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THE BON ACCORD - OWEN MEREDITH AREA

UR 1954/126-141

INTRODUCTION

A re-investigation of this long-since abandoned silver-lead area was commenced by the Department of Mines in November, 1953. Four properties, the Success, Owen Meredith, Bon Accord and Success Extended have been worked at times along what is apparently the one line of lode and extending for nearly a mile in a NNW direction. The four properties were worked in the period 1890 to 1893 or 1894 after which they were apparently abandoned. In about 1912 to 1917, the northern workings (Success Extended) were re-opened. No further work appears to have been done since the latter date so that the area has been abandoned for the past 27 years.

ACCESS

The area lies about two miles north-west of Renison Bell. It can be reached via the old Owen Meredith tramway which leaves the Zeehan - Renison Bell Road several hundred yards south of the overhead bridge over the Emu Bay Railway. From this point to the Owen Meredith shaft the distance is 3½ miles. By cutting over the Argent dam and intersecting the tramway, the distance can be reduced to 2½ miles. The tram is suitable only for foot or horse traffic and the area cannot be reached by vehicle. The track just described continues past the lode area to the Pieman River, 3½ miles beyond the shaft and thence a further eight miles to the abandoned Stanley Reward tin workings. At six miles from the Pieman on this track, a branch track of 1½ miles leads to the abandoned Mount Lindsay Tin Mine. The crossing of the Pieman River used to be effected by a suspension bridge. This is, however, of no further use all the decking having been washed away. A cage recently constructed for the P.W.D. at the site of the bridge cannot be used owing to poor construction.

An alternative route to the lode area is via the abandoned Dunkley Bros. timber tram from Zeehan. By this route, the lode area is approximately 18 miles from Zeehan. From about 1917 until the early 1920's a 2 ft gauge steam tram used this route to bring timber to Zeehan for milling. In the early 1930's the rails were removed from this tram and the formation is now much overgrown. It can now only be used for foot traffic. It cannot be used by horses as a number of bridges are down. The Owen Meredith tramway described above intersects Dunkley Bros. tram at Dunkleytown at a distance of two miles from the Argent dam. From Dunkleytown, the Owen Meredith tram is not used as Dunkley Bros. tram is better graded.

For present access, the route from Renison Bell is much to be recommended. Via this route the area is within 45 minutes walking distance from the road. Dunkley Bros. tramway is, however, a better formation and well graded and, were operations to be resumed in the area, the re-conditioning of this route for motor transport may well be investigated.

TOPOGRAPHY

Crimson Creek, the main drainage of the area, flows in an easterly direction and cuts through the lode in the vicinity of the Success and Owen Meredith workings. Just beyond this point, it turns sharply north for three quarters of a mile to empty into the Pieman River. Within the area covered by the present investigation, there are six small tributaries which flow into Crimson Creek. The northern portion of the area, the Success Extended and Bon Accord workings are located on the headwaters of the north-west-flowing Success Creek which empties into the Pieman some two miles downstream from the mouth of Crimson Creek. The latter creek and some of its tributaries are deeply incised and the banks are precipitous. The headwaters of Success Creek are less deeply incised and the country thereabouts is less steep. The maximum difference of elevation over the area covered i.e. between the level of Crimson Creek at the bridge and the divide between the Crimson and Success systems, is 220 feet.

The area is covered with primary rainforest consisting of myrtle, sassafras, leatherwood, some eucalypts and some good patches of blackwood and wattle. On the ridges, this type of vegetation is fairly open at ground level and easily traversed. Many of the blackwood areas have been cut out for milling timber and the resulting second growth of dogwood etc. is fairly dense. The stream valleys, particularly the upper more marshy areas are uniformly marked by patches of horizontal scrub which is most difficult to negotiate.

PREVIOUS LITERATURE

As far as can be ascertained, only two previous reports on the field have been made by officers of the Department of Mines:-

(1) In a report dated 20th May, 1893, on the "Progress of the Mineral Field in the County of Montagu" the Geological Surveyor, A. Montgomery, gives a fairly detailed account of the Success and Owen Meredith Mines and a briefer description of the Success Extended and Bon Accord.

(2) In a report dated 30th April, 1902, on "The Ore Deposits (other than those of Tin) of North Dundas" G.A. Waller gives some further information. In the case of this report also, the Success and Owen Meredith are covered in detail whilst brief reference is made to the others.

There appears to have been no report made on operations between 1912 and 1917 although production is recorded in the quarterly publication by the Department of Mines entitled "The Progress of the Mineral Industry in Tasmania".

HISTORY OF THE AREA

Activity in the area appears to have commenced during the early part of 1890. On 12th May of that year, two 80 acre sections were marked out by one Owen Meredith and numbered 2522/87M and 2523/87M. These were over the area subsequently covered by the Success and Owen Meredith Mines. It is assumed from this, though certainly not proved, that Owen Meredith was the original discoverer of this lode. Most of

the exploration and development work on these leases appears to have been done during the ensuing three years for the present extent of the workings, as far as can be ascertained, is similar to that described by Montgomery in 1893. According to Waller, tributors were working on these sections in 1894 or 1895.

