

DEPARTMENT OF THE INTERIOR  
UNITED STATES GEOLOGICAL SURVEY

Prepared for the  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NOTES ON BASE

A series of topographic maps covering the entire surface of Mars at a nominal scale of 1:5,000,000 was originally compiled from Mariner 9 data. Details of the Mariner 9 mission that are relevant to the mapping are described by Batson and others (1979). This revised version was based on Viking Orbiter images. A series of papers describing the Viking mission was published in the Journal of Geophysical Research (American Geophysical Union, 1977).

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, Lambert conformal conic, and polar stereographic projections are used for this map series. The scale of the series is 1:5,000,000 at the equator. The projections have common scales of 1:3,376,000 at latitudes  $\pm 30^\circ$  and 1:4,290,000 at latitudes  $\pm 65^\circ$ . Standard parallels for the Lambert conformal conic projection are at latitudes  $33.5^\circ$  and  $59.2^\circ$ . Longitudes increase to the west in accordance with astronomical convention for Mars.

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 Mariner 9 spacecraft. The first meridian passes through the center of a small crater, Ary-O (lat  $5.19^\circ$  S, long  $0^\circ$ ), located within the crater Ary.

MAPPING TECHNIQUE

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

Shaded relief was portrayed using airbrush techniques detailed by Inge (1972) and photointerpreter methods described by Inge and Bridges (1976). Uniform sun illumination from the west was used throughout. Sizes, shapes, and positions of features were taken from the base mosaic. In the first edition of the map, various computer enhancements of many Mariner 9 pictures besides those in the base mosaic were examined in an attempt to portray the surface as accurately as possible. This revised edition was produced by incorporating information derived from various enhancements of higher resolution Viking images of the map area. Original shaded relief analysis and representation were made by Patricia M. Bridges.

COLOR

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

NOMENCLATURE

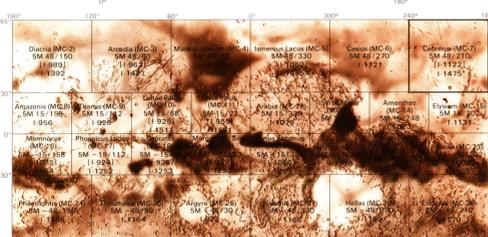
Names on this sheet are approved by the International Astronomical Union (IAU), 1974, 1977, and 1980 except for provisional names, which are listed below. Double- and triple-letter designations for craters refer to position on the map and are derived from a grid based on equidistant meridians and parallels; the alphabet (I and O omitted) runs in the direction of increasing longitude (W) and latitude (N). The complete designation of a crater is the name of the quadrangle followed by a double or triple letter. The prefix CEB (identifying the Cebrenia quadrangle) is part of the complete designation but, for brevity, is not shown on most craters. Some craters have commemorative names; letter designations for these craters are shown in parentheses. Where craters lie 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.

PROVISIONAL NAMES: Galaxias Fosse and Timar Vallis.

MC-7: Abbreviation for Mars Chart 7.  
M 5M 48/210 RN: Abbreviation for Mars 1:5,000,000 series; center of sheet, lat  $48^\circ$  N, long  $210^\circ$ ; shaded relief map, (R); with nomenclature, (N).

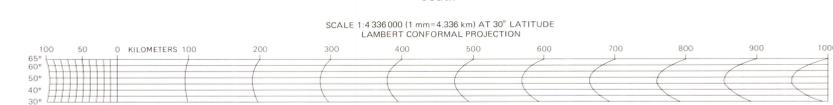
REFERENCES

- American Geophysical Union, 1977, *Journal of Geophysical Research*, v. 82, no. 25, p. 3919-4483.  
Batson, R. M., Bridges, P. M., and Inge, J. L., 1979, Atlas of Mars, The 1:5,000,000 map series: National Aeronautics and Space Administration, NASA SP-418, 146 p.  
Davies, M. E., 1973, Mariner 9: Primary control net: Photogrammetric Engineering, v. 39, no. 12, p. 1297-1302.  
Davies, M. E., and Arthur, D. W. G., 1973, Martian surface coordinates: *Journal of Geophysical Research*, v. 78, no. 20, p. 4355-4394.  
Inge, J. L., 1972, Principles of lunar illustration: *Aeronautical Chart and Information Center Reference Publication R172*, 1, 69 p.  
Inge, J. L., and Bridges, P. M., 1976, Applied photointerpretation for airbrush cartography: *Photogrammetric Engineering and Remote Sensing*, v. 42, no. 6, p. 749-760.  
International Astronomical Union, 1974, Commission 16: Physical study of planets and satellites, and Lunar and martian nomenclature, in 15th General Assembly, Sydney, 1973, *Proceedings: International Astronomical Union Transactions*, v. 118, p. 105-108, 217-221.  
1977, Working Group for Planetary System Nomenclature, in 16th General Assembly, Grenoble, 1976, *Proceedings: International Astronomical Union Transactions*, v. 118, p. 331-353, 333-336, 355-362.  
1980, Working Group for Planetary System Nomenclature, in 17th General Assembly, Montreal, 1979, *Proceedings: International Astronomical Union Transactions*, v. 118, p. 243-297.



