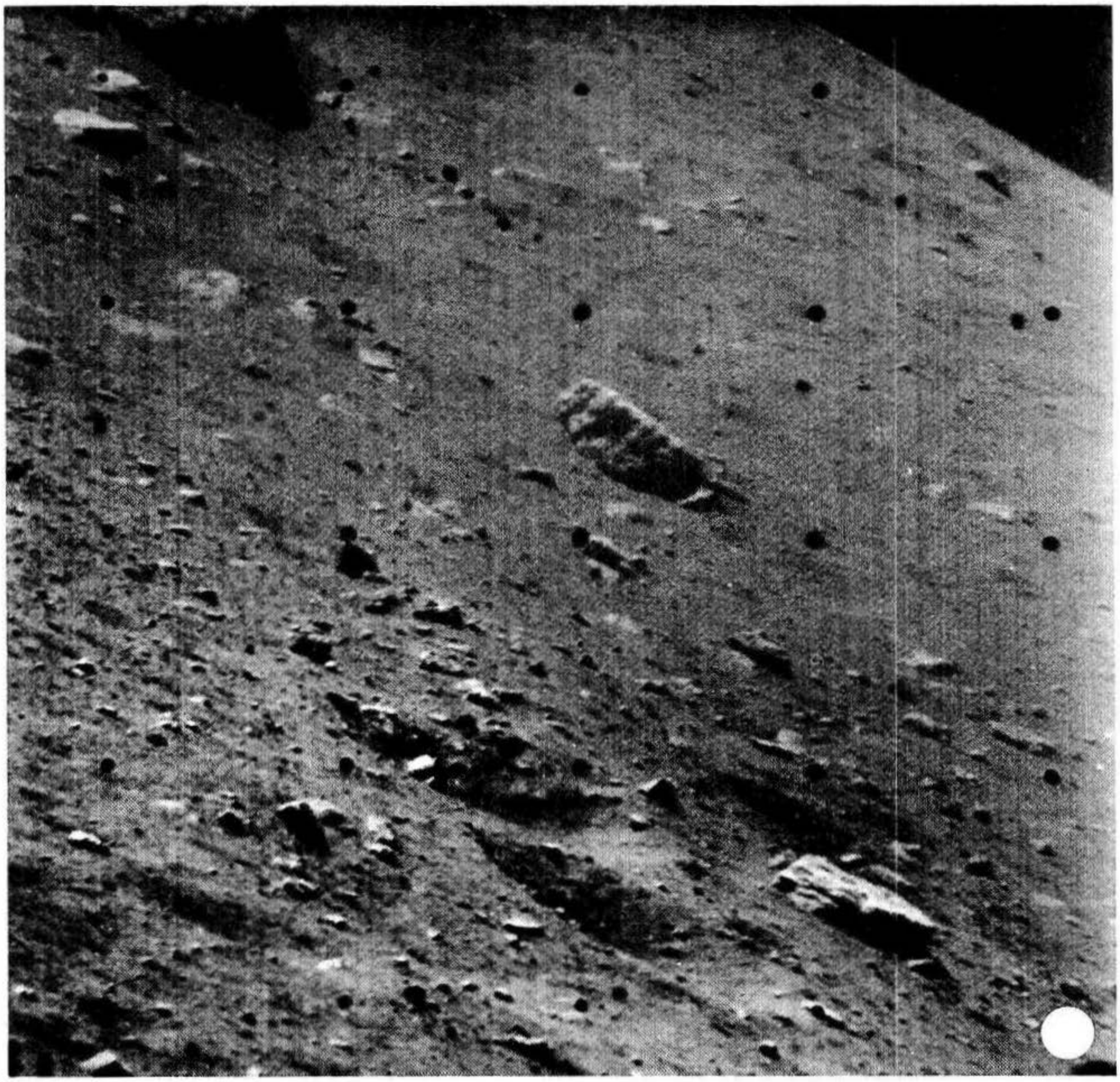
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(181)	Day 120, 14:47:09	51	21.58	30.2	f/15.1	N	Clear



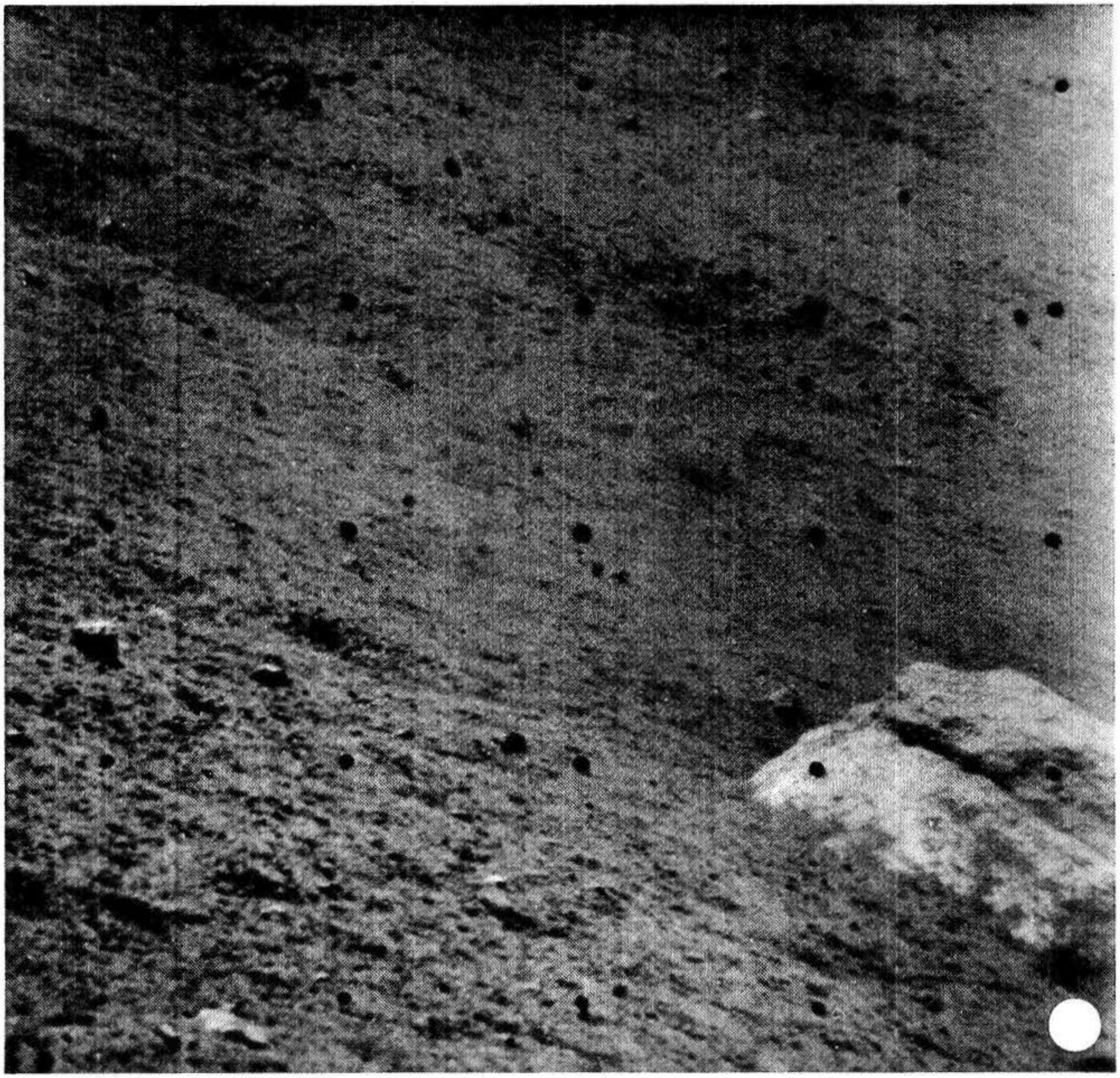
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(182)	Day 120, 14:51:59	60	—23.06	2.8	$f/15.1$	N	Clear



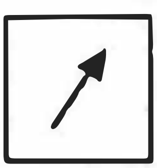
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(183)	**Day 120, 14:52:22**	**63**	**6.70**	**18.5**	***f*/15.1**	**N**	**Clear**

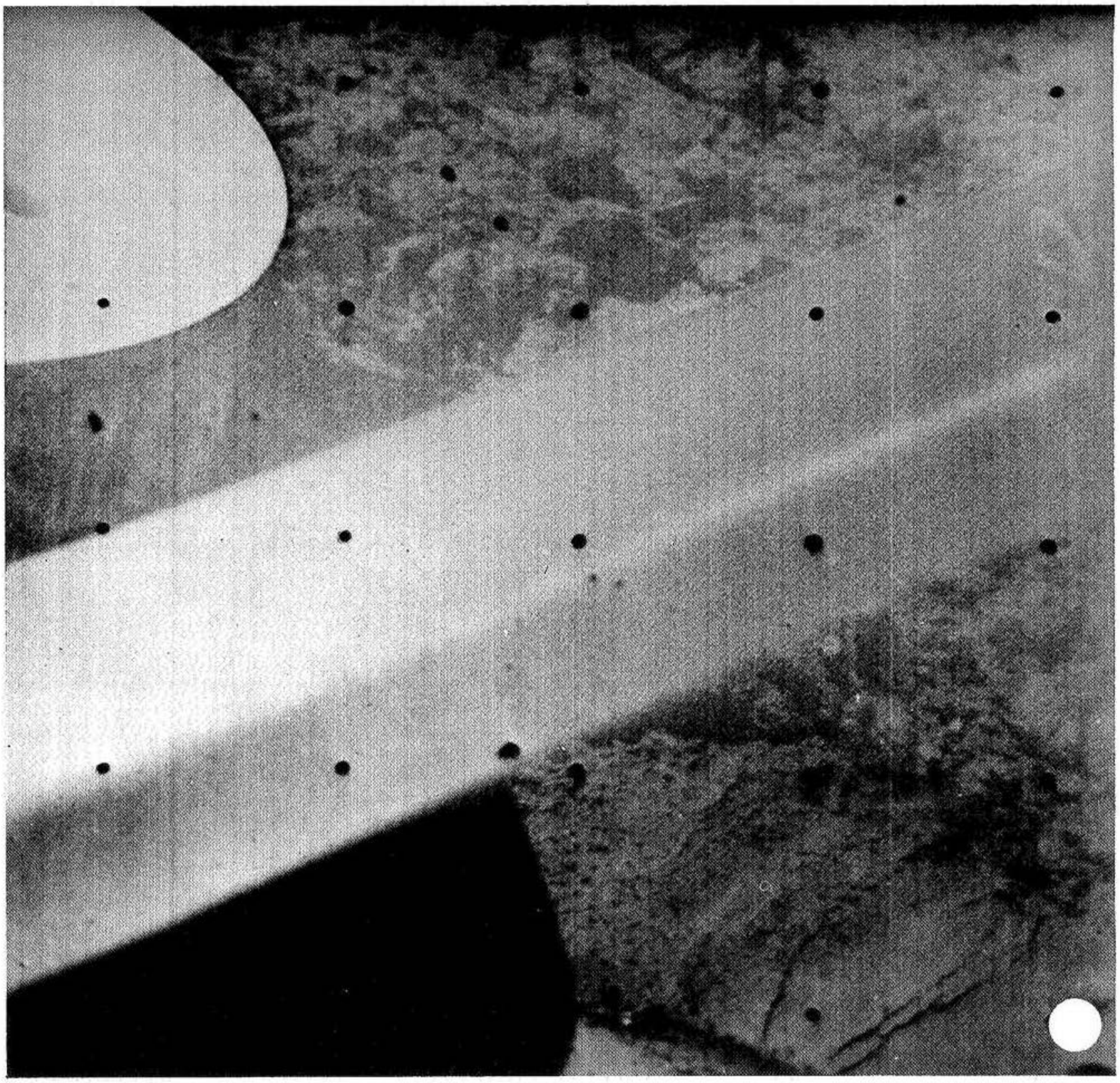


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(184)	Day 120, 14:52:35	63	21.58	30.2	f/15.1	N	Clear

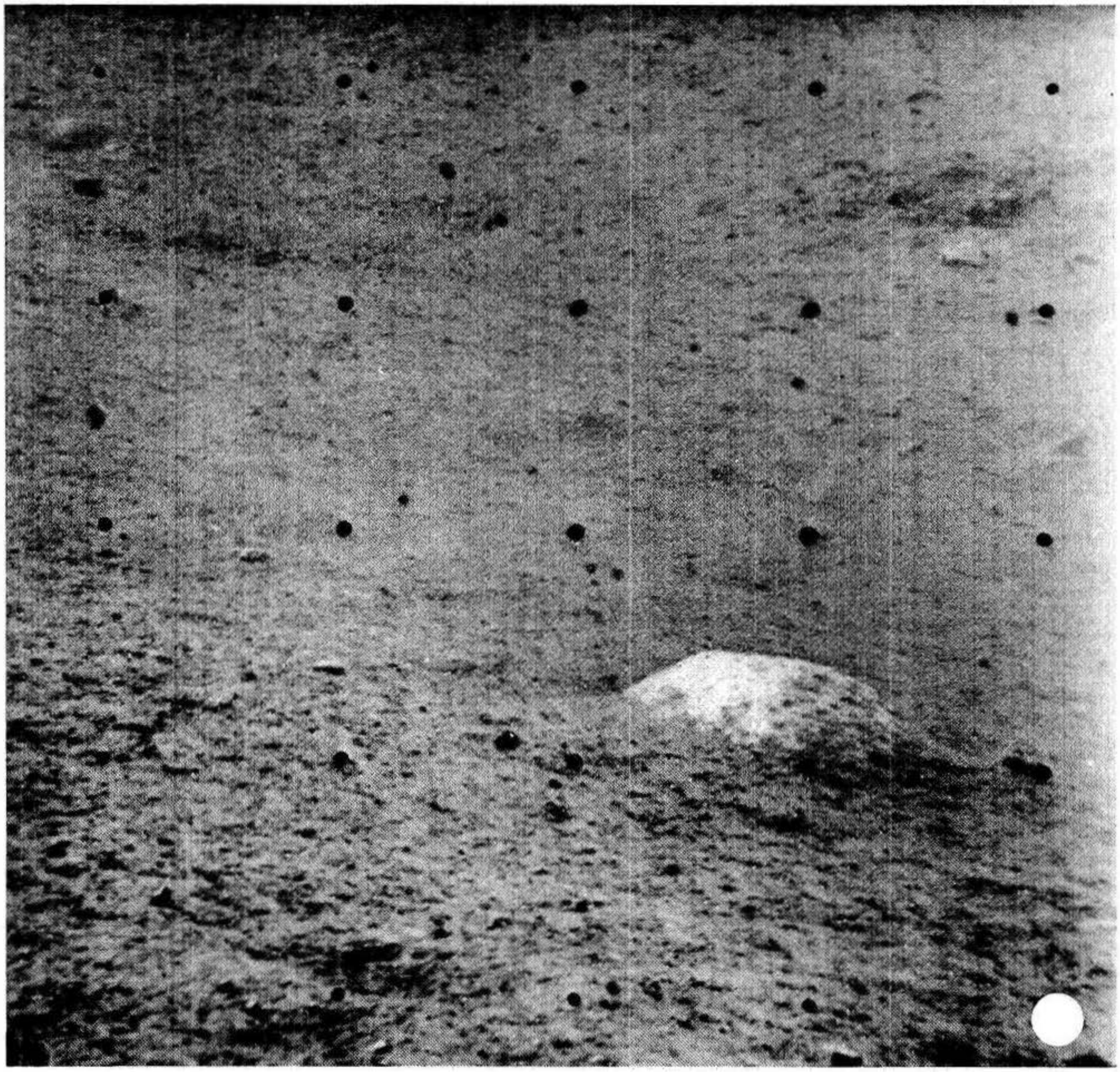


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(185)	Day 120, 14:54:23	66	6.70	18.5	f/15.1	N	Clear

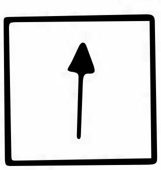


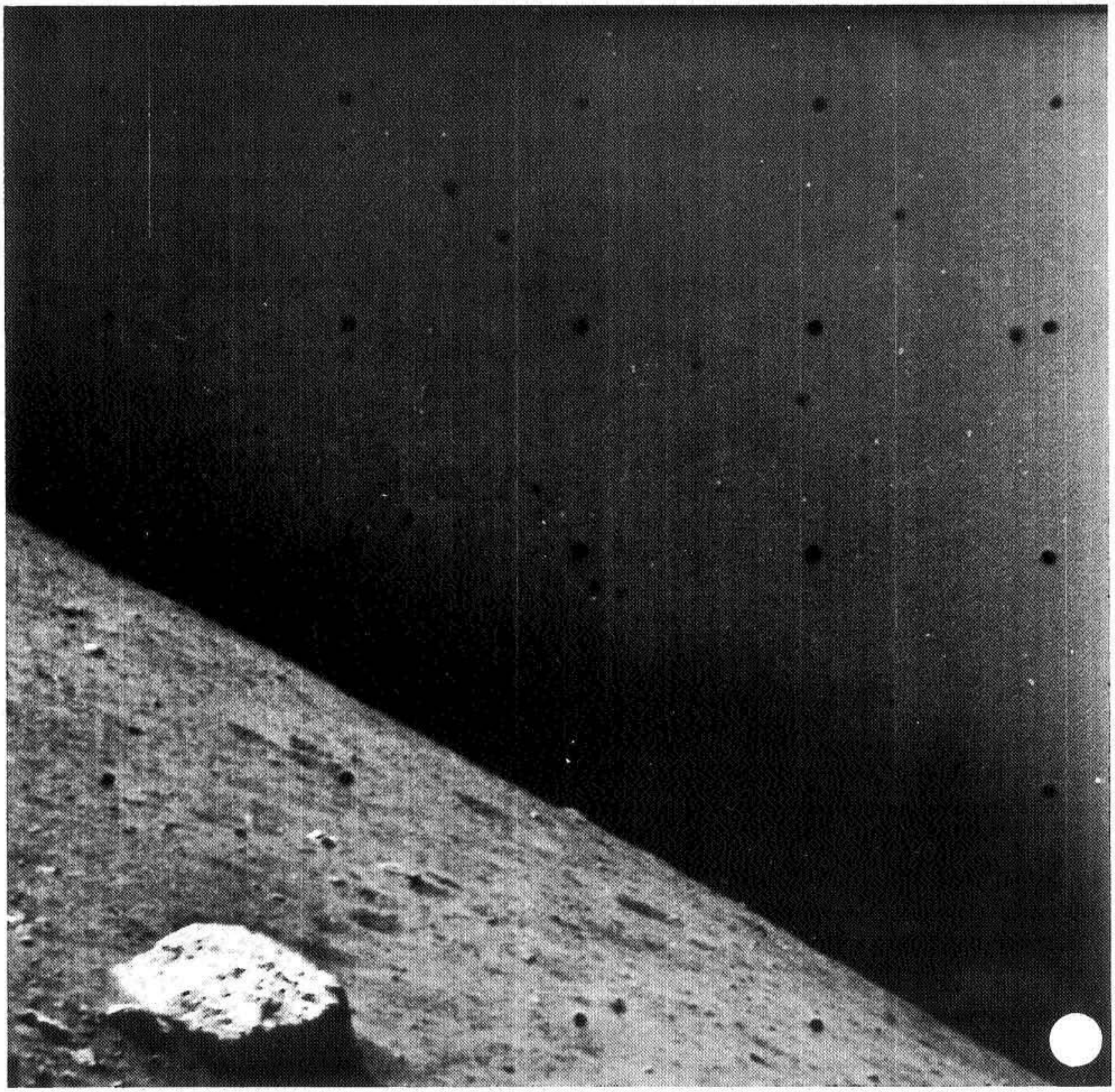


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(186)	Day 120, 14:56:04	72	—23.06	2.8	f/15.1	N	Clear



	GMT	Az	El	Focus, m	Iris	Lens	Filter
(187)	Day 120, 15:00:51	78	6.70	18.5	f/15.1	N	Clear

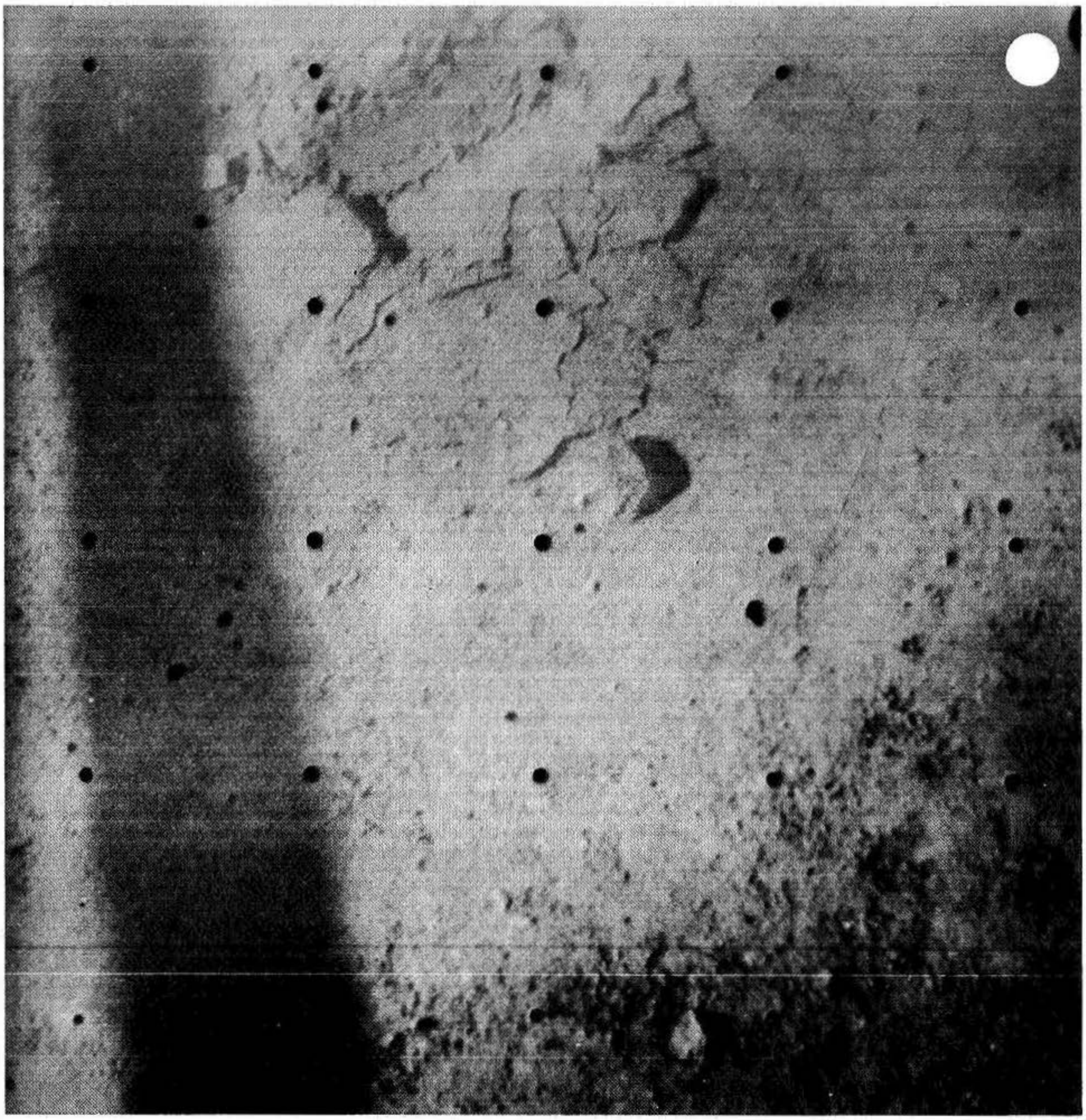




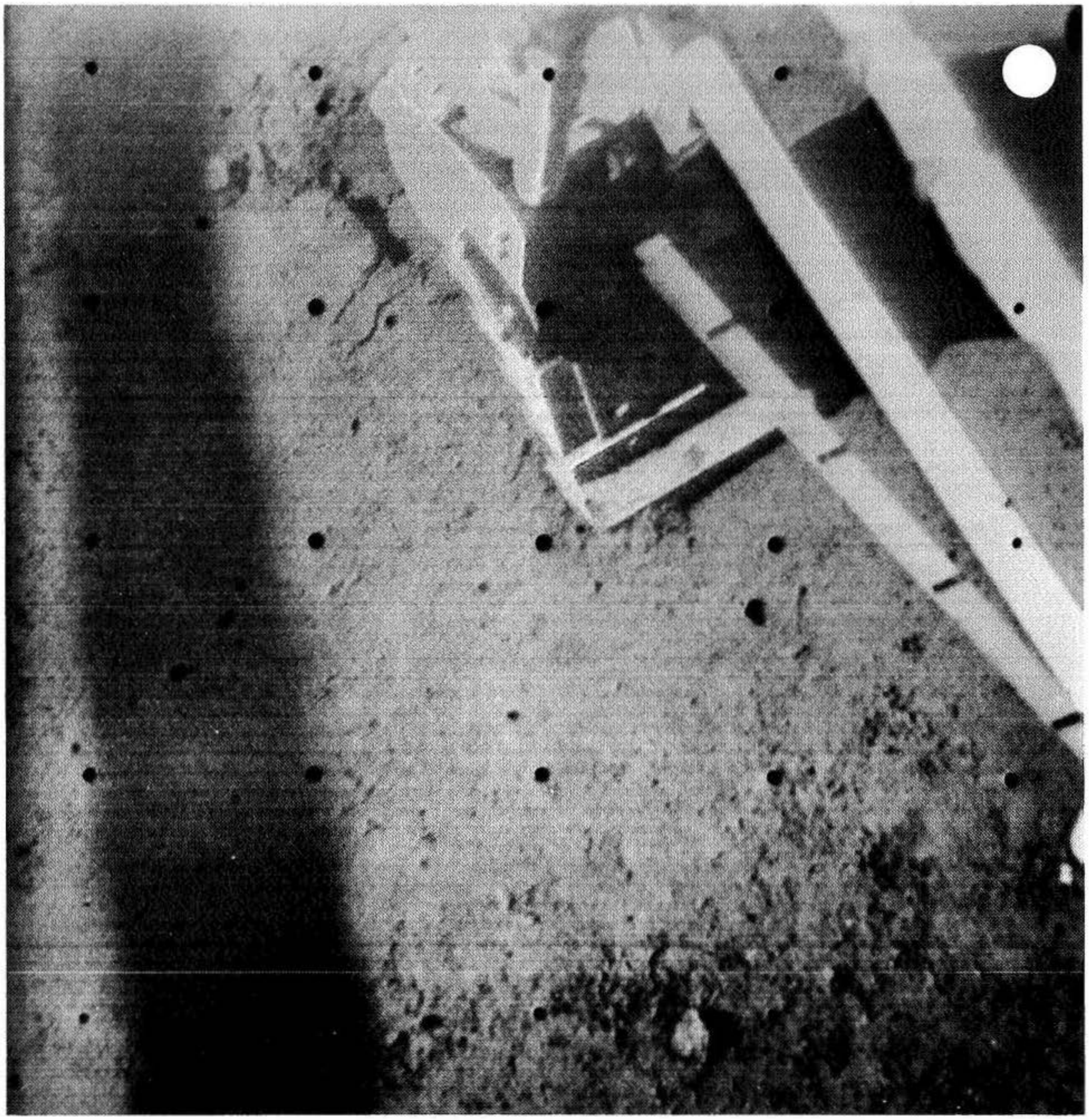
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(188)	Day 120, 15:07:16	66	26.54	30.1	f/15.1	N	Clear

	GMT	Az	El	Focus, m	Iris	Lens	Filter
(189)	Day 120, 15:36:15	33	—37.94	2.7	f/15.1	N	Clear

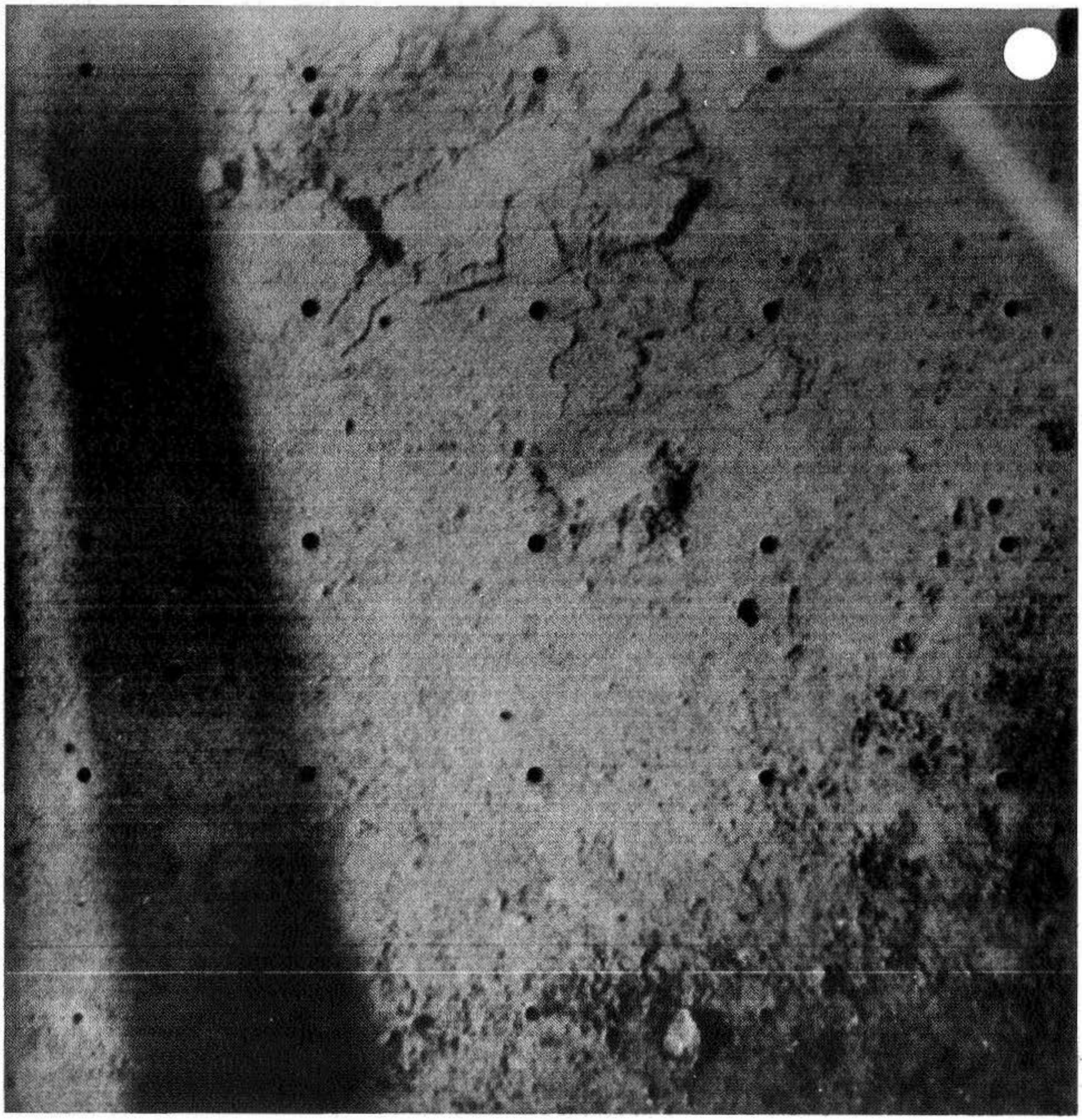
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(190)	Day 120, 15:39:30	33	—37.94	2.7	f/15.1	N	Clear



