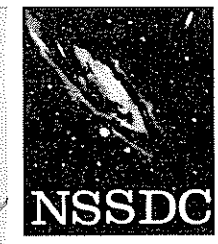
Geology - Planetary and Lunar

R150.1
Apo 13
Pho

George D. Wadland

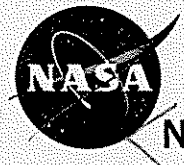


70-18

APOLLO 13

PHOTOGRAPHIC DATA PACKAGE

DECEMBER 1970



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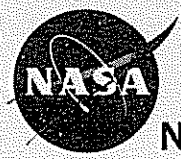
PART I

DATA USERS' NOTE

APOLLO 13 LUNAR PHOTOGRAPHY

(NSSDC ID No. 70-029A-01)



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PART I

DATA USERS' NOTE

APOLLO 13 LUNAR PHOTOGRAPHY
(NSSDC ID No. 70-029A-01)

Prepared by:

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FOREWORD

The purposes of this Data Users' Note are to announce the availability of Apollo 13 pictorial data and to aid an investigator in the selection of Apollo 13 photographs for study. In addition, this Note can provide guidance in the interpretation of the photographs. As background information, the Note includes brief descriptions of the Apollo 13 mission objectives, photographic equipment, and photographic coverage and quality. The National Space Science Data Center (NSSDC) can provide all forms of photographs described in the section on Format of Available Data.

NSSDC will supply, as resources permit, limited quantities of photographs without charge where they are to be used, first, for specific scientific studies, and, second, for college-level science courses. All requesters should refer to the section on Ordering Procedures for specific ordering instructions. Scientists conducting an investigation that requires photographic data should inform NSSDC of their needs and should identify the nature of their study, their affiliation with a scientific organization, university, or company, and any government contracts they may have for performing the investigation. The Data Center seeks to keep informed of the results of any scientific investigations performed with the use of Apollo photographs. We therefore request that scientists submit reprints of any published papers to the Data Center so that the results of their studies can be made known to other users. It is also requested that in such papers NSSDC be acknowledged as the source of photographic data.

CONTENTS

APOLLO 13 LUNAR PHOTOGRAPHY

INTRODUCTION

Apollo 13 (1970-029A) was launched from Cape Kennedy, Florida, on April 11, 1970, on a scheduled 10-day lunar landing mission. The spacecraft was inserted into an approximately 100-nautical mile circular earth parking orbit. After orbital insertion, all spacecraft systems were verified, and the translunar injection (TLI) burn was made in preparation for translunar coast. During translunar coast, however, a malfunction occurred in the command service module (CSM). This malfunction resulted in a loss of oxygen that made the fuel cells inoperative, leaving the command module (CM) with batteries normally used only during reentry as the sole power source and with only that oxygen contained in a surge tank and repressurization package. Because the command module was unusable, it was decided to abort the mission, activate the lunar module (LM), power down the command service module, and use the LM systems for life support. The crew remained in the LM and performed a free-return trajectory. Prior to entering the earth's atmosphere, the crew transferred back to the CM and returned to earth on April 17, 1970.

The purposes of this third Apollo lunar landing mission were: (1) to explore the hilly upland Fra Mauro region of the moon; (2) to perform selenological inspection, survey, and sampling of material (possibly 5 billion years old) in the Fra Mauro formation; (3) to deploy and activate an Apollo Lunar Surface Experiments Package (ALSEP); (4) to further develop man's capability to work in the lunar environment; and (5) to obtain photographs of candidate lunar exploration sites. These goals were to be carried out from a near-circular lunar orbit and on the lunar surface at 3°40'17" south latitude, 17°27'3" west longitude, about 95.6 nautical miles east of the Apollo 12 landing point at the Surveyor 3 crater. Because the Apollo 13 mission had to be aborted, it is planned that the mission objectives and similar scheduled scientific studies will be carried out by the crew of Apollo 14.

PHOTOGRAPHIC OBJECTIVES

The photographic objectives of Apollo 13 were: (1) to photograph "targets of opportunity," i.e., scientifically interesting sites and potential Apollo landing sites as time and circumstances permitted; (2) to obtain photographs of the lunar and command service modules; (3) to obtain vertical and oblique stereo strips of lunar nearside and farside regions of scientific interest; and (4) to record mission operational activities. Because the mission was aborted and, as a result, all photographic equip-

ment could not be used, the photographic objectives were not realized, and only a limited amount of photographic data were obtained.

PHOTOGRAPHIC EQUIPMENT

Cameras

The camera equipment carried by Apollo 13 consisted of two 70-mm Hasselblad EL cameras, two 70-mm Hasselblad data cameras, two 16-mm Maurer data acquisition cameras (DAC), one 35-mm lunar surface closeup stereoscopic camera, and one Hycon topographic camera. However, camera use was limited to the two 70-mm Hasselblad EL cameras and the 16-mm DACs.

70-mm Hasselblad EL Cameras. These cameras featured a motor-drive mechanism, powered by two nickel-cadmium batteries, that advanced the film and cocked the shutter whenever the camera was activated. The settings and ranges for equipment on these cameras were:

Lens Focal Length:	80 mm	250 mm
Focus:	91.3 cm (3 ft) to infinity	259.1 cm (8.5 ft) to infinity
Aperture:	f/2.8 to f/22	f/5.6 to f/45
Shutter Speed:	1 sec to 1/500 sec	1 sec to 1/500 sec
Field of View:	37.9° side, 51.8° diagonal	12.5° side, 17.6° diagonal
Film Magazine Capacity:	190 frames B&W, thin base 160 frames color, thin base 100 frames, standard base	

16-mm Maurer Data Acquisition Cameras. Apollo 13 carried two Maurer data acquisition cameras, one in the command module and one in the lunar module. The cameras were used primarily to record engineering data and for continuous-sequence terrain photography. The Maurer cameras weighed 2.8 pounds each, with a 130-foot film magazine attached. They had frame rates of 1, 6, and 12 fps (automatic) and 24 fps (semiautomatic), and shutter speeds of 1/60, 1/125, 1/250, 1/500, and 1/1000 second. Other settings and ranges for equipment on the cameras were:

Lens Focal Length:	18 mm
Focus:	30.5 cm (12 in.) to infinity
Aperture:	T/2 to T/22
Field of View:	32.3° horizontal x 23.5° vertical; 39.2° diagonal
Film Magazine Capacity:	140 feet, thin base

Films

The films used during the mission were as follows.

SO-368 Film (CEX)

Description:	Ektachrome MS, color reversal, ASA 64; haze filter required
Resolution:	80 lines/mm for 1000:1 test object contrast
Use:	terrain and general photography

SO-168 Film (HCEX)

Description:	Ektachrome EF, high-speed color reversal, ASA 160 for surface and interior photography; no filter required
Resolution:	80 lines/mm for 1000:1 test object contrast
Use:	surface and interior photography at low light levels

3400 Film (B&W)

Description:	Panatomic-X, black and white, ASA 80
Resolution:	170 lines/mm for 1000:1 test object contrast
Use:	high-resolution terrain photography

Accessories

Standard accessories for the Apollo 13 photographic equipment included the following.

- A light meter, used with the EL cameras, was an automatic spot meter with a narrow angle of acceptance (limited to 1°). The scales on the meter were automatically rotated to give the correct aperture and shutter speed settings.

- A right-angle mirror was used on the front of the 16-mm data acquisition camera for bracket-mounted photography.

- A Hasselblad adapter bracket was used to mount the EL camera in the command module rendezvous window. With the 80-mm lens, the camera was aligned along a line pitched up 12° from the X axis; with the 250-mm lens, the camera was aligned along the X axis.

- A power cable was used in the command module to provide power for the 16-mm Maurer cameras.

- A boresight bracket was used on the CM rendezvous window for the 16-mm Maurer camera.

- A sextant adapter was used with the 16-mm Maurer cameras.

- Two types of filters were used. A haze filter (Photar 2A) was used with the SO-368 film. This filter had a cutoff of 3400 A and less, a transmittance of 100 percent in the visible spectrum, and needed no exposure correction. A red filter (Photar 25A) was used with black and white film to reduce atmospheric haze. This filter had a cutoff of 6000 A and less, a transmittance of 90 percent for 6500 A and longer, and an exposure correction of 2.5 stops (needs added exposure).

PHOTOGRAPHIC COVERAGE AND QUALITY

The orbital and operational photographs obtained during the Apollo 13 mission ranged from good to poor in quality, resolution, and contrast. Only 584 frames of 70-mm photography and 22,073 frames of 16-mm photography were obtained. Of these, there were only two magazines (JJ and L) from which the photographs could be plotted, but a few good low- and medium-oblique photographs were obtained.

Although the Apollo 13 coverage included photographs of the earth, only the lunar photographs are described in this Data Users' Note. For

information on photographs of the earth, please refer to the section on Ordering Procedures.

The Apollo 13 photographic coverage is described in map form on the "Apollo Mission 13 Lunar Photography Index," which accompanies this data package. In the index map, limited photographic coverage is depicted on a mercator projection with an approximate scale of 1:5,500,000 at the equator. The index consists of one sheet that indicates lunar farside crater coverage for targets of opportunity shown on the 70-mm color magazines.

A brief summary of the photographic coverage for only the lunar magazines is given in the appendixes to this DUN. A more complete summary of all photography taken during the Apollo 13 mission is contained in part II of this data package, "Apollo 13 Photography: 70-mm and 16-mm Frame Indexes." At the end of this part are two Photo Index Area Location Diagrams, one for the lunar earthside and one for the lunar farside. On these diagrams, areas of the lunar surface have been numbered in an effort to facilitate and standardize the identification of lunar photography. Part III of this data package, "Apollo 13 70-mm Photographic Catalog," contains proof prints of the higher quality 70-mm lunar photography exposed during the Apollo 13 mission. These prints have been sorted by magazine and frame number.

FORMAT OF AVAILABLE DATA

The Apollo 13 films on file at NSSDC include master positive copies of the original 70-mm and 16-mm films that are stored at the NASA Manned Spacecraft Center (MSC), Houston, Texas. These films were processed by the MSC Photographic Technology Laboratory and constitute the NSSDC master copies. To satisfy requests for photographs, additional (second-generation) working copies have also been prepared. An indication of the standard formats and sizes of Apollo 13 photography available from NSSDC is given below.

70-mm Photography

Reproductions of complete magazines of 70-mm lunar photography can be obtained either (1) as positive or negative film copies on 70-mm black and white roll film or (2) as positive contact black and white paper prints on 70-mm roll paper. Selected frames of 70-mm lunar photography will be processed in limited quantities as 8- x 10-inch black and white paper prints or as contact black and white positive or negative film copies on 4- x 5-inch film sheets. (Color reproductions in the form of contact positive or negative film copies on 4- x 5-inch film sheets or as 8- x 10-inch prints can be obtained for selected frames. However, the

color reproductions will be provided only to those persons performing detailed scientific investigations.)

16-mm Photography

The 16-mm sequence films are available as 16-mm positive or negative color film duplicates. For convenience, the individual 16-mm magazines have been spliced together and are available on one reel. It should be pointed out that these photographs are of poor quality and are suitable only for limited scientific investigation. These films normally will be provided on a 3-month loan basis, although in special instances arrangements can be made for permanent retention.

ORDERING PROCEDURES

When ordering photographic data, please refer to part II, "Apollo 13 Photography: 70-mm and 16-mm Frame Indexes," and indicate:

- Apollo mission number,
- complete frame number(s), e.g., AS13-61-8727,
- form and size of reproduction, e.g., 8 x 10" B&W print or 4 x 5" color positive transparency, and
- other identifying information such as crater or feature names.

The Apollo Lunar Photography Order Form enclosed with this package is provided for the requester's convenience. All parts of the form must be completed to ensure satisfactory request fulfillment. If the photographs are to be used in an ongoing or planned study, this should be indicated in the appropriate place on the form, and some indication of the nature of the study and of whether it is being performed under contract to the government should be given. To assist NSSDC in processing requests for reproductions, please identify all required photography in a single order.

NSSDC will provide reproduction support to individuals and organizations only when the data requested are needed for specific scientific research projects or for use in college-level science courses, in that order. The current policy in satisfying such requests is to furnish limited quantities of reproductions without charge. Nominal charges will be imposed for large and/or multiple orders. When charges are deemed necessary, the requester will be advised of the exact charge and the procedure for making payment before the request is filled. The price

list provided on the order form is intended to give the reader an indication of the per item cost of reproductions in the event charges are necessary.

The Apollo 13 pictures may be reviewed at NSSDC. Inquiries about or requests for photographs from U.S. scientists should be addressed to:

National Space Science Data Center
Code 601.4
Goddard Space Flight Center
Greenbelt, Maryland 20771

Telephone: (301) 982-6695

Requests for photographs from researchers outside the U.S.A. should be directed to:

World Data Center A for Rockets and Satellites
Code 601
Goddard Space Flight Center
Greenbelt, Maryland 20771 U.S.A.

The World Data Center A for Rockets and Satellites is now assisting scientists located outside the United States in acquiring space science data held in U.S. national archives. Since January 2, 1969, it has been located contiguous to NSSDC.

Individuals or organizations that wish to obtain Apollo 13 photographic reproductions for purposes other than use in research projects or college-level science courses should address their requests to:

Public Information Division
Code FP
National Aeronautics and Space Administration
Washington, D.C. 20546

Printed materials to satisfy general information requests are also available from this division.

Representative sets of Apollo photographs suitable for framing can be obtained (at cost) as full-color lithographs from:

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

Requests should specify NASA Apollo picture sets as follows:

- NASA Picture Set 1, "Apollo - In the Beginning" ($1.25)
- NASA Picture Set 2, "Men of Apollo" ($1.00)
- NASA Picture Set 3, "Eyewitness to Space" ($2.75)
- NASA Picture Set 4, "First Manned Lunar Landing" ($1.75)
- NASA Picture Set 5, "Man on the Moon" ($1.00)
- NASA Picture Set 6, "Pinpoint for Science" ($1.50)

Inquiries or requests regarding pictures of the earth taken during the Apollo missions should be directed to:

Technology Application Center
University of New Mexico
Albuquerque, New Mexico 87106

ACKNOWLEDGMENTS

The Data Center wishes to thank the individuals and organizations responsible for the photographs and supporting data obtained during the Apollo 13 mission. The mission photography was accomplished by the Apollo 13 crew: Astronauts James A. Lovell, Jr., John L. Swigert, Jr., and Fred W. Haise, Jr.

Arrangements to have the photographs and data available through NSSDC were made with the assistance of Dr. Richard Allenby, Associate Director, Lunar Science, Apollo Lunar Exploration Office, NASA Headquarters; Mr. James Sasser, Chief, Mapping Sciences Laboratory, NASA Manned Spacecraft Center; and Mr. David Goldenbaum, Chief, Data Logistics Office, Manned Spacecraft Center. Copies of the photographs, the lunar photography index, and the supporting documentation were furnished by the MSC Photographic Technology Laboratory and the Mapping Sciences Laboratory, respectively.

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"Report of Apollo 13 Review Board," NASA Apollo 13 Review Board, Edgar M. Cortright, Chairman, National Aeronautics and Space Administration, June 15, 1970.

"The Role of Optics in the Apollo Program," Optical Spectra, 3, No. 5, Sept. - Oct. 1969.

APPENDIXES

Summary of Apollo 13
Photographic Coverage

APPENDIX A

70-mm Photographic Coverage

Film Type And Size	Magazine	Frame Numbers	Remarks
SO-368 70 mm Color	L	AS13-60-8577 thru 8726	This magazine was photographed with the 250-mm lens during earth orbit, transearth injection, and the single lunar pass with the transearth coast. It includes photographs of the frontside mares, Basin IX, and farside craters 208, 212, 215, 219, 220, 271, 273, 274, 276, 283, 293, 295, 297, and 302.*
	N	AS13-58-8456 thru 8481	This is a short sequence of photographs of the separated service module taken with the 250-mm lens.
SO-168 70 mm B&W	II	AS13-61-8727 thru 8879	This magazine contains small-scale lunar disc-type photographs including Mare Crisium, Mare Smythii, and farside Basin II.*
	JJ	AS13-62-8880 thru 9039	This magazine was photographed with the 80-mm and the 250-mm lenses. It contains photos of the earth crescent; a sequence of 90 percent overlap high obliques covering from 2° to 10° south latitude, from 8° to 15° north latitude, and from 147° to 158° east longitude; Mare Moscoviense; and farside craters 220, 221, 223, and 297.*

*Farside craters and basins are identified on the "Lunar Farside Chart" published in 1967 by the Aeronautical Chart & Information Center. The names on this chart were adopted from the International Astronomical Union (1935, 1961, and 1964).

APPENDIX A (continued)

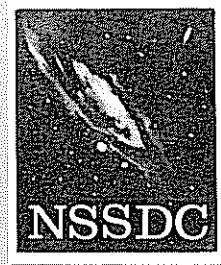
Film Type And Size	Magazine	Frame Numbers	Remarks
3400 70 mm B&W	R	AS13-59-8482 thru 8576	This magazine was taken with the 250-mm lens and contains photographs of the separation of the service module, lunar module jettison, and the earth and lunar discs.

APPENDIX B

16-mm Photographic Coverage

Film Type And Size	Magazine	Frame Numbers	Remarks*
SO-368 16 mm Color	A	1-2282	This magazine contains photos of the lunar module and the command service module taken during translunar coast.
	AA	1-5678	This magazine shows the LM spacecraft interior.
	FF	1-2181	This magazine contains photos of the service module and distant lunar disc photos.
	GG	1-2133	This magazine contains photos of the command module interior.
		2134-3410	These frames contain distant earth and lunar photos.
		3411-5951	These frames are of the spacecraft interior.
	K	1-2600	This magazine was photographed entirely within the spacecraft. These frames are of the lunar module.
		2601-4169	This magazine contains photographs showing the interior of the command module.
		4170-5918	This magazine contains photographs of the tunnel between the CM and the LM and their interiors.

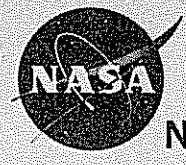
*Photography of intravehicular activity and of the earth has been edited from the 16-mm film magazines and is not available through NSSDC. This photography can be obtained from NASA's Public Information Division. (See page I.13 for address.)



PART II

APOLLO 13 PHOTOGRAPHY

70-mm and 16-mm Frame Indexes



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Part II

APOLLO 13 PHOTOGRAPHY

70-mm and 16-mm Frame Indexes

Prepared by

Mapping Sciences Laboratory
Manned Spacecraft Center
National Aeronautics and Space Administration
Houston, Texas 77058

Published by

National Space Science Data Center
Goddard Space Flight Center
National Aeronautics and Space Administration
Greenbelt, Maryland 20771

CONTENTS

INTRODUCTION

This index contains supporting information about the 70-mm and 16-mm photography taken during the Apollo 13 mission.

For each 70-mm frame, the index presents the information available on: (1) the revolution number, (2) the focal length of the camera, (3) the photo scale at the principal point of the frame, (4) the selenographic coordinates at the principal point of the frame, (5) the approximate tilt of the photo, (6) the percentage of forward overlap (Fwd. O/L) of the frame, (7) the approximate sun angle (medium, low, high), (8) the quality of the photography, and (9) the photo index area (using the Lunar Aeronautical Chart system for the earthside and similar breakdowns on the farside region). A brief description of each frame is also included.

The index to the 16-mm sequence photography includes information concerning the approximate surface coverage of the photographic sequence and a brief description of the principal features shown. A "remarks" column is included to indicate (1) if the sequence is plotted on the photographic index map and (2) the quality of the photography.

Directly following the indexes are two Photo Index Area Location Diagrams, one for the lunar earthside and one for the lunar farside, that have been prepared by the Mapping Sciences Laboratory, Manned Spacecraft Center. On these diagrams, areas of the moon have been numbered to facilitate and standardize the identification of lunar photography. It should be noted that the numbering of the earthside diagram corresponds to that on the Lunar Aeronautical Chart that accompanies this Apollo 13 data package.

The National Space Science Data Center (NSSDC) wishes to thank members of the staff of the Mapping Sciences Laboratory and the personnel of the Lockheed Electronics Company/Aerospace Systems Division for providing their original index pages to NSSDC. The document preparation effort at NSSDC was under the direction of Mr. Arthur T. Anderson

Apollo 13 Hasselblad Photography (70-mm)

MAGAZINE II

Frames AS13-61-8727 through 8879

Magazine II is 70-mm color (SO-168) photography of far distant views of the moon and earth. The quality of the imagery on the 153 frames generally is good. Since most of the exposures are small-scale disc-type views, no plots were made of this magazine.

APOLLO 13 PHOTOGRAPHY

Magazine (11) AS13- 61 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8727		250mm		Not Plottable					Good		Command Module Visible in Foreground w/Lunar Surface & Mare Smythii in Background
8728		"		"					"		Same as Above - Grid on LM Window is Visible Although Blurred
8729		"		"					"		"
8730		"		"					"		Same, Without CM Visible
8731		"		"					"		"
8732		"		"					"		Same With Crater Tsiolkovsky at Lower Left
8733		"		"					"		Same With Farside Basin II at Right Center
8734		"		"					"		"
8735		"		"					"		Same With Basin II in Blurred Area
8736		"		"					"		CM Visible in Foreground, Mare Smythii at Center Right
8737		"		"					"		"
8738		"		"					"		"
8739		"		"					"		"
8740		"		"					"		"
8741		"		"					"		Portion of Lunar Disc Looking East With Mare Smythii
8742		"		"					"		Prominent in Center

APOLLO 13 PHOTOGRAPHY

Magazine (II) AS13- 61 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point		Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
				Lat	Long						
8743		250mm		Not Plottable					Good		Portion of Lunar Disc Looking East With Mare Smythii
8744		"		"					"		Prominent in Center
8745		"		"					"		"
8746		"		"					"		Same as Above, Very Bright Exposure. CM in Foreground
8747		"		"					"		"
8748		"		"					"		Bright Lunar Disc With Mare Crisium at Left Side
8749		"		"					"		Same With Tsiolkovsky at Right
8750		"		"					"		Same Without Tsiolkovsky
8751		"		"					"		Bright Lunar Disc Seen From Eastern Limb
8752		"		"					"		"
8753		"		"					"		"
8754		"		"					"		"
8755		"		"					"		"
8756		"		"					"		"
8757		"		"					"		"
8758		"		"					"		"

NASA — MSC

APOLLO 13 PHOTOGRAPHY

Magazine (II) AS13- 61 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point		Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
				Lat	Long						
8759		250mm		Not Plottable					Good		Bright Lunar Disc, Seen From Eastern Limb
8760		"		"					"		"
8761		"		"					"		"
8762		"		"					"		"
8763		"		"					"		"
8764		"		"					"		"
8765		"		"					"		"
8766		"		"					"		"
8767		"		"					"		"
8768		"		"					"		"
8769		"		"					"		"
8770		"		"					"		"
8771		"		"					"		"
8772		"		"					"		"
8773		"		"					"		"
8774		"		"					"		"

APOLLO 13 PHOTOGRAPHY

Magazine (II) AS13- 61 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point		Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
				Lat	Long						
8775		250mm		Not Plottable					Good		Bright Lunar Disc Seen From Eastern Limb
8776		"		"					"		"
8777		"		"					"		"
8778		"		"					"		"
8779		"		"					"		"
8780		"		"					"		Same as Above - Spacecraft Receding From Moon Toward Earth
8781		"		"					"		"
8782		"		"					"		"
8783		"		"					"		"
8784		"		"					"		"
8785		"		"					"		"
8786		"		"					"		"
8787		"		"					"		"
8788		"		"					"		"
8789		"		"					"		"
8790		"		"					"		"

NASA — MSC

APOLLO 13 PHOTOGRAPHY

Magazine (II) AS13- 61 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8791		250mm		Not Plottable					Good		Bright Lunar Disc as Spacecraft Recedes From Moon Toward Earth
8792		"		"					"		"
8793		"		"					"		"
8794		"		"					"		"
8795		"		"					"		"
8796		"		"					"		"
8797		"		"					"		"
8798		"		"					"		"
8799		"		"					"		"
8800		"		"					"		"
8801		"		"					"		"
8802		"		"					"		"
8803		"		"					"		"
8804		"		"					"		"
8805		"		"					"		"
8806		"		"					"		"

APOLLO 13 PHOTOGRAPHY

Magazine (II) AS13- 61 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point		Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
				Lat	Long						
8807		250mm		Not Plottable					Good		Bright Lunar Disc as Spacecraft Recedes From Moon Toward Earth
8808		"		"					"		"
8809		"		"					"		"
8810		"		"					"		"
8811		"		"					"		"
8812		"		"					"		"
8813		"		"					Dark		Very Dark - Not Discernible
8814		"		"					Good		Bright Lunar Disc - Smaller and Smaller
8815		"		"					"		"
8816		"		"					"		"
8817		"		"					"		"
8818		"		"					"		"
8819		"		"					"		"
8820		"		"					"		"
8821		"		"					Triple Exposure		Triple Exposure of Bright Lunar Disc
8822		"		"					Good		Lunar Disc

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Magazine (II) AS13- 61 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point		Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
				Lat	Long						
8823		250mm		Not Plottable					Good		Small Lunar Disc
8824		"		"					"		"
8825		"		"					"		"
8826		"		"					Poor		Earth Crescent Through LM Window With LM Equipment Blurred in the Foreground
8827		"		"					"		"
8828		"		"					"		"
8829		"		"					"		"
8830		"		"					"		"
8831		"		"					"		"
8832		"		"					"		"
8833		"		"					Good		"
8834		"		"					"		"
8835		"		"					"		"
8836		"		"					"		"
8837		"		"					"		Small Bright Lunar Disc
8838		"		"					"		"

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Magazine (II) AS13- 61 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point		Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
				Lat	Long						
8839		250mm		Not Plottable					Good		Small Bright Lunar Disc
8840		"		"					"		"
8841		"		"					"		"
8842		"		"					"		Tiny Earth Crescent
8843		"		"					"		"
8844		"		"					"		"
8845		"		"					"		"
8846		"		"					"		Thin Sliver of Moon
8847		"		"					"		One-Quarter of Lunar Disc
8848		"		"					"		Lunar Disc
8849		"		"					"		"
8850		"		"					"		"
8851		"		"					"		"
8852		"		"					"		"
8853		"		"					"		"
8854		"		"					"		"

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Magazine (II) AS13- 61 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point		Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
				Lat	Long						
8855		250mm		Not Plottable					Good		Small Lunar Disc
8856		"		"					"		"
8857		"		"					"		"
8858		"		"					"		"
8859		"		"					"		"
8860		"		"					"		"
8861		"		"					"		"
8862		"		"					Dark		Dark - Not Discernible
8863		"		"					Good		Lunar Disc
8864		"		"					"		Earth Crescent With Thruster in Foreground
8865		"		"					Poor		Lunar Disc With Bright Disc Partially Covering Moon
8866		"		"					Good		Lunar Disc
8867		"		"					"		Earth Crescent With Portion of LM in Foreground
8868		"		"					"		Lunar Disc
8869		"		"					"		"
8870		"		"					"		"

APOLLO 13 PHOTOGRAPHY

Magazine (II) AS13- 61 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point		Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
				Lat	Long						
8871		250mm		Not Plottable					Good		Lunar Disc
8872		"		"					"		"
8873		"		"					"		"
8874		"		"					"		"
8875		"		"					"		"
8876		"		"					Dark		Inside CM Showing Storage Area
8877		"		"					Very Dark		"
8878		"		"					"		Not Discernible
8879		"		"					"		"

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MAGAZINE JJ

Frames AS13-62-8880 through 9039

Magazine JJ is 70-mm color (SO-168) photography showing interior and exterior views of the lunar module (LM) and the command module (CM), far distant exposures of earth and lunar discs, and farside coverage of the moon, which is plottable. The quality of the imagery on the 160 frames generally is fair. Most of the photography consists of very small-scale lunar and earth disc exposures.

Frames 8907 through 8923 are high-oblique photos of the farside of the lunar surface, with 90 percent overlap, taken in the areas of 2.0° to 10° south latitude and 8.0° to 15.0° north latitude and ranging in longitude from 147.0° to 158.0° east. Eight frames show crater 297 and the surface area surrounding this crater. Nine exposures cover Mare Moscoviense and craters 220, 221, and 223. The quality of the imagery in this sequence is fair.

APOLLO 13 PHOTOGRAPHY

Magazine (JJ) AS13-62 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8880	---	80mm	---	Not Plottable		---	---	---	Poor	---	Interior. Very Dark Photo. Details Not Discernible
8881	---	250mm	---	"		---	---	---	Fair	---	View From Spacecraft Window Of Far Distant Moon Crescent. Rocket Thruster in Foreground.
8882	---	250mm	---	"		---	---	---	Fair	---	Same As For 8881
8883	---	250mm	---	"		---	---	---	Fair	---	Same As For 8881
8884	---	250mm	---	"		---	---	---	Fair	---	Same As For 8881
8885	---	250mm	---	"		---	---	---	Fair	---	Same As For 8881
8886	---	250mm	---	"		---	---	---	Fair	---	Earth Crescent, Cloud Covered
8887	---	250mm	---	"		---	---	---	Fair	---	Earth Crescent, Cloud Covered
8888	---	250mm	---	"		---	---	---	Fair	---	Earth Crescent, Cloud Covered
8889	---	250mm	---	"		---	---	---	Fair	---	Earth Crescent, Cloud Covered
8890	---	80mm	---	"		---	---	---	Poor	---	Very Faint Outline of Circular Opening (Transfer Tunnel to LM)
8891	---	80mm	---	"		---	---	---	Poor	---	Very Faint Outline of Circular Opening (Transfer Tunnel to LM)
8892	---	80mm	---	"		---	---	---	Poor	---	Very Faint Outline of Circular Opening (Transfer Tunnel to LM)
8893	---	250mm	---	"		---	---	---	Poor	---	Faint Image of Moon Crescent
8894	---	250mm	---	"		---	---	---	Poor	---	Faint Image of Moon Crescent
8895	---	250mm	---	"		---	---	---	Poor	---	Faint Image of Moon Crescent

APOLLO 13 PHOTOGRAPHY

Magazine (JJ) AS13- 62 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8896		250mm		Not Plottable					Poor		Faint Image of Moon Crescent
8897		250mm		"					Poor		Faint Image of Moon Crescent
8898		250mm		"					Poor		Small, Narrow Red Bar, Probably Part of Interior of Spacecraft
8899		250mm		"					Poor		Very Faint Interior View of Spacecraft
8900		250mm		"					Poor		Very Faint Interior View of Spacecraft
8901		250mm		"					Poor		Very Distant Earth Crescent
8902		250mm		"					Poor		Very Distant Earth Crescent
8903		250mm		"					Poor		Very Distant Earth Crescent
8904		250mm		"					Poor		Very Distant Earth Crescent
8905		250mm		"					Poor		Same With Multi-Colored Circular Shape
8906		250mm		"					Poor		Very Distant Earth Crescent
8907		250mm	1/6,362,000	2.0°S	152.7° East	High Oblique	90%	20-30°	Poor	85	5 Frames. Crater 297 on Farside Spacecraft Covers ¼ of Frame
8908		250mm	1/6,362,000	2.0°S	152.7° East	High Oblique	90%	20-30°	Poor	85	Crater 297 on Farside Spacecraft Covers ¼ of Frame
8909		250mm	1/6,362,000	2.0°S	152.7° East	High Oblique	90%	20-30°	Poor	85	Crater 297 on Farside Spacecraft Covers ¼ of Frame
8910		250mm	1/6,362,000	2.0°S	152.7° East	High Oblique	90%	20-30°	Poor	84/85	Crater 297 on Farside Spacecraft Covers ¼ of Frame
8911		250mm	1/6,362,000	2.0°S	152.7° East	High Oblique	90%	20-30°	Poor	84/85	Crater 297 on Farside Spacecraft Covers ¼ of Frame

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APOLLO 13 PHOTOGRAPHY

Magazine (JJ) AS13- 62 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8912		250mm	1/5,302,000	2.0°S	151.5° East	High Oblique	90%	20 to 30°	Fair	84/85	3 Frames Crater 297 on Farside Spacecraft Covers Part of Frame
8913		250mm	1/5,454,000	9.0°S	150.0° East	High Oblique	90%	20 to 30°	Fair	84/85	Crater 297 on Farside Spacecraft Covers Part of Frame
8914		250mm	1/5,454,000	10.0° South	147.5° East	High Oblique	90%	20 to 30°	Fair	84	Crater 297 on Farside Spacecraft Covers Part of Frame
8915		250mm	1/7,952,000	15.0° North	161.5° East	High Oblique	90%	20 to 30°	Fair	67	9 Frames Sea of Moscow & Crater 220, 221, 223 on Farside
8916		250mm	1/7,952,000	18.0° North	158.0° East	High Oblique	90%	20-30°	Fair	67	Sea of Moscow & Crater 220, 221, 223 on Farside
8917		250mm	1/7,952,000	18.0° North	158.0° East	High Oblique	90%	20-30°	Fair	67	Sea of Moscow & Crater 220, 221, 223 on Farside
8918		250mm	1/7,952,000	8.0°N	156.0° East	High Oblique	90%	20-30°	Fair	67	Sea of Moscow & Crater 220, 221, 223 on Farside
8919		250mm	1/7,952,000	15.0° North	155.0° East	High Oblique	90%	20-30°	Fair	67	Sea of Moscow & Crater 220, 221, 223 on Farside
8920		250mm	1/7,952,000	15.0° North	155.0° East	High Oblique	90%	20-30°	Fair	67	Sea of Moscow & Crater 220, 221, 223 on Farside
8921		250mm	1/7,952,000	10.0° North	158.0° East	High Oblique	90%	20-30°	Fair	67	Sea of Moscow & Crater 220, 221, 223 on Farside
8922		250mm	1/7,952;000	15.0° North	155.0° East	High Oblique	90%	20-30°	Fair	67	Sea of Moscow & Crater 220, 221, 223 on Farside
8923		250mm	1/7,952,000	15.0° North	155.0° East	High Oblique	90%	20-30°	Fair	67	Sea of Moscow & Crater 220, 221, 223 on Farside
8924		250mm		Not Plottable					Fair		5 Frames Very Distant Views of Moon
8925		250mm		"					Fair		Very Distant View of Moon
8926		250mm		"					Fair		Very Distant View of Moon
8927		250mm		"					Fair		Very Distant View of Moon

APOLLO 13 PHOTOGRAPHY

Magazine (JJ) AS13- 62 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8928		250mm		Not Plottable					Fair		Very Distant View of Moon
8929		80mm		"					Good		Interior of Spacecraft. Emergency Rig Lithium Hydroxide Unit
8930		80mm		"					Good		Interior of Spacecraft. Emergency Rig Lithium Hydroxide Unit
8931		80mm		"					Poor		Interior-Unidentifiable Dark Imagery
8932		80mm		"					Poor		Interior-Unidentifiable Dark Imagery
8933		250mm		"					Poor		Very Distant View of Moon
8934		250mm		"					Poor		Very Distant View of Moon
8935		80mm		"					Poor		Interior of Spacecraft, Transfer Tunnel
8936		80mm		"					Poor		Lithium Hydroxide Unit and Hatch Cover in Background
8937		250mm		"					Poor		Distant View of Moon
8938		250mm		"					Poor		Distant View of Moon
8939		250mm		"					Poor		Distant View of Moon
8940		250mm		"					Poor		Distant View of Moon
8941		250mm		"					Poor		RCS Quad Thruster
8942		250mm		"					Poor		Sun Glint Off Spacecraft
8943		250mm		"					Poor		Earth Crescent

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APOLLO 13 PHOTOGRAPHY

Magazine (JJ) AS13- ~~62~~ Film ~~70mm~~ (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8944		80mm		Not Plottable					Poor		Very Dark Interior
8945		250mm		"					Poor		View From LM to CM
8946		250mm		"					Poor		View From LM to CM
8947		250mm		"					Poor		3 Frames. Distant Views of Earth
8948		250mm		"					Poor		Distant View of Earth
8949		250mm		"					Poor		Distant View of Earth
8950		250mm		"					Poor		4 Frames. Distant Views of Moon
8951		250mm		"					Poor		Distant View of Moon
8952		250mm		"					Poor		Distant View of Moon
8953		250mm		"					Poor		Distant View of Moon
8954		250mm		"					Poor		Earth Crescent With RCS Quad in Foreground
8955		80mm		"					Poor		Interior View of Spacecraft
8956		250mm		"					Poor		Earth Crescent
8957		250mm		"					Poor		Earth Crescent
8958		250mm		"					Poor		Dark. Imagery Not Recognizable
8959		250mm		"					Poor		Dark. Imagery Not Recognizable

APOLLO 13 PHOTOGRAPHY

Magazine (JJ) AS13-62 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8960		250mm		Not Plottable					Poor		Parts of Exterior of Spacecraft. Earth Crescent in Background.
8961		250mm		"					Poor		Parts of Exterior of Spacecraft. Earth Crescent in Background.
8962		250mm		"					Poor		3 Frames. Distant Views of Moon.
8963		250mm		"					Poor		Distant View of Moon.
8964		250mm		"					Poor		Distant View of Moon.
8965		250mm		"					Poor		Exterior of CM
8966		250mm		"					Poor		Dark Image of Moon & Sections of Window
8967		250mm		"					Poor		Moon & Sections of Window
8968		250mm		"					Poor		5 Frames. Bright Earth Crescent
8969		250mm		"					Poor		Bright Earth Crescent
8970		250mm		"					Poor		Same With Spacecraft Exterior
8971		250mm		"					Poor		Same With Spacecraft Exterior
8972		250mm		"					Poor		Bright Earth Crescent
8973		250mm		"					Poor		View of CM With Bright Sun Reflection
8974		250mm		"					Poor		View of CM With Bright Sun Reflection
8975		250mm		"					Poor		Dark. Single Small Strip of Color.

