# REPORT ON THE SOUTH MOUNT VICTORIA MINING FIELD.

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*Government Geologist's Office,*
*Launceston, 9th May*, 1904.

SIR,

As directed by you, I proceeded to the mining district situate between Mathinna and Mount Victoria on the 7th April, and was on the field till the 15th of that month.

The mining shows are scattered over a great extent of hilly country. With the exception of the Carnegie, the mines were idle; on many of the reefs work had ceased for years. Most of the works are now not in a condition to enter for inspection, and very little reliable information is obtainable as to their past history or what the reef looked like when work was stopped. Consequently my visit partook more of the nature of a reconnaissance than a complete examination of the mines, and a more definite report on these reefs and mines must be deferred until work is resumed on them. It may be expected that this will take place by degrees; and I hope that by the time I have finished the impending examination of the Mathinna Goldfield, some of the properties may be once more at work, when it would be desirable for me to pass through the field again.

## *Topography and Geology.*

This field is situate from 8 to 12 miles north of Mathinna, and is within the high hill country between that township and Mount Victoria (3964 feet), which with its companion, Mount Albert, dominates the foot hills, spurs, and gorges which cut up the field. The main inlet to the mining area from Mathinna is up the valley of Dan's Rivulet, a tributary of the South Esk River. This rivulet and its tributaries have carved their channels in the sedimentary rockmasses, leaving towering slopes on either side. The lower end of the valley as far as Strickland's Creek comprises a broad expanse of flat alluvial land bordering the stream. Farm selections have been taken up along the rivulet for 5 miles from the Esk, and similar land stretches for 3 miles further

north as far as Davern's, suitable for farm crops, and, when cleared, for cattle or dairying. Selection for agricultural purposes is bound to extend up this valley as far as the flat land continues. The rise from Mathinna is very gentle, and the road grade excellent. Some more attention to the present road is necessary for comfortable travelling in wet seasons. The flat and hills are well timbered at the mines, some of the stringy-bark trees growing to fine proportions. For the supply of mine timber the district is an ideal one. The varying heights at which the mines are situate will necessitate various plans for delivering their output to the batteries. In some cases, the facilities are all that can be desired: in none are the difficulties insuperable.

At Davern's battery site the Strickland Creek comes in from the west, cutting its way through a steep ravine down to the Dan. A fork of the latter comes here from the north after flowing through the Una and Hinemoa sections. To the north of the Strickland Creek is the north and south Hinemoa spur; to the south of it is Strickland's Hill. A steep sideling track from Davern's leads to the Strickland Mine, 1100 feet above the Dan; and the Alberton track, also a sideling, leads up from Dan's Bridge 1300 feet to the Alberton divide, passing the Hinemoa and Una group of mines.

This Alberton track, the construction of which I recommended in my North Mount Victoria Report, January 19, 1900, has been of great service to the travelling miner, and is destined to be of use to the mines located along its course. It will facilitate prospecting, for it passes through an otherwise trackless part of this mineral field. From Alberton to the Hinemoa turn-off is 5 miles; from the Hinemoa turn-off to Hickson's Camp is about 3 miles; thence to Mathinna 8 miles.

The field comprises a northerly extension of the Mathinna slates and sandstones, so famous for their gold quartz reefs. This system of sedimentary rocks, with their contained reefs, extends southward to Mangana and Fingal, and northwards through Mount Victoria to Warrentinna and Lyndhurst. The belt expands on the north coast in an easterly direction to Lefroy.

The age of this series of strata cannot be positively stated, owing to the absence of any fossils of definite stratigraphical value, but they are believed to belong to the Lower Silurian.

Lithologically they are alternately slates and sandstone, with intermediate varieties, which may be called argillaceous sandstones and sandy slates. The strike of the bedding planes varies from N. 20° W. to N. 40° W., and the dip is

either north-east or south-west. This indicates that anticlinals exist. The slates at the Hinemoa dip north-east, while further north, on Soley's, the dip is to the south-west. It is probable, therefore, that the Hinemoa spur is an anticlinal. I did not examine the high range on the east side of Dan's Rivulet, but if the strata there dip north-east, as is likely enough, considering their north-east dip further north on the sideling, it would appear that, contrary to what might have been expected, the valley of the Dan is below the position of the old arch of the anticline.

Looking at the reef structure of the field, it is apparent that at least three sets of fractures exist; viz., one series, as on O'Brien's, Soley's, Hinemoa, and perhaps the Laranda, having an approximately north and south direction; the other two inclined to that bearing at tolerably wide angles, being nearly east and west, and north-east-south-west, as at the Havelock, O'Brien Company, Starlight, Carnegie, King Edward, Lady Havelock, and Strickland's. It is highly probable that at the intersections of the two systems the ground will be found to carry concentrations of metal.

