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REPORT ON SOME DISCOVERIES OF COPPER ORE IN THE VICINITY OF POINT HIBBS.

Zeehan, 30th June, 1902.

SIR,

ACTING on your instructions, I left Zeehan on the 20th of May to examine and report upon the discoveries of copper ore in the vicinity of Point Hibbs, in the County of Macquarie, and have now the honour to forward you the following report. I was accompanied by several gentlemen who are interested in the district, and to whom I am indebted for much local information.

The sections which have been taken up are situated on the sea coast, about nine miles north of Point Hibbs and 17 miles south of Cape Sorell. Nineteen sections have already been surveyed in the district, representing a total area of 1150 acres.

Access to the sections is gained at present by means of a foot-track from Pebbly Beach, a small cove on the southern shore of Macquarie Harbour. This track is about ten miles in length, and is good for foot-traffic, but, owing to the presence of one steep gorge, it would be impossible to bring a horse along it in its present state. Another route, however, has already been marked out. This passes northward from the copper discoveries along the Ocean Beach for about three miles, and then strikes across in a north-easterly direction to Liberty Point, which is some five miles north-west of Pebbly Beach. This route is a little longer than the track from Pebbly Beach, but, owing to the absence of any serious gorge, it is more suitable for the formation of a road.

In fine weather a fishing-boat can be landed at several places along the beach on the surveyed ground, and by this means the stores for the mines can be cheaply brought on to the spot. The only objection to this means of transport is that often considerable periods of rough weather are experienced, which might be the cause of great inconvenience were there a large amount of work being carried on in the district. While, however, the district is passing through the preliminary prospecting stages, this means of access is practically all that could be desired. I understand that about

two miles south of the discoveries of copper ore there is a boat harbour, at which a boat may be safely landed, except in very stormy weather.

The country-rock of the district consists of ancient sandstones, quartzites, slates, claystones, and dolomites, which have often been distorted and crushed to a remarkable degree. Considerable bands of tightly-cemented "crush breccia" may often be seen along the sea-coast, and minor faults and distortions are very common. The strike and dip of the strata are very irregular, but I think that where the rocks are least disturbed it will be found that the strike is about north and south and the dip to the west at high angles. Many contradictory observations, however, were recorded, so that it is impossible to speak definitely on this point. Along the beach where the strata are exposed I did not find any of the old eruptive rocks which are usually associated with our metalliferous deposits, but a short distance inland, on the banks of Birthday Creek, I found a very decomposed rock, which may turn out to be a quartz porphyry or felsite. The rock was too much decayed to determine with certainty. To the north-east of the surveyed ground, on a section which has been lately pegged by Mr. H. Cook, there is, however, undoubtedly an igneous rock—a biotite syenite rich in black mica, and containing small quantities of pyrite. This rock appears to occur as a dyke about two chains in width. It is exposed in the bottom of a small creek. This discovery is a very interesting one, for rocks of a similar nature are found in the vicinity of deposits of pyritic ores in several parts of the West Coast. Thus at Mt. Lyell a syenite porphyry is known in the vicinity of Lynchford, and I have been told that this rock has been found even closer to the deposits of copper ores at the head of the Linda Valley. At Mt. Read and Mt. Black a soda syenite porphyry (keratophyre) occurs in abundance. This new discovery therefore makes it highly probable that the deposits of copper ores throughout the West Coast are connected with eruptive rocks of intermediate basicity.

All the sedimentary rocks of the district are traversed by innumerable quartz veins and stringers. Some of these are the so-called "buck quartz" veins which are so common throughout the West Coast, but others, and especially those in the vicinity of the copper discoveries, are of a more complex nature. These latter are composed of fibrous quartz and dolomite, with a little chlorite, and in places a good deal of specularite (crystalline hematite), together with copper and iron pyrites. The structure of these veins differs from

the common type of fissure vein in that there is no symmetrically banded or combed structure. The fibres of quartz, dolomite, and often specularite, extend from wall to wall without any intermediate space or parting. In my recent report on the ore deposits of North Dundas I have called attention to a very similar class of vein which accompanies the sulphide deposits of Mt. Read and Mt. Black, and which I have also found in connection with the North Lyell deposits. I believe that these veins, though worthless in themselves, may serve as valuable indicators of the presence of larger bodies of sulphide ores.

THE BIRTHDAY COPPER SYNDICATE.

