

with the agitation of the surface water. As already stated, it is sufficient for the formation of zeolites to have a very slow renewal of the water, and we have at the bottom of the Pacific this condition, which is observed in the waters infiltrating into the subaerial rocks and there depositing hydrated silicates. In consequence of the greater or less stability of the masses of water in contact with or imbibed by the sedimentary ooze and volcanic debris, diffusion, if not altogether suspended, operates only in a very slow manner in the deeper layers of the sea, and thus permits the dissolved elements to be deposited, in part at least, at the points not far removed from where they have been extracted. One of the conditions desired for the formation of zeolites—the slow renewal of the water—is then realised at the bottom of the sea, and especially in the muds saturated with water.

Another objection arises from the low temperature of the water at great depths, which oscillates between 2° to 3° C. above and below zero; it may be thought that these thermal conditions are incompatible with the formation of zeolitic crystals. It has generally been admitted that these minerals require for their formation waters of a high temperature, but that they can be produced without demanding a great heat is proved by the zeolites of Plombières, for, as already stated, they are there developed almost at the surface of the ground under the action of waters, thermal, it is true, but whose temperature scarcely rises to over 40° C. This is very far from the high temperature which has been hypothetically invoked to explain the deposit of all zeolitic matters. To judge from the effects produced at Plombières by waters of a comparatively low temperature during the relatively short time separating us from the Roman period, it is reasonable to suppose that even very much lower temperatures may produce analogous phenomena, if account be taken of the great alterability of basaltic silicates and the state of fine division in which they occur at the bottom of the sea. That which cool or tepid waters, like those of springs, can produce, will be realised in sea-water in a certain measure, especially if it has time to act, for time is a great factor in these reactions; the ultimate result will be the formation of crystals scarcely exceeding a fraction of a millimetre in diameter. It would be easy to prove, it may be added, that the decomposition of a great number of rocks, and the deposition of zeolites under the influence of water, could only take place at a relatively low temperature. It is scarcely necessary to remark that if a water but little mineralised, like that of Plombières, is sufficient to attack the substance of bricks and concrete, and there provoke the formation of zeolites and other species—chalcedony, opal, &c., the water of the sea is able to exercise an analogous action upon the natural silicates bathed by it. If it be admitted that pure water suffices to decompose rocks, with all the more reason may we conclude that sea-water charged with salts is able to attack the mineral matters which it penetrates. It is well known that water in contact with finely-pulverised silicates gives at once an alkaline