TABLE II

Basin	Stage I	Stage II
Serenitatis	yes	Part (Outer Rook equivalent).
Humorum	yes	Part (Outer Rook equivalent) plus patchy deposits along megaterrace to East.
Crisium	yes	Part (Outer Rook equivalent) and other minor areas (Patches to E and NE).
Nectaris	part (mostly within inner depression).	Patchy; may be unrelated to Nectaris.
Imbrium	yes	Large part; but outer ring structure uncertain in parts of basin.
Smythii	part (mostly within inner depression).	None?
Grimaldi	part (inner depression only).	None
Orientale	part (inner depression only).	Incipient flooding around base of second and third rings.

4. Discussion and Conclusions

4.1. GEOMETRY OF BASIN FILL

A topographic model of the Orientale basin is used as an approximation of an unfilled basin and is artificially flooded with mare lavas to map the geometry of basin fill. Details in the outer parts of the basin are reconstructed using topographic base maps for the Apennine Bench–Archimedes region of Imbrium. Two stages of fill can be distinguished: Stage I is characterized by flooding of the interior and thick deposits (~ 6 km) of small to intermediate volumes covering small areas (relative to the total basin geometry); Stage II is characterized by flooding out to the basin-defining scarp and thin deposits (~ 2 km) of large volume covering large areas. The resulting fill geometry can be generally approximated by two discs: the Stage II disc radius-to-height ratio exceeds that of Stage I by a factor of five. The concentration of Stage I fill in the basin interior correlates well with the location of the mascon mass in mascon basins. The location of concentric mare ridges may be related to the boundary between the thick and thinner lava load.

The major mascon basins and an interpretation of their flooding geometry are listed in Table II. This table is compiled from geologic maps of the distribution of mare and its relationship to basin ring structure (Wilhelms and McCauley, 1971; Solomon and Head, 1980). All basins show evidence of Stage I flooding, with Orientale, Nectaris, and Smythii having lesser amounts than most other basins. Stage II flooding is not extensive in these basins but often extends to the Outer Rook ring equivalent (second ring) as in the case of