Most of the work done so far has been on the east and west and north-east-south-west reefs. Very little has been done on the north and south ones. These latter appear to be parallel to the axes of folding of the beds, rather than on the axial lines themselves, and the other reefs are tangential to them. The probability is that the two sets came into existence contemporaneously, and that the fractures which they fill owed their origin to the secular folding of the strata. To discuss the relations existing between this folding and the consolidation of the granite and the formation of the reefs would be to pursue the subject into the domain of theory.

Long after the formation of the reefs this area was below sea-level, and covered with the coal measures sediments, now removed by denudation; its upheaval to its present height above the sea may have been partly the result of a secular process, and partly connected with the great intrusion of diabase or trap rock which found its way later into the overlying rock all through eastern and central Tasmania. This powerful intrusive process must have shaken the field, and is doubtless responsible for many of the slides found displacing the reefs. Crosscourses, however, which carry quartz and gold are more likely due to fractures or movements arising during the general period of reef-formation.

I have not yet been able to find any reliable basis for an opinion as to whether slate or sandstone is more favourable to the occurrence of gold in the reefs.

The shoots of auriferous quartz in this field are sometimes of considerable length, though shorter shoots are very common. It is a familiar axiom that a long shoot is likely to descend to a good depth, but the converse is not always true. It does not follow that a short shoot will always give out at a shallow depth. It is possible, too, that a shoot, short at the surface, may expand at a lower level. At all events, it is good mining to follow auriferous quartz down.

The field is now languishing as a result of past indiscretions. Inadequate provision of capital led to mining being stopped in many cases, just when continuance of the work was the most highly necessary. It also gave rise to what, in Germany, is called "Raubbau," a significant and useful term, for which we have no exact equivalent in English. It denotes that the stone has been torn out of the mine as if by robbers, the best quartz rooted out in all directions without any regard to economy, safety, or appearances. The Americans call it "coyoting." The old unfilled stopes and meandering unsupported excavations which I saw in some of the mines were illustrations of this practice.

Work done so far has been at quite shallow depths, mostly between the grass roots and 100 feet below; in one instance 140 feet has been worked, but no serious attempt has been made to go down on the shoots of stone.

A distinct defect in the mining done is that far too little use has been made of crosscutting. The structure of the field indicates a frequent occurrence of parallel reefs or quartz-filled gashes, and some of these it may be expected will not come to surface. Accordingly, if there is no crosscutting, such reefs may be missed altogether. Of course, the neglect of exploratory and dead work has been largely due to want of adequate funds in initiating the several enterprises.

As several reefs have been found payable for limited distances at shallow depths below the outcrops, the area lends itself to the inception of small undertakings, which, if ill-financed, can never be expected to last long, while at the same time a good deal of gold has been extracted at little cost. Considerable quantities could no doubt still be won by small parties in different parts of the field if crushing facilities were handy. In several of the mines a large proportion of concentrates would be obtained from the mineralised stone. If State batteries are ever established in Tasmania, this district would be one of the most suitable for a trial.

The future of the field, however, rests with the application of adequate capital and skill to the systematic development of the reefs at a depth.

I now proceed to give a short account of the several mines visited, premising that dependent as I have necessarily been upon various sources for information as to past history, which in some cases is merely a question of memory, I have selected accounts which appear to be credible, and have rather understated figures than the contrary.

I did not visit the Revenue mine, which is on the southern border of the district I examined, and which, moreover, could not be entered. The most southerly of the mines which I saw were on the old

*O'Brien Company's Sections.*

These are 288 and 289G, 10 acres each, charted in the name of S. P. Crisp, a quarter of a mile west of Dan's Rivulet. The track to Alberton and Ringarooma passes through Section 289, and the old mine-works are situate on the slope of the hill west of the road. Hickson's camp is on this section. There are two parallel main reefs, one on each section, and both of them have been attacked by tunnels, neither of which can be examined at present.

No. 1 tunnel on the western section has been driven to the No. 1 reef, which bears north-east to south-west and dips south-east, and a level was driven on the course of the reef for about 200 feet, with from 30 to 45 feet of backs. I am indebted to Mr. T. Hickson, who still resides on the spot, for much of my information respecting the work. For a horizontal length of about 160 feet the stone has been stoped out up to surface, a pretty fair indication that it was payable. The stopes are variously estimated to have yielded the O'Brien Company from 600 to 800 tons of quartz worth 1 oz. gold per ton. The reef pinches and swells alternately, varying between 18 inches and 2 feet in width generally. I am told that there is still a little stone in the face, but that practically the shoot has pinched or ended there, and has not been proved further. Two winzes were sunk in the level: one to a depth of 16 feet on stone stated to be 3 feet wide and of fairly good quality, the other also in nice-looking stone. Owing to water, the winzes were not sunk further. The tunnel has fallen in at the point where Messrs. Hickson and Kerrigan first found the reef at surface and sank a shaft 45 feet, taking out 70 tons of 1-oz. stone, besides further 30 tons from higher up the hill. The quartz has a very favourable appearance, and is well mineralised with iron and arsenical

pyrites, with some galena and blende (?). It is difficult to pick up a stone round the old works which does not carry one or more of these minerals, so intimately associated with gold in the quartz of our goldfields. Some of the quartz is very rich; pieces which I picked up haphazard assayed 2 ozs. 6 dwts. gold per ton.

