Simple, bowl-shaped craters are nearly the same on all planetary surfaces. Complex, flat-floored craters exhibit large morphometric variations (1-4). Variations in crater morphology may be attributed to properties of the projectile, substrate characteristics of the target, atmospheric pressure, gravitational acceleration, or modification of the initial crater form with time. If only young, complex craters are examined on a single planetary body, then the factors influencing crater morphology are limited to properties of the projectile and of the target. Examination of an indigenous crater population does not allow inspection of the projectile, but variations in crater morphology due to projectile characteristics should be randomly distributed across the surface. In contrast, crater variations resulting from changing substrate properties should exhibit a nonrandom surface distribution.

Interior depth (rim crest to floor) is a simple function of diameter for young, bowl-shaped craters; however, interior depth involves two components; rim height and apparent depth. Rim height is a function of the volume of material displaced from the crater; hence, it is partially a function of depth. Simple craters display a direct morphometric dependence of apparent depth to crater diameter, but there is little correlation for complex craters (4). The apparent depth of complex craters may be related to cratering mechanisms independent of the target (5) or related to limits of excavation imposed by vertical inhomogeneity of the substrate (1). If substrate characteristics control apparent crater depth, then complex craters in close proximity should have similar apparent depths and similar floor elevations regardless of crater diameters.

Average elevation of the floors of young, complex craters were obtained for an area within the Apollo metric photography envelope. Elevations from LTO and LM charts provide consistent data not available for any other planetary surface. A contour map was produced to provide generalized trends of crater floor elevations throughout the eastern equatorial region of the moon (Fig. 1). The distribution of points is sparse but random. The map displays floor elevations of large craters within 500 m.

Maps of apparent depths (4) and crater floor elevations (Fig. 1) exhibit nonrandom distributions. Crater floor elevations are neither simple mimics of surface elevations nor are they a random dispersal of unrelated values. Floor elevations define a concordant elevation trend throughout most of the equatorial zone between 25-80°E. High values are found in the central highlands, and seemingly anomalous low values are found between the Crisium and Serenitatis basins.

Only a few craters are in such close proximity as to display absolute concordance, but many craters within the same physiographic providence exhibit virtual concordance, or the floor elevations define a regional trend. Concordance of
floors, especially in craters of widely differing diameters, suggests either substrate structural control to the depth of excavation, or post-cratering modification of the floor by infilling or uplift. Inasmuch as the craters are young, unfilled, and apparently not in isostatic equilibrium, it follows that floor elevations provide evidence of structural control.

Figure 1. Contour map of the elevation of flat crater floors. Contour interval is 500 m.

REFERENCES