

PLUMMER'S WORKINGS (LAYHOE SYNDICATE), ROSSARDENINTRODUCTION:

Plummer's workings are situated on the western side of Storey's Creek and 50 chains to the west of the township of Rossarden. Access is gained by motor road (14 miles in length) from Avoca on the Conara-St. Marys railway.

Two leases, each of 40 acres, are held in the name of Victor Evans, but it is stated that the workings are owned by a syndicate - The Layhoe Syndicate. The leases are 48M/38 and 49M/38 and the principal workings are situated on the latter lease.

The workings have been carried out to test tin deposits and a very limited production has taken place. The specific object of the investigation was to examine a crosscut at a depth of 50 feet but owing to the workings containing water, it was not possible to achieve this objective. The opportunity was taken to survey and examine the surface workings and to make a reconnaissance of the vicinity.

PREVIOUS REPORTS AND HISTORY:

Tasmania and Tiger Creek flow through the leases and were worked for alluvial tin ore many years ago (leases were held prior to 1892), but there are no records of the workings or of the production.

The ground containing the principal lode workings does not appear to have been leased until 1928, but the discovery of the tin lodes was probably made a few years earlier. The first lease (10393/M) was held in the name of J.S. Goodall. Work was carried out by Goodall and a small amount of ore produced about 1926 from what is now the Main or No. 4 shaft.

About the same time, an adjoining lease (10345/M) to the north-west was taken up by E. Phillips, W.P. and M.A. Flaherty and the workings are now known as Flaherty's.

The present leases were taken up in 1938 and additional work was conducted on 49M/38.

The only published report is contained in Geological Survey Bulletin No. 40 - 1929. Avoca Mineral District - A. McIntosh Reid and Q.J. Henderson. (pp. 48-50).

GENERAL GEOLOGY:

The oldest rocks are the quartzite, slates &c. of the Cambro-Ordovician system. They have been highly folded, but lack of sufficient exposures prevents the detailed structure being determined. In general, the rocks strike at 330° to 340° and dip to the north-east at high angles (70° to 80°). These rocks occupy the north-eastern portion of the leases

The quartzites &c. intruded by granite. On the leases, the contact is a fairly straight line and there is no direct evidence of intrusion. In the workings, however, narrow vein-lets of granitic and aplitic material are found traversing the quartzites &c. The granite occupies the south-western portion of the leases.

On the southern part of lease 49M/38, a few outcrops and numerous boulders of conglomerates and grits occur. These probably represent the basal bed of the Permo-Carboniferous system and are present as a thin layer overlying the quartzites and the granite. The maximum thickness of the layer is about 40 feet but, in most places, the thickness probably does not exceed 5 to 10 feet.

On the southern portion of 48M/38, extremely friable and thin-bedded shales are exposed in a few places. These shales are probably part of the Permo-Carboniferous system, but their exact relations with the conglomerates could not be determined.

On the western side of Tiger Creek and particularly on the northern side of Tasmania Creek, there are extensive flats which suggest detrital and alluvial terraces above, and related to, the creeks. It is possible that the detrital and alluvial deposits on them cover Permo-Carboniferous rocks in, at least some parts.

ECONOMIC GEOLOGY:

The mineral deposits are those of tin and both alluvial and lode deposits have been worked on a very small scale. The tin-bearing mineral is cassiterite.

Alluvial deposits were worked in Tiger Creek and possibly also in Tasmania Creek. They were shallow and narrow and generally confined to the bed and to the banks immediately adjacent to the creek.

On the two leases, the tin lodes occur only in the quartzites etc. To the south of the leases, primary tin deposits occur in the granite, but none has, so far, been found in the granite on the leases.

The lodes occur in a zone generally parallel to, and situated 500 to 700 feet north-east of, the contact of the granite and the quartzites etc.

The workings on lease 49M/38 provide the best means of determining the nature of the lodes. In strike and dip, the lodes conform to the bedding of the containing rocks. The lodes consist of country rocks replaced to a very slight extent by cassiterite, quartz, tourmaline etc. The amount of quartz is extremely small and the replacement has been largely by cassiterite with little or no association of other minerals. The result has been that nearly pure cassiterite has been mined in small quantities in a few places. All this type of ore has been removed from the existing workings and none is available for inspection and description. In other places, the replacement has been much less complete and only a small amount of cassiterite is present in the rocks. Dark lines characterise some of these places and is probably due to extremely fine-grained tourmaline and associated minerals.

The lodes as described above appear as replacements of soft quartzites (the softness is due to either mineralisation, weathering or their clayey content), slates and perhaps tuffs and other rocks. In addition, there is another type of mineralisation which consists of small irregular bodies and veinlets of white quartz in hard glassy quartzites. This quartz mineralisation occurs, in some places, adjacent to the lodes, and in others, on their general line of extension, but appears to contain little or no cassiterite.

Little can be seen of the lode formations on lease 48M/38, but they appear to be in the extension of the zone from 49M/38 and of the same general character.

