

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

Prepared for the
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NOTES ON BASE

This is one map in a series of topographic map sheets covering the entire surface of Mars at nominal scales of 1:25,000,000 and 1:5,000,000 (Báton, 1973). The major source of map data was the Mariner 9 television experiment (Masursky and others, 1970).

ADOPTED FIGURE

The figure of Mars used for the computation of the map projection is an oblate spheroid (flattening of 1/192) with an equatorial radius of 3393.4 km and a polar radius of 3375.7 km.

PROJECTION

The Mercator projection is used for this sheet, with a scale of 1:5,000,000 at the equator and 1:4,136,000 at lat. 30°. Longitudes increase to the west in accordance with usage of the International Astronomical Union (IAU, 1971). Latitudes are areographic (de Vaucouleurs and others, 1973).

CONTROL

Planimetric control is provided by photogrammetric triangulation using Mariner 9 pictures (Davies, 1973; Davies and Arthur, 1973) and the radio-tracked position of the spacecraft. The first meridian passes through the crater Airy-O (lat 5.19° S) within the crater Airy. No simple statement is possible for the precision, but local consistency is 5-15 km.

MAPPING TECHNIQUE

A series of mosaics of Mercator projections of Mariner 9 pictures was assembled at 1:5,000,000.

Shaded relief was copied from the mosaics and portrayed with uniform illumination with the sun to the west. Many Mariner 9 pictures besides those in the base mosaic were examined to improve the portrayal (Levinthal and others, 1973). The shading is not generalized and may be interpreted with photographic reliability (Inge, 1972).

Shaded relief analysis and representation were made by Patricia M. Bridges.

ALBEDO MARKINGS

The markings superimposed on the shaded relief were hand copied from pictures that were computer enhanced especially to show low frequency tone variations (Báton and Inge, 1975). The surface in these pictures is illuminated from a variety of angles from the camera line of sight. The markings therefore delineate boundaries of local brightness variations only and should not be considered as true measure of albedo. No attempt was made to use Earth based telescopic albedo data.

Airbrush portrayal of albedo markings was done by Patricia M. Bridges.

CONTOURS

Since Mars has no seas and hence no sea level, the datum (the 0 km contour line) for altitudes is defined by a gravity field described by spherical harmonics of fourth order and fourth degree (Jordan and Larré, 1973) combined with a 6.1 millibar atmospheric pressure surface derived from occultation data (Klore and others, 1973; Christensen, 1975). This datum is a triaxial ellipsoid with semi-major axes of A=3394.6 km, B=3393.3 km, and a semi-minor axis of C=3376.3 km. The semi-major axis A intersects the Martian surface at long 105°.

The contour lines (Wu, 1975) were compiled from Earth-based radar determinations (Downs and others, 1971; Pettengill and others, 1971) and measurements made by Mariner 9 instrumentation, including the ultraviolet spectrometer (Báton and others, 1974), infrared interferometer spectrometer (Conrath and others, 1973), and stereoscopic Mariner 9 television pictures (Wu and others, 1973). Formal analysis of contour-line accuracy has not been made. The estimated vertical accuracy of each source of data indicates a probable error of 1-2 km.

COLOR

No attempt was made on the map to precisely duplicate the color of the Martian surface, although the color used does approximate it.