The No. 2 reef is 5 or 6 chains south-west of No. 1, and also bears north-east to south-west, with a southerly dip. It has been cut by a tunnel driven in the south-west corner of the eastern section. It has been stoped out to surface for a length of 80 or 90 feet, and an additional length was stoped a little further south, but not to surface. The general height of backs is about 40 feet. The reef is stated to have averaged 2 feet in width, and 300 or 400 tons of quartz were crushed, returning from 18 dwts. to 1 oz. gold per ton.

About 100 feet to the north is another strike of stone about 8 inches in width, which has been sunk upon for 15 feet, and has yielded a few tons of 2-oz. quartz, according to Mr. T. Hickson.

In the south-west part of Section 289 is a narrow north and south reef, dipping west, known as the Ironstone reef, from its gossan outcrop. A shaft has been sunk on it for 20 feet, and I am informed that 20 tons of stone were taken out and crushed for 23 ozs. of gold. The width of this small reef is 10 inches to 1 foot. A good deal of the stone is oxidised, and some of it is said to carry visible gold. I could not see any gold in the samples which I took, but when these were assayed by the Government Analyst they returned 3 ozs. gold per ton. These were oxidised specimens, but the gossan itself only contained a trace of gold.

Considered as a mining property, the whole weight of the proposition rests on the fact that the old workers (first Messrs. Hickson and Kerrigan, the discoverers, and after them the O'Brien Company) took out payable stone from a good length of reef, stoping it up to the grass roots, without facing the water difficulty and sinking to any serious depth They reached a point where the reef narrowed, and the gold apparently ran out horizontally, as it must always do in time. As the reef beyond has never been proved in the hill, no one can say how far the blank extends. The available capital was inadequate for sinking when they encountered water, though this is not likely to interpose any insuperable difficulty.

The course which owners should adopt if they are prepared to develop the property thoroughly would be to sink a main shaft between the two reefs, so as to attack either or both in depth.

There is a good site for a battery at the foot of the hill, and the race only needs to be extended half-a-mile to connect with the Dan, and provide water all the year round. Good mine timber is growing in abundance on the sections, and the cart road, of quite easy grade, leads past the mine from Mathinna.

*Havelock Mine.*

This was formerly Hickson's, but now comprises 10 acres, 178G, charted in the name of S. P. Crisp. It is situated half-a-mile north-west of the old O'Brien Company's sections, and about 8 miles north of Mathinna, just west of the track to Alberton. It formerly included 7 sections, but the one now held is that upon which the mine-works are situate.

Two reefs have been worked, one from a tunnel, and the other from the main shaft, which has been sunk to a depth of 200 feet, but only opened out from at 100 and 140 feet.

The tunnel has been driven south-west into the hill for 170 feet on the course of the reef called Hickson's, and discovered by him ten years ago. The reef dips to the south, and the country is slate. The stone varies in width from a track up to 2 or 3 feet, averaging, perhaps, 1½ foot. At 111 feet in the tunnel intersects a shaft which has been sunk from surface 30 feet. The stone has been stoped away here all the way down. It was evidently strongest round this shaft, and I was told that it was several feet wide at surface, but narrowed, coming down to a foot or two. Further in it contracts and goes underfoot on the south side of the drive. For about 15 feet behind the end the tunnel has been turned a few degrees to the west, and has left the lode line to the east. Consequently, the end is in country slate.

Thirty feet south-east of the tunnel mouth is an underlay prospecting shaft, which has been sunk 50 feet below tunnel level, and connected with latter by stoping. Some good gold returns were obtained from this shaft. Mr. Hickson tells me he raised £600 worth of gold from it.

Eighty feet east of this the main shaft was sunk with a view of working the tunnel reef at a depth. This reef, however, was not reached, but a short crosscut at 100 feet level, driven from the shaft for 30 feet north-west intersected a parallel reef. This was followed for 200 feet to the south-west, and the late manager, Mr. Good, says that it was payable for 150 feet in length. A still lower level was driven at 140 feet for a distance of 180 feet, and Mr. Good states that it was on stone 18 inches wide, and yielded 250 tons of 15-dwt. quartz, widening to 2 feet in the bottom. The shaft was sunk further to 200 feet, but I believe the

pumping power was inadequate, and nothing more was done beyond cutting the plat.

