are marked by infiltrations of manganese bringing out very characteristic undulations, which may be aptly compared to a transverse section of mahogany.

When the vitreous matter is areolar, it is evident that the alteration of the glass into palagonite must progress more rapidly than in the case of a more compact glass, and, as might therefore be expected, the primitive vitreous material has almost completely disappeared, and the fractures due to the perlitic structure are so pronounced that the entire fragment must have fallen to pieces were it not held together by the enveloping manganese. Pl. XVIII. fig. 4 shows the decomposition that takes place in some specimens of these basic glasses, and the same thing is well represented on the left hand side of figure 3 on the same plate. In these preparations, which must be made rather thick to prevent the nucleus falling to pieces, the palagonite is divided into little fragments following the sinuous lines of fracture. We often find in the sediments numerous splinters of palagonite with rounded or curved surfaces, along with zeolitic globules formed of the circular microscopic geodes, which probably once filled the circular pores of an original areolar fragment of rock, as shown in Pl. XVIII. fig. 4; Pl. XVII. fig. 2 also offers an excellent example of the same palagonitisation of the mass. Pl. XVIII. fig. 1 represents a still further advanced state of alteration; in this, throughout the fundamental mass of manganese, triangular, elongated, or irregular splinters of altered glass are observed. The sections of these are yellowish, often zonary near the borders; to a primary zone another succeeds of a deeper tint produced by the interposition of a black manganese pigment; then, near the centre, the colour becomes lighter, and often there exists an internal concretionary zone surrounding an empty space. In polarised light these sections of volcanic glass still show traces of a black cross and of chromatic polarisation; they are almost entirely transformed into zeolitic matter. Where the centre has disappeared, it is possible that in polishing the thin sections the hard centre was eliminated from the softer surrounding mass, but we are not disposed to admit this supposition as probable from our examination of specimens in reflected light previous to preparation. The view is rather held that the decomposition has advanced so far that the centre was reduced to an almost earthy mass, and has thus been eliminated, the border composed principally of zeolitic matter alone remaining.

In a subsequent chapter we shall return to the role played by zeolitic substances in these basic glasses, but it may be pointed out here that in the pores of the less compact fragments the colourless zeolites with radiate fibres give the black cross of spherulitic aggregates. These zeolites are arranged in the interior of the vacuoles upon a layer of carbonate of iron, and it is sometimes possible to observe crystals like phillipsite, brevicite, or even chabasite, but in the great number of cases these zeolitic aggregates are finely zonary, or at the same time zonary and fibro-radiate, as may be observed in Pl. XVIII. fig. 4. The part of the pores not filled with zeolites is generally invaded by manganese and the mud of the deposit, filled with microscopic concretions of peroxide of manganese.