Base from U.S. Geological Survey, 1985, Controlled photomosaic of part of the Maja Valles region of Mars [MTM 20057]: U.S. Geological Survey Miscellaneous Investigations Series Map I–1732. Minor errors inherent in this and adjacent photomosaics (noted on the photomosaic sheets) may result in offsets of physiographic features at map borders

SCALE 1:502 000 (1 mm = 502 m) AT 50° LONGITUDE
TRANSVERSE MERCATOR PROJECTION

10 0 10 20 30 40 50 60 70 80 90 100
KILOMETERS

Prepared on behalf of the Planetary Geology Program, Solar System Exploration Division, Office of Space Science, National Aeronautics and Space Administration under contract W–15,814

Edited by Sean Murphy Stone and Barry Moon; cartography by Bertha M. Bradley

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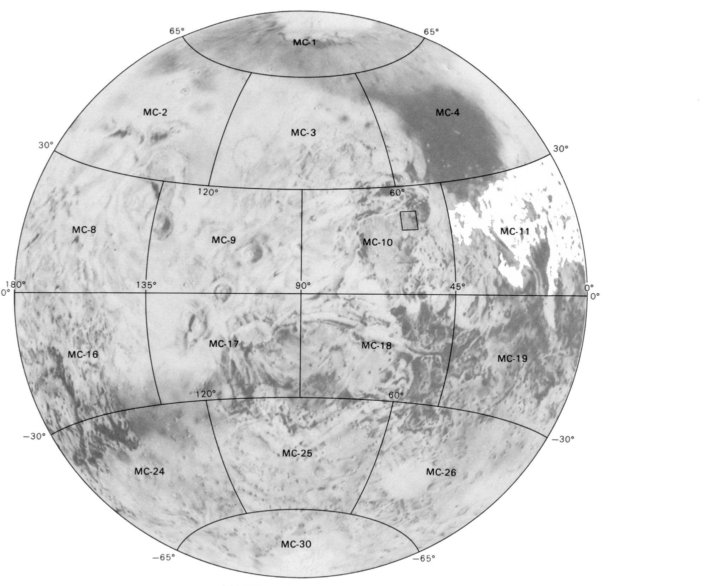
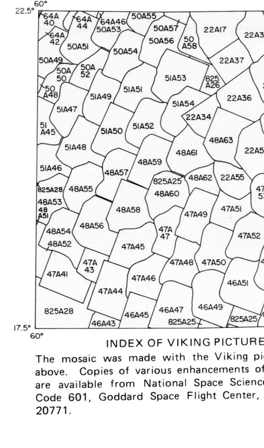


QUADRANGLE LOCATION
Photomosaic location is shown in the western hemisphere of Mars. The outline of 1:5,000,000-scale quadrangles is provided for reference.

GEOLOGIC MAP OF THE POMPEII QUADRANGLE (MTM 20057), MAJA VALLES REGION OF MARS

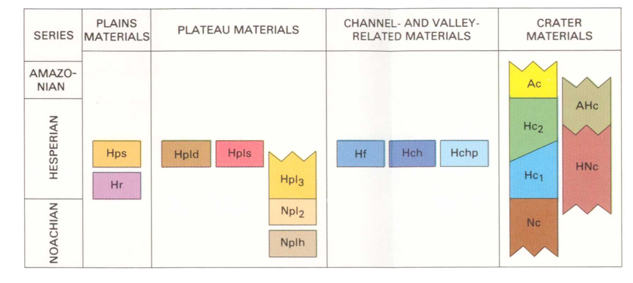
By
René A. De Hon

1992



INDEX OF VIKING PICTURES
The mosaic was made with the Viking pictures outlined above. Copies of various enhancements of these pictures are available from: National Space Science Data Center, Code 601, Goddard Space Flight Center, Greenbelt, MD 20771.

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

[Map-unit symbol in parentheses on map denotes buried unit]

PLAINS MATERIALS

Hps **Smooth plains material**—Smooth, featureless surface; covers floors of craters and isolated basins that are not located along obvious channels. *Interpretation:* Sediments of ponded floodwaters or materials from local sources moved by gravity or wind

Hr **Ridged plains material**—Broad, planar surface characterized by low albedo and mare-type, linear to sinuous, low ridges. Unit underlies channel floodplain material (unit Hchp) in south-central part of quadrangle. *Interpretation:* Volcanic flow material erupted at high rate of discharge. Ridges may be flow features or may have formed by later compression

PLATEAU MATERIALS

Hpld **Dissected plateau material**—Forms furrowed or gullied upland terrain of moderate to low relief and low albedo. All craters greatly degraded; small craters obliterated. *Interpretation:* Thin layer of reworked subdued cratered plateau material eroded and dissected by surface sheetfloods and incipient channeling; more eroded than smoothed cratered plateau material (unit Hpls)

