

SUPPLEMENTARY REPORT ON SOME MINES IN MT. FARRELL DISTRICTGeneral Statement

The following report is the result of a short visit of inspection to the mines at the southern end of Mt. Farrell Field. All of these properties had been examined either by L. K. Ward or the writer some years ago, little work has been performed since. This report therefore can be regarded only as supplementary to existing reports, giving the latest information. The lodes on these properties have been developed for their lead and zinc ore contents no thought having been given to their possibilities as repositories of tin ore. On this visit the writer found indications of tin ore as a component of some lodes and is in association with arsenical pyrites. It is doubtful however whether these deposits of tin ore will become of commercial importance, although they are worthy of further investigation.

Geologic Relations

The rocks of the area consist of igneous and sedimentary types. The former although of diverse kinds belong to one series and are apparently of later age than the slates and quartzites with which they are closely associated.

They are represented by granites, syenites, quartz porphyries, felspar porphyries, felsites, keratophyres, etc. - intrusive and effusive types.

Crustal movement has been responsible for the formation of the schistose structure of these rocks.

In the sedimentary rocks in particular the ore bodies are found. A few are contained in the igneous, but they are not as extensive. In the slate country a fracture zone has been formed with resultant displacement and later differential movement of walls one upon another.

This fracture zone by infilling of minerals has become the main line of lode of the district.

The lodes, veins, and "reefs" course in a general east of north direction and dip westward at angles of 55° to 70°. They vary in direction from N 7° E to N 20° E., the longest unbroken bodies trending close to the 7-degree strike in conformity with that of the containing slates. Many split and coalesce along their strike and dip; all are supported by well-defined slickensided walls. In some sections of wall-breccia the cementing material is composed almost wholly of metallic ores.

The Structure of the Lodes

The interpretation of the formation of the lodes of Mt. Farrell district depends largely upon the relative ages of the quartz and the lead ores. The determination of this is not difficult for there is ample evidence at many points and of many natures to prove that the lead veins are of later age than the quartz reefs with which they are in many places closely associated.

First, it may be pointed out that the lead ores of the Sterling - Mt. Farrell District are found generally in association with these "reefs" of barren quartz which are contained in a narrow belt of slate and which extend almost unbroken about five miles. On the hanging-wall side of these quartz reefs, which are from 10 to 25 feet wide, is a one to two-foot band of quartz - arsenopyrite containing tin ore, certainly of later age than the barren main body of quartz, and certainly older than the lead zinc ores found in other sections of that body. The quartz-arsenopyrite-cassiterite vein matter is the filling of a later fissure developed along the former plane of weakness parallel to and coincident with the quartz reef. It follows that the quartz reef is definitely older than the metallic ores, and that only where refissuring and infilling has taken place are the metallic ores to be found. Further evidence is obtainable in support of this at the North Mt. Farrell, Mt. Farrell and South Mt. Farrell mines, where the quartz reefs are veined and traversed by lead and zinc ores. In many places, as at Mt. Farrell Mine for instance, large vughs in the quartz are filled with galena and siderite; in other places empty vughs lined with crystallised quartz are found. Again, where galena is, siderite is present also and where the quartz is not veined with galena-siderite ore it is quite barren.

Summarising where the large quartz "reefs" have been reopened metallic ores may be found, where not the reefs are barren. The prospect, therefore, of finding ores of lead and tin below the quartz is not favourable, only where these reefs have been disrupted should the search be continued.

Types and natures of ore-deposits:-

The main types of lodes represented are:-

1. Pyrite-sphalerite - galena - siderite;
2. Quartz "reefs"
3. Arsenopyrite - quartz - cassiterite.

1. Pyrite - Sphalerite - Galena ore bodies

This is the prevailing type - excepting the so-called "reefs" of quartz - and the one at present the most productive. The ore minerals are argentiferous galena and sphalerite, siderite quartz, and pyrite. In some parts banded structure is well-formed - in others it is imperfect and the ore minerals are commingled or sprinkled through the quartz and siderite gangue the relative proportions of which vary from point to point. Everywhere the ore minerals are coarsely crystalline.

2. Quartz Reefs

Well defined barren bodies of quartz extend from one end of the field to the other. They occupy the main fracture plane and are strikingly evident to the casual observer.

3. Arsenopyrite - quartz - cassiterite

Abutting or close to the quartz reefs on either the hanging-wall or the footwall side are shoots of ore of this class. Arsenopyrite is the dominant ore mineral. In addition to cassiterite pyrite and chalcopyrite are found and a little fluorspar has been observed as an accessory gangue mineral in the quartz which is hard and dense as a rule but occasional geodes are seen.

