

was opened and worked some ten years since, but, as is the case with most gold mines, the pure metal was found to cost more than it was worth.

The eastern face of Parr's ridge seems destitute of metals, except iron ores in no great supply; but, upon crossing the summit, we find a very interesting metalliferous district east of the Monocacy. Indications of copper are abundant at many points between the Baltimore and Ohio Railroad and the Pennsylvania line, and generally in connection with the isolated areas of limestone in that region. We may designate it as the Linganore copper region, because that stream and its affluents drain the greater part of it.

Copper ore was mined and smelted near Liberty before or during the Revolutionary War. About thirty-eight years ago an attempt was again made, and persevered in for some time, to open a productive mine, but it was at length discontinued.

A few years since a mine was opened adjacent to the town of Liberty, on Dolohyde creek, and for some time was very productive, but, becoming less so, the works were suspended. Other attempts have been made in this district with like results.

I have had occasion, in former years, to make special examinations of portions of this district, and have come to the conclusion that there is a fair probability it will yet be found to contain valuable mines of copper. There are some intricacies in its geological structure which it would altogether exceed my limits to enter into at this time. A brief reference to the subject, however, seems proper.

Copper and some other metals occur under the following conditions :

1. In veins, which are cracks formed in rocks and afterwards filled by deposits from solutions aided by electric agencies.
2. In some cases they have been forced up from below in a state of fusion like intrusive rocks.
3. There are also cases in which intrusions of rocks have taken place, and contracting whilst cooling, have left cavities which afterwards were filled in the same manner as veins.

All European mines, except a portion of those in Sweden and in Tuscany, (including the island of Elba,) are in veins; so that the European mining captains who come here, have learned their geology from their experience in that kind of mining. Veins are continuous in nearly straight lines, sometimes for several miles, whilst a *contact mass* which occur in the second and third cases *never* extend to a great distance, but often contain immense deposits of iron or copper as in Cuba, Chili, Missouri and Michigan and other regions.

When I saw the Dolohyde mine in operation, the captain (an Englishman), thought he was working a vein, and of course wasted money by endeavoring to trace its prolongations. I told the parties by whom I was consulted, that it was a *contact mass*, and that the ore was to be sought for by working in the outer edge of the isolated mass of limestone (with which it was associated), and by resolutely sinking downwards. I also stated that no reliance should be placed in the horizontal extension of the *false* vein they were then working, which, although it contained a large proportion of rich ore, would not extend horizontally 100 yards. And such was the result.

In Tuscany, there are a few copper veins which were skillfully mined by the Romans more than 2000 years ago. The best of them were exhausted long since. The Tuscans have also *contact masses* which miners had often attempted to work, but failed to do so with profit. The *contact masses* being thin, irregular and unpromising at the surface, were much neglected. At length a French geologist (I think it was M. Burat), studied them, and by his advice one of them was penetrated downward, which brought to view extremely rich ores of copper in enormous masses.

Galena, a rich ore of lead containing silver was obtained in the Dolohyde mine, and had previously been discovered near Unionsville. I have also heard of its occurrence at other points, but have no definite information in reference to them.