

In what manner metallic veins were filled with ore has greatly divided the opinions of geologists. Dr. Hutton supposes that both dykes and veins were filled with their contents in a state of fusion by injection from below; the expansive force of the melted matter having cracked the surface, and opened a passage for its reception. (See Chap. IX.) From circumstances previously stated, it appears probable that many dykes were so formed. Other dykes appear to have been open fissures filled by materials washed from the surface, and contain rounded stones, and sometimes undecayed vegetable matter. From a dyke of clay in a coal mine in Yorkshire, two hundred and fifteen feet deep, I have drawn out long vegetable fibres, apparently roots, the woody part of which was unchanged, and burned like the roots of common weeds. Werner supposes that all veins and dykes were first produced by the shrinking of the materials, of which mountains are composed; and that metallic veins have been filled from above by the ores in a state of solution.* This theory has been advanced with much confidence, and warmly supported by many geologists: but I have no hesitation in asserting, that it is demonstratively repugnant to fact: indeed, the implicit credit which has been given to Werner's dogmas on this subject, is one instance among many, in which men of distinguished talents have resigned their judgment to authority, and supported the most absurd propositions, when conformable to a favourite hypothesis. If veins were filled by metallic solutions from above, these solutions must have covered the highest mountains over the whole earth; and, instead of finding metallic ores in the present confined repositories, they would fill all the cavities and valleys in every part of the world. As this theory supposes, likewise, that veins were formed at different times, a number of these metallic solutions would succeed each other, we should find regular strata of ore in all primary and transition rocks; and the quantity formed by these deep seas of metallic matter, would be inconceivably great.

This theory is, decidedly, invalidated by the following facts. When a metallic vein passes through different kinds of rock, it is generally observed, that the quality of the ore varies with that of the rock through which it passes; and even some beds of the same rock are more productive than others, and are called by miners *bearing measures*. This is the case in Durham, Derbyshire, Cornwall, and probably in every mining district, in England and Wales.

Not only does the variation in the nature of the rock, occasion a change in the quantity or quality of the ore, but the mineral substance or matrix which accompanies ores, generally varies in different kinds of rock. In granite and slate rocks, the matrix is more

* The round pebbles which are sometimes found in veins have been cited to prove that veins were filled from above: they were probably introduced by subterranean currents.