At some indeterminable date the leases on these two sections became void. They were marked out again by A.D. Slige on 3rd Jan. 1899, by J.E. Robertson on 24th September, 1900, and by T. Knapp on 22nd January, 1903. On 27th February, 1904, they were transferred to the Tasmanian Smelting Company and consolidated as Special Lease No. 904M of 158 acres. After a number of transfers the lease was surrendered on 25th January, 1921. On 28th January, 1921 it was re-applied for under the number 8700M by the Public Trustee but the application was cancelled on 20th June, 1922. On the present Mineral Chart (North Dundas) the area is shown as No. 8700M of 158 acres. It does not appear to have been held under lease since 25th January, 1921.

On 11th August, 1890, some three months after the original pegging, Felix Burns and J.M. Robertson marked out an 80 acre section No. 2843/87M northwest and partly adjoining Owen Meredith's northern section. On 19th March, 1891 this was transferred to the Bon Accord Prospecting Association N.L. and the lease became void on 5th December, 1893. Montgomery reports that on his inspection early in 1893, no-one was at work on the property. The section was subsequently held by W.J. Graham as 2128/91M, by G.L. King as 1936/93M by T. Graham as 4537/93M and by L.F. Jones as 434M in each case the lease being allowed to lapse after two or three years. Finally, as 434M it was allowed to lapse on 8th December, 1903.

North of the Bon Accord lease, section No. 2912/87M was marked out by J.G.S. Fawns on 29th August, 1890 and transferred to the Success Extended Silver Mining Company N.L. on 21st April, 1891. This lease became void on the same day as did the Bon Accord viz. 5th December, 1893. It was subsequently held by R.R. Rusha as 21/93M, by T. Graham as 5080/93M and by L.F. Jones as 435M. The latest lease, No. 435M was allowed to lapse as from 8th December, 1903.

The areas of the Bon Accord and Success Extended workings were again marked out as 783M and 784M by J. Llewellyn on 10th December, 1903, transferred to E. Ryan on 1st February, 1910, and allowed to lapse on 3rd June, 1910.

On 13th June, 1910, E. Ryan and D. Smith marked out a 40 acre section No. 4899M which included the actual workings of the Bon Accord and Success Extended. During the ensuing several years, a considerable amount of work was done on the old Success Extended main adit. This is the latest mining work done in the area. This lease became void on 15th January, 1918, and the area has not been held under lease since. Lease No. 4899M is shown on the present North Dundas Mineral Chart and serves to locate the area.

In considering the reasons for the decline of production in the area, consideration must be given to the difficulties under which the early miners worked. At the time of the first discovery in 1890, there was no railway, no track into the area and the nearest

approach to the centre of Zeehan was a rough cart track to approximately the present site of the Argent Tunnel. Writing in 1893, Montgomery notes that:- "....there is nothing but a very bad pack track to the Mine (Owen Meredith)" Subsequent to this period and presumably between 1894 and 1902, the tram was put in to the Owen Meredith mine from the end of the cart track mentioned above, a distance of 4½ miles. According to Waller, this work was done by the tributors who took over the mine. The present Renison Bell Road between the top of the Argent Tunnel and the railway overbridge is mostly along the course of the old tramway formation. Even when the tramway was completed, the cost of transport to Zeehan must have been considerable. The ore had to be taken over 4½ miles of tramway, which climbs two hills, and then transported 7 miles to Zeehan by cart. Waller records that 406 tons of ore were moved by the tributors in this manner.

When the E.B.R. was constructed in about 1902, the tram journey was reduced to 3½ miles. It is uncertain, from available records, whether ore was shipped via the E.B.R. at this time.

A considerable amount of information regarding the later (1912-1917) workings has been given to the writer by Mr. A. Fairbairn of Zeehan who was employed at the Success Extended during most of this period. According to him, all the ore produced was transported via the tram and loaded on to the railway at a siding.

At this period Dunkley Bros. timber Tram was being constructed. This tram from Zeehan had been in existence for many years as far as the head of Crimson Creek. About 1912 onwards itwas surveyed through to the Pieman River by A.M. Reid and construction undertaken by the government. By 1917, construction had proceeded as far as Dunkleytown, ½ mile from the Owen Meredith shaft and 1 mile from the then operating workings. Mr. Fairbairn recalls clearly that the last shipment of ore from the Success Extended workings was transported by tram to Dunkleytown and sent via the new tram to Zeehan. This is the only parcel of ore sent out from the area over this route. Dunkley Bros. tram was eventually constructed a further 1½ miles beyond Dunkleytown and is within a quarter of a mile of the Owen Meredith shaft and half a mile from the Success Extended and Bon Accord workings. It is a matter for regret that, just about the time that good transport facilities were provided so close to the workings, mining operations should be abandoned.

After the close of operations in 1917, there appears to have been no further interest shown in the area until 1950. In that year, North Broken Hill Ltd. as part of its West Coast prospecting venture carried out limited investigation of the area and the nearby Murchison and Almora (Poseidon) prospects. The track from Renison Bell was cleared, and workings were identified and surveyed. With the collapse of the N.B.H. prospecting section, work on the area ceased. It is not known to the present writer just what the results of this survey were, but he is aware that the investigation was not complete at the time of its abandonment.