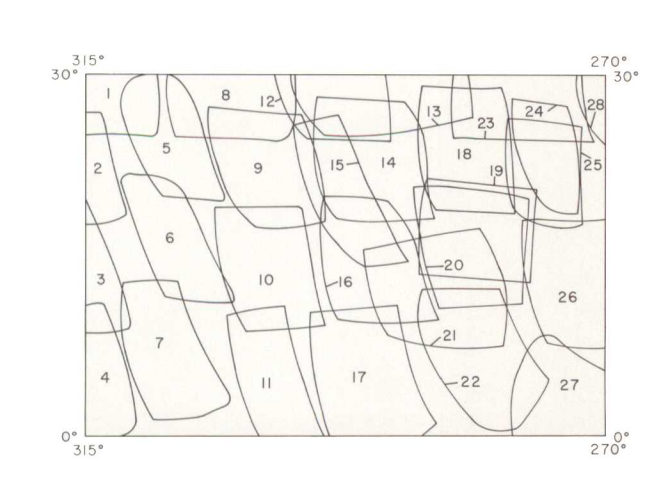
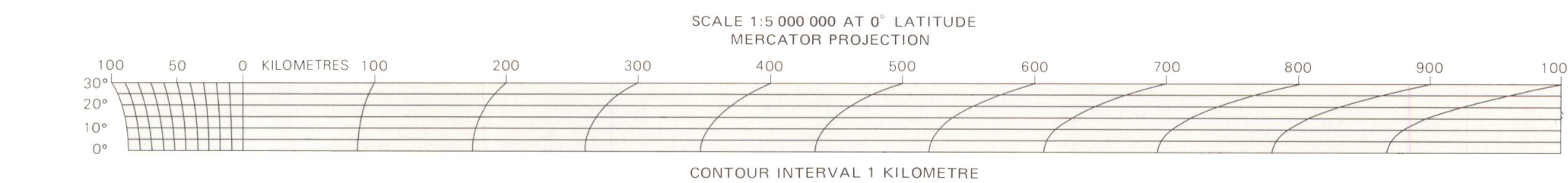
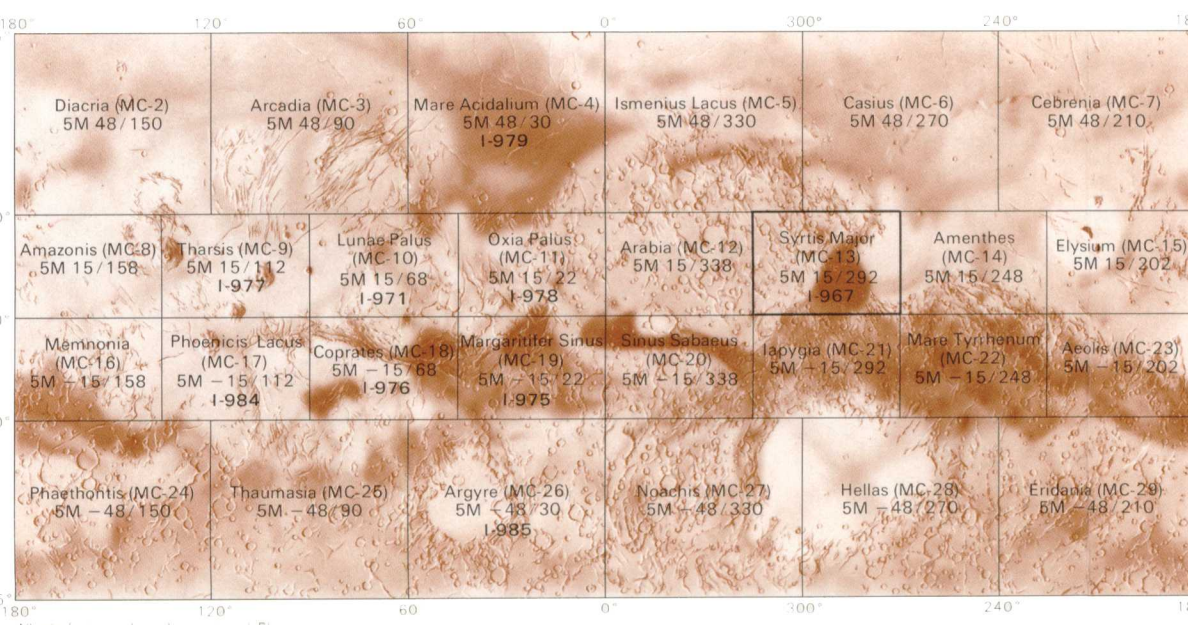