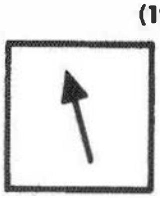
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(191)	Day 120, 15:40:08	33	—37.94	2.7	f/15.1	N	Clear

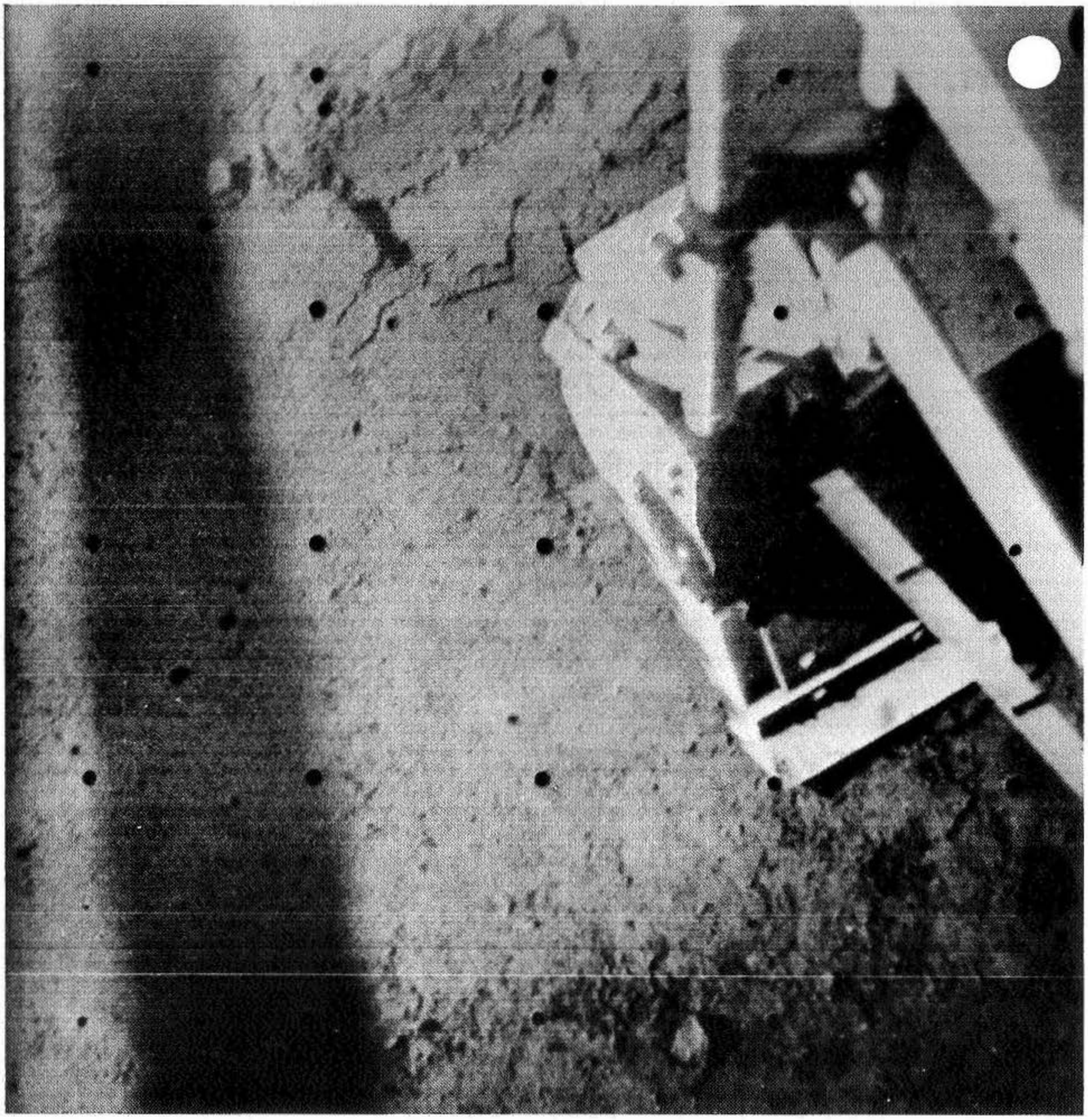


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(192)	Day 120, 15:42:19	33	—37.94	2.7	f/15.1	N	Clear

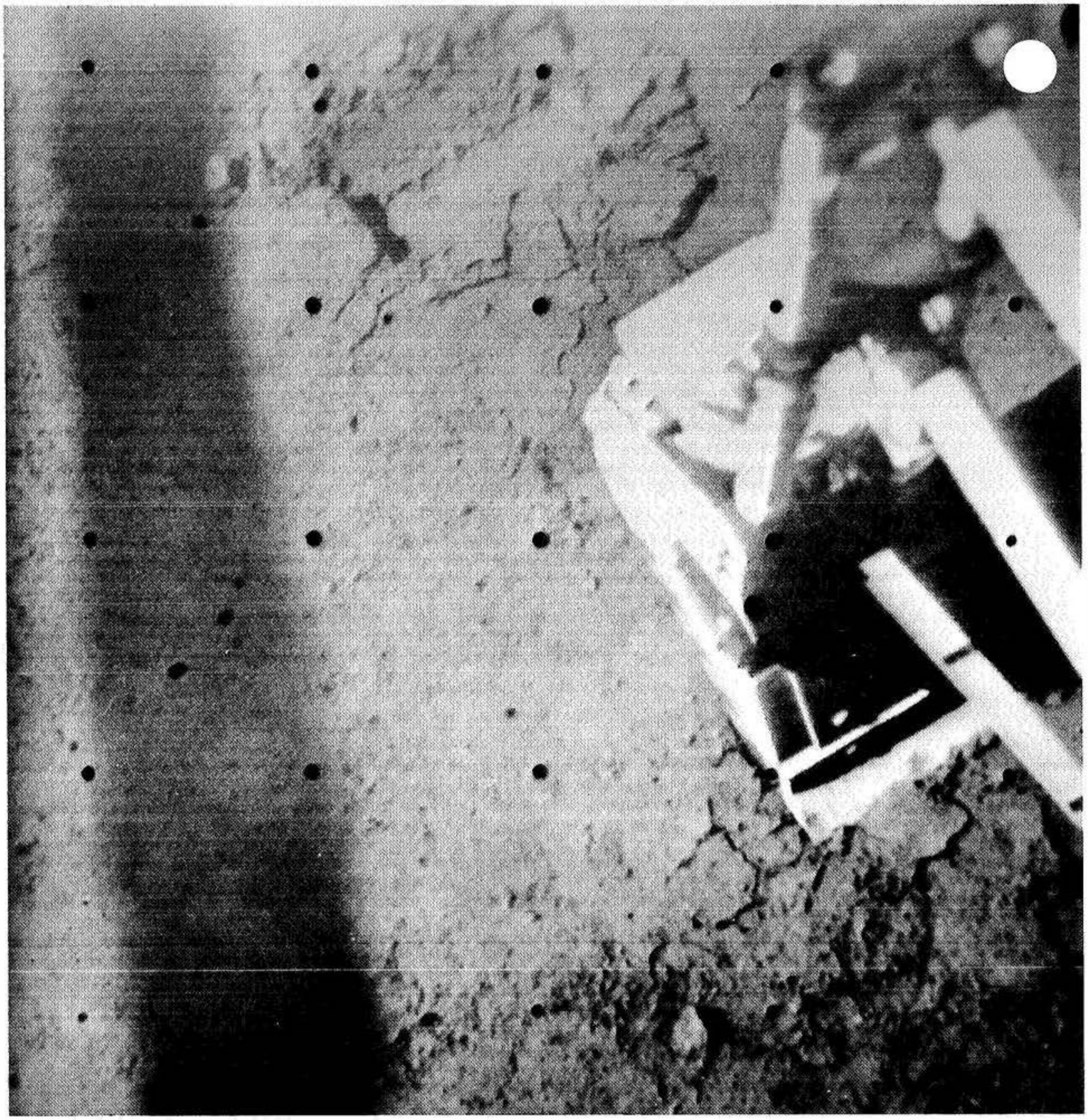


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(193)	Day 120, 15:45:42	33	—37.94	2.7	f/15.1	N	Clear

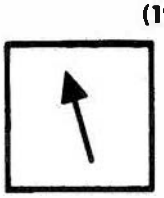


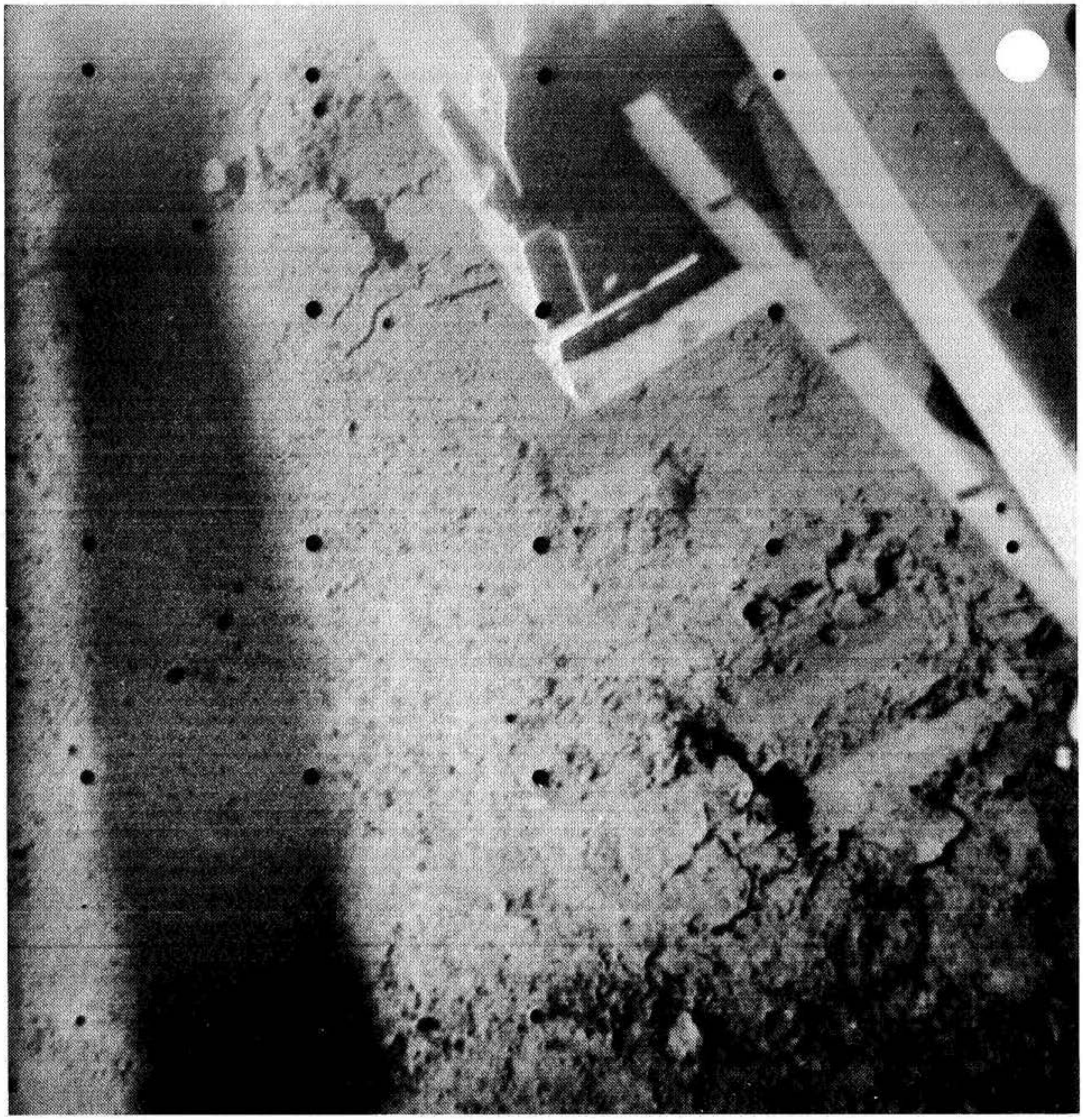


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(194)	Day 120, 15:47:30	33	−37.94	2.7	f/15.1	N	Clear

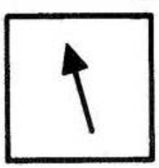


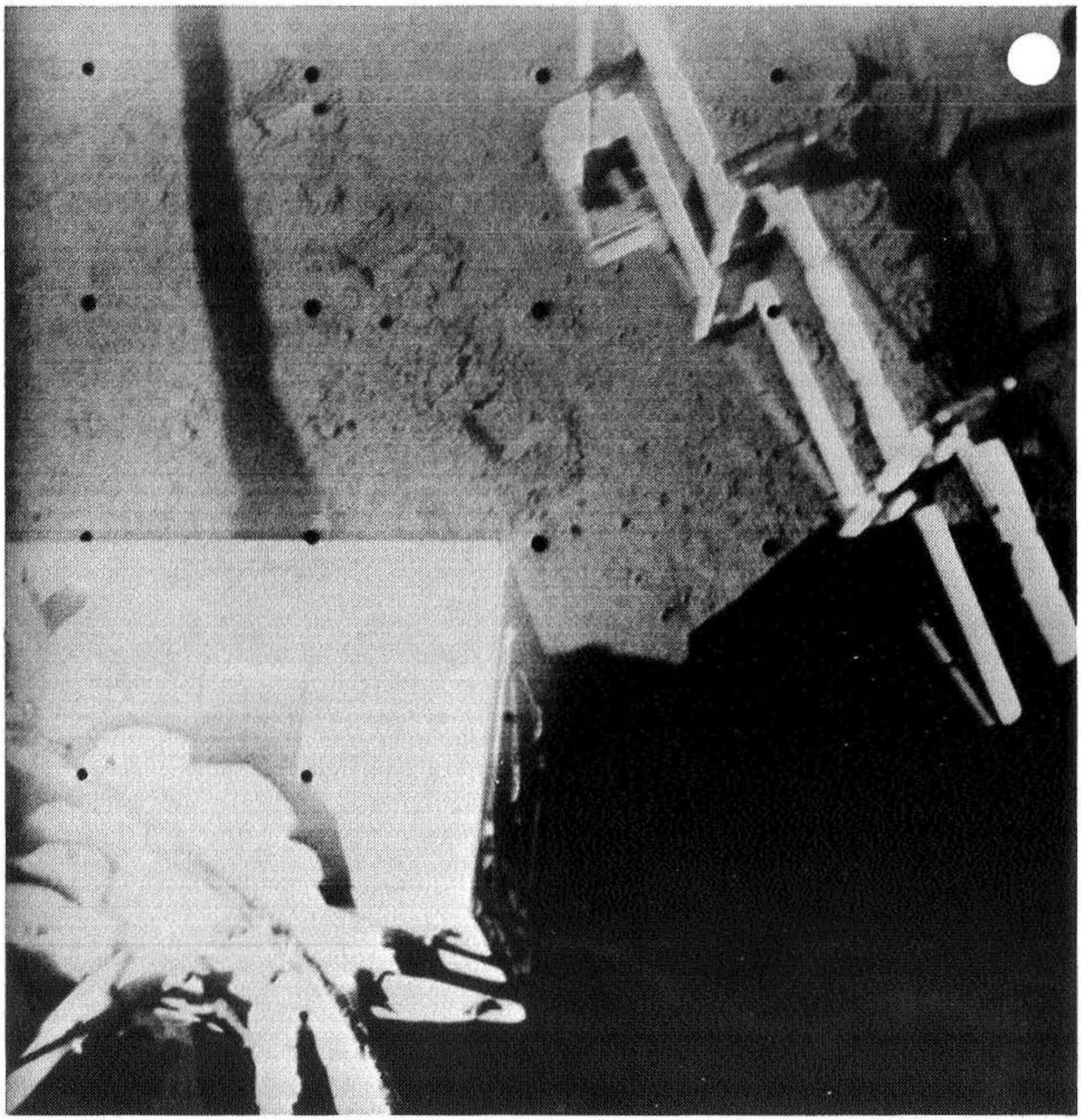
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(195)	Day 120, 15:48:50	33	—37.94	2.7	*f*/15.1	N	Clear



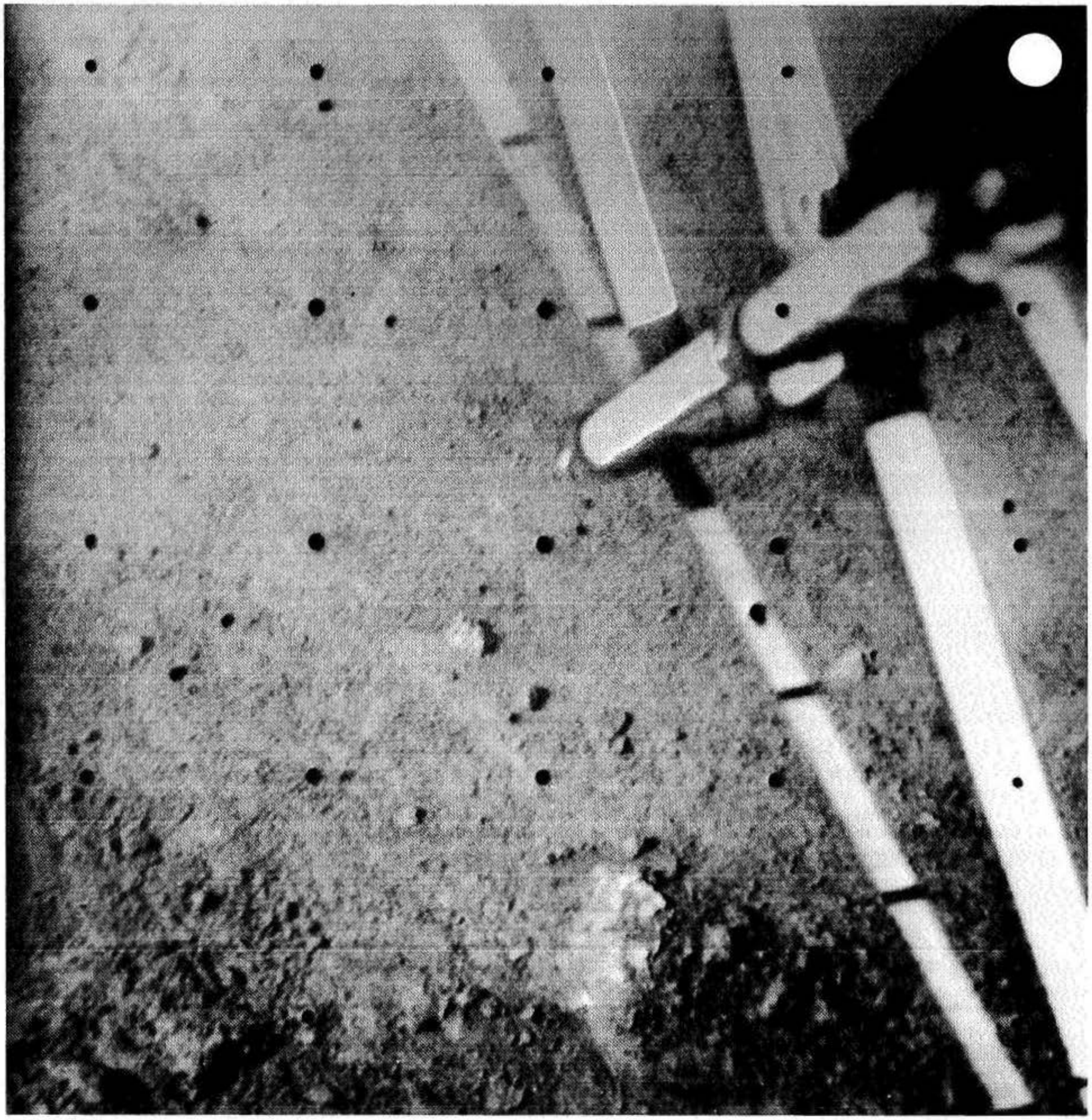


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(196)	Day 120, 15:50:17	33	—37.94	2.7	f/15.1	N	Clear

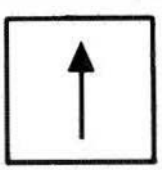


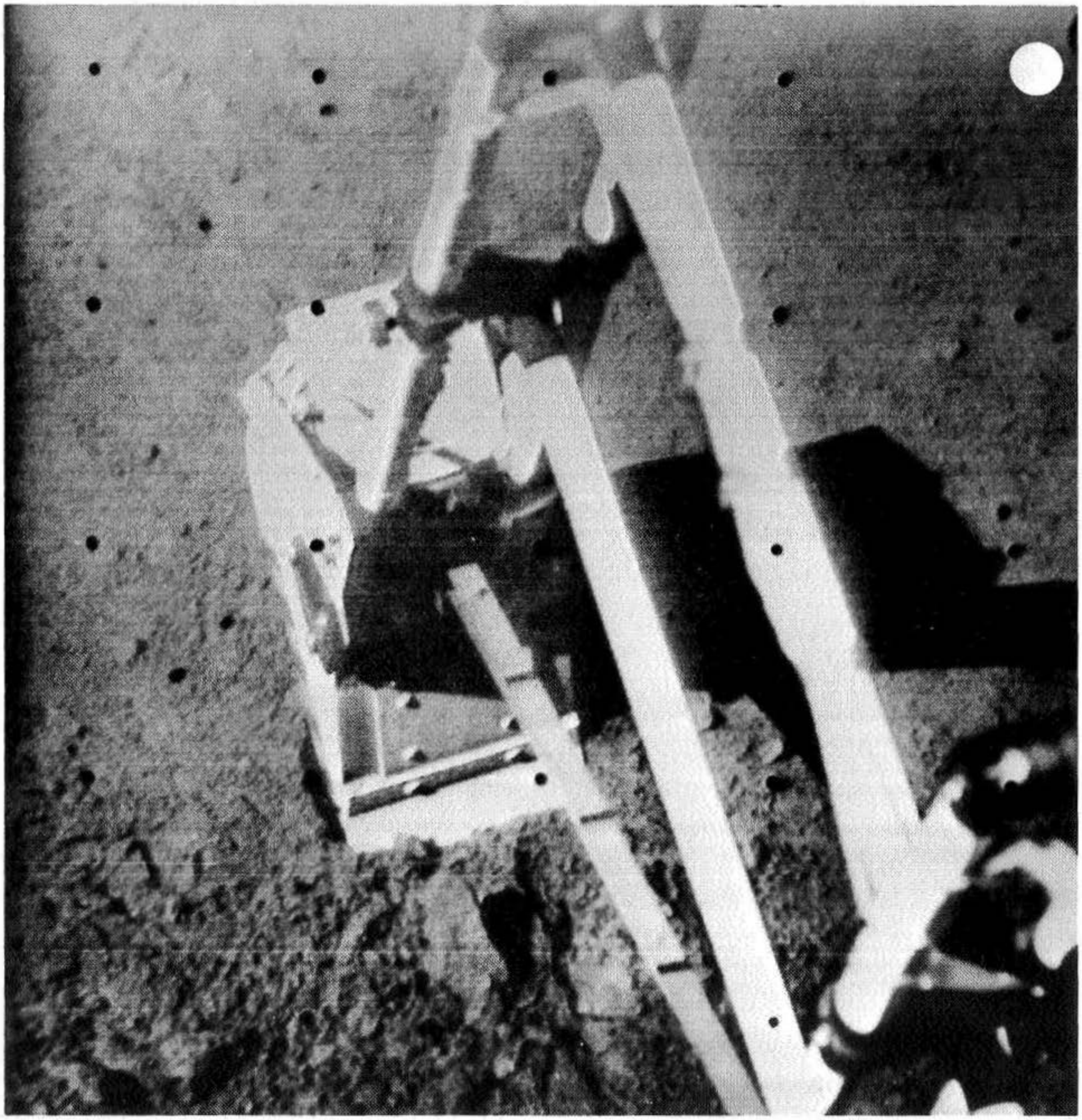


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(197)	Day 120, 16:08:43	33	—47.86	2.6	f/15.1	N	Clear

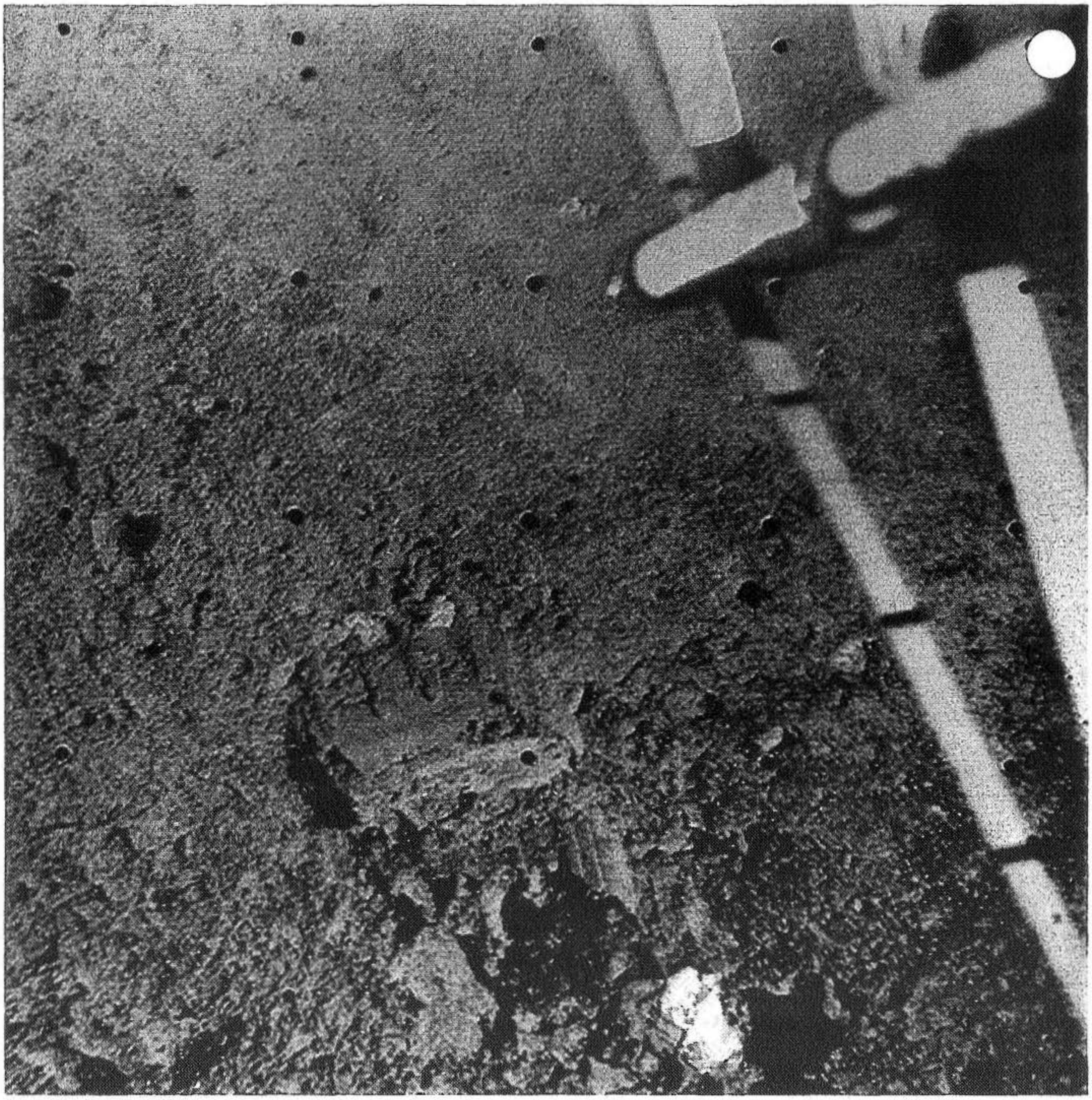


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(198)	Day 120, 16:37:14	21	−37.94	2.7	f/15.1	N	Clear

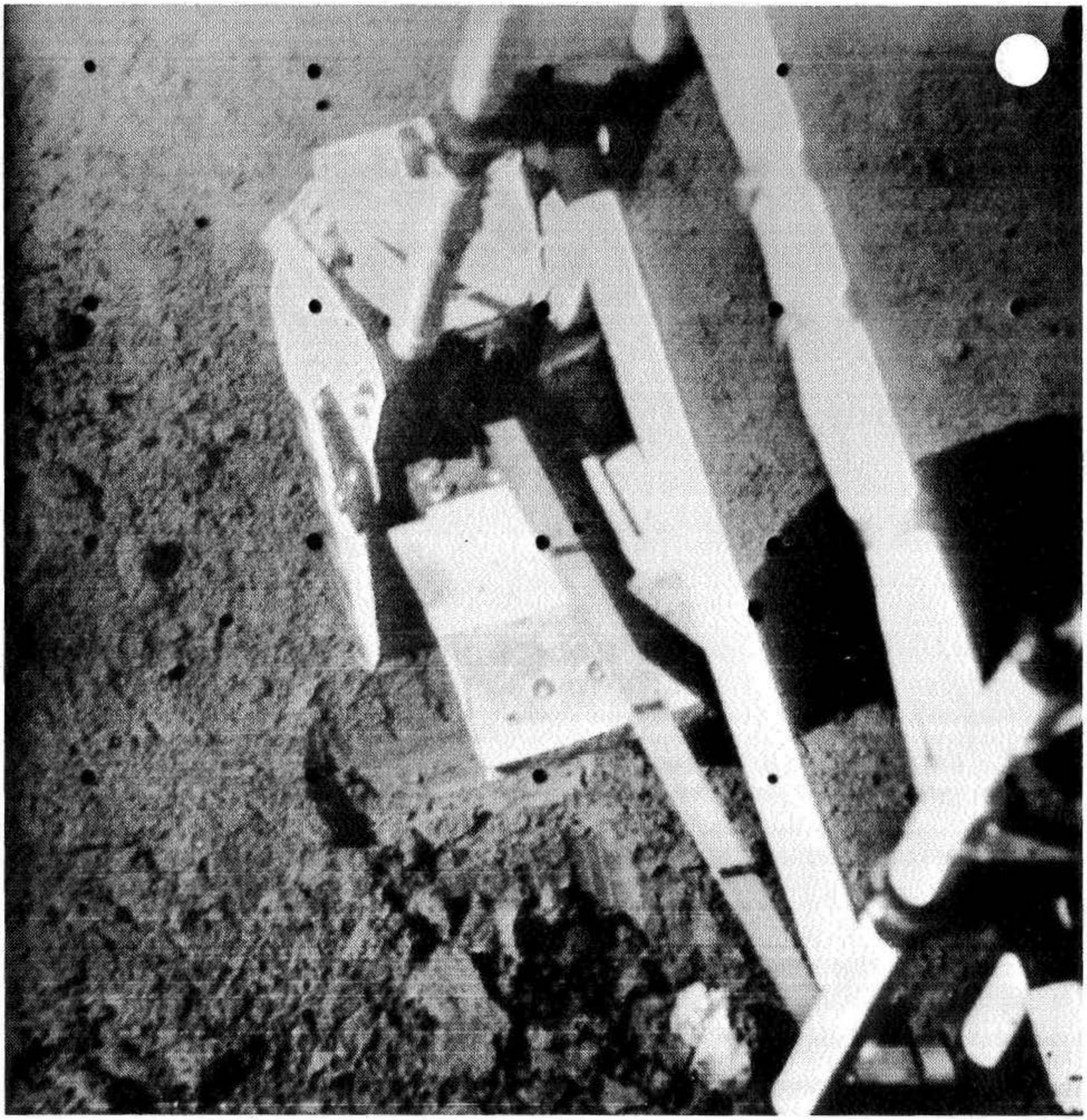




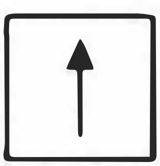
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(199)	Day 120, 16:41:30	21	−37.94	2.7	f/15.1	N	Clear