SCOPE OF PRESENT INVESTIGATION

It has been pointed out by the Director of Mines that, in the Zeehan Field, there are two series of lode fractures trending northeast and northwest and that concentrations of ore occur where these fractures intersect. On a much larger scale, northeast-trending

fractures occur in the vicinity of the present Montana Mine. If these fractures are produced northwards, they would be expected to appear in the vicinity of the Bon Accord-Owen Meredith lode which is along a north-west-trending fracture. By analogy with the Zeehan Field, therefore, it is probable that the latter area could be an area of intersecting fractures and thus probably a good mineral area.

Working on this premise, then, a regional survey of the whole area was instituted and is at present in progress. In addition to this, more detailed work has been undertaken in the vicinity of and north of the Montana Mine and over the Bon Accord-Owen Meredith lode area. This report deals with the latter area.

Work was commenced in the area in November, 1953, and proceeded until May, 1954. At the time of writing, the work is incomplete and the present report is to be considered as a progress report only. However, the general opinions arrived at are not likely to be altered significantly by later work.

Preliminary work involved the location and identification of workings. Concurrently with this, a start was made on the layout of a grid for geophysical traverses. Based on the figure of N 32° W as the bearing of the lode as per Waller's report, the originating point of the baseline was located some 175 feet west of the Owen Meredith shaft and the baseline cut on this bearing. As the location and mapping of workings proceeded, it was found that the bearing of the lode is variable from point to point but is generally N 35° W. As a result, as the baseline proceeds northwards it gradually converges towards the lode being, near the Bon Accord, only 50 feet to the west. Therefore, at this latter point, the baseline was stopped 200 feet to the west and taken forward from this point on a bearing of N 35°W. Arbitrary limits for the baseline were fixed as the intersection with Dunkley Bros. tramway in the south and the northernmost prospect workings in the north, the idea being that the line could be extended north and south if geophysical indications warranted. The total length of baseline is 5400 feet and, along this, traverses are spaced, as far as possible, at 100 feet intervals. In some cases as, for instance, at the crossing of Crimson Creek, the topography is such that the 100 ft intervals cannot be maintained. The traverses, at right angles to the baseline, are cut for 800 feet and pegged at 25 ft (horizontal) intervals. At 800 ft east, the east baseline is located paralleling the main baseline. The traverses are produced 190 feet east and west of the baselines and at these points east and west cable lines paralleling the baselines are provided. With certain other lines provided to complete the electrical loops, the total amount of line prepared is 91,000 feet or 17¼ miles.

The geophysical party from the Bureau of Mineral Resources, Geology and Geophysics commenced operations in the area during April, 1954. Magnetometer work was tried but, as it was found that it gave no results over the lode, it was abandoned. Self-potential electrical readings were completed over the whole area and electromagnetic (compensator) readings completed over the block from traverse BJ in the south to traverse N (excluding traverse F). These electromagnetic readings were taken with the cable on the west side only. The results of the geophysical survey work will later be the subject

of a report by the Bureau of Mineral Resources.

DESCRIPTION OF THE WORKINGS

It being 60 years since operations ceased in the area with the exception of those on the Success Extended Main Adit which ceased 37 years ago, it is now impossible to get into most of the workings. These notes are compiled, therefore, from the two previous reports supplemented by notes on observations from accessible workings and examination of dump heaps. Followed from south to north the workings are as follows:-

(1) Two Costeans - Vicinity BE 200

These are probably part of the Success workings and are prospects only. The southern, bearing N 32°W exposes a lode channel with the above bearing and dipping 60°E. The channel is 2' - 4' wide and is composed mainly of shattered black slate, slightly pyritised and carrying a silicified vein 4" wide. Fragments of silicified lode material containing some galena occur on the dump heap. Eighteen feet to the west, there is another lode outcrop approximately paralleling the first (N38°W and dip 65°E) The channel is two feet wide with individual mineralised veins 2" - 4" wide. Galena is visible in these veins.

The northern costean is 30 ft long on a bearing of N 18°E. At its western end it has exposed the cap of a lode. This consists of bright orange limonitic and siliceous material in places quite porous. The costean is not sufficiently deep to expose sulphides. The walls of the lode are not clearly developed. The approximate attitude is strike N 26°W and dip 70°E. These two costeans are apparently the workings referred to by G.A. Waller when he states:- "further south still (from Crimson Creek) the lode has been picked up in the bed of a small creek. A sample taken from the lode matter exposed here gave a return of 10.2 percent lead and 29 ounces of silver".

(2) Owen Meredith Shaft

This is located on the east side of the sharp bend in Crimson Creek, 175 feet east of the west base line and between traverses A and B. It is a matter for surprise that the collar is right at creek level. In fact, portion of Crimson Creek now flows through the shaft. The dimensions are 10' x 8'. As it is now quite inaceessible, the only information available is that contained in the old reports.

