

Brongniart has found, as the result of the various analyses, that what is termed *kaolin*, or true porcelain clay, is always a product of the decomposition of felspar in the primitive rocks, which, however, does not preclude clays in general being also formed by the weathering and decomposition of other minerals. An opinion different from this has been expressed by Fuchs, who assumes that kaolin is formed from a peculiar mineral resembling felspar, which he has analyzed and found to consist of $NS^3 + CS^2 + 9AS$. It is, however, difficult to understand in what way the large quantity of silicate of lime contained in it can be dissolved and carried away.

The kind of primitive rock in which the kaolin is most frequently formed, and in which it is purest, is pegmatite or graphitic granite, which is composed of a lamellar compound of quartz and felspar. It is, however, also formed in common granite, in gneiss, as well as in diorite and porphyry. The kaolin of Passau and St Yrieux occurs in gneiss, that of Auerbach and Zetlitz in granite. At St Yrieux a portion of it is met with in diorite, and at Morl in porphyry.

In regard to the circumstances which cause the conversion of felspar into kaolin, the change seems chiefly ascribable to perhaps a hydro-electrical influence exercised on a neighbouring rock, which is always met with in close proximity to the spots where the kaolin is found. This rock is of a red colour, in consequence of its containing a large quantity of oxide of iron. This circumstance was first remarked by Gehlen, when he examined the repository of kaolin at Passau. Kühn has adduced another striking proof upon this subject. Near Sosa in Saxony, kaolin is found. A vein of quartz which cuts through the granite, has on both sides a thick *sahlband* of iron-ore, and on both sides of the vein the felspar of the granite is converted into kaolin, which is of excellent quality. Brongniart has found in every locality where he has examined repositories of kaolin, that they are surrounded by a very ferruginous rock. It may also be added that the granite of Carlsbad, in which large felspar-crystals occur, which, though still retaining the crystalline form of felspar, have been converted into kaolin, is strongly coloured red by oxide of iron.

As to the formation of the kaolin, and the unequal proportions in which the remaining silicic acid and alumina are therein combined, he states the following probabilities:—1.

That the decomposition took place under unequal influences, in consequence of which sometimes more, sometimes less, of the silicic acid was left undissolved; 2. The dissolving medium could deposit silica while the potash was taken up; and, 3. The kaolin could be formed from other minerals besides felspar. He considers this last supposition improbable, but the second very probable. In the mean while the first seems the most probable of all; it requires only one condition to explain the dissimilarity of the result, viz. a greater or smaller amount of carbonic acid in the water, by which sometimes more, sometimes less, silica would be separated from the alkali.*

On the Composition of the Air found in the Pores of Snow.

By M. BOUSSINGAULT.

DURING his stay on the Col du Geant, Saussure, upon examining the air enclosed in the pores of snow, thought that it contained considerably less oxygen than the air of the atmosphere. The following is the account he has left us.

“We thought, but a little too late, of collecting the air enclosed in the interstices of the snow, and we carried it to M. Sennebier for the purpose of analyzing it. At Geneva, a mixture of equal parts of atmospheric air and nitrous gas afforded him, twice consecutively, 1.01. The air of snow, tested in the same manner, gave him on one occasion 1.85, and on another 1.86. This experiment, which appears to indicate a great degree of impurity in this air, would have required trials to ascertain the nature of the gas which occupies the place of oxygen in the air in question.”†

At the time when the beautiful investigations of Saussure were undertaken, the eudiometer had made little progress; but, notwithstanding its imperfection, it was difficult to admit that such observers as Saussure and Sennebier had been deceived in regard to the difference observed in the composition of two gases, analyzed by the same means and in the same conditions. It was this consideration which induced me to repeat Saussure's experiment when I happened to be among the glaciers of America.

In the first attempt made by Colonel Hall and myself to ascend Chimborazo,‡ on the side looking to Chillapullu, we fell in with snow so loose and deep that it was impossible, notwithstanding our utmost efforts, to get beyond the height of 5115 metres. It was at this point that I filled a jar with snow, sealing it hermetically. When we reached the hut where we were to pass the night, the snow was completely melted; the water produced by its fusion occupied $\frac{1}{3}$ of the vessel. Having analyzed the air in the vessel by means of phosphorus, I ascertained that it contained only 16 or 17 in the 100 of oxygen.

* From Berzelius's *Jahres-Bericht*, 19ter Jahrgang.

† Saussure, tome vii. p. 472.

‡ See Jameson's *Philosophical Journal*, vol. xix. p. 88.