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REPORT ON WOODSTOCK COPPER MINE, NATONE

(Supplementary to Report by Mr. Q.J. Henderson, Field Geologist, 29.7.41)

1. INTRODUCTION

A survey and examination of the Woodstock mine was made by Mr. Q.J. Henderson, Field Geologist, in July, and a report and plan was prepared by him. The present report is based on a brief survey made by the writer in which the report and plan of Mr. Henderson were used to the greatest extent possible. The present survey was devoted mainly to an examination of the underground work conducted since July, but the opportunity was taken to briefly examine the older work. The present report is being prepared as supplementary to that of Mr. Henderson. It will deal mainly with the more recent work but the general position as determined by all the work will also be described.

For general information as to location, access, &c., reference should be made to Henderson's report.

11 GENERAL GEOLOGY

In the Nos. 1, 2 and 3 prospects, the rocks exposed are slates except that at the approach to No. 2 prospect, a thin layer of quartzites appear to overlie the slates. The unweathered slates are black graphitic types and thinly bedded. As the workings are shallow, the slates are weathered in places to white types. White sericitic types occur in association with the mineralisation and are probably partly the product of mineralisation and partly of weathering. The slates are in a few places affected by faults, &c., and are highly graphitic and foliated, all trace of bedding having been destroyed. Black slates are also present in the eastern part of No. 5 prospect and are overlain by quartzites.

Quartzitic rocks are present on the western side of the creek, in the approach to No. 2 prospect and on the hills to the east of the workings. They are very massive in the latter locality. The quartzites are white and highly silicified.

In the No. 3 prospect, the dips suggest a shallow syncline (or a fault), and those in the entrance to the No.3 prospect and the No. 5 prospect (? cut with No.5 sample) suggest a shallow anticline to the west of the syncline. The Nos. 1 and 2 prospects show west-dipping rocks, but there may be a syncline between the entrance to No. 2 and the trench to the north. The No. 5 prospect shows quartzites overlying slates, the contact having a low westerly dip. In the entrance to No. 2 prospect a thin layer of quartzitic rocks overlie slates with a low westerly dip. It would appear, therefore, that the quartzites to the west of the creek overlie the black slates with a low angle of dip. The relations between the slates and the quartzites on the hills to the east are not so easily determined. The quartzites might have high dips and form a zone to the west of the slates but this structure would not so readily explain the low saddle between the two hills. It is more probable that the quartzites overlie the slates with a low dip and are, in fact, the eastern continuation of the quartzites to the west of the creek.

The general structure is, therefore, a band of black slates trending northerly along the eastern side of the creek and which are openly folded and faulted. They are overlain to the west by quartzites and probably also to the east by the eastern extension of the same quartzites.

111 ECONOMIC GEOLOGY

The mine workings are shallow and none exposes the lodes at depths greater than 20 feet below the surface. The lodes are, therefore, partly oxidised and the conditions do not permit of easy determination of the nature, width, dip, &c., of the lodes.

At the surface there are a number of small and isolated outcrops of limonitic material. As determined by Mr. Henderson some of them are gossans representing capping of lodes, while others have been formed from the Tertiary basalt. Quartzitic outcrops also occur and indicate mineralisation in the quartzites.

The only workings open for examination are the Nos. 1, 2 and 3 prospects. In these there are three principal lines of mineralisation or lodes - one in each of the three prospects. As already indicated, the lodes are partly oxidised, but sulphides (pyrite) are also present and the portions exposed represent those parts of the lodes at the base of a shallow oxidised zone and including some secondary enrichment. The lodes consist of an admixture of slates with pyrite and finely crystalline quartz and represent partly replaced slates. No primary copper minerals were observed but Mr. Henderson reported small amounts of chalcopyrite in the No. 2 prospect. It is possible that the copper content of the lodes is contained in chalcopyrite mixed with the pyrite, or alternatively that some copper enters into the composition of the pyrite. On the dump of the No. 2 prospect pieces of the lodes have blue films suggesting covellite. In the workings, bluish-green incrustations suggest copper sulphate, but some of it may be ferrous sulphate.