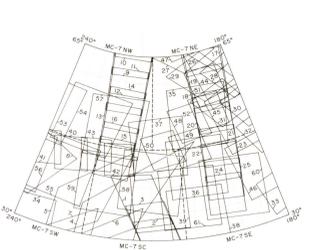
QUADRANGLE LOCATION  
Number preceded by 1 refers to a published shaded relief map. [Number in brackets refers to earlier map superseded by revised version.]

NOTE TO USERS  
Users noting errors or omission are urged to indicate them on the map and forward it to U.S. Geological Survey, Building 4, Room 454, 2255 North Gemini Drive, Flagstaff, Arizona 86001. A replacement copy will be returned.



1:2,000,000  
Controlled photomosaics

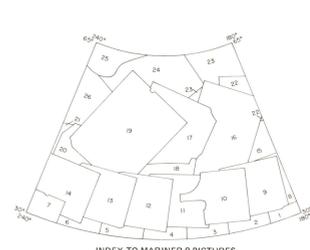
Index No.	Quadrangle No.	MC-7 NW	MC-7 NE	MC-7 SW	MC-7 SE
1	1521				
2	1522				
3	1581				
4	1582				
5	1583				
6	1584				
7	1585				
8	1586				
9	1587				
10	1588				
11	1589				



INDEX TO VIKING SOURCES  
This shaded relief map has been revised utilizing 1:2,000,000 controlled photomosaics and supplementary Viking pictures outlined above. Copies of various enhancements of these pictures are available from National Space Science Data Center, Code 001, Goddard Space Flight Center, Greenbelt, MD 20771.

Viking 1

Index No.	Picture No.	Index No.	Picture No.
1	470A06	32	776A31
2	470A08	33	776A32
3	470A09	34	803A01
4	704A01	35	803A02
5	704A02	36	805A05
6	704A03	37	805A06
7	704A04	38	805A07
8	722A08	39	805A08
9	766A09	40	807A13
10	766A10	41	807A14
11	766A11	42	807A23
12	766A12	43	807A24
13	766A13	44	808A24
14	766A14	45	808A25
15	766A15	46	808A26
16	766A16	47	810A03
17	771A27	48	810A04
18	771A28	49	810A11
19	771A29	50	810A12
20	771A31	51	810A26
21	771A32	52	810A30
22	771A33	53	828A05
23	771A34	54	828A06
24	771A35	55	828A07
25	771A36	56	828A08
26	776A25	57	804A18
27	776A26	58	804A19
28	776A27	59	804A20
29	776A28	60	802A07
30	776A29	61	802A08
31	776A30	61	802A09



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. The DAS number may vary slightly (usually by 5) among various versions of the same picture.

A-camera pictures

Index No.	DAS NO.	Index No.	DAS No.
1	9270214	14	8838044
2	9188234	15	9189004
3	9124454	16	1212267
4	9054454	17	1212245
5	8902655	18	8992354
6	8815664	19	1192929
7	8838055	20	8838055
8	9270254	21	8781126
9	9104464	22	9104464
10	9126074	23	1212287
11	9054464	24	1192209
12	8992794	25	1180151
13	8970254	26	1197056

SHADED RELIEF MAP OF THE CEBRENIA QUADRANGLE OF MARS

MC-7  
M 5M 48/210 RN  
1984

For sale by Branch of Distribution, U.S. Geological Survey, 1200 South East Street, Arlington, VA 22202, and Branch of Distribution, U.S. Geological Survey, Box 25286, Federal Center, Denver, CO 80225



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1/  
no. 1475  
c.2

