crystallised in the internal pores and vesicles of these vitreous fragments, but they may be seen as coatings lining the empty spaces of the palagonite, as represented in Pl. XVIII. fig. 4. These secondary minerals also cement several adjoining lapilli, in a manner like that represented in Pl. XVIII. figs. 2 and 3. When several splinters of basic glass, or even several vitreous basaltic fragments, are enclosed in a manganese nodule, each one of them is usually bordered by a colourless crystalline zone. This zone, which follows the contours of each fragment, is composed of little prisms fixed at one extremity and fibro-radiate, the whole presenting a mammillated or festooned appearance. These zeolitic prisms become entangled by their free extremities with a similar zone surrounding an adjacent fragment. Pl. XVIII. fig. 2 gives a good example of this cementation by zeolites; five splinters of porous, greenish, and highly altered basic glass are in this manner united by zeolitic bands developed in the intervals between the lapilli. Fig. 3 of the same plate shows portions of two lapilli, where the basic glass with plagioclase is altered into a palagonitic substance, and each fragment is surrounded by a crystalline zone of zeolites; here the little prisms which carpet the two opposite sides do not unite, and the space between them is filled by earthy matters of a more or less brownish colour, and by deposits of manganese. These microscopic crystals of zeolites are often so minute, and their free extremities so entangled in a neighbouring zone, that it is difficult to determine the species. In some exceptional cases, however, as in the interior of the microscopic geodes of scoriaceous glasses, sections of a quadratic aspect can be observed, with terminal crystalline faces, which recall in all points the crystals of phillipsite found free in the surrounding clay. It is important to notice that these zeolitic crystals are always fixed, and have but one free extremity, for by this means it is possible to distinguish them from crystals of phillipsite formed in a free state in the clay. It frequently happens, in fact, that the palagonite becomes completely disintegrated, the broken-down fragments being found among the materials of the deposits, and amongst them are bands of zeolites and globules of the same nature as those which formerly filled the vesicles in the form of geodes. It cannot be doubted that these zeolites have formerly lined the lapilli, when it is remembered that these fragments of the bands have crystalline faces only at one extremity, and in the case of the globules that all the crystals of which they are composed have their heads turned towards the centre of the geode.

The hydrochemical modifications determining the decomposition of these fragments of glass into palagonite, and at the same time the formation of zeolites, have likewise resulted in the complete transformation of these lapilli into ferruginous argillaceous matter. Granted the facility with which these easily alterable glasses undergo hydration, and their perlitic structure, the lapilli should break up into minute particles, if they be not surrounded by more or less thick layers of manganese. If they remained isolated in the mud, we should expect to find, in the form of broken-down particles, the microscopic