By the kindness of Mr. S. Percy Crisp, I am able to give accurate figures (supplied by Mr. Walter E. Taylor) of the output of the mine both during the time of the Havelock Company and prior to it. These are as follows:—

1 Crushings by the Hickson's Mine Company—

| | tons. | | Gold. ozs. | dwts |
|---|---|---|---|---|
| 1900—Aug. 22... | 85 | crushed, yielding | 43 | 16 |
| Sept. 30... | 85 | ,, | 39 | 5 |
| Oct. 14... | 35 | ,, | 10 | 2 |
| Nov. 1... | 12 | ,, | 11 | 16 |
| Dec. 3... | 13 | ,, | 15 | 15 |
| 1901—Mar. 24... | 25 | stone, 10 tons formation | 2 | 0 |
| May 9... | 15 | crushed, yielding | 16 | 13 |
| June 10... | 20 | ,, | 18 | 13 |
| July 4... | 18 | ,, | 12 | 17 |
| July 31... | 23 | ,, | 16 | 0 |
| | 341 | | 210 | 17 |

2 Crushings by the Havelock Gold-mining Co., N.L.—

| | tons. | | Gold. ozs. | dwts. |
|---|---|---|---|---|
| 1902—Jan. 16... | 40 | crushed, yielding | 18 | 10 |
| Feb. 15... | 40 | ,, | 20 | 0 |
| Mar. 15... | 60 | ,, | 45 | 4 |
| April 20... | 76 | ,, | 57 | 7 |
| May 29... | 64 | ,, | 30 | 4 |
| | 280 | | 171 | 5 |
| Total... | 621 | | 382 | 2 |

= 12 dwts. 7⅗ grains per ton

plus the results from 12 cwts. 2 qrs. 17 lbs. pyrites saved, viz., 5 ozs. 17 dwts. 19 grains per ton.

Mr. W. F. Ward, Government Analyst, April 10, 1902, made the following assay of the blanketings, Wilfley concentrates, and tailings for the Havelock Company:—

| | Gold. ozs. | dwts. | grs. | Silver. ozs. | dwts. | grs. | |
|---|---|---|---|---|---|---|---|
| No. 1—Blanketings..... | 1 | 2 | 1 | 0 | 3 | 6 | per ton. |
| No. 2—Wilfley Concentrates | 4 | 16 | 9 | 2 | 0 | 20 | ,, |
| No. 3—Tailings ..... | 0 | 4 | 21 | 0 | 2 | 10 | ,, |

The water in the shaft was up to 94 feet at the time of my visit, barring access to the levels, so that the above figures

are welcome, as showing the value of the stone which has been raised and crushed.

The old battery was driven by steam, and water for the tables was raised from the mine. Owing to this lack of water future crushing would best be done on the flat, where water can be brought in from the Dan.

The two reefs are a little over a chain apart. From the bearings of the reefs in the ends of tunnel and main shaft drives it looks as if they might possibly junction eventually at the southern end of an assumed horse of country. Although this would be at the southern boundary, if not outside it, it would furnish a reason for the reef becoming richer in that direction.

It would be good work to drive a crosscut north-west from near the end of the 100-feet or 140-feet level to intersect the shoot of stone in the tunnel-reef below the shaft, and eventually a crosscut at the 200-feet. The 200-feet level ought to be driven further.

The good shoot of stone which has been proved at the shallow levels in the main workings justifies an effort to prove it lower down, especially as the testimony is to the effect that it is widening in descending. I should recommend that the shaft be deepened and the reef tried at each 100 feet. The experience of the Golden Gate Mine at Mathinna, where the reef was of no particular value above the 100-feet level, shows that the upper parts of reefs in this field may cover strong and persistent developments of highly payable stone, and that it is utter folly to speak of a mine having had a proper trial when it is abandoned in the 100-feet zone.

The Havelock is as encouraging as any mine on the field, and more so than several of them. I understand that it is the intention to make a freehold addition to the mine of some of the alluvial valley bottom land which borders the Dan, and which is the prolongation of the agricultural belt which farmers are settling upon lower down the river. Settlement is sure to extend to the flat alluvial south-east of the Havelock, which will be of mutual benefit to mineowners and farmers.

*Carnegie Mine.*

This is situate a mile to the east of the Havelock, and on the east side of Dan's Rivulet, on Section 209G, 10 acres, formerly in the name of J. Dee, and is being worked by Messrs. Davies and Marsack. The 5-head battery which crushes for this and the King Edward Mine is driven by steam, and is within the eastern boundary of Section 299G (F. Davies).

In the centre of the Carnegie section a tunnel has been driven about 100 feet on the course of the reef, which bears E. 10° S., and dips steeply to the north. The reef-wall is clean on the south side, ragged on the north. At about 70 or 80 feet in the tunnel a winze has been sunk, 60 feet I was told, and overhead the reef has been stoped to surface 60 to 70 feet. Small drives were put in from the bottom of winze, 10 feet one way and 15 feet the other, and the reef is said to have widened, but the stone which was taken out was not considered payable. Beyond the winze a north and south crosscourse with westerly underlie crosses the level, and just east of this a short drive has been put in south, tapping the crosscourse, on which a winze has been sunk 35 feet and two small drives opened out, one at 15 feet, the other from the bottom. The crosscourse carries 18 inches to 2 feet of bluish, laminated, flinty-looking quartz. The stone is impregnated with arsenical iron pyrites, but not strongly, and contains small fragments of slate in linear arrangement, which gives it its laminated appearance.

