

**NORTH POLAR REGION**  
M 15M 90/0 R



**SOUTH POLAR REGION**  
M 15M-90/0 R

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

**NOTES ON BASE**  
This sheet is one in a series of shaded relief maps covering the entire surface of Mars at a scale of 1:15,000,000. The source for the map base was 1:5,000,000 shaded relief maps described by Batson and others (1979). Data used in the map portrayal were obtained from Viking Orbiter images.

**ADOPTED FIGURE**  
The figure of Mars used for computing the map projections is an oblate spheroid (flattening of 1/932) with an equatorial radius of 3,393.4 km and a polar radius of 3,375.7 km.

**PROJECTIONS**  
The Mercator projection is used between the 57° parallels and the polar stereographic projection is used for the polar regions north and south of the 55° parallels. Scales are 1:15,000,000 at the equator and 1:9,107,800 at the poles. The Mercator and stereographic projections have a common scale of 1:8,418,000 at 55° north and south latitudes. Longitudes increase to the west in accordance with usage of the International Astronomical Union (IAU, 1971). Latitudes are geographic (de Vaucouleurs and others, 1973).

**CONTROL**  
Planimetric control for the 1:5,000,000 maps used to compile the bases for these sheets was derived from photogrammetric triangulations using Mariner 9 pictures (Davies, 1973). This control net was upgraded through the use of Viking data (Davies and others, 1978). At least 85 percent of the image control points lie within 0.5 mm of the positions published in 1978.

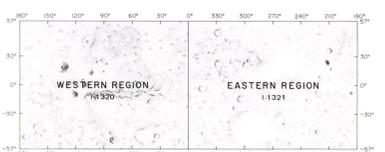
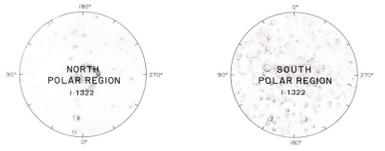
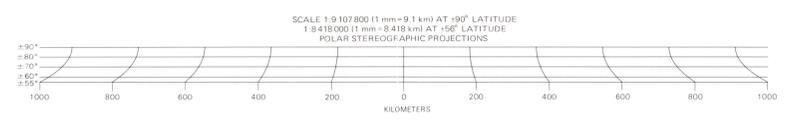
**MAPPING TECHNIQUE**  
The mapping bases for this series were assembled from 1:5,000,000 shaded relief maps reduced and digitally transformed where necessary to fit the projections. During shaded relief portrayal, features on these bases were used to position details taken from Viking Orbiter pictures. Features were drawn with uniform illumination from the west, using airbrush techniques described by Inge (1972) and photointerpretive methods described by Inge and Bridges (1976). The shading is not generalized and accurately represents the character of surface features.

Shaded relief analysis and portrayal were made by Barbara J. Hall (south pole) and Jay L. Inge (north pole).

**COLOR**  
No attempt was made to duplicate the color of the martian surface although the color used may approximate it.

**MAP DESIGNATOR**  
M 15M-90/0 R Abbreviation for Mars: 1:15,000,000 series; center of map, lat 90° N, or lat 90° S, long 0°; shaded relief map, R.

**REFERENCES**  
Batson, R. M., Bridges, F. M., and Inge, J. L., 1979, Atlas of Mars, the 1:5,000,000 map series, National Aeronautics and Space Administration, NASA SP-438, 146 p.  
Davies, M. E., 1973, Mariner 9: Primary control net: Photogrammetric Engineering, v. 39, no. 12, p. 1297-1302.  
Davies, M. E., Katayama, F. Y., and Roth, J. A., 1978, Control net of Mars: February 1978: The Rand Corporation, R-2309-NASA, February 1978.  
Inge, J. L., 1972, Principles of lunar illustration: Aeronautical Chart and Information Center Reference Publication 69-21, 60 p.  
Inge, J. L., and Bridges, F. M., 1976, Applied photointerpretation for airbrush cartography: Photogrammetric Engineering and Remote Sensing, v. 42, no. 6, p. 749-760.  
International Astronomical Union, Commission 16, 1971, Physical study of planets and satellites, in Proceedings 14th General Assembly, 1970: International Astronomical Union Transactions, v. 14B, p. 128-137.  
de Vaucouleurs, G. D., Davies, M. E., and Sturm, F. M., Jr., 1973, The Mariner 9 aerographic coordinate system: Journal of Geographical Research, v. 78, no. 20, p. 4393-4404.



INDEX TO THE 1:15,000,000 MAP SERIES  
POLAR AND MERCATOR PROJECTIONS HAVE  
COMMON SCALES AT 55° LATITUDE

**M(200)**  
**I-1322**

**SHADED RELIEF MAP OF THE POLAR REGIONS OF MARS**