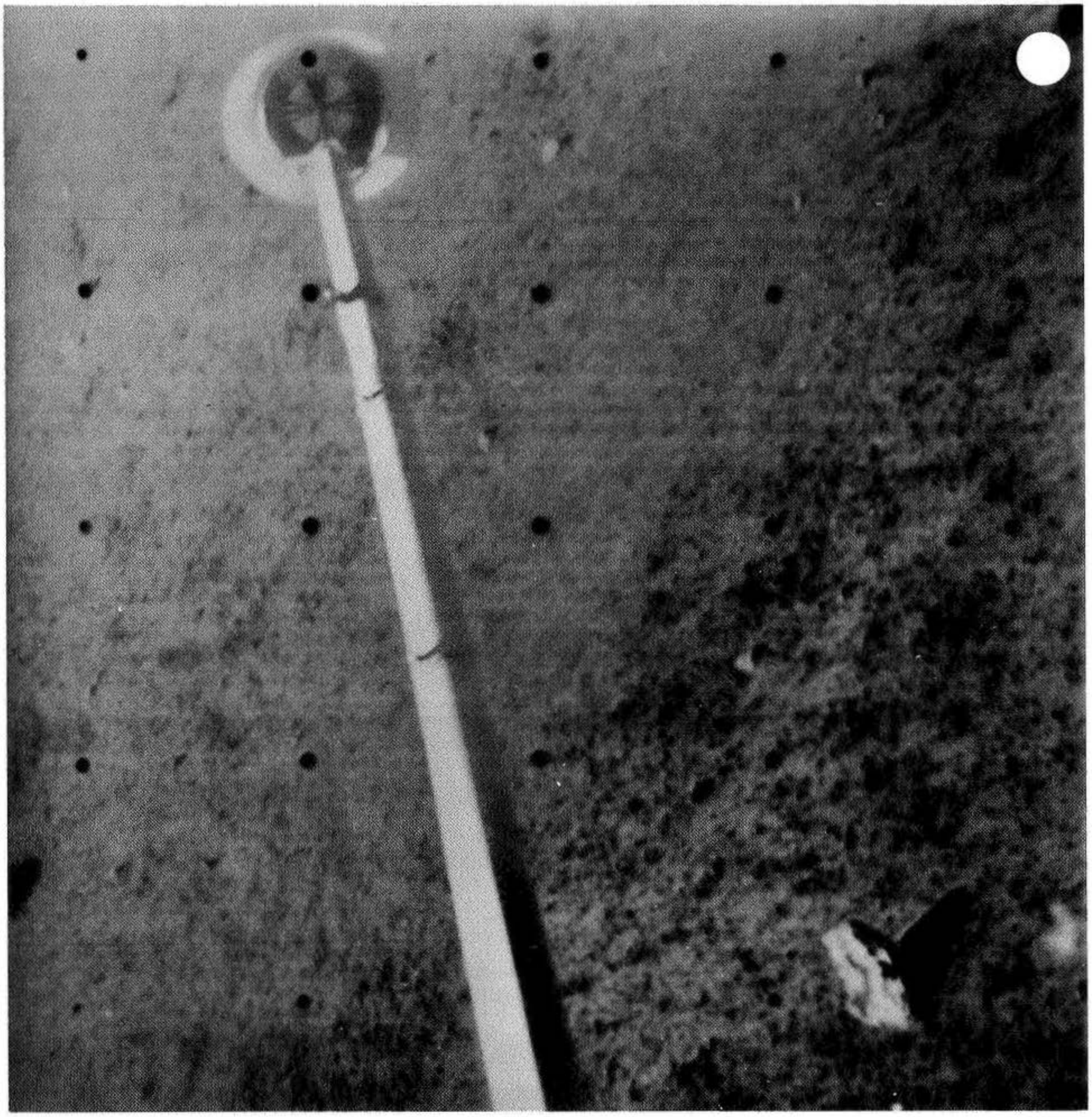


	GMT	Az	El	Focus, m	Iris	Lens	Filter	Remarks
(200)	Day 120, 16:59:28	21	—37.94	2.6	f/15.2	N	Clear	Processed

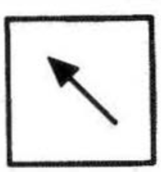


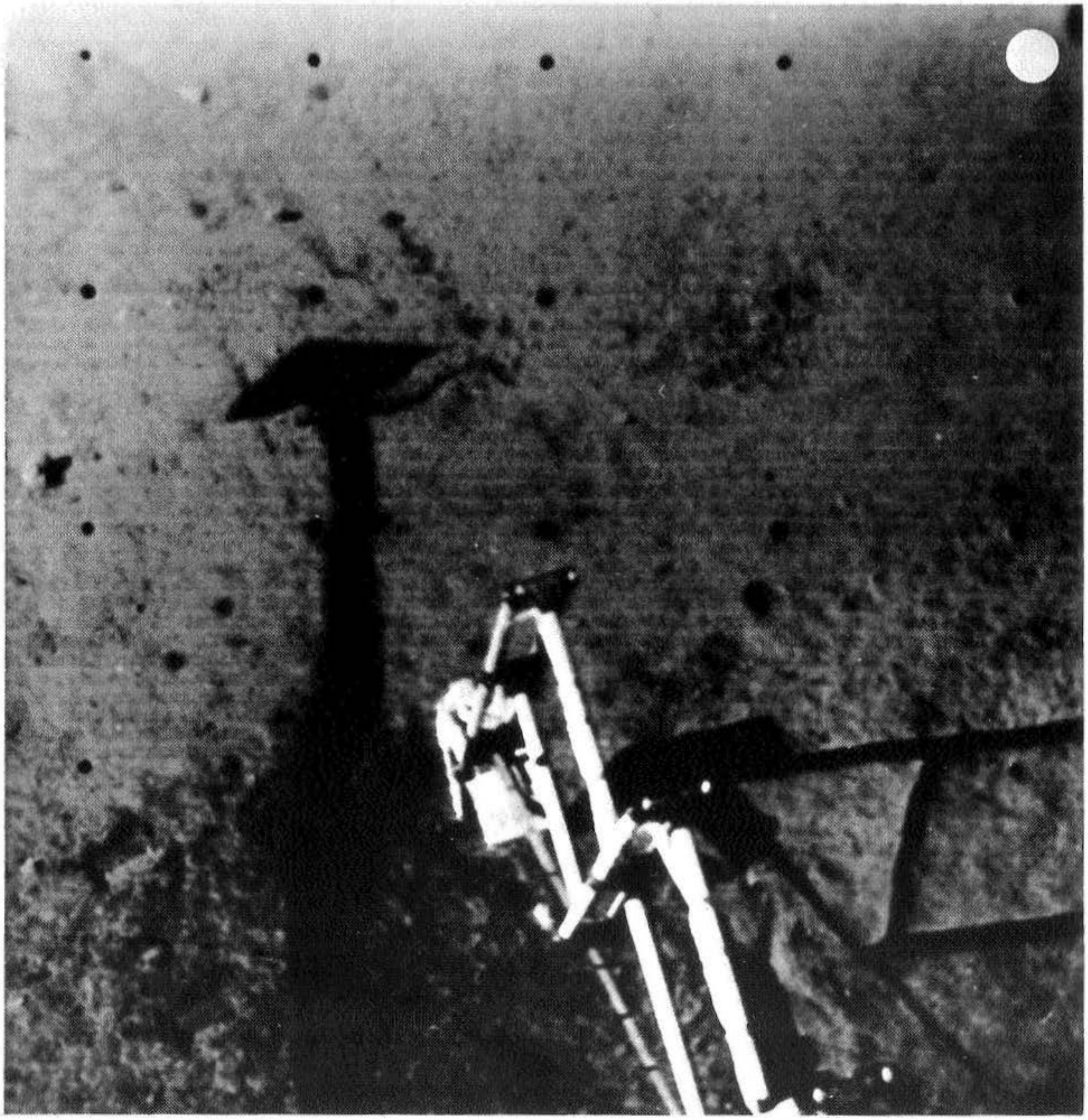
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(201)	Day 120, 17:14:20	21	—37.94	2.6	f/15.9	N	Clear



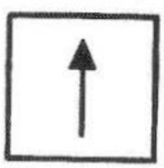


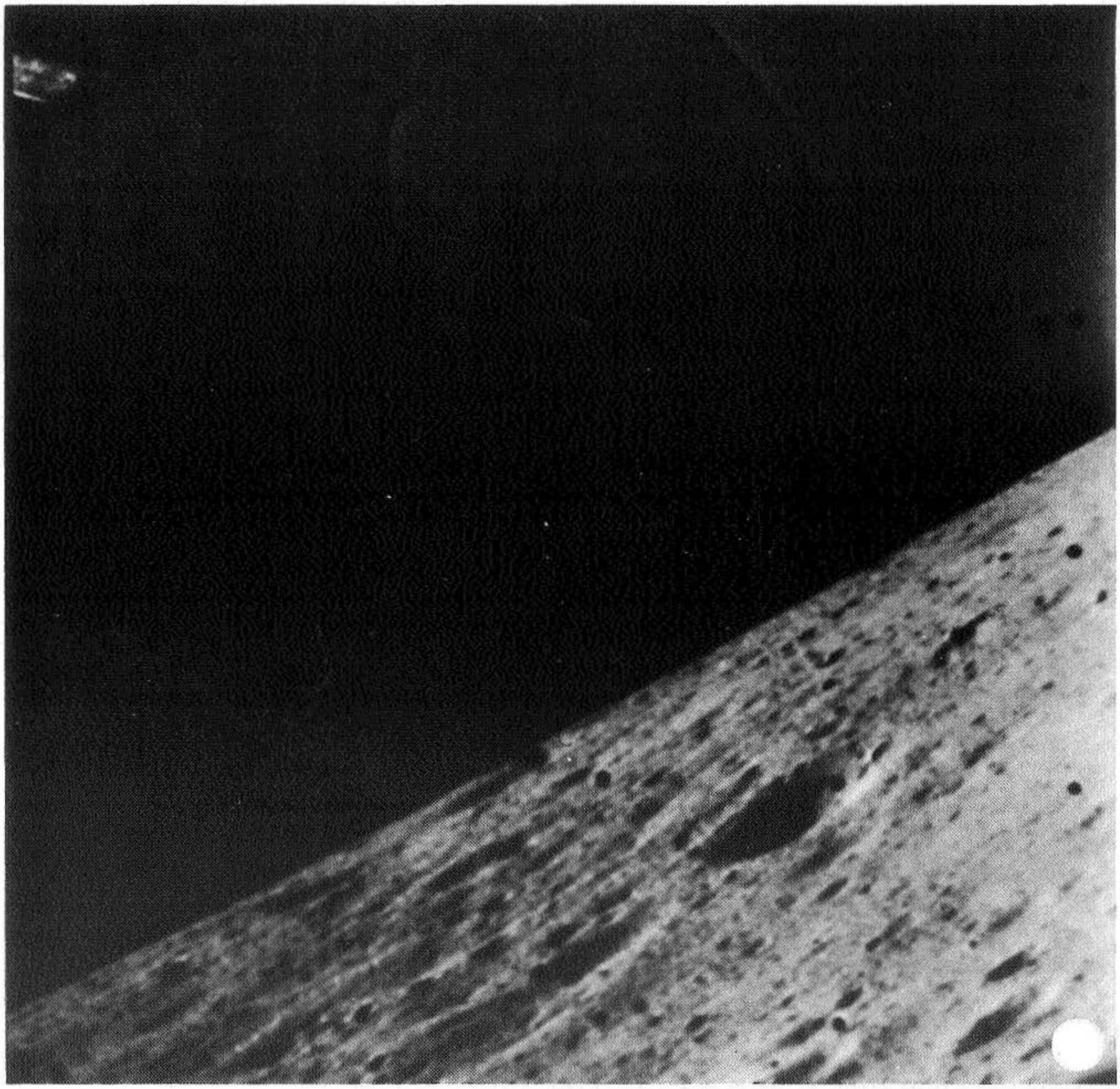
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(202)	Day 121, 10:53:26	57	—13.14	2.3	f/5.8	W	Green



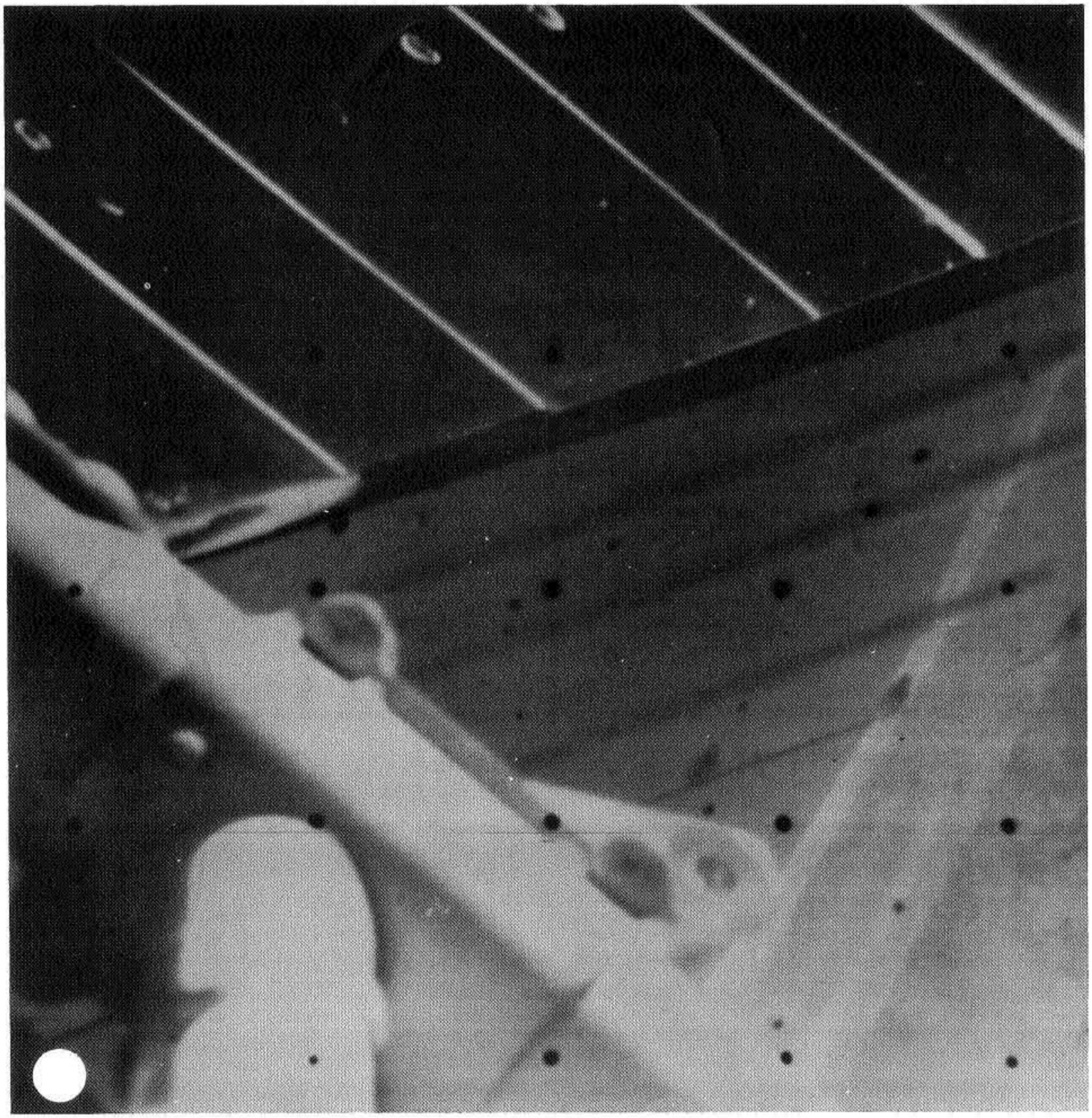


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(203)	Day 121, 11:10:19	21	—32.98	2.4	f/8.2	W	Green

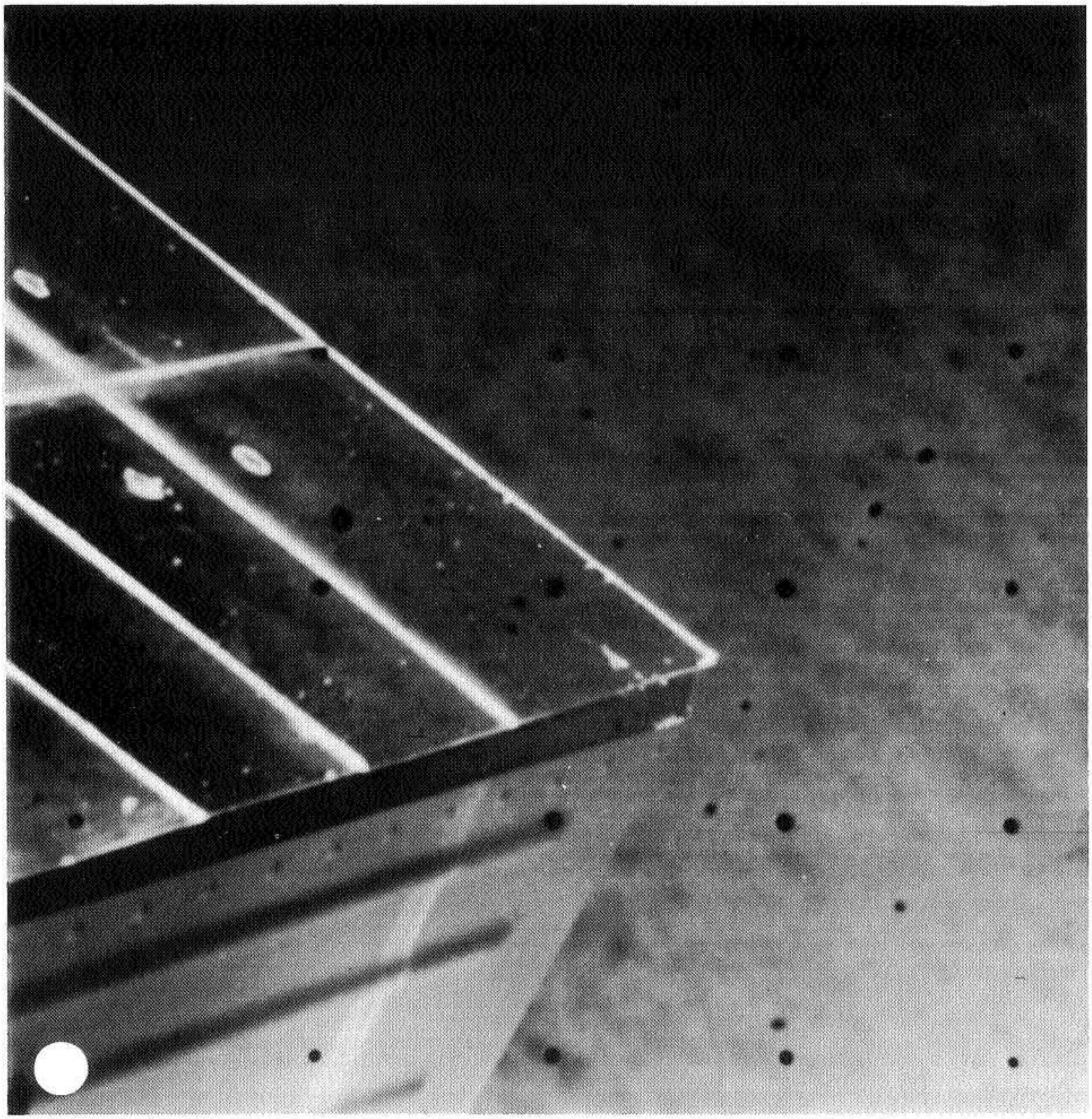




(204)	GMT	Az	El	Focus, m	Iris	Lens	Filter
	Day 121, 12:21:12	108	26.54	2.4	$f/11.3$	W	Clear

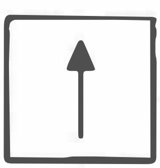


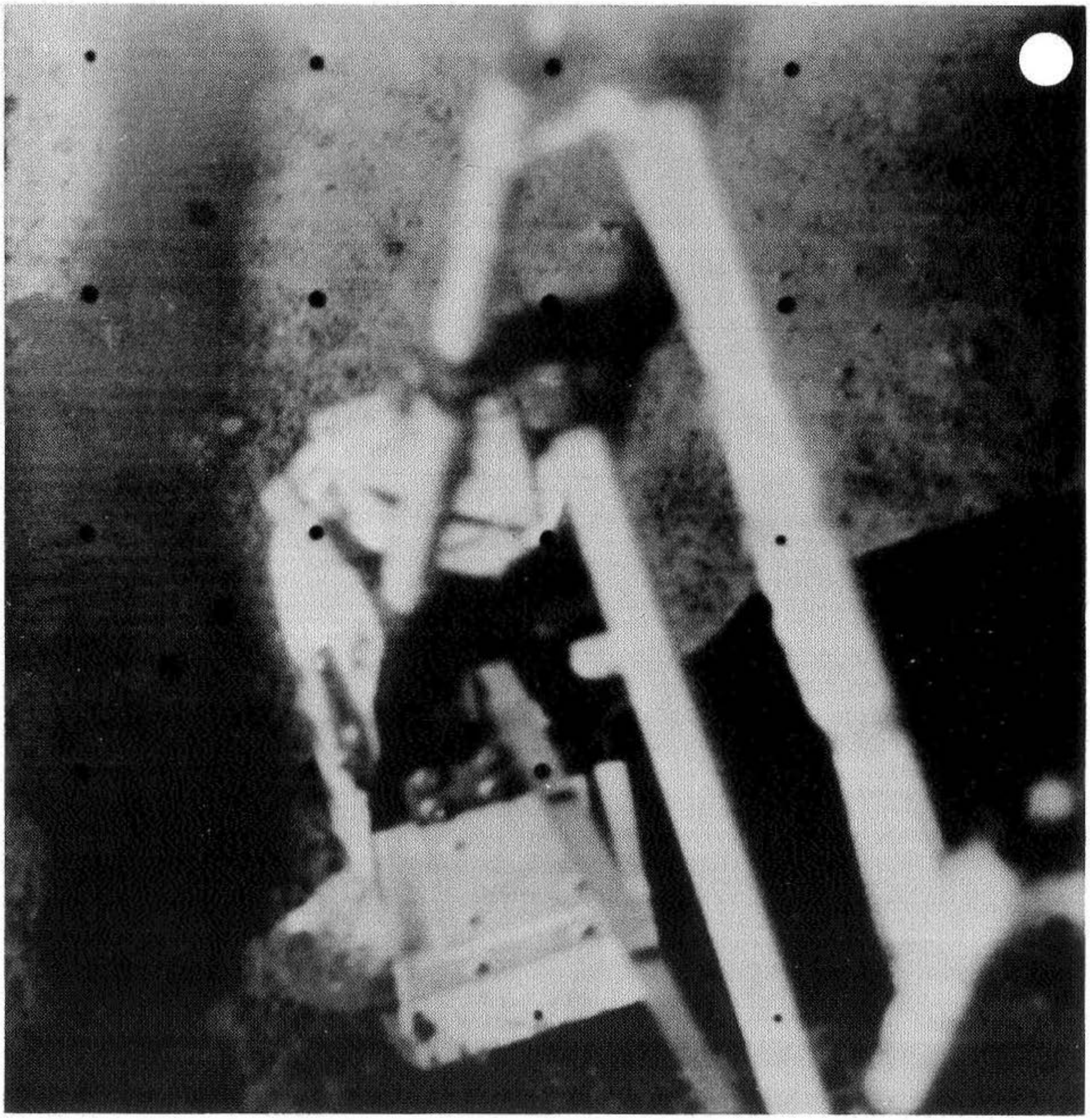
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(205)	Day 121, 12:30:22	129	—18.10	1.8	f/16.8	N	Clear



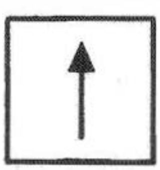
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(206)	Day 121, 12:31:31	129	—13.14	2.2	f/16.8	N	Clear

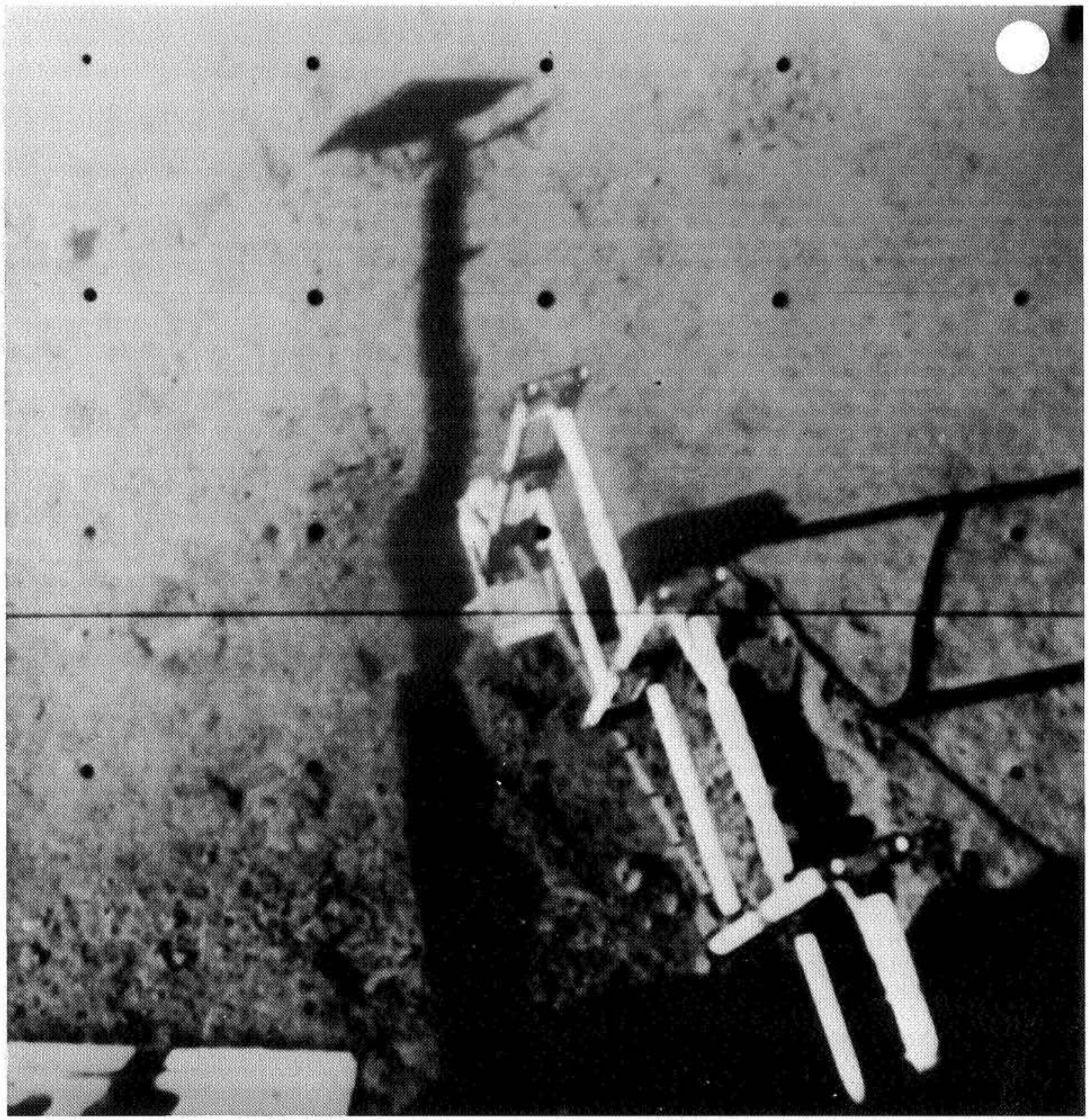
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(207)	Day 121, 14:39:02	21	—37.94	2.6	f/5.9	N	Green



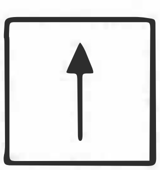


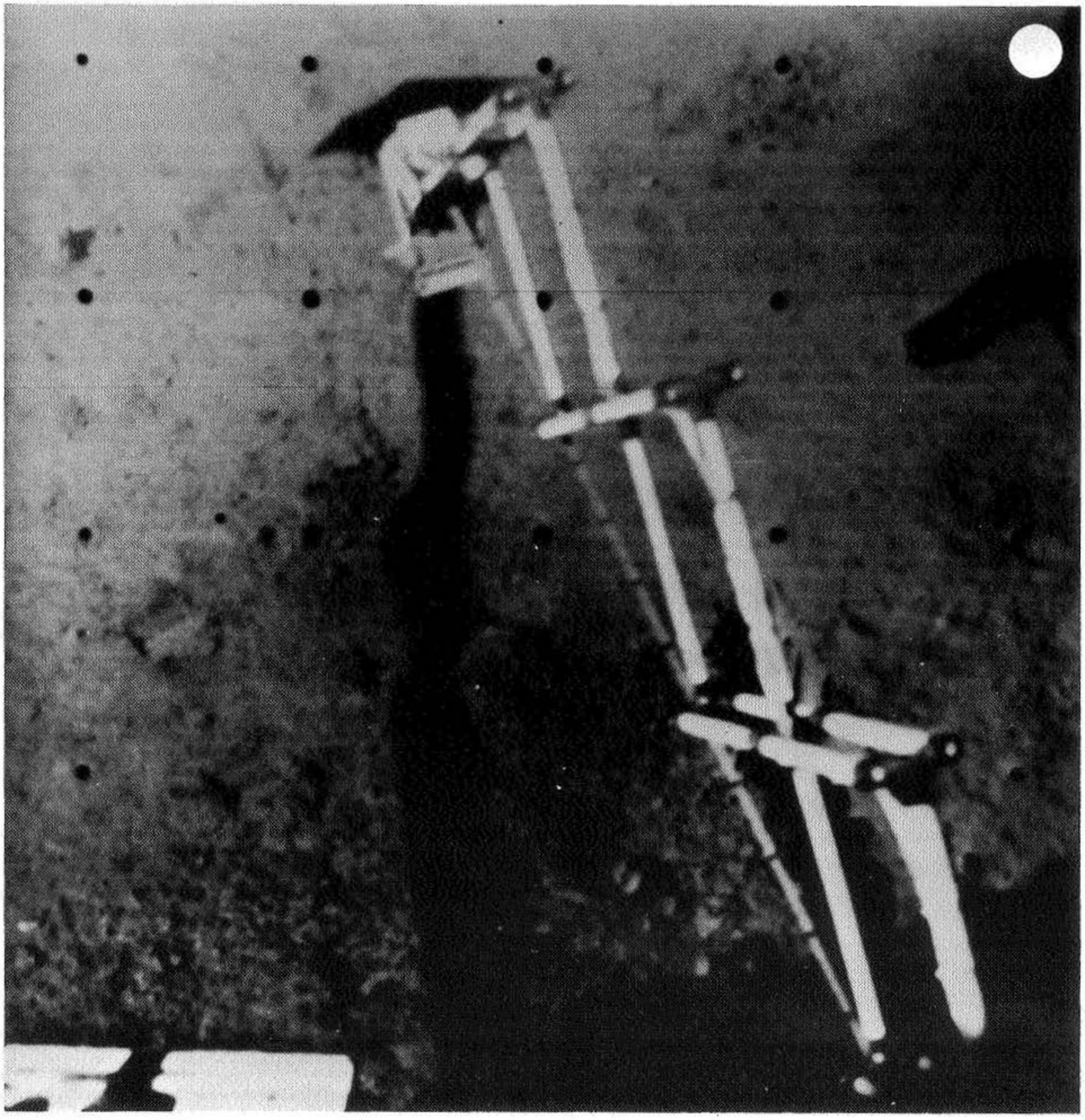
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(208)	Day 121, 14:54:35	21	—37.94	2.6	f/5.9	N	Green