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Magazine (JJ) AS13- 62 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8976		250mm		Not Plottable					Poor		CM From LM
8977		250mm		"					Poor		View of Earth Crescent
8978		250mm		"					Poor		View of Moon
8979		250mm		"					Poor		View of Earth Crescent
8980		250mm		"					Poor		View of Earth Crescent
8981		250mm		"					Poor		View of Earth Crescent
8982		250mm		"					Poor		View of Earth Crescent
8983		250mm		"					Poor		View of Earth Crescent
8984		250mm		"					Poor		View of Earth Crescent
8985		250mm		"					Poor		View of Earth Crescent
8986		250mm		"					Poor		View of Moon
8987		250mm		"					Poor		View of Moon
8988		80mm		"					Poor		Interior View Showing Astronauts' Suits
8989		80mm		"					Poor		Interior View Showing Astronauts' Suits
8990		80mm		"					Poor		Interior View Showing Astronauts' Suits
8991		250mm		"					Poor		View of Moon

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Magazine (JJ) AS13- 62 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point		Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
				Lat	Long						
8992		250mm		Not Plottable					Poor		View of Moon
8993		250mm		"					Poor		View of Earth Crescent
8994		250mm		"					Poor		View of Earth Crescent
8995		250mm		"					Poor		View of Earth Crescent
8996		250mm		"					Poor		View of Earth Crescent
8997		250mm		"					Poor		View of Earth Crescent
8998		250mm		"					Poor		View of Earth Crescent
8999		250mm		"					Poor		View of Earth Crescent
9000		250mm		"					Poor		View of Moon
9001		250mm		"					Poor		View of Moon
9002		250mm		"					Poor		View of Moon
9003		80mm		"					Good		Interior View. Swigert & Lovell Working on Air Lines
9004		80mm		"					Good		Interior View. Swigert & Lovell Working on Air Lines
9005		80mm		"					Good		Interior View. Swigert & Lovell Working on Air Lines
9006		250mm		"					Poor		View of Moon. Very Small Scale
9007		250mm		"					Poor		View of Moon. Very Small Scale

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Magazine (JJ) AS13- 62 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point		Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
				Lat	Long						
9008		250mm		Not Plottable					Poor		View of Moon. Very Small Scale
9009		250mm		"					Poor		View of Moon. Very Small Scale
9010		250mm		"					Poor		View of Moon. Very Small Scale
9011		250mm		"					Poor		View of Earth Crescent
9012		250mm		"					Poor		View of Earth Crescent
9013		250mm		"					Poor		View of Earth Crescent
9014		250mm		"					Poor		View of Earth Crescent
9015		250mm		"					Poor		View of Moon
9016		250mm		"					Poor		View of Moon
9017		250mm		"					Poor		View of Moon
9018		250mm		"					Poor		View of Earth Crescent
9019		250mm		"					Poor		View of Earth Crescent
9020		250mm		"					Poor		View of Earth Crescent
9021		250mm		"							View of Moon
9022		250mm		"							View of Moon
9023		250mm		"							View of Moon

APOLLO 13 PHOTOGRAPHY

Magazine (JJ) AS13-62 Film 70mm (SO-168)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point		Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
				Lat	Long						
9024		250mm		Not Plottable					Poor		Distant View of Earth
9025		250mm		"					Poor		Distant View of Earth
9026		250mm		"					Poor		Distant View of Earth
9027		250mm		"					Poor		Distant View of Earth
9028		250mm		"					Poor		Distant View of Earth
9029		80mm		"					Poor		Interior of Spacecraft
9030		80mm		"					Poor		Interior of Spacecraft
9031		250mm		"					Fair		View of CM From LM
9032		250mm		"					Fair		View of CM From LM
9033		250mm		"					Poor		View of Earth
9034		250mm		"					Poor		View of Earth
9035		250mm		"					Poor		View of Moon
9036		250mm		"					Poor		View of Earth
9037		250mm		"					Poor		View of Earth
9038		250mm		"					Poor		View of Earth
9039		250mm		"					Poor		Blurred Imagery of Window Frame

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MAGAZINE L

Frames AS13-60-8577 through 8726

Magazine L is 70-mm CEX (SO-368) photography taken with a 250-mm lens. The 150 frames include photographs taken during earth orbit on into transearth injection (TEI). The frames of plottable coverage of the lunar surface are 8629 through 8668.

The beginning of the magazine was exposed while the spacecraft was in earth orbit and reveals Baja California and the mainland of Southeast Asia in a series of photos. The docking sequence of the lunar module is also shown. Most of these frames are good exposures.

The next set of photographs in this magazine are some of the few frames made during Apollo 13 that include lunar surface coverage that could be plotted. These photographs are of the lunar farside and offer good coverage of the equatorial area from 170.0° east to 90.0° east longitude. Several high obliques were taken that cover crater Tsiolkovsky and Mare Moscoviense.

The remainder of this magazine is concentrated on transearth coast (TEC). Most of the frames show an eastern look at the receding lunar sphere, with a few photographs of the distant earth crescent.

APOLLO 13 PHOTOGRAPHY

Magazine (L) AS13- 60- ____ Film 70mm GEX (SO 368)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8577		250mm		Not Plottable					Fair		Horizon View of Earth Over Water
8578		"		"					Good		Southern End of Baja California With Mexican Mainland in Background
8579		"		"					"		Docking Sequence of Lunar Module
thru 8581		"		"					"		"
8582		"		"					"		Close up of LM w/S IV B* Seen in Background
8583		"		"					"		S IV B* With LM RCS (Thrusters) in Foreground
thru 8587		"		"					"		"
8588		"		"					"		Earth Disc With Terminator at Gulf of Mexico; Baja Calif. & W. Mexico
8589		"		"					"		at Center Probably S IV B* in Distance
8590		"		"					"		Earth Disc W/Terminator off West Coast of U. S. Storm Cloud Formation.
8591		"		"					"		Earth Disc with Pacific Cold Front Seen in Cloud Formation. Mainland
thru 8600		"		"					"		of Asia on horizon. Yellow Sea, Korea, S. E. Asia Visible in Last Frame
8601		"		"					"		Earth Disc. Florida, Yucatan Seen Between Cloud Formations
8602		"		"					"		Part of S. America Seen Faintly
8603		"		"					Poor		Dark
8604		"		"					"		Dark

*Saturn IV Booster.

APOLLO 13 PHOTOGRAPHY

Magazine (L)AS13- 60- Film 70mm CEX (SO 368)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8605		250mm		Not Plottable					Poor		Terminator-Horizon on Moon, Very Faint
8606		"		"					"		Same as Above Slightly Brighter
8607		"		"					"		Very Faint Lunar Surface Not Discernible
thru 8624		"		"					"		"
8625		"		"		High Oblique			Good		Lunar Horizon With Crater Tsiolkovsky at Center
8626		"		"		"			"		"
8627		"		"					Poor		Very Faint Lunar Features
8628		"		"					"		"
8629		"	1:4,000,000	7.5°S	137.5° East	Near Vertical	50%	20-30°	Fair	84	Midway Between Craters 288 and 293, Farside
8630		"	"	6.5°S	138.5° East	"	"	"	"	"	"
8631		"	"	4.5°S	134.5° East	"	0%	"	"	"	N.E. Tsiolkovsky Lunar Farside
8632		"	"	7.5°S	127°E	NE	"	"	"	"	N. Tsiolkovsky Lunar Farside
8633		"		Not Plottable		High Oblique	95%	"	"	"	Farside Crater Tsiolkovsky
8634		"		"		"	"	"	"	"	"
8635		"	1:4,500,000	9.5°S	163°E	"	80%	"	"	85	Horizon Photo of Crater 302
8636		"	"	4.5°S	157°E	"	"	"	"	"	Farside Oblique Crater 302

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APOLLO 13 PHOTOGRAPHY

Magazine (L)AS13- 60 Film 70mm CEX (SO-368)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8637		250mm	1:4,000,000	15.5° South	128°E	High Oblique	70%	25-35°	Good	101	Farside Crater Tsiolkovsky
8638		"	"	19°S	121°E	"	70%	"	"	"	"
8639		"	"	13°S	107°E	"	80%	"	"	82	Farside Lunar Horizon-Craters 271,274,276
8640		"	"	4.5°S	106°E	"	80%	"	"	"	Farside Crater 273
8641		"	"	5.5°S	108.5° East	"	80%	"	"	"	Farside Craters 273 & 276
8642		"	"	5°S	122°E	Med. Oblique	0%	"	"	83	Farside Crater 283
8643		"	"	19.5°S	115.5° East	High Oblique	40%	"	"	101	Farside Lunar Horizon-Crater 272
8644		"		Not Plottable		"	40%	"	"	"	"
8645		"	"	16°S	106°E	"	85%	"	"	100	"
8646		"	"	14°S	109.5° East	"	85%	"	"	82	"
8647		"	"	18°N	152°E	"	50%	"	"	49	Oblique Near Mare Moscoviense
8648		"	"	24°N	144°E	"	50%	"	"	48	Oblique of Mare Moscoviense
8649		"	"	9°N	162.5° East	"	20%	"	"	68	Farside Lunar Horizon-Crater 220
8650		"	"	20°N	157.5° East	"	20%	"	"	50	Farside Lunar Horizon-Crater 219
8651		"	"	16.5°N	151.5° East	"	90%	"	"	50	Farside Lunar Horizon
8652		"	"	11°N	150.5° East	"	90%	"	"	68	Farside Lunar Horizon-Basin IX

APOLLO 13 PHOTOGRAPHY

Magazine (L)AS13- 60 Film 70mm CEX (SO 368)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8653		250mm	1:4,000,000	26°N	130°E	High Oblique	0%	30-40°	Good	48	Mare Moscoviense
8654		"	"	6°S	141°E	"	"	"	"	84	Lunar Horizon W/Crater 293
8655		"	"	10°N	130°E	Low Oblique	"	"	"	65	Lunar Farside Crater 215
8656		"	1:4,500,000	25°N	135°E	High Oblique	"	"	"	48	High Oblique Above Mare Moscoviense
8657		"		Not Plottable		"		"	"		North of LOC Area, Not Identified
8658		"	1:4,500,000	19°S	129°E	"	95%	"	"	101	Farside Crater Tsiolkovsky
8659		"	"	19.5°S	129°E	"	"	"	"	"	"
8660		"	"	10°S	148.5° East	"	0%	"	"	85	Farside Craters 295 & 297
8661		"	1:7,500,000	10° N	131°E	Med. Oblique	15%	"	"	66	Farside Crater 215
8662		"	"	1°N	133.5° East	"	"	"	"	"	Farside Low Oblique
8663		"	"	11.5° North	123.5° East	Near Vertical	90%	"	"	65	Farside Crater 212
8664		"	"	11°N	123°E	"	"	"	"	"	"
8665		"	"	11°N	119.5° East	Low Oblique	75%	"	"	"	Farside Craters 212 & 208
8666		"		Not Plottable		High Oblique		"	"		High Oblique Toward North Off of LOC
8667		"	1:7,500,000	15.5° North	144°E	"	0%	"	"	66	Farside High Oblique
8668		"	"	1.5°N	125.5° East	Near Vertical	"	"	"	65	Lunar Farside Part of Crater 211

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APOLLO 13 PHOTOGRAPHY

Magazine (L)AS13- 60 Film 70mm CEX (SO 368)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point		Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
				Lat	Long						
8669		250mm		Not Plottable					Good		High Oblique Across Mare Australe
8670		"		"					"		Quarter Disc-Mare Crisium,Mare Marginis,Crater Joliot-Curie
8671		"		"					"		Mare Crisium,Mare Marginis,Mare Smythii, Crater Joliot-Curie
8672		"		"					"		Mare Tranquillitatis, Serenitatis, Bright Crater Proclus in Foreground
8673		"		"					"		Mare Crisium, Part of Tranquillitatis, All of Mare Serenitatis
8674		"		"					"		Mare Australe (upper right) Mare Frigoris at Left Near Horizon
8675		"		"					"		Bruno-Bright Crater, and J. Curie
8676		"		"					"		Mare Smythii at Lower Left
8677		"		"					"		Bruno at Very Top
8678		"		"					"		Langrenus at Lower Right. Fecunditatis and Tranquillitatis at Right Side
8679		"		"					"		Langrenus at Lower Right. Mare Nectaris at Upper Center
8680		"		"					"		Mare Crisium Lower Center With Tranquillitatis and Serenitatis Above
8681		"		"					"		Tsiolkovsky With Mare Australe At Right Corner
8682		"		"					"		Bright Crater Bruno. Mare Crisium is at Lower Left
8683		"		"					"		Crisium, Tranquillitatis, Fecunditatis, Serenitatis
8684		"		"					"		"

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Magazine (L) AS13- 60 Film 70mm CEX (SO 368)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8685		250mm		Not Plottable					Good		Mare Crisium at Center With Bright Crater Proclus
8686		"		"					"		Humboldt at Left Edge. Fecundatis at Bottom Center
8687		"		"					"		Crater Langrenus at Bottom Center
8688		"		"					"		Mare Australe at Top, Humboldt Crater at Left Center. Mare Nectaris lower right
8689		"		"					"		Mare Nectaris at Right Edge
8690		"		"					"		Mare Nectaris at Bottom Right
8691		"		"					"		Mare Crisium at Upper Right
8692		"		"					"		Mare Australe Right. Craters Hercules & Atlas at Lower Center
8693		"		"					"		Front Side Mares
8694		"		"					"		Mare Crisium at Left Center. Bruno Crater at Upper Right
8695		"		"					"		Mare Nectaris at Right Edge
8696		"		"					"		Looking East Past Mare Crisium
8697		"		"					"		Looking Northeast Past Mare Crisium
8698		"		"					"		Lunar Disc
8699		"		"					"		Tsiolkovsky Visible
8700		"		"					"		Lunar Disc

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APOLLO 13 PHOTOGRAPHY

Magazine (L)AS13- 60 Film 70mm CEX (SO 368)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8701		250mm		Not Plottable					Good		Lunar Disc With Very Rough Region Near South Pole
8702		"		"					"		Half the Lunar Disc
8703		"		"					"		Lunar Disc
8704		"		"					"		"
8705		"		"					"		"
8706		"		"					Blurred		Undiscernible
8707		"		"					Good		Lunar Disc
8708		"		"					"		"
8709		"		"					"		"
8710		"		"					"		"
8711		"		"					"		"
8712		"		"					"		"
8713		"		"					"		"
8714		"		"					"		"
8715		"		"					"		"
8716		"		"					"		Quarter Earth With Cloud Cover

APOLLO 13 PHOTOGRAPHY

Magazine (L) AS13-60 Film 70mm CEX (SO 368)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8717		250mm		Not Plottable					Good		Quarter Earth With Cloud Cover
8718		"		"					"		Lunar Disc
8719		"		"					"		"
8720		"		"					"		Earth Crescent
8721		"		"					"		"
8722		"		"					"		Lunar Disc
8723		"		"					"		"
8724		"		"					"		"
8725		"		"					"		Earth Crescent
8726		"		"					"		"

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MAGAZINE N

Frames AS13-58-8456 through 8481

This short magazine of 70-mm CEX (SO-368) film consists of 26 frames, taken with a 250-mm lens, showing the separated command service module (CSM). The quality of the photography is fair and shows the service module as it slowly turns around and end-over-end.

APOLLO 13 PHOTOGRAPHY

Magazine (N)AS13- 58 Film 70mm GEX (SO 368)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8456		250mm		Not Plottable					Fair		Sequence of Photographs of the
8457		250mm		Not Plottable					Fair		Separated Service Module as it
8458		250mm		Not Plottable					Fair		Slowly Turns From End to Side
8459		250mm		Not Plottable					Fair		To The Other Side
8460		250mm		Not Plottable					Fair		"
8461		250mm		Not Plottable					Fair		"
8462		250mm		Not Plottable					Fair		"
8463		250mm		Not Plottable					Fair		"
8464		250mm		Not Plottable					Fair		"
8465		250mm		Not Plottable					Fair		"
8466		250mm		Not Plottable					Fair		"
8467		250mm		Not Plottable					Fair		"
8468		250mm		Not Plottable					Fair		"
8469		250mm		Not Plottable					Fair		"
8470		250mm		Not Plottable					Fair		"
8471		250mm		Not Plottable					Fair		"

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Magazine (N) AS13- 58 Film 70mm CEX (SO 368)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8472		250mm		Not Plottable					Good		(cont.) Sequence of Photographs
8473		250mm		Not Plottable					Good		of the Separated Service Module
8474		250mm		Not Plottable					Good		as it Slowly Turns From End to
8475		250mm		Not Plottable					Good		Side to the Other End
8476		250mm		Not Plottable					Good		"
8477		250mm		Not Plottable					Good		"
8478		250mm		Not Plottable					Good		"
8479		250mm		Not Plottable					Good		"
8480		250mm		Not Plottable					Good		"
8481		250mm		Not Plottable					Good		"

NASA — MSC

MAGAZINE R

Frames AS13-59-8482 through 8576

This black and white Panatomic-X (3400) magazine contains frames taken immediately before and immediately after the separation of the command service module (CSM) and jettison of the lunar module. The general quality of the imagery is fair.

The magazine sequence begins inside the command module, with photographs of Astronauts Haise and Swigert and of portions of the instrument panel.

There is a long sequence showing the separation of the CSM and the command module, with the earth crescent seen at first, then the separated CSM with the lunar disc in the distant background.

The final sequence is of the lunar module beginning its separation from the command module, becoming separated, and gradually falling behind.

APOLLO 13 PHOTOGRAPHY

Magazine (R)AS13- 59 Film 70mm BW (3400)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8482		80mm		Not Plottable					Blurred		Interior of Command Module. Black & White
8483		80mm		Not Plottable					Poor		Astronaut Haise in Command Module
8484		80mm		Not Plottable					Blurred		Astronaut Swigert in Command Module
8485		80mm		Not Plottable					Fair		Interior of Command Module
8486		80mm		Not Plottable					Fair		Showing Portion of Panel
8487		80mm		Not Plottable					Fair		and Astronaut.
8488		80mm		Not Plottable					Fair		"
8489		80mm		Not Plottable					Fair		"
8490		80mm		Not Plottable					Fair		"
8491		80mm		Not Plottable					Fair		"
8492		250mm		Not Plottable					Fair		Earth Crescent
8493		250mm		Not Plottable					Fair		Earth Crescent
8494		250mm		Not Plottable					Fair		Earth Crescent
8495		250mm		Not Plottable					Fair		Earth Crescent
8496		250mm		Not Plottable					Fair		Earth Crescent
8497		250mm		Not Plottable					Fair		Earth Crescent

APOLLO 13 PHOTOGRAPHY

Magazine (R) AS13- 59 Film 70mm BW (3400)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8498		250mm		Not Plottable					Fair		Earth Crescent
8499		250mm		Not Plottable					Fair		Earth Crescent
8500		250mm		Not Plottable					Fair		After Separation of Service Module, With Moon in Distant Background
8501		250mm		Not Plottable					Fair		and Command Module in Foreground "
8502		250mm		Not Plottable					Fair		Edge of Command Module
8503		250mm		Not Plottable					Fair		Edge of Command Module
8504		250mm		Not Plottable					Fair		Edge of Command Module
8505		250mm		Not Plottable					Fair		Edge of Command Module With Small Lunar Disc in Background.
8506		250mm		Not Plottable					Fair		Edge of Command Module With Small Lunar Disc in Background
8507		250mm		Not Plottable					Fair		Edge of Command Module With Small Lunar Disc in Background
8508		250mm		Not Plottable					Fair		Portion of Service Module
8509		250mm		Not Plottable					Fair		Edge of Command Module With Moon in Background
8510		250mm		Not Plottable					Fair		Edge of Command Module With Moon in Background
8511		250mm		Not Plottable					Fair		Edge of Command Module With Moon in Background
8512		250mm		Not Plottable					Fair		Command Module and Separated Service Module With Moon in Background
8513		250mm		Not Plottable					Fair		

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APOLLO 13 PHOTOGRAPHY

Magazine (R)AS13-59 Film 70mm BW (3400)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8514		250mm		Not Plottable					Fair		Command Module and Separated Service Module With Moon in Background
8515		250mm		Not Plottable					Fair		Command Module and Separated Service Module With Moon in Background
8516		250mm		Not Plottable					Fair		Command Module and Separated Service Module With Moon in Background
8517		250mm		Not Plottable					Fair		Service Module and Distant Moon
8518		250mm		Not Plottable					Fair		Service Module and Distant Moon
8519		250mm		Not Plottable					Fair		Service Module and Distant Moon
8520		250mm		Not Plottable					Fair		Service Module and Distant Moon
8521		250mm		Not Plottable					Fair		Service Module and Distant Moon
8522		250mm		Not Plottable					Fair		Service Module and Distant Moon
8523		250mm		Not Plottable					Fair		Service Module and Distant Moon
8524		250mm		Not Plottable					Fair		Service Module and Distant Moon
8525		250mm		Not Plottable					Fair		Service Module and Distant Moon
8526		250mm		Not Plottable					Fair		Service Module and Distant Moon
8527		250mm		Not Plottable					Fair		Service Module and Distant Moon
8528		250mm		Not Plottable					Fair		Service Module and Distant Moon
8529		250mm		Not Plottable					Fair		Service Module and Distant Moon

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APOLLO 13 PHOTOGRAPHY

Magazine (R)AS13-59 Film 70mm BW (3400)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8530		250mm		Not Plottable					Fair		Service Module and Distant Moon
8531		250mm		Not Plottable					Fair		Service Module and Distant Moon
8532		250mm		Not Plottable					Fair		Service Module and Distant Moon
8533		250mm		Not Plottable					Fair		Service Module and Distant Moon
8534		250mm		Not Plottable					Fair		Service Module and Distant Moon
8535		250mm		Not Plottable					Fair		Service Module and Distant Moon
8536		250mm		Not Plottable					Fair		Service Module and Distant Moon
8537		250mm		Not Plottable					Fair		Service Module and Distant Moon
8538		250mm		Not Plottable					Fair		Service Module and Distant Moon
8539		250mm		Not Plottable					Fair		Service Module and Distant Moon
8540		250mm		Not Plottable					Fair		Service Module and Distant Moon
8541		250mm		Not Plottable					Fair		Service Module and Distant Moon
8542		250mm		Not Plottable					Fair		Service Module and Distant Moon
8543		250mm		Not Plottable					Fair		Service Module and Distant Moon
8544		250mm		Not Plottable					Fair		Service Module and Distant Moon
8545		250mm		Not Plottable					Fair		Service Module and Distant Moon

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Magazine (R)AS13- 59 Film 70mm BW (3400)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8546		250mm		Not Plottable					Fair		Service Module and Distant Moon
8547		250mm		Not Plottable					Fair		Service Module and Distant Moon
8548		250mm		Not Plottable					Fair		Service Module and Distant Moon
8550		250mm		Not Plottable					Fair		Beginning the Sequence of
8551		250mm		Not Plottable					Fair		Separation of the Lunar
8552		250mm		Not Plottable					Fair		Module From the Command Module
8553		250mm		Not Plottable					Fair		"
8554		250mm		Not Plottable					Fair		"
8555		250mm		Not Plottable					Fair		"
8556		250mm		Not Plottable					Fair		"
8557		250mm		Not Plottable					Fair		"
8558		250mm		Not Plottable					Fair		"
8559		250mm		Not Plottable=					Fair		"
8560		250mm		Not Plottable					Fair		"
8561		250mm		Not Plottable					Fair		"
8562		250mm		Not Plottable					Fair		"

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APOLLO 13 PHOTOGRAPHY

Magazine (R)AS13-59 Film 70mm BW (3400)

Time Reference — GET _____ = GMT _____

Frame No.	Rev. No.	Camera f Length	Approx. Photo Scale	Principal Point Lat	Principal Point Long	Approx. Tilt Data	Fwd. O/L	Approx Sun Angle	Photo Quality	Photo Index Area	Description
8563		250mm		Not Plottable					Fair		Sequence of Separation of LM
8564		250mm		Not Plottable					Fair		From the CM
8565		250mm		Not Plottable					Fair		"
8566		250mm		Not Plottable					Fair		"
8567		250mm		Not Plottable					Fair		"
8568		250mm		Not Plottable					Fair		"
8569		250mm		Not Plottable					Fair		"
8570		250mm		Not Plottable					Fair		"
8571		250mm		Not Plottable					Fair		"
8572		250mm		Not Plottable					Fair		"
8573		250mm		Not Plottable					Fair		"
8574		250mm		Not Plottable					Fair		Lunar Module Falling Behind
8575		250mm		Not Plottable					Fair		After Separation "
8576		250mm		Not Plottable					Fair		"

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Apollo 13 Sequence Photography (16-mm)

MAGAZINES A, FF, GG, K, and AA

Magazines A, FF, GG, K, and AA are 16-mm color (SO-368) sequence photography of the interiors of the CM and LM, the damaged service module, distant earth and moon shots, and the astronauts. The quality of the photography ranges from good to poor.

Magazine A was taken during translunar coast (TLC) and portrays the LM and CSM docking. Magazine FF was taken during TEC and shows the damaged command service module and distant moon shots. Magazine GG includes photography of the CM interior, the astronauts, and distant earth and moon shots. Magazine K contains photography of the astronauts and the interiors of the CM and LM. Magazine AA shows the astronauts and the interior of the LM.

APOLLO 13 SEQUENCE PHOTOGRAPHY (16mm)

MAG: A-SN1135 FILM: (SO-368)

LENS 18mm

FRAME NUMBER	LOCATION	DESCRIPTION	REMARKS
1-2282	TLC	LM & CSM docking	Photo quality good to
			poor

APOLLO 13 SEQUENCE PHOTOGRAPHY (16mm)

MAG: FF/SN115/ FILM: SO-368

LENS 18mm

FRAME NUMBER	LOCATION	DESCRIPTION	REMARKS
1-2181	TEC	Service Module & distant Moon	Photo quality good to
		Shots	poor

NASA — MSC

LEC 12569

APOLLO 13 SEQUENCE PHOTOGRAPHY (16mm)

MAG: GG/SN 1038/ FILM: SO-368

LENS 18mm

FRAME NUMBER	LOCATION	DESCRIPTION	REMARKS
1-2133	Spacecraft interior	Interior of CM ; Haise is sleeping	Photo quality from
			good to poor
2134-3410	Distant Earth; Moon shot		
3411-5951	Spacecraft interior	Astronauts eating	

APOLLO 13 SEQUENCE PHOTOGRAPHY (16mm)

MAG: K/SN 1030 FILM: SO-368

LENS 18mm

FRAME NUMBER	LOCATION	DESCRIPTION	REMARKS
1-2600	Spacecraft interior	Astronauts doing chores in LM	Quality of photography
2601-4169	Spacecraft interior	Interior CM	good - Poor
4170-5918	Spacecraft interior	Tunnel & interior LM; Astronauts	

NASA — MSC

LEC 12569

APOLLO 13 SEQUENCE PHOTOGRAPHY (16mm)

MAG: AA/SN/142 FILM: SO-368

LENS 18mm

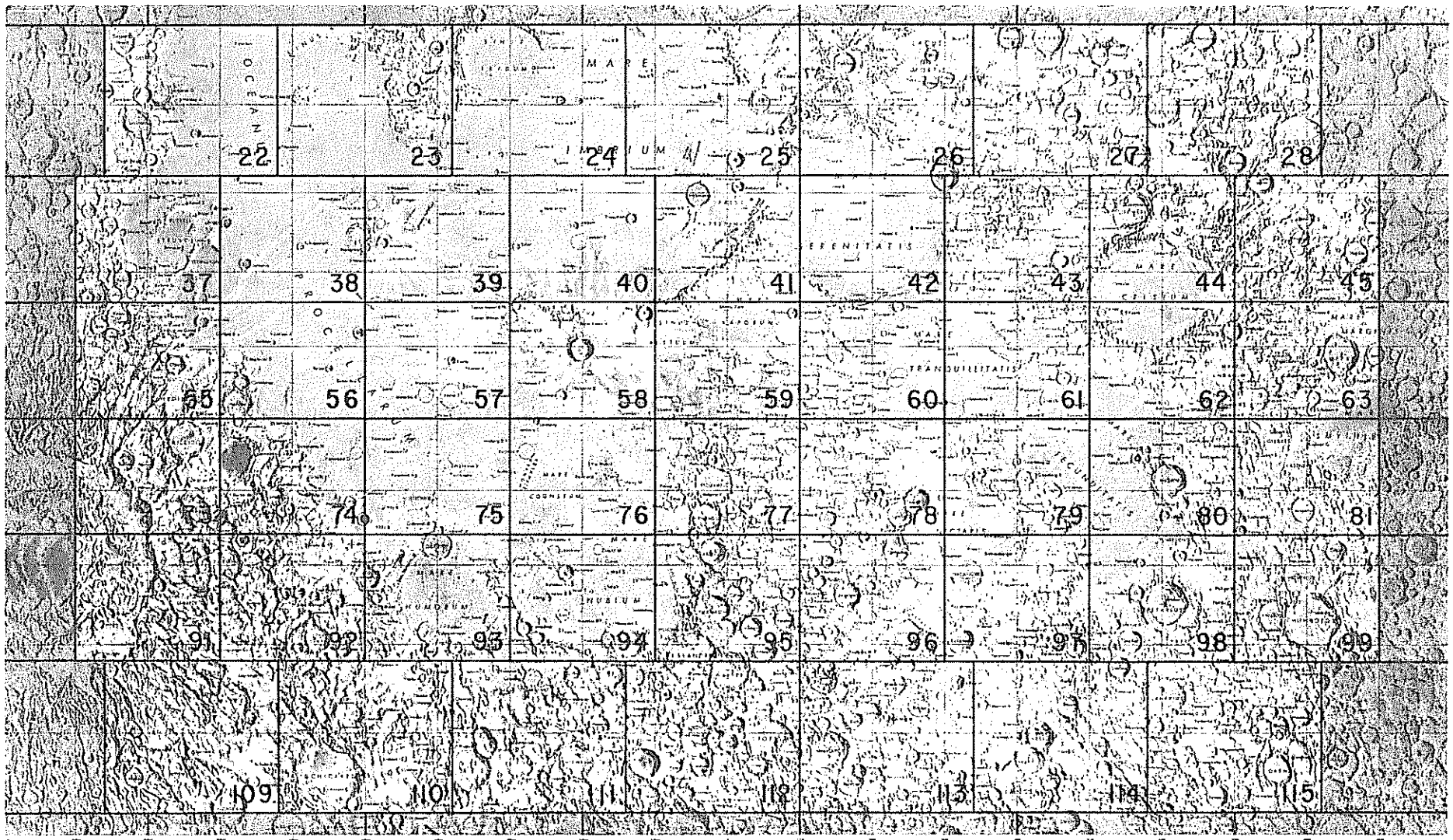
FRAME NUMBER	LOCATION	DESCRIPTION	REMARKS
1-5678	Interior spacecraft	Interior of LM; Astronauts working	Quality of photography
		and sleeping	good to poor.

II.59

PHOTO INDEX AREA LOCATION DIAGRAM

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

LUNAR EARTHSIDE CHART

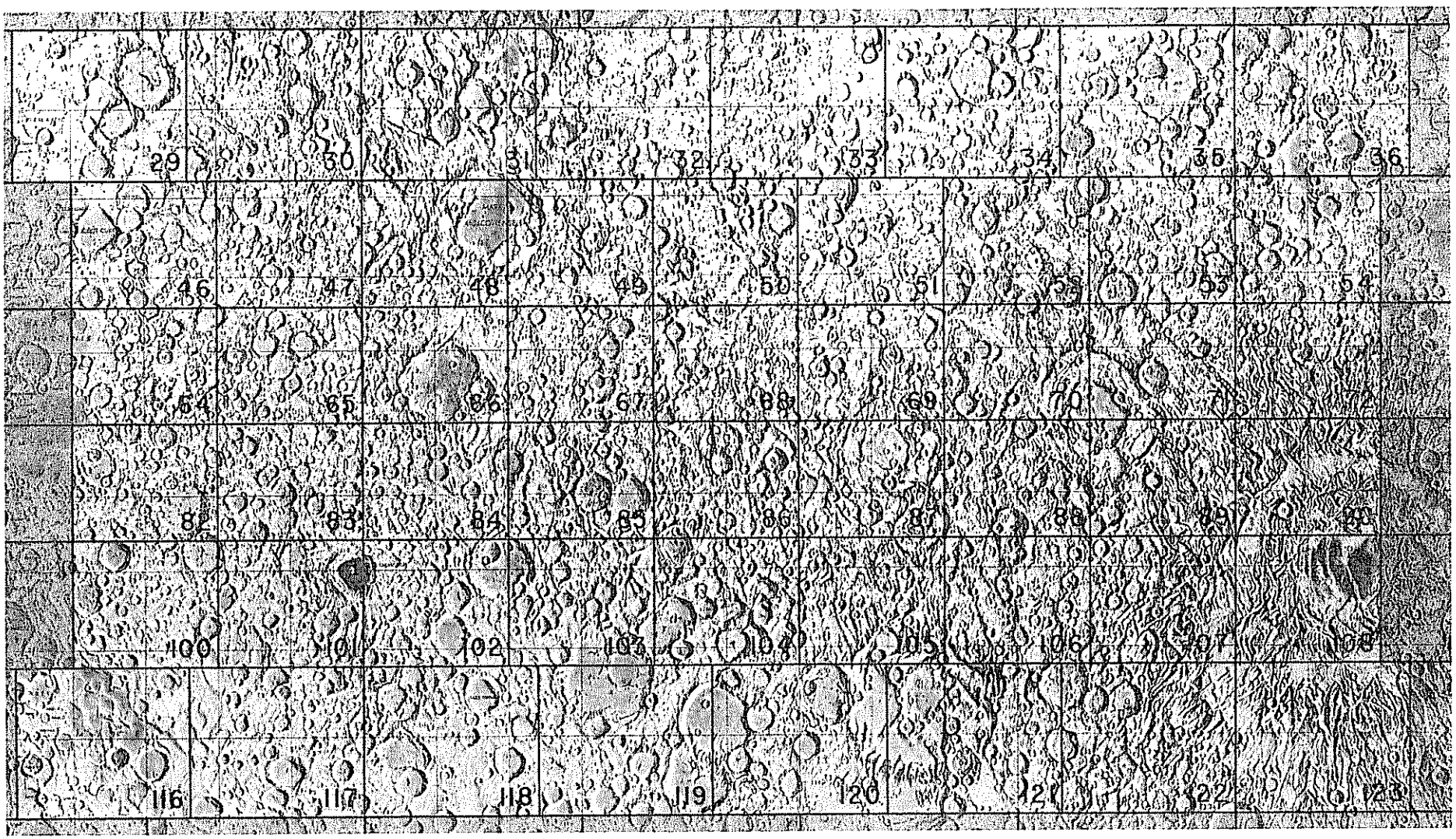


II.60

PHOTO INDEX AREA LOCATION DIAGRAM

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

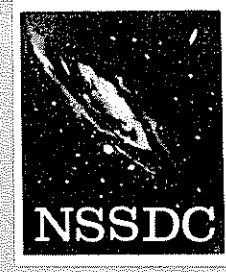
LUNAR FARSIDE CHART



II.61

NASA — MSC

MSC 52 01-70



PART III

APOLLO 13 PHOTOGRAPHIC CATALOG

NATIONAL SPACE SCIENCE DATA CENTER

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION · GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.

Part III

APOLLO 13 PHOTOGRAPHIC CATALOG

Prepared by

Mapping Sciences Laboratory
Manned Spacecraft Center
National Aeronautics and Space Administration
Houston, Texas 77058

Published by

National Space Science Data Center
Goddard Space Flight Center
National Aeronautics and Space Administration
Greenbelt, Maryland 20771

INTRODUCTION

This catalog contains proof prints of 70-mm photographs taken during the Apollo 13 mission. Only photographs of the earth and moon are included; operational and damage assessment photographs have been deleted.

In this catalog, the photographs have been sorted by magazine and by frame number. For example, in AS13-60-8577, AS13 indicates that the photograph is part of the Apollo 13 mission, 60 is the magazine number, and 8577 is the frame number. This numbering scheme is being used for all Apollo missions. In addition, the photographs have been placed so that north is at the top of each page.

This catalog is designed to be used in conjunction with the section on 70-mm photography in part II of this Apollo 13 data package. The information in this section makes it possible to locate the area covered by each frame.

NSSDC will provide reproduction support to individuals and organizations only when the data requested are needed for specific scientific research projects or for use in college-level science courses, in that order. The current policy in satisfying such requests is to furnish limited quantities of lunar reproductions without charge. Nominal charges will be imposed for larger orders. Individuals or organizations that wish to obtain Apollo 13 photographic reproductions for purposes other than use in research projects or college-level science courses should address their requests to:

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Washington, D.C. 20546

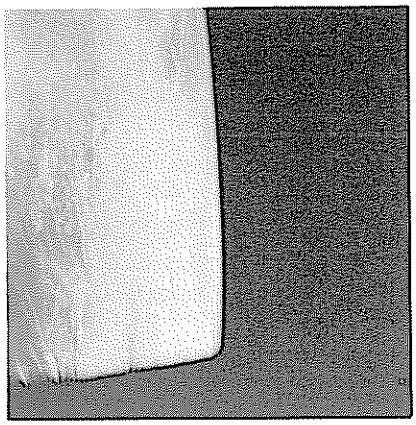
Printed materials to satisfy general information requests are also available from this division. The section on Ordering Procedures in the Data Users' Note for Apollo 13 (Part I) provides more specific instructions on ordering Apollo photography.

