In the sections of these basic glasses that have been examined, augite among the basaltic elements plays the least important role. If this mineral be present its form is not sharply defined; its sections are greenish, sometimes violet coloured. Its cleavages are not distinct, and the crystals are small, containing inclusions of the vitreous mass. Magnetite is generally absent.

The various minerals enumerated above are not found together in all the preparations, but it cannot be denied that we find in them the whole series of transitions from these basic glasses to felspathic magma basalts. However, in these vitreous fragments the substance which serves as a base is incomparably better developed than in those basalts, and the crystals disseminated in the glass are very small in comparison with those observed in typical basaltic rocks; besides, the crystallites are as numerous in the basic glasses as in the basaltic rocks. It might be said that when the basic vitreous rock is porous, the crystalline elements are better developed, and that the transition to the basalts or limburgites takes place rather through the types of areolar basic glass than through the types of compact structure.

The progress of the decomposition of the basic glasses into palagonite can be distinctly followed in thin sections under the microscope. The unaltered part, as already stated, is in transmitted light characterised by a great homogeneity of structure; no trace of perlitic scaling can be observed; the colour is clear, brownish or greyish in different specimens. The palagonite, on the contrary, is but little homogeneous; the zonary and perlitic structures are sharply accentuated; the colour is a beautiful red, sometimes remarkably brilliant, and may pass into reddish yellow, yellow, dirty brown, green, and finally to a milky white, in which last case transparency gives place to semi-opacity. This resinoid substance is still further distinguished from the unaltered vitreous matter by optical properties: while the latter is always isotropic, the former presents between crossed nicols the phenomena of chromatic polarisation; the palagonite is coloured brilliant yellow mixed with red; the tints have a wavy disposition, and the layers are seen to be formed by an aggregate of crystalline fibres disposed more or less perpendicularly to the surface of the lapilli in process of decomposition. This fibrous arrangement is also evident by the well-marked traces of the black cross of spherulitic aggregates observed in the palagonitic zones. This secondary substance is seen to line or to infiltrate all the fissures of the vitreous fragment, more or less profoundly according to the degree of alteration; it surrounds all the external borders, and is generally zonary, but the zones are capricious, sometimes imitating those of concretionary minerals, like the zinc blends or certain agates. One of the best examples in this respect is the specimen figured on Pl. XIX. fig. 3, as seen by reflected light. The fragment is enveloped in black-brown opaque manganese, seen on the right, left, and bottom of the figure. Directly in the centre is a fragment of black-grey, homogeneous, unaltered basic glass; around this nucleus are found the various zones of decomposition,