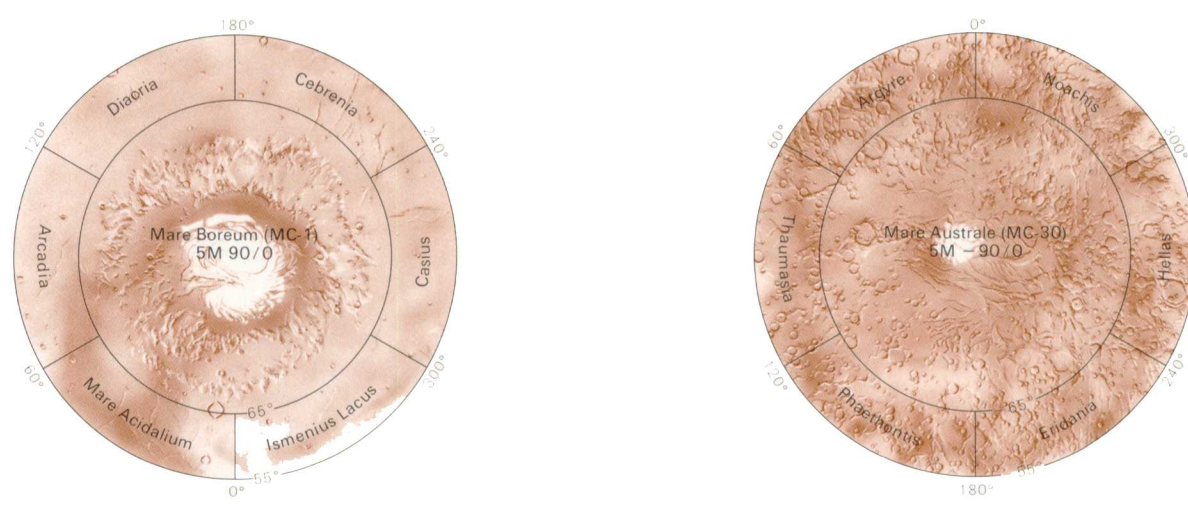
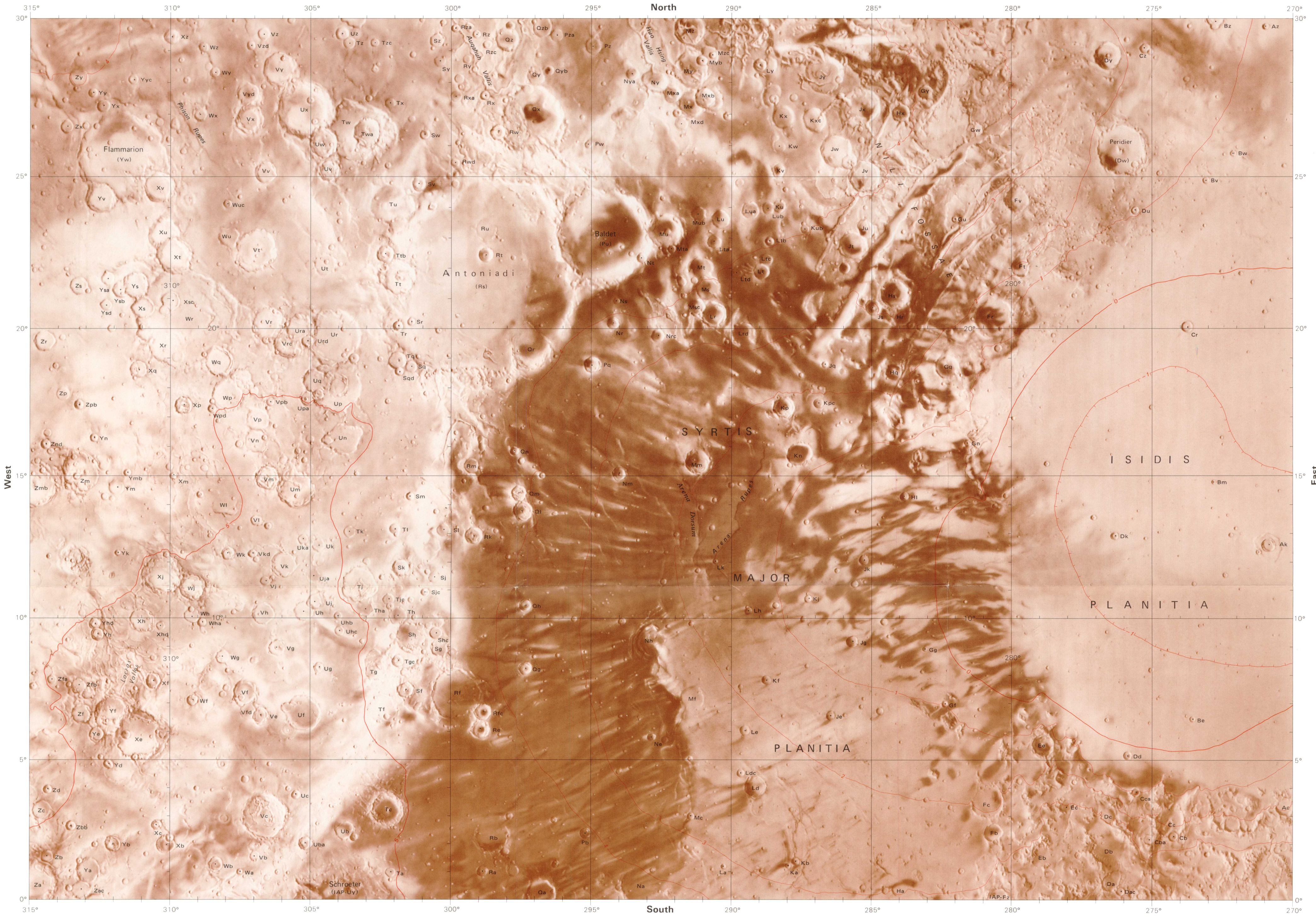
NOMENCLATURE