Hpls **Smoothed cratered plateau material**—Uneven surface of moderate to low relief; texture rounded or smoothed. Small craters highly degraded or obliterated; large craters degraded at lower levels of outer ejecta blanket. Contains many faint valleys and drainage lines; locally overlies subdued cratered plateau material (unit Npl2) in northeast corner of quadrangle. *Interpretation:* Thin sheetflood deposits of reworked surficial material, less eroded than dissected plateau material (unit Hpld)

Hpl3 **Plateau plains material**—Forms relatively featureless, rolling plains in highland part of quadrangle. Locally embays older units. *Interpretation:* Interbedded volcanic and eolian materials. May consist, in part, of colluvium shed from surrounding highlands; probably flooded during early stages of sheetflood flow across Xanthe Terra

Npl2 **Subdued cratered plateau material**—Cratered, uneven surface of moderate relief. Underlies large part of Xanthe Terra; locally underlies smoothed cratered plateau material (unit Hpls) in northeast corner of quadrangle. *Interpretation:* Degraded, impact-brecciated highland material

Nplh **Hilly plateau material**—Forms hills or isolated low massifs near east edge of Lunae Planum and within Xanthe Terra. Similar to subdued cratered plateau material but has lower relief and is less rugged. *Interpretation:* Highly fractured basement and impact-brecciated material

CHANNEL- AND VALLEY-RELATED MATERIALS

Hf **Fan material**—Forms fans at mouths of channels and downslope side of breached basins. Locally contains longitudinal channel segments. Low to moderate relief. *Interpretation:* Dissected alluvial fan or inlet delta sediments

Hch **Channel material**—Associated with outflow channels within well-defined topographic valley. Channels range from shallow and rounded to steep sided and flat floored. Outer edges of channel mapped at break in slope. *Interpretation:* Channels and related features thought to be formed by rapid outburst of water. Possibility of large amount of ice or ice cover is not dismissed

Hchp **Channel floodplain material**—Characterized by streamlined islands, scours, and other faint flow features; outer edges not visually well defined. Wrinkle ridges scarce or subdued. Overlies ridged plains material (unit Hr) in south-central part of quadrangle. *Interpretation:* Result of unconfined or semiconfined outflow and subsequent ponding in craters and ill-defined, poorly drained basins

CRATER MATERIALS

[Ages of craters based on superposition and sharpness of topography. Craters less than 2 km diameter not mapped. All craters thought to be of impact origin]

Ac **Material of fresh crater**—Rim, wall, and floor material superposed on all other units. Sharp rim, rugged and complete rim crest; outer edge of ejecta blanket well defined. Amazonian age

AHc **Material of moderately fresh crater**—Considered Amazonian or Hesperian in age, because, although fresh, it lacks clear-cut superposition relations with Upper Hesperian material

Hc2 **Material of slightly degraded crater**—Similar to fresh crater material, but rims less sharp and outer edge of ejecta blanket less well defined; few superposed craters. Overlies channel materials and flood-modified topography. Hesperian age

Hc1 **Material of moderately degraded crater**—Most rims complete, but ejecta blankets incomplete; floor commonly smoothed by later deposits. Older than channels and modified by flood features. Hesperian age

HNc **Material of degraded crater**—Hesperian and Noachian age

Nc **Material of severely degraded crater**—Low or discontinuous rims and shallow floors. Noachian age

Contact—Dashed where approximately located; dotted where buried; queried where uncertain

Ridge in plains material—Line marks crest of ridge; filled symbol denotes broad, well-defined ridge; open symbol denotes narrow, low ridge

Irregular scarp—Line marks top; hachures point downslope

Furrow or valley—Narrow, curvilinear depression; probable drainage trace

Rimless depression

Terrace—Flat, benchlike surface adjacent to valleys; probably erosional

b **Bar or streamlined island on flood plain or within channels**—Most are depositional

Crater rim crest—Dotted and dashed where buried

Crater central peak—Rugged peak or broad mound on crater floor

scp **Secondary crater**—Aligned chains, clusters, and irregular craters in fields surrounding large, young craters. Source crater indicated by additional letter(s), for example: sco, secondary crater from Sögel; scs, secondary crater from Sharonov (north of quadrangle at lat 27.2° N., long 58.2°). Symbol scu indicates source crater unknown

INTRODUCTION

The Pompeii quadrangle is in northern Maja Valles region between Lunae Planum to the west and Xanthe Terra to the east (fig. 1). Approximately two-thirds of the surface is a relatively smooth plain, and the other third is subdued, cratered, upland plateau. Several large (greater than 35 km in diameter) craters dominate the landscape. The crater Pompeii is the largest fresh crater in the quadrangle. The major interest in the map area is evidence of the relatively brief, catastrophic Maja outflow and its associated topographic modification of much of the area. The effects of erosion and deposition by the Maja flood are pronounced and are a chief part of the story; therefore, flood-modified terrain is divided in considerable detail. The stratigraphic units associated with the outflow are true rock units although they may be very thin.