The Mines and Prospects - Finn's Prospect

Between Thomas Blacks and Sterling Valley Mines a massive body of quartz of great extent outcrops in the low buttongrass country. The "reef" is contained in a belt of slate and enclosed narrow bands of porphyroid. It has been cut through at widely separated points by a number of deep trenches. In one of the south trenches the body is 8 feet 6 inches in width and consists of 5 feet of white opaque quartz with bbs and veinlets of pyrite on the footwall side, and 6 inches of soft slate, 12 inches of arsenopyrite, pyrite, chalcopyrite and quartz on the hanging-wall. A sample of the arsenical ore submitted by the prospector for assay contained:

Arsenic	17 per cent
Gold	7 grn. per ton
Silver	5 dwt. per ton

A sample taken by the writer was assayed for tin and arsenic and yielded.

Tin	0.35 per cent
Arsenic	9.50" "

This is the first recorded discovery of tin in Mt. Farrell District. The presence of tin was indicated by the finding of fluorspar as an accessory ingredient of the lode matter. Twenty chains farther north a deep trench exposes a massive quartz body 25 feet in width. The arsenic band on the hanging-wall side of this body has not been cut.

The large quartz body crops here and there 30 chains still farther on to another knob where a hole has been sunk on the footwall side in dense quartz-arsenopyrite in which pyrite in bbs and bunches, and veinlets is distributed. About a chain ahead another trench exposes the body in great width where it contains abundant pyrite and a little arsenopyrite.

The quartz reef is almost completely barren of galena and tin ore is found in it only where reopening of the plane of weakness has provided a later channel of access for mineral bearing solutions. Further investigations of the arsenopyrite sections of the ore bodies is advised in order to ascertain the proportion of tin ore in other parts of the body. The tests made show that at the points examined the ore is not of commercial value, but at other points richer ore may be found. Attention should be given to both sides of the barren quartz reef.

South Farrell Mine

This property is now held under lease by a Melbourne Syndicate and operations are in charge of A. W. Maggs of Tullah. The orebodies are opened in adits at different levels.

In the lowest adit, 130 feet in length, a 3 foot lode formation is exposed between two sharply marked slickensides walls of slate. The brecciated rock between the walls is cemented with galena, siderite and quartz with also a little sphalerite. Although the materials of the wall-breccia is disposed in all directions there is a tendency to banding where conditions are suitable. On the hanging wall is an 8-inch band of finely brecciated material cemented with galena, and on the footwall is a 1-inch band of selvage. Veinlets of galena are found on or close to both walls. At the end of the drive the walls are broken and the ore-body is split into two diverging bodies which, however, may coalesce at a point farther along the strike.

Intermediate Adit Level

At this level are the most extensive workings, which it may be stated here are reported to be 405 feet lower than the main adit of the North Mt. Farrell Mine. A crosscut on a bearing N. 7°E intersects them at their point of junction. The first mentioned, it is reported, has been exposed in a drive 1200 feet long not now accessible beyond 200 feet. This, the so-called "slide" drive, is on a brecciated slate body 3 feet wide, between two sharply defined walls. The interstices have been filled with quartz and galena. The quartz is found in irregular veins up to 6 inches in thickness and in large glocks 2 feet in diameter, and is definitely older than the galena, which has been deposited in short shoots where the walls have been reopened as a result of subsequent movement. The most productive shoot opened in this drive was close to a rise which connects with surface 200 feet above. Tributary Gabbedy and Woolf during the period 1910-1912 mined several parcels of ore from these shoots. An idea of the value of the ore may be obtained from the following statement:-

prill ore	contains	an average of	40%	lead	and	70 oz	silver	per ton.
hand-jigged ore	"	"	19%	"	70	"	"	"
coarse jig concentrate	"	"	56%	"	60-80oz.	"	"	"

The second mentioned body, coursing N 20°E and dipping westward is well exposed in the drive. About 60 feet from the junction is a 12-inch band of brecciated slate containing galena and siderite, and 60 feet farther north is a wide breccia-cemented body with quartz and siderite between two smooth walls. Quartz and siderite veins penetrate the walls, and galena-siderite ore fills fissures in the brecciated intervening body. Near and at the end of the drive is a 1½ inch vein of galena on the footwall. The brecciated rock here is so well compacted that little space remained for ore.

Upper Adit Level

A crosscut bearing S. 70°E intersects two small bodies before entering main lode, which courses N 17°E and dips westward. The north drive exposes a 4-foot body with 6-inch veins traversing it at right angles and all directions. In the end a 12-inch vein of almost barren quartz lies on the footwall. Very little galena is found in the body of the lode, but bunches of clean galena such as that cut at 50 feet are occasionally found. In the galena-sphalerite-siderite ore vein the quartz here and there penetrates the walls of the fissures. A cut 12 feet into the footwall country reveals a two foot band of brecciated rock with infillings of quartz, galena, sphalerite, and siderite resting on a smooth slickensided wall. On the hanging-wall side pyrite is abundant.