The Data Center wishes to thank Mr. James H. Sasser, Chief, Mapping Sciences Laboratory, Manned Spacecraft Center, for providing the original layout pages from which this catalog has been prepared. The work in preparing these pages represents the combined efforts of Mr. Robert Musgrove, Mr. Gary Gutschewski, and Mr. Andrew Patteson, Mapping Sciences Laboratory, and the personnel of Lockheed Electronics Company/Mapping Sciences Department. The document preparation effort at NSSDC was under the direction of Mr. Arthur T. Anderson.

MAGAZINE

L

AS13–60–8577 thru AS13–60–8726



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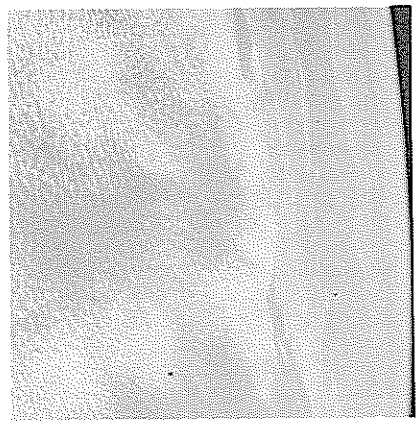


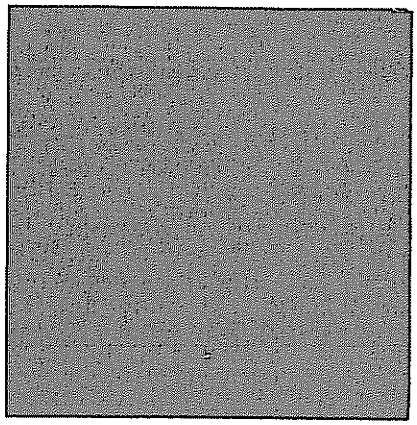
AS 13–60–8578

13–60–8579 thru 13–60–8581
OMITTED
S–IV–B W/LM
PRE–DOCKING

13–60–8582 thru 13–60–8584
OMITTED
LM STOWAGE AREA IN S–IV–B
POST–DOCKING

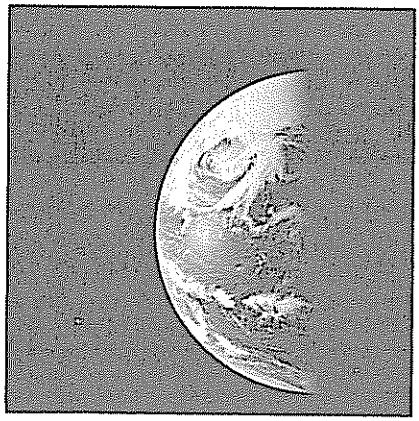
13–60–8585 thru 13–60–8587
OMITTED
DISTANT S–IV–B

AS 13–60–8588



AS13-60-8589

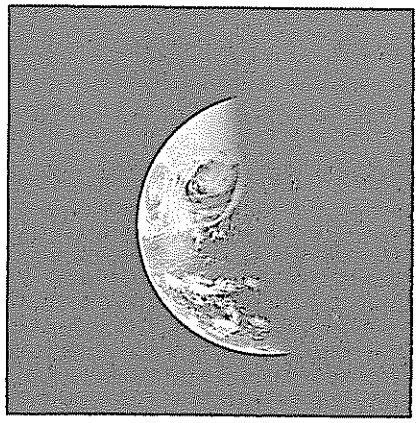
AS13-60-8590



AS13-60-8591

AS13-60-8592

AS13-60-8593



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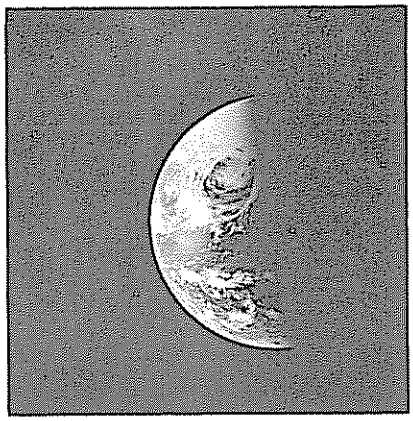

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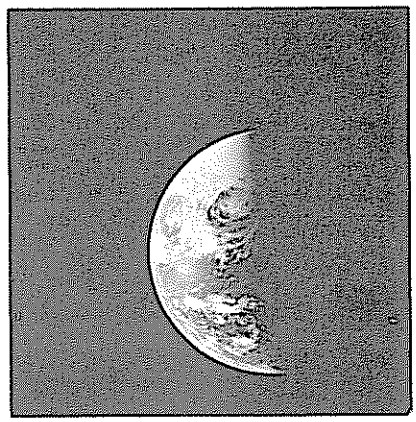

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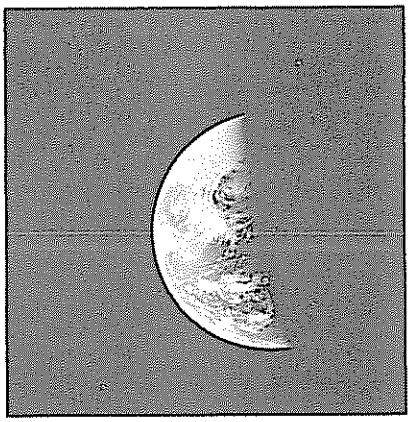

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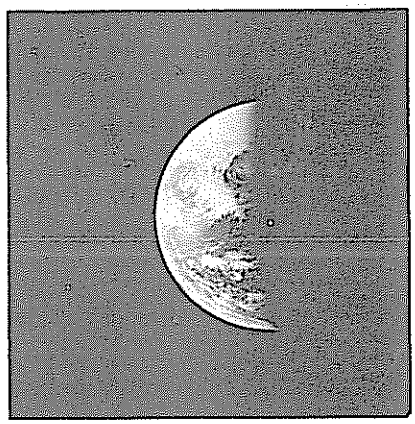

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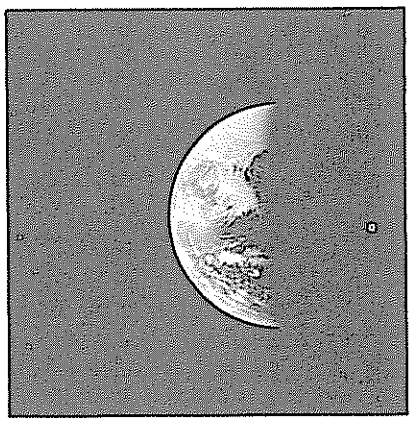

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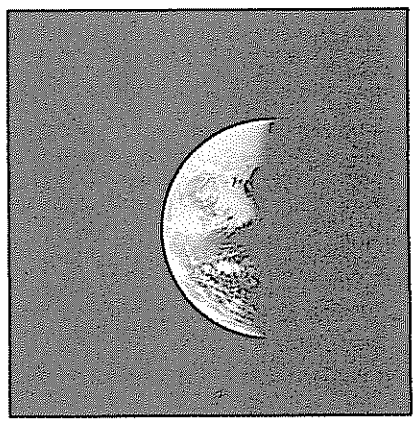

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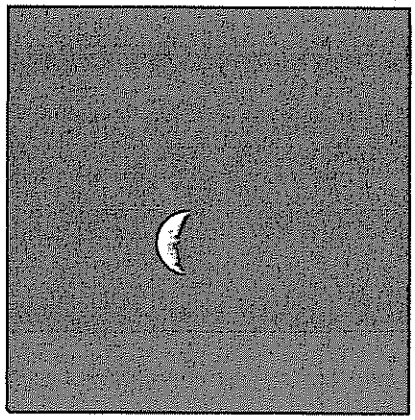

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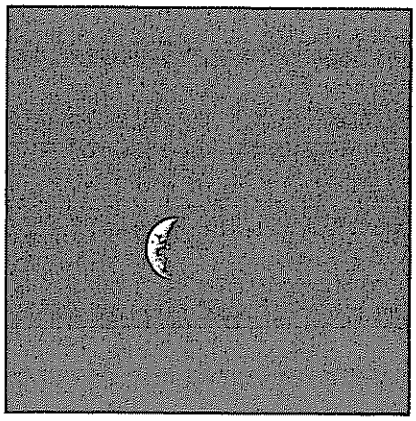

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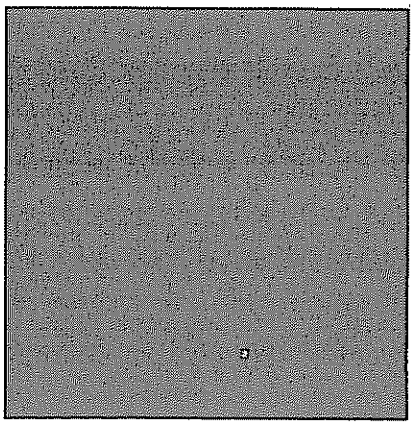

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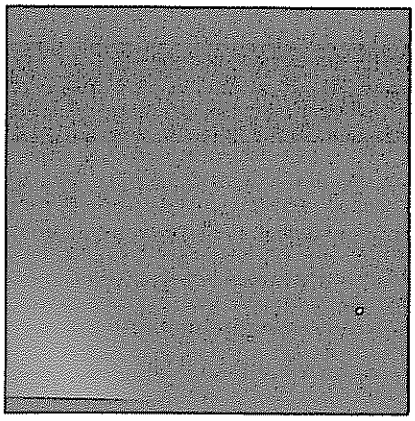

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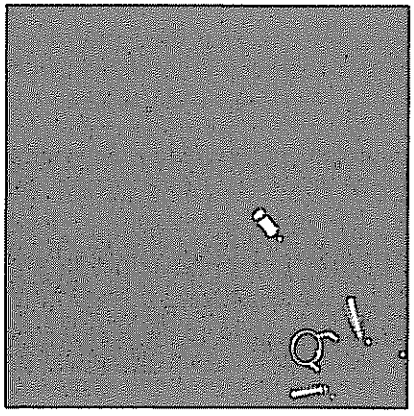

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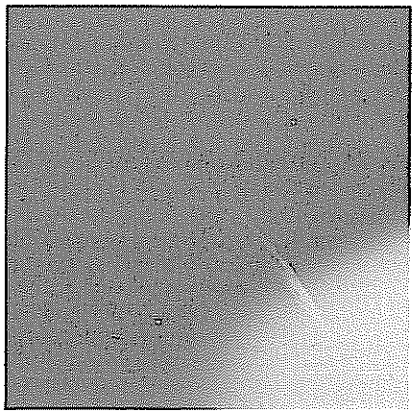

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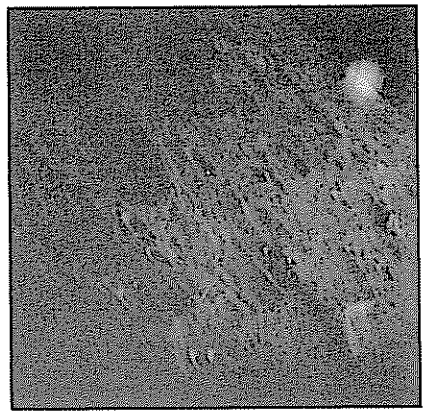

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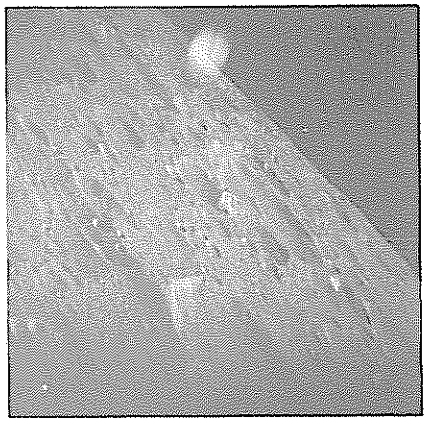

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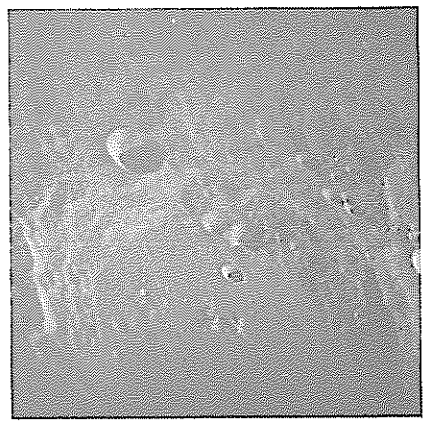

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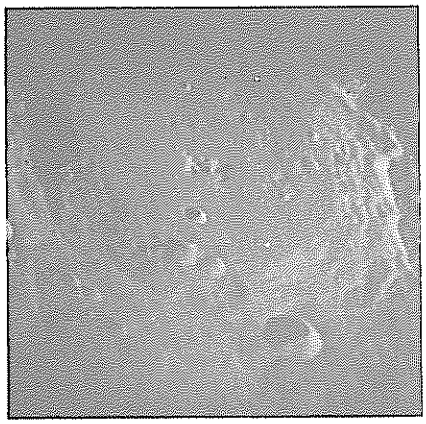

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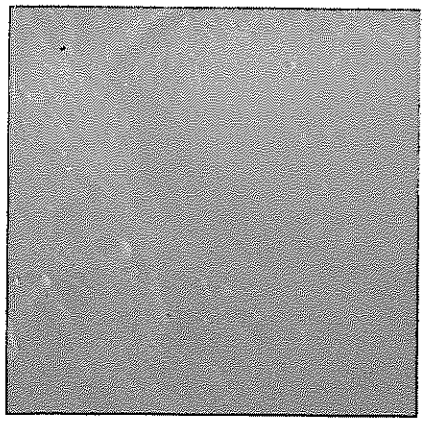

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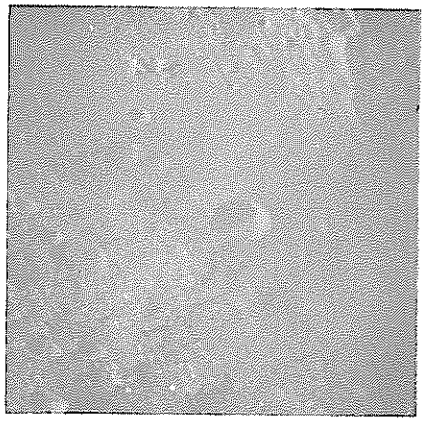

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AS13–60–8615

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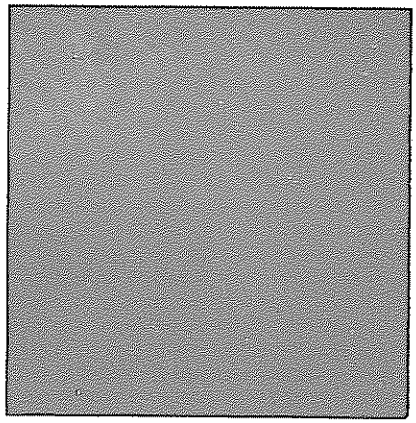

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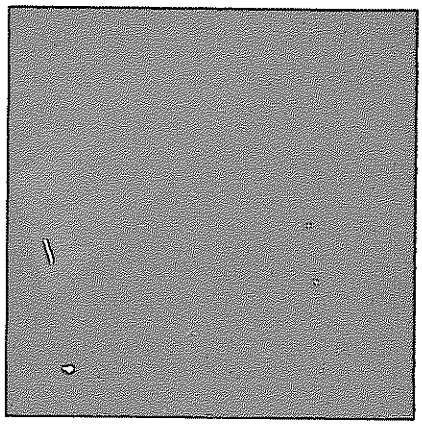

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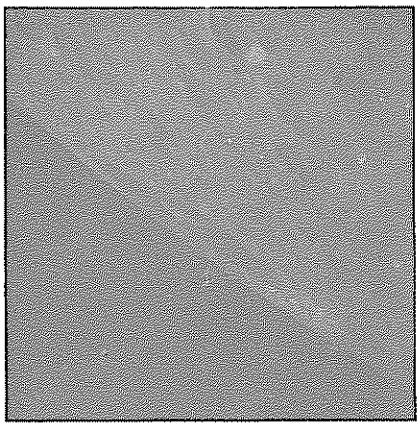

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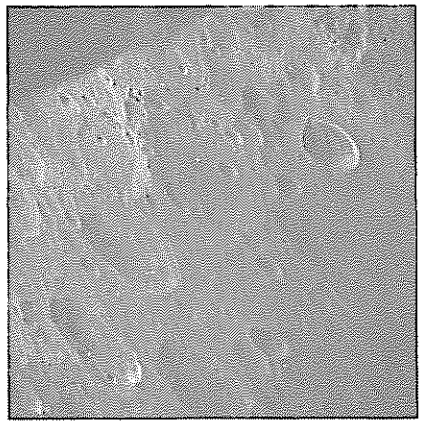

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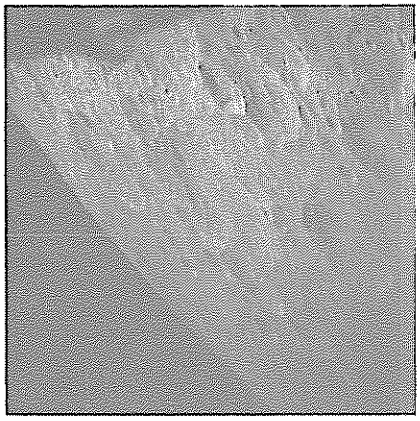

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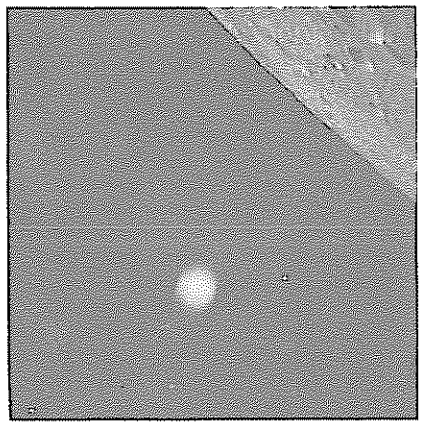

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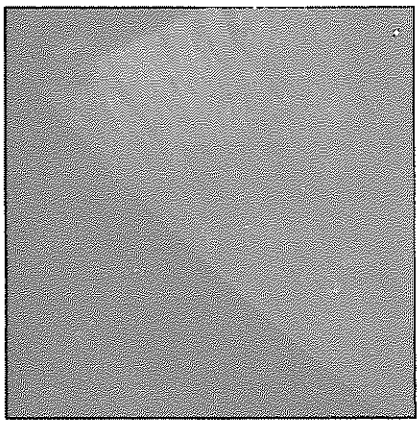

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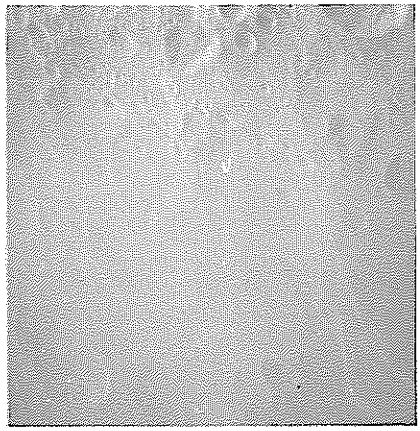

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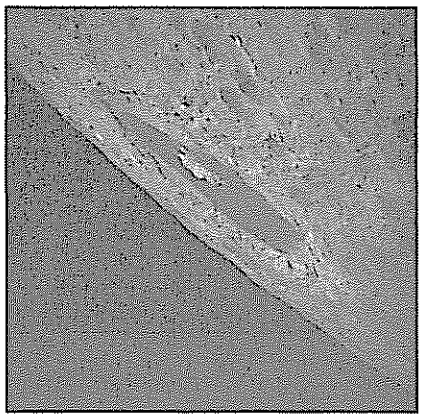

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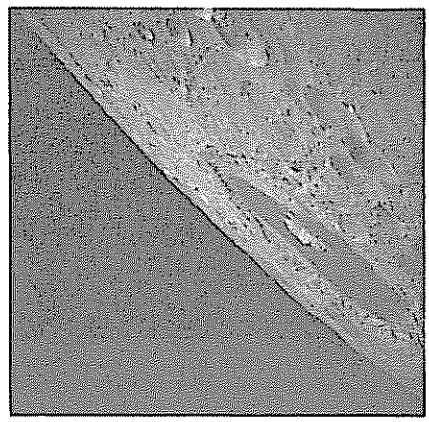

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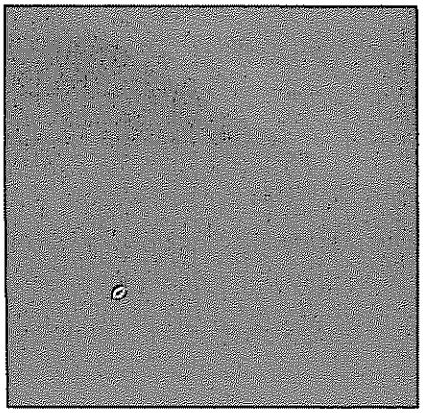

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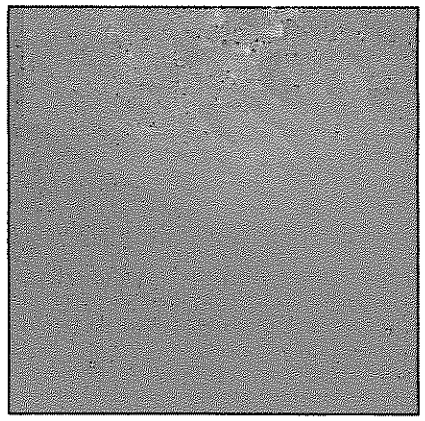

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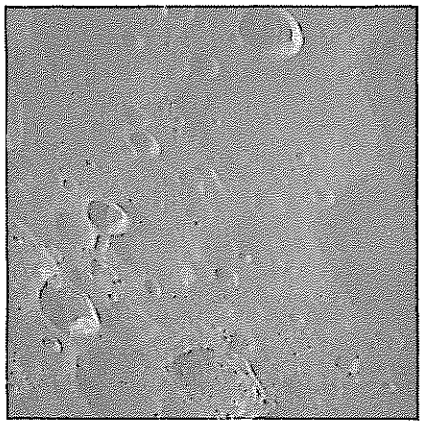

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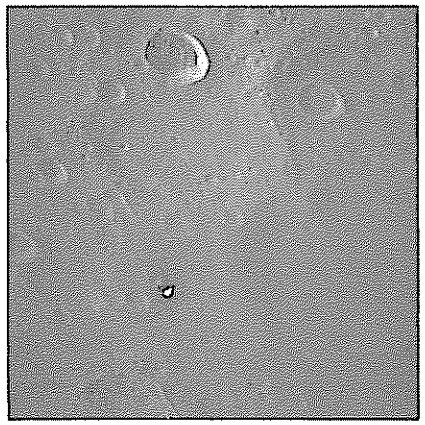

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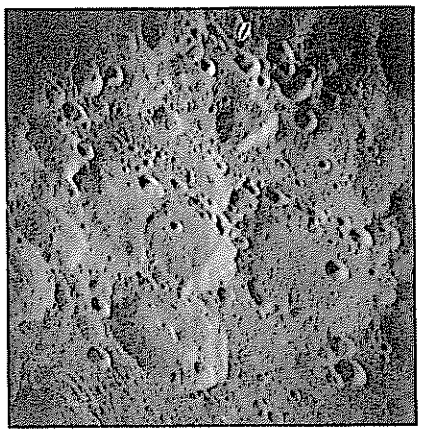

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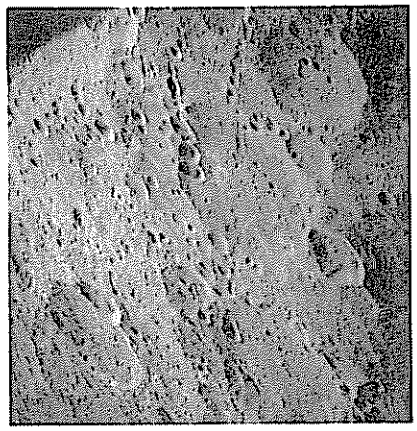

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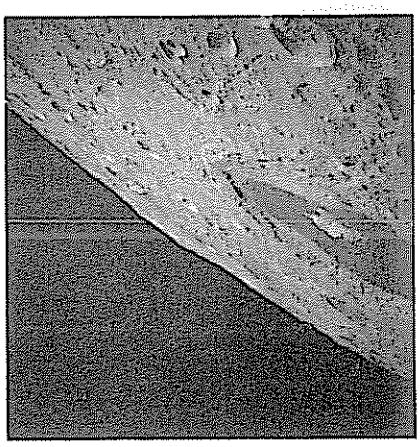

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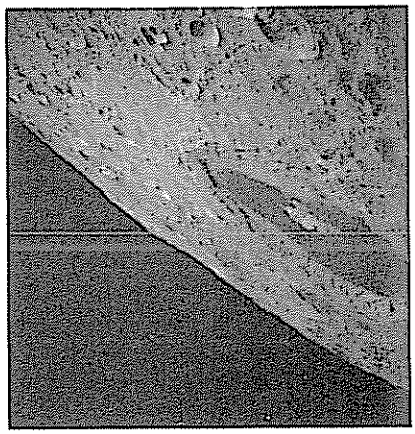

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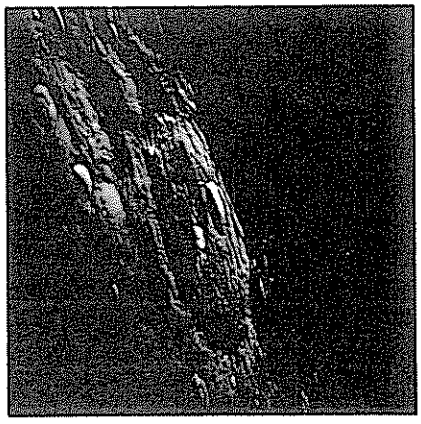

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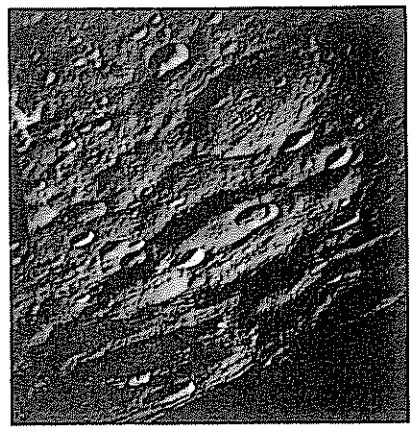

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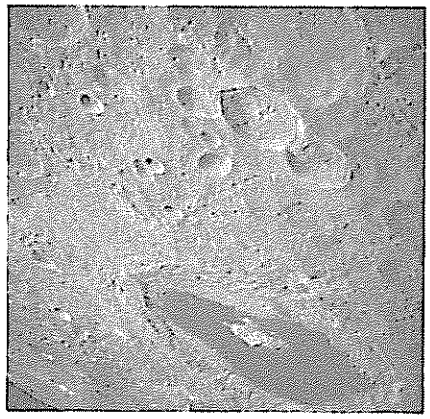

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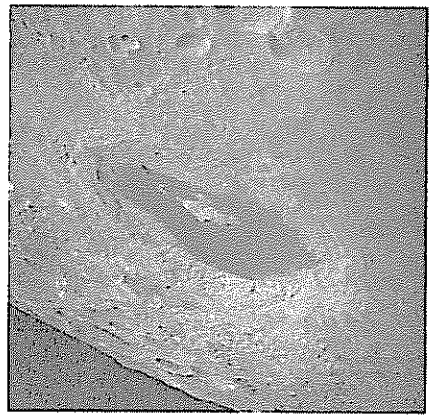
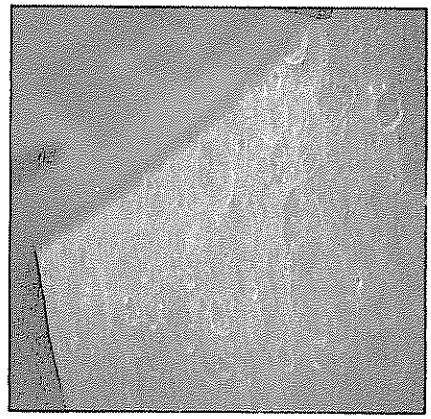
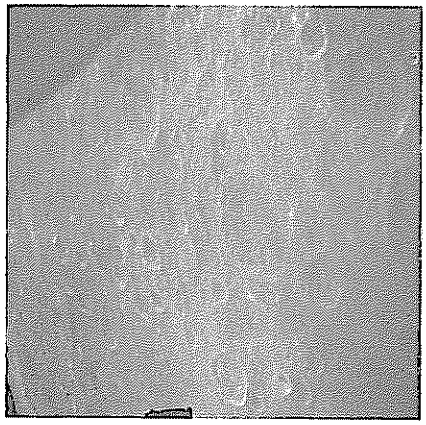


AS13–60–8638

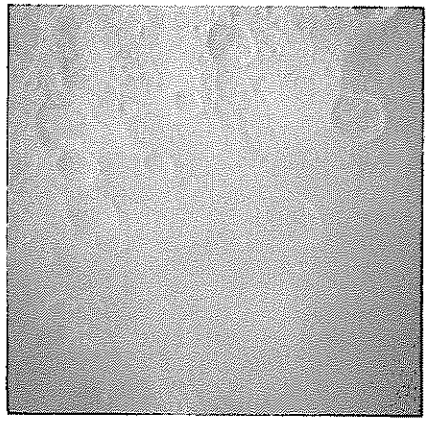
AS13–60–8639



AS13–60–8640



AS13–60–8641



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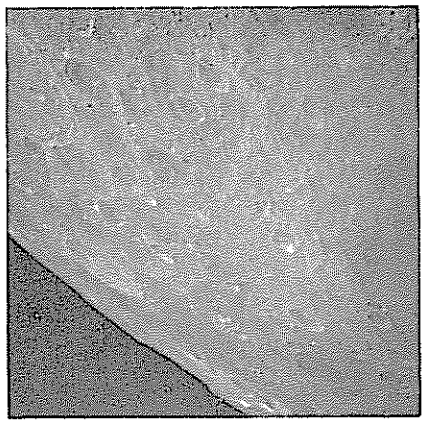

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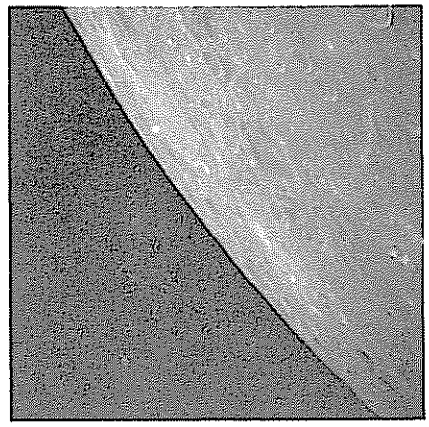

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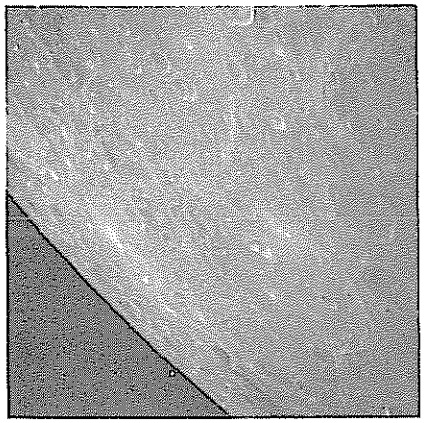

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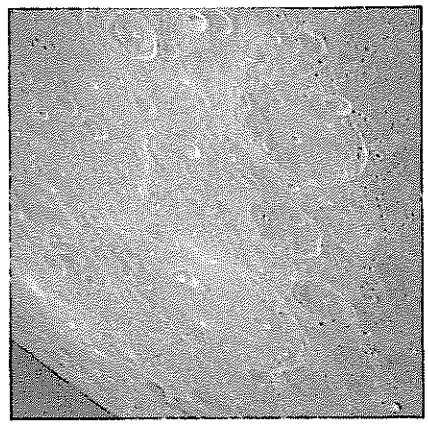

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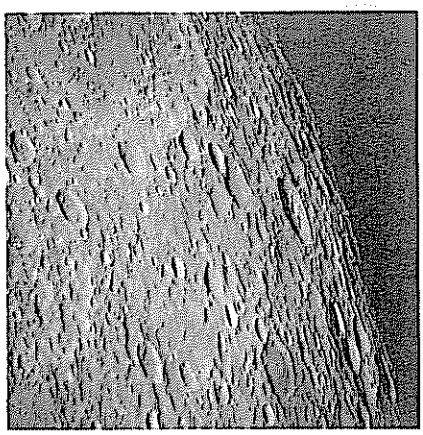

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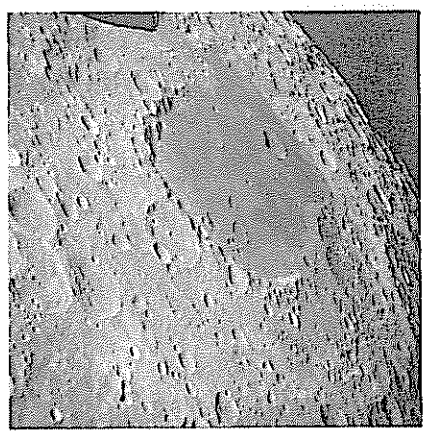

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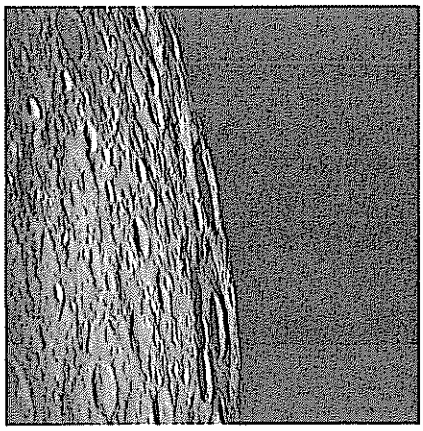

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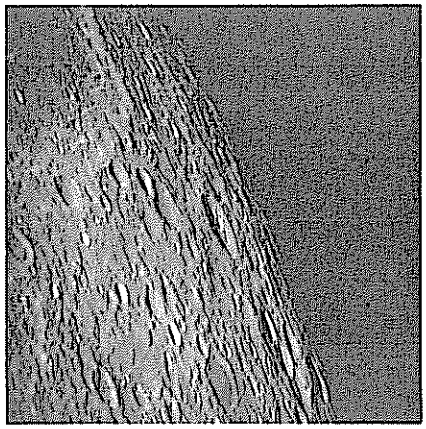

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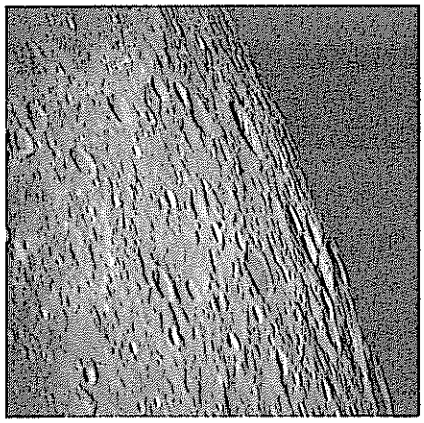

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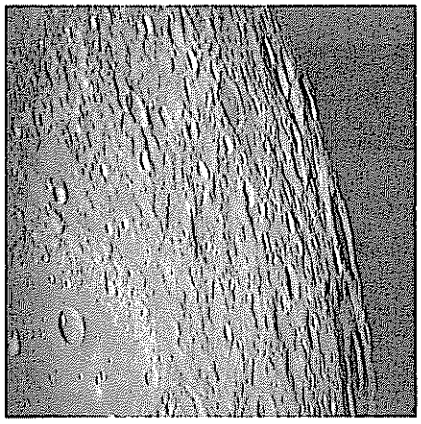

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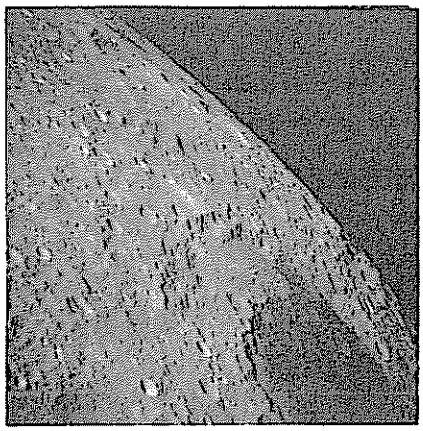

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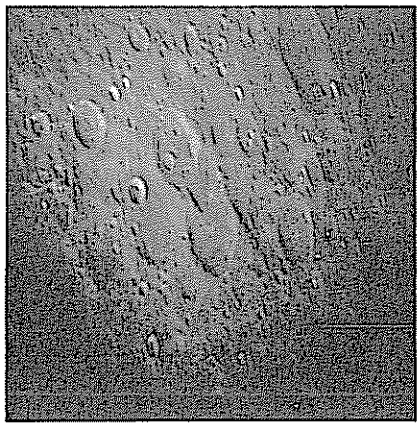

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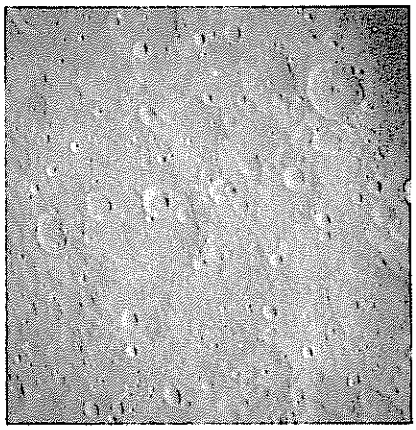

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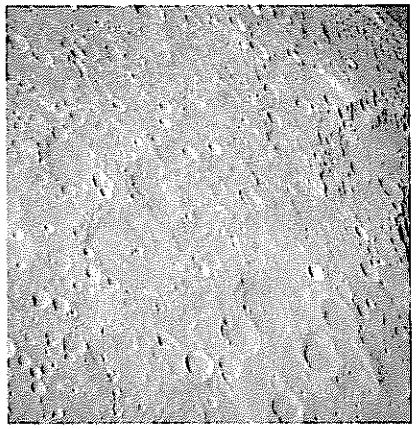

