

of silica which is soluble, and if it be converted into silicates, as in most of the minerals used by Professors Rogers, it is soluble, and is found in most mineral waters. The decomposition of these silicates is accomplished in a variety of ways, and usually leaves an excess of silica in a free state, which forms quartz.

How deep water penetrates into the crust of the earth we know not. But we know that it possesses an astonishing power of working its way into fissures and pores. Especially when converted into steam, and kept in by strong pressure, we can hardly set bounds to its interpenetration. We know that rocks deposited in water are several miles thick, and in some of them water is chemically combined.

We might suppose that the increasing heat as we descend into the earth would expel all the water, or at least drive it near the surface. But the phenomena of volcanoes leads to a different conclusion. The immense quantities of steam that are poured forth from the craters demonstrate the presence of water at a great depth, as do the eruptions of mud, called Moya, in South America and in the Caucasus, and which in one volcano in Java became a river of mud and diluted sulphuric acid. But the most remarkable fact of all is, that ejected molten lava probably owes its liquidity to water. When a stream of it is poured forth, steam escapes from the surface, and a crust is formed in consequence, which prevents the escape of the condensed steam within, except when cracks are formed; and hence the fluid state is preserved within for a long time; nor till that has escaped will it be consolidated; so that in the opinion of some of the ablest writers on volcanoes, such as Scrope, liquid lava is an aqueo-igneous fusion. The heat is found to be not high enough to produce liquidity without water.

Suppose, now, the water in the stratified rocks to be highly heated, and yet essentially imprisoned by impervious strata at the surface; it is easy to conceive that they might reduce the rocks to a fluid or semi-fluid condition without destroying the planes of stratification or producing a complete fusion like that of lava. In that state such chemical changes might occur as would give a crystalline structure, form new simple minerals and produce planes of cleavage, foliation and joints.

But though hot water and steam would produce powerful metamorphic effects, they would be very much increased if we suppose