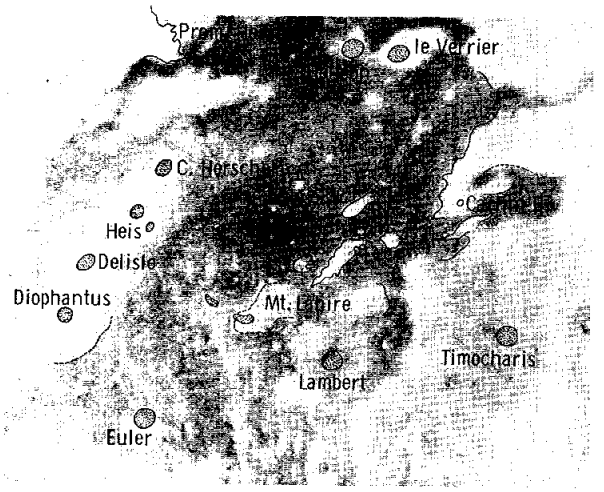

FIGURE 25-79.–Color-composite photograph (infrared minus ultraviolet) of Mare Imbrium. Color boundaries that correspond with visible flow fronts are outlined.

The photographs also show clearly that most of, if not all, the mare ridges included were formed after the solidification of the flows. Thus, several flows appear to cross ridges of substantial elevation without deviation, ponding, or change in thickness–an impossibility if the ridges had preceded the flows.

Comparison of the metric camera photography and the improved color-composite photography is difficult because of grossly different viewing directions and the general disappearance of recognizable landmarks in the composite. Furthermore, few color boundaries exist in the area of metric photography where the illumination angle is low enough to show the fronts of some of the very thin flows. Nevertheless, patches of redder material lying northeast of Mt. Lahire are found to be enclosed by low flow fronts (i.e., they are "kipukas"), confirming the theory that the redder material represents an earlier filling of the Imbrium basin. A portion of a color-composite photograph of Mare Imbrium in which redder areas appear lighter is shown in figure 25-79. Color boundaries that correspond with visible flow fronts are outlined in this figure.

Elsewhere in the lunar maria, the evidence is always that the bluer areas are more recent than the redder background. Thus, several instances are known where portions of ray systems lying on the older, redder surface have been obliterated by later, bluer deposits. Strom noted some time ago[1] that an apparent correlation exists between the degree of blueness and the titanium content of the regolith. Analyses of Apollo 12 and 14 materials also support this idea. Thus, it appears that, for any lunar mare where color differences are visible, the redder material represents an early filling of low-titanium-content basalt, while the bluer material represents a later (in some cases, apparently much later) inflow of titanium-rich basalt.

[1]Private communication.

PART N

AN UNUSUAL MARE FEATURE

Ewen A. Whitaker[a]

While the Apollo 15 panoramic camera photography was being rapidly scanned, a most peculiar feature was noted that presented a totally different appearance from anything seen in all the rest of the Lunar Orbiter and Apollo photography. The feature was missed on Lunar Orbiter IV frame H-102 because it is situated in a group of bimat marks. The feature is located at latitude 18°40′ N, longitude 5°20′ E in a small patch of mare material lying between the Haemus and the Apennine Mountains. This patch is abnormal in that it is an unbordered plateau; the surface appears to lie several hundred meters above adjacent mare patches.

The feature is D-shaped with a 3-km-long straight edge. Viewed stereoscopically, it is seen to lie perhaps a few tens of meters below the level of the surrounding mare, the latter presenting a convex meniscus at the line of contact. About half of the floor is covered with blobs of marelike material, reminiscent of dirty

[a]Lunar and Planetary Laboratory, University of Arizona.