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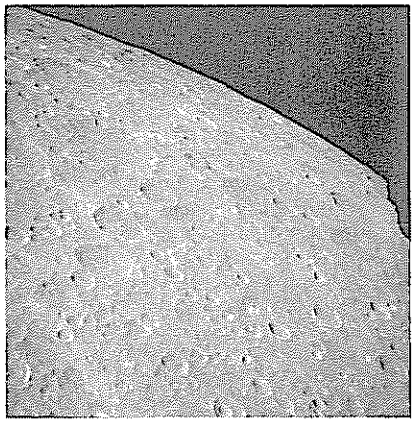

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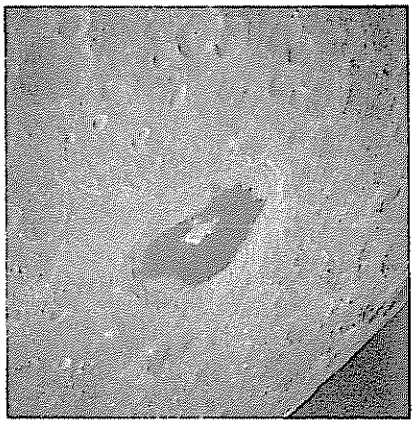

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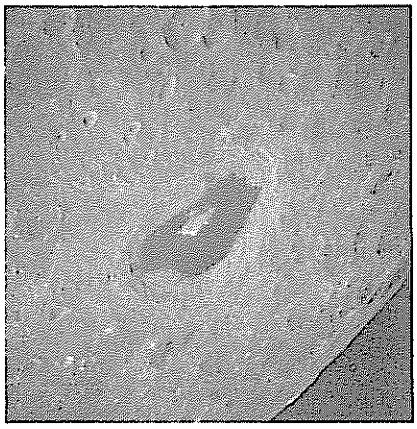

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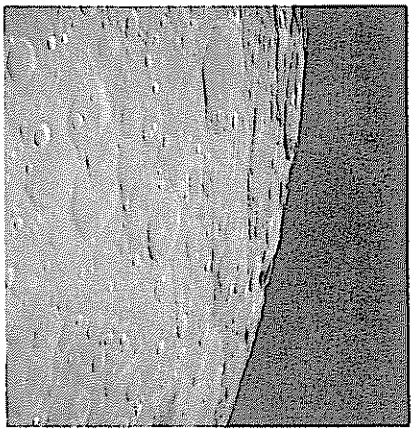

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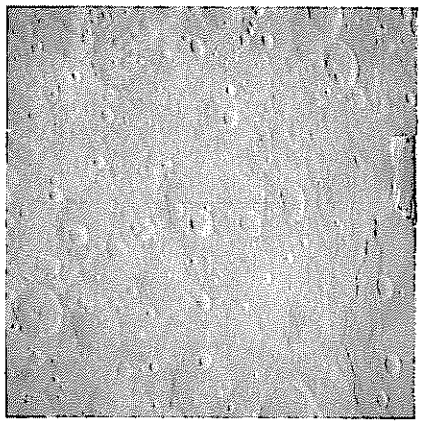

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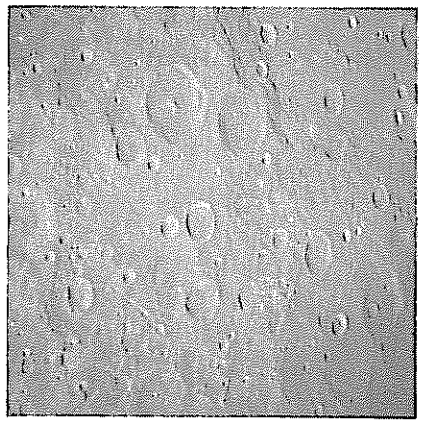

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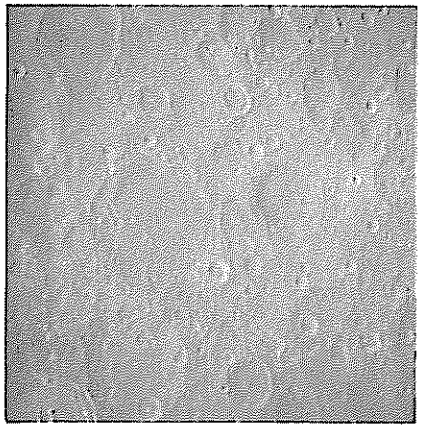

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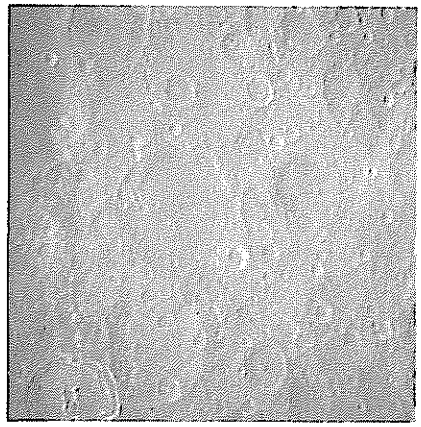

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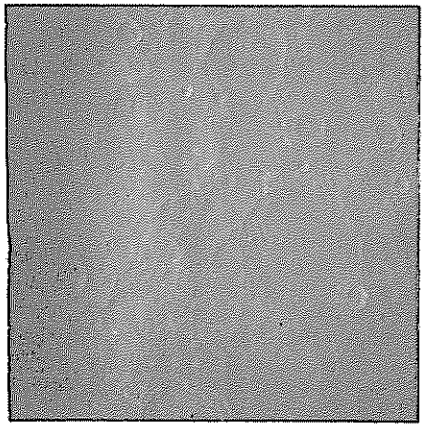

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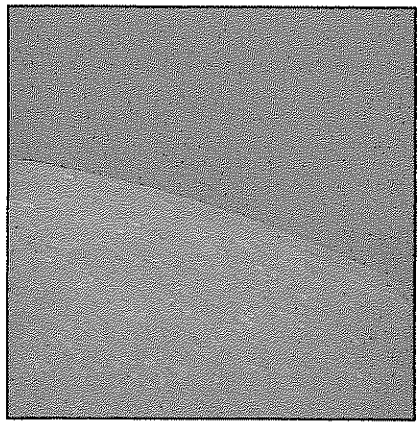

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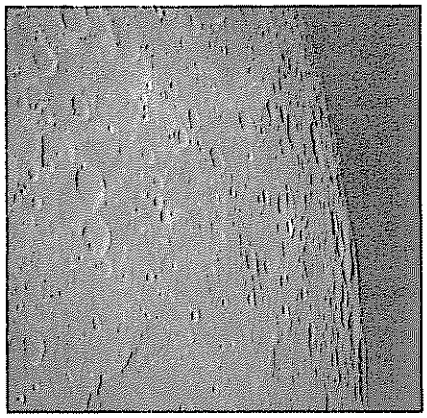

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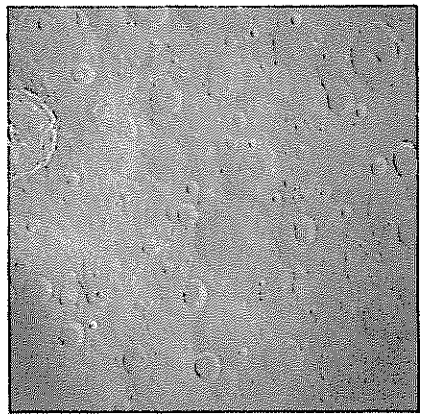

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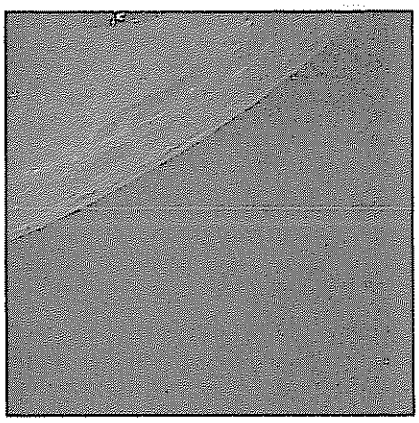

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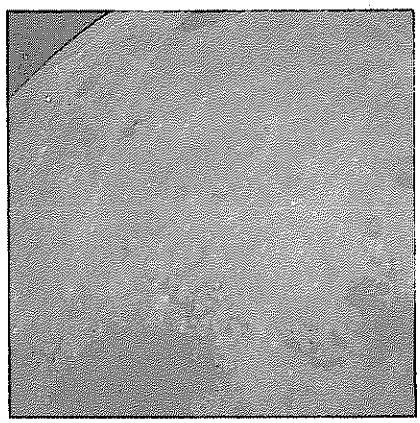

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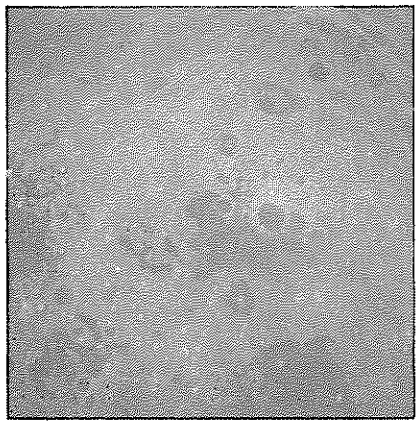

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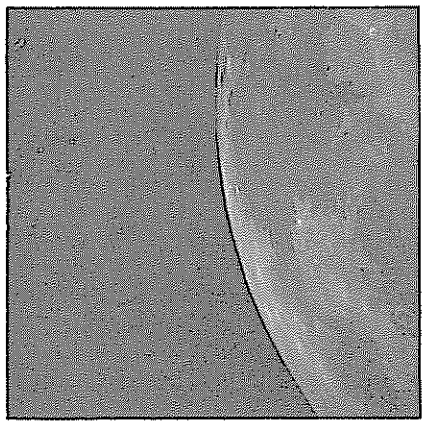

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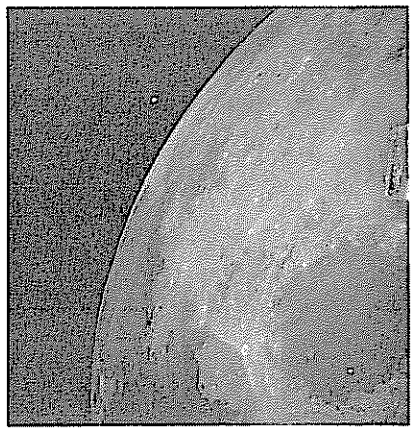

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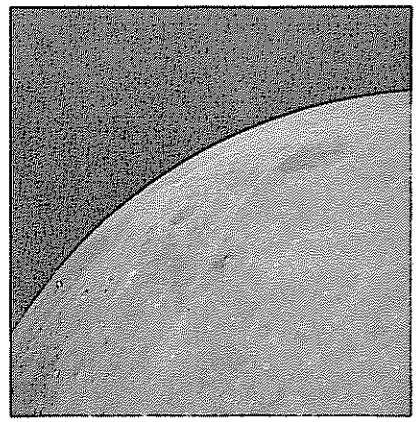

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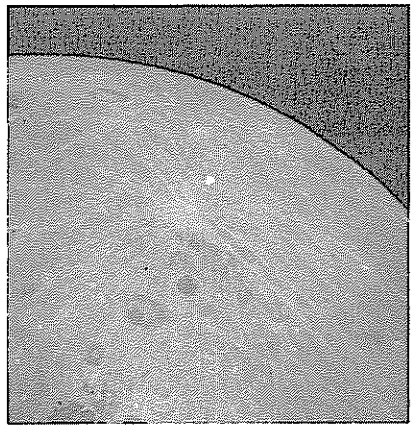

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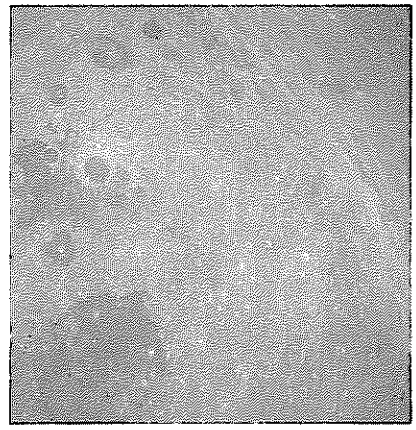
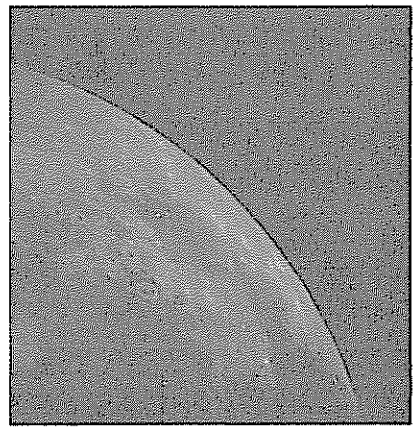


AS13–60–8676

AS13–60–8677



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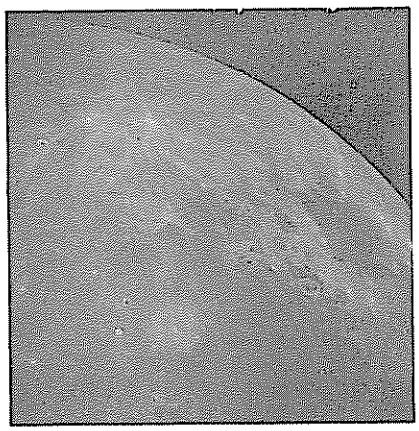

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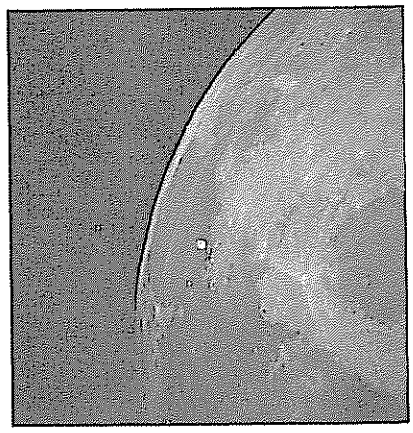

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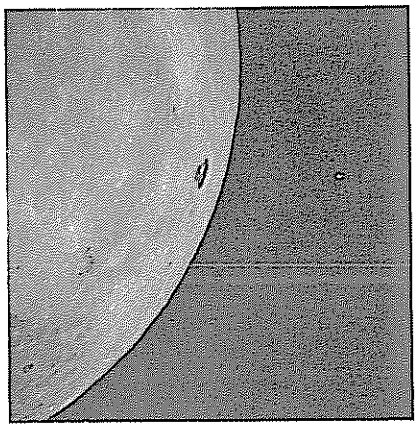

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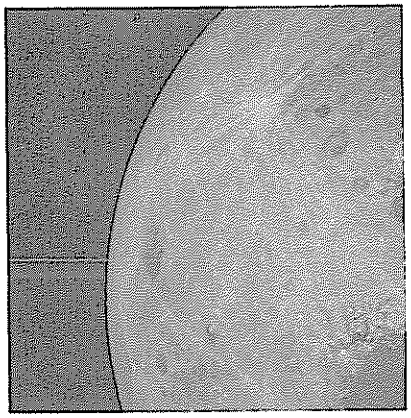

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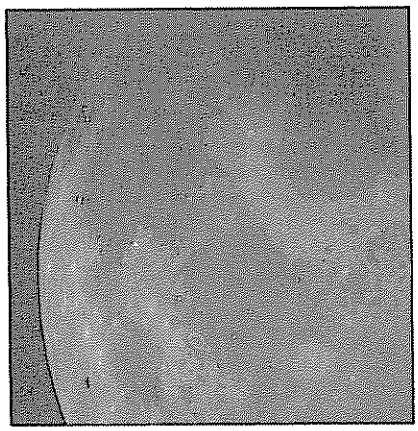

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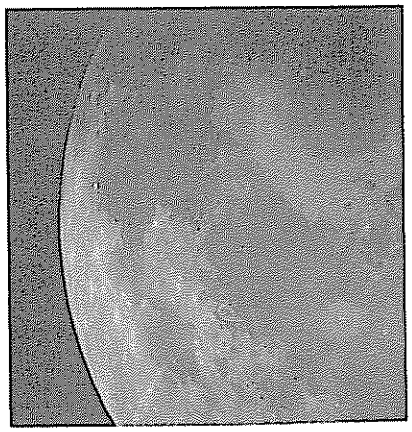

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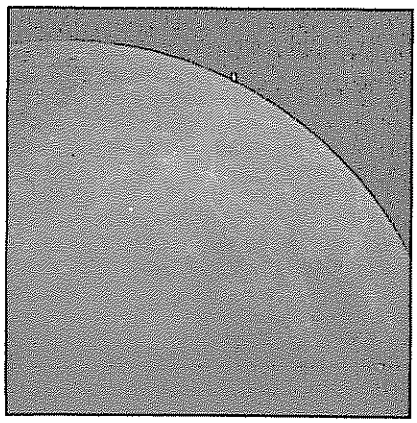
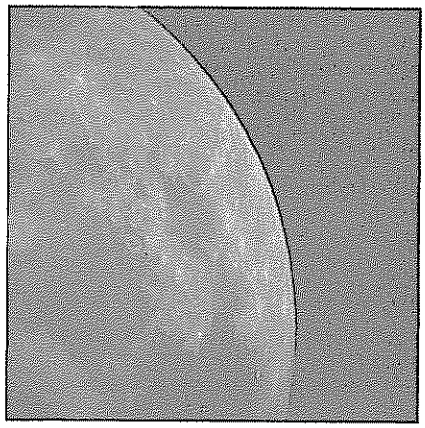


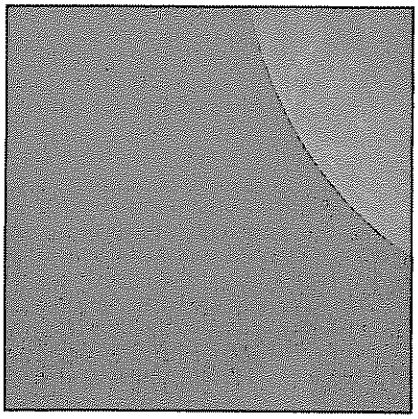
AS13–60–8685

AS13–60–8686



AS13–60–8687

AS13–60–8688



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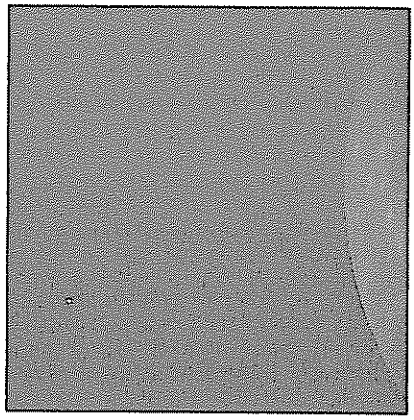

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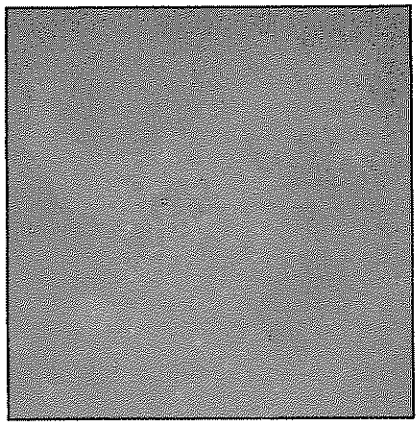

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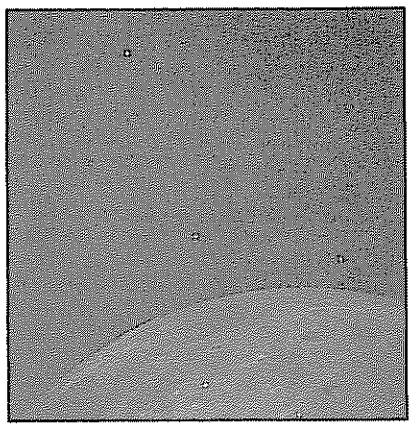

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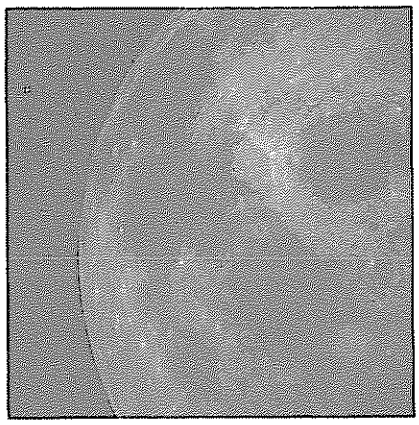

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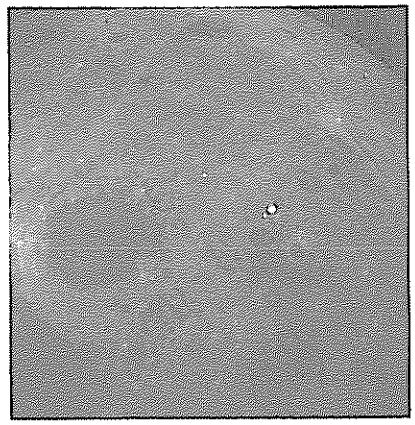

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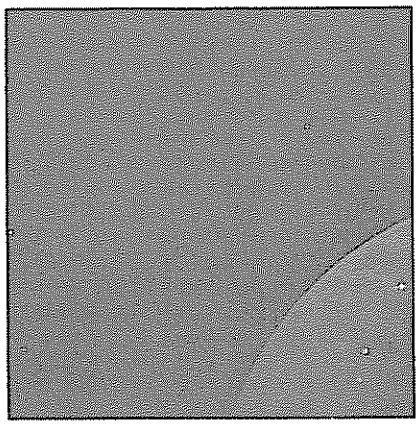
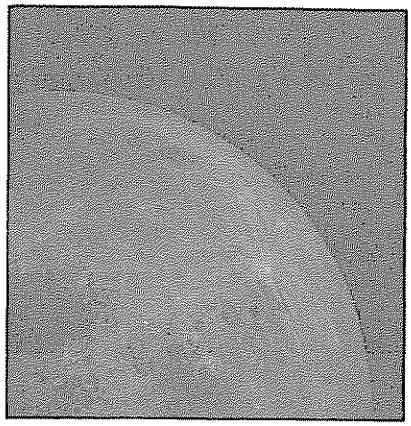


AS13–60–8695

AS13–60–8696



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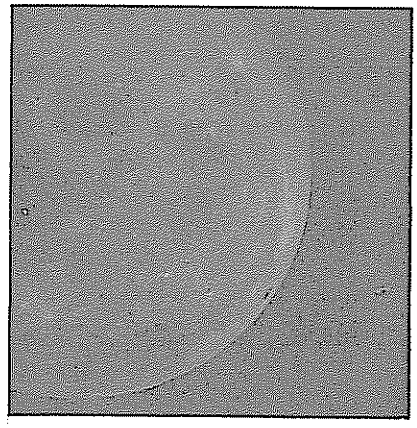

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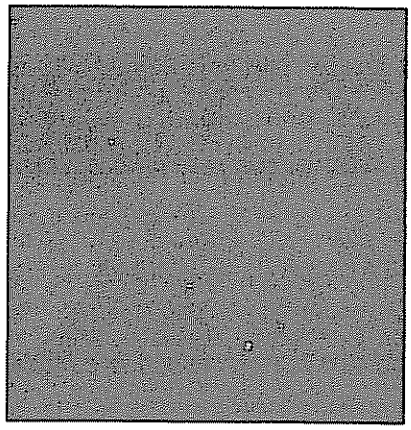
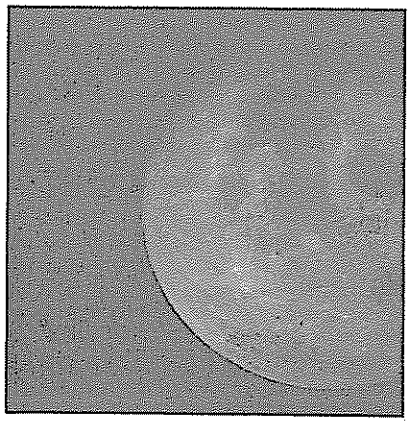


AS13–60–8699

AS13–60–8700



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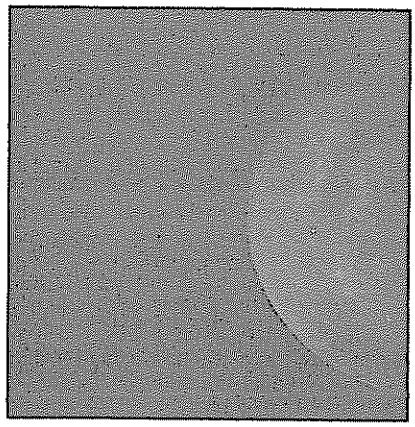

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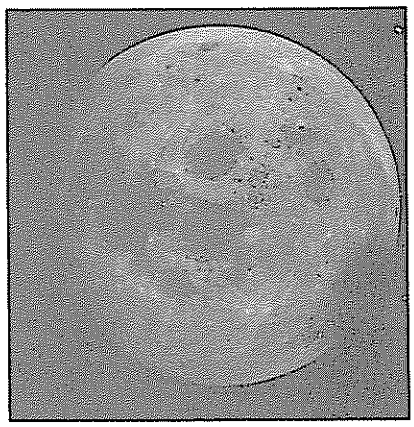

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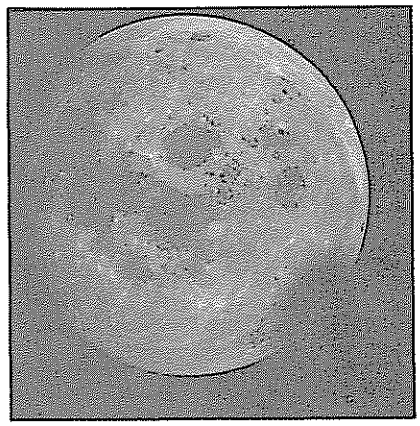

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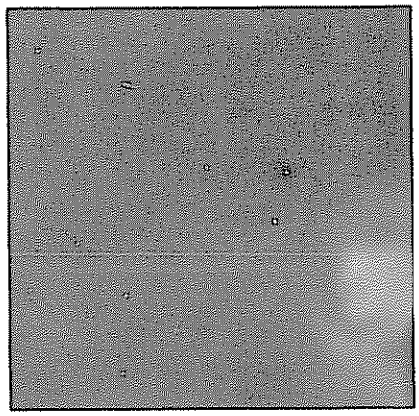

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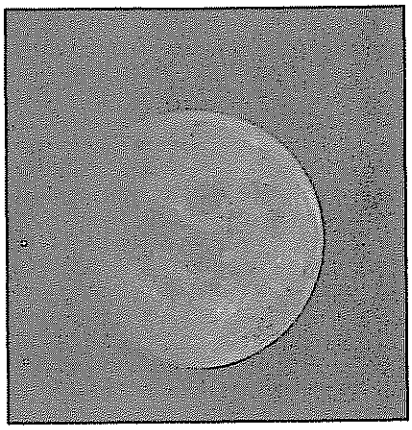

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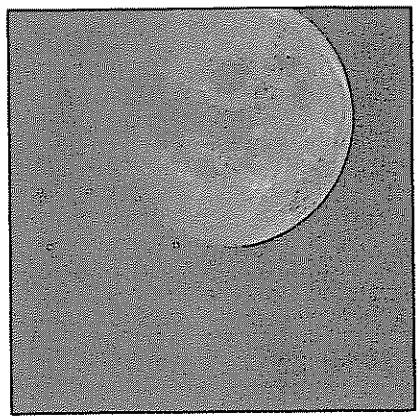

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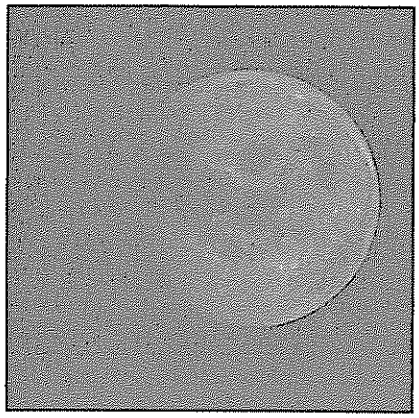

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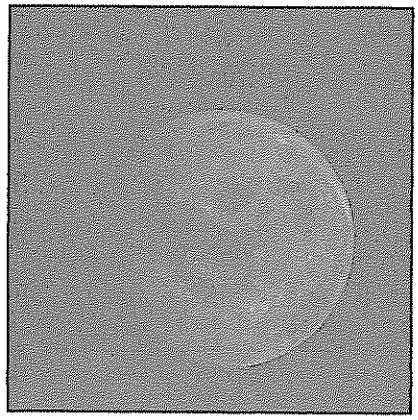

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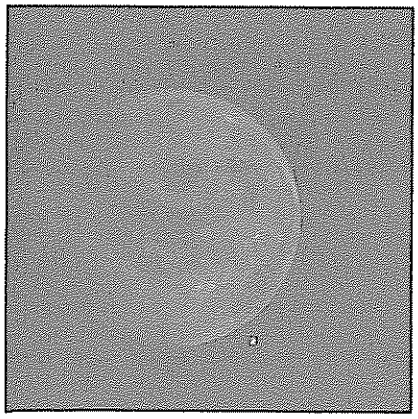

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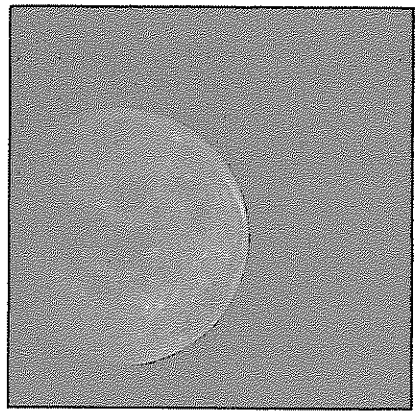

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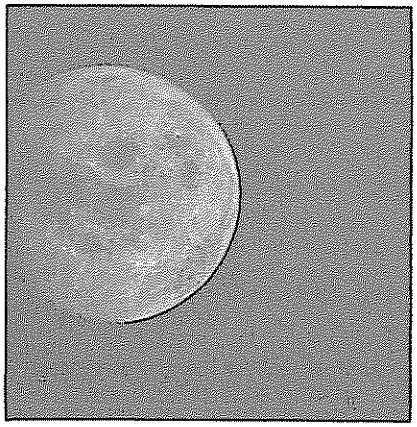

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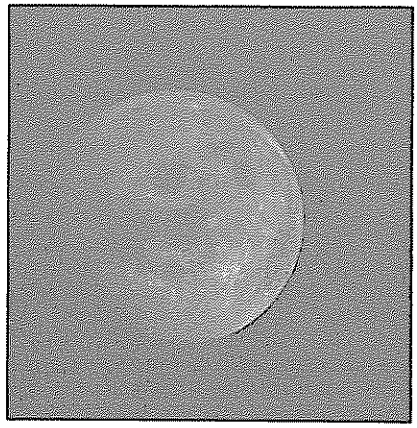

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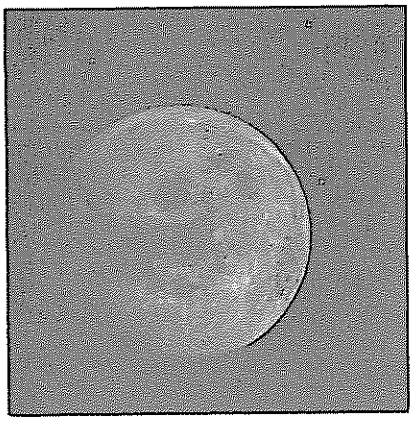

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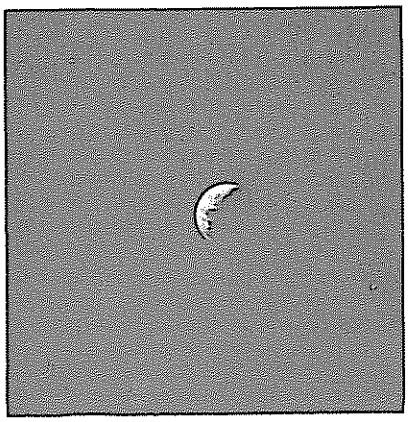

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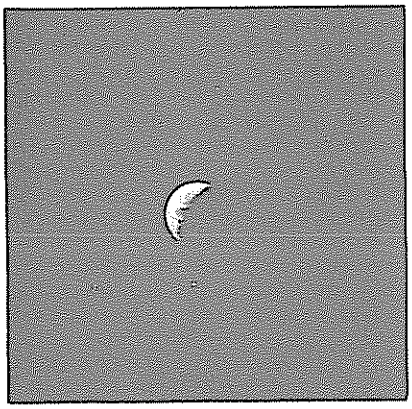

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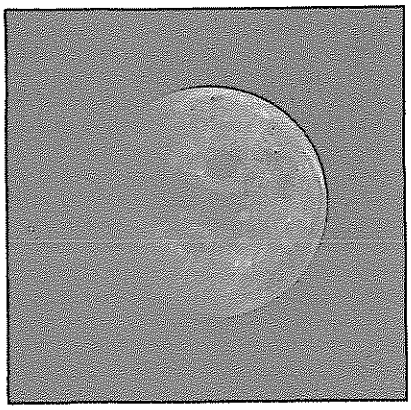

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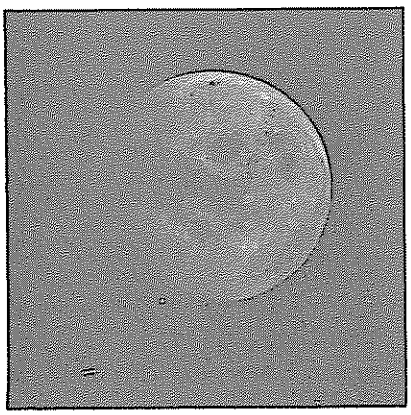

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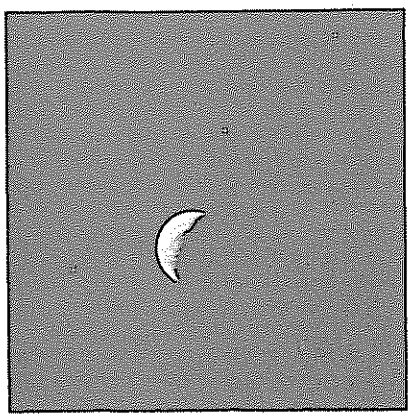

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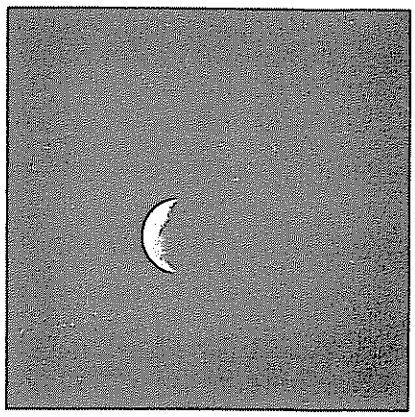

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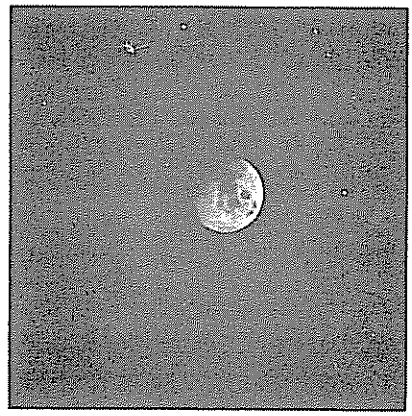

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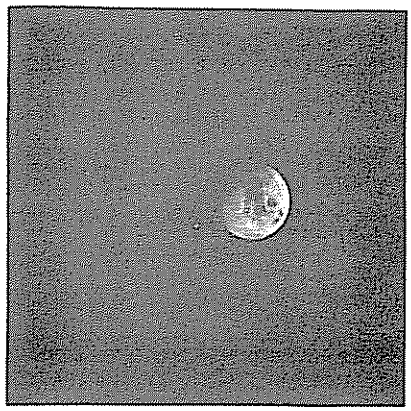

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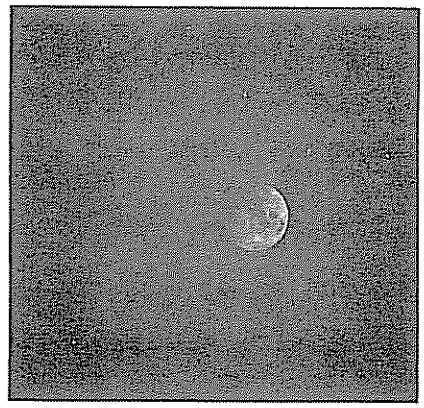

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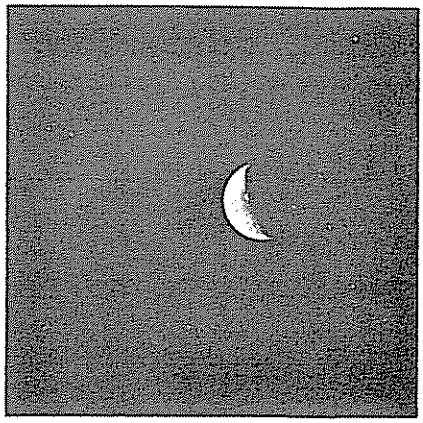

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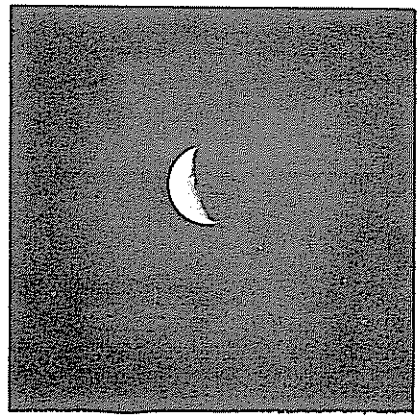