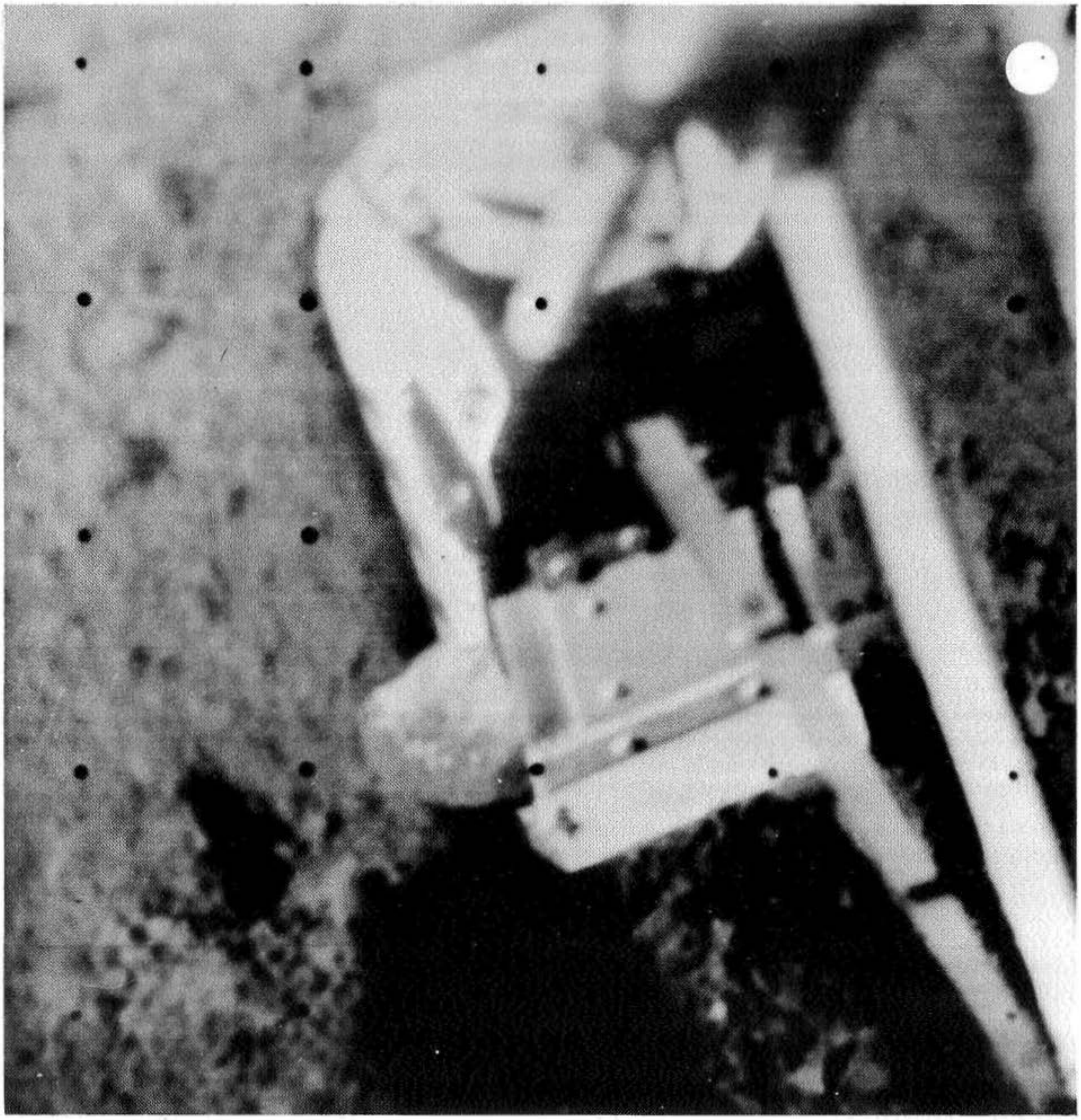


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(209)	Day 121, 14:56:38	21	—37.94	2.6	f/5.9	N	Green

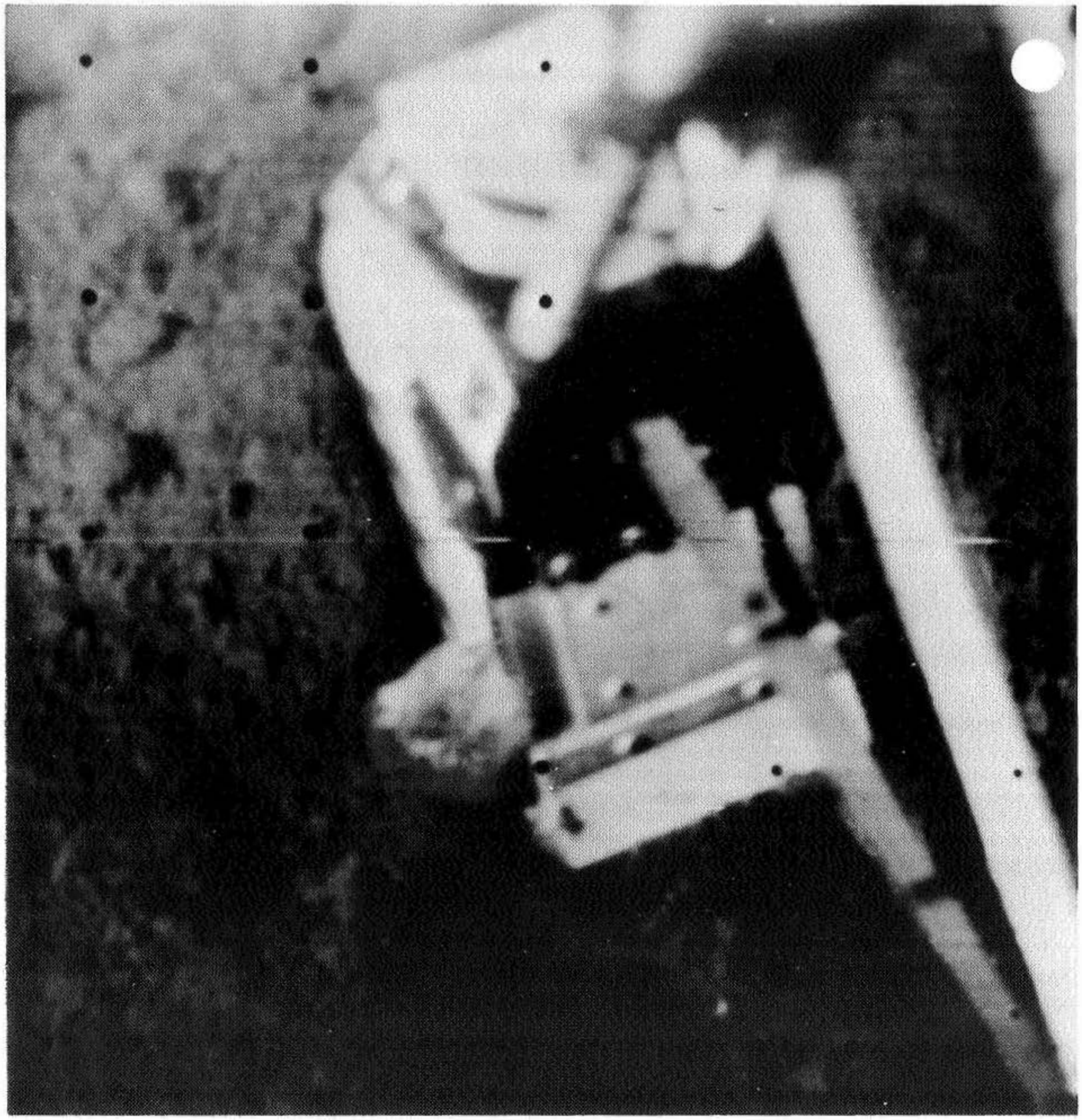




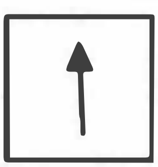
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(210)	Day 121, 14:58:13	21	—37.94	2.6	f/5.9	W	Clear

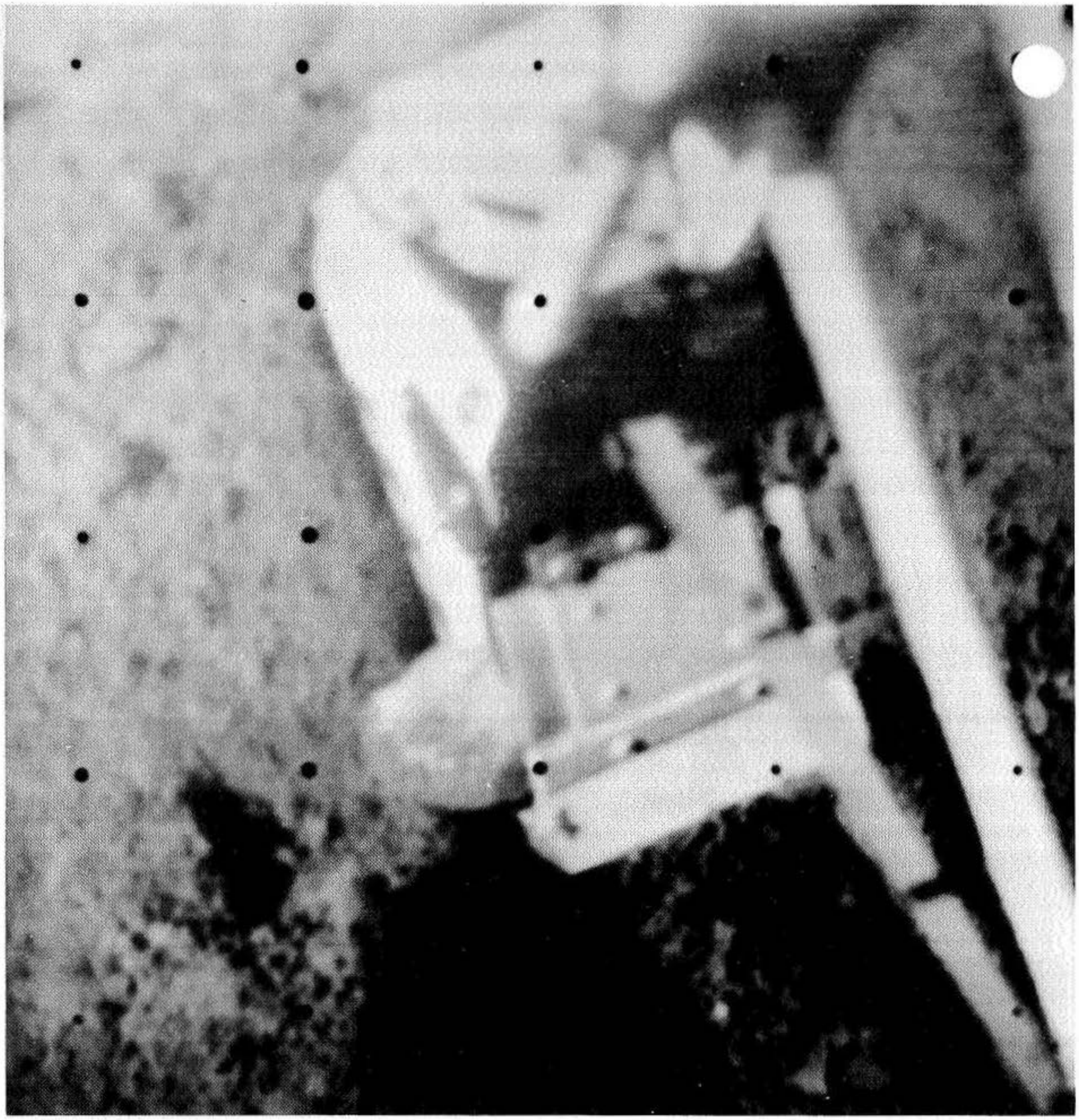


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(211)	Day 121, 15:18:39	24	—37.94	2.1	f/5.9	N	Red

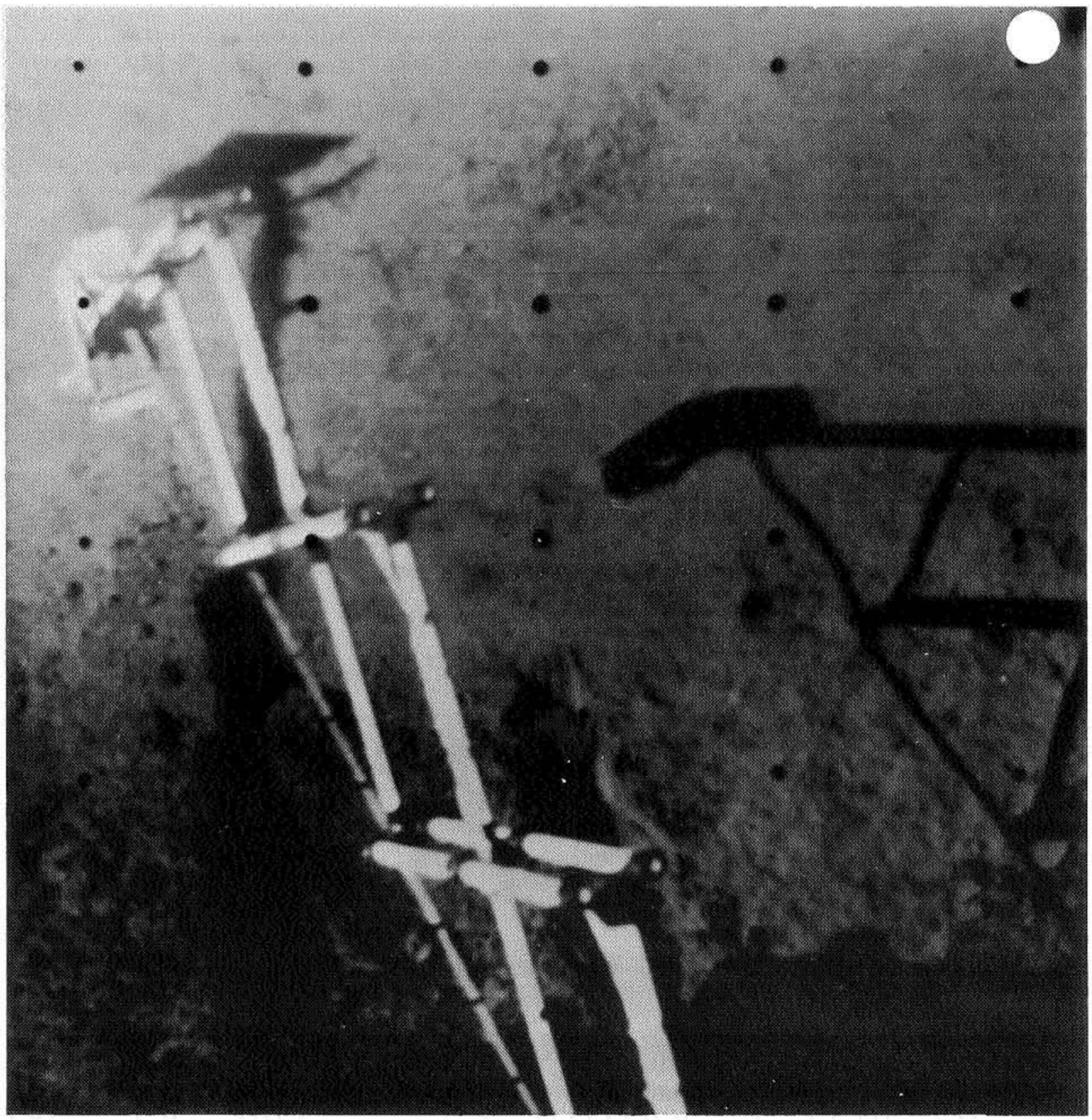


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(212)	Day 121, 15:21:05	24	—37.94	2.1	f/5.9	N	Blue

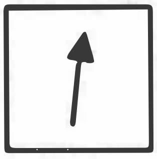


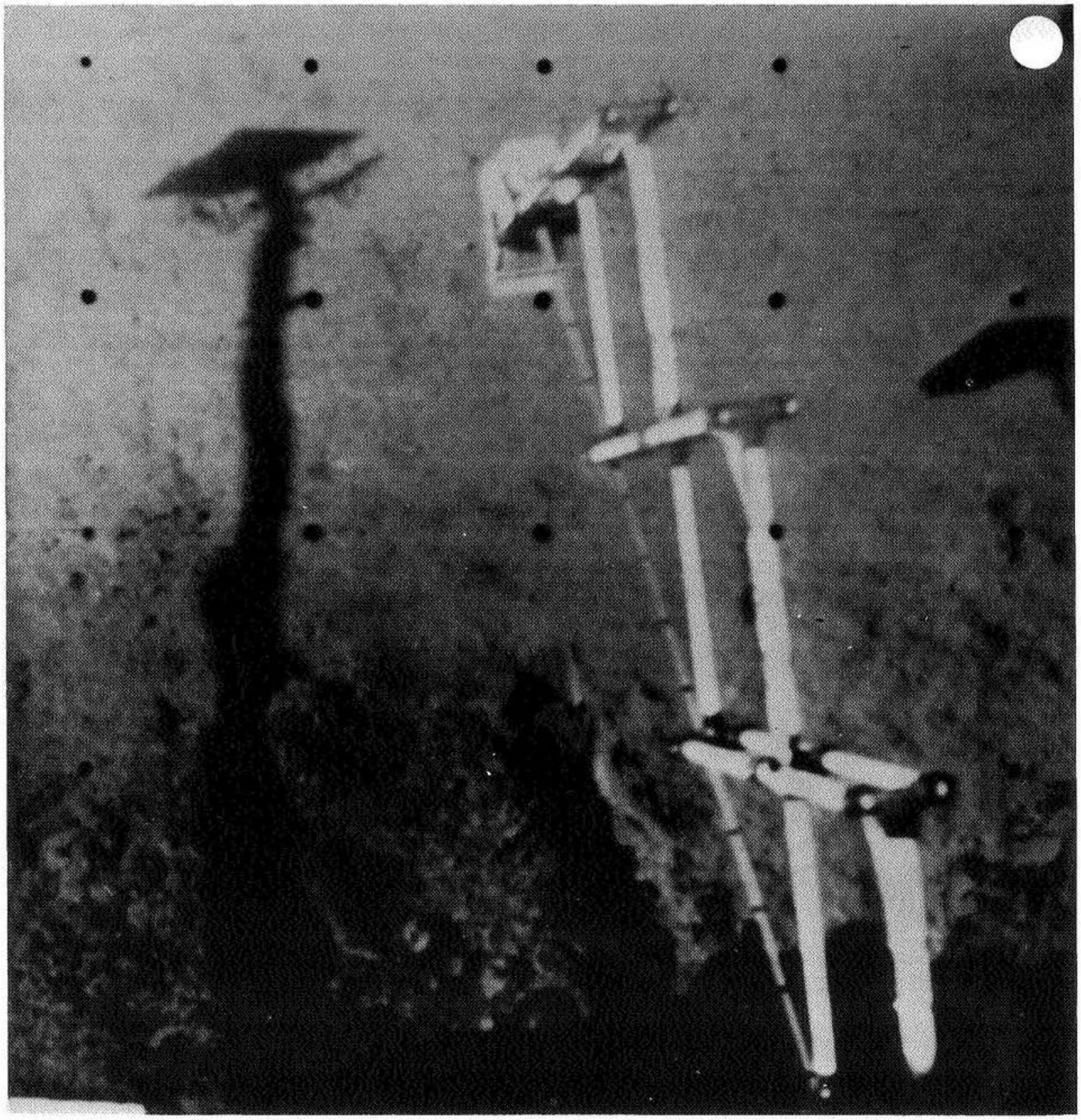


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(213)	Day 121, 15:21:35	24	—37.94	2.1	f/5.9	N	Green

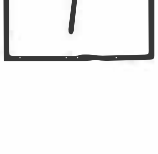


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(214)	Day 121, 15:32:39	15	—37.94	2.6	f/5.9	W	Clear

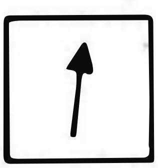


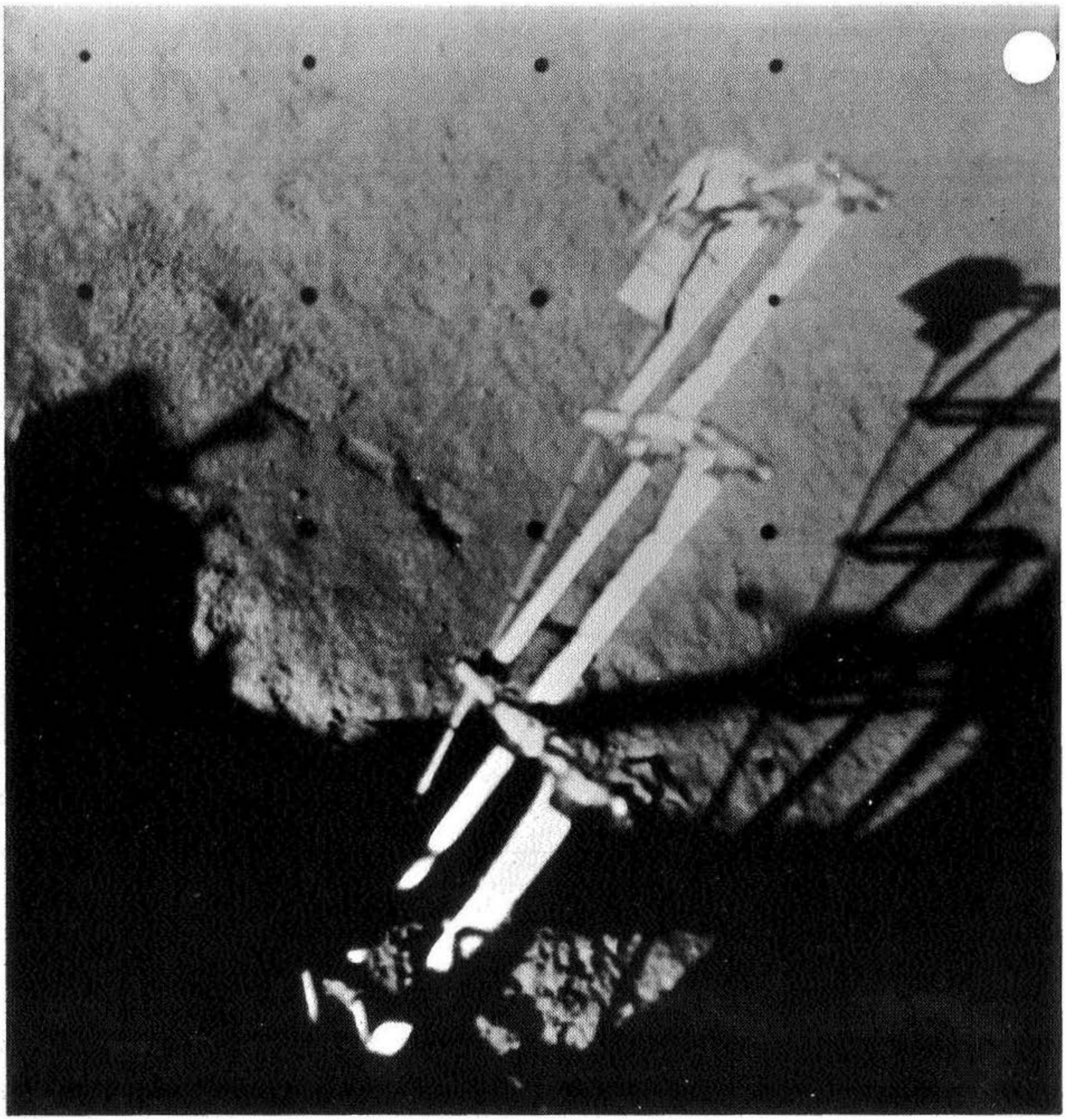


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(215)	Day 121, 15:34:25	15	−37.94	2.6	f/5.9	W	Clear

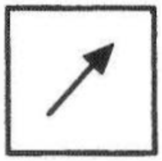


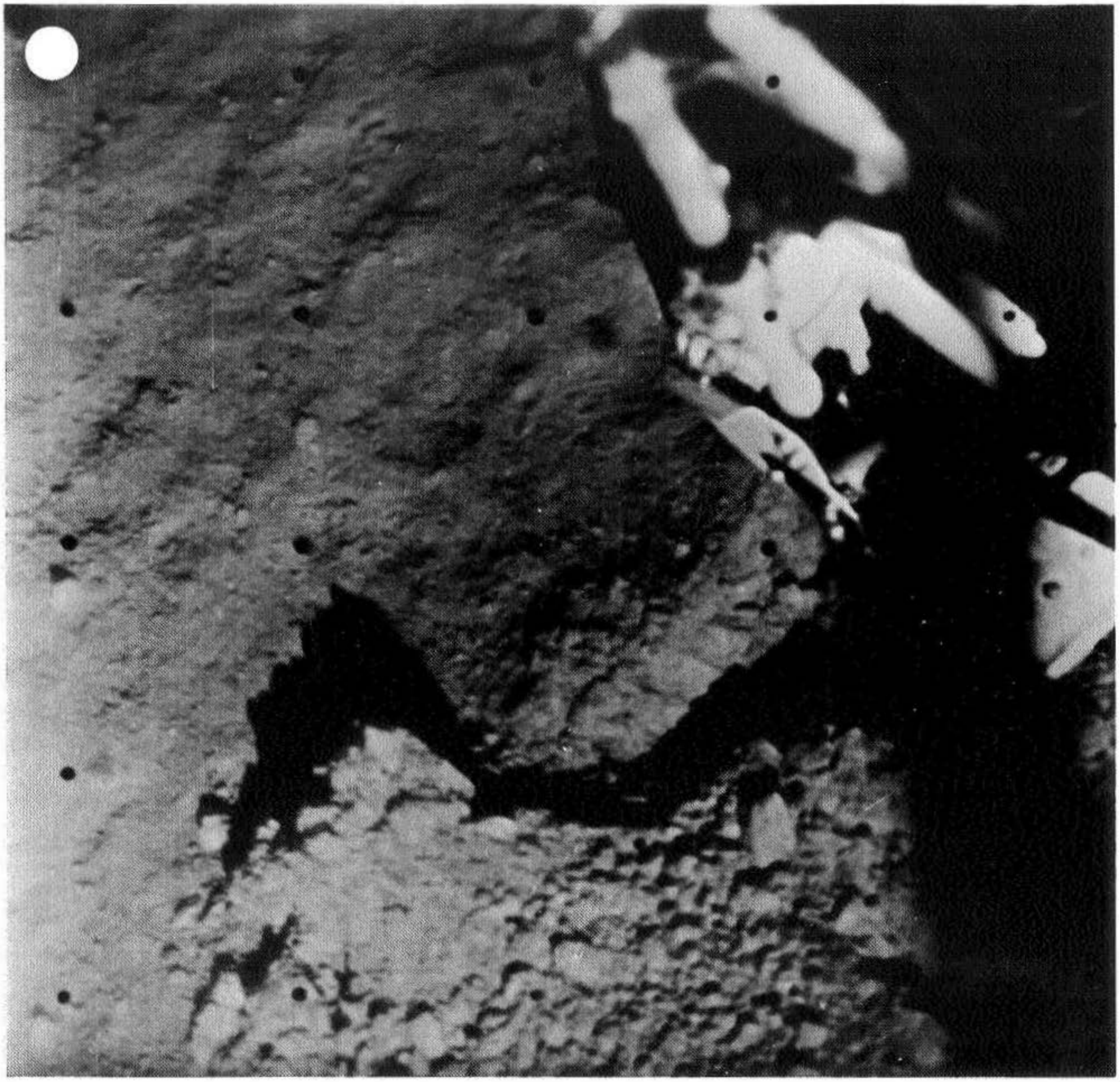
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(216)	Day 121, 16:14:14	15	—43.90	2.5	f/5.9	N	Blue



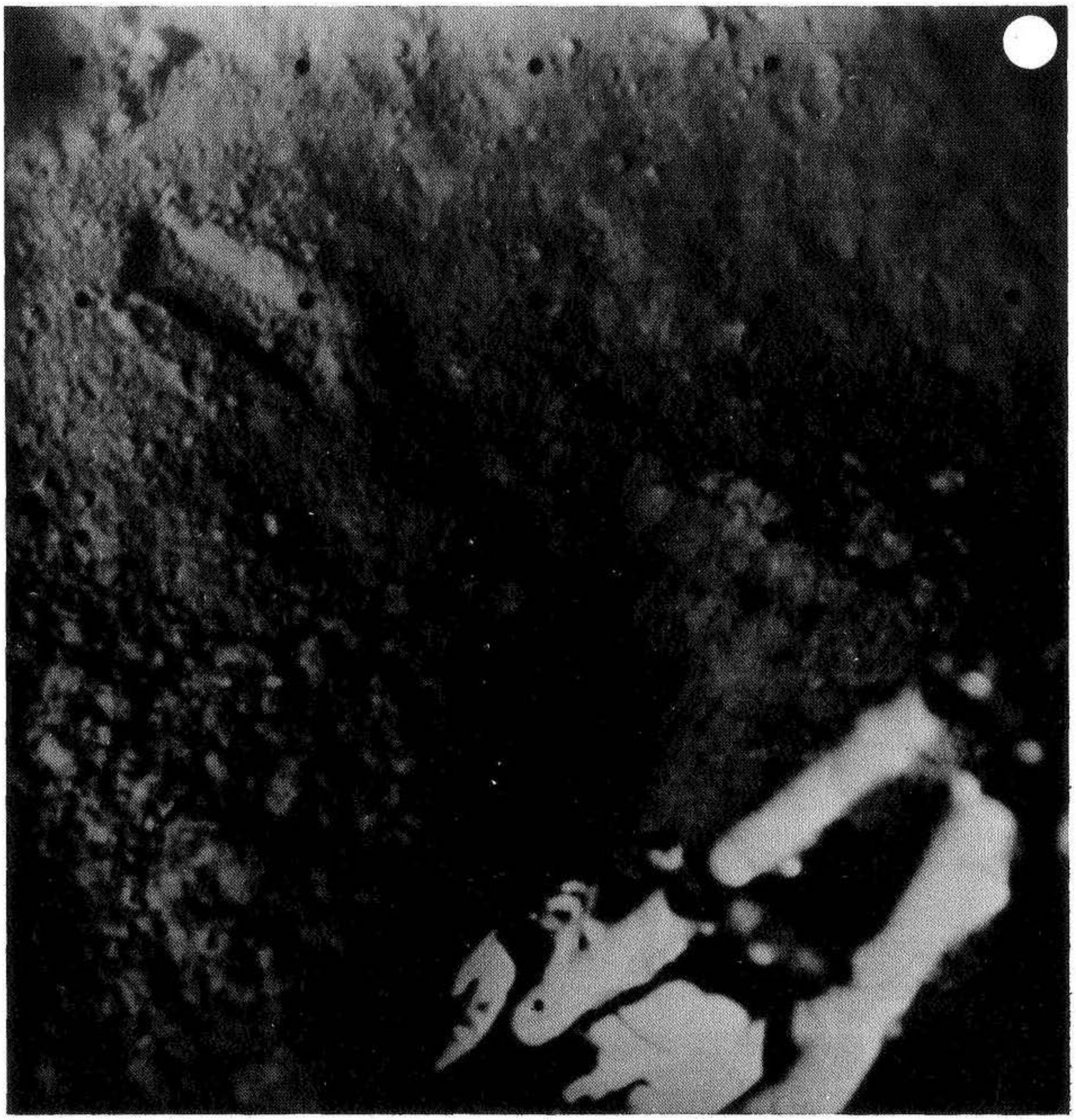


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(217)	Day 122, 11:55:24	—21	—42.90	2.7	f/5.7	W	Red

