ANALYSIS OF LUNAR GEOLOGY FROM APOLLO PHOTOGRAPHY,

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High resolution metric and panoramic photographs taken by the Apollo SIM Bay camera system provide an excellent opportunity for detailed interpretation of lunar surface features.

Near-terminator photography from the area east of Letronne illustrates the morphology of landforms related to volcanism and tectonism in the maria. Mare ridges apparently form by several processes including faulting, flexuring, volcanism, and probably plutonism. In most instances, several processes appear to contribute to the formation of individual ridges. Some mare ridges change in character along their length as several processes of formation exert varying influence from one part to another. Evidence of faulting along the mare ridges is conspicuous. Much of the volcanism in the maria apparently has taken place in the form of fissure eruptions along fractures beneath mare ridges. Late volcanism has obscured much of the evidence of earlier faulting on some ridge segments.

Close spatial relationships between sinuous rilles and mare ridges imply close genetic relationships. Herigonius and Jansen Rilles appear to have formed as lava tubes with vents along mare ridges. Supporting evidence of volcanic activity in the form of volcanic subsidence craters and possible volcanic cones appears to be present near the Herigonius Rille. The collapse of lunar lava tube roofs and the conspicuous absence of fine surface detail on lunar volcanic features can be ascribed to the intense post-mare impact flux documented by other investigators.

King Crater, on the lunar farside, is particularly well illustrated on Apollo 16 photography. The distribution of its ejecta blanket, in which several facies can be recognized, can easily be observed in the surrounding terra. Aspects of the surface morphology are revealed in detail. Volcanism to the northwest of King Crater appears to have taken place along fractures on and adjacent to the rim. Surface features visible on the flows indicate that flow was to the north and east, and caused the filling of a small lava pool.

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In the highlands adjacent to the eastern maria, there are extensive areas composed of hilly or hummocky terrain which commonly exhibits subdued cratering or appears to be only slightly cratered. Its pattern of distribution and superposition relationships indicate that much of it is relatively old. Apollo photography indicates that this terrain has had a complex origin beginning with initial deposition as part of the ejecta blankets around the large impact basins. Intermittant motion on sub-blanket faults has formed elongate depressions which vary from nearly linear to arcuate to slightly sinuous. Continued lunar tectonism and impact events have resulted in seismic shaking which appears to have caused gravitational motion along fractures formed both in the ejecta blankets at the time of deposition and as a result of motion along sub-blanket faults. This has caused the apparent widespread gravity faulting, slumping, and other forms of mass movement which have resulted in the development of surfaces composed primarily of low rounded hills and complexes of small valleys. In many instances fault produced lineaments can be traced over large distances only with difficulty, and many faults which extend from the surrounding maria into the highlands appear to end abruptly due primarily to the complex structural history of the terrain.