granite, and copper where they traverse slate; the same lode, as at Botallack, may cross three times from the one rock into the other, and each time the same change of metallic contents takes place. Some of the lodes, which are poor in ore in the slate, become rich as they cross an elvan (Fig. 320), or, on the other hand, the ore is so split up into strings in the elvan, as to be much less valuable than in the slate. Similar variations in the nature or amount of ores and vein-stones with the character of the rocks traversed by mineral-veins have been generally observed in mining districts, even among the most diverse geological formations. Chemical analysis has revealed the presence of minute quantities of metallic ores dispersed through the substance of the rocks surrounding mineral-veins. By isolating some of the more frequent silicates found as rock-constituents (such as augite, hornblende, and mica), iron, nickel, copper, cobalt, arsenic, antimony, tin, etc., have been found in appreciable quantity, and the conclusion has been drawn by F. Sandberger that the heavy metals are present in the silicates of the crystalline rocks of all geological periods. Stratified rocks also, when subjected to sufficiently delicate analysis, reveal the presence in them of the metals and non-metallic substances that constitute mineral-veins. Clay-slates, for example, have been found to contain copper, zinc, lead, arsenic, antimony, tin, cobalt, nickel.[1]

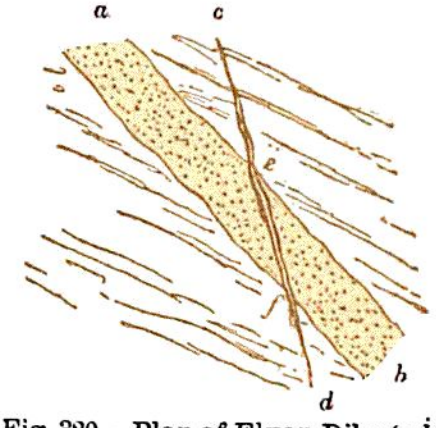

Fig. 320.—Plan of Elvan Dike (*a b*) traversed by a metallic vein (*c e f d*), which dies out as it passes into the surrounding slate, Wheal Alfred, Guinear (*B.*).

Decomposition and recomposition in mineral-veins.—It has

[1] This question has been made the subject of an exhaustive research by Prof. F. Sandberger, "Untersuchungen über Erzgänge," Part i.