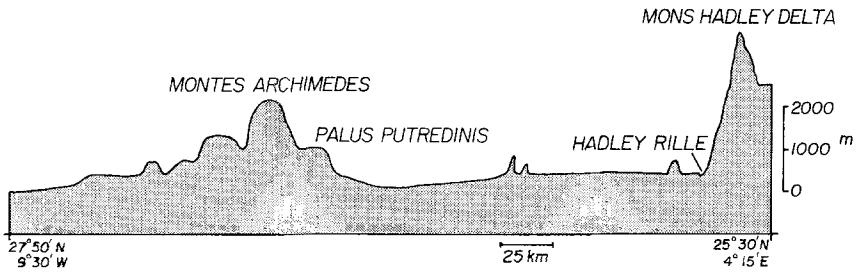

Fig. 12. Topographic profile of the Archimedes–Apennine Bench region prior to artificial flooding. Vertical exaggeration X 20.

between the second and third Imbrian basin rings is relatively low (Figure 12); craters formed on the second ring will therefore initially sit topographically higher than other craters in this part of the basin. If a thickness value derived from such a crater is extrapolated over a large area, a thickness *underestimate* is likely to result. For example, the crater Lambert R is located approximately at the position of the second basin ring. Using the Apennine–Archimedes region as an example, the topography of the ring area may differ from that at the base of the third ring by as much as 1000 m (Figure 12). The DeHon map (Figure 11) shows the lavas thinning from Lambert R to the Carpatus Mountains (third ring). On the basis of the Apennine–Archimedes example, the lavas should *thicken* in this direction, perhaps as much as one kilometer due to the low topography alone. Thus, initial slope of the submare terrain may have an important influence on lava thicknesses in areas with few data points.

On the basis of the above comparisons, it is concluded that the majority of the region between the second and third (Imbrium) rings extending from the Archimedes area around to Oceanus Procellarum exceeds one kilometer average thickness of mare basalts. The area towards the basin interior exceeds this value, as indicated by the Orientale example describe above (Figure 5).

A major question related to the thickness of mare lavas is the importance of *vertical* mixing of material. Rhodes (1977) and Hörz (1978) have discussed the evidence for relatively inefficient lateral transport of highland material onto the mare. To explain the abundance of non-mare fragments in mare soils, Hörz (1978) developed the hypothesis that vertical mixing is significant in bringing sub-mare material to the surface. The mechanism outlined by Hörz is very plausible in areas of relatively thin maria. However, basalt depths 'deeper than 1 km would virtually preclude the vertical admixture of highland materials on the scales observed' (Hörz, 1978, p. 3325). Analysis of the isopach map (Figure 9) shows that only a small portion of the artificially flooded area (~ 10%) is less than one kilometer thick (a small area around the Archimedes Mountain peaks, the rim crest area of Archimedes, and the edge of the Apennine Mountain front). On the basis of this analysis it is concluded that for areas flooded in a manner comparable to the test area, vertical mixing on the scale of the mare regolith is not a significant process.