AS13–60–8726

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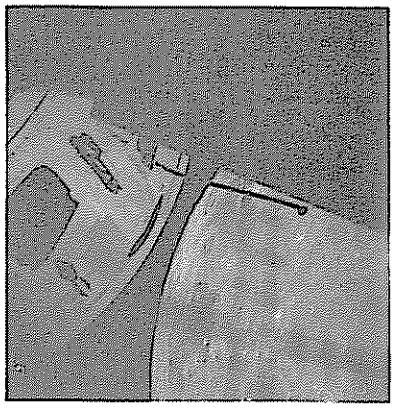
AS13–61–8727 thru AS13–61–8879



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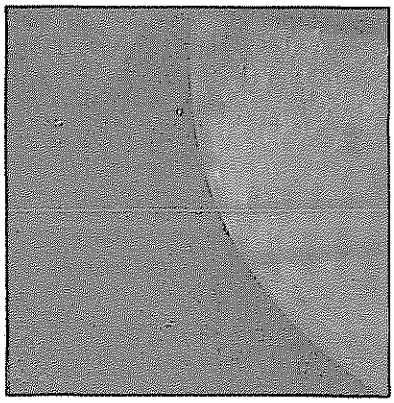

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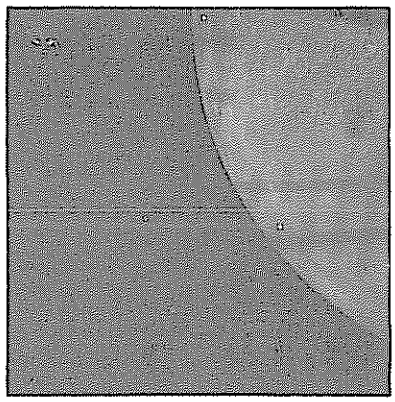

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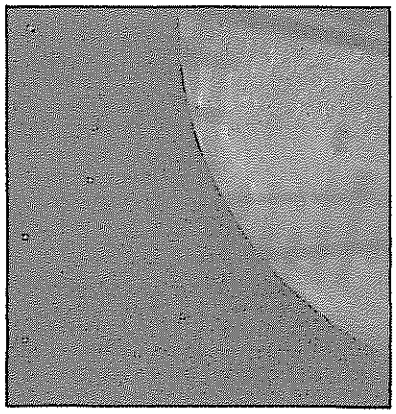

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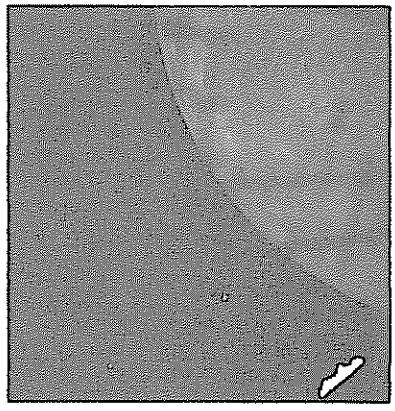

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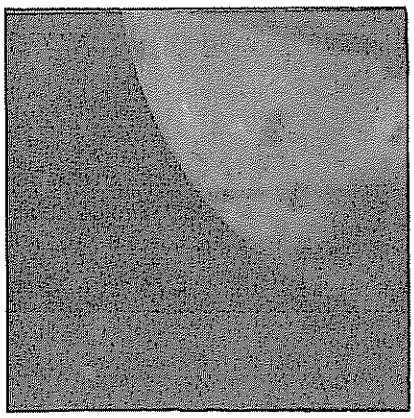

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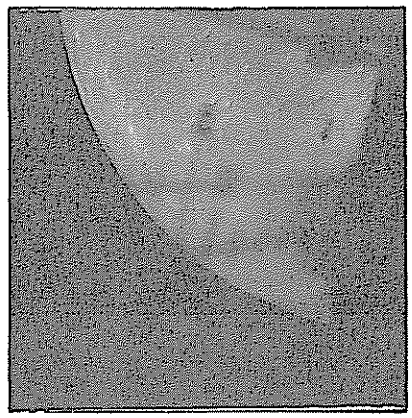

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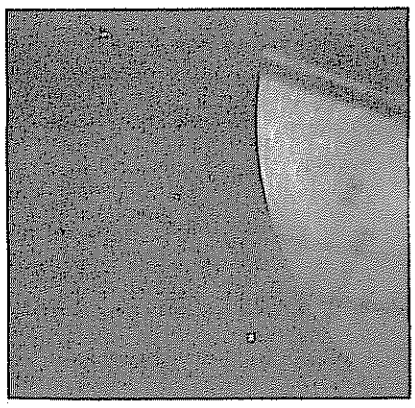

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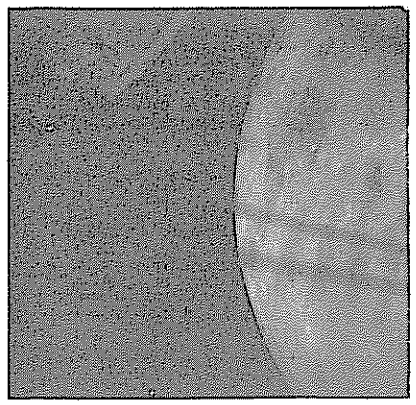

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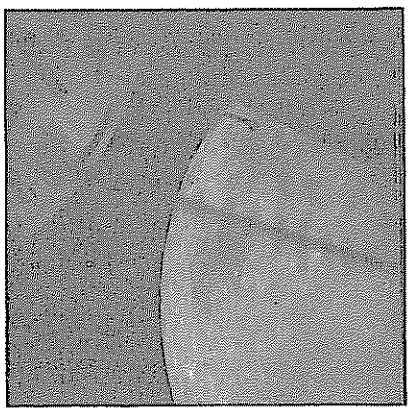

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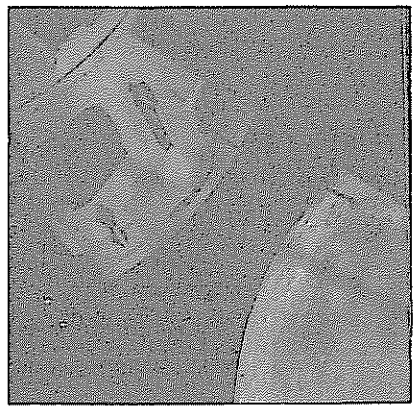

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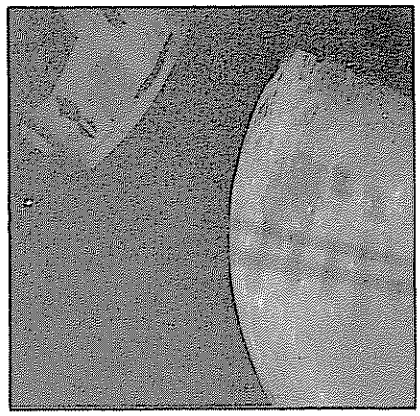

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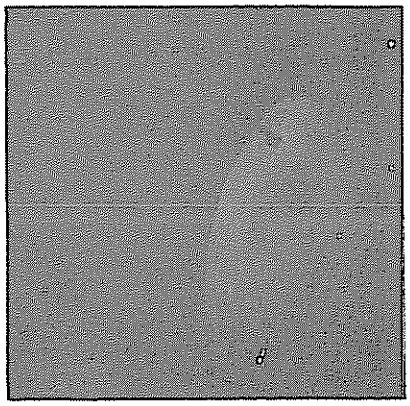

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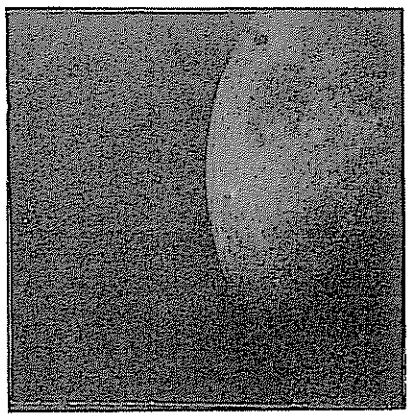

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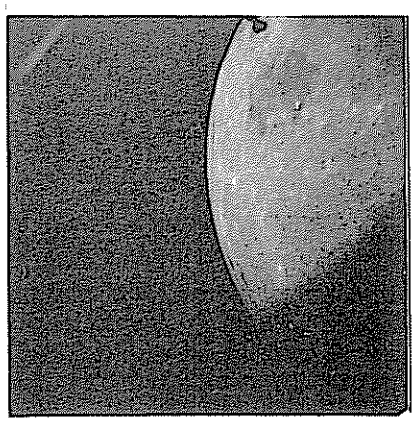

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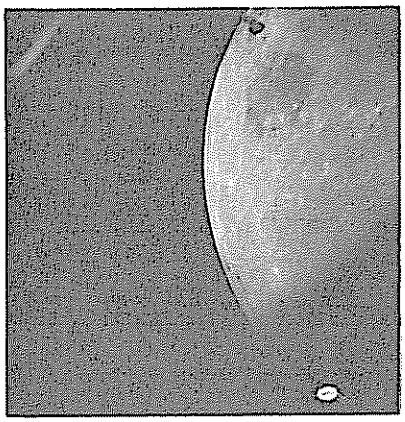

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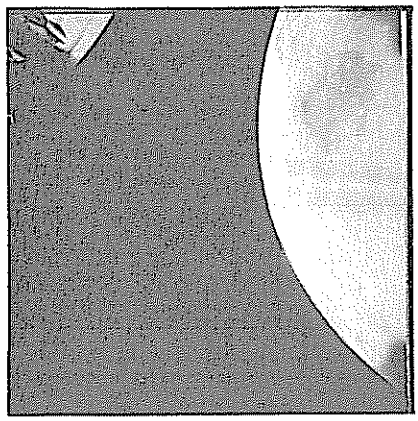

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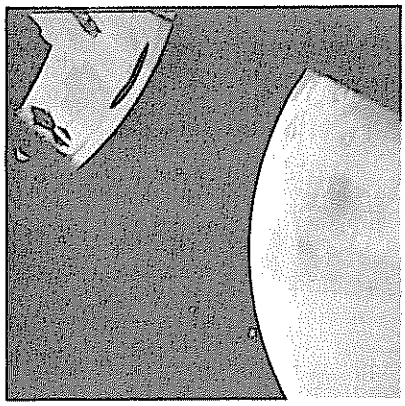

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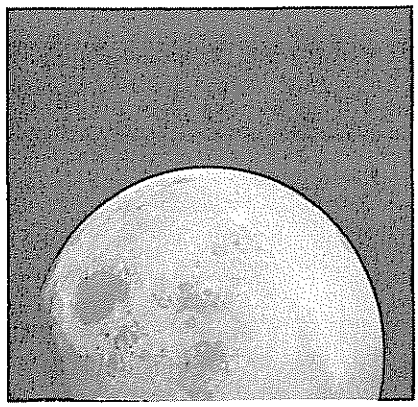

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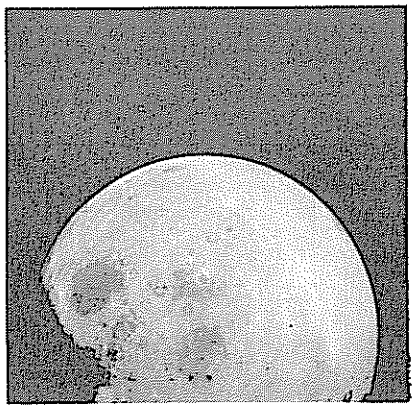

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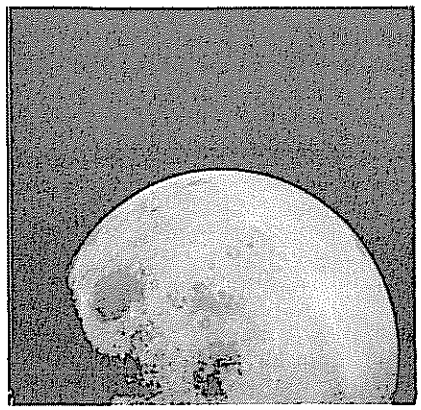

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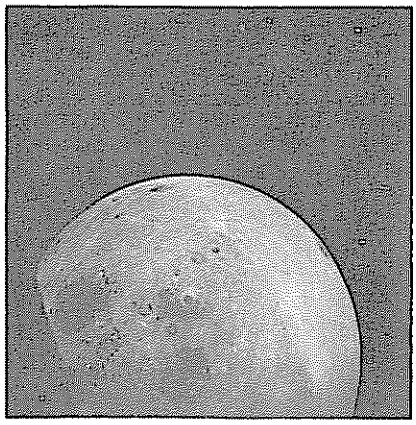

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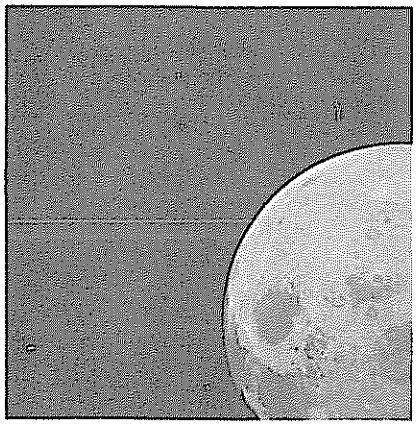

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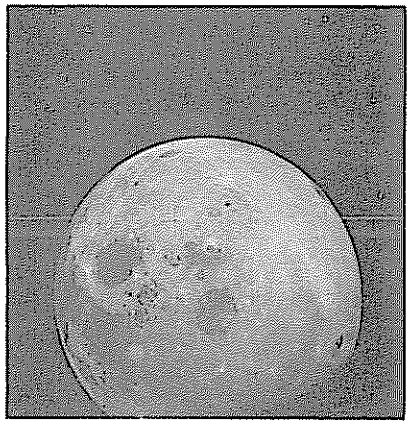

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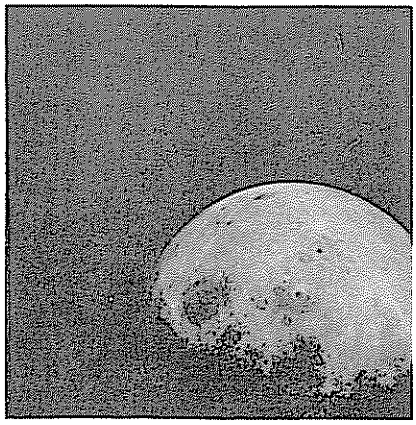

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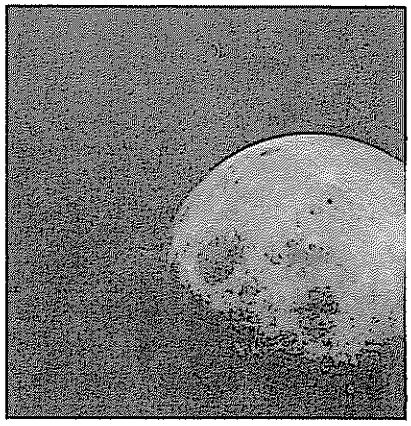

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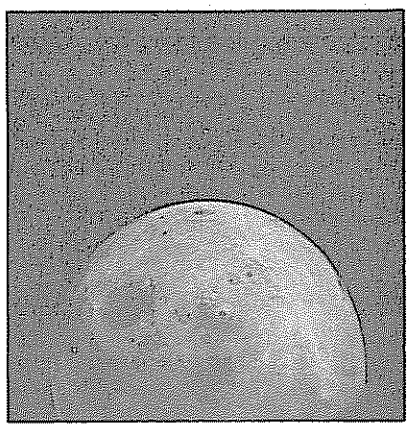

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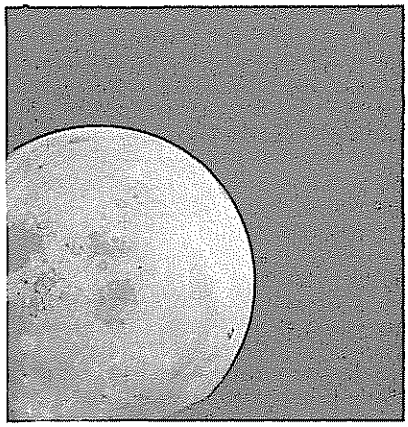

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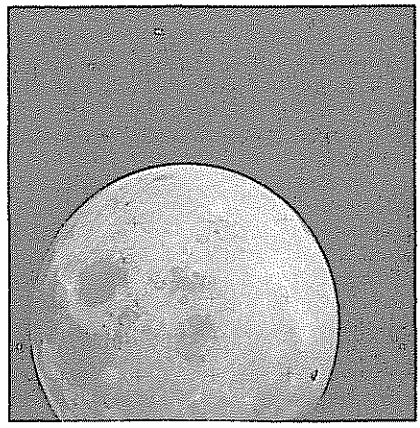

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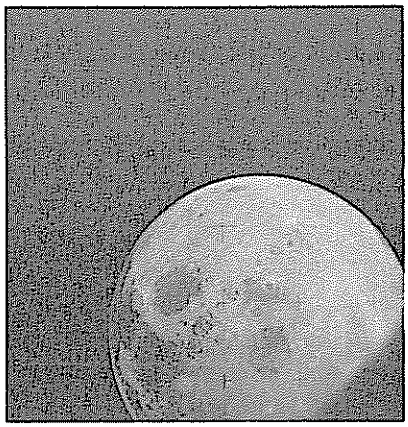

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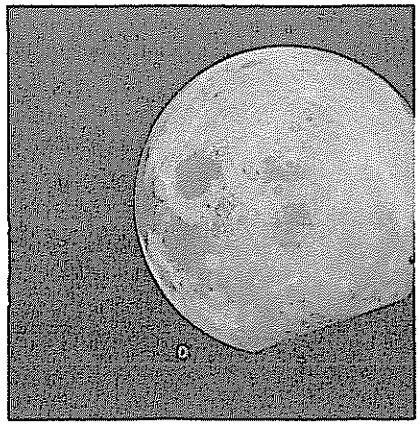

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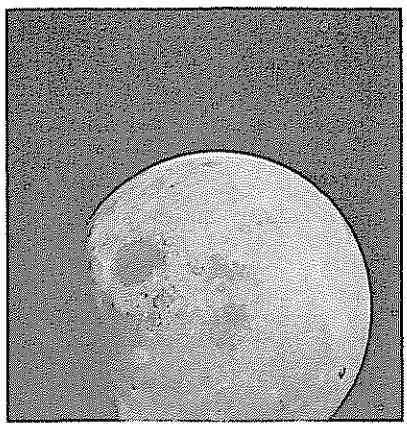

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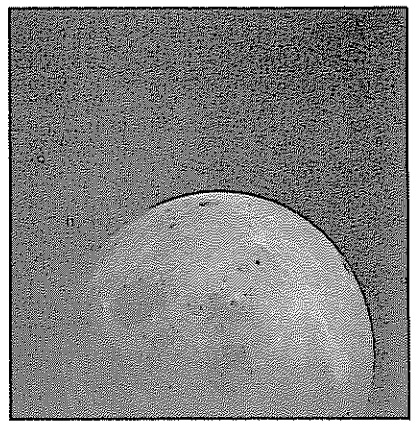

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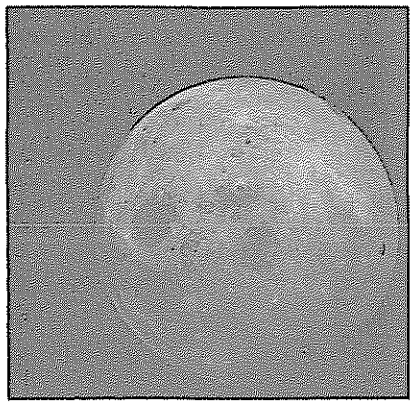

AS13–61–8765

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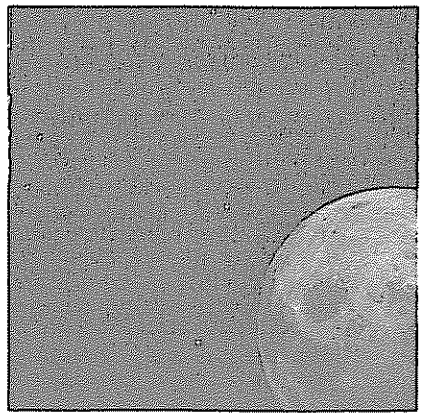

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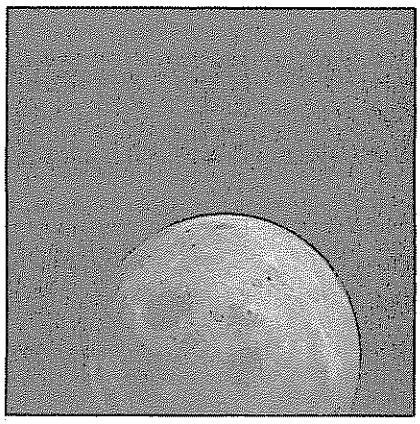

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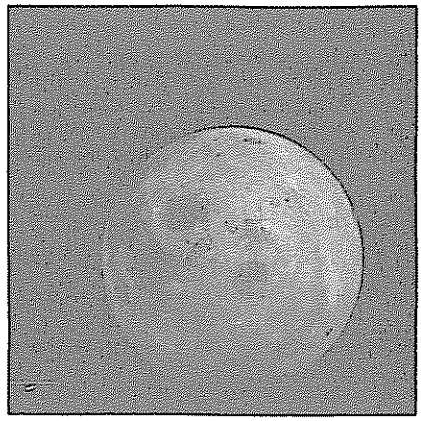

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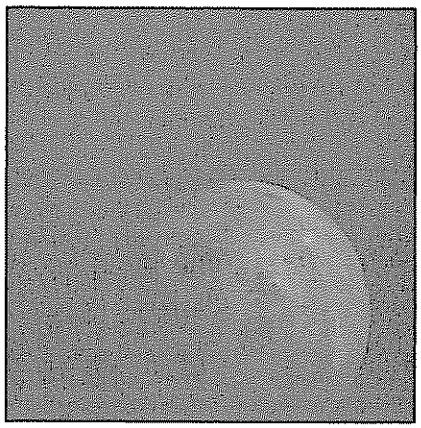

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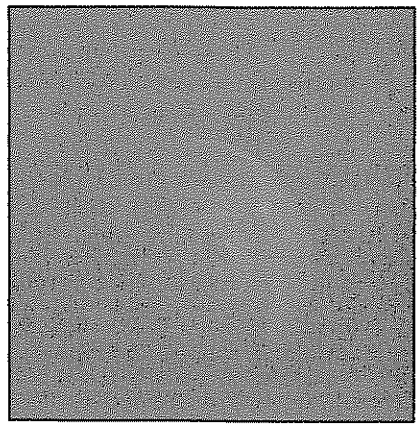

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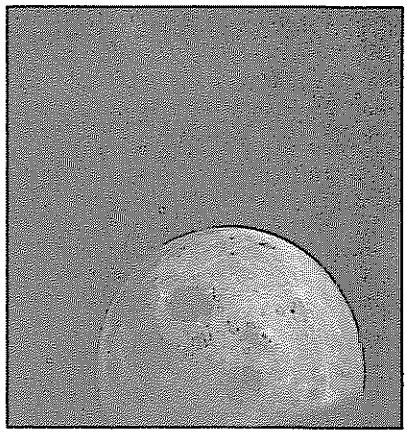

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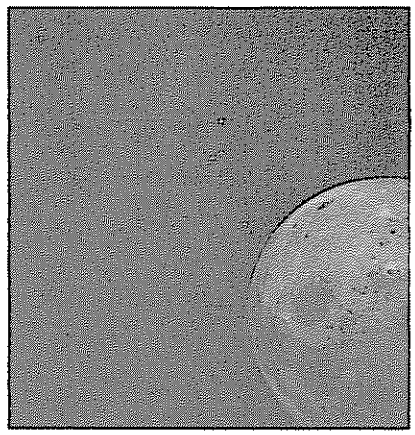

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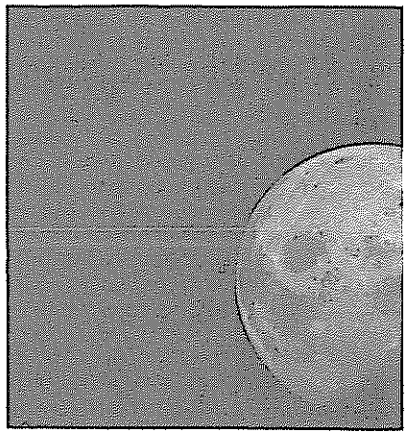

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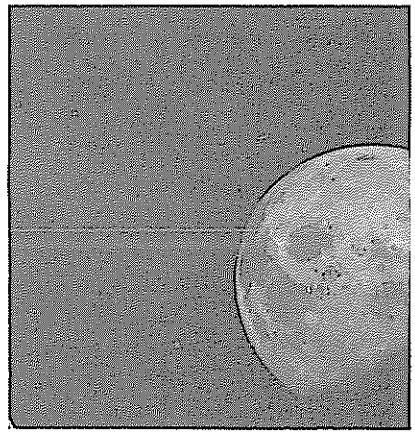

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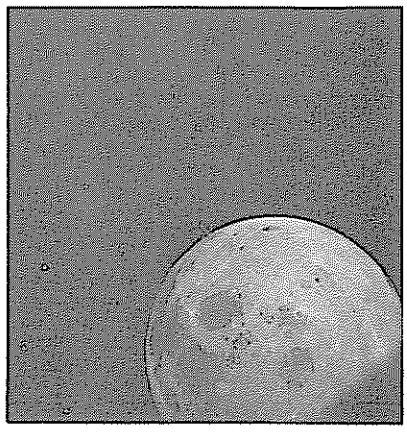

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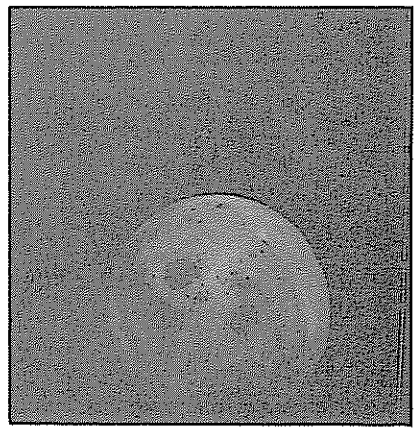

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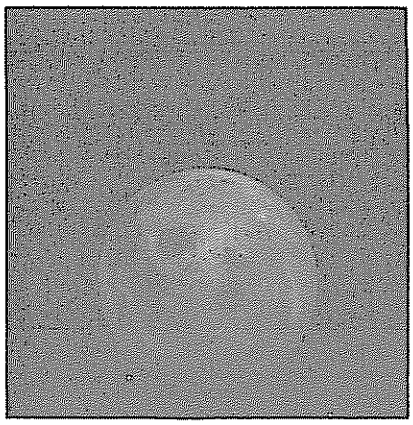

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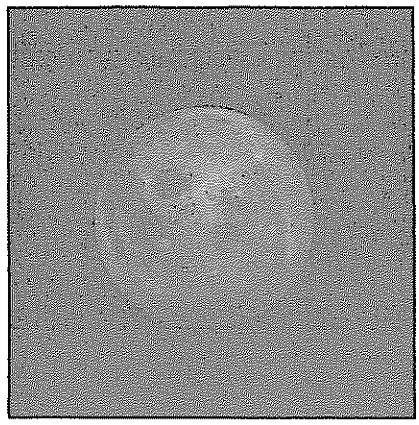

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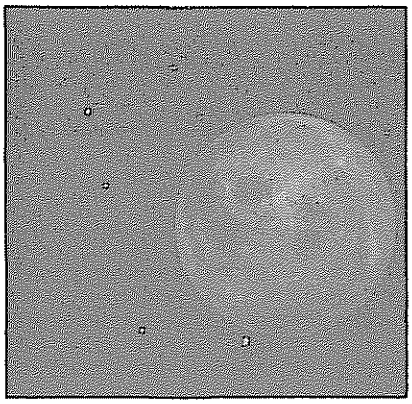

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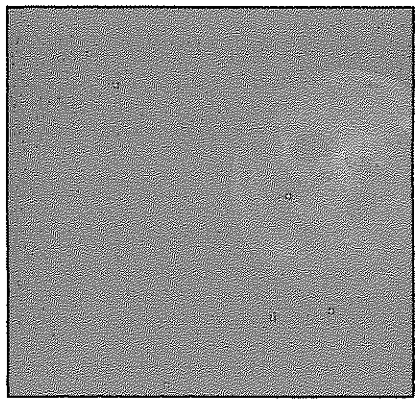

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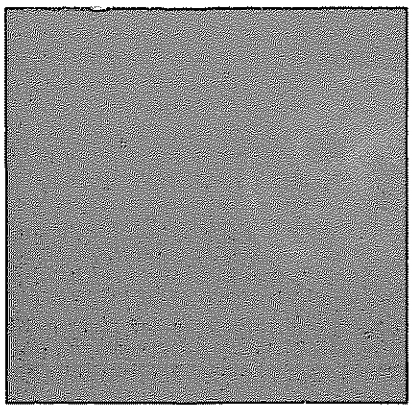

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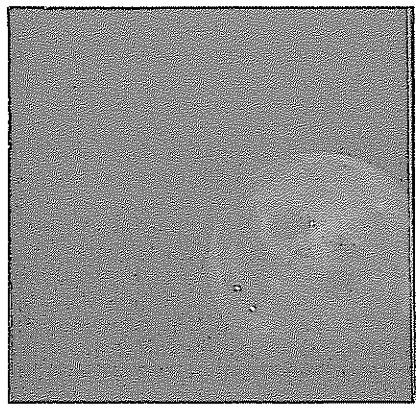

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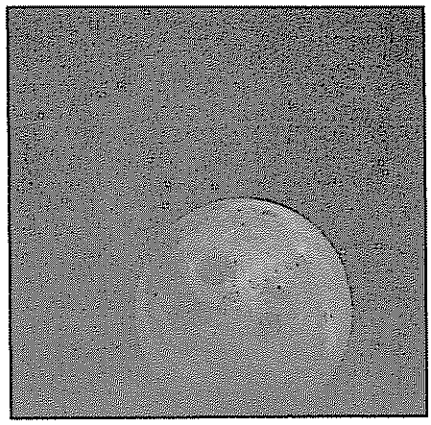

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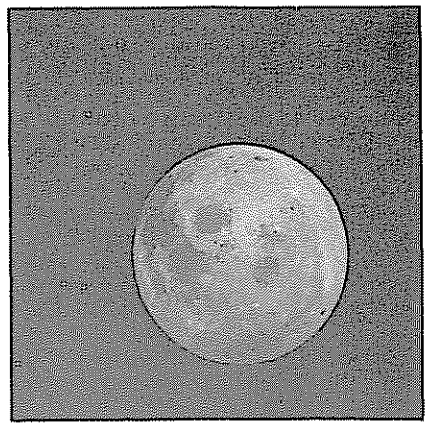

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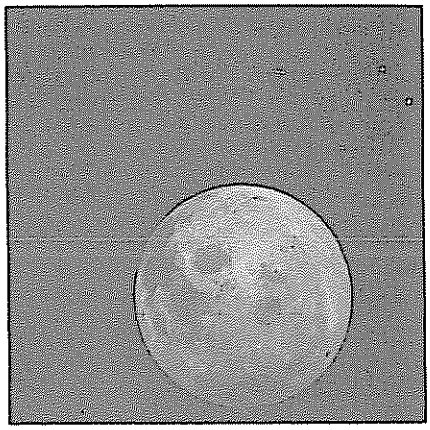

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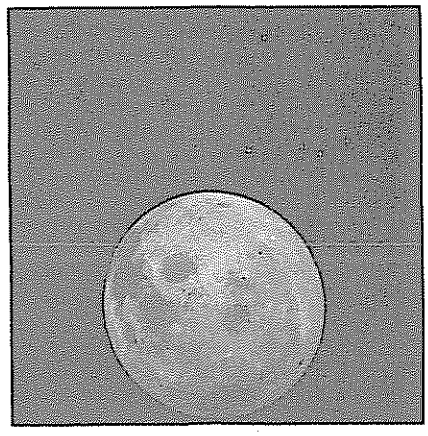

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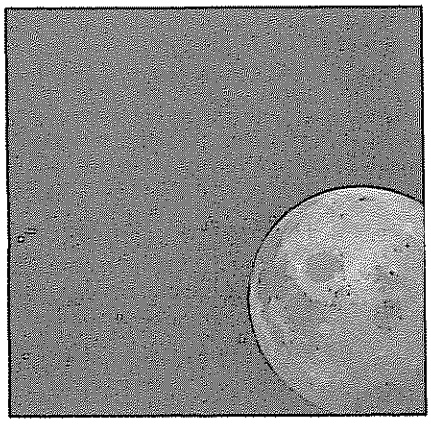

AS 13–61–8791

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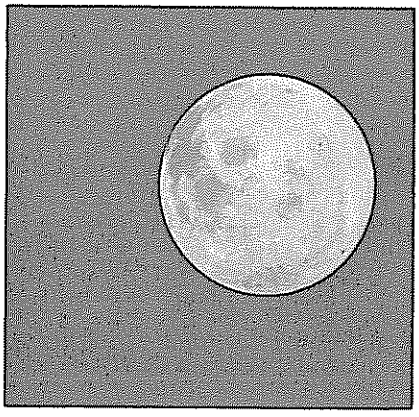
AS13–61–8796



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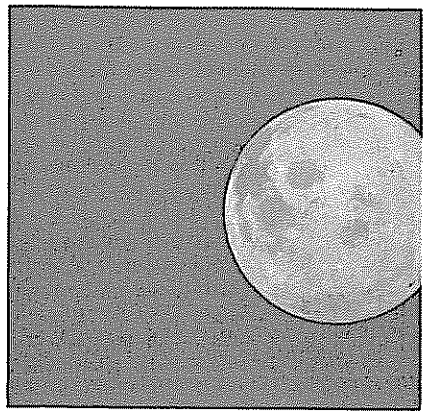

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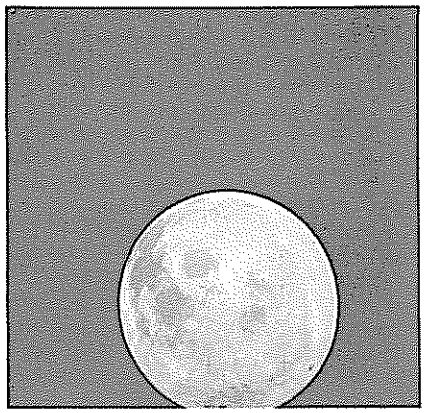

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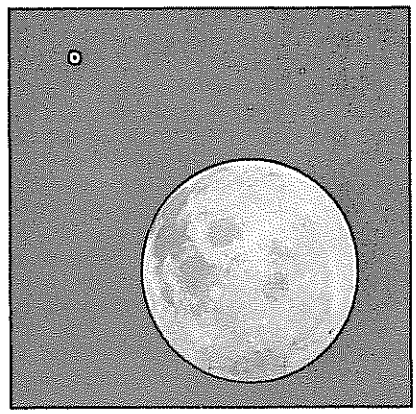

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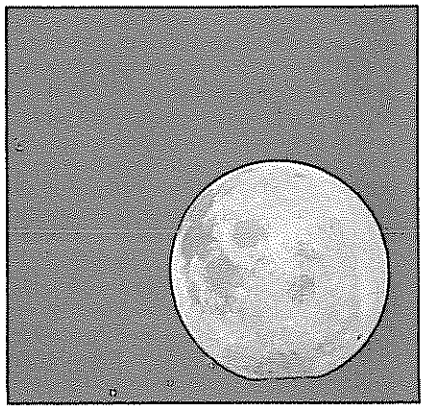

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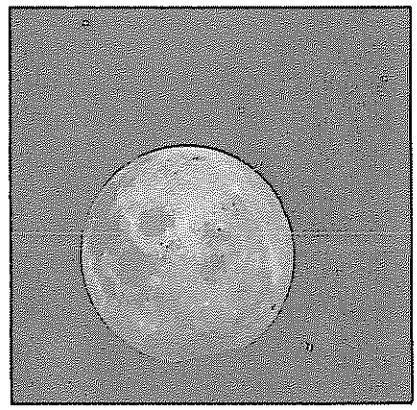

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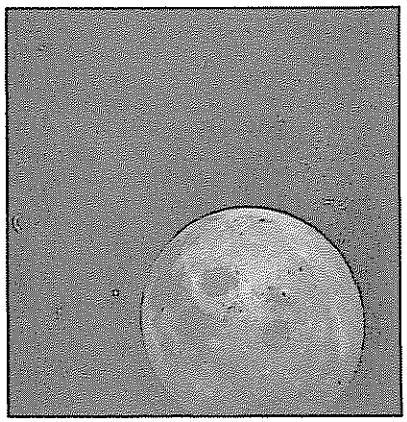

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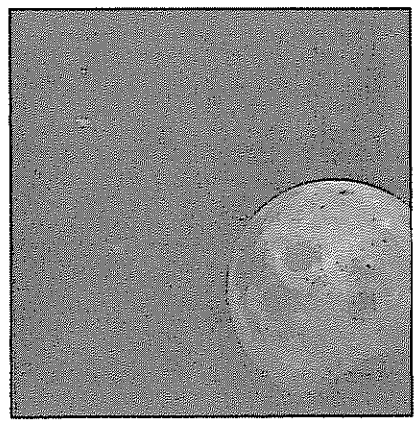