Montgomery states:- "The shaft was sunk 38 feet vertical at which depth is struck the lode and was then continued on the underlay for 70 feet, the inclined portion making an angle of about 45 degrees with the horizon. The shoot of ore was followed down in this shaft and was found to pitch somewhat to the southwards but proved to be very short. At the bottom level it seems to have died right out and been replaced by lode slate. At the 38 ft level a short drive has been made on the lode but it is poor: on the hanging wall there is about 18 inches of quartzose ore and then from 2 to 3 feet of broken country and carbonate of iron. In this shoot, as in the ore further north, the hanging wall

rib of the lode appears to carry the most of the ore. A little fahl ore was found with the galena in these workings in addition to the minerals above mentioned".

Somewhat different figures and details are given by Waller writing in 1902. It is evident from his report that he did not personally inspect the shaft workings probably because they were, even then, inaccessible. He states that:- "The shaft cut the lode 50 feet from the surface and from this point it was continued on the underlay for a further distance of 40 feet. This 40 feet is said to have been all good ore. From the bottom of the shaft, the lode was driven on 150 feet north and from 50 to 60 feet south. Above these levels some stoping was done and, altogether, 405 tons 17 cwt of ore was won. The assay values of the parcels varied from 4 to 41 per cent lead and from 32 to 550 ounces of silver. The majority of the parcels, however, contained 15 to 30 per cent lead and 60 to 110 ounces of silver".

In view of the discrepancies in the figures given, it is rather difficult at this stage to decide just what are the actual dimensions of the workings. It can be taken, however, that the shaft is approximately 100 feet deep, partly vertical and partly on the underlay and that some driving was undertaken. The figures for quantity and value can be taken at their face value.

(3) Owen Meredith Adit Drive

The entrance to this drive is located at creek level on the south bank of Crimson Creek some 35 feet upstream from the shaft. It is now two thirds silted up and quite inaccessible. The rock at the entrance is ironstained weathered grey slate containing a 2" vein of ironstained pug. Specimens on the dump heap consist of black slate containing lenses and veins of calcite and siderite impregnated with pyrite and galena. Montgomery states:- "From the creek, a drive has been put in along the lode for 470 feet to the southwards but, in all that distance, it has been rather poor though there is encouragement in the fact that some shoots of nice ore were met with and these seemed to be getting better going downwards. Above the tunnel level the lode soon becomes oxidised and barren so it is quite possible that the drive is just a little too high to strike the ore. The walls of the lode are very distinct and often slickensided and striated and the lode matter is quartz galena, siderite, iron and copper pyrites, occasional stibnite and arsenical pyrites. Native silver is not uncommon in the galena". Waller variously reports the length of the drive as "470 feet" and "about 600 feet". He went into the drive some distance until stopped by a fall of earth. He reports that the drive is timbered most of the way but "in one or two places where the walls were exposed, I saw some galena in the stone".

(4) Small Cut at B 150

This is 15 feet long on a bearing of N 66°W. The lode is exposed over a distance of ten feet but the actual attitude is not determinable. The lode matter is partly oxidised and consists of limonite, quartz, galena and pyrite together with shattered grey slate.

(5) Adit South of C 175

This is 78 feet long on a bearing of S 59° W. Just north of the portal there is an exposure of the lode 9" - 12" wide, well mineralised with galena and pyrite. Both foot and hanging walls are slate. The attitude of the lode is N 46° W with a dip of 60° NE. Within the adit, no lode is revealed. The first 20 feet consists of weathered grey slate at S 45° E and 50° NE followed by more compact material of the same type. Some black slate occurs at the end of the adit and there is a seepage of limonitic water near the face. This adit has fairly obviously been driven in search of a parallel lode.

Describing this adit, Montgomery notes that the lode appears at the entrance "It consists of 6 to 8 inches of siliceous galena on the hanging wall resting on a smooth polished and striated wall. Under this, there is about 6 inches of poorer ore and then about 2 feet to 4 feet of broken country with carbonate of iron and a little ore. The rich vein on the hanging wall dips right under the creek. The false wall on which it rests is strongly slickensided being very smooth, almost polished in parts, and distinctly striated: the striae dip southwards at about 60°".

(6) Adit North of C 175

This is 30 feet long on a bearing of S 63° W. The lode was intersected and driven on 20 feet north and 12 feet south. The lode bears N 55° W and dips 55° NE. It is very poor and no stoping has been done. Waller took a bulk sample across 15 feet of lode matter here for a return of 2.3% lead and 21 oz. silver.

(7) Adit at E 225

This is driven 126 feet on a bearing of S 73° W. At 60 feet the lode channel was intersected and driven on 138 feet south. At the end of this drive there is a winze of unknown depth. The lode channel bears N 30° W and dips 53° E. It is one to three feet wide with 4 inches of pug on the hanging wall. The latter is smooth and well developed. There is no stoping.

Of this drive, Montgomery reports:- "A lode 2 ft to 6 ft wide was followed but was poor. The distinct hanging wall rib, is however, still visible though not rich.

(8) Trench at 250 Between Traverses D and E

This is a surface cut along the course of the lode on the steep west bank of Crimson Creek, the total length of cut being 100 feet and of varying depth. The lode here bears N 33° W and dips 56° E. The maximum exposed width is 4 feet and in places the lode is well mineralised. Good specimens of galena have been obtained from the dump-heaps. It should be noted, however, that in the drive along the lode beneath the cut (see 7 above) the lode is poor.