The output of the mine is at present coming from the crosscourse. I am informed that nearly 100 tons have been crushed for 10 dwts. gold per ton: another crushing is ready in the paddock, and it is hoped that the yield of this will not be much less than previous returns.

Samples which I took of the crosscourse stone, on being assayed by the Government Analyst, went 6 dwts. gold per ton; but stone from the main lode assayed as high as 1 oz. 18 dwts.

East of the crosscourse the lode is split up, and ahead of this the tunnel is blocked, but I was told that it communicates with a 70-feet shaft from the surface.

From its position, the lode on the Carnegie would appear to be the eastward continuation of the Starlight reef on the adjoining section to the west. This line is a very long one, extending through the two sections, and the best recommendation for the Carnegie owners is to locate the shoot of gold-bearing stone in the reef and sink on it. Although the crosscourse for the present is auriferous, and perhaps payable in the neighbourhood of its junction with the reef, not enough is known of it to warrant any prediction. But the reef itself is known to have followed a long course, and it is extremely probable that deeper work will prove it equally constant vertically. In the meantime it should be followed east of the crosscourse and driven on to the boundary. It would be very desirable to amalgamate this and the Starlight section, and work them as one property.

*Starlight Section.*

This is charted in the name of T. Hickson, 135G, 10 acres, west of and adjoining the Carnegie. No work is going on upon it at present. The old Starlight Company drove a long crosscut tunnel north-east from outside the present south boundary, and then a long drive east to the east boundary-line on the course of the reef for upwards of 500 feet. No work was done on the lode west. Several parallel reefs are said to have been cut in the tunnel, but were not payable. I am informed that these reefs were from 1 to 2 feet in width, and generally parallel, but that one, a wide one (12 feet), crossed the tunnel at an angle. The main shaft lode was intersected at a depth of 100 feet from surface, and this was the one which was driven upon right to the boundary, carrying at intervals shoots of payable stone, which have been stoped to surface. A winze was sunk 32 feet from the 100-feet level, and I am told that 30 tons of stuff were taken from it, crushing 16 dwts. per ton. The first 10 tons crushed from this reef went 2 ozs. 15 dwts. at the New Golden Gate battery a dozen years ago. The old shafts seen at surface along the line of reef have been sunk on varying widths of stone, from 1 foot to the width of shaft.

The old workings are inaccessible, but my information is that the reef was seen as wide as 3 feet, but that the stone is somewhat irregular. Some nice honeycomb specimen quartz with coarse gold was shown me from this reef, and burning some pieces of stone brought out a good deal of gold. The total yield of this mine in the old days is estimated to have been between 600 and 800 ozs. gold.

No one can stand on this line of reef and notice the old stopes and works coming to the surface at intervals without recognising that the stone was worked just where it was payable; and I have no doubt that dead-work was religiously shunned. The greatest depth attained anywhere was the bottom of the winze, 132 feet from the surface. Apart from the work of sinking on the known ore-shoots, the tunnel, if extended north into the hill, would intersect other reefs known to exist, and would gain increasing backs. Difficulty experienced in coping with water was represented to me as being the cause of work ceasing on this property. It would seem as if this, too, is a mine on which some serious work could be well taken in hand.

*King Edward Mine.*

This is on a section, 157G, 10 acres, charted in the name of T. Davies, north of and adjoining the Starlight.

Two tunnels have been driven east into the side of a north and south spur, which descends to the flat in a southerly direction. There is a vertical distance of about 50 feet between the two tunnels.

The lowest one has been driven E. 10° N. for 115 feet, first 53 feet in the clayey hill drift, and afterwards 62 feet across vertical slates which have the usual north-west strike. At 115 feet, a drive E. 20° S. has been put in for 20 feet upon a few inches of rubbly quartz. The end still carries the track of this.

The upper tunnel has been driven 95 feet, following a small vein on the north side, which further in widens to a foot or two of quartz. At a chain from the entrance a horse of country divides the reef, and the drive has been widened to 7 feet of stone and country. Some rich stone came from a winze here at the junction of the two forks of the lode. The south fork has been followed by a short drive which communicates with a shaft from surface, and has been stoped out for 15 to 20 feet. A narrow drive has been put in on the north leg, which began with 9 inches to 1 foot of stone, which has been stoped away a little in the sole of the level. Beyond this the quartz has thinned out to a small vein on the north wall.

A few loads of stone in the paddock show nice-looking, grey, mottled quartz, highly mineralised with arsenopyrite. I understand that 60 or 70 tons have been crushed, the first 50 tons with very good results. There is a small 5-head battery driven by steam, situate on the machinery site to the south.