Two major topographic provinces are present in the map area. The Lunae Planum surface is a relatively smooth plain that slopes gently downward to the east; it is interrupted by dominantly north trending wrinkle ridges. Xanthe Terra is a moderately rugged, cratered highland surface that stands higher than Lunae Planum. Xanthe Terra also has a regional downward slope to the northeast toward Chryse Planitia (U.S. Geological Survey, 1989). Hence, Xanthe forms a broad trench between the higher Lunae Planum surface and the lower Chryse Planitia surface. On a regional scale, the east edge of Lunae Planum is modified by craters, streamlined islands, and a broad scour zone of the upper part of the Maja Valles system along the boundary with Xanthe Terra. Xanthe is traversed from southwest to northeast by four major canyon systems—Bahram Vallis, Vedra Valles, Maumee Valles, and Maja Valles. The Maja system is mostly located immediately south of the quadrangle.

Milton (1974) mapped the geology of the Lunae Palus quadrangle at 1:2,000,000 scale using Mariner 9 images that revealed part of the Maja Valles system. Milton's (1974) work called attention to the problem of distinguishing age of surface modification from age of emplacement, a problem that exists on any planet with an active atmosphere. As Viking imagery became available, parts of the quadrangle were included in mapping of the western part of Chryse Planitia by Greeley and others (1977), and most of the area was included in the region discussed by Theilig and Greeley (1979). Baker and Kochel (1979) described the geomorphology of the Maja outflow system, and De Hon (1987) likened the extensive trans-Xanthe canyon system to overbank flooding and crevassing in a low-gradient river at flood stage. A regional overview based on Viking imagery is provided in the "Geologic Map of the Western Equatorial Region of Mars" (Scott and Tanaka, 1986).

Current mapping is based on 75 Viking images that have 40-to-45-m/pixel resolution. Four low-resolution synoptic views provide regional context and viewing at more favorable sun angles. A photomosaic of high-resolution images (U.S. Geological Survey, 1985) shows the images in their proper context and serves as the base map for geologic mapping. The techniques of geologic mapping of remote planetary surfaces were developed by Hackman and Mason (1961) and Shoemaker and Hackman (1962) and subsequently were refined by Wilhelms (1970, 1972) and other workers. Photogeologic interpretation utilized superposition and transection to establish relative age of the materials. Material units on Mars are assigned to formal time-stratigraphic divisions as defined by Scott and Carr (1978) and refined by Scott and Tanaka (1986), Tanaka (1986), and Greeley and Guest (1987).

STRATIGRAPHY

The map units are classified as plains materials, plateau materials, channel- and valley-related materials (redistributed by the Maja outflow), and crater materials. This quadrangle, as others on Mars, displays significant surface modification by ephemeral processes; hence, in contrast to the Moon, where most depositional units have pristine surface morphology, Martian rock units may exhibit erosional surface morphologies not related to the mode or time of emplacement. Some units in the Lunae Planum region are distinguished on the basis of the surficial modification of preexisting units. These thin layers of reworked materials are considered significant in the geologic history of the region.

The oldest materials in the region are Noachian materials of the Xanthe Terra part of the quadrangle. Hilly and subdued cratered plateau materials (units Nplh and Npl2, respectively) form rugged surfaces of moderate relief. These units are impact brecciated materials formed during the late stage of high impact rates and possible basin ejecta from the formation of the Chryse Planitia basin. Hilly plateau material in Xanthe Terra forms massifs and isolated areas of moderately rugged terrain. A plateau plains material (unit Hpl3) embays the more rugged plateau materials and is characterized by a rather smooth, gently rolling surface. In geographic and topographic occurrence, plateau plains material resembles the Cayley plains material that floors irregular highland basins and troughs on the Moon.

The widespread ridged plains material (unit Hr) of Lunae Planum was emplaced at the beginning of Hesperian time. This material has a smooth, nearly flat surface and wrinkle ridges, and it resembles lunar mare material. Sparse buried craters overlain by ridged plains material suggest that the plains material forms a cap on the east side of the Tharsis Montes rise. The plains material thins from a maximum thickness of 1.5 km on the west edge of Lunae Planum to zero along the east edge that is included in this quadrangle (De Hon, 1982, 1985). Isolated patches of smooth plains materials (unit Hps) scattered throughout the region fill craters and form the smooth floors of basins.