This company holds Sections 5054, 5053, 5139, 4983, 5138, 5034, 5013, 5021, 5014, and 4982—all 93m—with a total area of 510 acres. With the exception of Nos. 5013 and 5014, all of these sections are situated along the ocean beach, which is held by the syndicate for a distance of nearly two miles.

The work done up to the present has been confined to the sinking of prospect-holes along the beach, where in a great many places the rocks are stained with a thin coating of copper carbonate. In many cases the latter has been leached out of the small quartz veins which traverse the strata, and which contain copper pyrites in small quantities; in other cases the claystones are themselves impregnated with the latter mineral.

What is known as the main rock is situated in the northern portion of Section 5034. It is a mass of hard, slightly calcareous claystone, standing out into the sea, and surrounded, except at very low tide, by water. On the southern end of this rock two prospect-holes or cuttings have been made, while on the eastern side the surface of the rock has been shot away in several places. This work has shown that the claystone is traversed by small quartz veins carrying iron and copper pyrites, while the whole rock is rather sparingly impregnated with the latter mineral. The dark blue coellite (CuS) is also present in small quantities. There is undoubtedly some nice copper ore showing in these workings, but I regret to say that its amount is very small in comparison with the amount of barren or nearly barren rock through which it is distributed. It is a most difficult matter to obtain really reliable bulk samples from a formation of this nature. Indeed, nothing short of shooting out many tons of stone, and having this crushed and quartered down,

would give accurate results. I could not do this, so contented myself by chipping the stone at short intervals over the face of the exposures. This is not an accurate method, and I do not think that, in a patchy formation of this kind, it can be relied upon to give results nearer than 50 per cent. of the actual value.

The results, as furnished by Mr. W. F. Ward, Government Analyst, of three samples taken from these workings are as follows:—

No. 1 copper, 1.2%	} No appreciable gold or silver was detected in any case.
No. 2 „ 0.9%	
No. 3 „ 1.0%	

Sample No. 1 is a bulk from a cutting 10 feet long on the south-west edge of the main rock.

Sample No. 2 is a bulk from a cutting 13 feet long on the south-east end of the main rock.

Sample No. 3 is a representative sample of some of the stone lying at grass.

From the above it is evident that, even allowing a much larger margin of error than 50 per cent., the stone is far from being payable in bulk.

About 250 feet west of the main rock there is a cleft in the low cliffs forming the margin of the beach in the end of which a shot or two has been made. The stone is copper-bearing, and about half a ton is at grass. I am informed that it assays 2 per cent. of copper.

Seven and a half chains north-east of the main rock is what is known as No. 2 workings. These consist of two prospect-holes about 4 or 5 feet in depth. The largest of these has been sunk on a similar claystone formation to that exposed on the main rock. The hole is 4 feet 8 inches in width, and throughout this distance copper pyrites is distributed through the stone. I took two samples from here, No. 1 representing a bulk of the whole of the stone exposed, No. 2 representing a bulk from about 2 feet of somewhat better class stone in the centre of the cutting. These samples yielded the following results:—

<i>Sample No. 1</i> copper, 0.9%	} No appreciable gold or silver detected.
<i>Sample No. 2</i> „ 1.2%	

Besides these exposures there are a number of quartz veins in the vicinity carrying a little copper and iron pyrites, and occasionally nice bunches of ore may be seen. I do not consider that any of these are of economic importance.

About 30 chains north-east of these workings, near the south-east corner of the 10-acre Section, No. 5139, is what is

known as the glance lode. This at first gave promise of being a valuable discovery. Unfortunately, it has turned out to be only a rich patch of very limited extent. There is here a bed of dolomite, altered in places to a compact hornstone containing blebs of red oxide of copper, carbonate of copper, and copper sulphide (chalcocite). In one place there is a larger mass or bunch of rich gossan containing a good deal of chalcocite, and some of the latter is almost pure. Two tons of this ore have been sent away, yielding something like 40 per cent. of copper. These two tons have, however, nearly exhausted the ore in sight. There is still a little ore in the bottom of the trench, but it has been sunk through, and appears to be lying on a hard quartzite impregnated with pyrites. It is probable that this bunch is due to a surface concentration at the contact of the dolomite. The strike of the formation is about 30° W. of N., which would bring it just about in line with the southern workings already described. The country is, however, so broken that it is impossible to trace any continuity between the two.