Work has been going on here for a couple of years. The stone is irregular, making in shoots and trenches, but this is not surprising, considering that the levels are quite shallow, not more than 30 to 40 feet from the surface. Driving on the reef should be continued until the north and south reef some distance ahead is intersected ; and then the best spot in the lode could be selected for sinking upon. It is impossible to do justice to the claim without sinking and proving what this irregular stone becomes at a fair depth.

The Carnegie, Starlight, and King Edward group of reefs comprise a system of east and west fractures which, produced westward, would intersect the extensions of the Havelock and O'Brien Company system of reefs at different points below the Dan valley. Unfortunately this land is flat and saturated with the drainage of the hills, but it is possible that at a distant date deep mining from below the surrounding heights, extended into the area of intersections, will disclose good deposits of metal. This is a fair inference,

viewing the structure of the country as a whole, without reference to any particular instance.

### *Lady Havelock.*

This mine is on uncharted land on the north bank of a western tributary of the Dan, and at the south-east extremity of the Strickland spur. It is about a quarter of a mile east of the track to Alberton, and the same distance north of the Havelock Mine.

At about 50 feet above the stream a tunnel has been driven N. 50° W. into the hill. Just inside the entrance a winze has been sunk 10 or 12 feet on stone 6 to 8 inches wide. This stone was very rich when first cut, but has become poor, and is tailing out on its southern dip. I am informed that the yield decreased from 15 dwts. to 5 dwts. per ton. The quartz is good-looking and well mineralised with arsenopyrite.

At 28 feet in the tunnel a small cuddy was cut west on a flat reef, and at 34 feet, on the opposite side of the tunnel, a drive east has been put in on the same flat formation, which is 3 to 4 feet wide, with bands of stone in it a foot wide. The last part of this short drive has bent to the north and got off the track of the stone.

After passing through this lode, the tunnel was continued in hard silicified slate for 60 feet without cutting anything else.

On the slope of the hill, between 30 and 40 feet above the tunnel, is a shallow shaft which is now filled in. Stones of bluish-grey quartz, well mineralised with pyrite and arsenopyrite, are lying round the shaft. Samples which I took from these, on being assayed by the Government Analyst, returned 13 dwts. gold per ton. The lode is said to have been 18 inches wide, and to dip at an angle which would take it down to the reef in the tunnel. Its strike is N. 50° E.

The reef dips with the hill, and this interferes with the backs. A little driving on its course is necessary to define and locate its best part, but sinking is the only means of opening out anything permanent. The stone is of the favorable nature which is prevalent throughout this district.

### *Strickland's Mine.*

This property is charted in the name of A. Morrisby, 177G, 5 acres, and 176G, 10 acres, and is situate on a lofty spur on the south side of Strickland's Creek, a tributary of the Dan.

The reef was discovered 20 years ago by Mr. T. Donovan, or, as some say, by Mr. White, who, after prospecting all round, gave it up, as the country then was far less accessible than it is now. A Launceston syndicate then took it and drove the upper tunnel. Afterwards, Mr. Strickland came into possession of the claim, and got a fair quantity of gold from it, crushing the quartz in a small 2-head battery. Then Mr. Chas. Seale acquired the ground, and during his time the underlay shaft on the reef was sunk between 80 and 90 feet, carrying good stone. Later, Mr. E. Davern started work and took a crushing down to the battery on the Strickland Creek, which he is said to have put through mixed with some old stone from the Compeer. He brought wire rope from the West Coast, and tried to fix it for aërial transport from the mine, but without success. This rope is still lying in the bush.

The mine is approached by a zigzag sideling from Davern's 49 acres purchased block. The track is steep, as may be judged from 1000 feet in height being gained in 63 chains horizontal distance.

Two tunnels have been driven into the hill in a southerly direction. The upper one is a short drive. The lower one is the more important, and has been driven over 200 feet. Mr. Treverton reports 250 feet, but the last part of the tunnel was too wet for me to examine.

Quartz was struck about 100 feet in, and then lost by the drive, which forked to the east. The lode, however, was picked up and the drive continued on the original strike, viz., south-west. The reef dips north-west.

I examined the tunnel as far in as the water would permit, and at the furthest point found the reef had been stoped out in the back to a height of 15 feet for an equal distance in length. It was here 9 inches to 2 feet of stone intermixed with country. The stone is a white quartz, streaked with graphitic and slaty matter, and having a kindly appearance. It has been followed a little underfoot, but I could not see much, as the winze and all excavations in the sole of the drive are now filled with water. I understand that the winzes show a reef of good quality stone, averaging about a foot in width. Mr. John Treverton, on authority considered reliable, reports that the last 7 tons of quartz from the north winze averaged over $2\frac{1}{2}$ ozs. per ton, plus $2\frac{1}{2}$ cwt. of concentrates saved (9 ozs. per ton).

