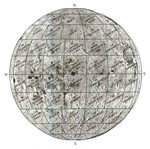
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
MANNED SPACECRAFT CENTER
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

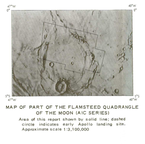
GEOLOGIC ATLAS OF THE MOON
FLAMSTEED K REGION
I-826 (ORB III-12 (100))

Large numbers 1-3 refer to regions that include early Apollo landing sites:
1. Mare Tranquillitatis region - 1416
2. Oceanus Procellarum region - 1625 (Apollo 11)
3. Descartes A region - 1625
4. Wichmann C A region - 1624
5. Flamsteed K region - 1626
6. Flamsteed A region - (this report)
7. Landberg P region - 1627 (Apollo 12)

Small number above quadrangle name refers to lunar chart (LAC series).
Small number below refers to published geologic map (scale 1:1,000,000)



INDEX MAP OF THE EARTHSIDE HEMISPHERE OF THE MOON



MAP OF PART OF THE FLAMSTEED QUADRANGLE OF THE MOON (AIC SERIES)
Area of this report shown by solid line; dashed circle indicates early Apollo landing site. Approximate scale 1:3,100,000

GEOLOGIC SUMMARY

The Flamsteed K region is in the southern part of Oceanus Procellarum, approximately 60 km (kilometers) north of the crater Flamsteed and 320 km southwest of the crater Kepler. The region was photographed by Lunar Orbiter III (LO III) on its 100th orbit of the moon (LO III-100, or generally early Apollo landing site). The area is included in a 1:1,000,000 scale map by Marshall (1962).

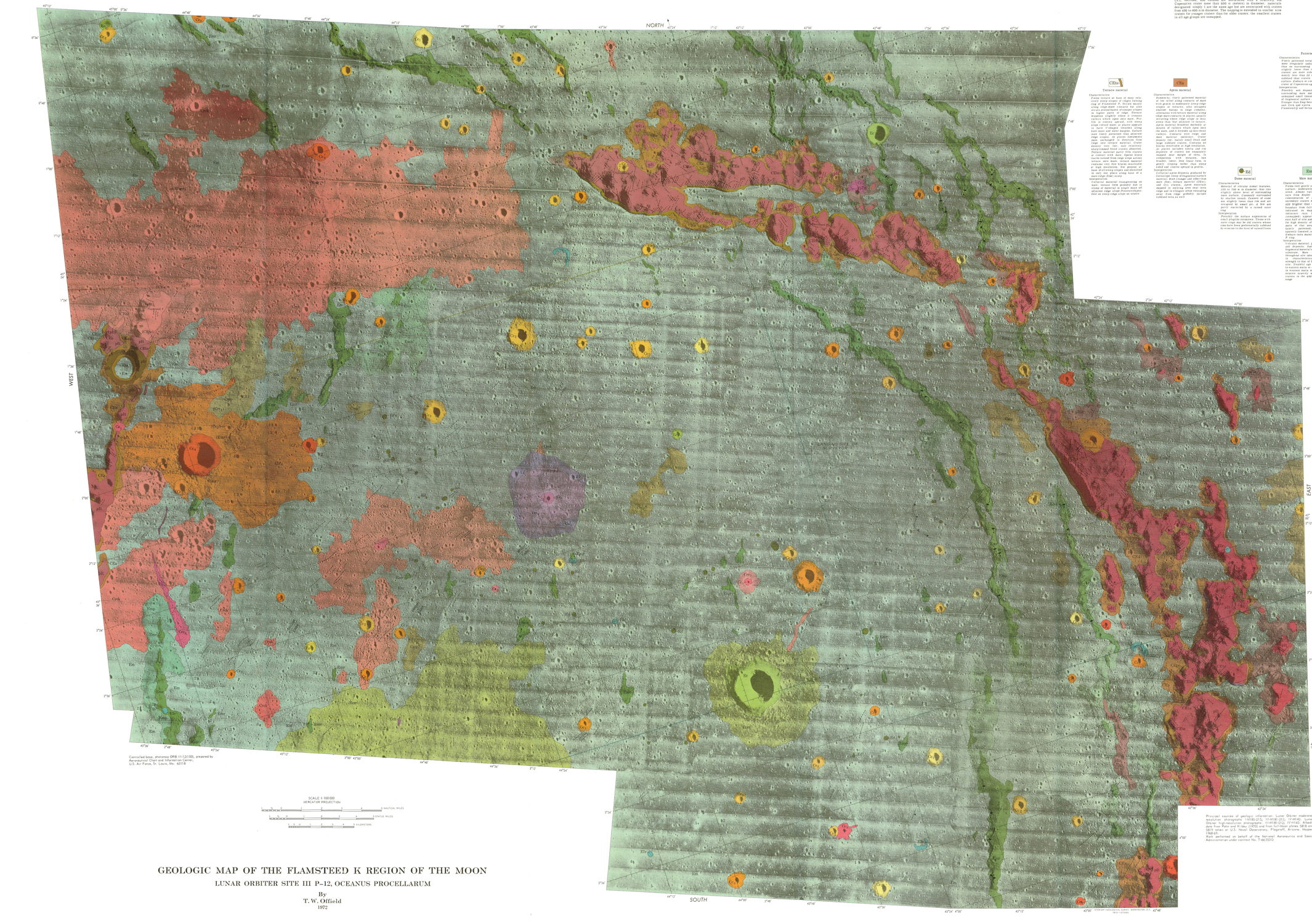
Terra material (pt) is the region forms the ridges of Flamsteed P, an incomplete circular structure construed to be the rim or concentric ridge of a large multiringed impact basin. Exposure of this material is highly limited. Fractured bedrock appears to be exposed at places, but the surface is interpreted to consist mostly of jumbled fragmental debris. The paucity of craters on the ridges is ascribed to destruction by downslope movement of the surface material. This process is also thought to be responsible for the subdued craters (CEts) and apron deposits (CEa) along the bases of the ridges.