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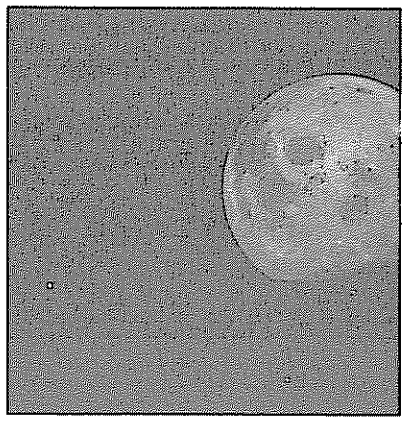

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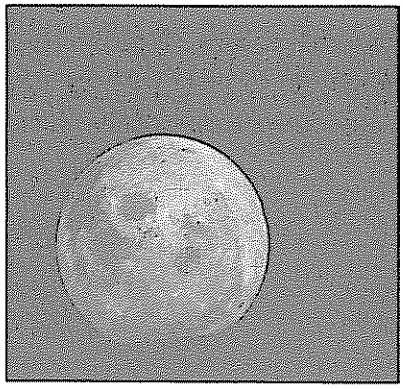

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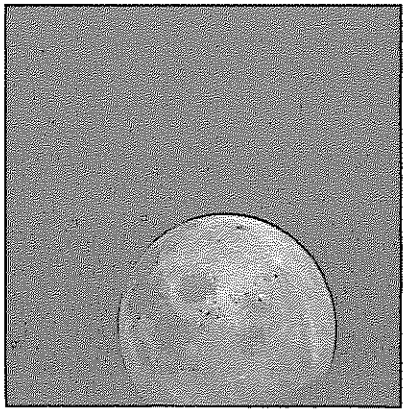

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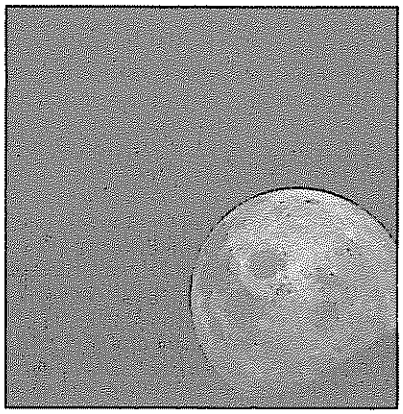
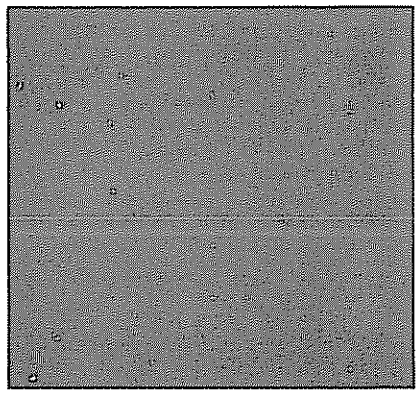


AS13–61–8810

AS 13–61–8811

AS 13–61–8812



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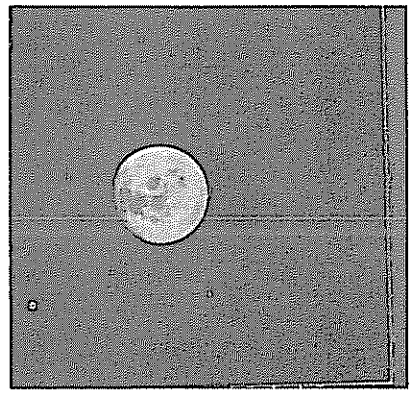

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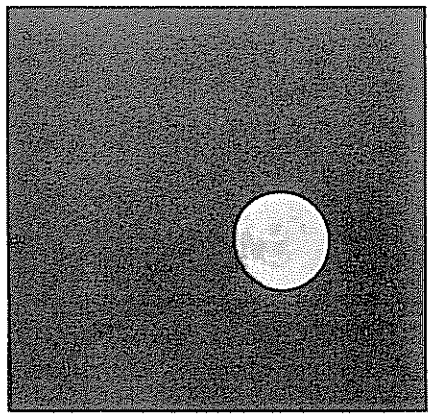

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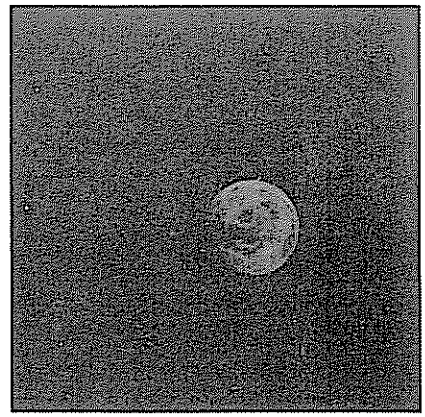

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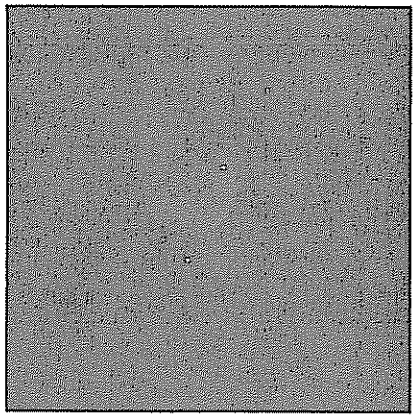

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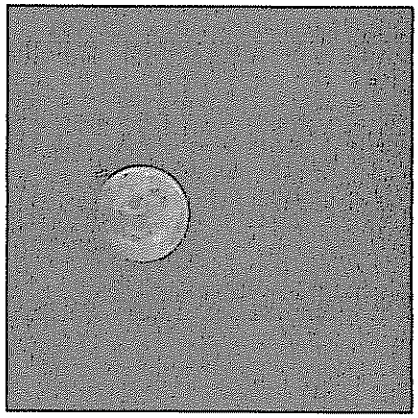

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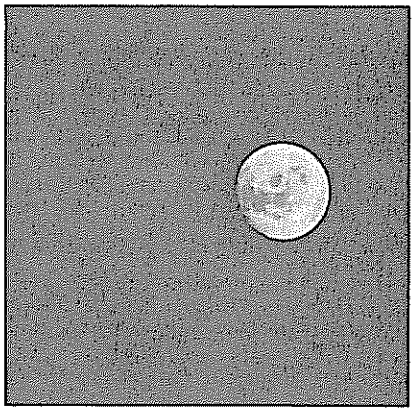

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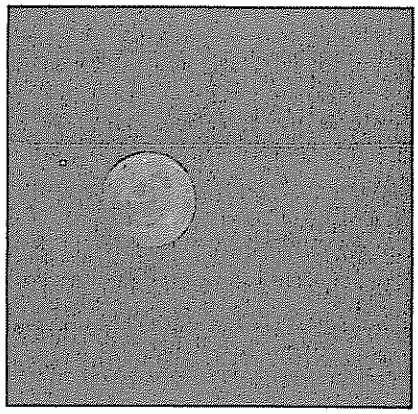

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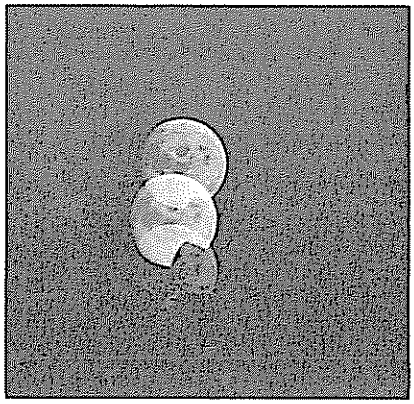

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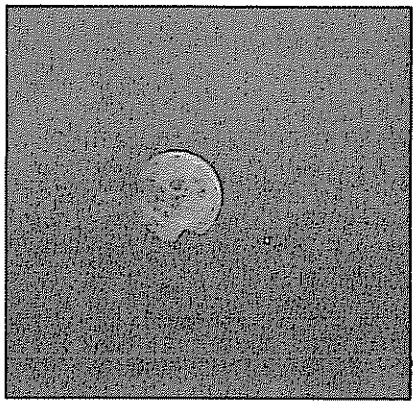

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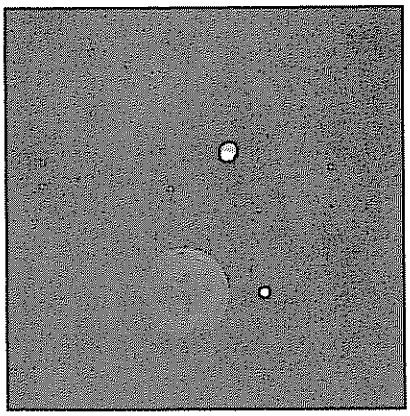

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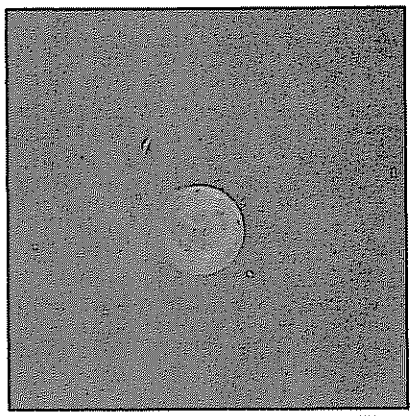

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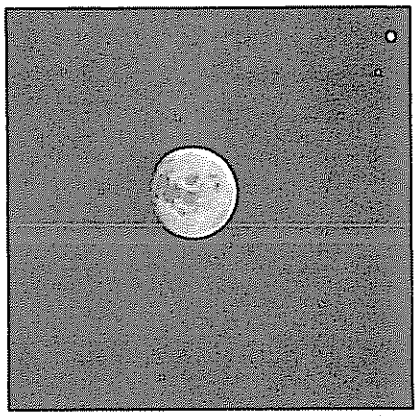

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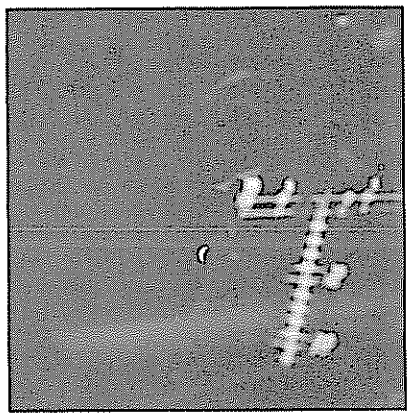

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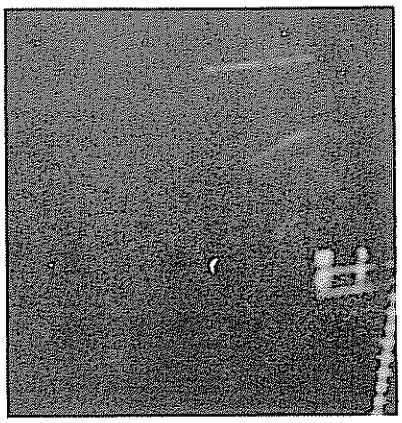

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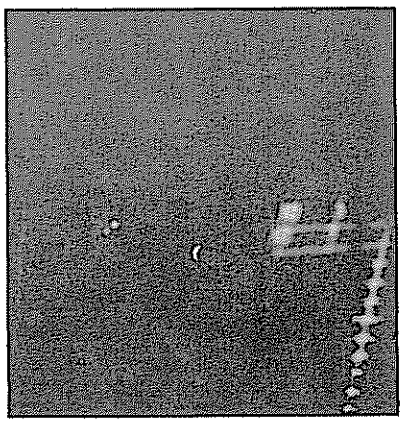

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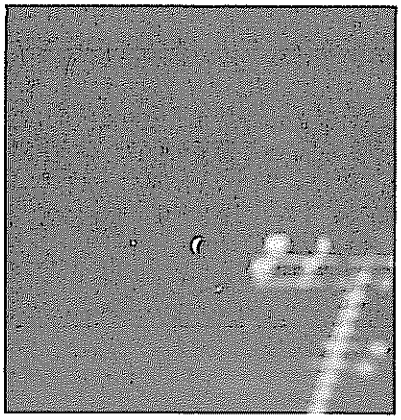

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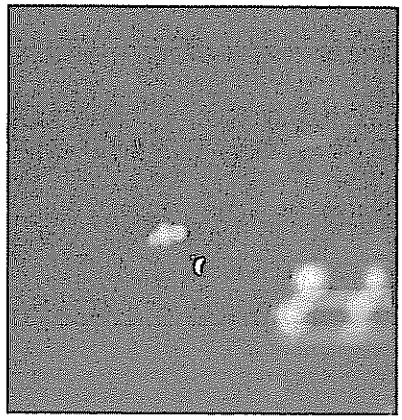

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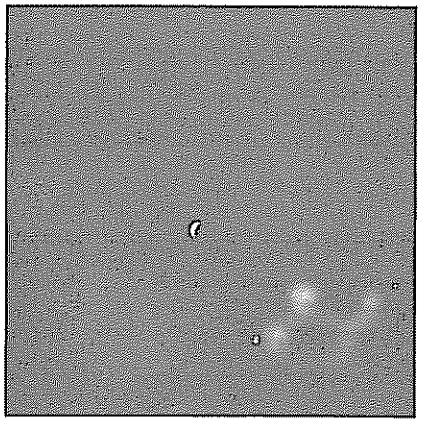

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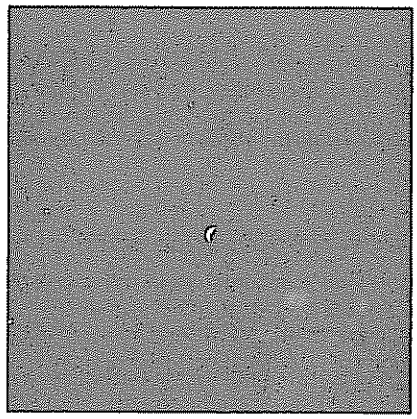

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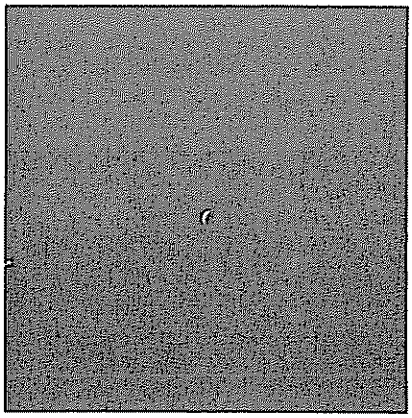

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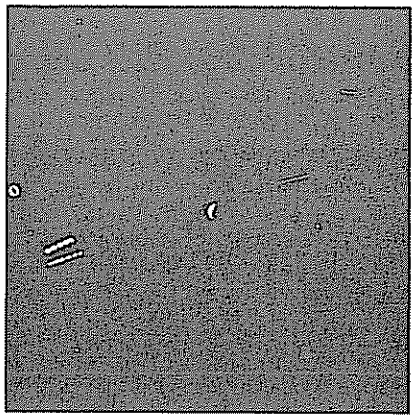

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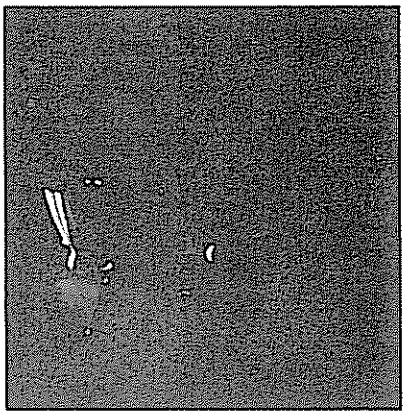

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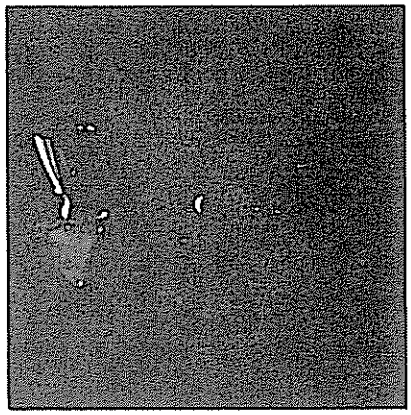

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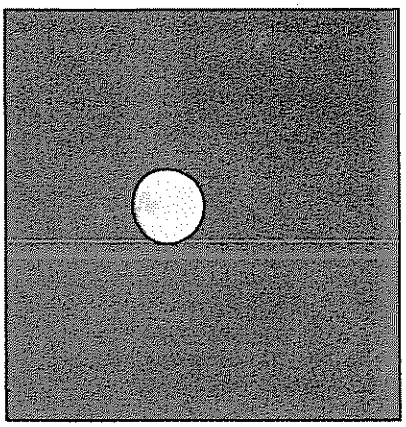

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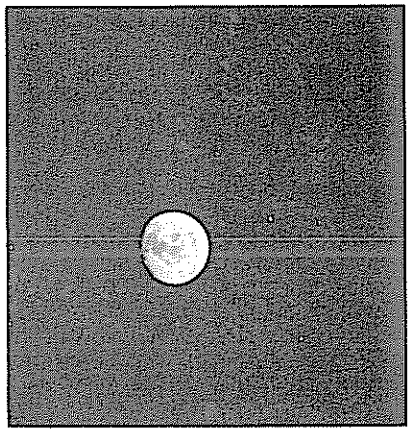
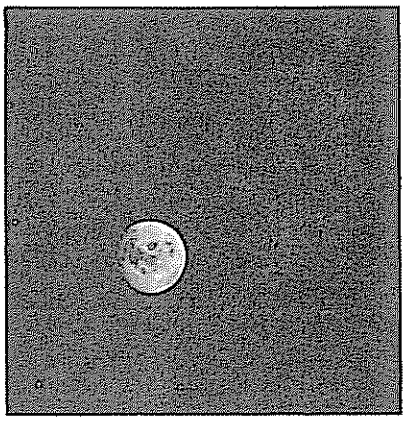
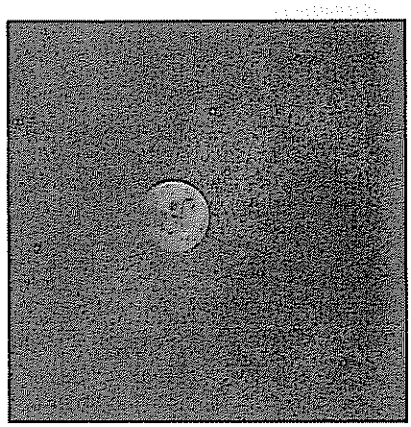


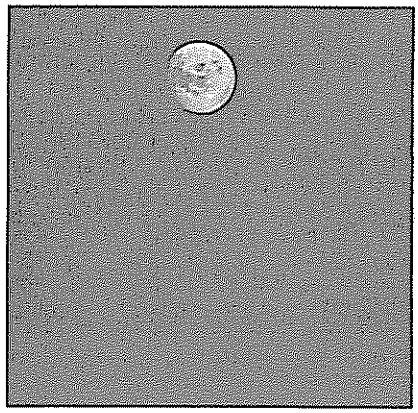
AS13–61–8838



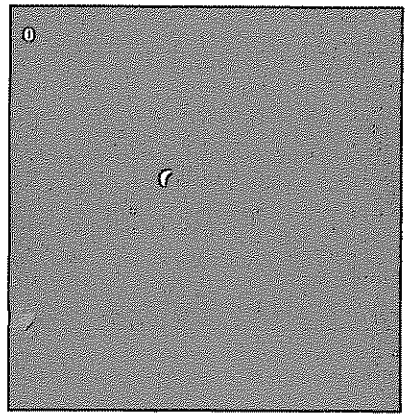
AS13–61–8839



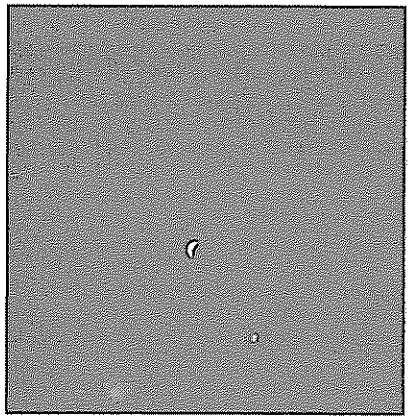
AS13–61–8840



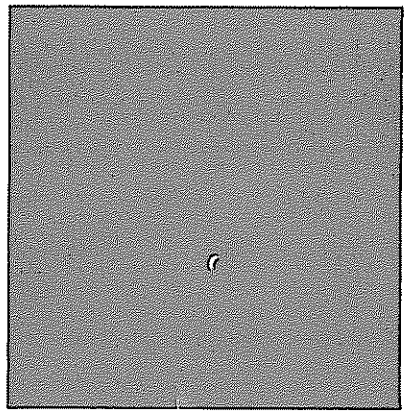
AS13-61-8841



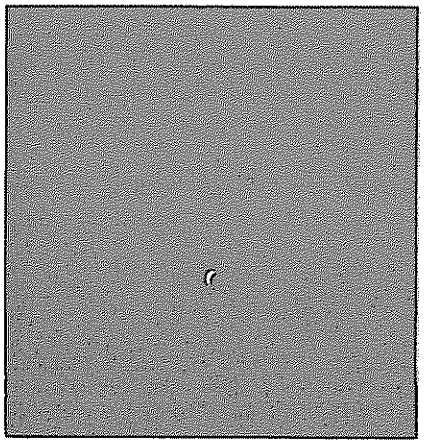
AS13-61-8842



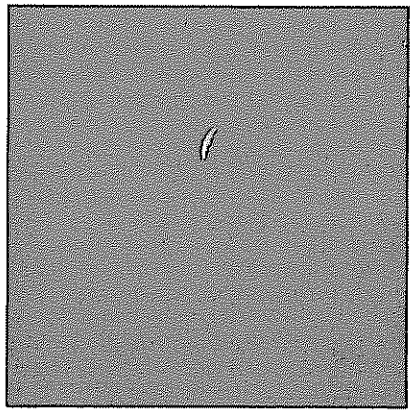
AS13-61-8843



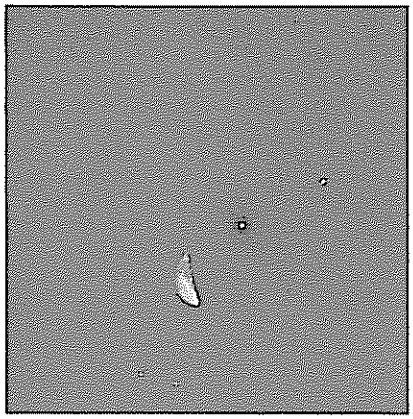
AS13-61-8844



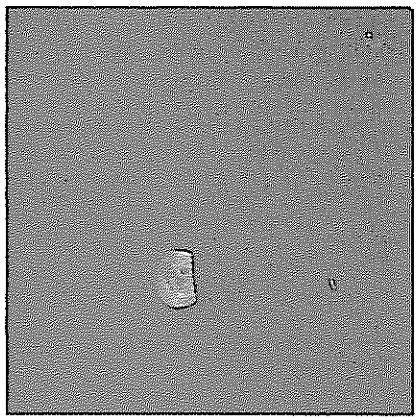
AS13-61-8845



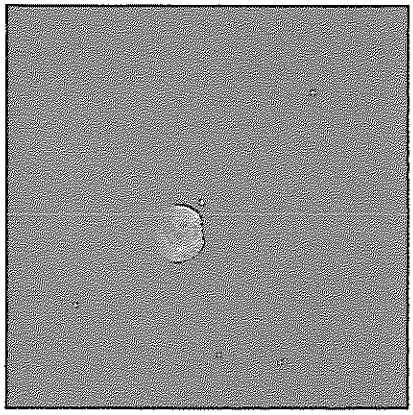
AS13-61-8846



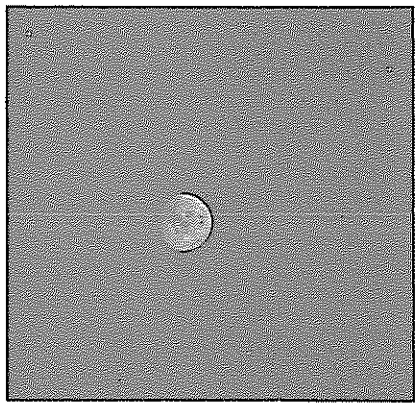
AS13–61–8847



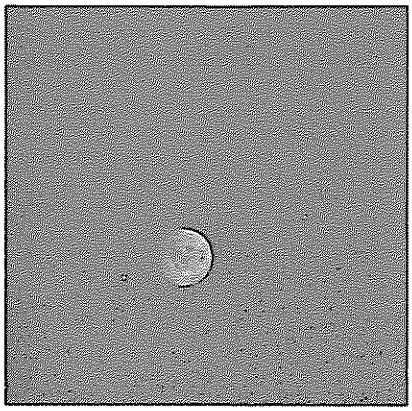
AS 13–61–8848



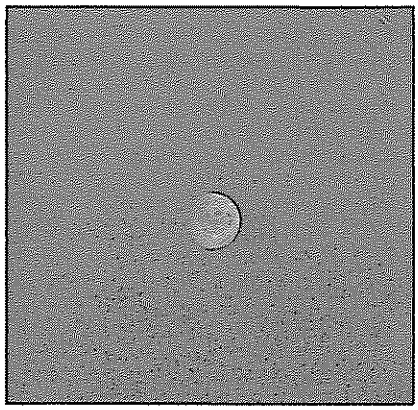
AS 13–61–8849



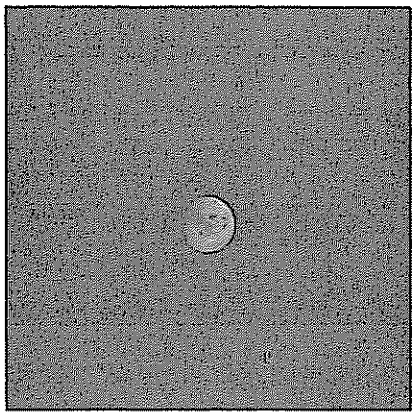
AS 13–61–8850



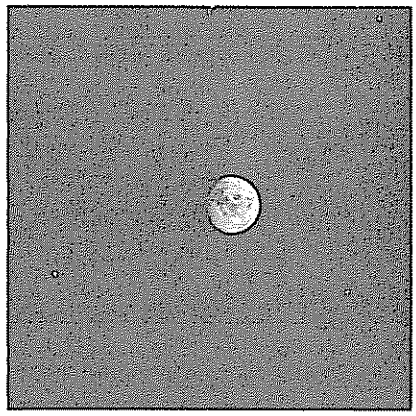
AS13–61–8851



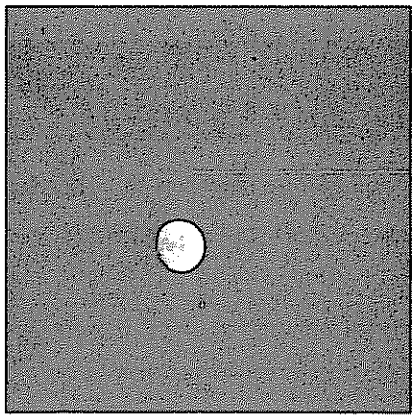
AS 13–61–8852



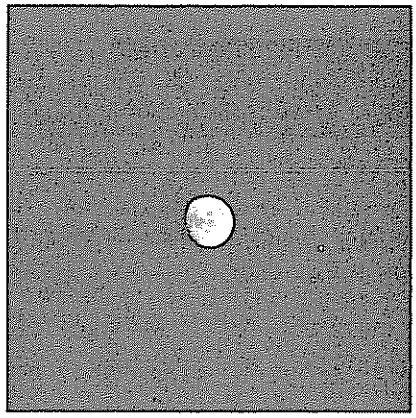
AS13–61–8853



AS13–61–8854



AS13–61–8855



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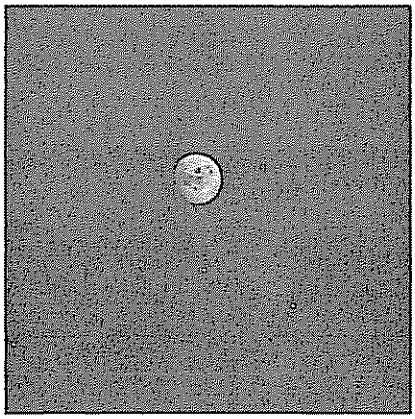
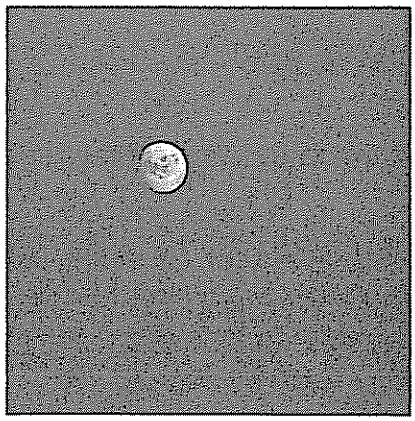
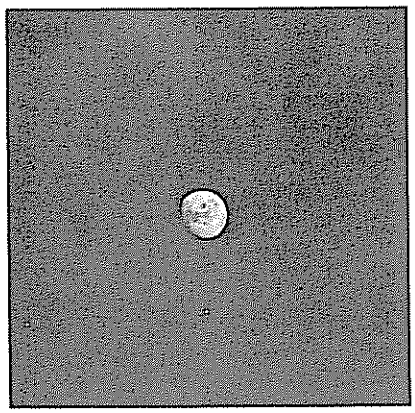


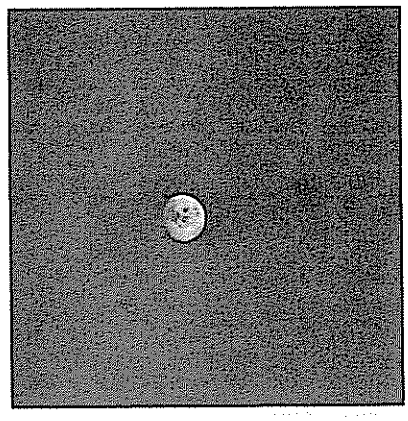
AS13–61–8857



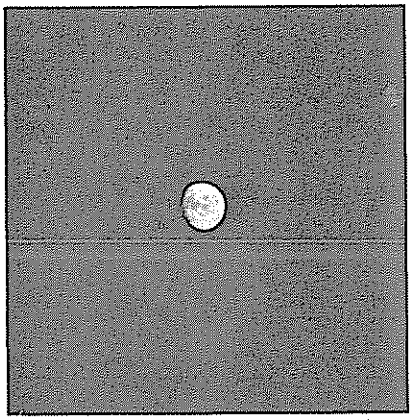
AS 13–61–8858



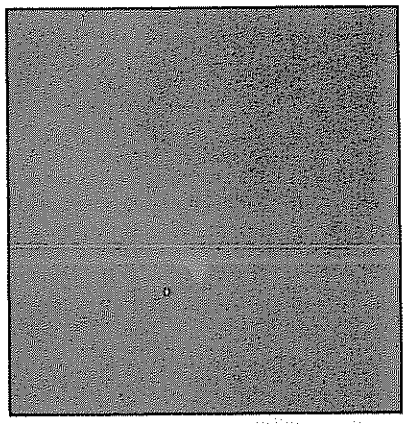
AS13-61-8859



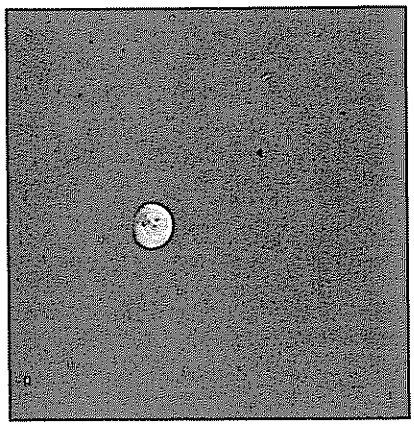
AS13-61-8860



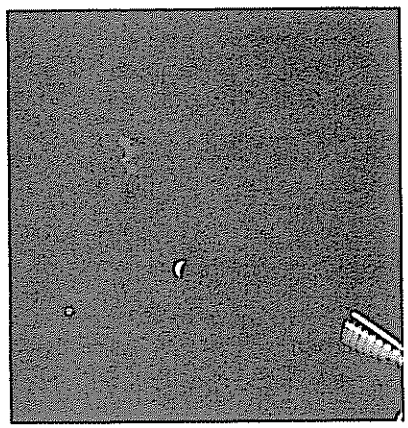
AS13-61-8861



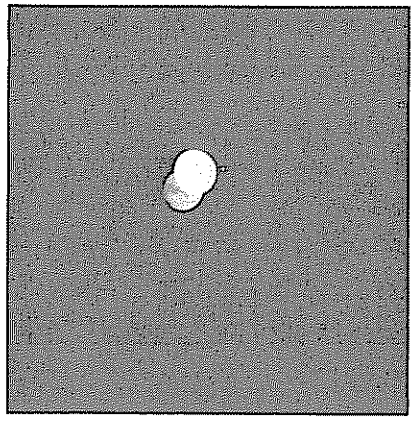
AS13-61-8862



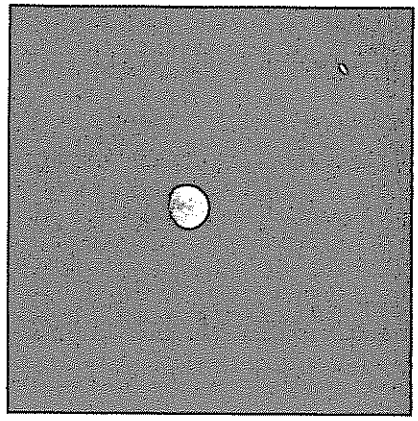
AS13-61-8863



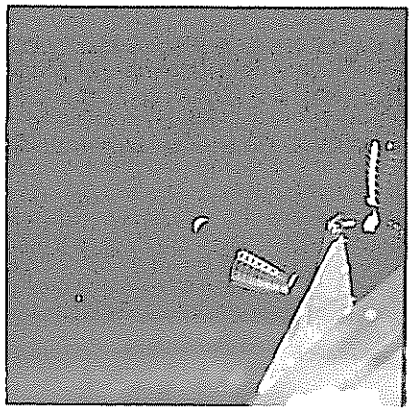
AS13-61-8864



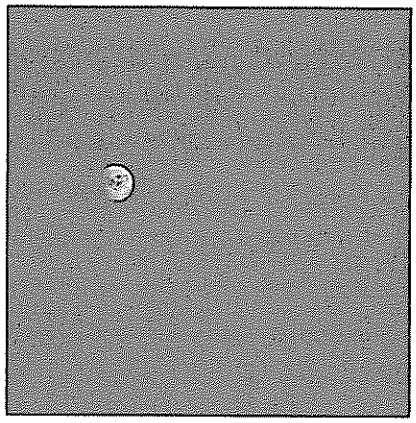
AS 13–61–8865



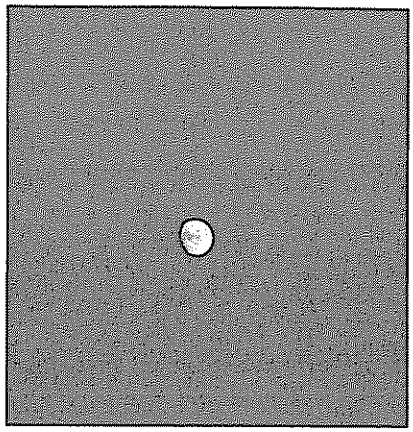
AS 13–61–8866



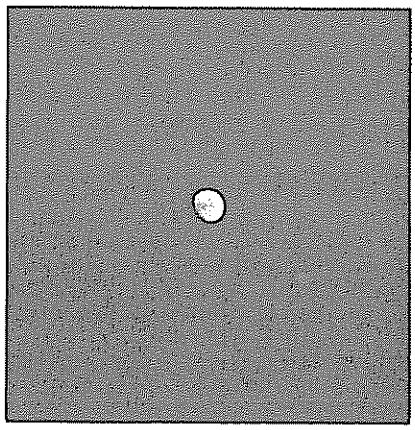
AS13–61–8867



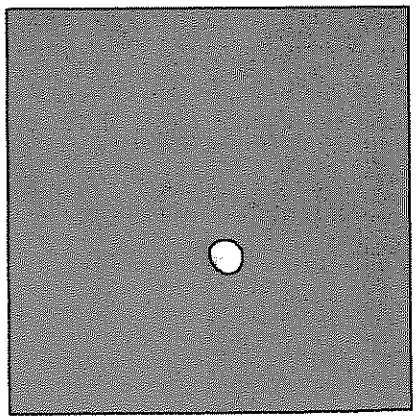
AS 13–61–8868



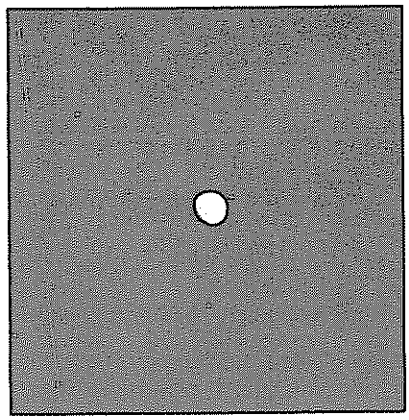
AS13–61–8869



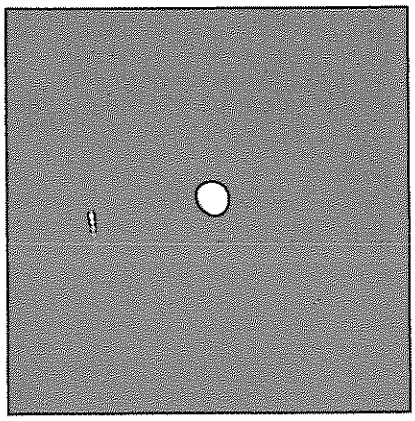
AS 13–61–8870



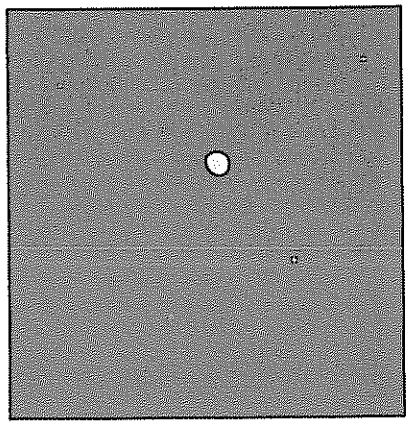
AS13-61-8871



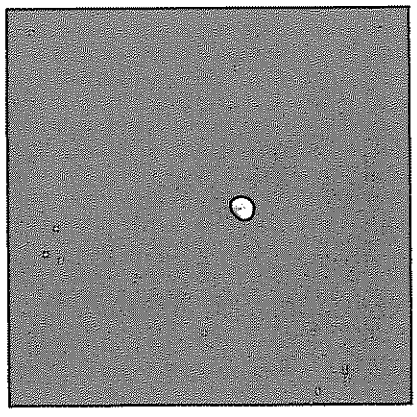
AS13-61-8872



AS13-61-8873



AS13-61-8874



AS13-61-8875

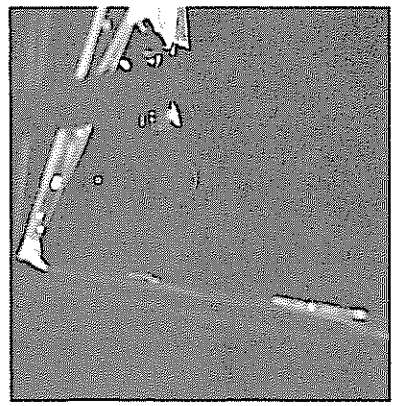
13-61-8876 thru 13-61-8879
OMITTED
SPACECRAFT INTERIOR