Other materials of the plateau area of the quadrangle include Hesperian smoothed cratered plateau material and dissected plateau material (units Hpls and Hpld, respectively). These materials are essentially thin Hesperian units derived by reworking of the underlying Noachian cratered plateau material (fig. 2). The smoothed cratered plateau material represents redistribution of a thin surface layer of originally Noachian plateau material by Hesperian flooding. The unit is characterized by a rounded, hummocky surface whose original roughness has been softened by erosion. Dissected plateau material represents a more extensive modification of the original cratered plateau material in which broad, incipient floodways formed before the channel systems became established. Dissected plateau material is found in the northeastern part of the quadrangle in a series of interconnected, broad basins that appear to empty into topographically lower channels.

Abundant channel- and valley-related materials were emplaced after the Hesperian ridged plains unit. Ridged plains material modified by surface flow features (for example, bars and flow lines) on which the characteristic ridges are subdued is mapped as channel flood-plain material (unit Hchp; fig. 3). The northern limit of flood-plain material is not well defined in this region; hence, for mapping purposes, the contact is drawn at the northern limit of streamlined bars and canyon heads in Xanthe Terra. Material of deeply carved valleys or canyons is mapped as channel material (unit Hch). One deposit of fan material (unit Hf) at lat 19.6° N., long 57.0° associated with an irregular highland basin may be an inlet delta.

CRATERS

Martian craters, although similar to lunar craters, exhibit some characteristics unique to Mars. As a rule, fresh craters tend to be shallower than lunar craters of the same diameter, and ejecta blankets commonly exhibit lobate terminations. The outer parts of many ejecta blankets are relatively thin, and the ejecta may drape over topography with little loss of subjacent topographic detail.

Severely degraded craters of Noachian age (unit Nc) have rims that are generally degraded and incomplete. Craters of Hesperian age are subdivided into moderately degraded craters cut by channels and flow features (unit Hc1) and slightly degraded craters superposed on channels (unit Hc2); these two crater units are better preserved than Noachian crater material and are superposed only on Noachian and Hesperian materials. Material of fresh craters of Amazonian age (unit Ac) is topographically sharp, fresh appearing, and superposed on all other materials.

Dixie and Waspam are both flat-floored Noachian craters that are partly filled by younger plains materials. Bahram Vallis cuts the rim and floor of Waspam (fig. 4), which suggests that the valley was formed by headward erosion; its tributaries cut the north rim of crater Sögel. On the other hand, tributaries of Maumee Valles transect the rim of Dixie but not the smooth materials within the crater (fig. 5). Dixie appears to have been flooded as water crested and cut gaps in the west rim, filled the crater to capacity, and spilled out through breaks in the northeast rim.

Two large Hesperian craters (approximately 30 km in rim-crest diameter), Sögel and Valverde, are superposed on the highland terrains. The upper parts of these craters retain fresh morphologic detail, but the lower parts of the ejecta blankets are smoothed where the ejecta have been degraded or redistributed by sheetflow and incipient channeling during a period of flooding across Xanthe Terra.

Two other craters, Pompeii and Herculaneum, dominate the southwestern part of the quadrangle. Formed after the Maja Valles outflow crossed the region, they exhibit extensive ejecta blankets that have distinct lobate margins. Pompeii (31-km diameter) formed after Herculaneum (36-km diameter). The older crater's ejecta blanket is less distinct along its distal parts. The outer edge of the ejecta from Pompeii is sharply defined (fig. 6). Where the radial ejecta of the two craters overlap, a disorganized, low hummocky pattern is developed. A linear, hummocky pattern is found where the radial ejecta of Pompeii are emplaced on the floor of Herculaneum. The lobate margins of the craters are characteristic of "splosh craters," which suggests that the ejecta were emplaced as a fluidized debris flow (Carr and others, 1977). These craters were probably formed in wet target material. Hollows near their rim crests, observed in highest resolution images, are traps for eolian sediments.

Parent craters of secondary craters are indicated if they are identified with reasonable certainty. Abundant secondary craters from the large crater Ottumwa (symbol sco), north of the quadrangle, are found on Xanthe Terra in the northeastern part of the quadrangle. Secondary craters associated with Sogel and Valverde are well preserved. Secondary craters from crater Medrissa provide confirmation that Medrissa is younger than incised channels in the plateau part of the quadrangle. In contrast to other secondary craters in the map area, those from Pompeii and Herculaneum are too small to show at map scale and are scarce, despite their young age. The paucity of secondary craters may be related to the properties of the target material.

