

MINING LECTURES.

Lecture 4.—Mines, Mining, and Ore Deposits.

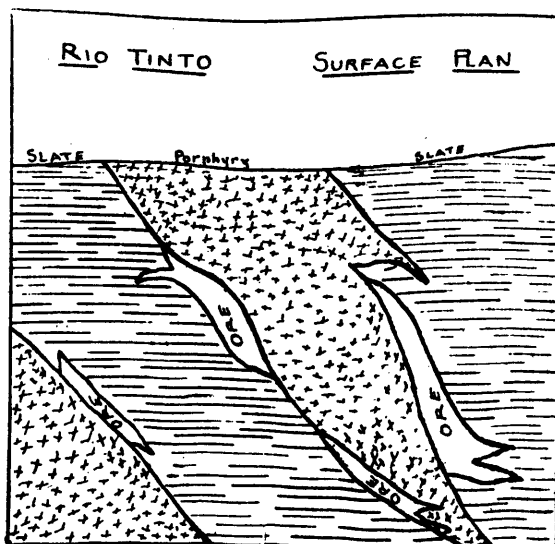
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Before discussing placers and placer mining to-night—and I have no doubt there are some here who are past masters in that class of mining—I would like to speak of one more form of ore deposit which may be of great interest in this Province. There is one camp at present attracting the greatest attention and many hopes are centered there, and though I have not yet been there it will be of great interest to me to learn whether the ore deposits in that camp at Rossland conform to the class we will now speak of, namely 'concentrations.'

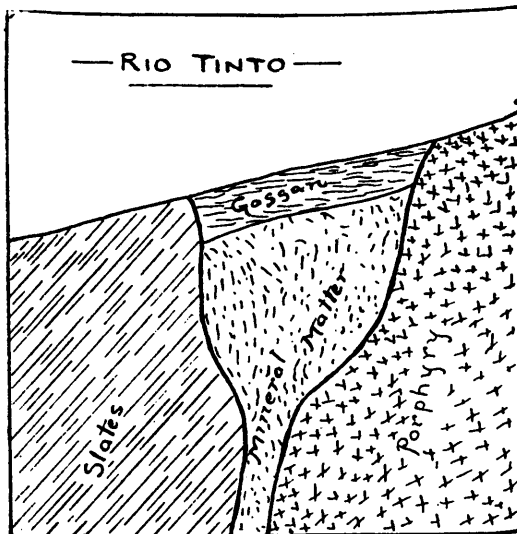
With the exception of 'concentration' deposits, all deposits of ore already described, have been found by this precipitation of the mineral from aqueous solution, but 'concentration' deposits have been formed from cooling masses of molten igneous rock, when certain minerals crystallizing first such as magnetite, pyrite, pyrrhotite, chalcopyrite, etc., have sought parts cooling first, or the outer limits of the mass and concentrated there in large irregular masses. Hence such deposits are almost invariably found only along the outer limits of the area of igneous rock, as diorite, gabbro, and next to the rock that surrounds the eruptive mass.

In the great Sudbury mines in Ontario they have enormous bodies of pyrrhotite, a combination of sulphur and iron, a mineral in many localities of no value whatever, but nickel is generally found associated with pyrrhotite. Large bodies of this pyrrhotite are being found in this Province, especially at the now famous mines at Rossland, where most of the ore shown is this same mineral with chalcopyrites and also gold, and now in many other localities this mineral is being exploited. The fact that lying against these ore deposits are large masses of diorite—an igneous rock, sometimes known as gabbro, and in some places as porphyry—make that camp one of great interest to me, apart from the great deposits of rich ore they are finding, for if this ore has been thus deposited, it will help in the search for other bodies and their mining.

Let us refer for a moment to the diagram of the Rio Tinto mine in Spain, one of the greatest copper mines in the world. It has been worked for a thousand years and more, and at the present time, has millions of tons of ore in sight blocked out and ready to be mined.



In this mine, the Rio Tinto, beside these enclosing slates, there are large areas of igneous rock known as 'porphyry,' which is much the same as our 'diorite,' and you will notice that these large deposits are found along the edges of these masses of igneous rock, forming the copper deposits of that mine 300 to 650 feet wide, which are simply quarried out from the top after working of



the covering of gossan. The working out and study given to this and other deposits in other places have been of very great practical benefit in the mining of other deposits formed in this way, and have been of very great utility to the miner, prospector and investor. These enormous bodies of sulphides concentrated in the outer limits of the masses of diorite are never found at any distance within the diorite itself, hence it is almost useless to look, or prospect for the mineral except along the edges of the igneous rock. Sudbury has been carefully studied to see whether conditions there conformed to this rule, and it was found that the enormous masses of pyrrhotite were also found only along the edges of the diorite, and this again may be found to be the case at Rossland. Fissures are sometimes found leading into the enclosing rock and these fissures have been filled with mineral, while it has been found that the mineral decreases, as would be expected, as they run into the diorite or igneous rock away from the edge until it peters out and becomes too poor or valueless to mine. At Sudbury above these vast ore bodies you can see along the surface the brown, reddish, stain caused by the decomposition of the pyrites to gossan which may be traced for long distances and conforming with conditions found elsewhere. In some places there was but a small percentage of nickel from 1-10th to 2-10 per cent. when the mass of diorite was small, but where the diorite was in large areas the percentage became merchantable, from 2 1-2 to 3 per cent.

Whether the ore in the new camp of Rossland will be found in deposits of this sort I do not know, they may be, and if it is found that the deposits are of this character it will be of advantage to miners, prospectors, and, in fact, all interested, to know how such are found in other parts. These deposits are large and fairly regular as formed along the edges of the igneous rock, but subsequent breaks and faults may have disturbed them, at least such has been more or less the case at Sudbury.

Turning now to a short and elementary discussion of 'placers,' or gold as found in alluvial deposits. The vast bulk of the gold that has been redeemed to the world has been got from placers, nearly 90 per cent, in fact. From the placers of California during the 35 years prior to 1883 there was taken an almost unconceivable