

*strings* and *threads* are small filaments into which the vein sometimes ramifies. The two sides of the sheet or lode are called its *walls*; and if the dip of the vein is considerable, the upper one is termed the *hanging wall*, and the lower the *foot wall*.

Metallic veins are most numerous in hypozoic and palæozoic rocks. No vein is worked in Great Britain above the new red sandstone. Nor are any explored of much importance, above the carboniferous limestone. In the Pyrenees, however, hematitic and spathic iron occurs in palæozoic strata, in the lias, and the chalk. In the Cordilleras of Chile, also, tertiary strata, which have become crystalline by the proximity of granite, are traversed by true metallic veins of iron, copper, arsenic, silver, and gold, which proceed from the underlying granite.

As a general fact, metallic veins are most productive near the junction of stratified and unstratified rocks. Their productiveness depends also on their relative direction. If one lode is rich, another lode near it, with nearly the same direction and in nearly the same country, will probably be found rich in that part opposite the rich part of the first lode. It is also considered a favorable indication of rich metallic veins, to find at the surface decomposed masses of the ore called *gossan*.

The latest writers upon metallic veins argue that the ores are richer near the surface than at great depths.

Metallic, like common veins, have been produced at different epochs. Mr. Carne finds evidence in Cornwall of the existence of metallic veins of no less than six or eight different ages; a case analogous to the one exhibited in Fig. 31, in Section I.

Fig. 412 is a section of tin and copper veins near Redruth, in Cornwall. They generally pass from the killas, or slate, into the granite beneath. The section reaches to the depth of 1,200 feet. The dotted lines represent the tin lodes (veins), and the continuous lines the copper lodes.

*Lead Veins of the Upper Mississippi.*—The most extensive deposits of galena in this country are in the valley of the Upper Mississippi, in rocks of the Hudson River group. The simplest form of the lode is a vertical sheet, from the thickness of a knife-blade to several feet; or a number of these sheets may be grouped together.

Sometimes the sheets terminate downwards in a large horizontal bed of ore, not usually less than four nor more than fifteen feet thick. The sheets connected with these beds or *openings*, are called *chimneys*, as may be seen in Fig. 413.

Very frequently these openings are not filled with ore, but are merely cavities in the rock, and often contain bones of extinct species of animals—as the wolf, peccary, etc.

Or these openings may be partially occupied by ore. Fig. 414 represents

Fig. 412.

