

depositions, was that of Werner, who, in 1791, gave what he considered a "New Theory of Mineral Veins," of which the principal points of novelty are, the application of the phenomena of intersections to determine the *ages* of veins, and the hypothesis of aqueous solution for the filling of the fissures. In proof that the fissures of veins were filled from above, Werner mentions the occurrence of rounded pebbles at the depth of 180 fathoms in the vein Elias in Danielstollen at Joachimsthal, and similar instances in the Stoll refier near Riegelsdorf in Hussia, and in Dauphiné.

His notion of the manner in which veins were filled, partakes of the errors which belong to all the Wernerian hypotheses of the origin of mineral masses. He says, — "The same *precipitation* which in the humid way formed the *strata* and *beds* of rocks (also the minerals contained in these rocks), furnished and produced *the substance of veins*; this took place during the time when the solution from which the precipitate was formed, covered the already existing *rents*, and which were as yet wholly or in part empty, and open in their upper part." *

The Huttonian hypothesis of the earth's construction, opposed in almost every point to that of Werner, conducted naturally to a different interpretation of the same facts. The fissures were produced by forces depending on subterranean heat, and were filled by injection like rock dykes; and the parallel bands in the vein, which Werner ascribed to *successive aqueous deposition*, were referred by Hutton and Playfair to *successive igneous injection*. In support of this explanation, the acknowledged impossibility of solution in water of native, sulphuretted, and oxidised, metals, and many of the veinstones, was alleged, as fatal to the Wernerian but favourable to the Huttonian view.

The complicated phenomena of veins led some English

* On Veins, p. 50.—See also p. 110. for a further development of this very crude notion, mixed with some very ingenious suggestions, and important views of the relations of geology and mining.