

This field, as I have stated previously, is an extremely large one, with metalliferous lodes cropping out in all directions, but it will take a number of years to develop the mines and unbosom their wealth, as there are considerable drawbacks to contend with. There is no mining timber of any consequence to be had nearer than Menindie, which is seventy-six miles distant from Silverton, and in dry seasons there is scarcely any water. The Government has done a good deal in boring for water, but so far they have not been successful in finding any which is not brackish. The fresh water in dry weather is confined to the soakage in creek beds. However, there is no doubt but these difficulties will be overcome, and that this field will ultimately produce immense wealth.

Mr. C. S. Wilkinson, F.L.S., F.G.S., the Geological Surveyor in Charge, New South Wales, made an examination of this country last year, and his report to the Government contains valuable information with reference to its geological formation and character of the various lodes he examined.

COPPER MINING.

The only copper mine that I visited was the Cobar Company's, which is situated at the Township of Cobar, about ninety miles west of the Western Railway line at Nyngan, where all the copper that is smelted on this company's works is brought to be forwarded to Sydney for shipment.

This mine has been steadily worked for a number of years with good results, but at the present time the price of copper is so low that very little profit, if any, can be made.

The main shaft for working the mine is sunk to a depth of about 450 feet, but the deepest workings are about 270 feet, where a level is constructed and stoping carried on between this and the next level at 228 feet, the lode above this being all worked out to the surface.

The lode runs in a northerly and southerly direction, having an underlay to the east, and is from 20ft. to 30ft. in width, having clay-slate walls on both sides with a casing of soft slate, which appears to be intermixed with some form of magnesium or lime. The lode is formed in horizontal beds: for instance there may be a layer of gossan 2ft. thick, then a layer of some other description of ore for a certain distance—thus: gossan, grey ore, black oxide, native copper, grey ore, red oxide, gossan. A good deal of carbonates were found on the upper levels near the surface, but where the workings are confined to at the present time the character of the ore may be classed as grey ore, red and black oxide, and native copper. Under the level of the present workings the ore gets into sulphides and sulphurets, and is not so rich. I was informed that the whole of this lode stuff gave from 10 to 15 per cent. of payable ore.

Very little timber is used in this mine unless for passes, which are formed of logs; the system adopted in stoping is to fill each stope as it is taken out, timber only being used as props for holding up the roof if it appears dangerous.

The ore is hauled up to the surface in trucks by means of ordinary cages. The trucks are emptied on the sorting-floor, where all the ore is hand-picked by boys who are paid from 2s. to 2s. 6d. per day. The ore is next put through the pulverizer, when it is broken up into pieces of about 1in. in diameter, and thence taken to the smelting works.

These works consist of sixteen reverberatory furnaces, eleven of which are used for reducing, four for roasting, and one for refining. There are likewise two new furnaces, which have recently been erected, to treat the ore in such a manner as will dispense with the process of skimming, and thereby save labour, but, so far, they have not come up to expectations. These new furnaces are built with fire-brick, of the same shape as a cupola for melting cast iron, with this exception, that there are two openings left near the bottom—one for drawing off the melted ore, and the other, which is a little higher up on the opposite side, for drawing off the slag. As the melted ore is tapped it runs into another furnace termed a "converter," or "roaster," and thence, in turn, it runs out of the converter into the refining furnace, the object being in this new process to save fuel and labour. This is to some extent the system of smelting that Messrs. La Monte and Kahlo adopt in treating silver ore; but the principle of the La Monte furnace is entirely different from the furnaces erected here, and this company will require to make great alterations in the furnaces before they will ever be able to work them economically.

At the other works the smelting operations are conducted as follows: The ore is brought from the pulverizer at the mine and stacked in large heaps, from which it is taken and mixed with slag, charcoal, and limestone, in proportion of one truckload of slag and charcoal to four truckloads of copper ore. This quantity is deemed sufficient for a charge to put into one of the reducing furnaces.

The reducing furnaces are built of fire-brick, and bound together with strong iron bolts and clasps. They are oblong in form, or more like the shape of an egg with a little taken off at both ends. At one end of the furnace there is a fire-box about 5ft. to 6ft. in length and 2ft. 6in. in width, having a bridge about 14in. high between it and the furnace, where the ore is smelted. The floor of the furnace is made with a little fall towards the centre, and to one side, in order to draw off the metal when required. At the opposite end from the fire-box there is a small opening to allow the ore to be stirred up and the slag skimmed off before the metal is allowed to run out at the side opening. The stirring is done with scrapers having a long iron handle, which are drawn over the surface of the molten mass, hauling the slag out at the same hole where the scrapers are worked. The slag is then run into open sand-moulds, and when cool it is taken away to the slag heap, a portion of it being again broken up to mix with crude ore. When the slag is skimmed off as clean as it can be got, the hole in the side is tapped, and the metal drawn off and run into similar moulds to cool before going through the next process. The metal in this state contains about 33 per cent. of copper; it breaks up very freely, having a steel-grey appearance. The time a charge is in this furnace varies a little according to the character of the ore, but it is generally from five to six hours. These furnaces, as well as those for roasting, are about 18ft. long and 10ft. wide inside, having a height at the end next the fire-box much greater than at the opposite end, where there is a flue on