STRUCTURE

Xanthe Terra, located to the west of Chryse Planitia (fig. 1), may be, in part, a section of the rim of an ancient Chryse impact basin. The Xanthe Terra/Chryse Planitia boundary beyond the east border of this map area also coincides with the planetwide highland-lowland boundary scarp.

The only other significant structural features in the quadrangle are the ridges of Lunae Planum. The ridges are typically composed of a low, broad arch about 10 km across. Superposed on the arch is a smaller, crenulated, sinuous ridge 1 to 2 km across. Some ridges are notably asymmetrical. Most ridges on Lunae Planum are sinuous to linear, trending north to north-northwest. Spacing averages 25 to 50 km between ridges. Other ridges form circular outlines, and some are seen as continuations of the rim crests of partly buried craters; these ridges are apparently localized by irregularities of the subjacent topography. The Lunae Planum ridges resemble lunar mare ridges and are assumed to indicate that the Martian ridged plains are volcanic in origin. Scott (1989) indicated that the ridges may be lava extrusions from fissures and that they are characteristic of lava plains on Mars. However, on the basis of observations of terrestrial surface deformation accompaning shallow thrust faults, Plescia and Golombek (1986) suggested that the ridges are structural in origin and may not be unique to volcanic materials.

FLUVIAL HISTORY

Fluvial features are an important aspect of the geology in this quadrangle, which is situated at the lower reaches of the Lunae Planum part of the Maja Valles system. Maja Valles may be traced from their source in Juventae Chasma 1,100 km to the south (fig. 1). A secondary source of outflow is associated with chaotic terrain at lat 12.5° S., long 56°. After their apparent ponding in the map area, the flood waters flowed eastward across Xanthe Terra and spilled onto Chryse Planitia (fig. 7). Three major types of water-derived features are seen in the quadrangle: (1) dissected plateau and smoothed cratered plateau materials muted by sheetflood flow, (2) channels and alcoved valleys cut by confined flow, and (3) smooth plains material of probable lacustrine origin. Smaller water-derived features are streamlined islands, scours, a washover delta (fan material at lat 19.6° N., long 57°), and small channels. A time-dependent sequence of water-formed features is evident along the Maja Valles system. Whether the features represent a protracted history of multiple releases or a short-lived event cannot be determined from the available evidence in this quadrangle.

Any incipient flows are ponded in local, closed basins until the basins are filled. When local catchments overflow, the water continues downslope. Local, irregular low spots and low-rimmed craters in this quadrangle were flooded. The upstream rims of some craters were cut by crevasses as floodwaters spilled into the craters, and the downslope rims were similarly cut a water crested and spilled out (fig.5). Thus, craters and irregular basin along the flow courses acted as natural catchments for the water. The largest catchment is the north limit of the Maja flow on the Lunae Planum surface (De Hon, 1987). Here the flow ponded on Lunae Planum, trapped by the eastward-sloping lava plain and the highlands to the east. A large lake was formed, which persisted until the water rose to spill across the Xanthe Terra barrier onto the Chryse Planitia surface. In like fashion, as the water crossed the rugged terrain, smaller ponds formed in local catchment basins and then drained to lower elevations (fig. 7).

Much of the northeastern, highland part of the quadrangle is covered by smoothed cratered plateau material. An initial sheetflood covered the surface of the Xanthe Terra region and muted, by erosion and redeposition, all but the highest standing topography. The initial relief of this part of the quadrangle is preserved in small areas that have not been modified by sheetflood flow, but much of the surface is now more rounded, possesses less relief, and is less cratered than unmodified cratered plateau materials seen elsewhere on the planet (fig. 2). Channels are abundant on the east slope of Xanthe Terra (fig. 8). Some early-formed and rapidly abandoned channels have anastomosing patterns and rounded cross-valley profiles. As flow was captured in fewer major channels, these channels were gouged deeper to form steep-sided, flat-bottomed valleys. Abandoned channels were left as hanging valleys as the main channels continued to erode. Eventually, flow was confined to the four major channels of Vedra, Maumee, Bahram (lower part) and Maja (canyon section) Valles. In the late stages of drainage from the Lunae Planum surface, the Maja Valles canyon section across Xanthe Terra captured the remaining flow. Evidence of multiple releases from Juventae Chasma or chaotic terrain cannot be confirmed from the available evidence within this quadrangle. If there were subsequent releases, the water was probably diverted directly into the Maja canyon and did not reach into the Pompeii area.

Bahram Vallis exhibits two distinct styles of valley development. The lower part is similar to the other trans-Xanthe valleys, but the upper part is characterized by a sinuous, alcoved pattern (fig. 4). The sinuous portion of the upper part of Bahram Vallis on Lunae Planum probably represents a later period of headward erosion by spring sapping. This drainage course may have been the main one for a remnant lake on Lunae Planum and, therefore, may have continued to develop for a longer time and at a slower pace than the other channels. Faint furrows indicative of minor drainage traces on the Lunae Planum surface may represent minor streams developed on lake sediments as the lake shrank from its maximum size.