The lodes in the Nos. 1 and 3 prospects have general north and south strikes and may be portions of one and the same lode. The lode in No. 2 prospect has a strike of 40°. The lodes have almost vertical dips, but owing to the irregular replacement, oxidation and small exposures, the dips cannot be accurately determined.

In addition to the above three lodes, there is some mineralisation along some of the slate beds for short lengths and across narrow widths. In some places, for example, No. 2 prospect, these appear as flat spurs from the lode. In the No. 3 prospect such mineralisation consists of fine-grained quartz-pyrite.

In the three old collapsed adits on the western side of the creek, a mineralised formation (or formations) exist in the quartzite. From what little can be seen they are of the same quartz-pyrite type as in the slates, but coarser in grain .

1V THE LODES

Most work has been conducted in the Nos. 1, 2 and 3 prospects and a trench above the latter.

In the No. 1 prospect, a very irregular formation occurs in the face of the north cross-cut and a shallow excavation (filled with water) has been dug. The lode possibly has a north-south strike, but this is not definitely established. The formation is black and probably slightly oxidised but contains fine pyrite. A sample taken across the dump from the excavation gave assay results of 0.8 per cent of copper and traces of gold and silver. The width of the lode in the excavation could not be determined, but Mt. Henderson took a sample across 60 inches. His assay result was 0.9 per cent copper which agrees with the 0.8 per cent. of the recent sampling. This lode has not been cut at any other place unless it is continuous with that in No. 3 prospect.

In the No. 2 prospect a lode was exposed in the face at the time of Mr. Henderson's visit. His sampling across 96 inches gave an average grade of 1.5 per cent of copper. Since this the lode has been driven on to the north-east for 20 feet and cross-cuts have been driven to the north and to the south-east. In the north cross-cut the lode is 90 inches wide and a sample (taken along the cross-cut) gave an assay result of 3.1 per cent of copper and 5 oz. of silver per ton. This lode has not been exposed at any other place. The small outcrops of gossan to the north-east may possibly indicate its extension in that direction. To the south-west, any extension would pass close to the Rutherford lode and the two might possibly be on the same line of strike.

In the No. 3 prospect, a lode has been cut in the eastern end and driven on to the south for 15 feet since Mr. Henderson's visit. Short cross-cuts from the end of the drive to the east and south-west passed beyond the lode. A south cross-cut (later turned to the south-east) will, if continued, cut the lode, but has represented much wasted effort. On the north side of the adit, a drive had been put to the north, but it is now filled with waste rock. The drive connected with a small hole sunk from a trench above the adit, the hole being sunk on the same lode. A sample across 48 inches at the face of the south drive gave an assay result of 2.9 per cent. of copper and 1.4 oz. of silver per ton.

Mr. Henderson sampled a limonite vein (3/16" wide) and the adjacent country, but it yielded only 0.2 per cent. copper (his sample No. 4). Between the timbered part of the approach and the entrance to the adit, a fault traverses the black slates and there is a small amount of bluish incrustation, but little other evidence of mineralisation.

V CONCLUSION

Scattered workings at numerous places have revealed evidence of mineralisation. The most extensive working has been conducted at Nos. 1, 2 and 3 prospects and the mineralisation appears to have been more intense and the lodes therefore more prominent at these places. The widest lode - 90 inches is in No. 2 prospect. The lodes in No. 1 and No. 3 prospects are about 60 and 48 inches wide respectively. The

assay results of samples across the above three lodes were 3.1, 0.8 and 2.9 per cent oopper respectively with negligible amounts of gold. The lodes are partly oxidised and appear to be secondarily enriched (with films of covellite, &c), so that the above contents are possibly higher than those of the primary ore. For copper lodes with the above narrow widths, the copper contents are two low to justify much, if any, further work on them. Although there is a small amount of mineralisation outside the lodes, there is so much unmineralised black slates that there would be no possiblity of the slate zone being treated as a large deposit because the grade would be only a fraction of that of the lodes and altogether too low to render the deposit of any economic important.

If the leases and owner contemplates any further work, it is suggested that it would give more informative results if conducted at a greater depth than the present workings. The only work at all justified in the present workings is a drive north-east along the lode in the No. 2 prospect as the depth of the workings would increase in that direction.

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