APOLLO 15 LUNAR ROCKS 15555, 15565, 15505 AND THEIR ASSOCIATED GLASSES,

M. Christophe Michel-Lévy* and Z. Johan**
* Laboratoire de Minéralogie, Université de Paris VI
** Service Géologique National, BRGM Orléans

A few chips from basalt 15555 and from breccias 15505 and 15565 have been studied. Two of these specimens have been collected at station 9, near the Rille ; 15565, at first listed as coming from station 9 is now considered as from unknown locality. The Mare basalt 15555 was probably near its place of occurrence : indeed, regolith 15531, which has been scooped just beside 15555 (both station 9A) is very rich in minerals from the local basaltic flows and contains few glass particles. The 15555 basalt has been extensively studied in the course of 1972 and we shall only insist on the particularity of specimen 15555-216, which has been allocated to us. The two specimens 15505 and 15565 are unrecrystallized breccias, but quite different one from the other. Their relations with the local regolith is a subject of controversy.

Basalt 15555

This basalt, composed of zoned crystals of olivine, pyroxene and plagioclase, of spinels, ilmenite and cristobalite (1), contains little residual glasses : tiny droplets <10 μm are found in the olivine crystals, which now contains mostly ilmenite, glass, sulfide and a shrinkage bubble (Roedder 2) ; larger glassy inclusions (with dendritic pyroxene) are found in augite, fibrous devitrified brownish patches in cristobalite. A scoriaceous crust of an analogous brownish glass has been found on the chip 216, where it probably coated a void. It seems to be more developed on neighbour fragment 217 (personal communication from P. Butler, Jr.). Vitreous coatings on fractures and cavities are frequent in lunar rocks, but this one is special : it can be seen on a polished section prepared perpendicularly to the coating that the crystals are broken near the glass which has frothed, showing that the rock has lost rapidly its pressure when still hot, but almost totally crystallized however. These observations, coupled with forthcoming chemical analyses, can help understanding the history of this basalt containing so strongly and unusually zoned crystals.

Breccia 15565

This lightly consolidated breccia contains some Mare and non-Mare material as shown by Warner (3) and Juan (4). In fact, many basaltic and vitrophyric clasts are found, but also noritic and glassy clasts. Fragment 49 contains a several mm.green glass clast and a noritic white oval xenolith, but it is above all interesting because of the occurrence of a striated glassy coating where several events are superimposed : splashing ; striation on the still viscous glass which is scoriaceous only on its edges, and, later on, long exposure to the flux of micrometeorites as

APOLLO 15 LUNAR ROCKS

M. Christophe-Michel-Lévy

proved by the abundance of zap pits ; the morphological particularities of this splashing glass have been observed and photographed.

Breccia 15505

Contrary to breccia 15565 where the glassy coating is exceptional (5), this 1147 g stone is nearly wholly covered by glass, as observed by Jackson (6), so that it is difficult to understand how splashing glass could be responsible for such a coating. It is a very hard, well consolidated breccia, nearly devoid of basaltic clasts, and rich in glassy clasts.We have not seen any green glass but found some orange one. Nearly all the clasts show evidence of shock. The matrix is rich in comminuted debris welded by a very thin glassy film. At the edge of the specimen, a vesiculated glassy coating is found. The bubbles seem to come out of the matrix of the breccia into the coating. There are questions with respect to the origin of this breccia : according to von Engelhardt (7) and Laul (8), it is the result of the compacting of local soil ; according to Silver (9) who notes the absence of local basaltic clasts in the breccia, it could come from the substratum, and its desagregation would contribute to the local regolith. Our own study would lead us to think that the second hypothesis is more plausible.

Besides the glassy clasts found in the two breccias, these three rocks have shown interesting examples of residual glass (15555), splashing glass (15565), and perhaps exudation glass, if breccia 15505 is accepted as a breccia consolidated in a first phase and then involved in an impact event such as the one responsible for the 15 m crater of station 9, as suggested by Swann (9).

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