

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

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 (Batson, 1973; 1976). The major source of map data was the Mariner 9 television experiment (Marsky and others, 1976).

ADOPTED FIGURE

The figure of Mars used for the composition 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. This is not the height datum, which is defined below under the heading "Contours".

PROJECTION

The Lambert conformal conic projection is used for this sheet with standard parallels at 35°S and 59°S. A scale of 1:4,336,000 at lat 30°S was chosen to match the scale at lat 30°S of the adjacent Mercator projections. 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 Alys-Odus 5.19° S within the crater Airy. No simple statement is possible for the precision, but local consistency is about 10 km.

MAPPING TECHNIQUE

A series of mosaics of Lambert conformal conic 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, using airbrush techniques described by Inge (1972) and Inge and Bridges (1976). To improve portrayal, various computer enhancements of many pictures besides those in the base mosaic were used. Computer enhancement of Mariner 9 pictures is described by Levitt and others, 1973, and Green and others, 1975. Viking orbiter pictures were also examined and used where they significantly clarified Mariner 9 image data. No attempt was made to portray all information in the Viking pictures, however.

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

ALBEDO MARKINGS

The markings superimposed on the shaded relief were hand copied from Mariner 9 pictures that were computer enhanced especially to show low-frequency tone variation (Batson and Inge, 1976). 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 a 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 Lorell, 1973) combined with a 6.1-millibar atmospheric pressure surface derived from radio-occultation data (Klore and others, 1973; Christensen, 1975; Wu, 1975).

The contour lines on most of the Mars maps (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 (Hord and others, 1974), infrared interferometer spectrometer (Conrath and others, 1973), and stereoscopic Mariner 9 television pictures (Viv and others, 1973).

Formal analysis of the accuracy of topographic elevation information 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 duplicate precisely the color of the Martian surface, although the color used does approximate it.

NOMENCLATURE

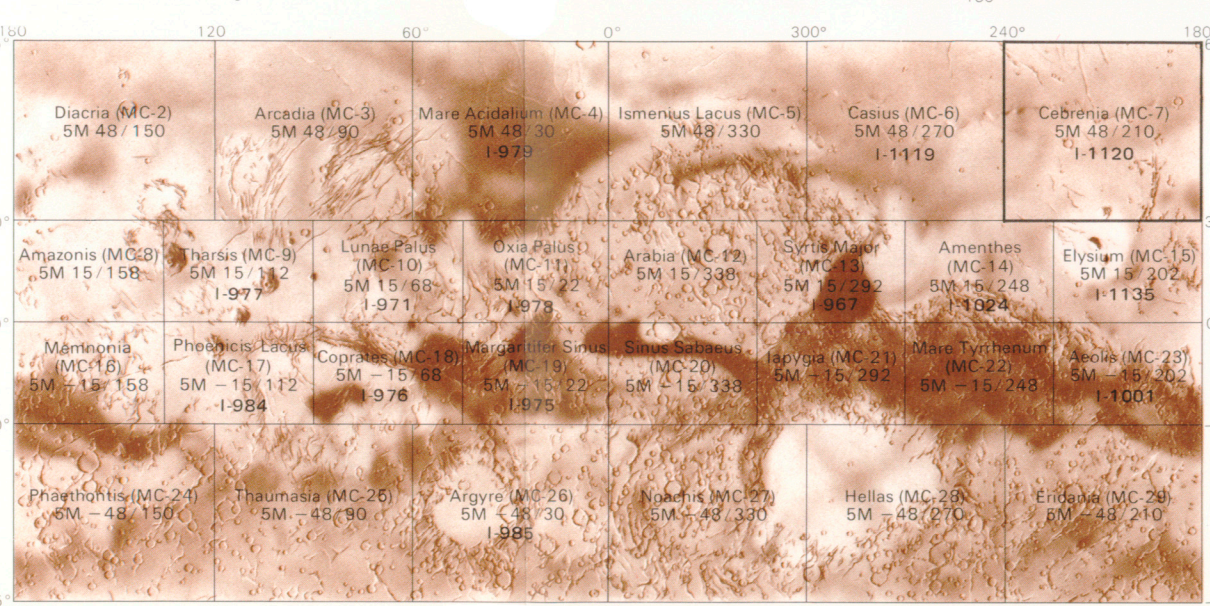
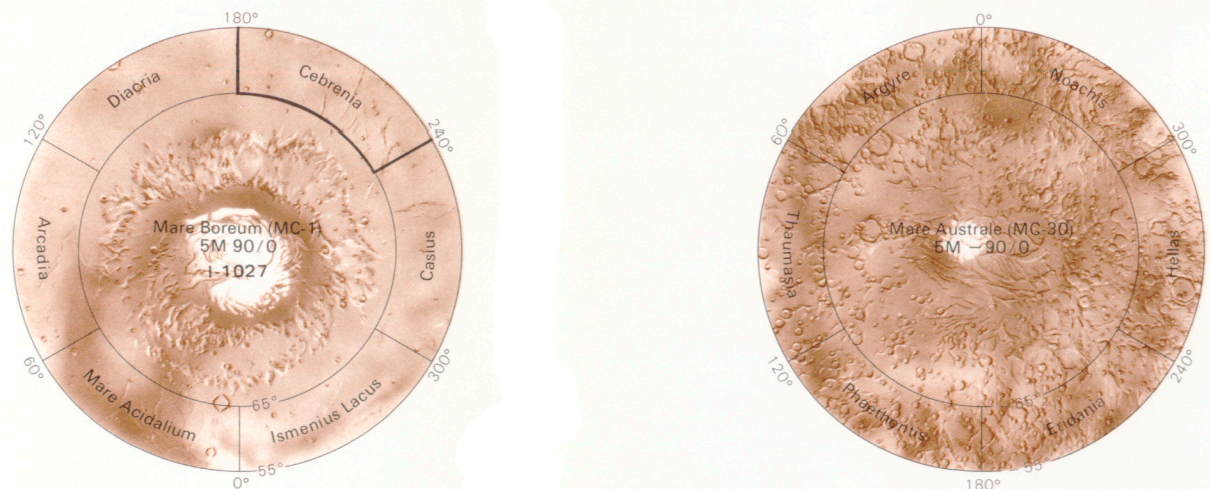
All names on this sheet are approved by the International Astronomical Union (IAU, 1974), except Brad Vallis, which is provisional. Double and triple letter designations for craters refer to position on the map and are derived from a grid based on equidistant meridians and parallels; the alpha (A) and (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.

Abbreviation for Mars Chart 7.

MC-7: M 5M 48/210 RMC: Abbreviation for Mars 1:5,000,000 series; center of sheet lat 48° N, long 210°; shaded relief map, R, with albedo markings, M, and contour, C.

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QUADRANGLE LOCATION
Note: Pictures numbered by 1 refers to published topographic map.

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Most of the pictures indexed above were specially processed to accommodate albedo markings. Only the useful image area of the pictures are outlined.

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