

"copper ever were in a fluid state, its point of fusibility being much higher than that of silver, the latter metal would have become combined with it, whereas it contains none of it, although the veins of silver are most intimately mixed with the metallic copper. These objections apply equally to the hypotheses of the sublimation of copper and silver, for silver is not volatile at the temperature of our furnaces.

"Taking the hypothesis of a watery deposit, we must assume a chemical solution of copper, and a reacting influence, by which the copper may be precipitated, and then the result of the decomposition ought to be found in the vein which is the product; moreover, we must suppose a solution of metallic copper, one to three inches in depth, completely filling the crevices of the rock in which it is found.

"It has been supposed that a galvanic separation might explain the origin of those veins of copper, but from what matters has the copper been separated? Galvanism could never have separated copper from rocks of traps or sandstone; and it would be difficult to form an idea of the position of the poles of a voltaic pile of sufficient force to effect the deposit of masses of copper so considerable. Traps are known to be magnetic and polar; this has been satisfactorily demonstrated by Dr. Locke and other observers of the rocks of Lake Superior; this property is the result of the action by induction of terrestrial magnetism, on the vast abundance of magnetic iron ore contained in the trap. I have ascertained in fact, that a specimen of trap assayed in the furnace, yielded about 12 per cent of metallic iron. The magnetic needle gives us no assistance to ascertain whether electric currents exist, because its variation is produced by the influence of polar magnetism in the trap.

The presence of crystals of native copper among those of prehnite datholite, carbonate of lime and quartz, clearly indicates the simultaneous formation of the copper and the minerals containing it. If the igneous formation by injection or by sublimation of the zeoliths and carbonate of lime be admitted, how shall we explain the circumstance that Jacksonite and anhydrous prehnite are the only minerals which are not hydrates?

"It is a matter of inquiry, whether the native copper in the amygdaloids was originally diffused throughout the sandstone, or has been mechanically introduced by the agency of the trap? It has been alleged that the sandstone being formed of the detritus of older rocks, might contain copper ore of the same date of deposit as itself, afterwards reduced to the metallic state by the agency of the trap; and this assertion would be admissible if it could be proved that in the neighborhood of traps, sandstone contains copper in sufficient quantity to yield the amount of that metal found in the amygdaloids. But this is not the case. It has been asserted likewise, that the deposit of ore might have taken place in certain parts of the sandstone, in which it had been subsequently reduced by the trap. This we confess supposes a remarkable degree of intelligence in the trap, which must in some way, have been able to hit upon the places in which the mineral was deposited.

But wherefore should this faculty exclusively belong to volcanoes, since they inject at one time lead, at another zinc, or gold, or copper? It seems that they are mindful, not only of the direction of the fissures, but even of electrochemical affinities, as in the injection of sulphur, gold, arsenic, copper, &c. May not trap, which they say owes its existence to volcanoes have inherited some degree of intelligence, at least in regard to copper?

"In the conglomerate there are veins of carbonate of spathic lime, containing crystals of copper weighing sometimes half a pound, and generally in shape rhomboidal dodecahedrons; in the veins of carbonate of lime, at Agate Harbour mine, there are masses of copper weighing several hundred pounds.