frequently quartz and barytes than calcareous spar; in calcareous mountains, quartz is rarely the prevailing matrix. In the counties of Durham and Northumberland, veins pass through siliceous sandstone, argillaceous shale, and limestone. (See Plate VII. fig. 2.) The ore is more abundant in the limestone than in the sandstone, and in the shale, provincially called *plate*, ore, very rarely if ever, occurs. In one mine at Welhope, the matrix of the vein, as it passes through the sandstone, is cawk or the sulphate of barytes; but when it enters the limestone, it changes to carbonate of barytes in balls, having a radiated diverging structure. It is still more deserving of notice, that when the rock on one side of a vein is thrown up or down considerably, so as to bring a stratum of limestone opposite a stratum of sandstone, or when what are called the walls or cheeks of the vein are of two different kinds of stone, (see Plate VII. fig. 5.) the vein is never so productive in ore, as when both sides of the vein are of the same kind. In the above figure, different strata are opposite to each other, except where the strata are of great thickness: thus, parts of the lower bed of limestone, *a a*, form the wall on each side of the vein, and in such situations it is rich in ore; but the upper part of the bed, *a*, is brought opposite to a bed of sandstone, *b*, on the left; and in this part of the vein it will become poorer, and the same will be the case when the vein passes through the upper strata; in some it will contain no metallic ore. This fact alone seems sufficient to invalidate the theory of Werner, that veins were filled with metallic solutions, poured in from the upper part. Had this been the case, the nature of the rock could have made no difference in the quality or quantity of the ore.

Werner, in his "Treatise of Veins," states one instance, as if it were extraordinary, of the ore changing its quality, as the vein passed through different rocks; and is inclined to admit that elective affinity for the rock may have contributed to the effect. The circumstance, so far from being extraordinary, is of common occurrence, and known to all working miners. The entire cessation of the ore in one part of a rock, and its re-appearance below, are still more striking.

In Derbyshire the beds of metalliferous limestone are separated by beds of basaltic rock, called toadstone.* When a vein of lead is worked through the first limestone down to the toadstone, it ceases

* The fact of metallic veins being entirely cut off by the beds of toadstone, has recently been doubted; it is supposed that the vein is continued through the toadstone, though it contains no ore: but the fact of veins being cut off by the seams of clay, (called *way boards*,) if it could be established, would lead to the same conclusion as the separation of the vein by toadstone. My late visits to Derbyshire have convinced me more fully, that Mr. Farey was too hasty in forming his opinions, and that he did not always select his information from the best sources. Neither the beds of clay nor toadstone may contain ore, and yet the vein may pass through them, but, being unproductive, it is not noticed. In some instances, probably, the beds of toadstone were protruded between the beds of limestone, after the formation of metallic veins, as Mr. Whitehurst originally maintained.