In the south winze the reef is said to be up to 2 feet in width, and as the stope over the level also shows that the reef is wider than where it was first struck in the tunnel, it

would seem as if work has been abandoned just where it ought to have been continued.

I obtained some good prospects from pieces of quartz which I brought from the few tons in the hopper, and several samples showed coarse gold. I had no time to carry out a proper sampling of the hopper contents, so did not attempt it. However, I selected some of the best-looking stones (a few of them showed gold) for curiosity, and had them assayed in the Government Laboratory. They returned 5 ozs. 7 dwts. gold per ton—no index of average values, but showing that the stone carries rich concentrations.

About 100 feet above the end of the main tunnel is an underlay shaft, 80 to 90 feet deep, which has followed a reef down, believed to be a parallel one with that of the tunnel.

A feature of this mine is that the stone is more strongly developed in the bottom level than in any other part of the reef, and the history of the work shows that the quality of the quartz is as good as or even better there than in any other portion of the mine.

It would be desirable to clean out the tunnel to the end and make a careful examination. If the reef in the end is encouraging, driving should be continued; and at the same time a lower level must be driven to get under the good quartz in the stope and winze.

The outcrop of the reef should be looked for lower down the hill. The hillside slopes to the north-east down to the Strickland valley several hundred feet at an angle of 40°, and unexampled facilities exist for driving on the course of the reef a good deal lower than the present levels.

If there are really two reefs running parallel with each other, as is thought to be the case, they should be explored in depth by crosscutting.

When the mine is sufficiently developed to maintain a regular output, aërial haulage may be used for conveying the quartz to the valley, but for the present any capital put into the property should be devoted to developing and opening out the mine. The little work that has been done hitherto has shown that the reef is gold-bearing, and even rich in places. There are indications that it may gain in width as it goes down. The necessary outlay for proving it and putting the mine into a condition to produce is thoroughly justifiable. The indications are that it will be found necessary to follow the make of stone in depth more than horizontally (though the latter is not excluded), and when capital is raised, this eventuality should be kept in view.

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### *Laranda Mine.*

On the Strickland spur, at its south-east end, a reef of white and bluish quartz, nicely mineralised with iron and arsenical pyrites, has been uncovered by prospectors, who got some fair returns of gold from it; it bears east of north. This is above the Lady Havelock, overlooking the creek which flows into the Dan. A cut has been made into the reef for 20 feet in length and 12 feet in depth. Gold is stated to be freely visible in the stone, but I arrived there towards evening, when the light was insufficient for a close search. Twenty feet east of this a shaft was sunk 20 feet deep, and some very nice gold was won from it. About 3 feet width of stone was worked at this show (the Laranda), and there is still some promising quartz lying about outside, highly mineralised with arsenopyrite, and green with arsenical decomposition products. I have no certain information respecting the history of this mine, or why work was suspended. A report is to the effect that one wall in the shaft carried a narrow make of 2-oz. stone, and that the reef in the bottom is 8 feet wide, with gold all through it; but that it was intentionally filled over with mullock by the last party working there.

Mr. P. J. M'Leod, B.A, A.O.S.M., F.R.G.S., &c., has made an assay of this ore for Mr. S. P. Crisp, with the following results:—

| | ozs. | dwts. | grs. | |
|---|---|---|---|---|
| Bullion... | 1 | 15 | 22 | |
| Gold..... | 0 | 19 | 14 | value per ton £4 |
| Silver .... | 0 | 16 | 8 | |

The Government Analyst's assay of my sample resulted in a yield of 13 dwts. per ton; but this was only from a piece or two picked up promiscuously, whereas Mr. M'Leod's assay was of a larger quantity. I saw free gold obtained by dollying some of the fragments we took to camp, and gold showed also on roasting some of the stone on the hearth.

The lode can be worked easily from successive tunnels all the way down the hill, and the first thing to be done with the property (which has been taken up by Mr. S. P. Crisp) would be to put in an adit at a reasonable depth below the outcrop, and test the reef in a practical way. The character of the stone fully warrants such a trial.

### *Hinemoa Mine.*

These sections, 290, 295, 307a, 10 acres each, are held by the Hinemoa Gold-mining Company, No Liability, on the south side of the Alberton divide, about 12 miles from

Mathinna. The property is on a north and south spur, which extends southwards to the north side of the Strickland Creek. The Alberton track at the turn-off to the mine is about 1000 feet above the Dan bridge, and a steep track to the camp leads westward down the side of the Hinemoa ravine, falling 600 feet at an angle of 40°.

On the western side of the small creek, and about 20 feet above it, a tunnel has been driven about 200 feet into the hill due south, on the course of a quartz reef, which dips from vertical to west. The enclosing slates have a mean strike of N. 30° W., and a general dip north-east.