MAGAZINE

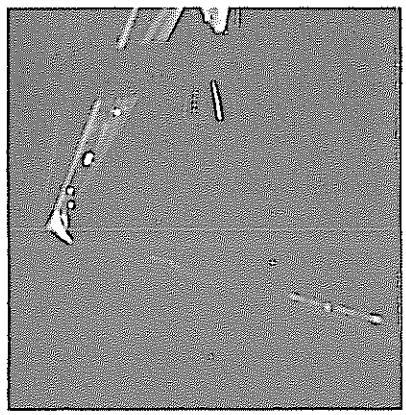
J J

AS13–62–8880 thru AS13–62–9039

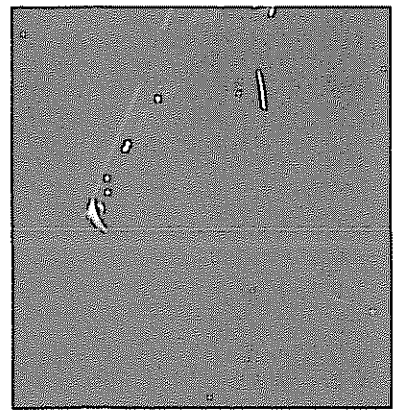
13–62–8880
OMITTED
SPACECRAFT INTERIOR



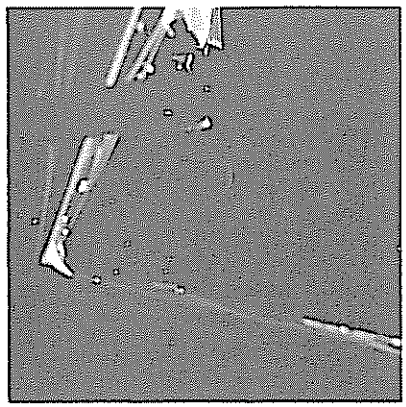
AS 13–62–8881



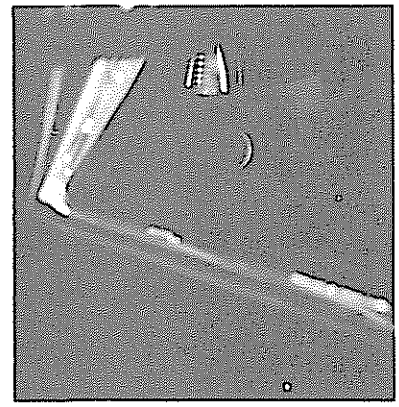
AS 13–62–8882



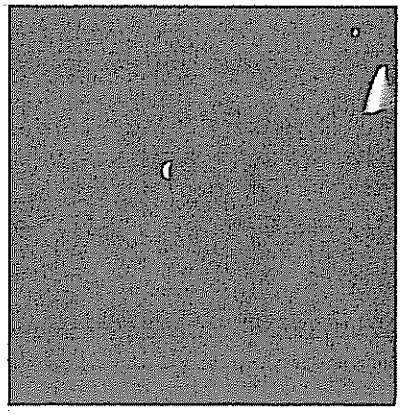
AS 13–62–8883



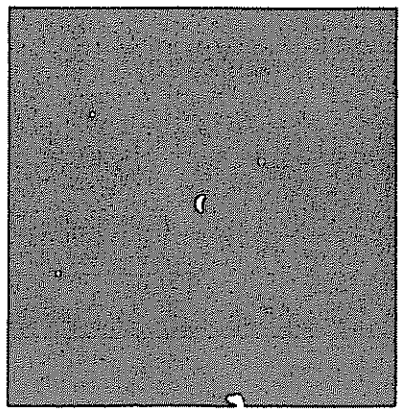
AS 13–62–8884



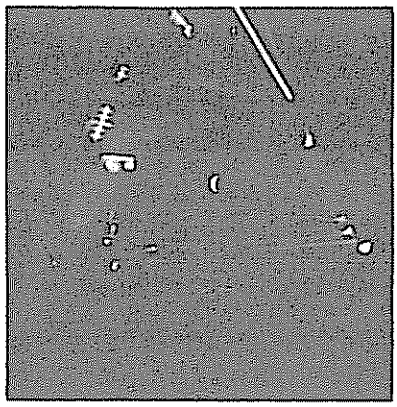
AS 13–62–8885



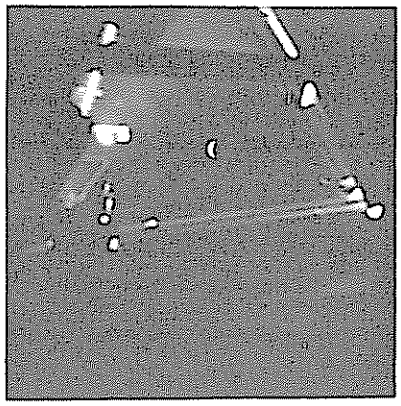
AS 13–62–8886



AS 13–62–8887

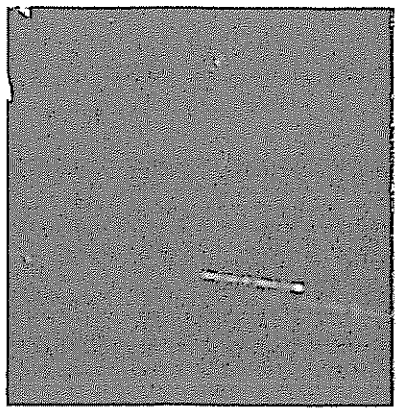


AS 13–62–8888

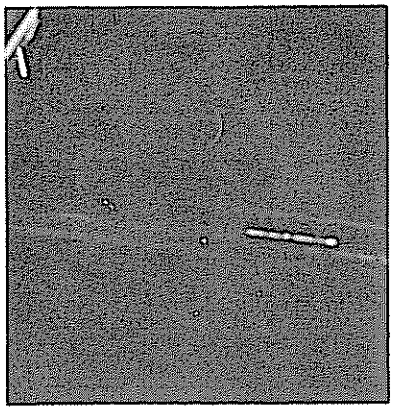


AS 13–62–8889

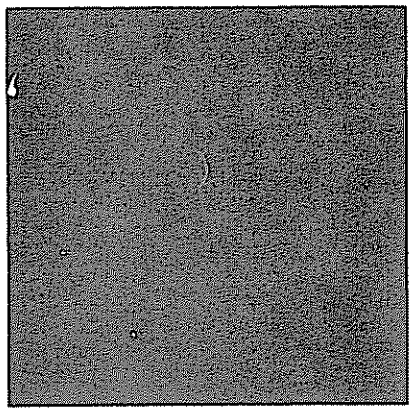
13–62–8890 thru 13–62–8892
OMITTED
SPACECRAFT INTERIOR



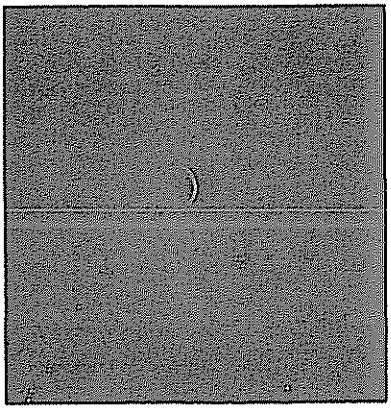
AS 13–62–8893



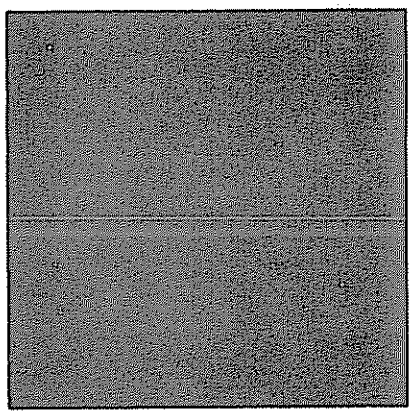
AS 13–62–8894



AS 13–62–8895

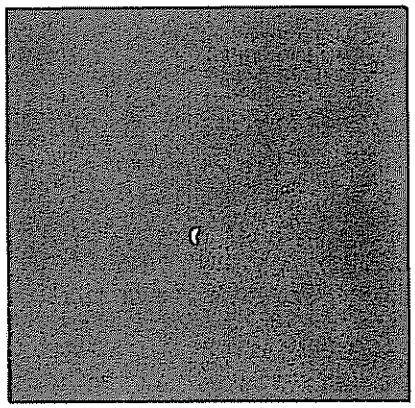


AS 13–62–8896

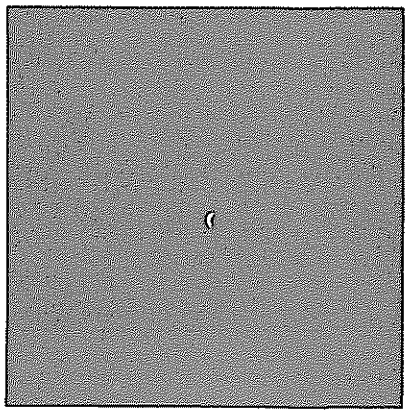


AS 13–62–8897

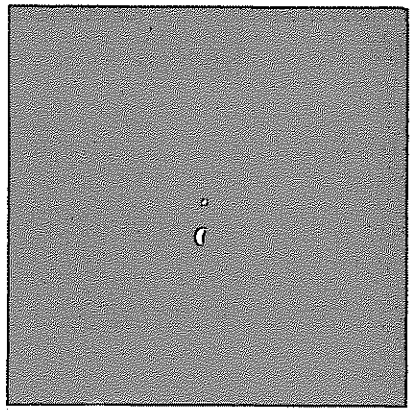
13–62–8898 thru 13–62–8900
OMITTED
BLACK OR
SPACECRAFT INTERIOR



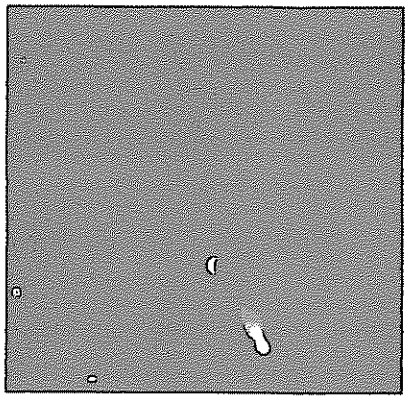
AS 13–62–8901



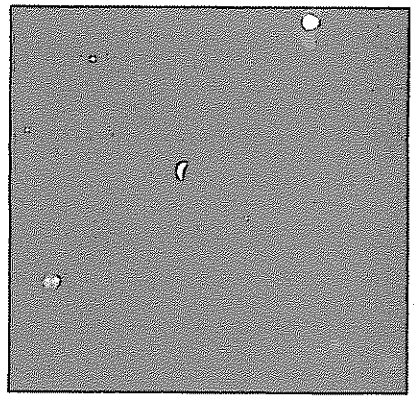
AS 13–62–8902



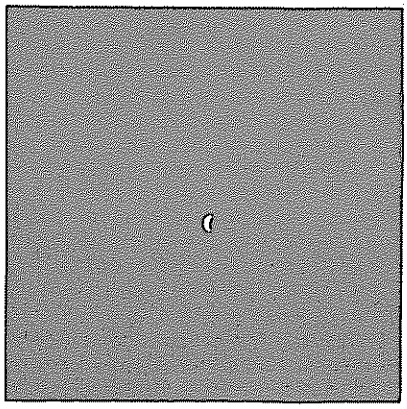
AS 13–62–8903



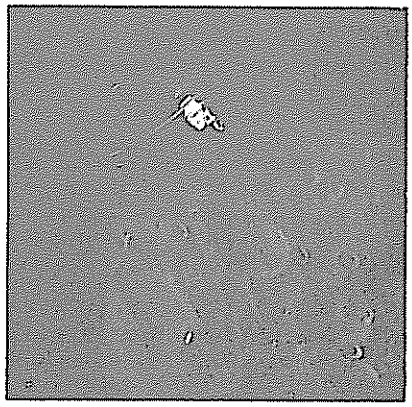
AS 13–62–8904



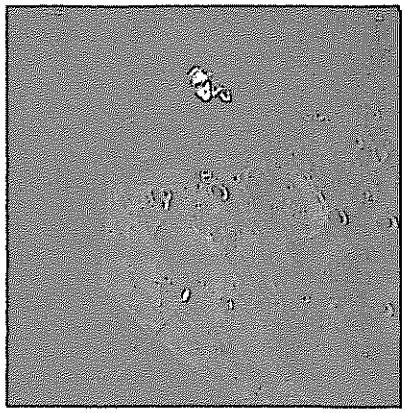
AS 13–62–8905



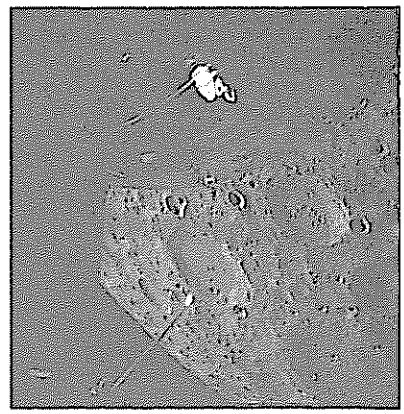
AS 13–62–8906



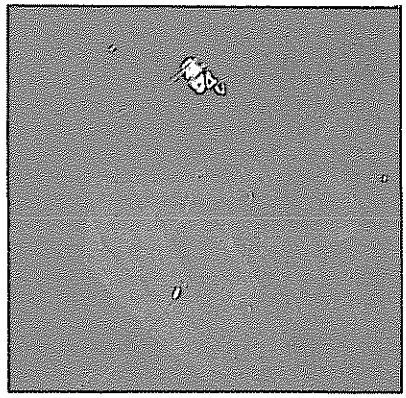
AS 13–62–8907



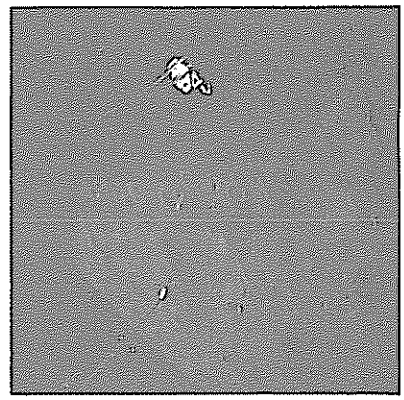
AS 13–62–8908



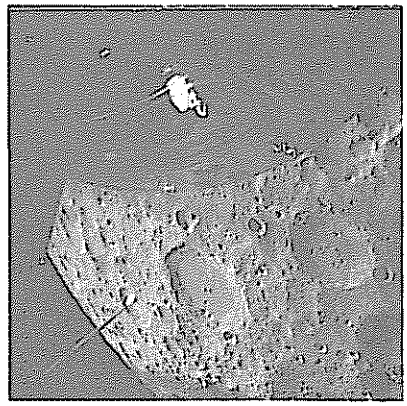
AS 13–62–8909



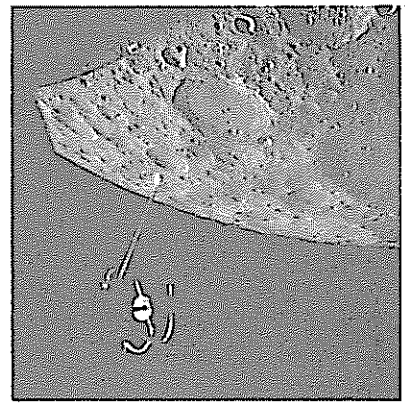
AS 13–62–8910



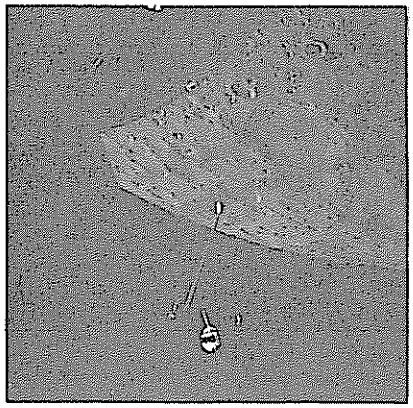
AS 13–62–8911



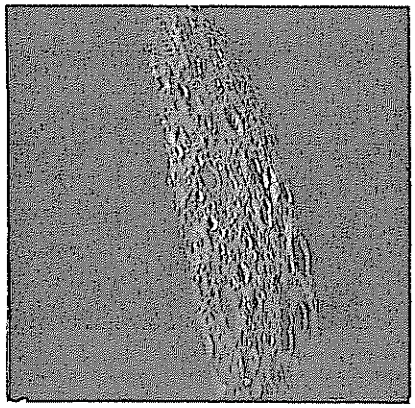
AS 13–62–8912



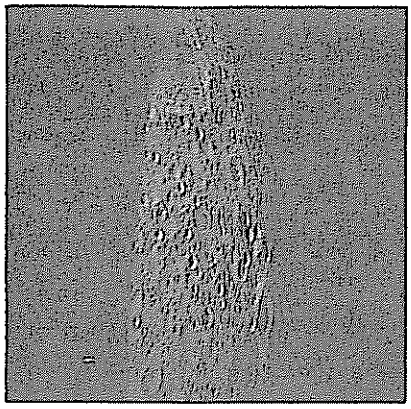
AS 13–62–8913



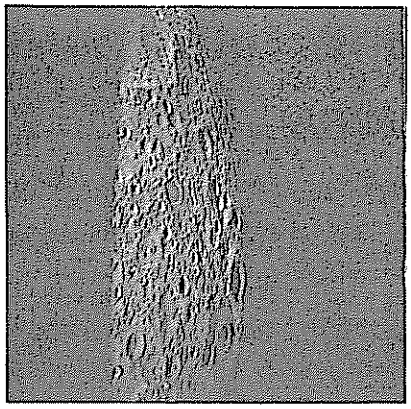
AS 13–62–8914



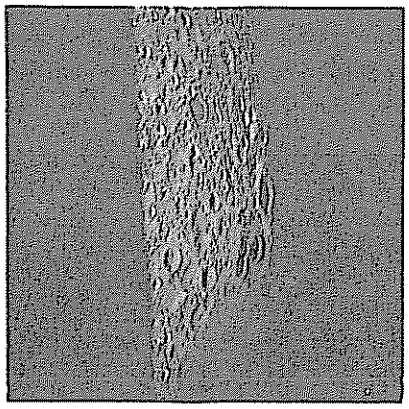
AS 13–62–8915



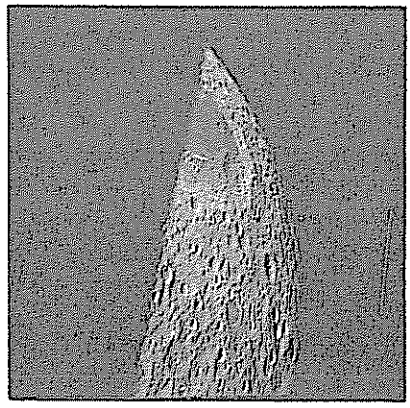
AS 13–62–8916



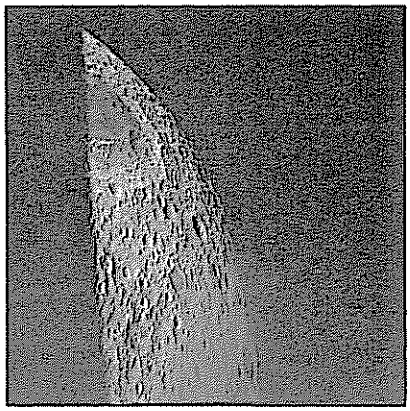
AS 13–62–8917



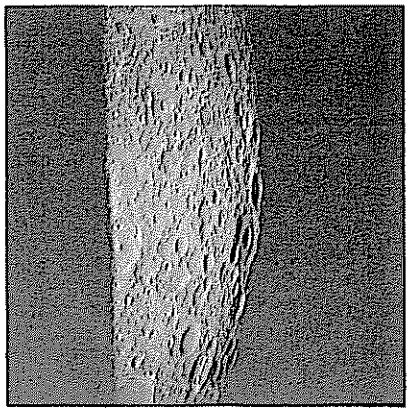
AS 13–62–8918



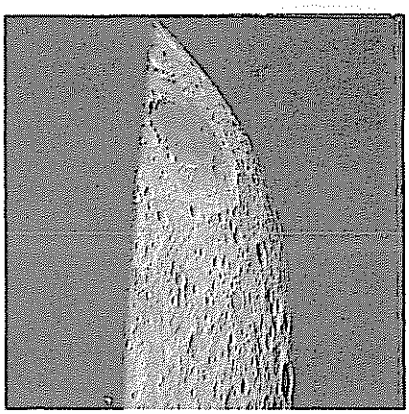
AS 13–62–8919



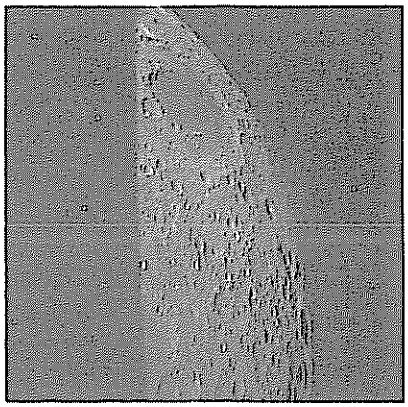
AS 13–62–8920



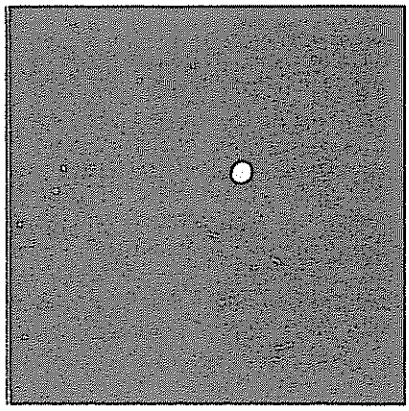
AS 13–62–8921



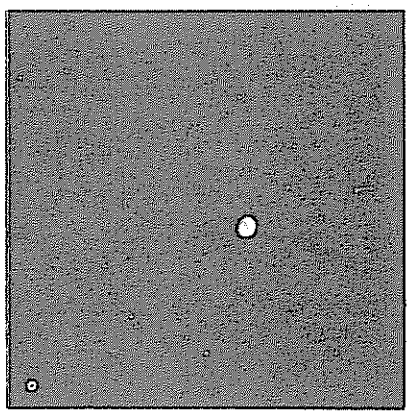
AS 13–62–8922



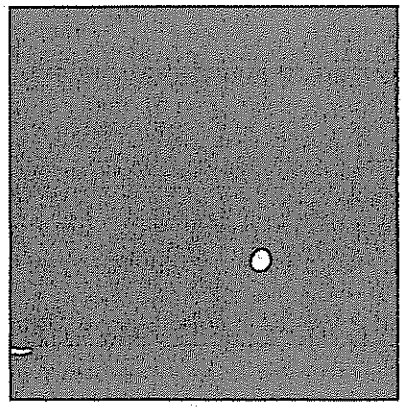
AS 13–62–8923



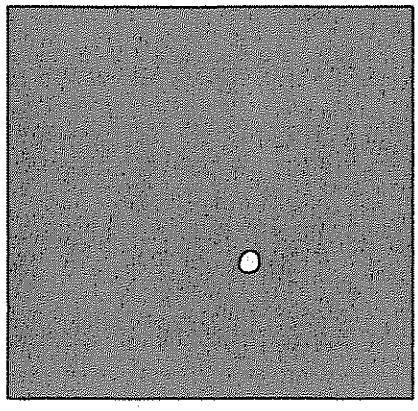
AS 13–62–8924



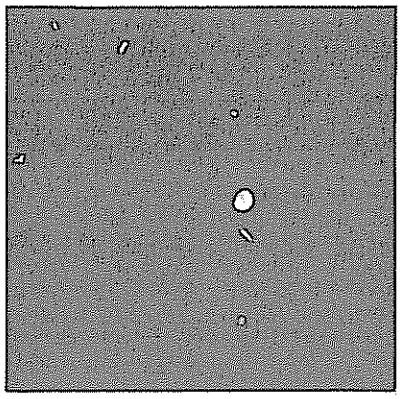
AS 13–62–8925



AS 13–62–8926

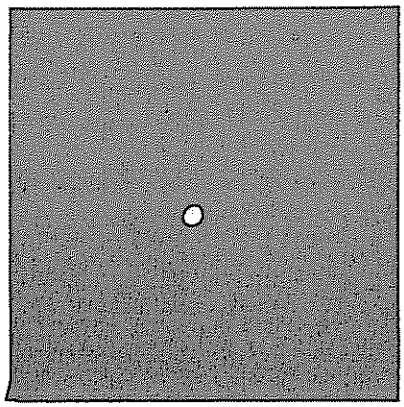


AS 13–62–8927

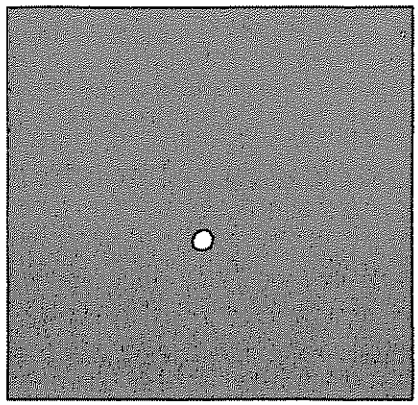


AS 13–62–8928

13–62–8929 thru 13–62–8932
OMITTED
SPACECRAFT INTERIOR

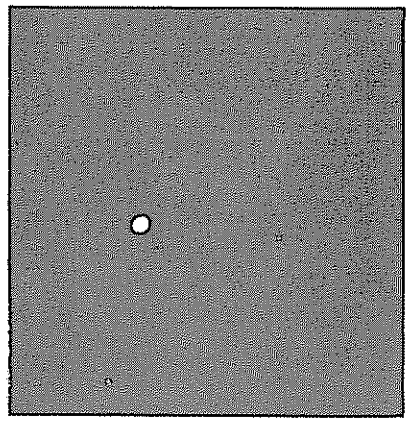


AS 13–62–8933

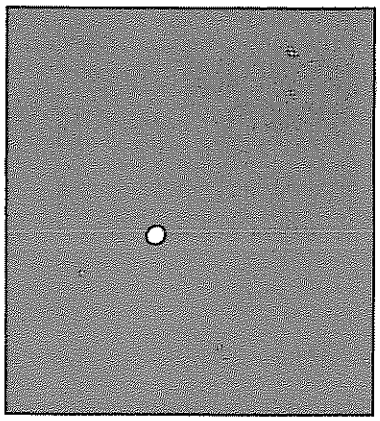


AS 13–62–8934

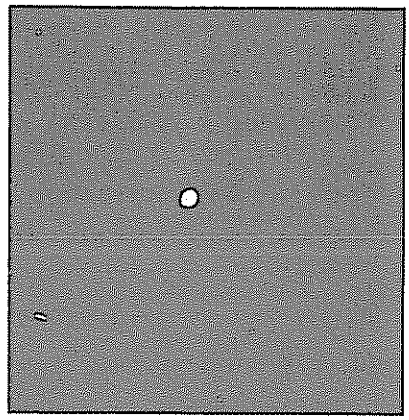
13–62–8935 and 13–62–8936
OMITTED
SPACECRAFT INTERIOR