On the most southern of these sections held by this company, No. 4982, there is a considerable area of copper-bearing rock, on which no work has as yet been done. It is traversed by numerous quartz veins, and the claystones are much stained with copper carbonate. I could, however, find no indications of an ore deposit which gave promise of affording any quantities of payable ore.

As regards these discoveries of copper ore on the beach, I fear that they are only valuable as showing the presence of copper ores in the district. The indications, in my opinion, are not sufficiently favourable to warrant the large expenditure which would be necessary to test their value in depth. It is true that, as far as work has gone up to the present, the copper contents show a decided improvement in depth, but this fact loses much of its significance when it is understood that the maximum depth attained is not more than 7 feet. As a matter of fact this increase in the first few feet is just what we should expect under the circumstances. The copper contents of the rock become leached out close to the surface, and to some extent become concentrated a few feet below. There is no reason to believe that they will continue to increase below the permanent water-level. On the other hand, I think that it would be worth while spending a little more money in conducting prospecting operations on the rising ground inland, especially on Sections 5013 and 4985. In the south-western portion of the latter section there is

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a large bog-iron formation on the south bank of the Birthday Creek. A good trench put across this would quickly show whether it is the capping of a lode, as is very possible. For the rest, the ground should be gone over carefully, and any gossan formations which are met with should be similarly dealt with.

THE STRAHAN COPPER COMPANY, NO LIABILITY.

This company holds Sections 5022, 5023, 5024, and 5025—all 93M—total area 320 acres. The sections are situated east and adjoining those held by the Birthday Syndicate. The only work done on the sections is situated in the north-western portion of Section 5024. There is a curious decomposed lode formation here, some 20 feet in width, consisting of graphite slate, with some pyrites and bunches of gossan. The graphite slate is cleaved by numerous slickensides, and there are evidences of considerable movement. Samples of the gossan have been assayed, and have yielded 2 per cent. of copper, a trace of gold, and 7 ozs. of silver. This formation has been cut by a tunnel at a depth of about 35 feet. Here the whole formation is still very much broken up and decomposed, and, with the exception of some small seams of copper pyrites, nothing of value was found. By driving north on this formation from the tunnel a considerable amount of backs would be gained, and it is not unlikely that a shoot of ore may be met with. I think, however, that the formation should first be prospected more thoroughly by surface trenching along the course of the lode. If it contains shoots of ore it should be possible to locate some of their outcrops at the surface with a comparatively small outlay, while if nothing of a promising nature is found by surface trenching it is useless to go underground. Quite apart from this lode formation, however, I believe that the sections are well worth prospecting. Much of the country is very highly mineralised, and very little surface work of any kind has as yet been done to test it.

CONCLUSIONS.

Notwithstanding the fact that the prospecting operations which have been conducted up to the present have not succeeded in discovering any deposits of economic value, I believe that the district is one which is well worth the attention of prospectors. The indications are of a favourable nature, being in several respects almost identical with those at Mt. Lyell and other districts on the West Coast, where large

pyritic ore-bodies are known to exist. It is true that the stratified rocks are of a different character, but we have no reason to believe that they are less favourable to the processes of ore deposition. There is practically only one belt of country which has been carefully examined in the district, namely, the portion of the beach where the naked rock is exposed to view between high and low water-mark. But since the beach runs approximately parallel to the strike of the country, it follows that in reality only a very narrow section is exposed. Moreover, the rocks which are exposed on the beach are those which have been longest able to withstand the disintegrating influences of the tremendous seas of the West Coast. All the softer rocks have been worn away, and are hidden under a covering of sand or shingle, so that even in this narrow section it is only the hardest rocks which have been examined. It is therefore very evident that the district has not yet had anything like a fair trial. The country to the north of the surveyed ground specially suggests itself as likely to be productive, for here we already know of the existence of those old igneous rocks with which our ore deposits on the West Coast are so frequently associated, while the presence of copper ores, and of the characteristic quartz-veins which I have described, afford evidence that the same processes of ore deposition have been in operation which have produced valuable deposits of ore in other parts of the Coast. I can recommend this district to the earnest attention of prospectors.

I have the honour to be,
 Sir,
 Your obedient Servant,

GEORGE A. WALLER,
Assistant Government Geologist.

W. H. WALLACE, Esq.,
Secretary for Mines, Hobart.