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PRELIMINARY REPORT

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on

STORMONT BISMUTH PROSPECT.

Introduction

The opening of this mineral field lays to the credit of Richard Magee, who, in prospecting the valley of Lea River and its tributaries two years ago, found in the gravels specks of a bright metallic mineral which he later identified as bismuthenite. It is probable that this prospector was not the first to traverse and explore the area, but being a keen and closeobserver and having a knowledge of mineralogy he was successful where others failed. Following the specks of bismuthenite upstream he saw a large outcropping body of garnet rock which on examination proved to contain blebs and veinlets of bismuth ores. He did not further investigate this ore-body for various reasons, until April of this year. Since that time active development has been carried on with the results recorded in the following pages.

Area, Situation etc.

The Syndicate operating in this area was organised in Adelaide a few years ago to explore the Moina District and, after the discovery of the bismuth prospect, located on Extended Prospecting Area of 240 acres. The results of the work performed encouraged them to select a 40 acre block for leasing, while the remaining part of the area is being explored for other bodies of ore.

The prospect is situated on the east side of Lea River about 3 miles west of Moina township. A track, formed by the Syndicate, connects with the end of the Moina Road at the bridge over Iris River. Thebridge has been re-decked by the Public Works Department and is now in a condition to carry heavy loads. The track which is suitable for present needs, is rather steeply graded in section, but, it is stated that a road grade not exceeding 1 in 34 can be laid down between the bridge and the mine. This route passes along low basalt-covered hills through wonderful sylvan glades of fern tree (dicksonia antarctica) and beech (fagus cunnunghami), locally termed myrtle. Peat from the thick vegetabed growth almost completely mantles the soil and underlying rock adding greatly to the difficulties of the prospectors in the work of unearthing ore-bodies.

Geologic Relations

The basal formation of the area consists of quartz conglomerates, sandstones, slates and limonstones of Silurian Age. This formation, which extends over Black Bluff Range to the west and north-west and eastward over a large part of Moina District, is intruded by granites of Devonian age - the intrusive responsible for the mineral-isation. Although the nearest outcrop of granite is in Moina area it lies at no great depth below the Lea River country as exemplified by the complete conversion of the limestone into lime silicate hornstone and crystallised and crystalline garnet, the formation of large bodies of magnetite and the deposition of bismuth ores in the garnet rock. It is reported that the garnetised limestone extends three miles farther up Lea River valley where other bodies of ore may be looked for.

Overlying the Silurian formation in the hilly parts are sheets of basaltic land of varying thickness and of Tertiary age. In valleys the basalt has been entirely removed by agents of erosion and the basal rocks are exposed to view.

The Structure and Formation of the Ore-bodies.

The most prominent natural feature of the area is a waterfall in Castle Creek a little to the north of the main workings. The development of this feature is the result of the removal by erosion of the garnetised limestone hanging-wall of a large lenticular reef of white opaque quartz. This quartz reef, 10 to 30 feet wide courses north-west (N. 41° W) and dips at an angle of 50° south east and contains a trace of silver only. It extends through the property of Lea River and crops out again high up the northern valley-side of that stream. On the hanging-wall and footwall sides of this reef are the more important of the known bodies of ore. These irregular bodies of bismuth-garnet are conform in strike and dip with the quartz reef. Other bodies of quartz, parallel to the main one but much smaller are disconnected, traverse the garnetised rock at intervals of 30 to 60 feet.

These quartz reefs occupy the main fissure channels and were formed from silica-rich solutions which emanated from the underlying granite intrusive - contemporaneously with the conversion of the limestone into the lime silicates, actinolite, hornstone, and diopside. The crystalline garnet and thebismuth ores were formed and deposited at a later stage.

The following is a section of the footwall bodies exposed near the workings;-

1. quartz reef, 20 feet wide;
2. actinolite and hornstone with veinlets of quartz, 12 feet wide;
3. yellowish-grey massive crystalline garnet, 8 feet;
4. mineralised granular garnet (now decomposed and gossanous) containing ores of bismuth, 30 feet wide;
5. Actinolite and vein quartz in garnet;
6. ordinary grey garnet veined with quartz.

What appears to be the north-western continuation of the main ore-body (4) is a large pyritic body 60 feet wide in the bed of Lea River. This ore-body contains iron, zinc, and copper sulphides and in addition a little bismuth. A sample taken from the River east of quartz bar by R. Magee contained 8.65 per cent bismuth.

It was not examined by the writer.

Everywhere the bismuth ore is associated with red crystallised garnet, the ore filling interstices between crystals. It, however, occurs also in the forms of blebs and veinlets in massive garnet.

A common associate of the ore is magnetite which is usually found in fine crystal aggregates, sometimes in very large bodies; and occasionally in irregular veins.

Samples of stone yielded:-

from western wall country - nil
"the creek near the waterhole - a trace.

The ore and their natures.

The following ores of bismuth are present in these ore-bodies;

1. native Bismuth;
2. Bismuthenite, sulphide of bismuth;
3. Bismuthite, hydrous carbonate of bismuth;
4. Bismite, oxide of bismuth.