(9) Stope Between F 175 and G 200

This occurs above an adit commenced from the small stream at about G 200. The total length of open stope is 89 feet. The bearing of the lode is N 32° W and the dip 62° E. The average width of stope is four feet and the maximum backs obtained were of the order of 45 feet. Both hanging and foot walls are clearly defined, the hanging wall country being jointed grey argillite. From the fact

that the ore has been stoped out from the adit level to the surface along the whole length of the adit, it is assumed that this must have been a patch of good ore. Observations have been taken from the surface only as the entrance to the adit is inaccessible. It is not known therefore whether any ore was extracted below the adit level or, alternatively, whether it still exists underfoot.

A further point should be made with regard to these workings. On the plan, the lode appears to have a different orientation to and to be ofset with regard to that exposed in the adit from E 275. This is due to the difference in elevation. When both are reduced to the one level, it can be seen that the lodes in the two adits mentioned lie along the same course and are, in fact, the one line of lode.

(10) Cut South of F 150

In this small cut 18 feet long and bearing about east-west, the lode is exposed on the flank of the hill and bears N 25° W.Looking at the south wall of the cut, the hanging wall only is revealed, the cut not having penetrated far enough to expose the foot wall. The actual width of lode is a minimum of four feet. Near the top (west) end of the cut the hanging wall has a dip of 56° E. At the bottom (east) end the dip is 42° E. There is, therefore, over this short distance a distinct "roll" in the lode. As the general dip of the surface is in the vicinity of 45° E, it is probable that portion of the lode has been removed by erosion and that the lode re-appears at a lower level on the surface in the trench described under (8) above.

The workings so far described appear to constitute those of the Success and Owen Meredith leases. For the next 1300 feet along the assumed course of the lode, there is no sign of any surface or underground workings. Beyond this latter point (vicinity of traverse V) there commences a series of trenches which are probably part of the Bon Accord workings. With reference to these latter workings, Montgomery is very brief and his remarks are quoted in full:-
"The lode worked in the Success Extended workings (further north) runs across the southern boundary into the northeast angle of section 2843/87M and has been worked from 2½ to 3 chains in length by shallow shafts and trenches on the outcrops. The lode was from 2 to 4 feet wide and the galena vein up to 10 inches. Some native silver was found in the galena as at the Owen Meredith. Machinery for drainage is here again required. No-one was at work on this property and I have not been able to find out if any ore was sold from it".

Waller adds little to Montgomery's description. Apparently between 1893 and 1902, further work had been done as Waller makes mention of a shallow tunnel brought into the Bon Accord lease from the Success Extended. He states with reference to this :- "Above the tunnel there has been some stoping done and in the south end of the stopes the lode is exposed. It is composed of a black slate and pug formation containing several seams of ore near the foot wall. A bulk sample from these gave 14.8 per cent lead and 10 ounces 15 dwts of silver.

(11) Group of Trenches and Cuts Between Traverses V and AF

A large number of trenches etc of varying size occur along this 1000 ft stretch. With the exception of two shafts, one of 6 feet and the other of 15 feet, in the vicinity of Z 25 to Z 100, all the prospecting workings are only a couple of feet deep. It must be remembered that all these workings are over 50 years old. Consequently the walls are now moss covered and the trenches are full of water and rubbish and in some cases collapsed. It is difficult at this stage to get accurate observations along them. The present observations have been made as accurately as possible without going to the extent of cleaning out all the trenches. In the 6 ft shaft near Z 25, there occurs a 4" vein of iron stained pug carrying some quartz fragments. Again, in a trench at X 100 the dump heap shows quartzite carrying specks of pyrite. These are the only two signs of mineralisation which could be found in the group of trenches. Observations on the remainder reveal country rock only. Generally this is a purple argillite where fresh, yellow to brown argillite where partly weathered, and a stiff yellow clay where completely decomposed. Towards the western end of several of the more northerly trenches, grey and black slates were noted.

(12) Adit South of AG 225

This is alleged to be the main Bon Accord workings. The adit is driven south on a bearing of S 33° E into the hill. From the size of the dump heap, it must be a considerable length. The writer would estimate 400 to 600 feet. At the portal occur yellow-brown and reddish decomposed argillites. The decomposition has advanced to the stage where the bedding has been obscured. It was considered that the adit was unsafe to enter so no record of underground observations can be given. The dump heap shows only argillites less decomposed than those at the portal. A search failed to reveal any trace of ore on the dumps. The adit is along the bearing of the lode and where one would expect the lode to be for, known ore-bearing workings occur 200 feet further north. It is, therefore, somewhat of a mystery. It is hardly likely that such a length of adit would be driven for no result. Yet no ore shows in the dump heap. One can only conclude that any ore recovered has been removed.

(13) Trench Between AJ 225 and AG 225

This is apparently prospecting work ahead of the lode. The trench is 137 feet long with two cross-trenches at the south. Two shallow shafts occur, one 15 feet and the other 22 feet deep. Country rock exposed in the trenches and shafts is a grey slate. The lode is not evident but the workings are part filled with rubbish. However, no sign of lode material could be found on the dump either.