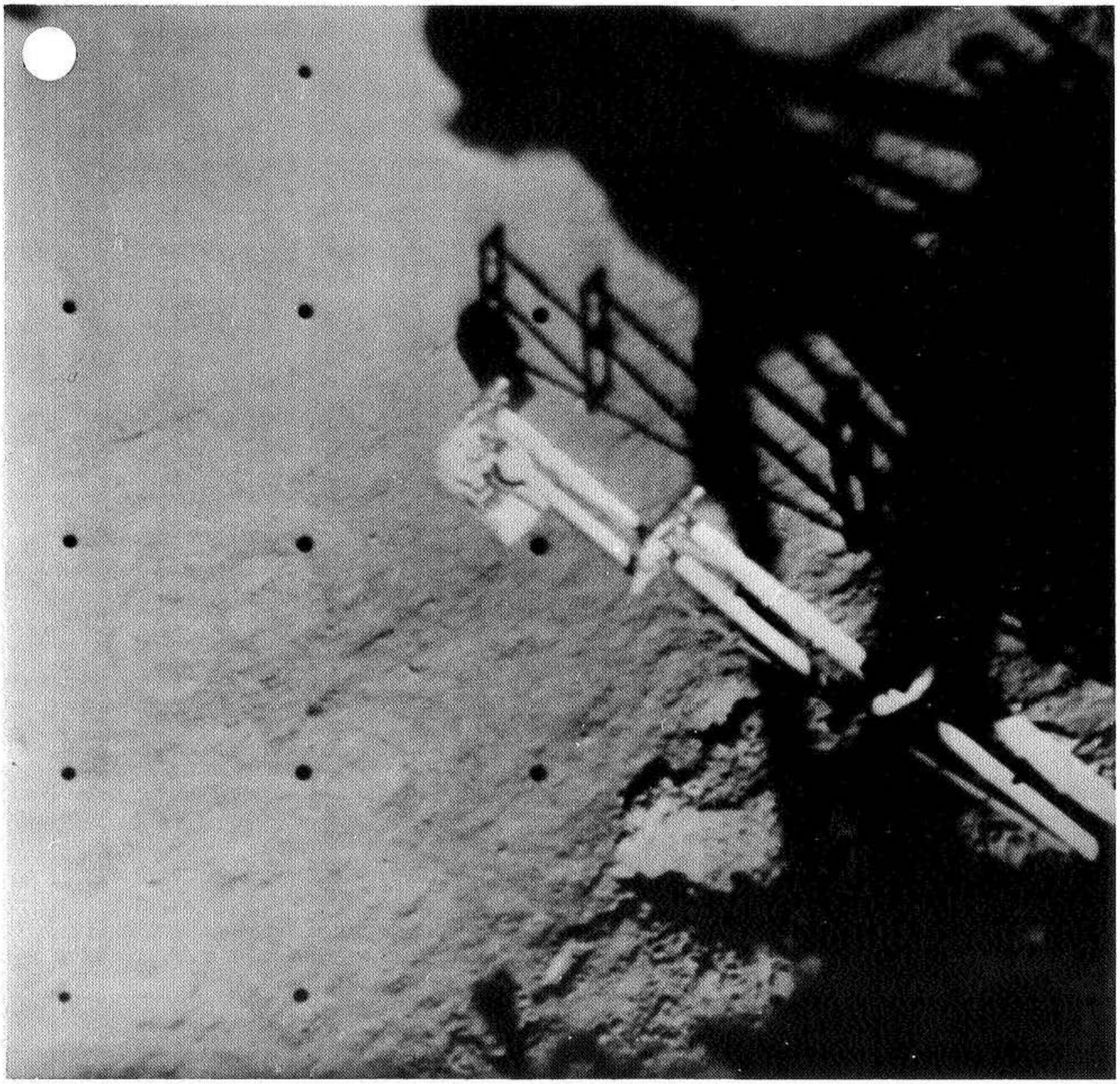




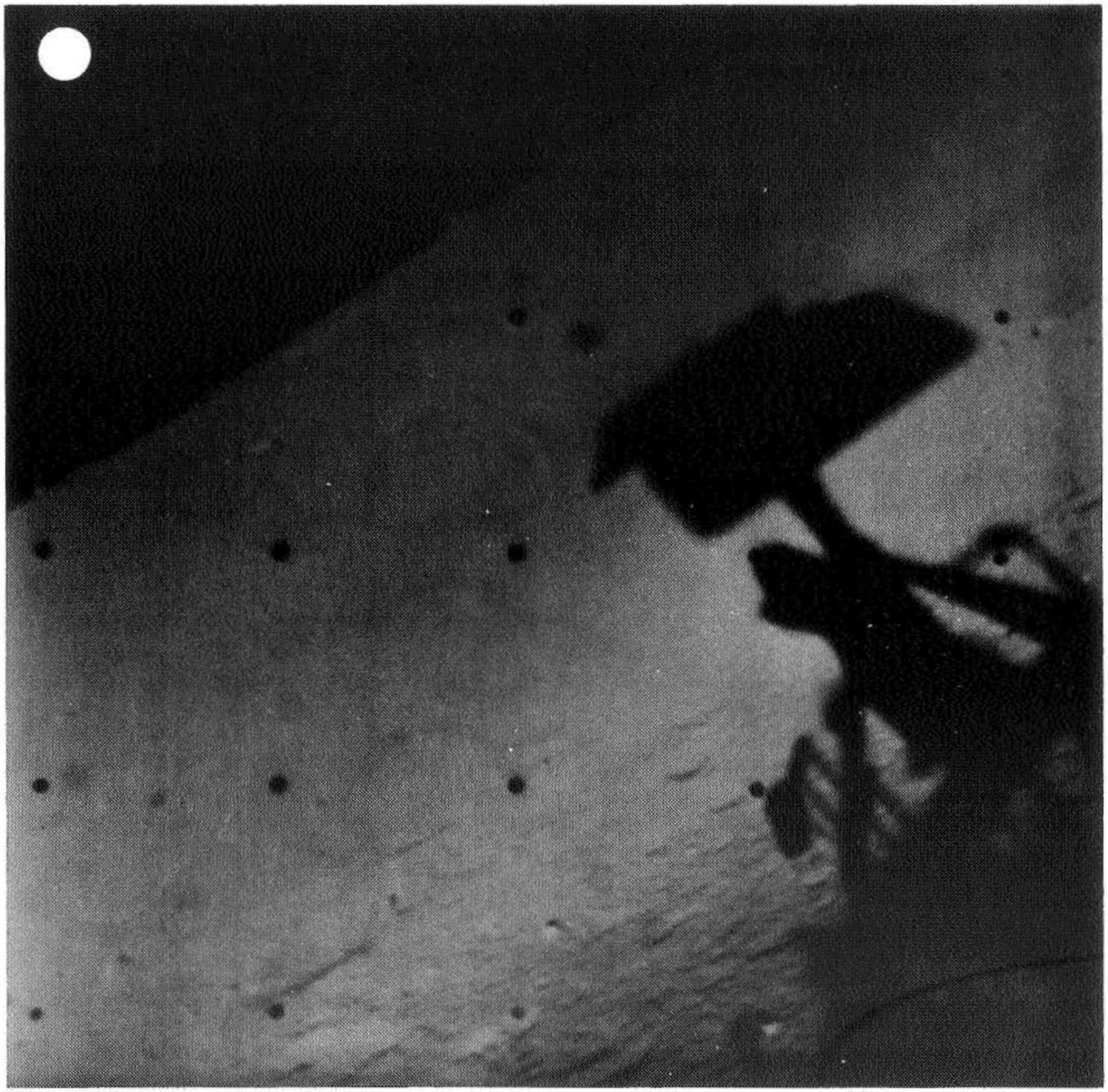
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(218)	Day 122, 13:05:11	—24	—42.90	2.7	f/5.5	N	Red



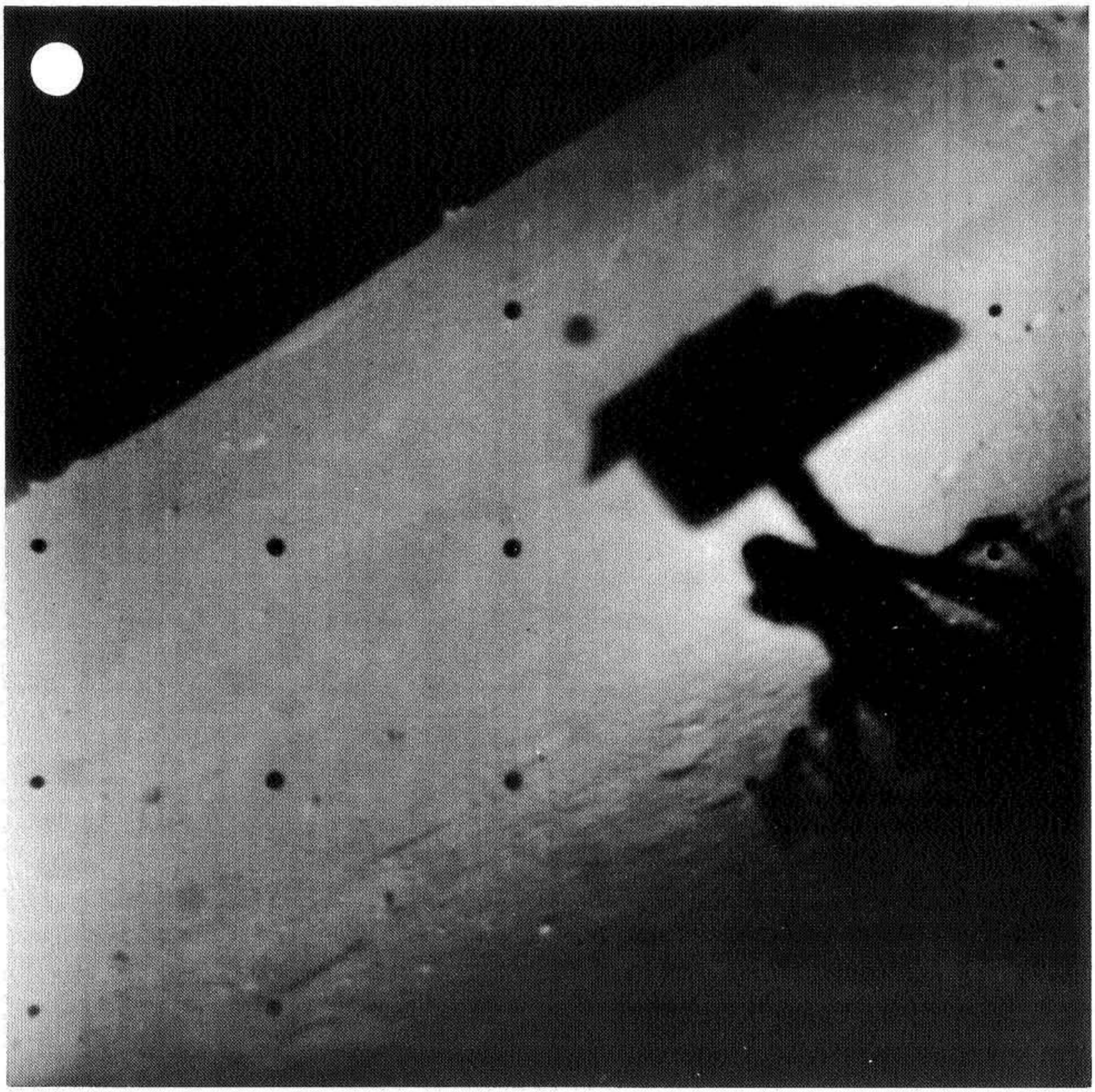
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(219)	Day 122, 13:52:27	—18	—42.90	2.7	f/5.5	N	Red



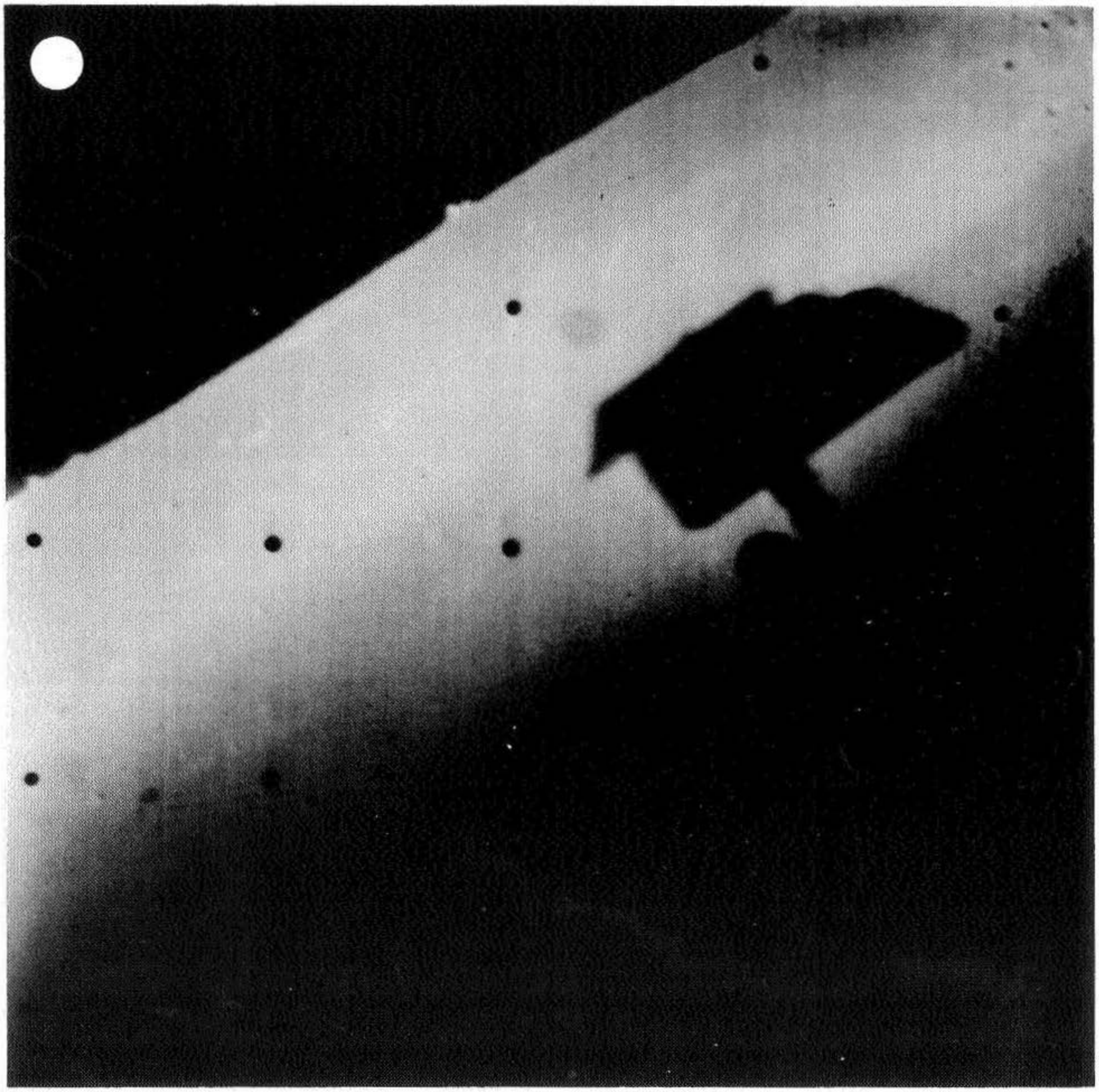
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(220)	Day 122, 14:17:04	—27	—37.94	2.7	f/5.5	W	Red



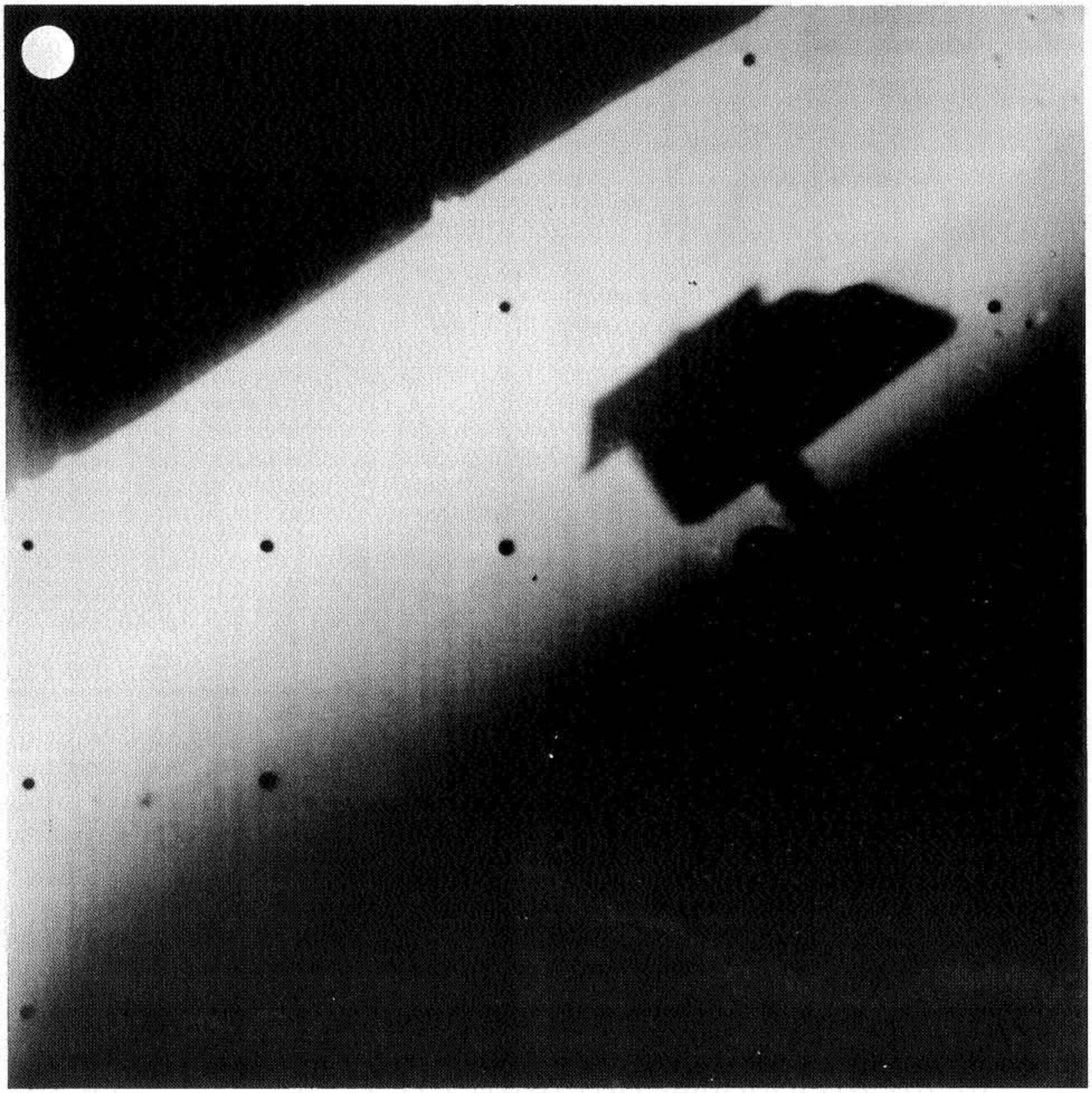
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(221)	Day 123, 17:15:38	—39	—13.14	29.9	f/5.5	W	Blue



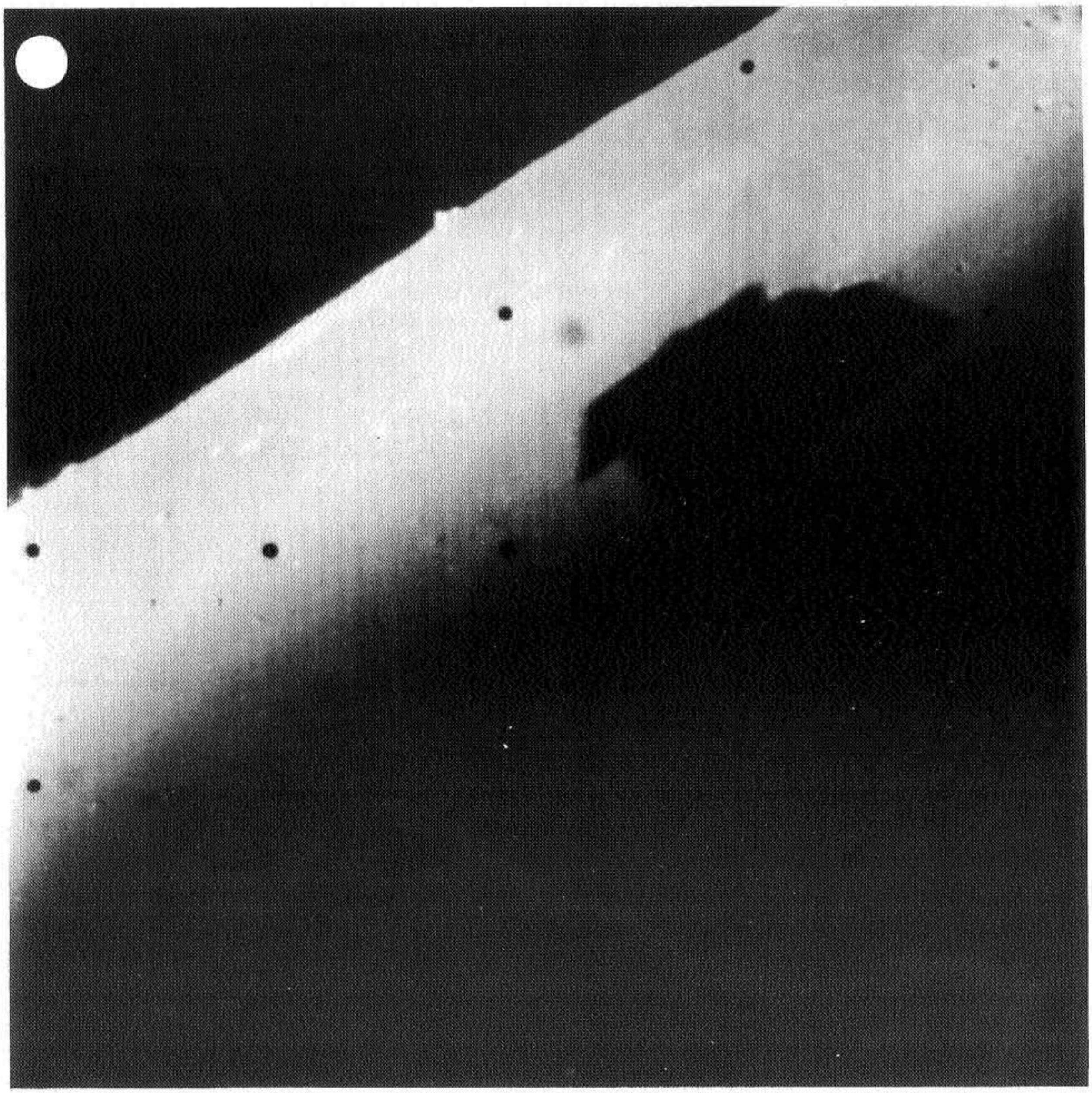
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(222)	Day 123, 17:37:14	—39	—13.14	30.0	f/5.5	W	Blue



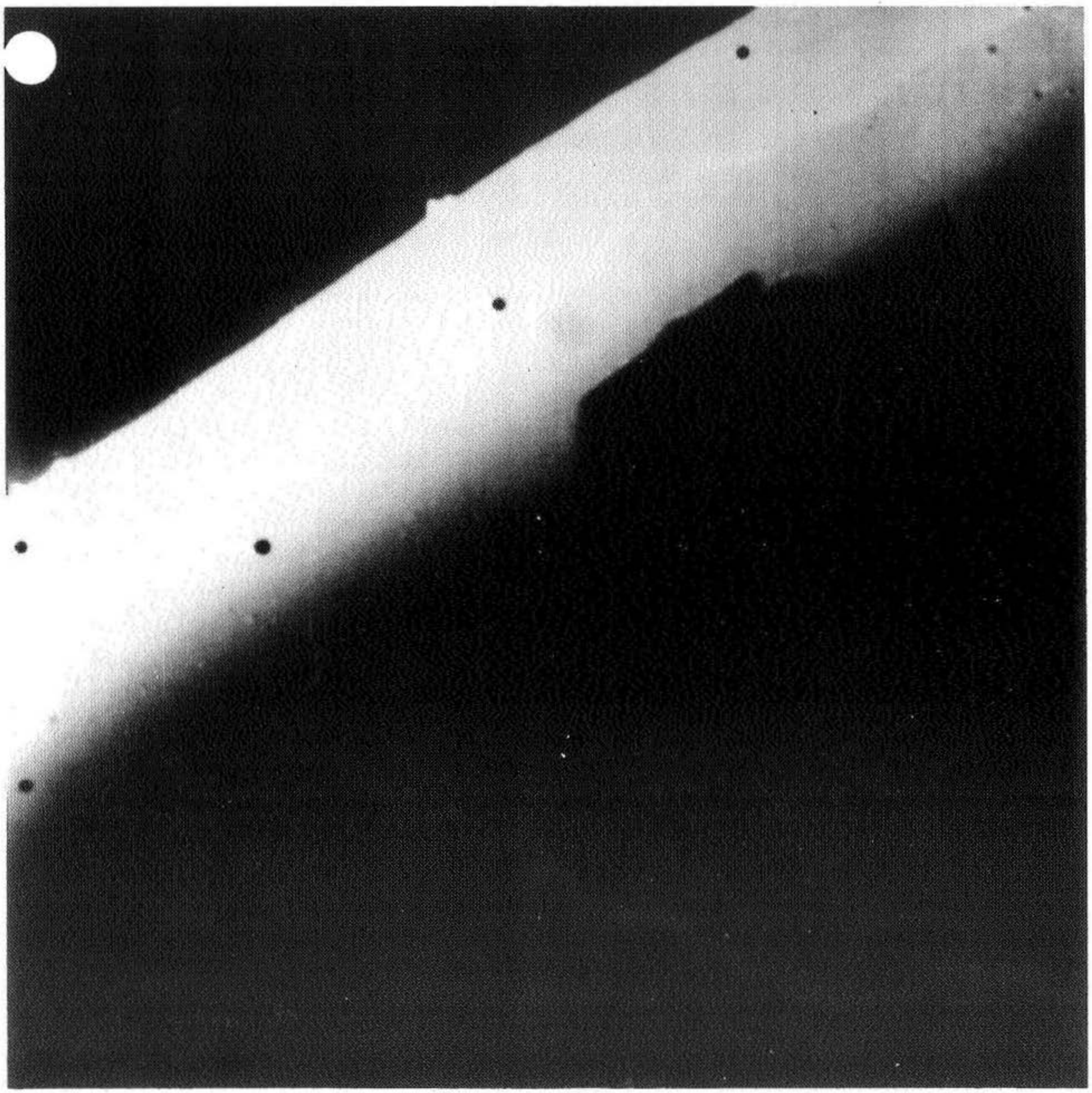
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(223)	Day 123, 18:03:01	−39	−13.14	30.0	$f/5.9$	W	Blue



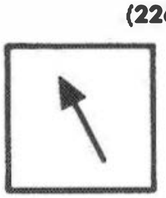
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(224)	Day 123, 18:10:30	—39	—13.14	29.9	f/3.9	W	Green

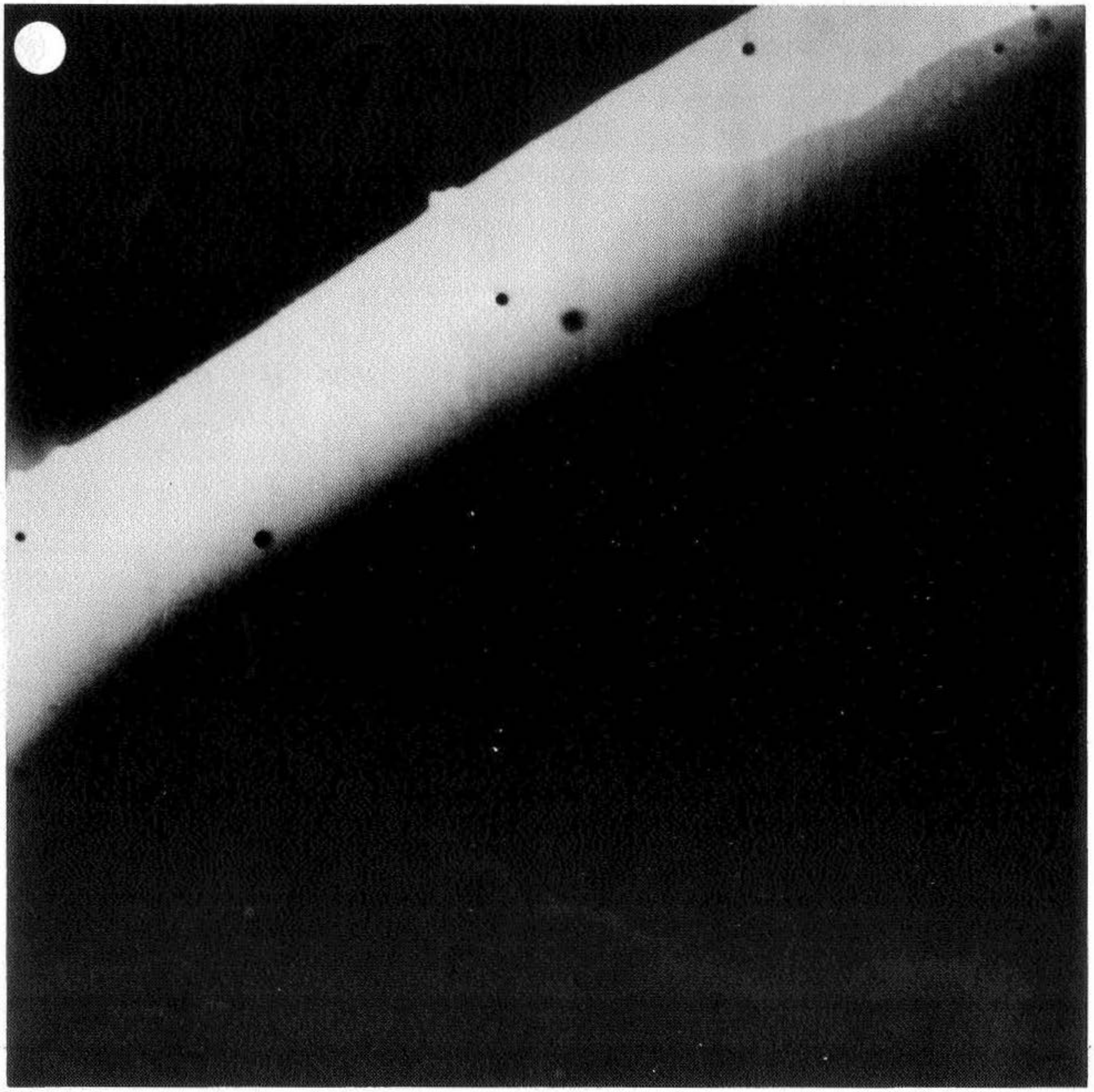


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(225)	Day 123, 18:12:58	—45	—13.14	30.0	f/5.8	W	Green