Much of the Lunae Planum surface in the southwestern part of the quadrangle is marked by a mottled albedo pattern characterized by a bright surficial material spotted with dark haloes of small craters (fig. 6). This pattern is superposed on ridged plains material. Where the pattern is present, wrinkle ridges are more subdued than elsewhere on Lunae Planum. Originally interpreted as possible windblown material (Theilig and Greeley, 1979), this material occupies part of the topographic basin that ponded water on Lunae Planum (De Hon, 1987). The bright appearance may be related to a thin surficial mantle of windblown salts precipitated as the lake evaporated or, if ice covered, sublimated. Scattered bright streaks of probable depositional origin extend west-southwestward from small (less than 1 km diameter) craters along the east edge of Lunae Planum.

GEOLOGIC HISTORY

The earliest history recorded in this quadrangle is represented by hilly and cratered Noachian materials. Isolated massifs of hilly Noachian material may be, in part, uplifted basement rocks related to the formation of the Chryse basin. The craters Dixie and Waspam were formed in Late Noachian time on the highland plateau.

Much later, in earliest Hesperian time, flood basalts were emplaced as ridged plains material. These flows originated to the west of this region. Their eastward flow was stopped by the highland plateau of Xanthe Terra. The craters Sögel and Valverde were superposed on the highland plateau.

After an extended period of relative inactivity, catastrophic flooding related to the Maja outburst produced significant modification of existing topography. The Maja outflow surged northward from its source to pond on the Lunae Planum surface in this region. Much of the quadrangle was affected by the floodwaters. The water level crested on high-standing Xanthe Terra and spilled downslope to the lower part of the Chryse Planitia surface. The entire eastern part of the quadrangle, mostly Noachian plateau materials, was awash, and only the topographically highest materials were unaffected by the flow. Thus, the chief material of the Xanthe Terra section of the quadrangle, the Noachian moderate-relief, subdued cratered plateau material, was modified to produce the muted topography of the smoothed cratered plateau material.

As initial sheetflood flow collected into distinct flow lines, channels were cut into the surface. Early-formed drainage valleys of high density and anastomosing patterns developed, but many of the channels were progressively abandoned as fewer and fewer larger channels captured the flow. Although the materials deposited by this event are not volumetrically significant in the region, the areal extent is vast. The event was largely a single major episode of flooding, but because of temporary restraint of flood waters in local basins and secondary releases from these sources, the flooding may have spanned a somewhat prolonged period of time. Subsequent releases from Juventae Chasma or chaotic terrain south of this quadrangle probably flowed directly across Xanthe Terra through the Maja canyon section without affecting the map area north of the canyon.

The remaining history of the quadrangle records a decreasing impact cratering rate. Two large craters, Herculaneum and Pompeii, and several smaller craters formed on the plains and now dominate the landscape. Eolian processes have redistributed the topmost surficial materials.

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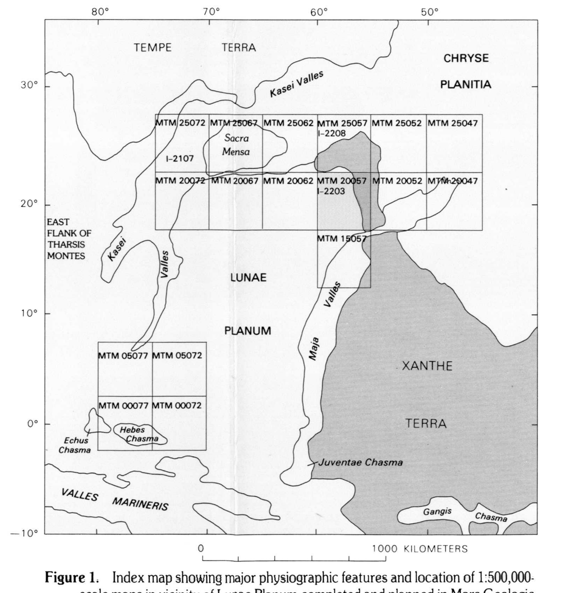

Figure 1. Index map showing major physiographic features and location of 1:500,000-scale maps in vicinity of Lunae Planum completed and planned in Mars Geologic Mapping Program. Mars Transverse Mercator (MTM) numbers indicate latitude and longitude of center of map. Published or in-press maps are indicated by an "I" series number.