Beyond this point, the workings are those of the Success Extended. Writing of these workings in 1893, Montgomery states:- "The lode bears N 20 degrees to 30 degrees W and dips easterly 1 in 1, corresponding in these respects to the Success and Owen Meredith lode. It is also like the latter in the nature of ore contained in it and has the same peculiarity of carrying the best ore in a separate rib on the hanging wall often separated from the poorer portion by a slickensided wall. The good ore is from two inches to two feet in thickness and the whole lode from 2 to 8 feet. It has been worked at intervals for 7 or 8 chains from the south boundary and has been

more or less ore-bearing all the way....the tributors have sent out about 30 tons of galena realising about £8 per ton after paying all expenses except packing which is done by themselves .....the ore in both this and the last-described mine (Success) is very free from blende although this does at times occur in it. Waller, in 1902, re-iterates portion of Montgomery's statement but does not add any further information.

(14) Group of Working Between AJ 225 and AM 225

These consist of four sections of open stopes and two shafts. They constitute the major workings of the Success Extended and were the site of operations in the period 1912 - 17. Beneath the stopes, the adit drive is a continuous unit and access was gained via the adit crosscut the portal of which is found at AM 75W. This is in the valley of Success Creek. The creek was diverted to clear the adit but has now resumed its original course. As a result, the adit is two-thirds full of water and access is impossible. On the track between AL 250 and AK 250 there occurs the top of an open stope or rise. Through this, the adit floor can be seen 33 feet below. The lode channel bears N 38° W and dips 63° east. The lode channel is clearly defined, approximately three feet wide, the footwall well developed, the hanging wall less clearly defined. Hanging wall country is slaty brown argillite. The collapsed stope on and north of AL 250 does not define the walls of the lode having suffered advanced collapse. On the dump heaps are a quantity of well mineralised fragments of lode material. This, and other stopes further south indicate that the footwall country is black and grey slate sometimes rather iron-stained. On the long collapsed stope crossing AK 250, both hanging and footwalls are clearly defined, the footwall being exceptionally smooth. The lode channel is three to four feet wide. In the vicinity, many of the dump heaps show quite good specimens of mineralised lode material consisting almost entirely of galena and siderite. Zinc appears to be quite absent from the specimens studied and pyrite is only a minor constituent.

The following notes on these workings were supplied by Mr. A. Fairbairn of Zeehan. The adit goes into the hill and takes a curve to the left (north) just inside the portal. The crosscut to the lode is about 300 feet long. When the lode was met, a drive put to the north for 50 feet revealed pug only and was not proceeded with. The drive south goes about 400 feet and the maximum backs obtained were about 45 to 50 feet. Three shoots of ore were met in this drive. The dimensions of the first cannot be recalled but a stope was taken through to the surface. (This is probably the stope on the track) A winze out down in this shoot for a few feet showed eight inches of metal. At about 250 feet from the crosscut, the "long shoot" of ore was met with. This proved to be 44 feet long. The ore channel widens from 3 ft to 18 ft and back again to three feet at the south end of the shoot. Throughout this shoot, there were seams of clean metal six to twelve inches wide. There were also seams of "white iron" (Samples of this material recognised by Mr. Fairbairn on the dumpheap prove to be marcasite). The assay value of parcels from this shoot were 48 per cent lead and 48 ounces silver. The total quantity of ore shipped is not known. At the south end of the shoot, a winze put down about 12 feet showed 30 inches of clean metal. However, owing to drainage problems, the party was unable to develop below

adit level. Between the end of the "long shoot" and the end of the drive, (i.e. between about 300 ft and 400 ft from the crosscut) another shoot was encountered. Four to five tons of metal were taken out of the drive and an unknown quantity from the stope above.

Regarding general conditions in the mine, Mr. Fairbairn states (a) that the ground is not soft enough for picking but soft enough to make close timbering necessary all the way.
(b) both hanging and foot walls are very clean.
(c) a thick seam of pug is constantly found on the hanging wall, this commonly containing slugs of metal and quartz.
(d) if anything, the metal favours the hanging rather than the foot wall.

In the quarterly publication of the Mines Department entitled "Progress of the Mineral Industry in Tasmania" records are given of the quantity and value of ore produced together with details of the men employed. Unfortunately the writer has available only copies up to December, 1913. For the period from 1st April, 1912 to 30th June, 1913, the Success Extended Mine produced 151.66 tons of ore valued at £1791 - an average value of £11.78 per ton. In order to get an idea of the grade of ore, the figures for all the galena-producing mines of Zeehan area for the same period averaged. This shows an average value of £16.45 per ton. As it is known that some of the mines were producing exceptionally rich ore especially as regards silver content, the figures given above by Mr. Fairbairn for the Success Extended ore would seem to be somewhere near correct. During the period covered as above, the Success Extended employed an average of three men. For the quarter ending 30th September, 1913, no production is recorded for an average employment of four men. For the quarter ending 31st December, 1913, no production occurred and no men were employed.