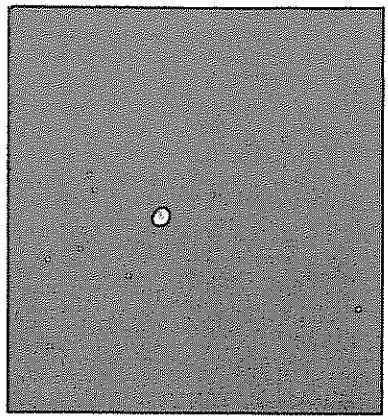
AS 13–62–8937



AS 13–62–8938

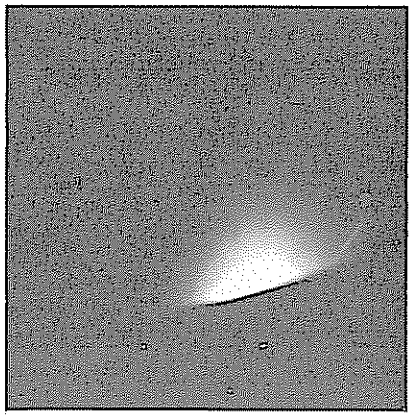


AS 13–62–8939

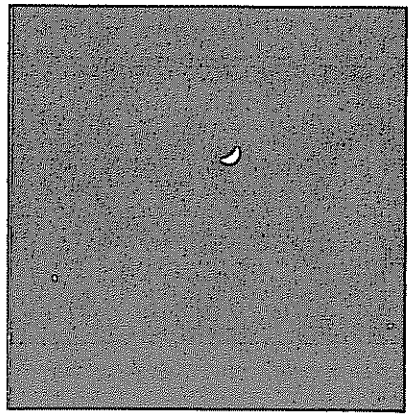


AS 13–62–8940

13–62–8941
OMITTED

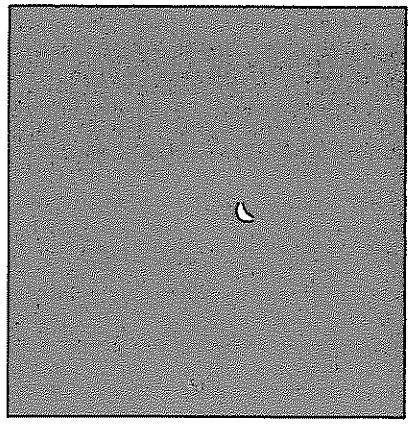


AS 13–62–8942

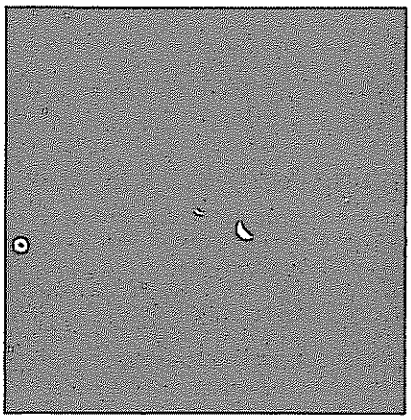


AS 13–62–8943

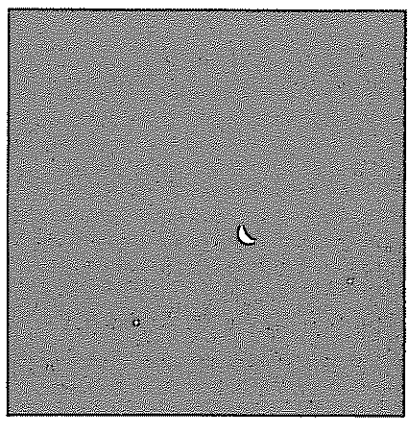
13–62–8944 thru 13–62–8946
OMITTED



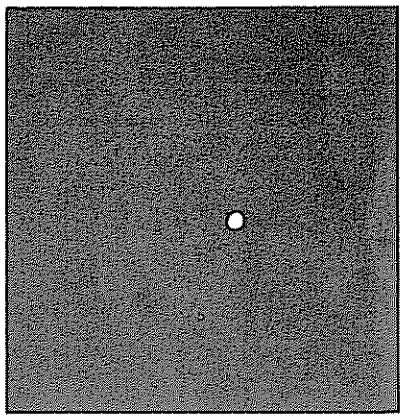
AS 13–62–8947



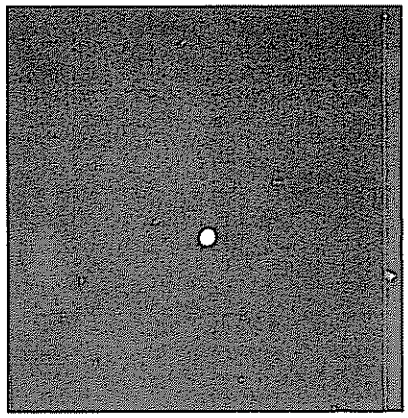
AS 13–62–8948



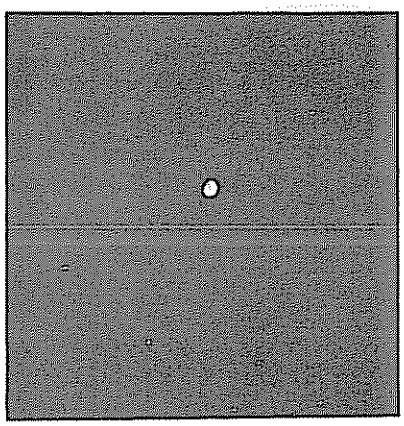
AS 13–62–8949



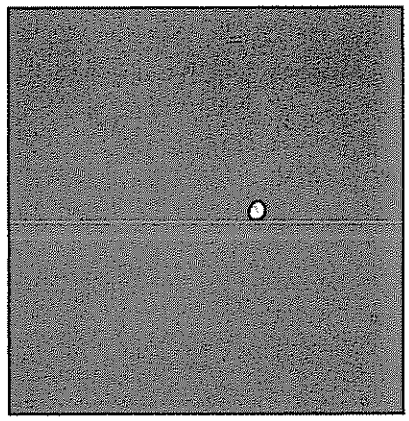
AS 13–62–8950



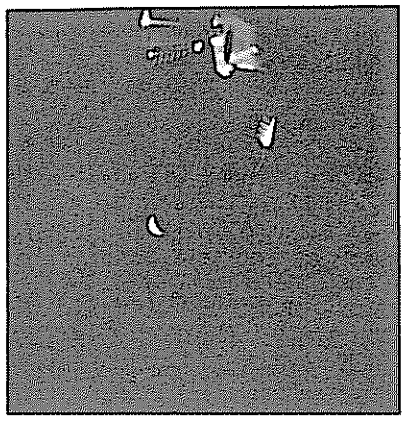
AS 13–62–8951



AS 13–62–8952

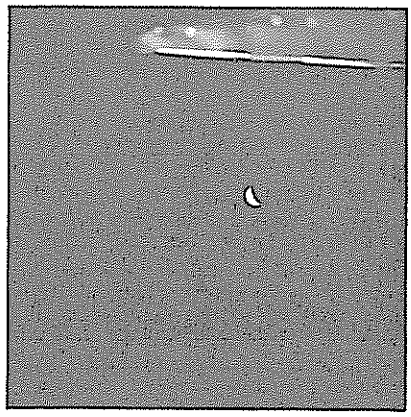


AS 13–62–8953

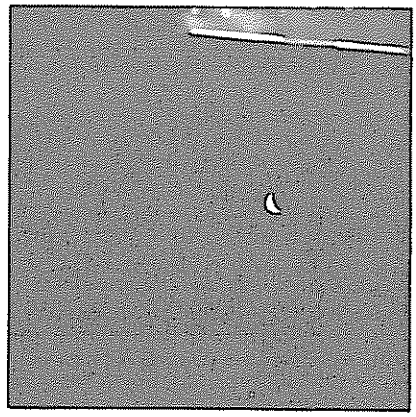


AS 13–62–8954

13–62–8955
OMITTED

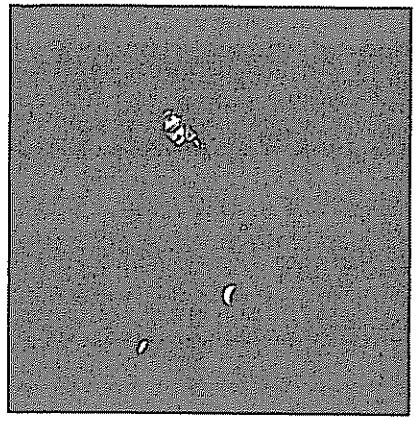


AS 13–62–8956

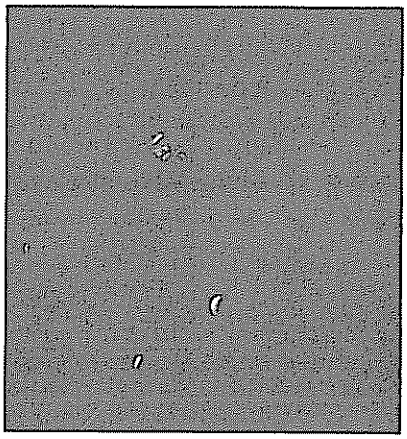


AS 13–62–8957

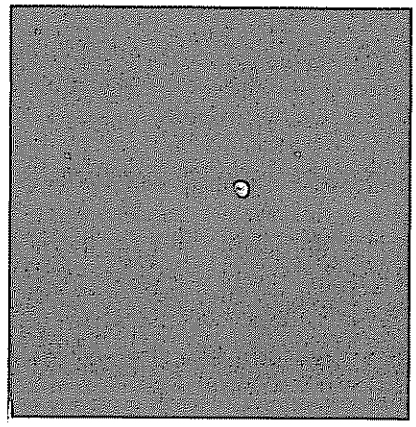
13–62–8958 and 13–62–8959
OMITTED



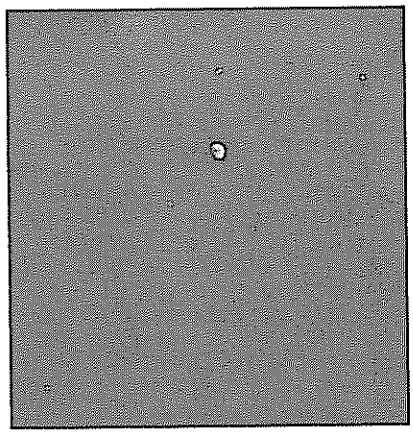
AS 13–62–8960



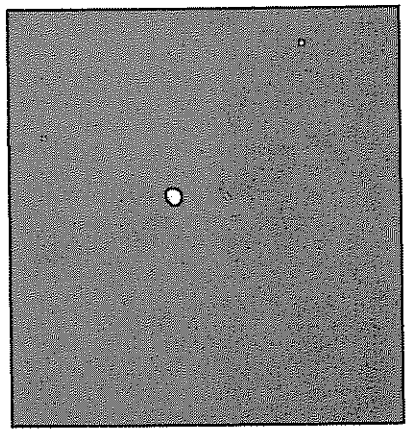
AS 13–62–8961



AS 13–62–8962

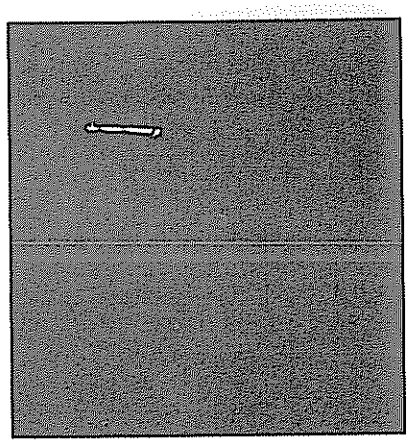


AS 13–62–8963

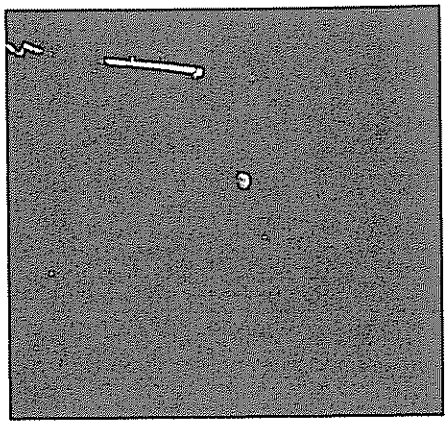


AS 13–62–8964

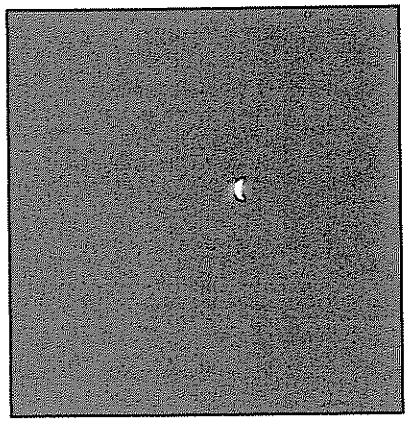
13–62–8965
OMITTED



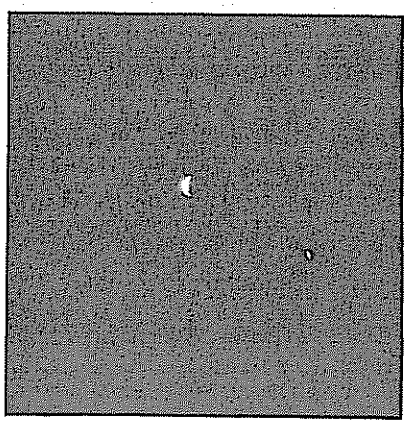
AS 13–62–8966



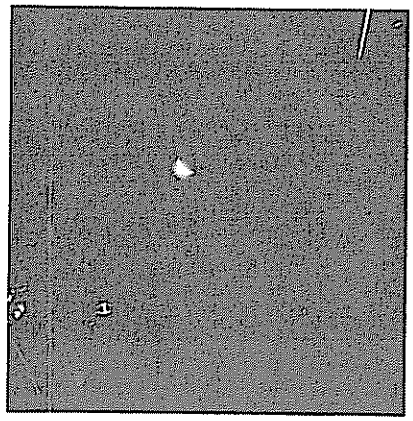
AS 13–62–8967



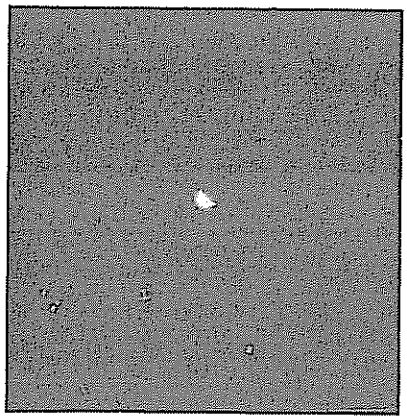
AS 13–62–8968



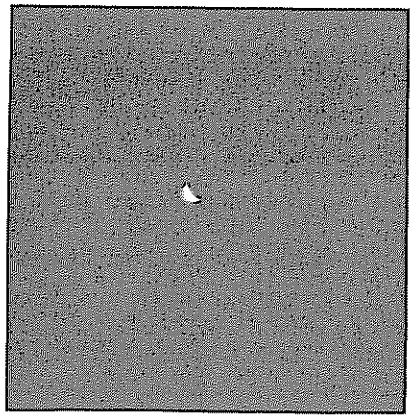
AS 13–62–8969



AS 13–62–8970

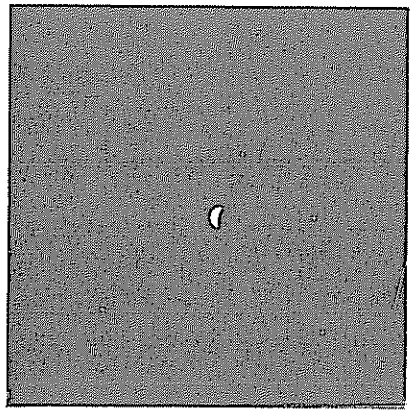


AS 13–62–8971

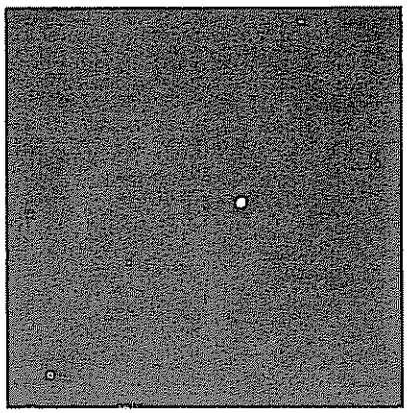


AS 13–62–8972

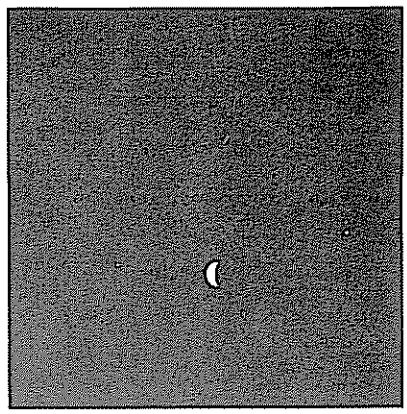
13–62–8973 thru 13–62–8976
OMITTED



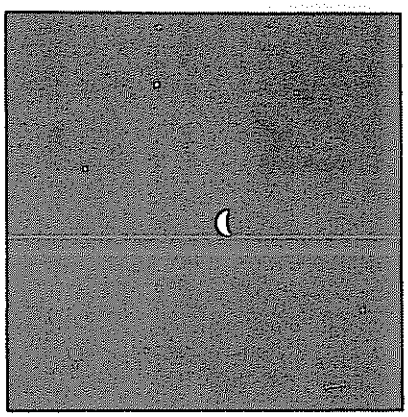
AS 13–62–8977



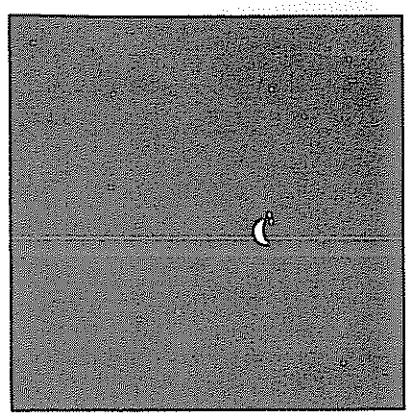
AS 13–62–8978



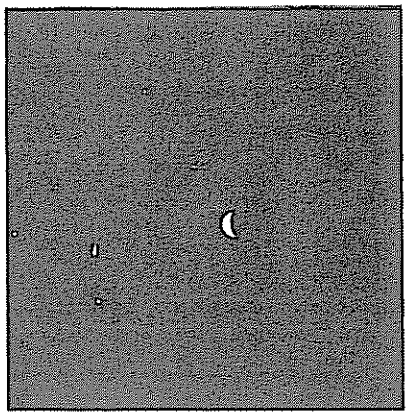
AS 13–62–8979



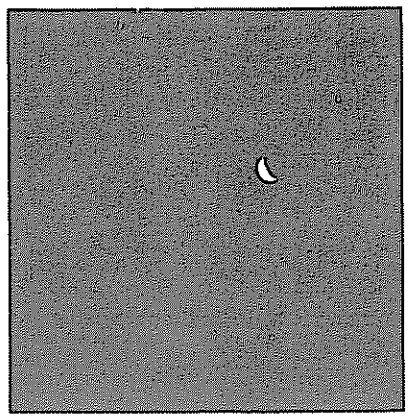
AS 13–62–8980



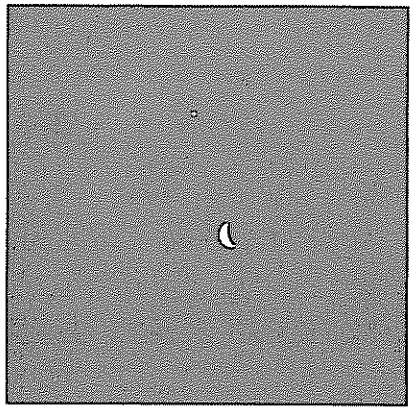
AS 13–62–8981



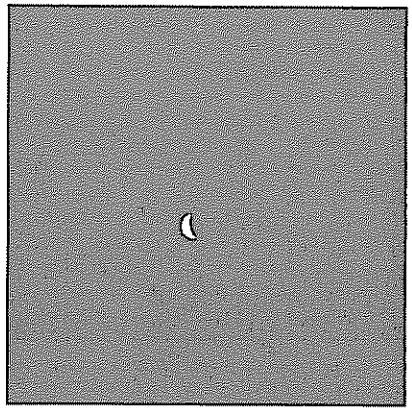
AS 13–62–8982



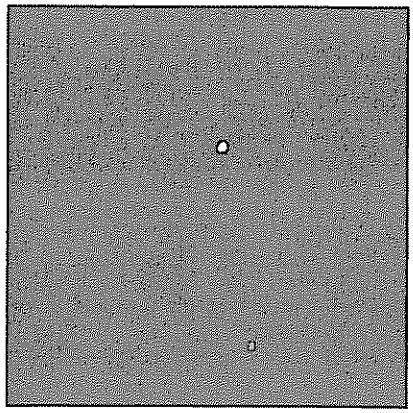
AS 13–62–8983



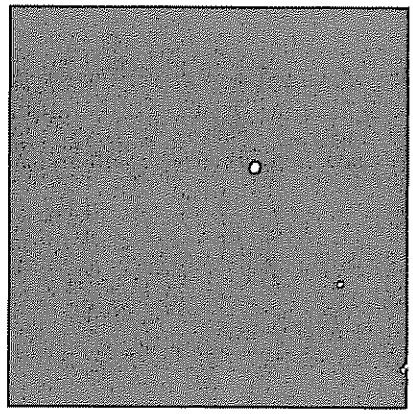
AS 13–62–8984



AS 13–62–8985

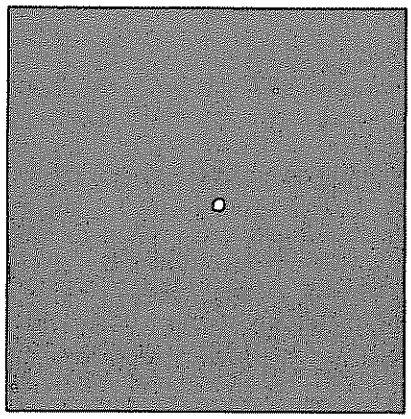


AS 13–62–8986

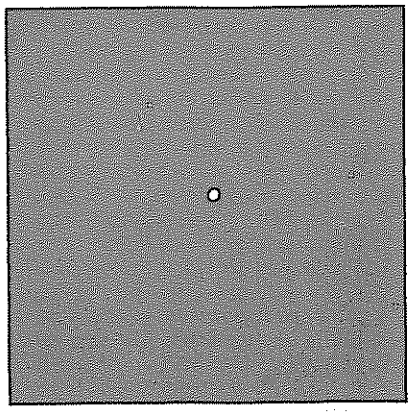


AS 13–62–8987

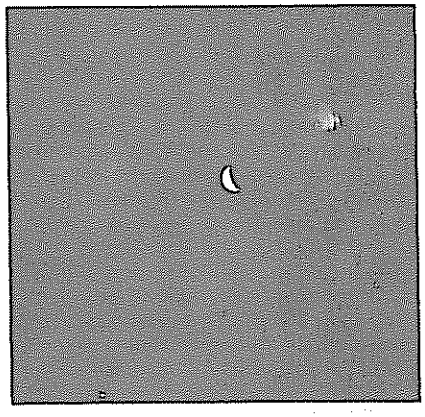
13–62–8988 thru 13–62–8990
OMITTED
SPACECRAFT INTERIOR



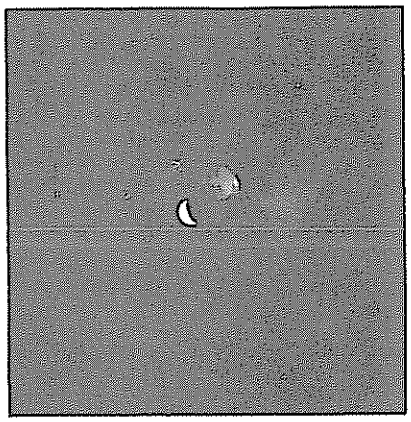
AS 13–62–8991



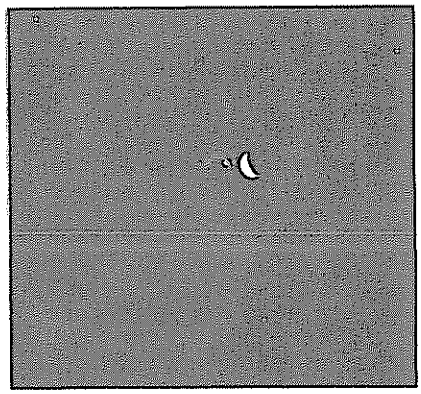
AS 13–62–8992



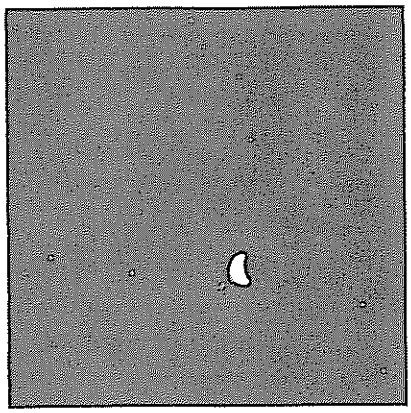
AS 13–62–8993



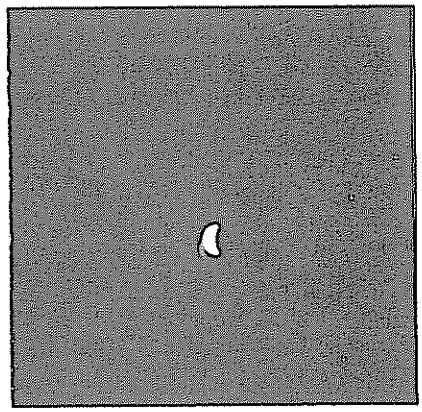
AS 13–62–8994



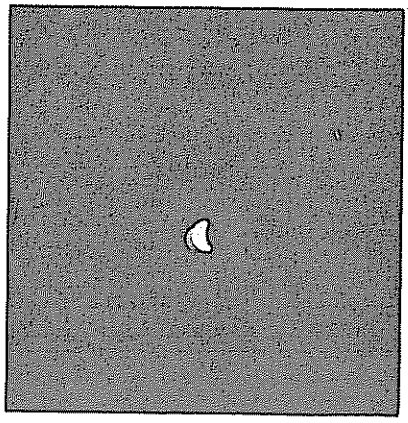
AS 13–62–8995



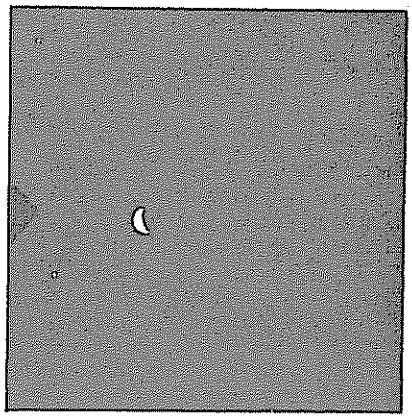
AS 13–62–8996



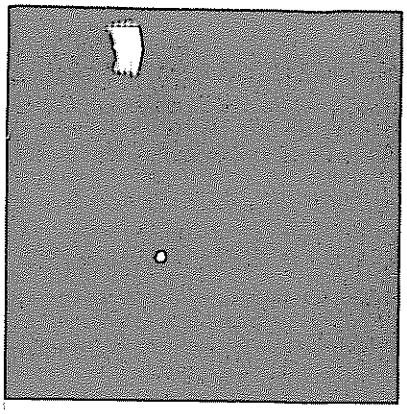
AS 13–62–8997



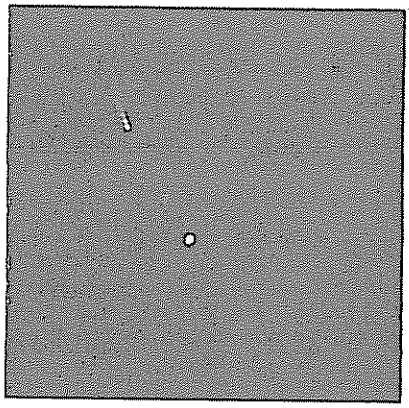
AS 13–62–8998



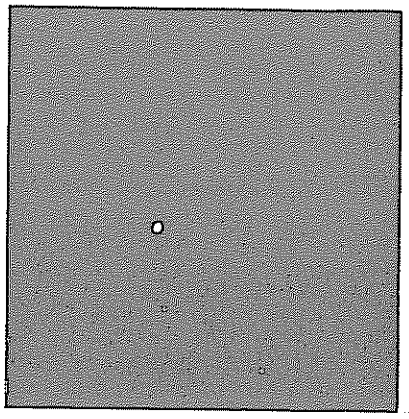
AS 13–62–8999



AS 13–62–9000

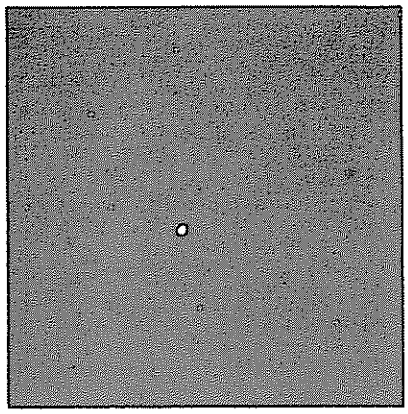


AS 13–62–9001

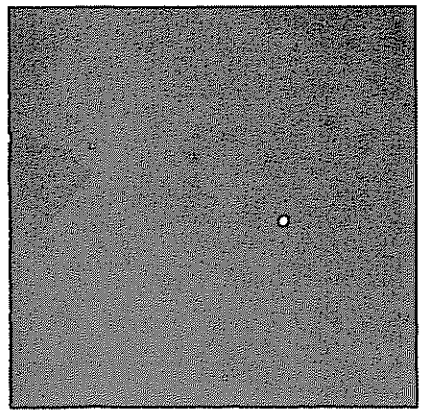


AS 13–62–9002

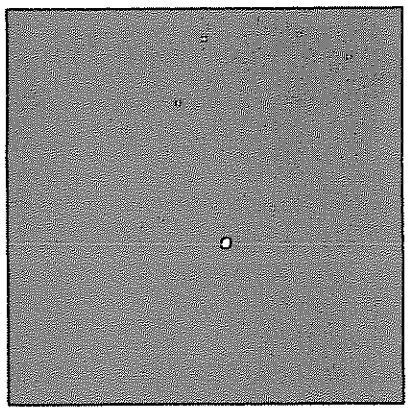
13–62–9003 thru 13–62–9005
OMITTED
SPACECRAFT INTERIOR



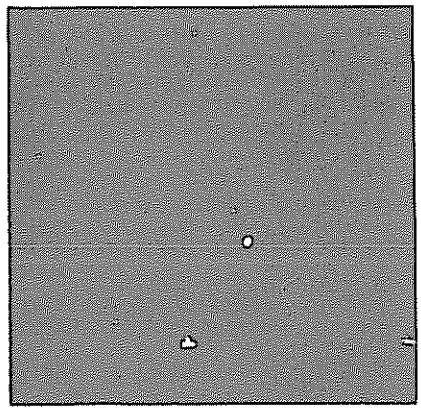
AS 13–62–9006



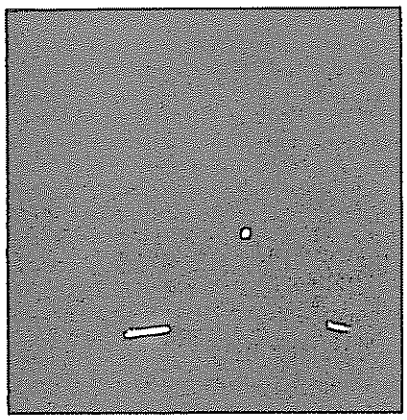
AS 13–62–9007



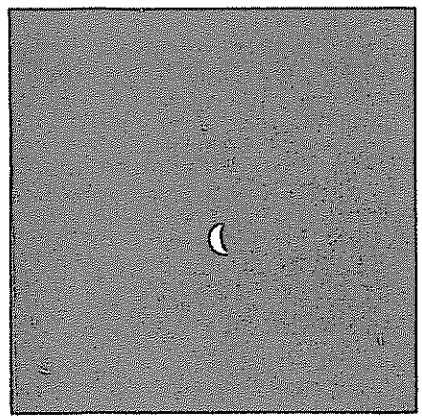
AS13–62–9008



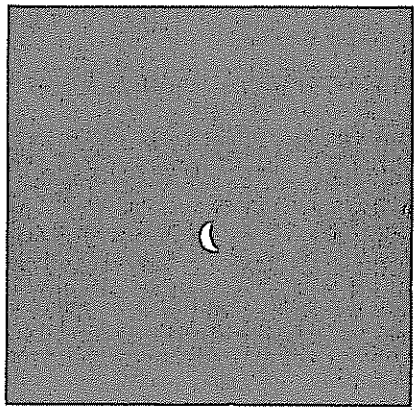
AS 13–62–9009



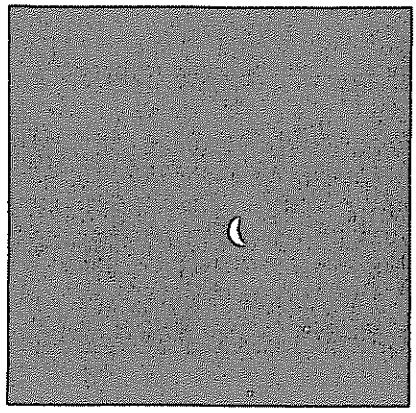
AS 13–62–9010



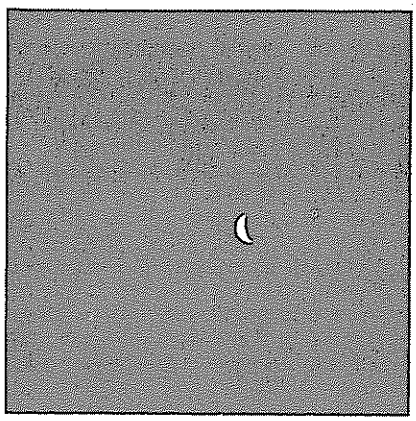
AS 13–62–9011



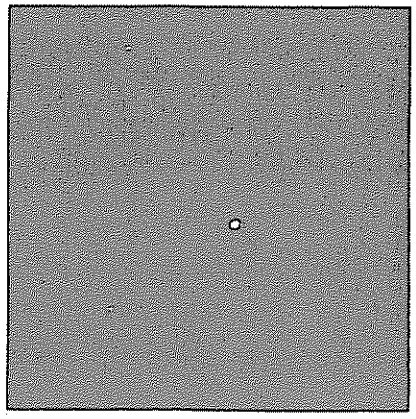
AS 13–62–9012



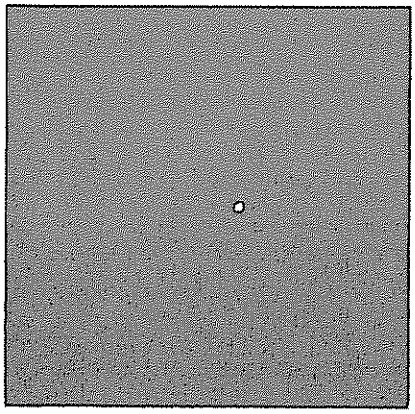
AS 13–62–9013



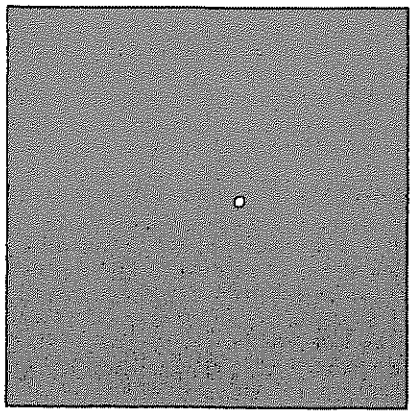
AS 13–62–9014



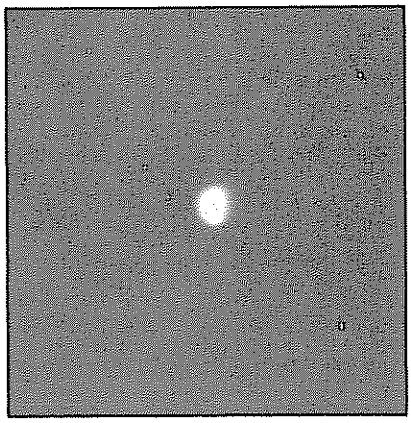
AS 13–62–9015



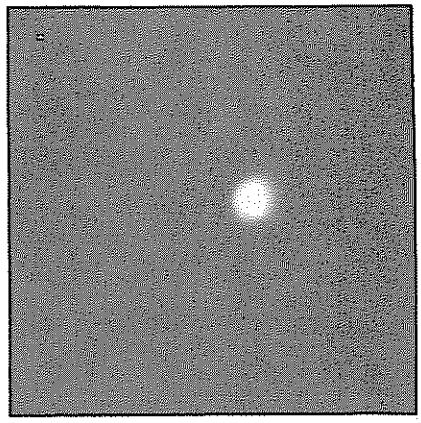
AS13–62–9016



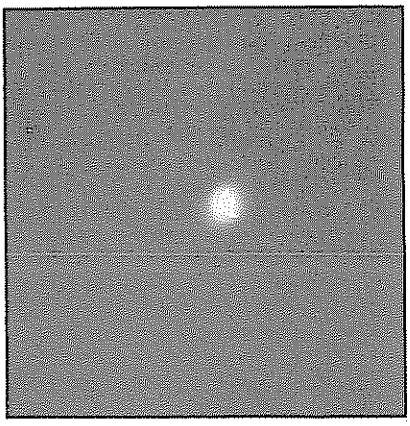
AS 13–62–9017



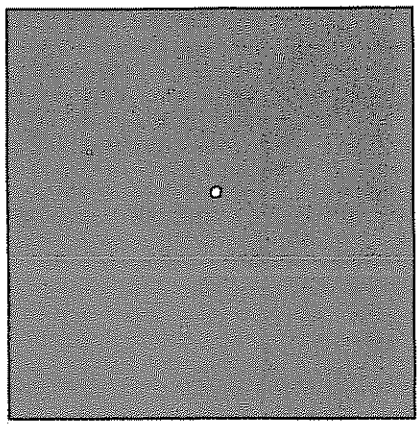
AS 13–62–9018



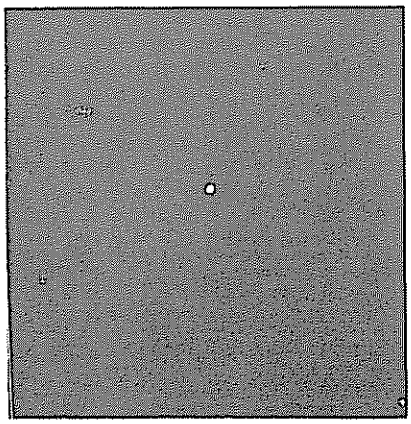
AS 13–62–9019



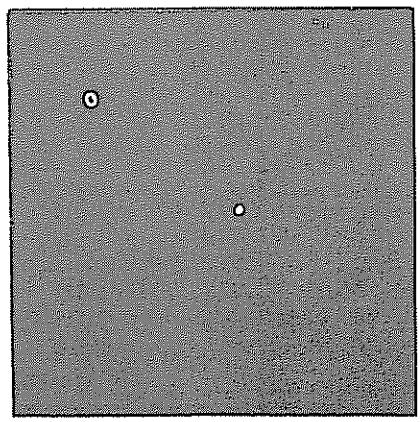
AS 13–62–9020



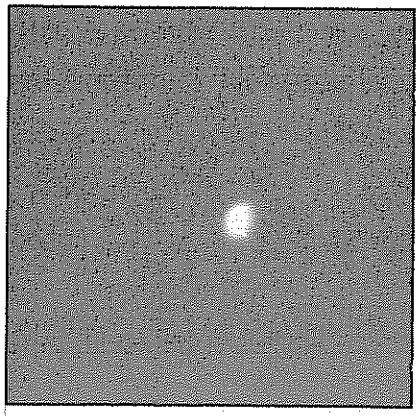
AS 13–62–9021



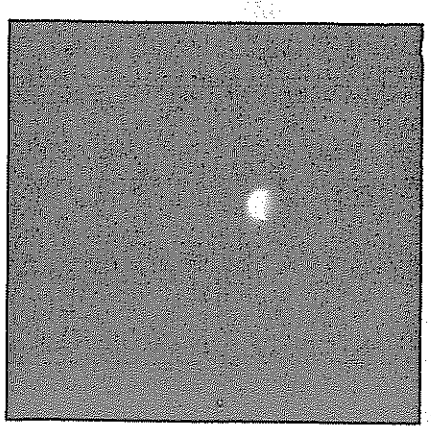
AS 13–62–9022



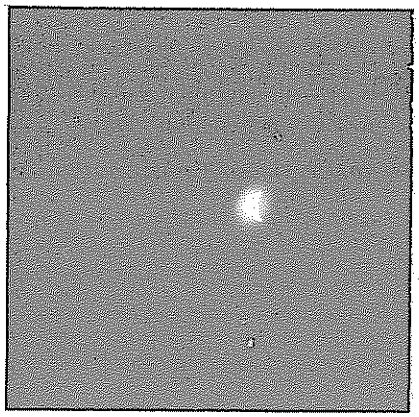
AS 13–62–9023



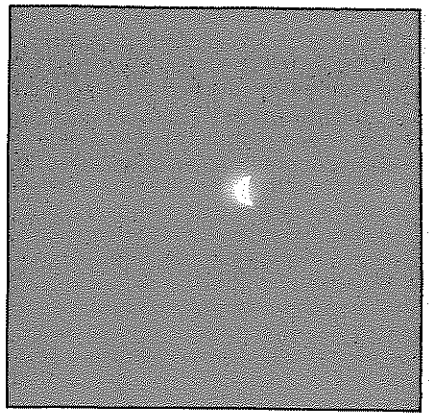
AS 13–62–9024



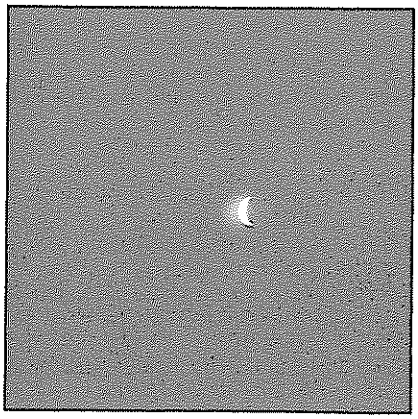
AS 13–62–9025



AS 13–62–9026

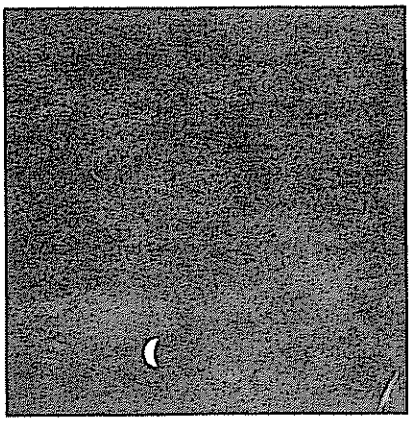


AS 13–62–9027

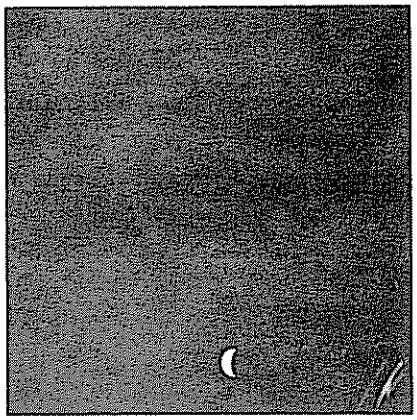


AS 13–62–9028

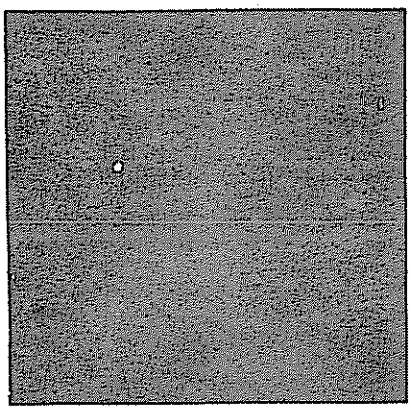
13–62–9029 thru 13–62–9032
OMITTED



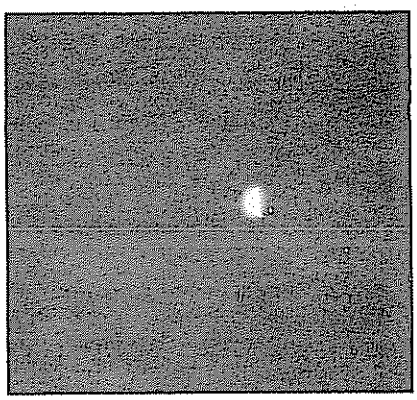
AS 13–62–9033



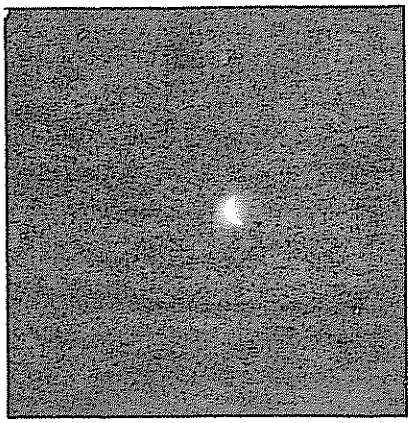
AS 13–62–9034



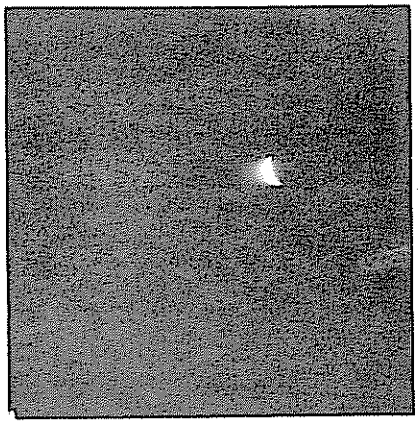
AS 13–62–9035



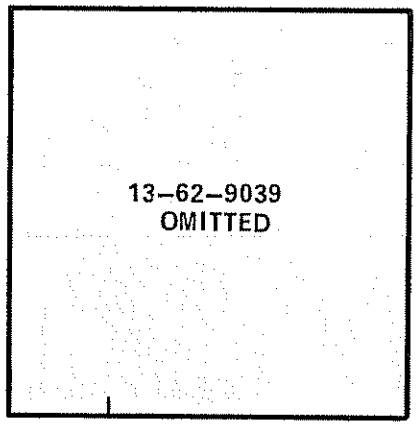
AS 13–62–9036



AS13–62–9037



AS 13–62–9038


13–62–9039
OMITTED