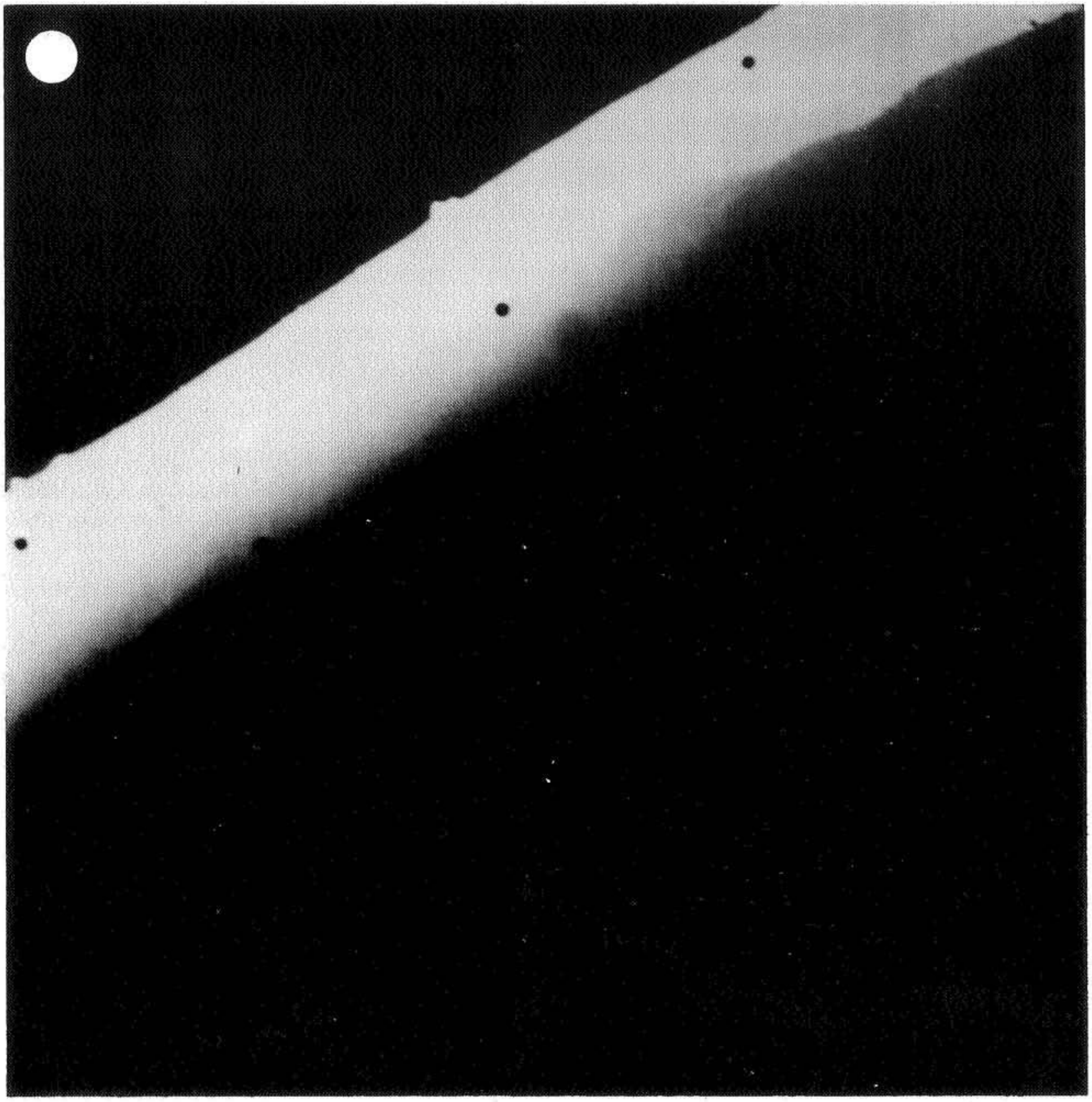


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(226)	Day 123, 18:31:59	—45	—13.14	30.0	f/3.9	W	Green

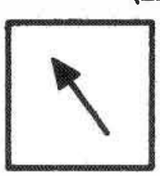


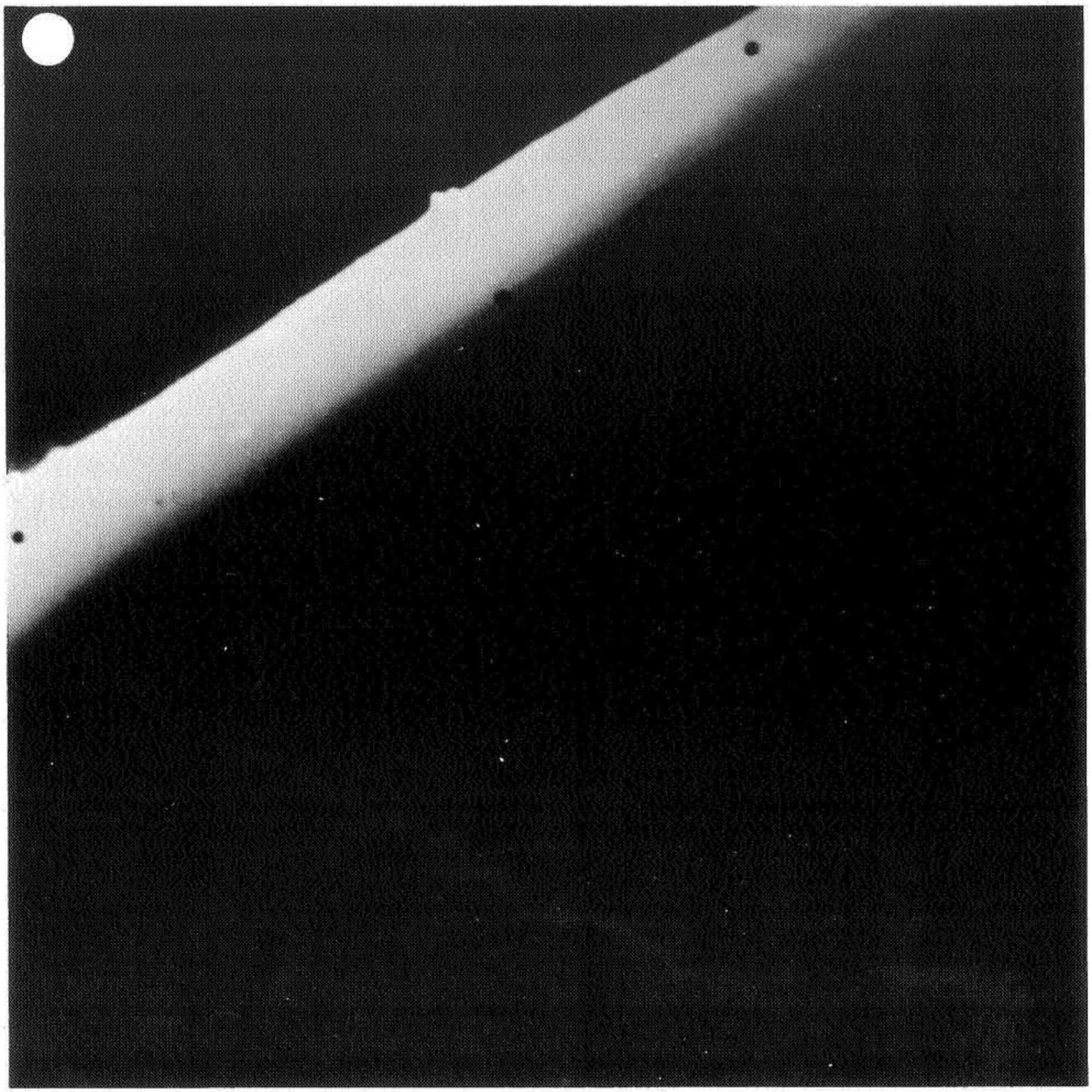


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(227)	Day 123, 18:48:40	—45	—13.14	22.5	f/7.9	W	Clear

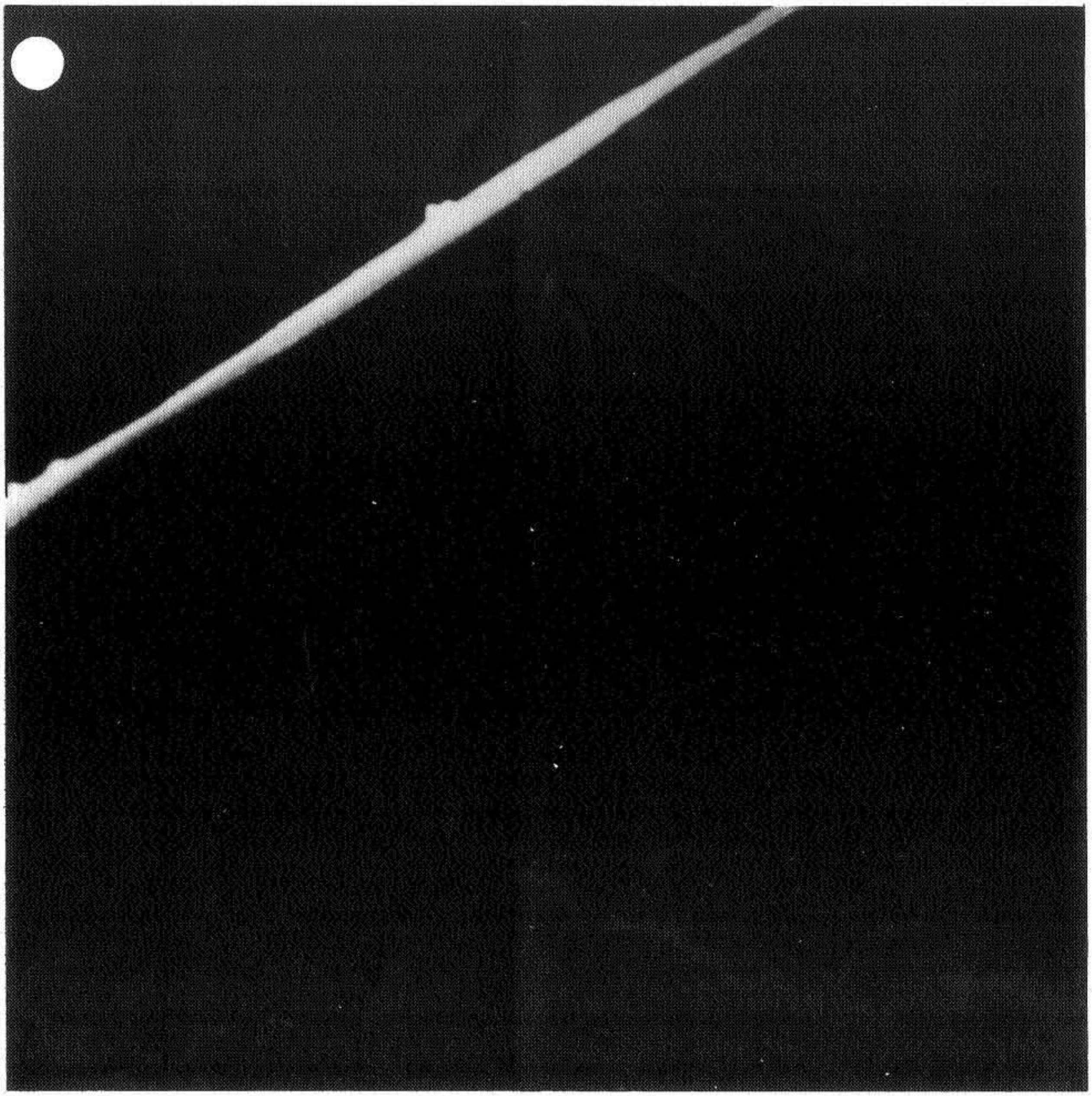


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(228)	Day 123, 18:51:27	—39	—13.14	30.1	f/3.9	W	Red

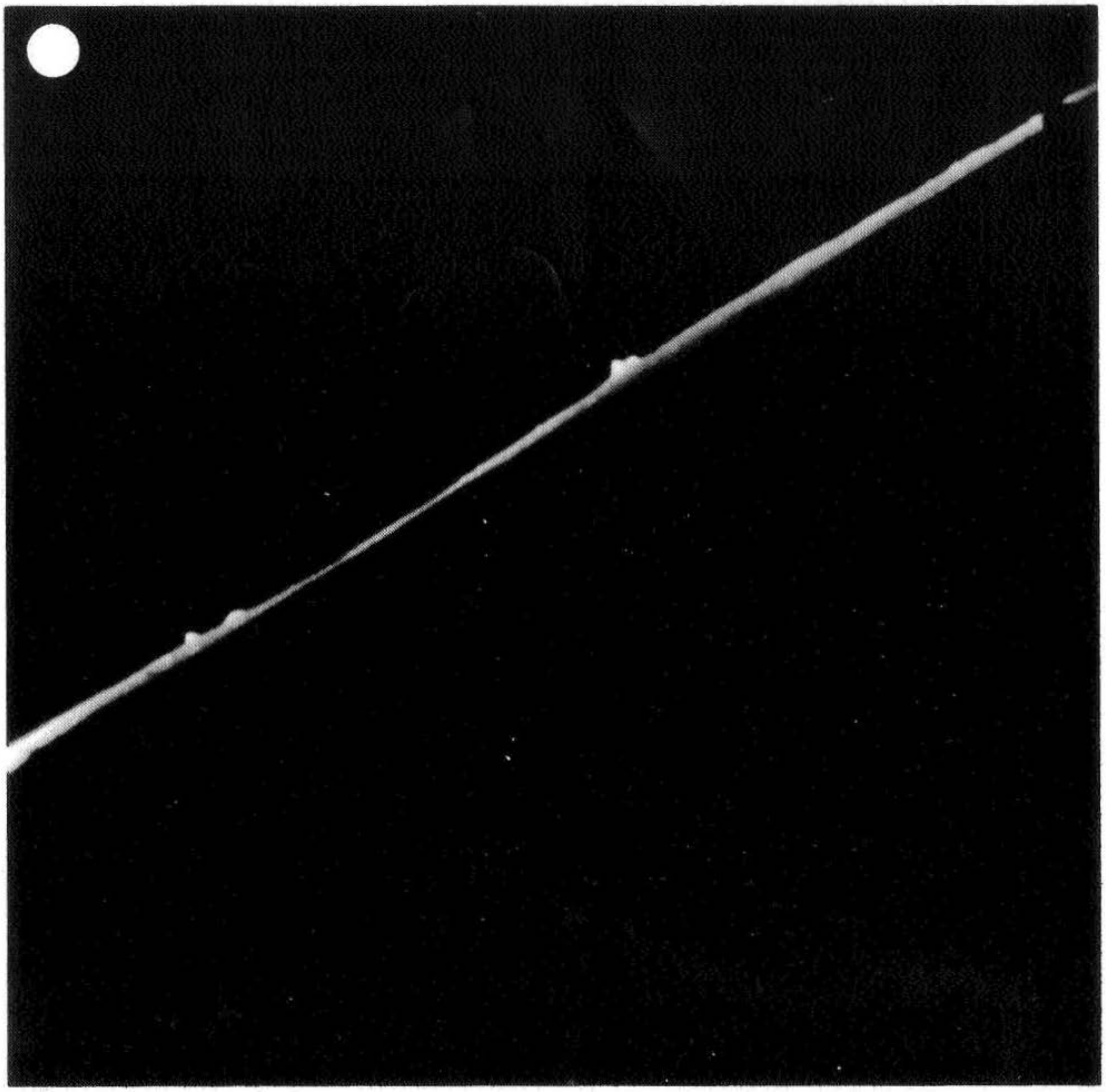




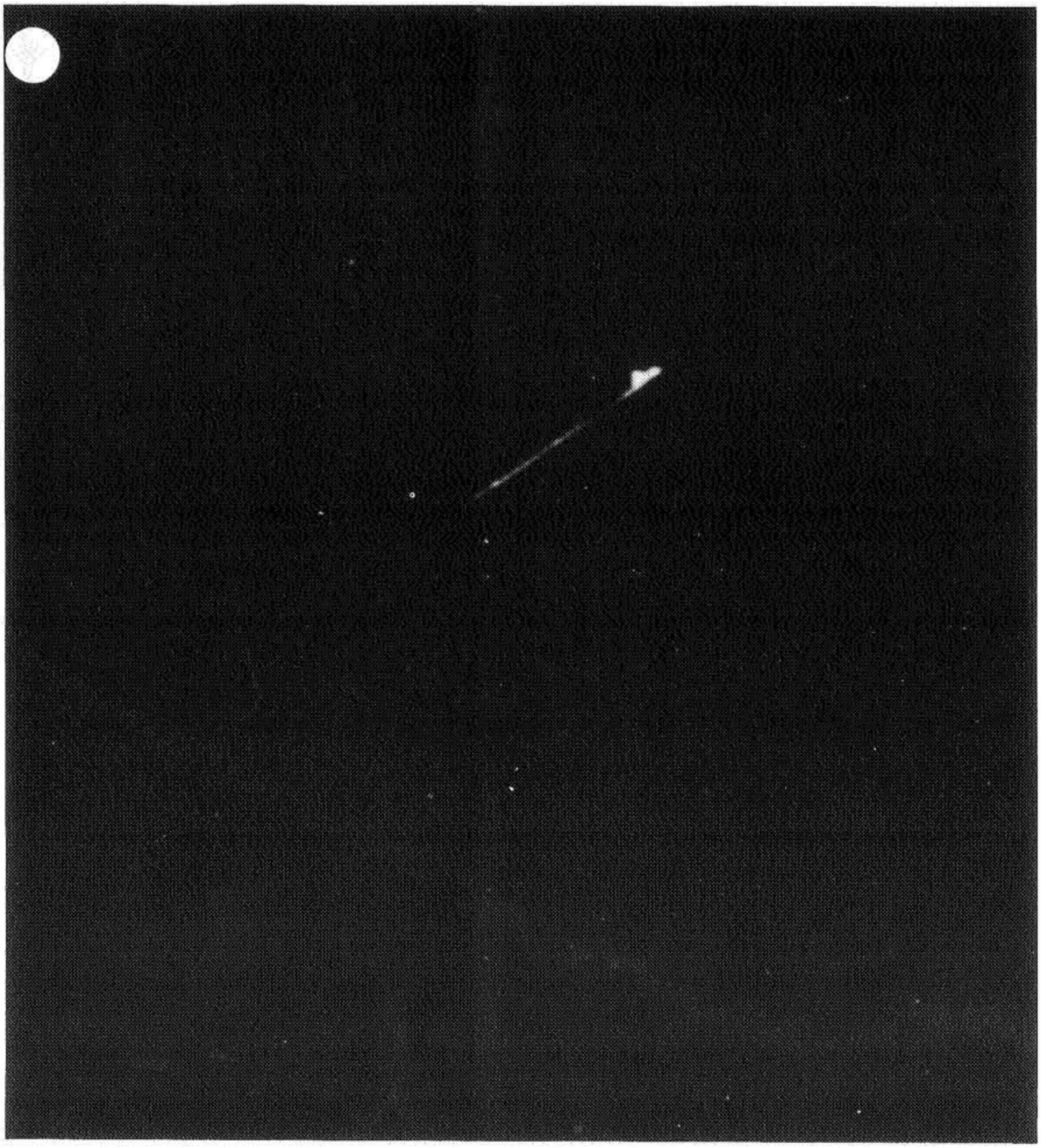
	GMT	Az	El	Focus, m	Iris	Lens	Filter
(229)	Day 123, 19:11:11	—39	—13.14	30.1	f/3.9	W	Red



	GMT	Az	El	Focus, m	Iris	Lens	Filter
(230)	Day 123, 20:08:40	—39	—13.14	30.1	f/3.9	W	Red

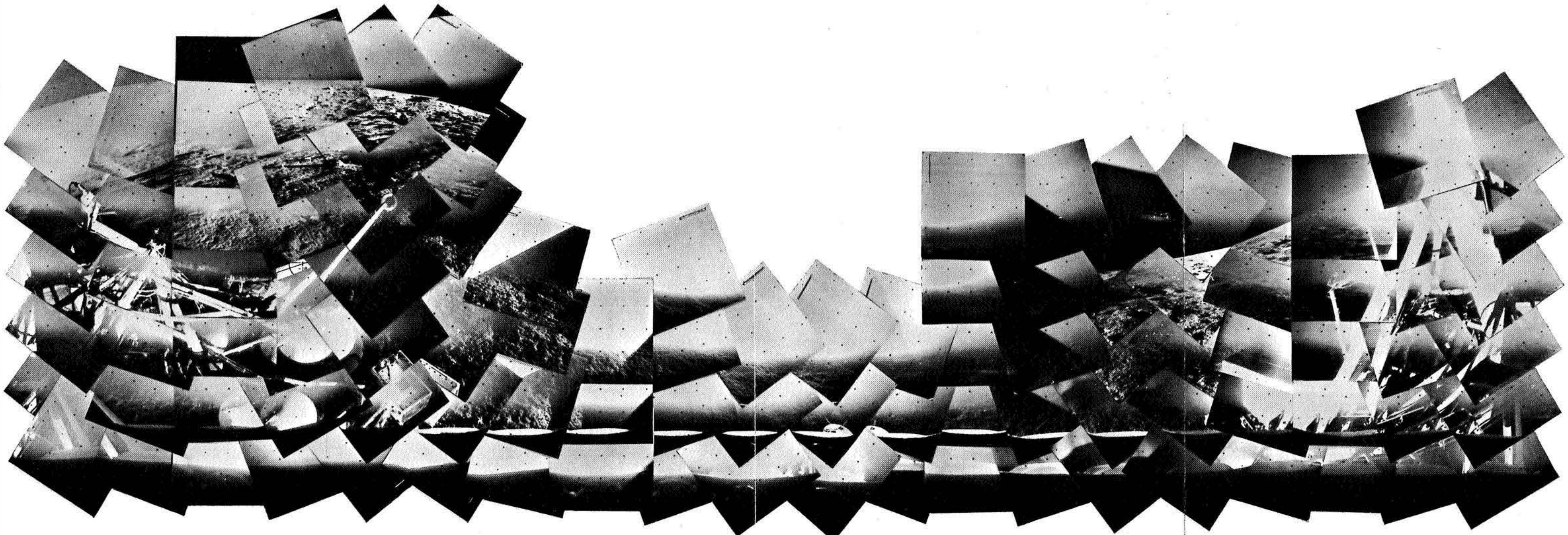


	GMT	Az	El	Focus, m	Iris	Lens	Filter
(231)	Day 123, 20:25:05	−39	−8.18	30.1	f/3.9	W	Red



	GMT	Az	El	Focus, m	Iris	Lens	Filter
(232)	Day 123, 20:55:46	—39	—8.18	30.1	f/8.1	W	Blue

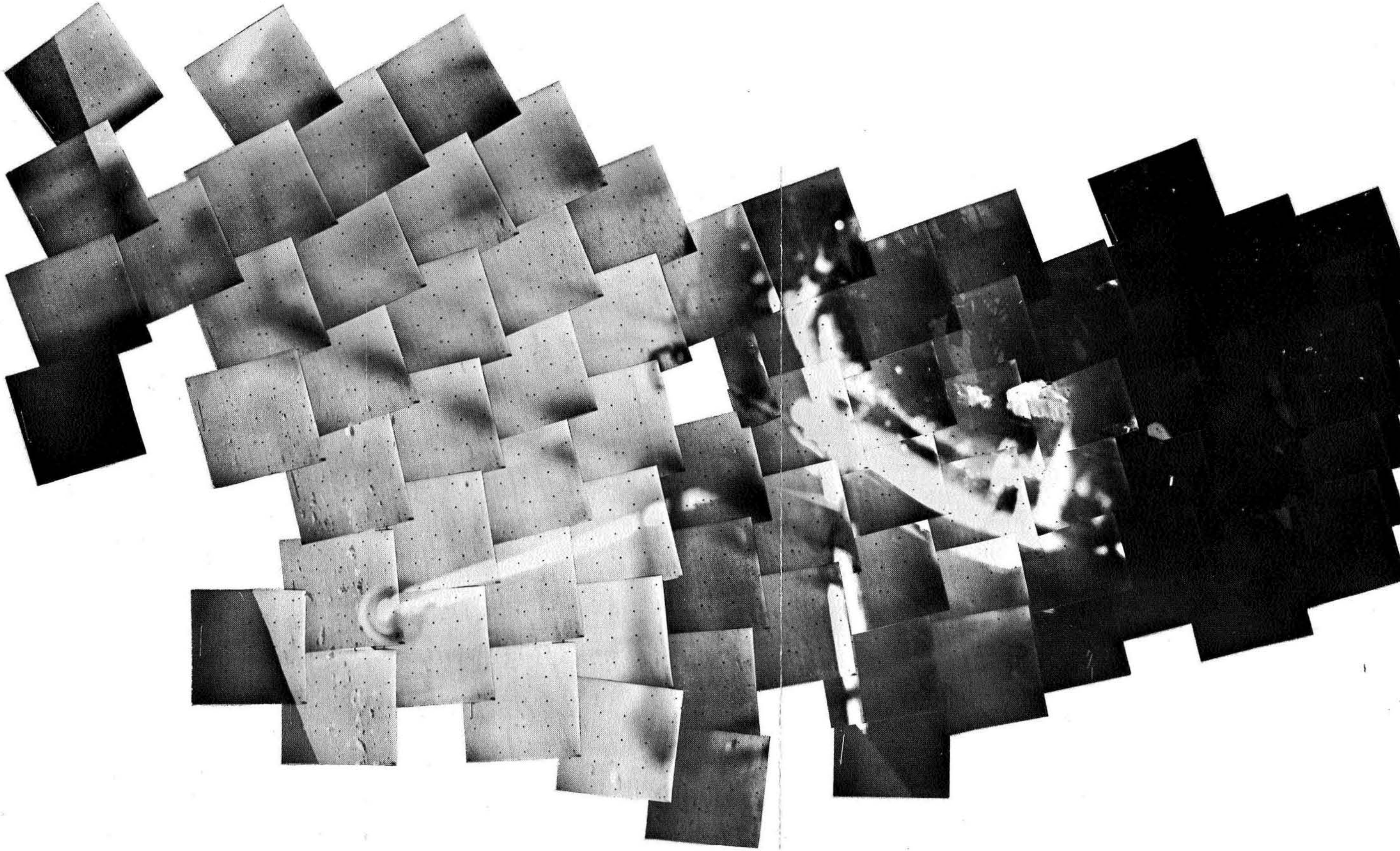
PRECEDING PAGE BLANK NOT FILMED.