1. Native bismuth is found in blebs abd short veinlets from a thin film to ¼ inch in width. It contains a high proportion of gold and therefore, closely approaches the composition of the mineral maldonite.

2. Bismuthenite, in thick bladed form as a rule, rarely acicular is the commonest and the most important ore of bismuth. It is a primary mineral but readily undergoes change to the oxide and carbonate compounds. In its untarnished condition it is of lead grey colour and of metallic lustre, and it is very brittle. Here the ore contains a high proportion of gold as shown in the following analysis of a concentrated sample:-

Bismuth	54 per cent
Gold	in the proportion of 27 oz. 12 dwt. per ton of ore.

3. Bismutite, an amorphous mineral found as blebs and coatings and sometimes in more massive particles around a bismuthenite nucleus is commonly found in the oxidised portions of the ore-bodies.

4. Bismite is found as a yellowish white coating and is of secondary origin.

In almost all cases the gold content is bound up with the bismuth mineral; as an alloy with native bismuth, and in unknown form in bismuthenite. But specimens have been found showing gold attached to bismuthenite. Very little free gold is found here. (It is interesting to record here that R. Magee found that the gold of the Black Bluff veins was shed from bismuthenite after the oxidation of that ore, and he suggests that the Stormont gold was similarly derived. It will be remembered that the operators at Stormont reported the occurrence of galena which might have been mistaken for bismuthenite.

The ore-bodies and their development.

Main ore-body is exposed at several points along its course in trenches and an adit. At Castle Creek near the waterfall it is exposed in a deep trench ~~where it is exposed in a deep trench~~ where it is completely oxidised and has a gassanous appearance. The materials of the ore-body are broken and detached and this give rise to the idea that they are detrital; but they are in place and occupy the original fissure. How far below this point oxidation extends is not known but it is likely to continue to the level of the base of the waterfall because the channel is an open one. In the oxidised parts of this ore-body very little of the primary bismuthenite and native bismuth remains, those minerals having been oxidised to bismite and bismutite and a little gold set free in the process. In the adit a little to the south-east the body is open for closer inspection. Here near the mouth is massive and crystalline garnet containing bismuthenite and native bismuth. A grab sample taken by R. Magee yielded.

Gold at	19 dwt. per ton
Bismuth	2½ per cent
Tin	0.2 per cent

and a little lead and silver, and molybdenum. The oxidised portion of the ore-body about 15 feet wide, ends abruptly against a highly inclined hanging-wall of lime silicate rock. In this the proportion of bismuth is much lower, likely due to dissolution and migration of the solutions. It may be stated here that the oxidised parts are directly along the line of fissuring. This body is again exposed in a trench beyond the end of the adit, and in a creek bed on the north side of the track about five chains away. At this point it is highly pyritic. Samples taken at random from the oxidised material at the end of the adit contained:-

bismuth 2.16 per cent

and the one from the pyritic body in the creek bed near the track showed a trace only.

Nine chains south-east of main lode and on the northern or hanging-wall side of the quartz reef is another outcrop of crystalline and crystallised garnet carrying bismuthenite and bismite. Only one shot has been fired in this body, but it appears to be one of promise and is worthy of close attention. The effects of oxidation are not in striking evidence. Here filaments of bismuthenite fill interstices between individual crystals of red garnet and blebs appear in the yellowish-green massive variety of that gangue mineral. Coatings of bismite on joint planes are the only evidence of oxidation. Actinolite is a prominent accessory component of the garnet rock.

This body courses in a north-westerly direction t towards Alford's cut near the waterfall where another similar body isbeing opened for examination.

About 13 chains from the falls along the course of Castle Creek is a large body of magnetite as yet unexplored. Nearby small tributaries of Castle Creek yield a little find gold, and a little farther upstream another ore-body is known.

Between magnetite and main ore-bodies a little gold and bismuthernite has been found in the detritus on the hillside. The source of these minerals is not known, but likely they have been shed from another and parallel formation.

Twenty five chains distant down the valley of Lea River is another group of lodes. These are quartz chalcopyrite bodies of little apparent commercial value. The following analysis represents the content of a sample selected by R. Magee:-

Gold	Nil
Silver	17 oz. 1 dwt. per ton
Copper	7.27 per cent.

In the first place it should be noted that the ore-bodies are large and extensive and in bulk are not likely to be rich, but the ores are of very high market value and the native and sulphuric ores can be concentrated at low cost by oil flotation processes. The conditions for exploration and development are favourable and the prospects certainly justify the decision of the syndicate to expend money on such works to ascertain the actual value of the deposits.

If later developments are such as to warrant the opening of a mine and the erection of treatment works it will be found that every facility is naturally provided. The ore-bodies can be attacked at depth of 150 feet in a very short distance, and an ample supply of water is available both for power and treatment purposes. Although those facts are recorded it must be understood that a great amount of work is necessary before consideration need be given to such works.

Establish first a very large reserve of ore, ascertain its bulk value, and determine whether it can be mined and treated at a high profit. To this end the advice of the engineer, R. Magee, should be accepted and followed for few are more capable than he to undertake the work of development.

Sgd. A.W.McIntosh Reid

DIRECTOR OF MINES.

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