silicate of alumina and lime, may perhaps be taken as a representative of the hydrous double silicates in the soil, show that these substitutions of protoxyd bases are neither complete nor absolute. It would appear, on the contrary, that there takes place a partial exchange or a partition of bases according to their respective affini-Thus the normal chabazite, in presence of a solution of ties. chlorid of sodium exchanges a large portion of its lime for soda; but if the resulting soda-compound be placed in a solution of chlorid of calcium, an inverse substitution takes place, and a portion of lime enters again into the silicate, replacing an equivalent of soda; while, by the action of a solution of chlorid of potassium, both lime and soda are, to a large extent, replaced by potash. In like manner, chabazite, in which, by the action of a solution of sal-ammoniac, a part of the lime has been replaced by ammonia, will give up a portion of the ammonia, not only to solutions of chlorids of potassium and sodium, but even to chlorid of calcium. It results from these mutual decompositions that there is a poirt where a chabazite containing both lime and soda, or lime and ammonia, would remain unchanged in mixed solutions of the corresponding chlorids, the affinities of the rival bases being balanced.\* Inasmuch, however, as the proportions of ammonia and potash in natural waters are usually small when compared with the amounts of lime and soda existing in the form of hydro-silicates in the soil. the result of these affinities is an almost complete elimination of the ammonia and potash from infiltrating waters.

§ 7. That the replacement of one base by another in this way is not complete is shown moreover by the experiments of Liebig, Dehérain and others, who have observed that a solution of gypsum removes from soils a certain amount of potash-salt, which was insoluble in pure water. In this way gypseous waters may also acquire portions of sulphate of soda, and perhaps of sulphate of magnesia, from silicates.

It is not certain that all the above reactions observed for chabazite are applicable without modification to the double hydro-aluminous silicates of sedimentary strata. Were such the case, important changes might, in certain conditions, be effected in the composition of saline waters. Thus in presence of a great amount of a hydrous silicate of lime and alumina, solutions of chlorid of