		Azimuth	Lens focal length	Identification
(1)	Day 110	−222 to +132	Wide angle	Catalog No. 3-3-SI; semi-improved

FOLDOUT FRAME #1

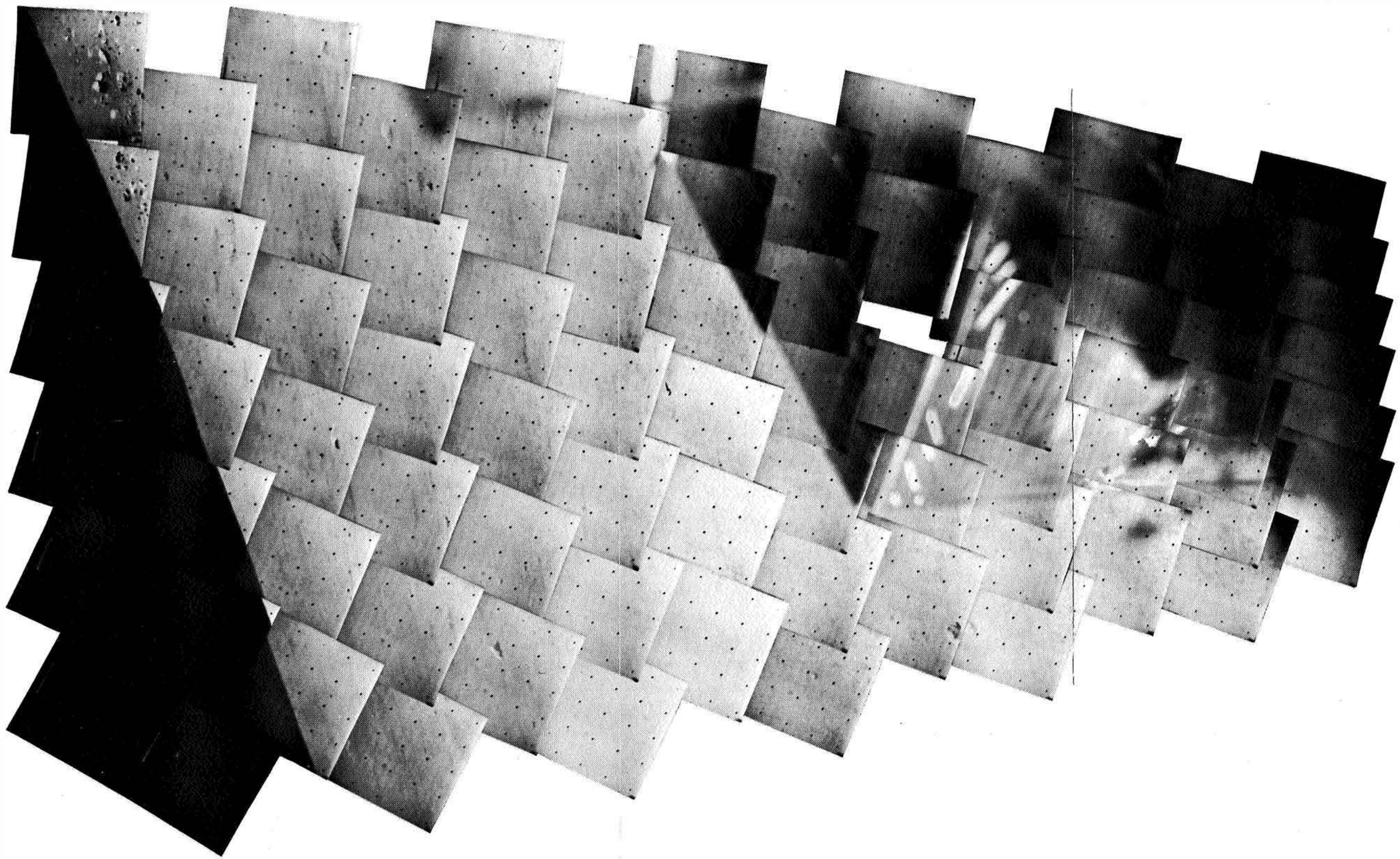
FOLDOUT FRAME #2



(2) Day 117 | Azimuth −213 to −180 | Lens focal length Narrow angle | Identification Catalog No. 3-32-Sl; semi-improved

FOLDOUT FRAME #1

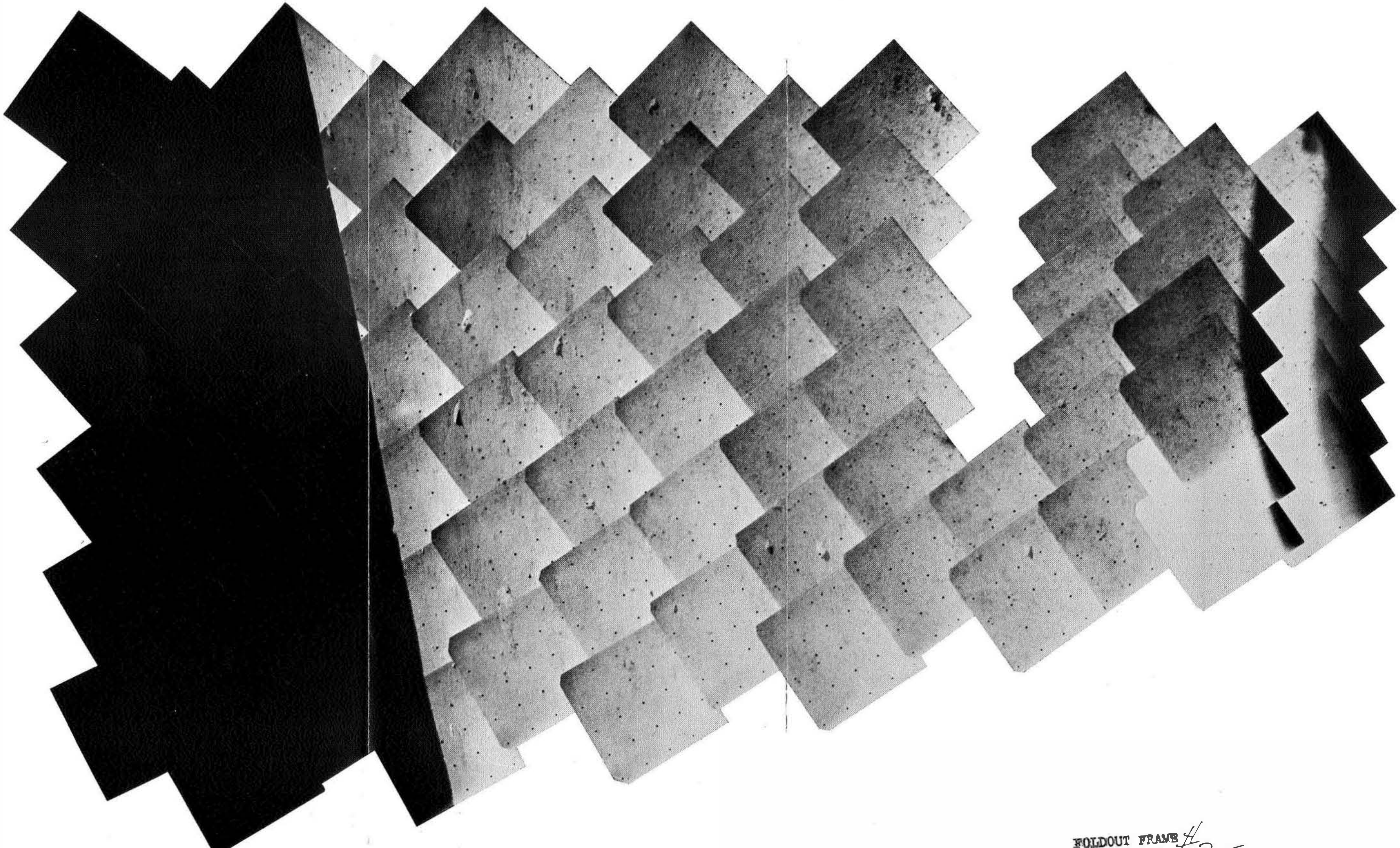
FOLDOUT FRAME #2



(3) Day 117 | Azimuth −180 to −144 | Lens focal length Narrow angle | Identification Catalog No. 3-33-SI; semi-improved

FOLDOUT FRAME #1

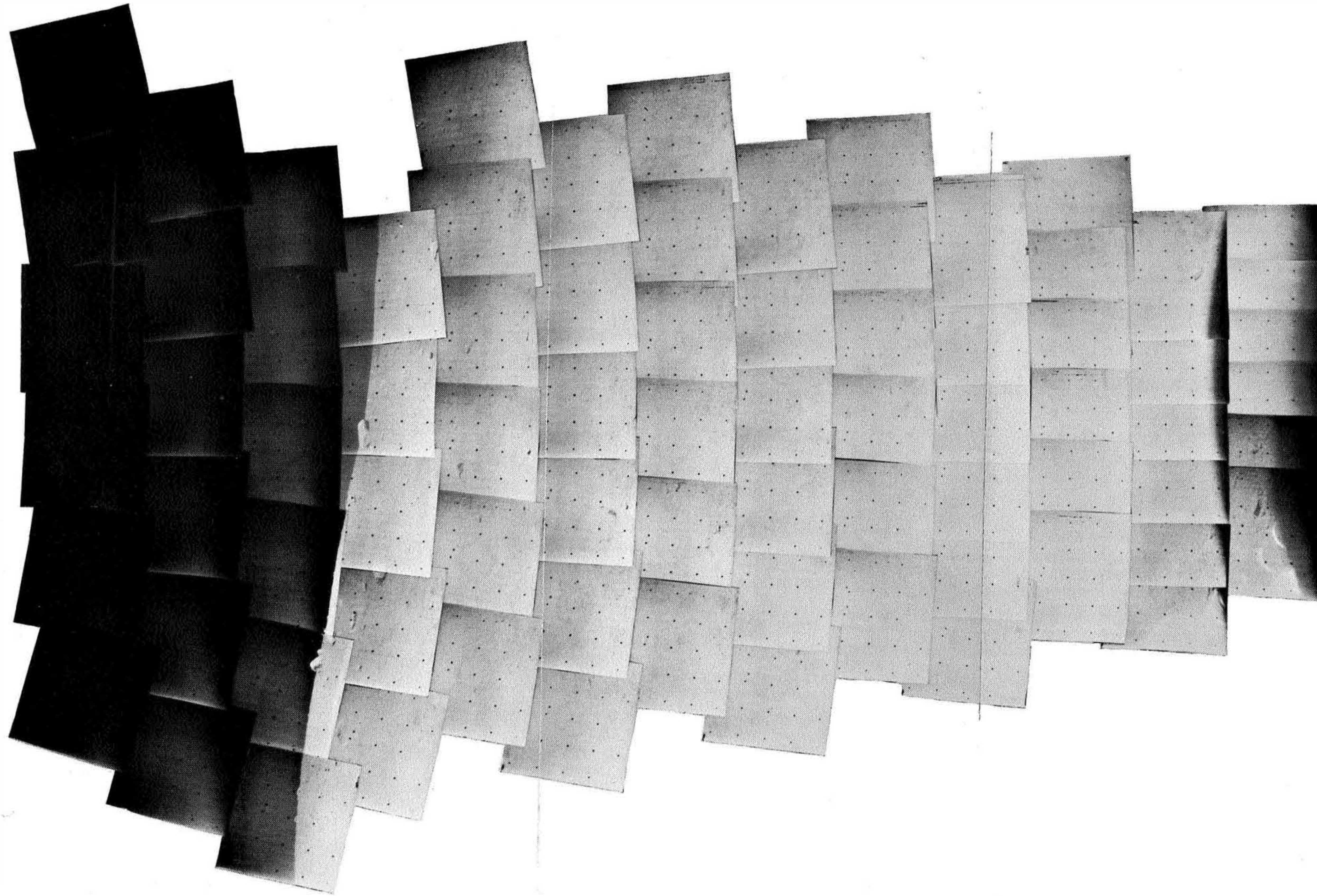
FOLDOUT FRAME #2



(4) Day 120 — Azimuth −144 to −108 — Lens focal length: Narrow angle — Identification: Catalog No. 3-65-SI; semi-improved

FOLDOUT FRAME #1

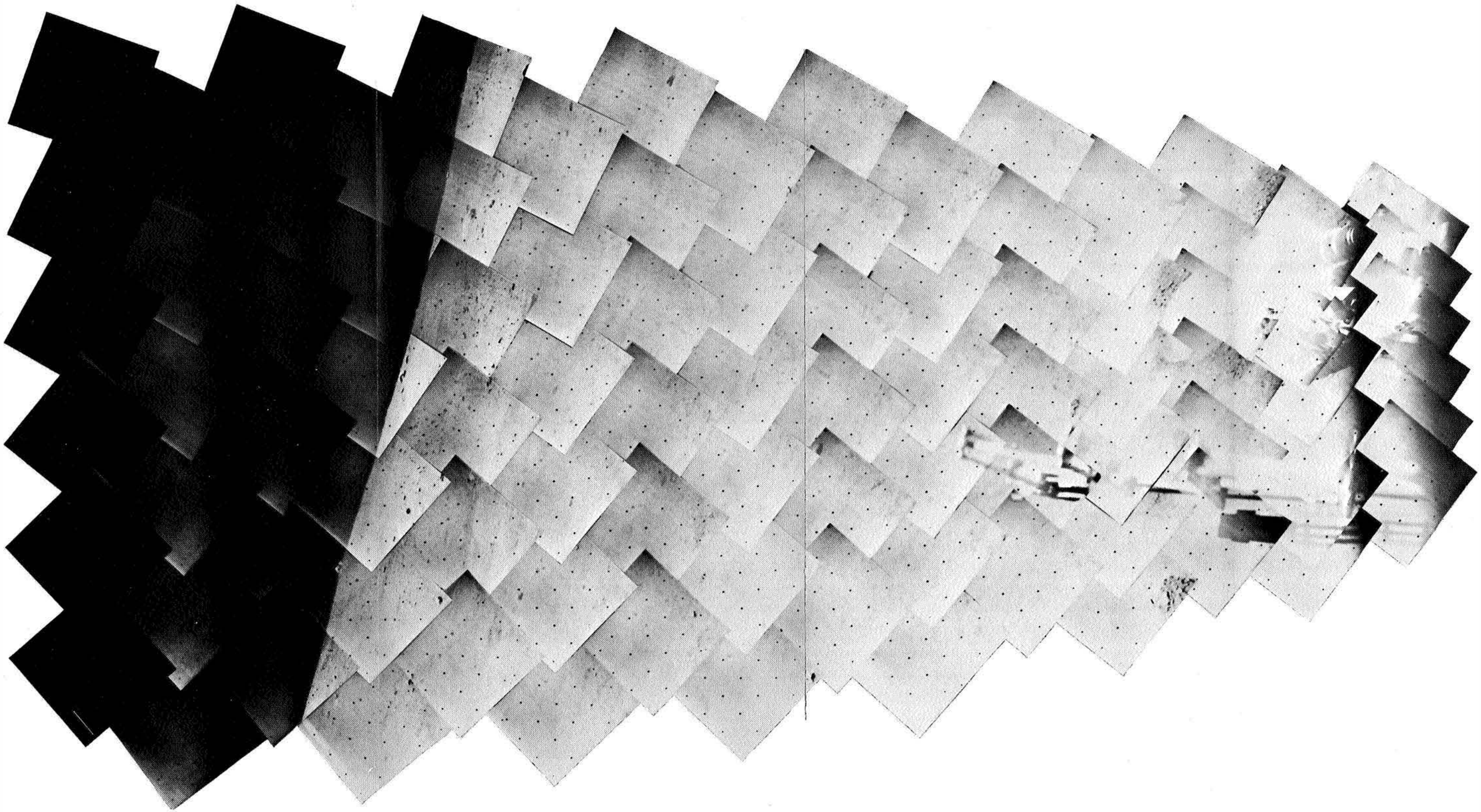
FOLDOUT FRAME #2



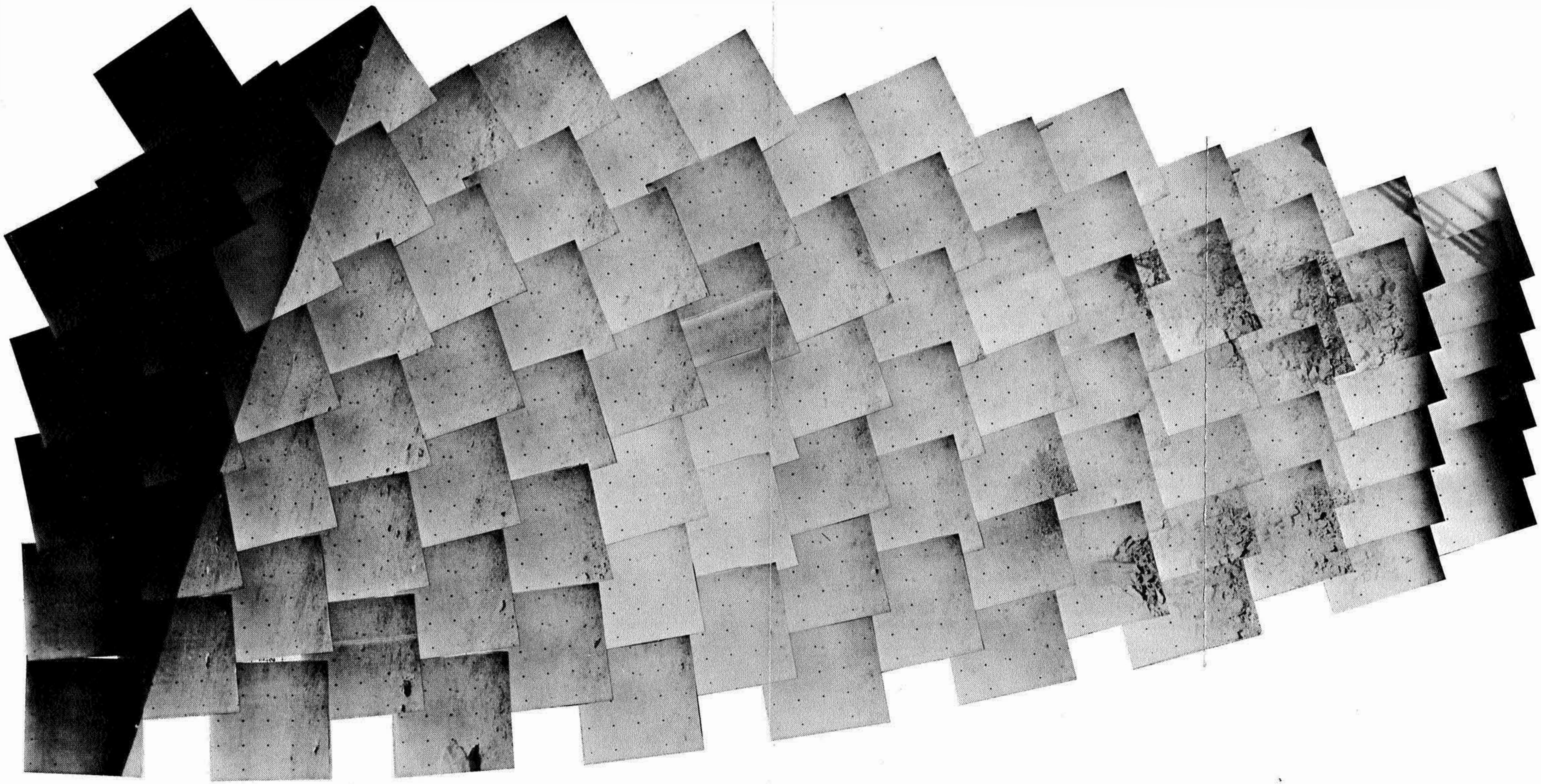
(5) Day 118 Azimuth −108 to −72 Lens focal length Narrow angle Identification Catalog No. 3-48-SI; semi-improved

FOLDOUT FRAME #1

FOLDOUT FRAME #2



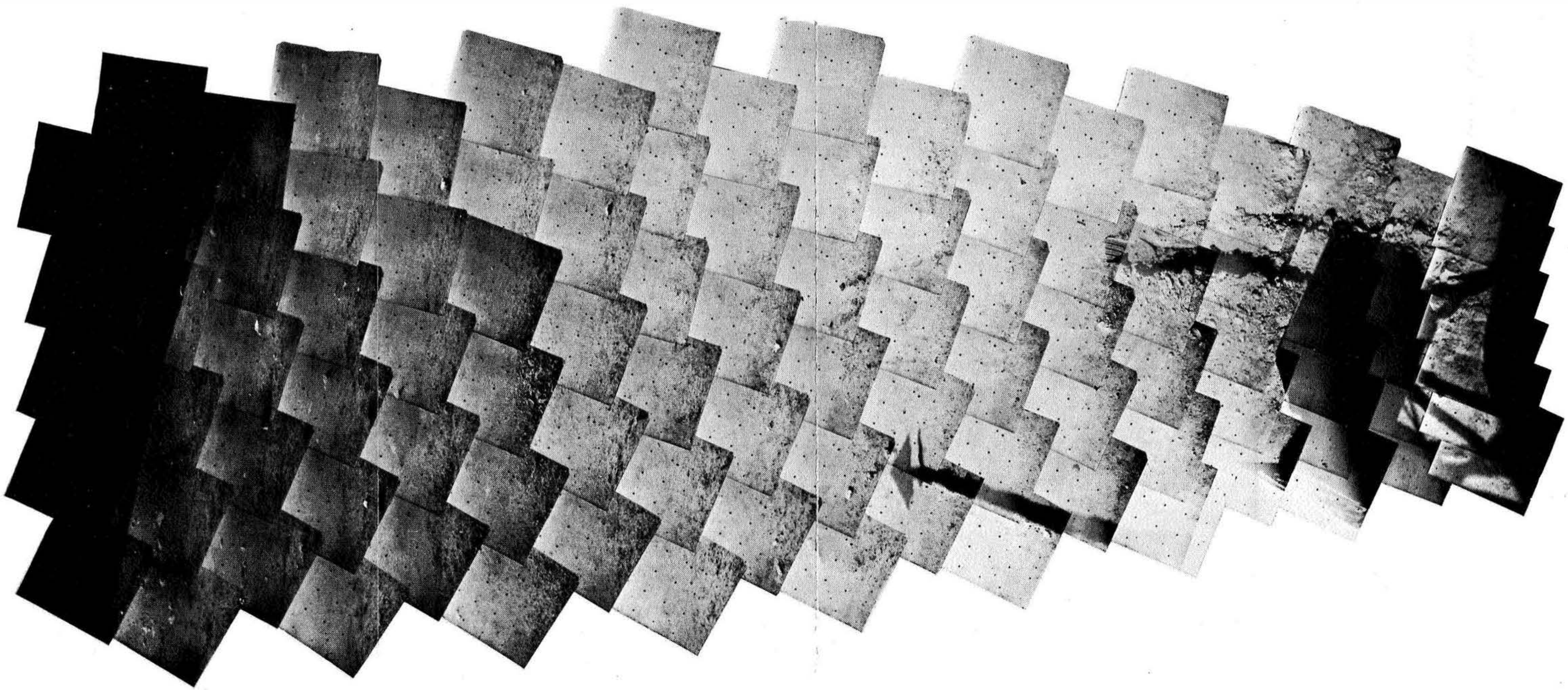
(6) Day 117 | Azimuth −72 to −36 | Lens focal length Narrow angle | Identification Catalog No. 3-37-SI; semi-improved



(7) Day 117 Azimuth —36 to 0 Lens focal length Narrow angle Identification Catalog No. 3-38-Sl; semi-improved

FOLDOUT FRAME #1

FOLDOUT FRAME #2



(8) Day 120 | Azimuth 0 to +36 | Lens focal length Narrow angle | Identification Catalog No. 3-76-SI; semi-improved

FOLDOUT FRAME #1

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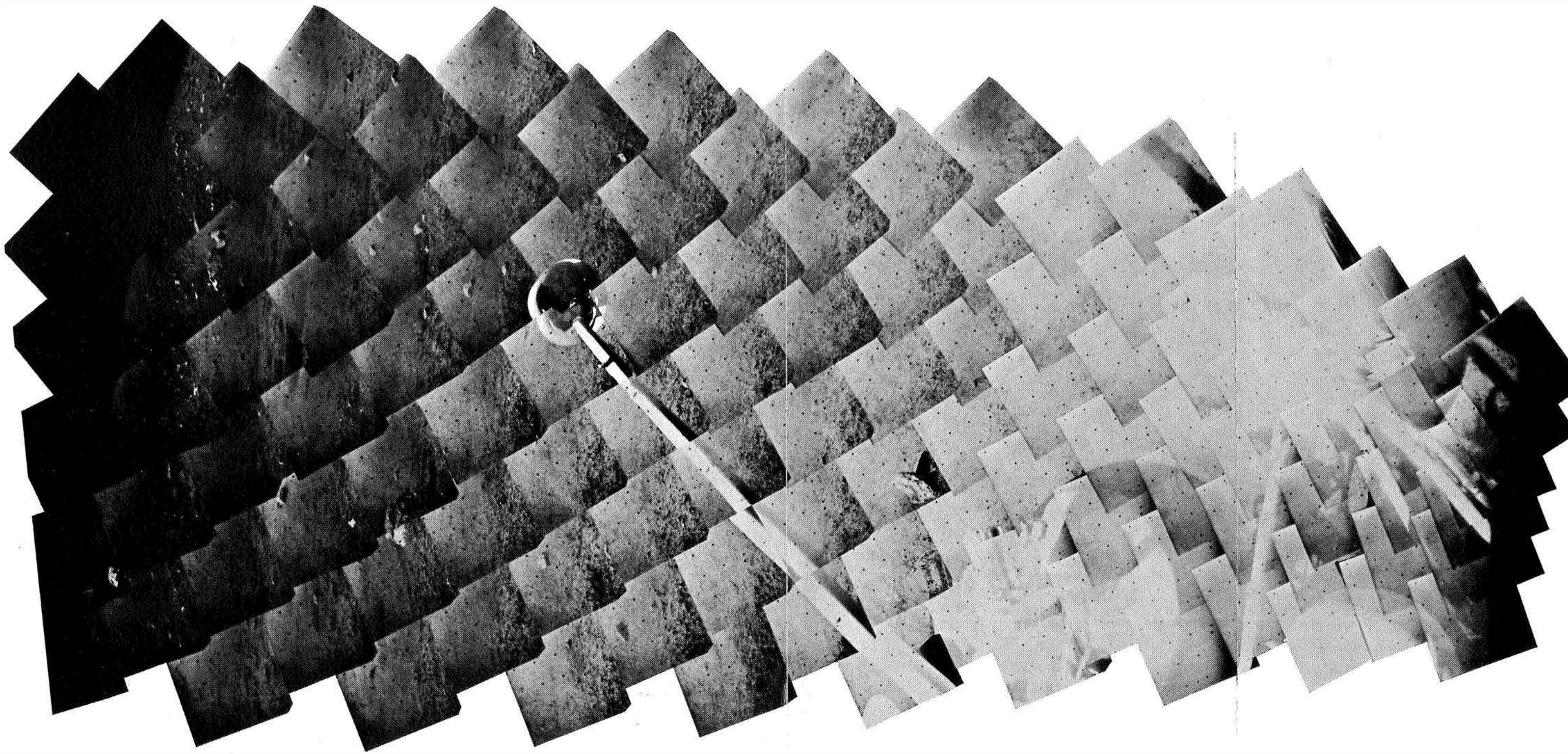
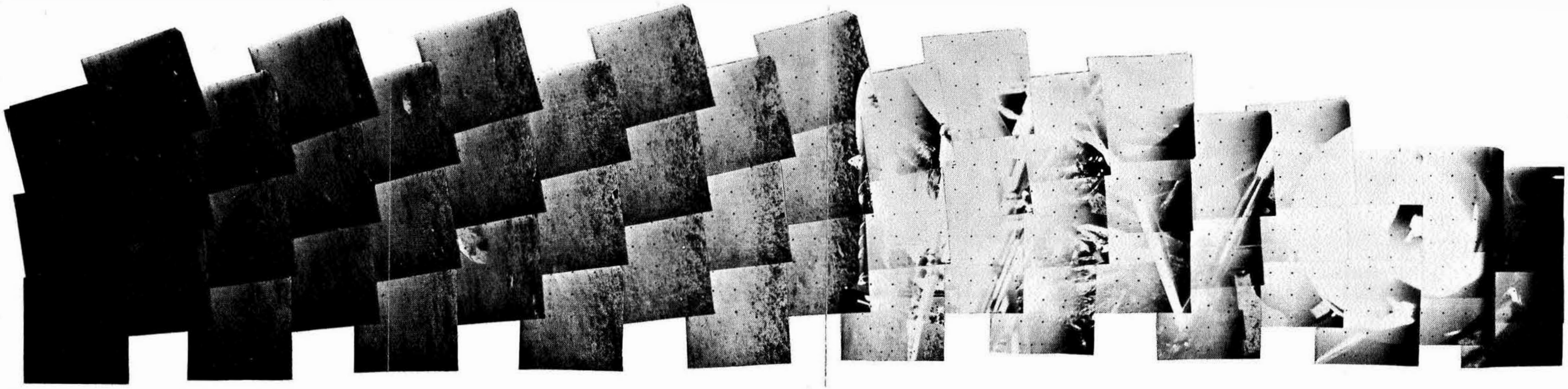


(9) Day 120 | Azimuth +36 to +72 | Lens focal length Narrow angle | Identification Catalog No. 3-78-SI; semi-improved

FOLDOUT FRAME #1

FOLDOUT FRAME #2



(10) Day 120

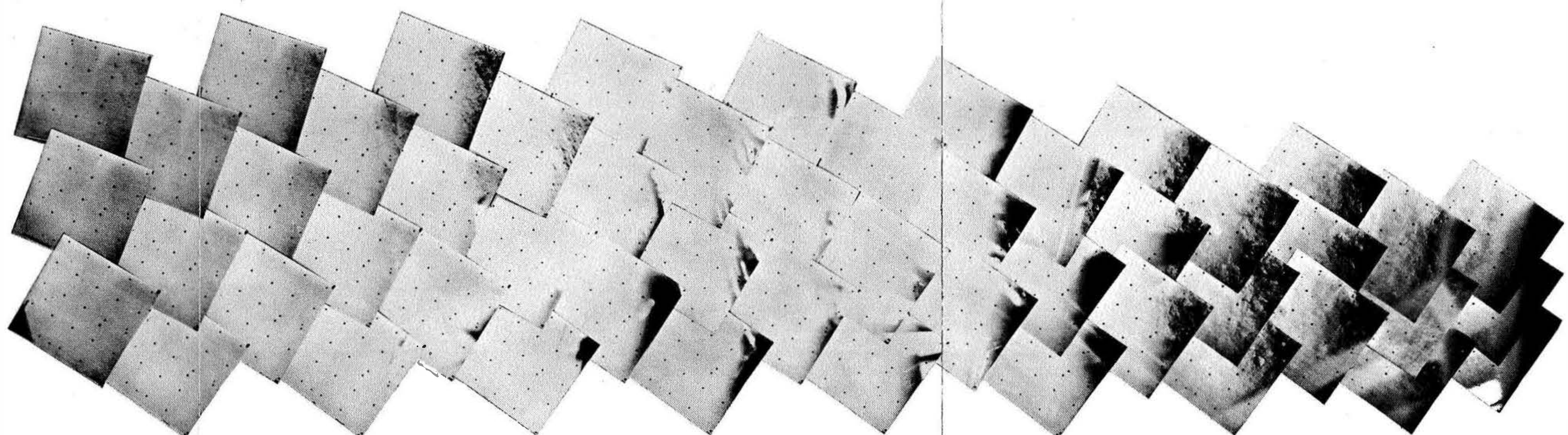
Azimuth +72 to +90

Lens focal length Narrow angle

Identification Catalog No. 3-79-SI; semi-improved

FOLDOUT FRAME #2

FOLDOUT FRAME #1



(11) Day 111

Azimuth +108 to +126

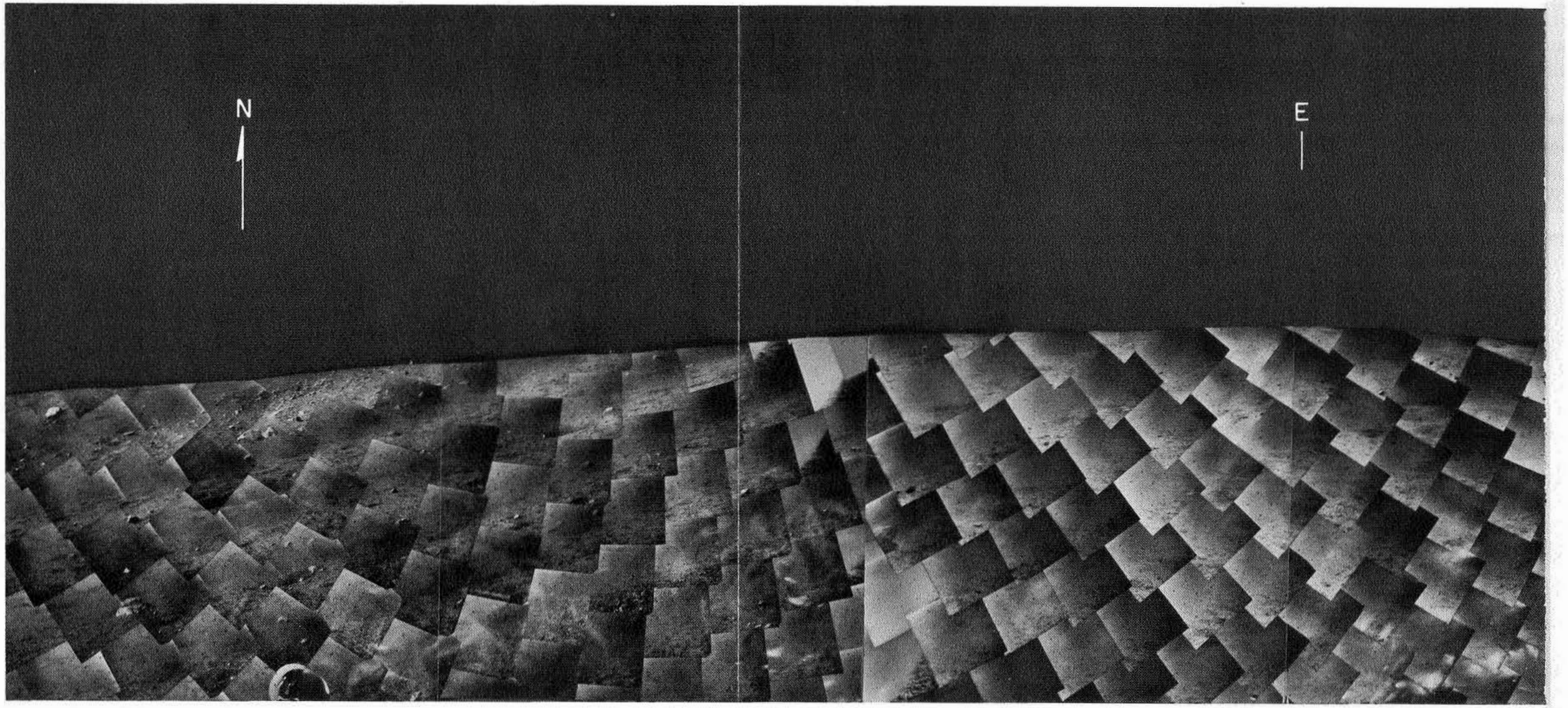
Lens focal length Narrow angle

Identification Catalog No. 3-14-Sl; semi-improved

FOLDOUT FRAME #1

FOLDOUT FRAME #2

FOLDOUT FRAME

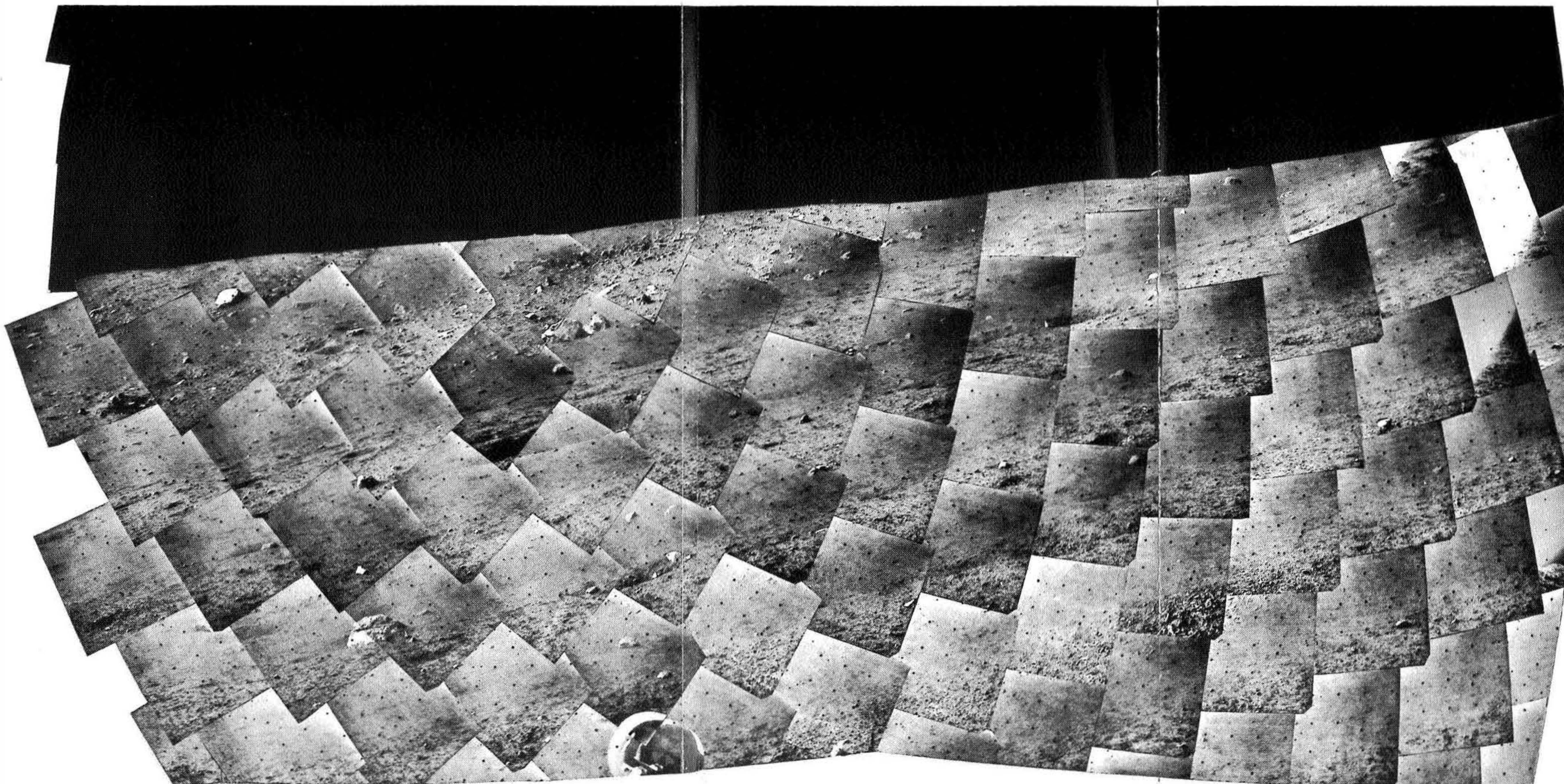


(12)	Azimuth	Lens focal length	Identification
	+195 to +72	Narrow angle	Catalog No. 3-SE-2-SI; 3-SE-3-SI; 3-SE-4-SI; 3-SE-5-SI; 3-SE-6-SI; 3-SE-7-SI; 3-SE-8-SI; and 3-SE-9-SI; semi-improved

Elements of spherical mosaics, rephotographed to a rectangular coordinate system. The horizon variation is the result of the near and far rim (above the local level) for the crater in which the spacecraft landed.