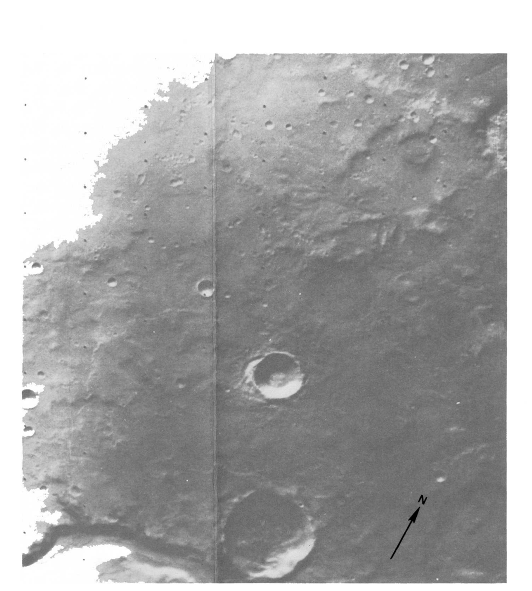

Figure 2. Smoothed terrain near northeast corner of map area. Topography is softened and has many faint drainage traces. Small craters are poorly preserved. Clusters of young secondary craters in northern part of frame are from large crater north of map boundary. Crater at bottom center of image is about 8.6 km across. Viking Orbiter image 022A39.

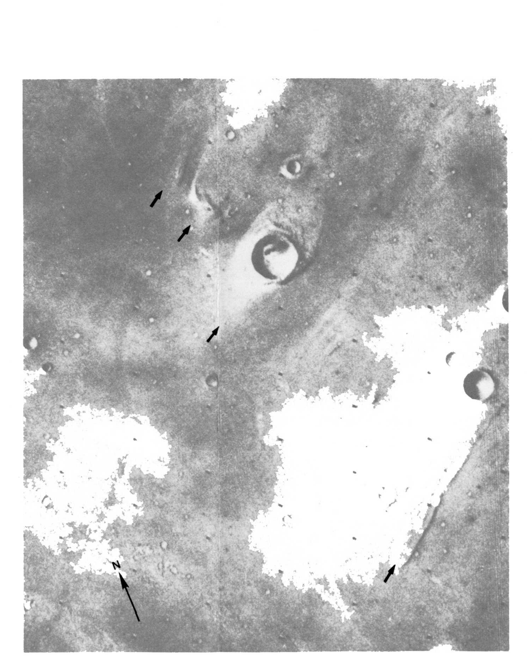

Figure 3. Northernmost streamlined islands of Maja flood plain. Arrows mark upstream ends of islands. These and other scattered streamlined islands show that in this area Maja flow turned eastward toward Xanthe Terra. Field of view about 44 km across. Viking Orbiter image 046A47 (41.34 m/pixel).

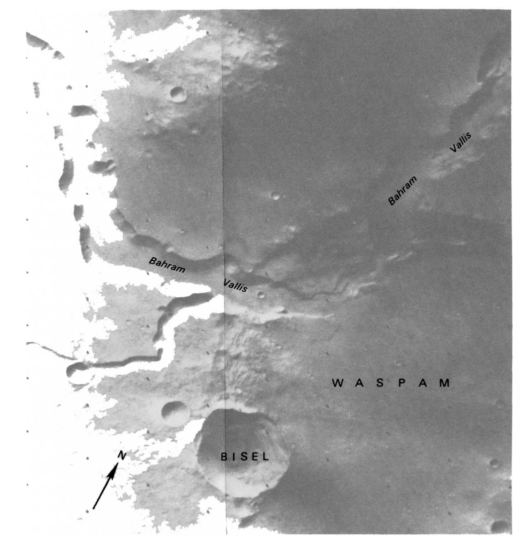

Figure 4. Incision of floor of crater Waspam by Bahram Vallis, the only example in map area of a valley cutting a crater floor. Alcoved valley walls west of Waspam were formed by spring sapping. Crater Bisel about 9 km across. Viking Orbiter image 022A34.

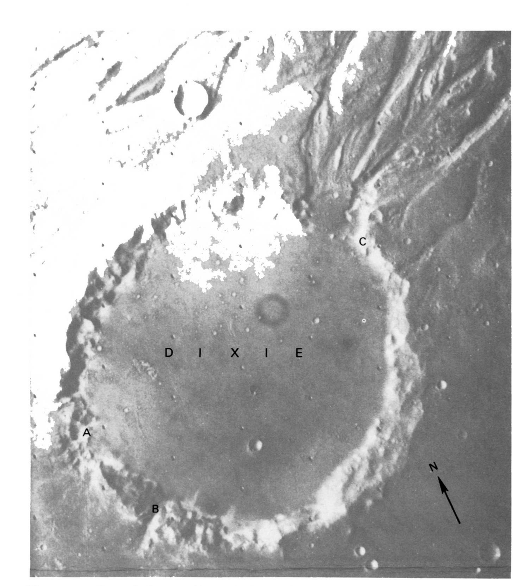

Figure 5. Smooth floor and breached rim of crater Dixie. Maja flood breached west crater wall at several points (examples at A and B). Most of flood drained through crevasse (C) in east wall and split into multiple channels. Dixie about 28.5 km across. Viking Orbiter image 046A54 (40.93 m/pixel).