All names on this sheet are approved by the International Astronomical Union (IAU, 1974; Milton, written communication, 1975), except the following names which are provisional: Locas Valles. Double and triple letter designations for craters refer to position on the map. Some craters have commemorative names; letter designations for these craters are shown in parentheses. Where craters are mostly on an adjoining map, their letters are derived from the other map; where craters lie exactly on the boundary of two maps, their letters are derived from the eastern or southern map.

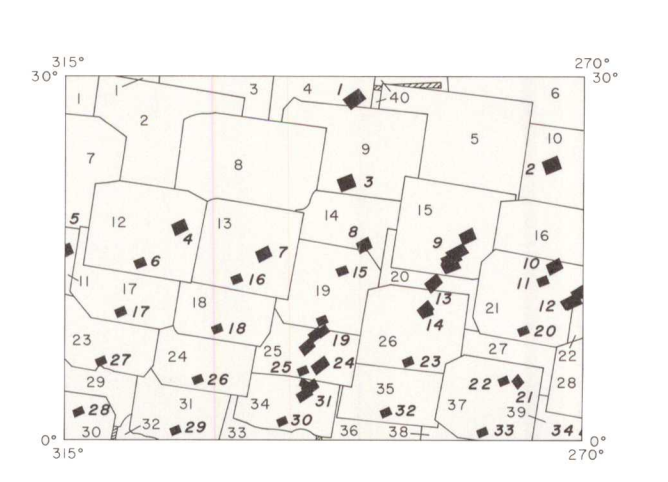
MC-13: Abbreviation for Mars Chart 13.
M 5M 15/292 RMC: Abbreviation for Mars 1:5,000,000 series; center of sheet, 15° latitude, 292° longitude; shaded relief map, R, with albedo markings, M, and contours, C.

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Index No.	DAS No.	Index No.	DAS No.
1	8262839	15	7003883
2	6807753	16	7075703
3	6807763	17	7075703
4	6807763	18	7147800
5	6807763	19	7147800
6	6807763	20	7147733
7	6807763	21	6803048
8	8334865	22	7147863
9	7007423	23	8050889
10	7007423	24	7147943
11	7007423	25	7219763
12	8406829	26	7219893
13	8903829	27	7219893
14	7075733	28	8622849



A camera pictures				High-resolution B camera pictures			
Index No.	DAS No.	Index No.	DAS No.	Index No.	DAS No.	Index No.	DAS No.
1	8262839	21	7218143	1	8953794	15	7075288
2	7147978	22	7281393	2	7147978	16	7003358
3	8154809	23	6811293	3	6803198	17	6923298
4	8903829	24	7003253	4	6931748	18	7003289
5	7147800	25	7011029	5	6803198	19	7075129
6	8550889	26	7147213	6	6931398	20	8981274
7	6803703	27	7219723	7	6803198	21	8981274
8	7007423	28	7281233	8	7075129	22	8981274
9	7075733	29	6811223	9	7147978	23	7219723
10	7219763	30	6811223	10	7003253	24	8981274
11	6803403	31	7003463	11	7003253	25	7147278
12	6811423	32	7003113	12	7003253	26	7147278
13	7003293	33	7075143	13	7147453	27	7075248
14	7075423	34	7075213	14	7219723	28	7075248
15	7147453	35	7147243	15	7219723	29	7075248
16	7219723	36	7147453	16	7219723	30	7075248
17	6831363	37	7219703	17	10169394	31	6931189
18	7003323	38	7219703	18	7003323	32	7003323
19	7075323	39	7281163	19	10169394	33	7075129
20	7147983	40	8406829	20	8953284	34	8953284
					7147248	35	7147209
					1170741	36	7219709
						37	8693274

INDEX TO MARINER 9 PICTURES USED TO MAKE THE ALBEDO MARKINGS OVERPRINT
Most of the pictures indexed above were specially processed to accentuate albedo markings. Only the useful image areas of the pictures are outlined.

INDEX TO MARINER 9 PICTURES
The mosaic used to control the positioning of features on this map was made with the Mariner 9 A-camera pictures outlined above. Useful coverage is not available in cross-hatched areas. Also shown (by solid black rectangles) are the high-resolution B-camera pictures, identified by italic numbers.

TOPOGRAPHIC MAP OF THE SYRTIS MAJOR QUADRANGLE OF MARS
MC-13
M 5M 15/292 RMC
1976