

horizontal fissures due to the shrinkage of the rock during cooling. The floors are arranged like the rungs of a ladder, and such lodes are called *ladder-lodes* (Fig. 3). The typical examples are at Wood's Point in Victoria, where they occur in dykes of hornblende-porphyrine in slate. As a rule the floors of a ladder-lode are confined to the igneous rock; but where on solidification that rock froze firmly to the adjacent slate the shrinkage cracks and consequently the quartz-floors extend into it.

*Contra-lodes* (Fig. 4) are small lodes which cross a lode at a high angle, just as great faults are crossed by secondary cross-course faults. If some lode material has been deposited along a cross-fault it is a *metalliferous cross-course* or contra-

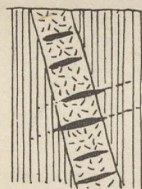


FIG. 3.—A LADDER-LODE.

A ladder-lode in a dyke traversing slate. In two cases the quartz-floors are shown penetrating along cracks into the slate.

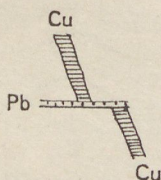


FIG. 4.—A CONTRA-LODE.

A contra-lode (Pb) containing lead, formed along a fault which has broken a copper lode (Cu).

lode; if the cross-course be only filled with clay it is a *cross-fluccan*. Great faults may extend to depths of probably a hundred miles, and the fissure lodes doubtless extend far below the levels which can be reached by mining; and some lodes, or series of associated lodes, may extend for hundreds of miles in length.

Lodes are usually much longer than their thickness; but those formed along the intersection of two fractures or in a solution channel are *pipe-lodes* or "ore chimneys," as the Achilles lode of gold ore at Tarradale, Victoria, or the Harrington-Hickory Mine in Utah due to the replacement of limestone along a cross fissure by lead ore (Butler, *U.S.G.S., Prof. Pap.*, 111, 1920, p. 517).

Lodes in folded sedimentary strata are often isolated, and