The formation of the lodes was associated with the granitic intrusions. The parallelism of the zone to the granite contact probably has structural significance (additional to that due to the bedding of the rocks). The system of lodes on McDonald's lease (1M/38) probably represents a parallel zone.

THE LODES AND WORKINGS:

The principal workings are on 49M/38, but there are four groups of workings on 48M/38. Each group, and the lodes in them, will be described separately.

(1) Plummer's Workings:

These workings are situated in the north central part of lease 49M/38. They consist of numerous trenches across the lines of lode, deep trenches and shallow open cuts along the lodes, and three shafts. The deepest working is the Main or No. 4 shaft which is 50 feet deep and has, it is stated, a crosscut 75 feet long driven eastwards from it.

These workings have revealed five lines of lode which have been numbered from 1 to 5 from east to west. No. 5 lode has been cut in only one place, but the other lines have been cut on the surface in a number of places. Many of the deeper workings contain water, and other workings have been partly or wholly filled with waste rock. In spite of the number of workings, the opportunities for examining the lodes are, therefore, restricted. Moreover, even where the workings can be examined, the shoots of tin ore have been mined and little or no ore remains to be seen. A brief description of the lodes is given in Bulletin No. 40, p. 48-49.

(a) No. 1 Lode:

This line has been exposed at intervals along a length of 230 feet. The various exposures indicate that the general strike is 327° and the dip is high to the east. The deepest working is an 18-foot shaft with a southerly drive from it (the drive could not be entered). An inclined open-cut connects with the northern side of the shaft and about 10 tons of ore were taken from this working. To the south of the shaft, a long trench has been put along the lode and branch excavations on the western side appear to have cut a parallel formation. The workings are 2 to 3 feet wide and, in general, the width of the lode formation appears to be similar.

The only place where a sample could be taken was at a depth of 12 feet on the southern side of the shaft. The sample was across 30 inches and yielded, on assay, a "nil" return of tin.

About 10 tons of ore from the shaft were included in a parcel of 29.5 tons treated at Mathinna.

(b) No. 2 Lode:

This lode has been cut in one, or possibly two, places. A shaft has been sunk to 14 feet, and an open cut extended to the south along the lode, but the cut is partly filled. It is stated that the lode was cut in a trench 100 feet to the south, but a few veinlets of quartz in quartzite are the only indication.

At the shaft workings, the lode has a strike of 323° and the walls dip high to the east. The walls are 2 feet apart.

The conditions were not convenient for sampling and no samples could be taken. About 0.75 tons of ore were included in the parcel of 29.5 tons sent to Mathinna.

If, as stated by the operators, three lodes were cut in the crosscut from the Main shaft, it is possible that the easternmost was the No. 2 lode.

(c) No. 3 Lode:

This lode has been cut at not more than four places within a length of 170 feet. In this section, the lode has a general strike of 333° and dips easterly at a high angle. The veinlets of quartz in a trench 80 feet to the south are considered to be the extension of this lode but are somewhat off the line (there may, however, be a slight change of strike such as exists in the No. 4 lode).

The main working is an irregular open cut, 30 feet long, along the lode, and 14 feet deep at its deepest part. Most of the cut is 2 to 3 feet wide, but, for a portion of its length, it has a width of about 5 feet with tin ore over most of that width. A sample taken at a depth of 6 feet and taken across 54 inches (24 inches at the southern face and 30 inches across the bulge to the east, gave, on assay, a result of 0.42 per cent of metallic tin. About 0.75 tons were included in the 29.5 tons sent to Mathinna.

It is stated that this lode was cut in the crosscut from the Main shaft, but it was not possible to enter the crosscut to determine if such was the case.

(d) No. 4 Lode:

This line has been cut at numerous places within a length of 500 feet. The northern half has a strike of 333° and the southern half a strike of 322° (a corresponding change occurred in the case of No. 3 lode.) The dip is high to the east.

The most important working is an open cut at the northern end of the line. It is 60 feet long and 4 to 7 feet wide. It is mainly in-filled with rock, but is stated to have been stoped to a depth of 15 feet at its northern end. Fifteen tons of ore from this cut were included in the parcel of 29.5 tons

treated at Mathinna. The Main shaft was sunk to a depth of 6 to 8 feet on the No. 4 lode, but then followed a west-dipping wall, the total depth being, it is stated, 67 feet. A crosscut was driven 75 feet eastwards from a depth of approximately 50 feet and cut, it is stated, the No. 4 and two other lodes.

Judging by the workings, the width of the lode ranged from 24 to 60 inches. The only place suitable for sampling was at the southern end of the open cut. At a depth of 4 feet, a sample across 42 inches yielded, on assay, a result of 0.45 per cent of tin (metallic).

- (e) No. 5 Lode: This lode has been cut at one place only. The lode is stated to occur against an easterly dipping footwall, and irregular bodies of quartz are present in glassy quartzites about 5 feet to the west of the wall.