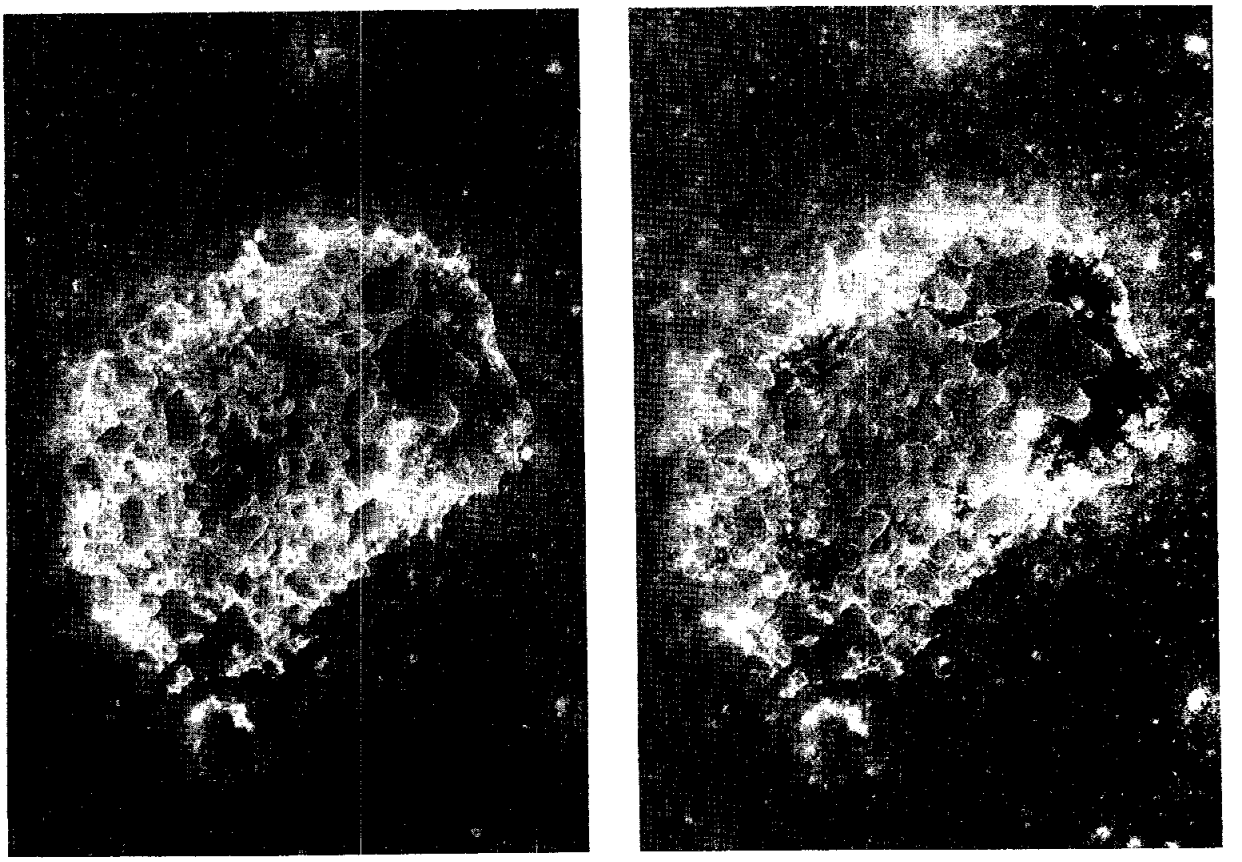

FIGURE 25-80.–Unusual mare feature of latitude 18°40′ N, longitude 5°20′ E. Feature may be viewed stereoscopically in these photographs (pan AS15-10176 and 10181).

mercury. Contacts between the floor and both the mare and blobs are frequently outlined with highly reflective material, perhaps sublimates. The floor also displays some darker areas that have noticeably different photometric properties from the mare surface and the blobs. The whole feature is seen to be almost devoid of small impact craters, thus differing from the surrounding mare. Two panoramic camera photographs of the feature are shown in figure 25-80, which may be viewed stereoscopically.