

*Copper-Deposits of Keweenaw Point.*

1. Vein-deposits (fissure-veins).
2. Flow-deposits (melaphyrs or amygdaloids).
3. Bed-deposits (conglomerates).

The conglomerates are known to be old sea-beach deposits, like those that are forming along the lake or ocean at the present time. This is proved by the rounded and water-worn character of their pebbles and grains; by the observed water-action on the surface of the underlying lava-flow; and by the fact that at their base the conglomerates contain considerable basaltic mud and pebbles derived from the underlying lava, both of which diminish in amount or are entirely wanting as the distance from the underlying trap increases.

That the copper was deposited from water, with or without electro-chemical action, is shown by the fact of its being found inclosed entirely in minerals known to be formed by water only; also by its enclosing such minerals; by its being found in disconnected or isolated masses in the lavas and elsewhere, and by its greater abundance where there are to be seen the most signs of water-action. Had the copper been deposited by igneous agencies subsequently to the formation of the melaphyr and conglomerates it would have had a channel or line of passage, and would have been continuous along that line, so that all the different masses of copper would have been connected together downward, unless separated by fractures or faults.

The copper seems to have needed for its deposition the open spaces of veins and fissures, and rocks that were porous and cellular, or those whose parts were easily removed by the percolating waters, like melaphyrs or the cementing mud of the conglomerates. In truth, the copper seems to have been deposited wherever there were found any places in which to leave it.

From the fact that the copper is generally found most abundantly under the heavy lava-flows, and associated with minerals evidently the product of the decomposed lavas, it appears probable that the copper was once finely disseminated through the lavas, and has since been concentrated by waters percolating through them. This view is advocated by Müller, Bauermann,