FOLDOUT FRAME # 2

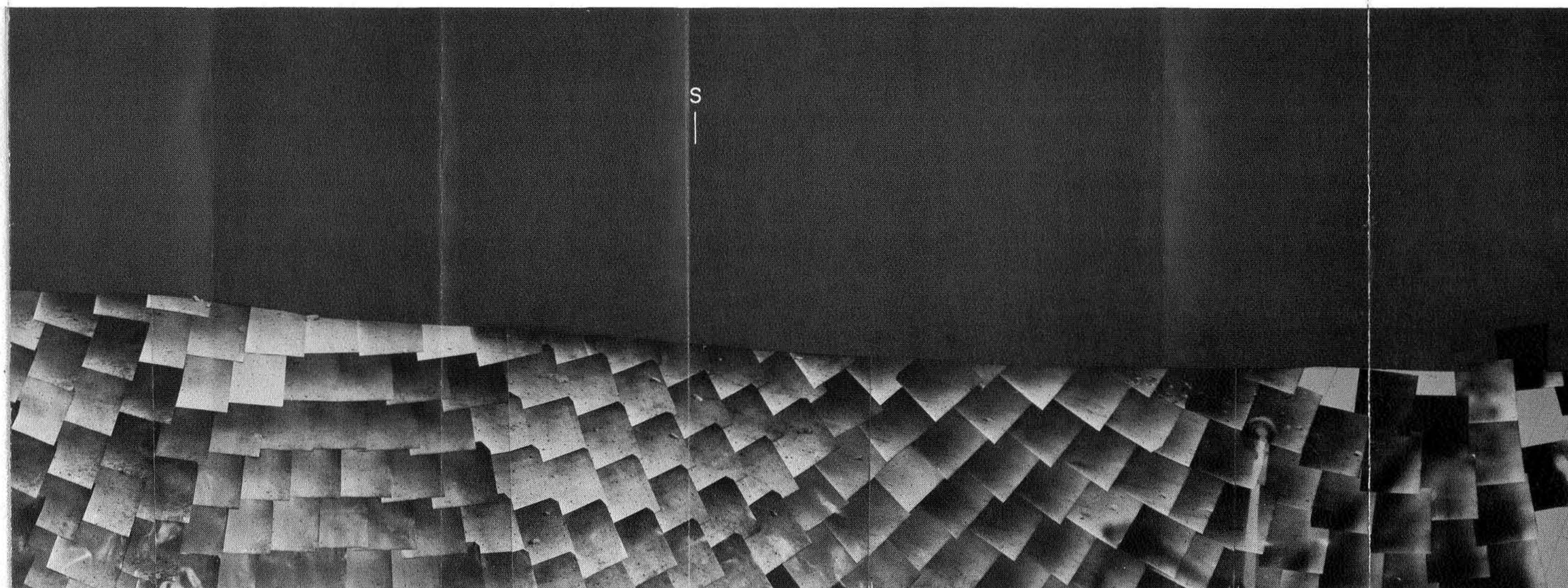
FOLDOUT FRAME # 1



(13)	Day 120	Azimuth	Lens focal length	Identification
		0 to +72	Narrow angle	Catalog No. 3-SE-1-SI; semi-improved

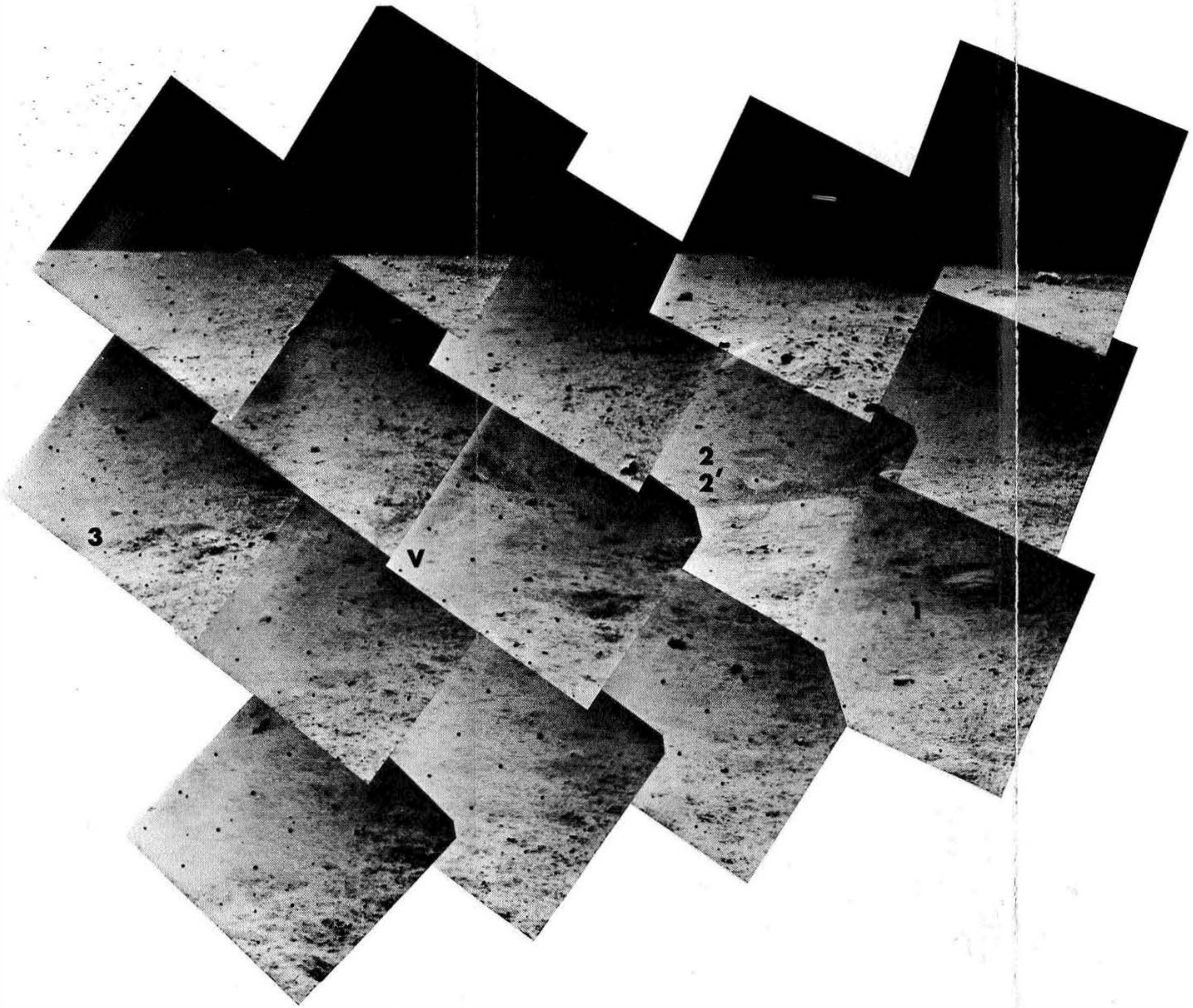
FOLDOUT FRAME #1

FOLDOUT FRAME #2



FOLDOUT FRAME #3

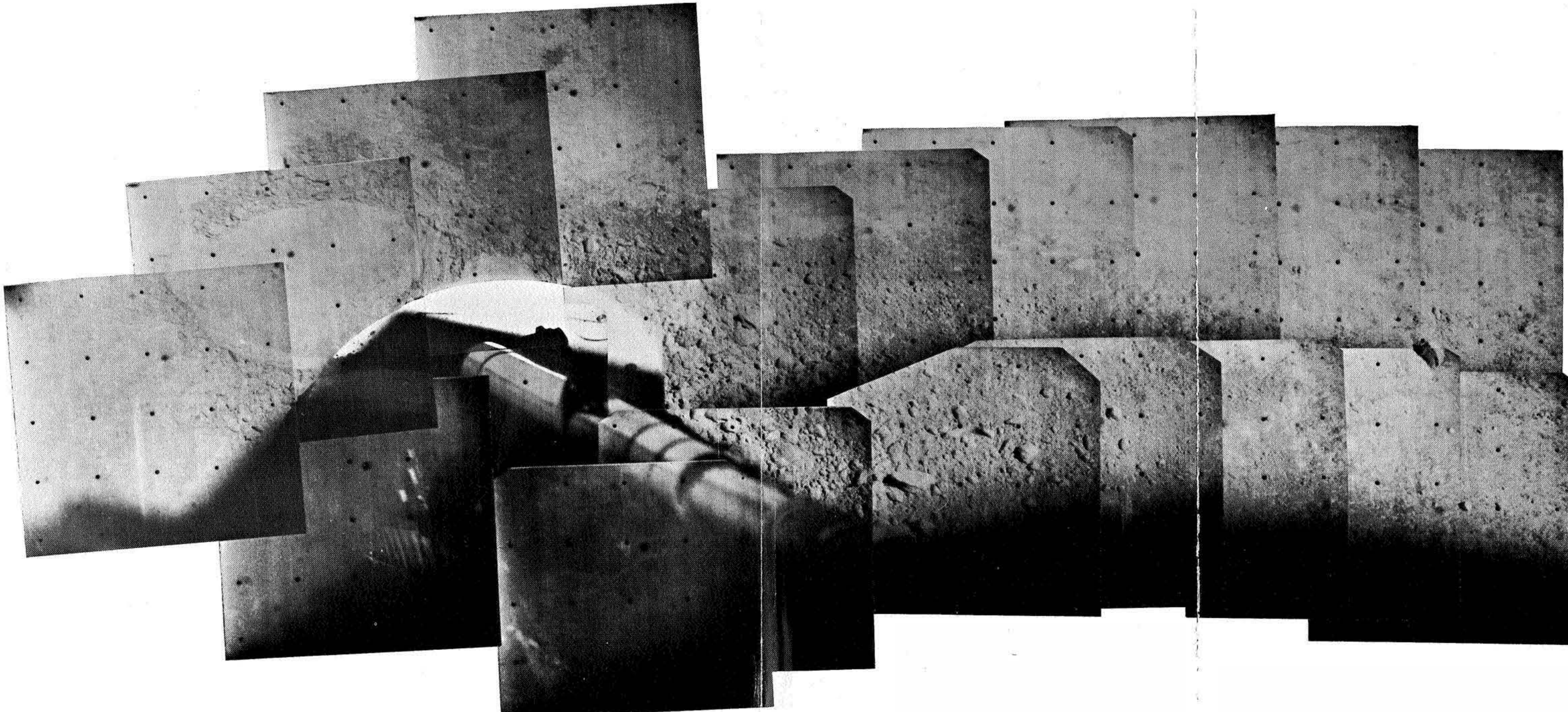
FOLDOUT FRAME #4



	Azimuth	Lens focal length	Identification
(14) Day 116	—48 to —30	Narrow angle	Area of second bounce during landing; semi-improved

FOLDOUT FRAME #1

FOLDOUT FRAME #2

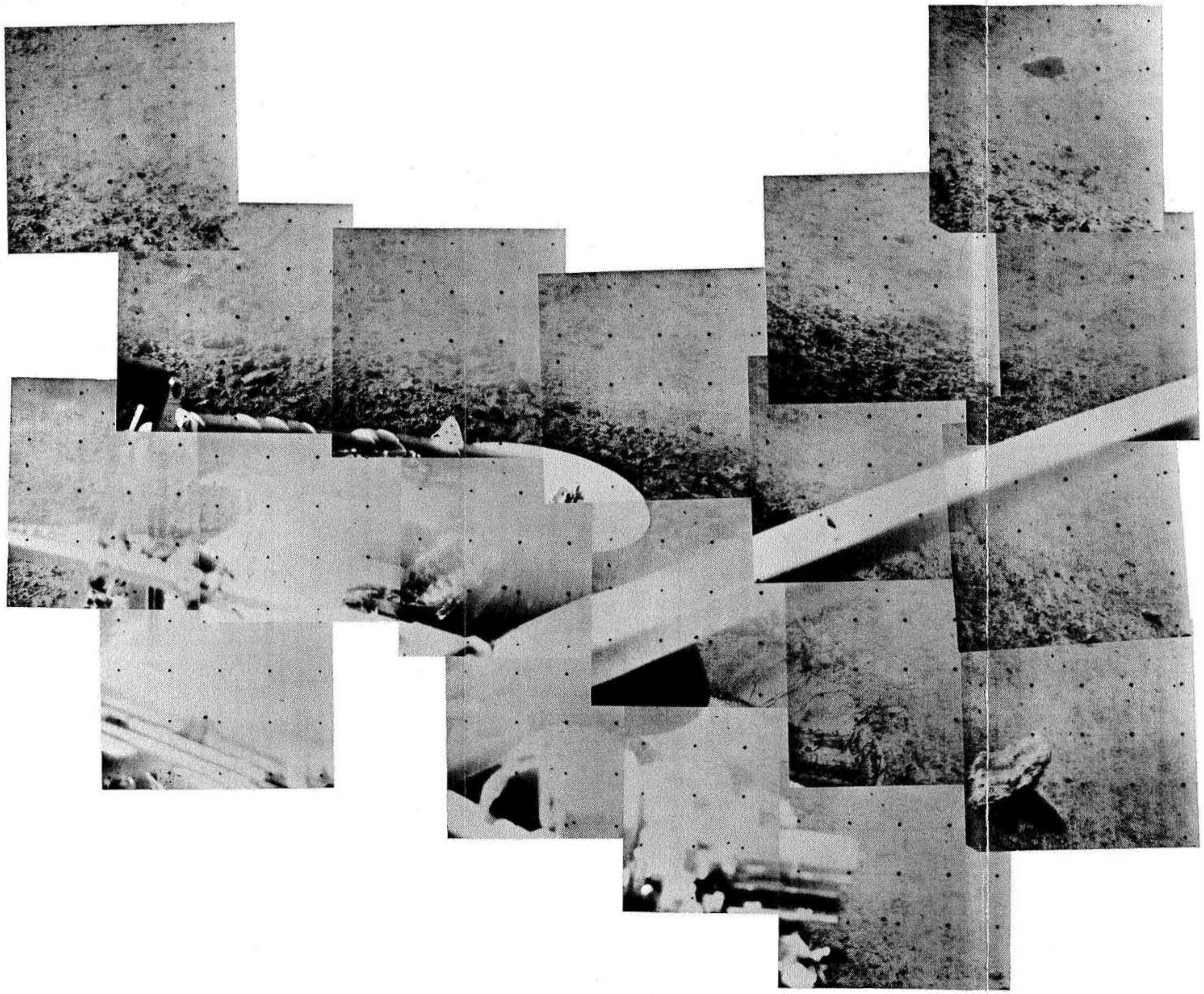


		Azimuth	Lens focal length	Identification
(15)	Day 120	−96 to −47	Narrow angle	Footpad 2 and imprint made on final bounce; semi-improved

FOLDOUT FRAME #1

FOLDOUT FRAME #2

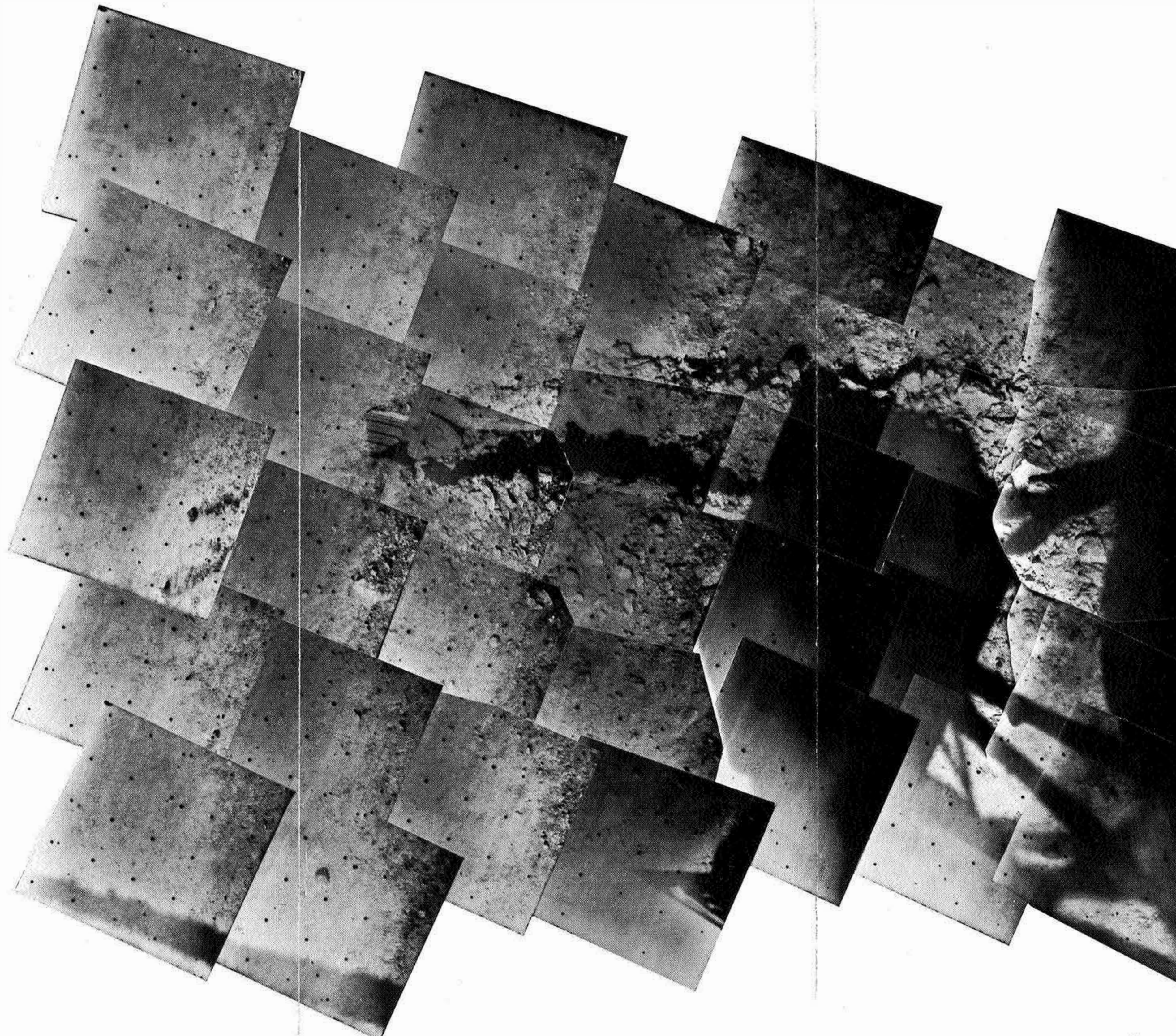
FOLDOUT FRAME



		Azimuth	Lens focal length	Identification
(16)	Day 120	+60 to +90	Narrow angle	Footpad 3 and imprint made on final bounce; semi-improved

FOLDOUT FRAME #1

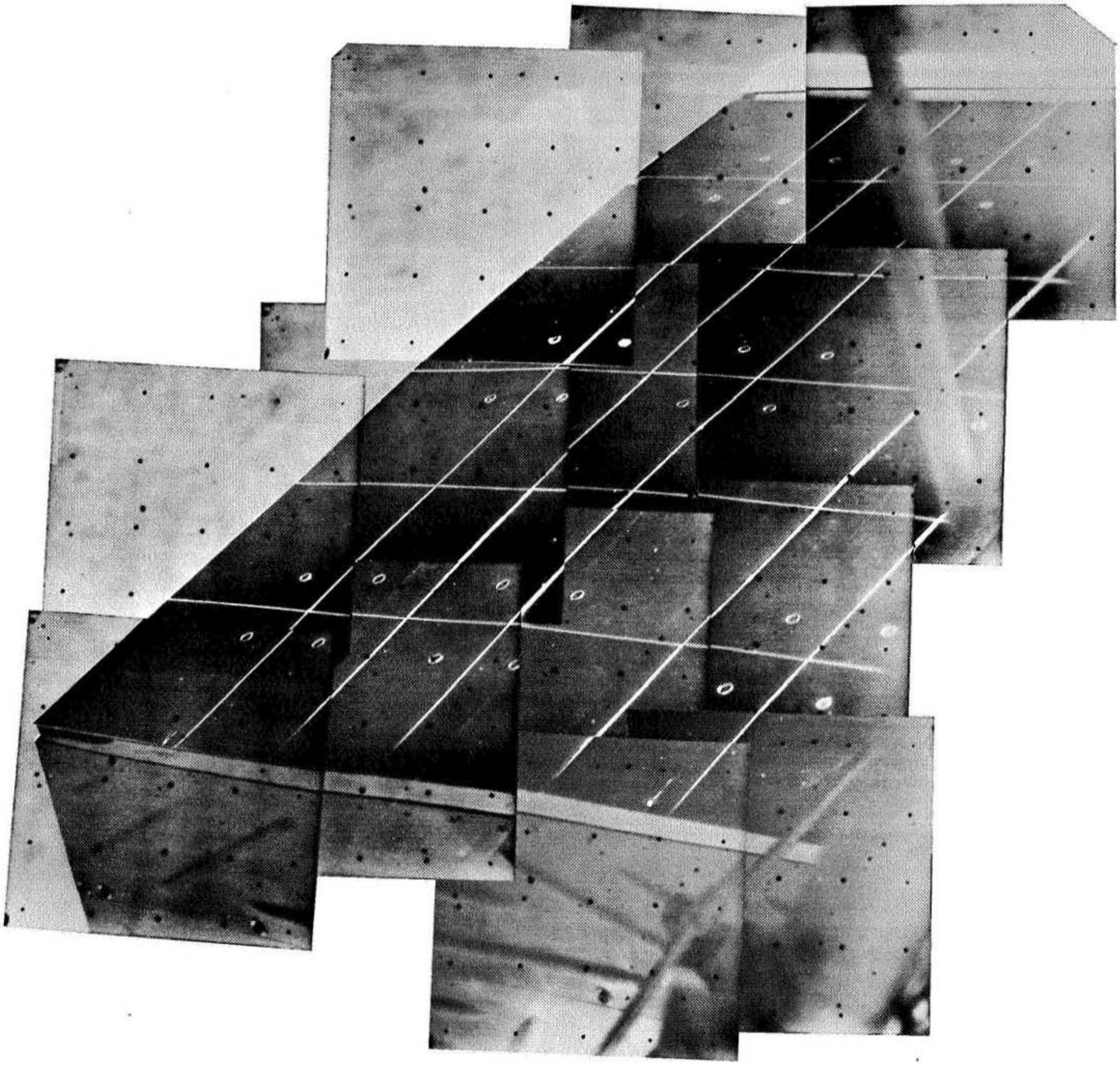
FOLDOUT FRAME #2



		Azimuth	Lens focal length	Identification
(17)	Day 120	+3 to +36	Narrow angle	Trench made by surface sampler; semi-improved

FOLDOUT FRAME #1

FOLDOUT FRAME #2



	Azimuth	Lens focal length	Identification
(18)	−180 to −159	Narrow angle	Radiation thermal control mirror surface, top of compartment A; semi-improved

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Technical Report 32-1177

Surveyor III Mission Report

Part III. Television Data

Addendum

J. J. Rennilson

JET PROPULSION LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA, CALIFORNIA

July 15, 1968

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Approved for publication by:

H. H. Haglund
Surveyor Project Manager

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July 15, 1968

JPL TECHNICAL REPORT 32-1177

Prepared Under Contract No. NAS 7-100
National Aeronautics & Space Administration

Surveyor III Mission Report

Part III. Television Data

Addendum

The purpose of this addendum is to present selected color transparencies from the Surveyor III mission. Transparencies were selected rather than color prints because more accurate color control was possible with this process. These color transparencies should be correlated with the black and white photographs and descriptions given in Section 3 of NASA Report SP-146, "Surveyor III: A Preliminary Report," (pp. 48–59), June 1967.

Color is often used in terrestrial geological studies as an aid in differentiating various rock types and their weathering states. Astronomical use of color for solar and planetary observations can yield knowledge of the atmospheres of these bodies. In the *Surveyor III* television camera, color filters were incorporated essentially for these same purposes.

Three color filters, each composed of one or two glass elements, were successively inserted in the light path to the vidicon. The color filters were computer-designed to give the television camera the approximate response of the three color-matching functions used most often in international colorimetry; these functions are similar to those of the human eye. The filters were given a neutral density deposit of Inconel, so that, without varying the iris, approximately equal video signals would be produced by exposure to a daylight source.

The color filter–television camera system was calibrated prior to launch. Determination of the proportionality factors, which relate the video voltages to the tristimulus values of the color, was accomplished by exposing the camera to object colors of known spectral radiance. For calibration after landing, proportionality factors used were derived from measurements of pictures of calibrated color charts flown on the spacecraft.

After receipt of the three color/separation pictures of a scene, reconstitution of the scene in color was accomplished by using calibration frames for control. Film negatives were prepared of each image taken through the three different camera color filters and then were projected to form a single image.

These projections were accomplished sequentially through a conventional photographic enlarger and included color filters in the light paths, which gave each separate image the color, as observed through the corresponding camera filter. The resulting reconstituted color image was exposed on color print film and resulted in a positive transparency. From this transparency, other color prints and negatives were generated by usual photograph techniques. Transparencies 1 through 5, obtained through the previously discussed technique, are provided in a jacket at the end of this report.

1 This color picture was obtained by photographic reconstruction using three color filters and three black and white negatives. This is the first observation of a solar eclipse by earth taken on April 24, 1967 at approximately 11:38 GMT. The north pole of earth is in the upper left of the picture. The sun, behind the earth, creates a halo by scattering and refraction of light. Areas without clouds refract sunlight most, causing a beaded appearance. The sun is closest to the Northern Hemisphere where light intensity is so great that it eradicates all colors.

2 This is the second picture of the solar eclipse taken approximately 38 min after the first. Yellow and orange beads are more visible because of reduced exposure. The brightest portion of the halo has shifted eastward, with the sun. The camera's mirror edge cuts away a small portion of the halo on the right edge. This picture was taken at 12:02 GMT, on April 24, 1967.

3 This color picture, obtained by photographic reconstruction using three color filters and three black and white negatives, shows the Surveyor *III* footpad and photometric target. The gold tip of an attitude control jet is seen against the dark grey background of sample of lunar soil which was placed on the footpad by the surface sampler. This picture was taken at approximately 11:00 GMT, on April 26, 1967.

4 This color picture, obtained by photographic reconstruction using three color filters and three black and white negatives, shows the first color view of the crescent earth taken from the lunar surface on April 30, 1967. The crescent at the top is centered over the Atlantic Ocean. The white cloud cover is partially centered over Eastern Brazil, and the bottom corresponds to the South Atlantic.

5 This color picture, obtained by photographic reconstruction using three color filters and three black and white negatives, shows a narrow-angle view of one of the trenches made by the surface sampler, visible on right slightly out of focus. The light blue of the surface sampler is in direct contrast with the dark grey of the lunar soil. The surface sampler image, in some portions, was overexposed, resulting in a white appearance. The picture was taken during the April 23–24, 1967 viewing period.

TR 32-1177

Part III Addendum

July 15, 1968

To COMPLETE this report

Copies of the following negatives must be obtained from Photo Lab.

P 6586 BC

P 6587 AC

P 6587 BC

P 6588 C

P 6622 BC

1

2

3

4

5

Surveyor III Mission Report

Part III. Television Data

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