(15) Group of Trenches etc Between AM 225 and AU 200

This group consists of a series of trenches, a short adit, and a shaft and appear to be located along the line where the lode ought to exist. The group centreing on AM 225 consists of three trenches of a maximum depth of three feet. They disclose only yellow brown clay and fragments of argillite. No lode matter is revealed. Just north of AN 225, there is a shaft 33 feet deep. The shaft itself was not inspected but the dump heaps shows only iron stained dark grey slate. The short adit and cut near AP 200 country rock of decomposed argillite. There is also some limonitic weathered material which could possibly be gossan. The water in the cut smells of H_2S. The trench near AQ 175 shows decomposed argillite and also a limonitic weathered material which again may be lode capping. Similar conditions apply with respect to the two trenches in the vicinity of AU 200. In this case the possible capping is near the centre of the western trench.

It will be seen, therefore, that there has been considerable activity along the line of lode, some of which has been profitable, some unprofitable, and some inconclusive. One point can be settled, however, from the detailed survey which has been carried out and that is that all the workings are along the one line of lode extending a minimum distance of 4000 feet. The line has been proved to be ore-bearing for an approximate minimum distance of 600 feet near the southern end and for approximately 400 feet in the northern. Between these two areas, there is a length of 2700 feet

over which only surface prospecting has, so far been carried out with no apparent result. The area is, however, a potentially mineralised one and it can be stated at this stage that the geophysical results so far obtained indicate that shoots of ore probably exist in this zone.

GENERAL GEOLOGY

As mentioned above, the whole of the area under review is bushcovered and thus, outcrops are extremely limited. The only places where satisfactory outcrops were obtained were along the tracks and streams, and in the workings. As the work proceeded, it was realised that only two basic rock types occur and these, when weathered, form characteristic soil types. In the absence of other outcrops these soil types gave valuable information as detailed below.

In addition to detailed geological mapping, regional mapping carried out previously as part of the North Pieman Mineral Area programme had provided some idea of the general geology and structure.

Along the Pieman River from a point one mile east of the Ring River downstream as far as the old Suspension Bridge, a distance of approximately seven miles, there occur a thick series of purple and green argillites. These rocks are compact mudstones, the grain size being constantly very fine. Thus, when compact, these rocks do not exhibit the fissility of shales. Generally, it is exceptionally difficult to determine the attitude of these beds owing to the constant grain size. However, occasionally variations in grain size do occur and, in some places, narrow bands of tuffaceous material occur. The greater part of this series has the distinctive purple colour but sometimes bands several feet in width having a green colour occur. There appears to be no essential lithological difference between these types except for the colour. Rarely, along the section quoted, bands of grey to black shale occur and these stand out clearly from the enclosing argillites owing to their different colour and lithology. The whole series has been highly compacted but cannot be said to have suffered any significant amount of metamorphism - they are merely compacted and indurated. Sometimes slaty cleavage is developed but this is the exception rather than the rule. This series has been traced over many square miles. It extends in a belt several miles wide northwestwards from the Pieman towards the granite of the Meredith Range and southwards through Renison Bell, the Argent Tunnel, and the Copper-Nickel Field. South of the latter point it narrows rapidly, bends around the top end of the Zeehan Syncline, and tails out against the Gordon River Limestone some two miles north of the Montana Silver Lead Mine. In the area between the Copper-Nickel Field and the Meredith Range, it may be regarded as the most extensive rock type present. No sign of this type has so far been found in the Zeehan area.

Along the section of the Pieman River above quoted, the strike of this series is uniformly N.N.W. varying only a few degrees. The dip is uniformly steep to the northeast ranging between 50 and 90 degrees, the majority of records being between 70 and 90 degrees. Followed up Crimson Creek, from its mouth to the bridge, dips and strikes recorded agree with the figures above quoted. However, from Dunkleytown along approximately

three miles of the tramway W.S.W. there is considerable variation in the attitude, and quartzite makes its appearance at intervals. At least two fault zones trending approximately East-West together with numerous minor faults occur. The contortion and fracturing of this section are in striking contrast with the extremely regularly bedded section north of Dunkleytown. At Renison Bell, a narrow zone of quartzite and shale occurs and appears to be heading northwesterly for it has been observed along the Owen Meredith track. South of Renison Bell, along the road and rail, as far as the Argent Tunnel and beyond, the argillite series again appears. It is here also highly contorted and fractured, as is the section from Dunkleytown southwest.

So far, no fossils have been found in the argillite series, although a search has been made. Owing to the lithology and the degree of compaction, it is considered unlikely that fossils will be found in this series, except perhaps in the black shale bands mentioned. However, this series is succeeded along the Huskisson by a series of shales, sandstones and conglomerates of approximately 4000 feet thickness in which a number of fossiliferous horizons have been discovered. The fossils, trilobites, brachippods and dendroid graptolites, have been determined as being from Lower Upper Cambrian to Middle Middle Cambrian in age. As the succession is normal, it is deduced that the age of the argillite group is below Middle Middle Cambrian and it is tentatively regarded as ranging from Lower Middle Cambrian to Middle Lower Cambrian.