Aside from craters, the mare surface is generally flat but has numerous elevated patches, low scarps, and irregular areas of patterned ground. The mare material is brighter in the western half than in the eastern half because of the presence of ray materials and secondary-crater clusters from the crater Kepler. Structural lineaments are uncommon in the mare; they are relatively uniformly oriented (northeast, north, and northwest) in both mare and terra materials, and probably reflect bedrock fractures related to the lunar grid system. An Eratosthenian age for the surface mare unit in the sag area is suggested by the fact that the mare is not significantly more cratered than the ejecta of Eratosthenian craters; thus the Eratosthenian crater Flamsteed (south of the area), ejecta from which is partly covered by this same unit of mare material. Probably more than one episode of deposition of the presumably volcanic mare material was involved.

Dome material is apparently concentric to the ridge system of Flamsteed P and partly transverse to it. Near the relatively fresh 2.3-km Crk crater southeast of Flamsteed Q_1 the mare ridge appears to be older than the crater because dunes of ejecta are piled along the base of the ridge. An adjacent area of patterned ground embays the ejecta and thus appears younger than the crater. The ridge and the dome material (and the patterned ground probably) are volcanic in origin and may represent rest areas which were the sources of the surrounding material.

Craters in the region range in diameter from the limit of resolution to 3.3 km, and vary in form from sharp-rimmed bright craters to shallow depressions with subdued rims. The youngest crater has three distinguishable facies of ejecta: concentrically distributed successively outward: a hummocky to faintly smooth raised facies, a hummocky ejecta blanket consisting of irregularly interesting radial and concentric dunelike ridges, and an array of secondary craters and discontinuous ejecta. Blocks are very abundant around this crater and occur as much as 1 km from the crater rim; they are also common on the ejecta of other craters; secondary craters are difficult to recognize, and resolvable blocks are less abundant and do not extend as far from the crater rim.

The principal object of scientific interest in the region is the ring structure Flamsteed P. Bare rock appears to be exposed on steep faces of the ridges, and fragmental debris is thought to be shed from the ridges. Interpretation of their stratigraphic relationship to the adjacent mare should indicate whether the ring is an old crater rim or a volcanic feature (Fielder, 1967; O'Keefe and others, 1967; Wilhelms, 1967). Other features of scientific interest are the mare ridges, patterned ground in the mare, remnants of Kepler ejecta, and hotmelike domes which may be of volcanic origin.

NOTE: A crater's materials are mapped and given symbols according to the size (rim-crest diameter) and interpreted relative age of the crater. The apparent freshness of the crater on Orbiter photographs is used to determine its age, and allowance is made for an inverse relation between size and freshness (that is, small craters look fresher than equivalent craters). The larger craters in each age group are mapped in color (magnitude materials extend relatively farther from the rim crests of larger craters than of smaller craters of the same age and freshness). The smaller craters, which are too small to show materials, consist of a capital letter to designate lunar time-stratigraphic division (system), lowercase letters to designate rock unit, and, in the Copernican System, a subscript number to designate relative age within that system. To show that a crater is younger than another of the same age, craters in each age group are not outlined; such craters are indicated by number or letter symbol only. For example, materials designated as Cr_1, outlined, and colored are associated with a relatively old Copernican crater (more than 600 m (meters) in diameter; materials designated as Cr_2 are those of a younger crater (from 300 m to 600 m in diameter). The outgoing is extended to smaller, also craters for younger craters than for older craters: the smallest craters in all age groups are unmapped.

EXPLANATION