The foregoing is a brief description of the workings and the nature of the lode formations and of the ore contained in them. The fissures, though irregular in some respects, are confined to crush planes in the slate belt and conform in direction and dip to that of the rock. Two stages of deposition are in evidence, namely:

1. quartz
2. metallic minerals

The quartz infiltration took place first. Subsequent movement, bringing about a reopening of the fissures, provided restricted channels of access for the metal bearing solutions. Deposits of galena and sphalerite

sphalerite therefore are small and irregular, and near the places examined are not likely to improve in importance.

Thomas Blocks Mine

Three ore veins have been opened, two at main adit level, but none is of any present commercial importance where exposed. Main lode consists of galena, sphalerite (zinc blende), copper pyrites, and iron pyrites in a gangue of quartz, siderite and fluorspar the whole contained in altered quartz porphyry of Ordovician age. A little fahlore appears here and there along the course of the vein and being highly argentiferous adds greatly to the value of the admixed ores at those points.

The first exploratory work performed was the sinking of a shaft on the main lode at a point near a bend in the creek which flows through the section. In this shaft a 12-inch body containing galena, sphalerite, chalcopyrite, pyrite and a little fahlore in a band 4 to 6 inches wide was showing when development was discontinued owing to a heavy inflow of water. It was then decided to explore the ore-body by cross-cutting and driving by way of adit. The crosscut on a bearing S 75° E intersected the ore vein at 220 feet, and drives N.W. and S.E. opened the ore over 500 feet in length. North drive, on a bearing N 13° W exposes the ore 59 feet. Fourteen feet from the end a winze was sunk to a depth of 15 feet. There the lode channel is 3 feet wide, but the mixed ores are 6 to 10 inches only and are not of high average grade. A sample of the better grade ore contained -

Lead	28.84 per cent
Zinc	19.55 " "
Silver	15 oz. 0 dwt. 13 gr. per ton

South drive follows the lode (S. 20° E) 496 feet. It pinches and swells from 1 to 12 inches and is nowhere remarkably rich. A typical section from footwall to hangingwall is:

Quartz with sphalerite	1 inch
Galena and "	5 "
Pyrites & sphalerite and a little galena	2½ "
Quartz and sphalerite	1½ "

In some parts, the winze in particular, siderite is an abundant component, and chalcopyrite and fahlore are prominent. Banding is imperfect.

In the end of South drive the vein pinches to a narrow streak of sphalerite. The vein is contained between two slickensided walls.

A little underhand stoping and overhead stoping has been performed where the vein is widest, but the width varies on the dip as on the strike and the vein pinches in both places.

Three hundred feet from main crosscut an east cross cut intersects a parallel vein of ore (No. 2 lode) 1 to 6 inches wide. The ore is composed of galena and sphalerite in almost equal proportions. This body was not intersected in the extension of main crosscut, and no attempt has been made in any other part of the workings to explore it.

The veins are well defined, of long linear extent, but are very narrow and are contained in hard wavy porphyroids. Under existing conditions the mine is not of any commercial value and the indications for improvement are not encouraging.

The Sterling Valley Mine

The ore bodies on this property - which lies at the southern end of the field - were unearthed in 1911 by a party engaged in the cutting of a track between Tullah and Rosebery. In the following year a company was organised to develop the ore body and during that and the ensuing year two adits were driven and shaft sunk to a depth of 20 feet.

The vein is a fissure filling in sheared graphitic slate near its contact with wavy porphyroid. In general the ore body, which consists of quartz and later metallic minerals, has little regularity in this shattered country. Shoots 20 to 50 feet long separated by almost barren material recur at intervals in the drives for 250 feet. The fissure shows movement both prior and subsequent to the introduction of the quartz. First the wall rock suffered several deformation and brecciation, then the inter-wall fragments were cemented by quartz, and following the second major movement the shattered materials of the vein filling were re-cemented with galena, sphalerite, pyrite, arsenopyrite and quartz.

The average strike is 30 degrees E of N and the dip is at an angle of 73° eastward, though numerous marked local changes appear in the workings.

The ore body is composed of galena and sphalerite, with also in smaller proportion pyrite, arsenopyrite, siderite and chalcopyrite. These minerals are commonly found in a quartz gangue, filling fissures, vughs, or pores. Imperfect banding is noticeable where the metallic minerals deposits are widest. The galena is usually in shoots 20 to 50 feet long, in some places associated with sphalerite, but the latter is more frequently found in clean veins 2 to 6 inches wide and generally on the footwall side of the lode.

Since the previous investigation in 1918 a little development work has been performed by a Burnie Company. That Company continued the north drive, sank the shaft to 45 feet, and exposed the ore body north of the shaft in a number of trenches. Very little further information has been gained as a result of that work. It is useless to attempt development by adit, the shaft method only being worthy of consideration. After careful investigation it is thought that the prospects are such as to warrant the expenditure of a modest sum to sink the shaft to 90 feet and explore the ore body at that level.

One of the chief difficulties to be overcome is that of transport, but that can be dealt with after the development work has been performed.

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