The age and position of the Renison Bell quartzites is obscure at the moment. It is probable, however, that these rocks are representatives of the Carbine Group typically developed on the Carbine Hill several miles southeast from Renison Bell, to which a Lower Cambrian or Upper Pre-cambrian age has been assigned by Carey (Geology of Australian Ore Deposits Table 1 page 1108).

The argillites are relatively rich in iron and readily weather to a stiff yellow clay. At certain points along the Pieman River section this phenomenon can be well observed and every graduation seen between unweathered argillite below and a yellow clay soil above. This soil is apparently rich in plant food as thus the argillite series typically supports a luxurious forest growth.

Reverting now to the area covered by the Geophysical Survey. East of a line approximately along the course of the lode i.e. N 35° W it was found that outcrops constantly showed the purple argillite and the soil was constantly a yellow clay. West of this line, the outcrops are a grey to black shale and it was observed that soil in the vicinity of the outcrops was a rather grey clay somewhat less plastic and stiff than the yellow clay. Owing to the general paucity of outcrops, it was decided to map the soil type at each peg and to consider the point where the soil type changed to be the contact between the argillite and the shale. The distribution of the two rock types as shown on the plan has mainly been inferred by this means.

It is stressed at this point that the grey shale is, in fact, part of the argillite series and not a separate rock group. This is proved by work done west of the area under review. On Crimson Creek, between the West Base and the West Cable Lines, the western side of the shale band can be observed. West of this point, argillites occur for a considerable distance.

From BJ to BC the contact gradually swings to the northwest and then to the west. From BA to B the contact trends north. In the vicinity of BB a fold has been shown on the plan. This is, however, not proved. It is possible that a fault exists at this point. From B to E the contact trends northwest changing to north between F and G. In the vicinity of G the contact is stepped some 250 feet west, continues north to K and then northwest. It is quite evident from the mapping, that a northeast - southwest fault exists in the vicinity of G and that the movement has been north-block west, Beyond K, the contact shows some slight changes in direction but generally trends northwest as far as AV.

It is not possible to deduce from the available information whether any further faults exists but it can be stated that any crossfaulting occurring will be only minor.

Observed dips over the area range from 43° to steep east to northeast, the majority being between 60° and steep and, as detailed above, the general strike is approximately N.N.W. Thus it will be seen, that the attitude of the beds is in complete agreement with that of those in the much larger area in the north along Crimson Creek and the Pieman River.

THE LODE FORMATION

The lode trends in a general direction of N 35° W with local variations of a few degrees only. The general dip is to the northeast at 50° to 70°. An inspection of the workings leaves little doubt that it is a fissure filling and thus similar to the silver-lead lodes in the Zeehan District. The walls are generally striated and polished and, at the Success, the striae dip southwards at about 60°. The lode matter is extremely dense and it appears likely that the original fissure was under compression rather than tension. On the hanging wall, the best ore is consistently found in a vein from two inches to two feet in thickness. Footwall ore is much poorer and this section is often represented by lode slate only. Throughout the exposed length of the lode, the footwall and hanging wall sections are separated by a false wall which is strongly slickensided. This indicates that there have been two periods of ore deposition separated by a period of movement along the fracture.

It is noteworthy that the lode parallels closely the general strike and dip of the country and is located close to the junction between the argillite and the shale. In fact, in the Success Extended workings, the lode is right on this junction, the hanging wall being argillite and the footwall black to grey shale. The original fracture, may therefore be regarded, in general, as a strike fault.

In the northern workings (Success Extended and Bon Accord) the lode appears to be simple i.e. there is only the one fracture and no splits occur. However, in the Success and Owen Meredith area, the lode is more complex. The stope shown between G200 and F175 appears to have a different strike from that shown between E230 and D240. However, whilst the latter is at creek level, the former is between 40 and 90 feet higher. When both these sections are projected to creek level, it is found that they are along the one line. Lode exists just north of C 200, just south of C 225, at B 150 and north of A 125 - 150. As shown on the plan, these four exposures are essentially at the one elevation and it is impossible to regard them as all along the one line. The only explanation is either

that splits occur or that there are a series of minor post-ore faults. In this regard, Montgomery states that "The lode.....showed itself as three veins of mineral-bearing matter lying about parallel to each other".

Along the course of the lode, a number of ore shoots occur, the known ones having been worked out. In the Success Extended, over a drive length of 400 feet, three shoots of ore were encountered from a few feet to 44 feet in length, indicating that the size of ore shoots is variable.

The mineral content of the lode consists of galena, small amount of iron pyrites, copper pyrites and sphalerite, and occasional stibnite and arsenopyrite. Gangue minerals are quartz and siderite. The galena is silver-bearing the ratio of silver to lead being extremely variable ranging from 1 : 1 to 10 : 1 according to figures quoted by Waller. It appears, however, that the extreme variation occurs in the oxidised portion of the lode. Within the more normal portion of the lode, the ratio in the Success and Owen Meredith is about 3 : 1 according to Waller, and in the Success Extended area about 1 : 1 according to Mr. Fairbairn as indicated on pages 10 to 11 of the present report.

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