

with sulphur and muriate of lime.* The thermal waters of Aix, in Savoy, in passing through strata of Jurassic limestone, turn them into gypsum or sulphate of lime. In the Andes, at the Puerta del Inca, Lieutenant Brand found a thermal spring at the temperature of 91° Fahr., containing a large proportion of gypsum with carbonate of lime and other ingredients. † Sulphureous acid gas escapes plentifully both from the volcanos and thermal springs of Iceland. It may, indeed, be laid down as a general rule, that the mineral substances dissolved in hot springs agree very closely with those which are disengaged in a gaseous form from the craters of active volcanos.

Siliceous springs. — Azores. — In order that water should hold a very large quantity of silica in solution, it seems necessary that it should be raised to a high temperature. ‡ The hot springs of the Valle das Fernas, in the island of St. Michael, rising through volcanic rocks, precipitate vast quantities of siliceous sinter. Around the circular basin of the largest spring, which is between twenty and thirty feet in diameter, alternate layers are seen of a coarser variety of sinter mixed with clay, including grass, ferns, and reeds, in different states of petrification. In some instances, alumina, which is likewise deposited from the hot waters, is the mineralizing material. Branches of the same ferns which now flourish in the island are found completely petrified, preserving the same appearance as when vegetating, except that they acquire an ash-grey colour. Fragments of wood, and one entire bed from three to five feet in depth, composed of reeds now common in the island, have become completely mineralized.

The most abundant variety of siliceous sinter occurs in layers, from a quarter to half an inch in thickness, accumulated on each other often to the height of a foot and upwards, and constituting parallel, and for the most part horizontal, strata many yards in extent. This sinter has often a beautiful semi-opalescent lustre. A recent breccia is also in the act of forming, composed of obsidian, pumice, and scoriæ, cemented by siliceous sinter. §

Geysers of Iceland. — But the hot springs in various parts of Iceland, particularly the celebrated geysers, afford the most remarkable example of the deposition of silex. || The circular reservoirs into which the geysers fall, are lined in the interior with a variety of opal, and round the edges with sinter. The plants incrustated with the latter substance have much the same appearance as those incrustated with calcareous tufa in our own country. They consist of various grasses, the horse-tail (*Equisetum*), and leaves of the birch-tree, which are the most common of all, though no trees of this species now exist in the surrounding country. The petrified stems also of the birch occur in a state much resembling agatized wood. ¶

By analysis of the water, Mr. Faraday has ascertained that the

* C. Prevost, *Essai sur la Constitution Physique du Bassin de Vienne*, p. 10.

† *Travels across the Andes*, p. 240.

‡ Daubeny on Volcanoes, p. 222.

§ Dr. Webster on the Hot Springs of

Furnas, *Ed. Phil. Journ.* vol. vi. p. 306.

|| See a cut of the Icelandic geyser, chap. 33.

¶ M. Robert, *Bullétin de la Soc. Géol. de France*, tom. vii. p. 11.