(2) Workings between Tiger and Tasmania Creeks:

These creeks join in the south-eastern portion of 48M/38 and, in the angle between them, there are two old trenches and a vertical shaft (filled with water to within 25 feet of the surface. Quartzites occur on the dumps and the only indication of any lode is the presence of quartz veins in silicified quartzites. There is no record of the workings or of any production therefrom.

(3) Flaherty's Workings:

These are situated on the northern side of Tasmania Creek and in the south-eastern portion of 48M/38. They consist of four long and deep trenches sub-parallel to one another and within a distance of 100 feet. They have partly fallen in and examination is hindered. The trenches probably suggest a lode or lodes striking at 335° , which is similar to the prevailing strikes at Plummer's workings. Nothing can be seen of the lodes and the only indications of mineralisation are the narrow veinlets of quartz in quartzites. The workings exist in any extension of the zone north-westwards from Plummer's workings.

Reference is made in Bulletin No. 40, pp. 49-50, to the lodes and workings, but there is no record of any production.

(4) Shaft in North-Western Portion of 48M/38:

A shaft was recently sunk apparently to intersect either the north-westerly continuation of the zone from Plummer's workings or the southern extension of the lode from Jarman's workings. It was sunk in a depression in the hillside and passed through 10 feet of detritus and soil without reaching bedrock.

(5) Jarman's Workings:

On the southern portion of 12M/39, there are five recently-dug trenches within a length of 150 feet. The trenches are east-west ones and appear to indicate a lode with a general north-south strike. The formation consists of white altered quartzites with brown iron-stained and some quartz veinlets. In the centre trench a small excavation has been made under a wall dipping westerly at 40° .

South of the above and probably on 48M/38 there is an old trench about 60 feet long, but now partly in-filled.

The lode in Jarman's workings probably occurs in any north-westerly extension of the zone from Plummer's workings but its strike may differ slightly from that of the zone and the other lodes therein.

PRODUCTION AND GRADE:

Plummer's Workings:

It is stated that, in the upper 12 feet of the Main shaft, Goodall struck a small body of good ore and that about 2.7 tons yielded, after being knapped, burnt, and hand-crushed, about 7.5 cwt. of cassiterite. This would represent a grade of 14 per cent of tin oxide. There are no recent records of similar high-grade bodies.

In recent years, 29.5 tons of ore taken from the four places referred to above, and including, also, 5 tons of reject ore from the dump of the Main shaft, were treated at Mathinna, and are stated to have yielded 4.5 bags of concentrates which assayed 55 to 56 per cent of tin (metallic). This would give an average grade of 0.4 per cent tin (metallic). The grade of the ore was probably lowered by the reject ore said to have been included in it, but, on the other hand, the 24.5 tons probably came from the places where the highest grade ore was known to exist. In a general way, the grade may, therefore, represent the grade of those portions of the lodes from which ore has been taken. It agrees, generally, with the assays of two of the samples (0.42 and 0.45). In the working from which the third sample was taken, the ore of the above grade was probably completely removed by mining.

CONCLUSIONS:

A mineralised zone containing tin lodes trends through leases 49M/38 and 48M/38 with a general bearing of 330° to 340°. Workings exist at five places within this zone, but the workings are more extensive at the south-eastern end (Plummer's workings) and some five lodes have been exposed in the latter.

In Plummer's workings, the mineralisation along each line is, generally, restricted to widths of 18 to 30 inches, but in a few places may attain a width of 54 inches. The lode material consists of slightly altered country rocks (quartzites, slates, tuffs &c.) with little or no quartz or associated minerals. In one or two places, very small but high-grade bodies of cassiterite have been found, but the most notable only yielded about 2.7 tons of ore. Recently, 29.5 tons of ore were treated and the calculated average grade is about 0.4 per cent tin (metallic). Facilities do not exist for extensive sampling (due to some workings being filled with waste rock and to others containing water) and of three samples taken two gave results of 0.42 and 0.45 per cent tin (metallic), that the average grade of the ore (apart from small bonanzas) so far exposed (and most of which has been mined) may be about 0.4 per cent tin (metallic). It would appear that ore of this grade has been exposed in only a few places in the lodes.

The Main shaft and crosscut can be considered as the first steps to test and develop the lodes underground. Although two visits were paid to the workings, the crosscut had not been unwatered by the operators on either occasion. Nothing can, therefore, be said to the results of such work.

The necessary steps to determine the value of the mine are:-

- (1) To remove all waste rock and water from the existing workings.
- (2) To undertake a systematic sampling campaign of the workings.
- (3) To prepare an assay plan of the lodes.
- (4) To determine what additional work, if any, is warranted as a result of the first three steps.

If additional work is justified it should consist of surface trenching and underground work. The underground work should be shaft-sinking, cross-cutting and driving at shallow depths (50 to 100 feet). Drilling is not favoured because the lodes would not be readily detected and because the tin values are erratic, so that the information to be obtained from the drill holes might not be of much use.

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