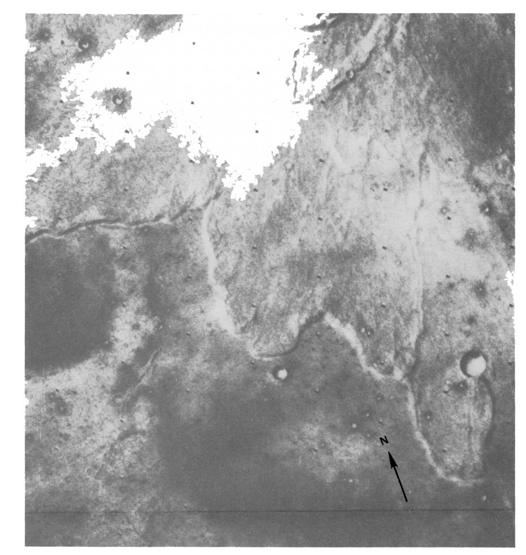

Figure 6. Sharp, lobate outer edge of lineated ejecta from crater Pompeii overlying ridged plains material southwest of crater. Irregular secondary craters absent. Mottling of ridged plains material caused in part by dark halos of many small craters superposed on brighter materials. Small craters (less than 1 km in diameter) have bright, sediment-filled interiors. Field of view about 44.5 km across. Viking Orbiter image 047A41 (41.73 m/pixel).

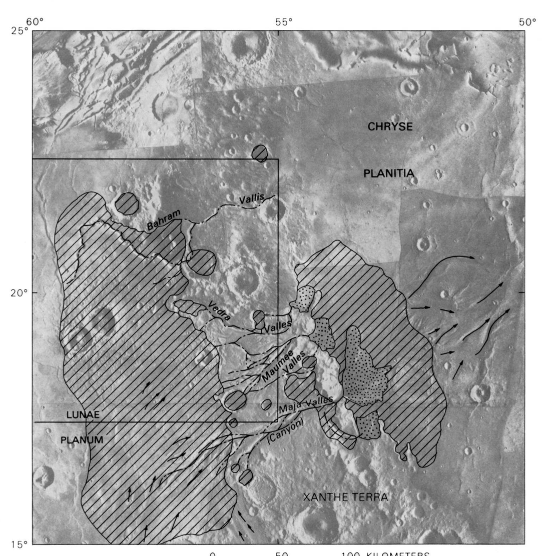

Figure 7. Distribution of ponded flood waters in Pompeii quadrangle (box) and vicinity. Except where floods ponded against obvious barriers, extent of ponding (diagonal-line pattern) on Lunae Planum is poorly defined. Shoreline features not evident. Major channels (dash-dot line) and valley-end deltas (stipple pattern) also shown. Flow trace not confined to incised channels shown by arrows. Base from U.S. Geological Survey (1980).

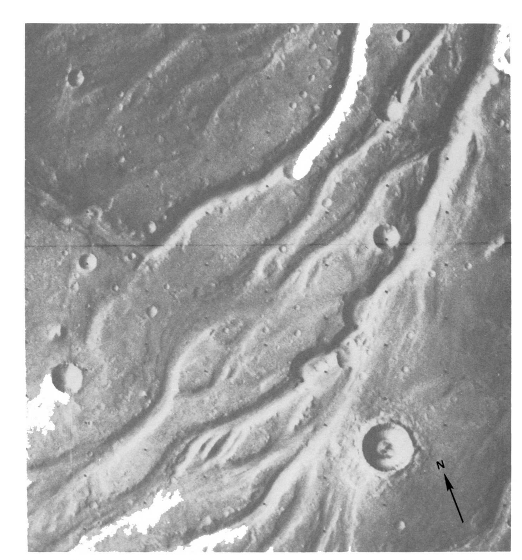

Figure 8. Anastomosing channels of Maumee Valles on Xanthe Terra. Maumee system heads at west edge of Xanthe Terra where multiple channels feed across Xanthe Terra in anastomosing, subparallel drainage pattern. Tributaries coalesce into single channel that empties onto Chryse Planitia. Field of view about 45 km across. Viking Orbiter image 046A55 (40.92 m/pixel).

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