Work was started here in April, 1903. The reef shows in the approach, where some nice quartz is seen on the footwall; entering the tunnel a make of stone on the hanging-wall side continues a couple of fathoms, and is then replaced by country; it afterwards comes in again for 7 or 8 feet; then passes into country, with broken shoots of quartz, totalling 1 to 2 feet in width. At a wide part of the adit, about 3 feet of stone apparently went off eastwards, but tailed out when followed 3 or 4 yards. Beyond this 1 foot to 18 inches of stone is seen in the roof for 20 feet, but its behaviour in general is irregular. Ten feet behind the end a slide crosses the tunnel in a north-western-south-eastern direction. A short crosscut east and the continuation of the tunnel south of the slide have failed to pick up the reef. The tunnel end is in silicified slate, carrying minute disseminations of galena, and seamed irregularly with veinlets of quartz. A small vein of quartz follows the footwall side in the end, as if there were still a track of something going ahead.

The country through which the tunnel has been driven has evidently been disturbed, as is shown not only by this slide, but also by the peculiar arching and bending of the slate at the widened part of the level, where the drive is stopped at an abrupt face of country.

The lode consists more or less of a series of bunches of stone, the best run occurring in the first portion of the tunnel. The stone is a gray quartz, fairly well mineralised with pyrite and arsenopyrite, and containing also a little copper pyrites and erubescite.

The present tunnel should be extended some distance further, and a crosscut driven west; after picking up the lode again, a shaft should be sunk in the hillside, and the reef followed down. The work which has been done on the lode so far is not sufficient for a safe estimate of its value to be made. The tunnel has opened out a run of quartz at that level of very variable width, mostly between 1 and 2 feet, but some of it upwards of 4 feet wide, of low grade on the

whole, though good in places, as published assays show up to 17 dwts. per ton. These richer patches may be expected to sweeten the poorer grade. A published crushing of 70 ~~tons~~ returned 8 dwts. per ton. To be satisfactory, either this average should be raised to 10 dwts., or the stone increased to a mean width of 2 feet. However, no attempt has been made yet to see what the reef is like underfoot. At 15 yards in there is a body of quartz, which appears to be confined to the sole of the level. This irregularity in the upper zone is often indicative of a more persistent lode at a depth.

A cut into the hill 60 to 80 feet above the creek, and south of the tunnel, shows a lode, which is ahead of the present end, and crosses the tunnel line, dipping into the hill. It was difficult to see its width, but some 8-inch blocks of quartz had been broken out, fairly mineralised.

A new reef has been trenched across and cut into east of the tunnel, showing mineralised quartz. It has been cut across again further south-east, about 200 feet above the creek and 5 chains from the tunnel, where it is 3 to $3\frac{1}{2}$ feet wide, composed of quartz and lode slate. The quartz is well mineralised.

One and a half chain further south another cut has been put through this reef, which maintains its characteristics and is better defined. It here has a width of $1\frac{1}{2}$ foot. It is jointed into solid cubical blocks, and is strongly impregnated with pyrite.

A little further south it has been cut into again, showing about a couple of feet of bluish laminated quartz. It has been again trenched further to the south, being exposed in this way by successive cuts for a length of about 600 feet. It is thus strongly persistent, and there is no doubt about its promising appearance. I sampled two of the cuts; the last but one gave 11 dwts. gold per ton, the other 4 dwts. gold per ton. It is not to be expected that this long run of stone will prove of equal value throughout. In its free gold contents it is probably inferior to the tunnel reef; the gold associated with the pyrites will be found to be its most important feature.

A good trial could be given it by putting in a crosscut 200 to 300 feet from lower down the hill. It dips into the hill at an angle of 66° to 76°, which will contribute to the length of the crosscut; or if a shaft on the tunnel reef be decided on, it could be reached from that by a crosscut in depth. The adit crosscut, however, is preferable.

There was very little water in the creek when I was there. The quantity would, no doubt, be increased in winter, but to

what extent can only be ascertained by those on the spot. The machinery site would have to be lower down the valley.

I understand that an amalgamation of this property with the Una group further north is talked of, in which case the quartz from that group would be conveyed down the creek to a battery to be erected below this mine.

As far as the tunnel reef is concerned, a winze might first be sunk on the good stone to see how it continues underfoot, and if the result is satisfactory, shaft-sinking should be arranged for.

There appear to be local concentrations of metal in the reefs, parts being poor, and other portions carrying a fair proportion of gold. If the existence of a long enough shoot of the higher grade stone can be established, the facilities for mining it, especially in conjunction with the neighbouring properties mentioned, will add greatly to the importance of the mine. Up to the present work appears to have been carried on rather timidly, probably being considered as being of a preliminary nature. The more recent discovery, too, of what would seem to be the more important new reef, has possibly delayed decision as to the first point of attack.

Besides work on the known reefs, an exploratory crosscut could very well be continued past the new reef into the hill. Reefs in this belt of country are known often not to rise to surface, and can only be disclosed by underground work. It cannot be too well borne in mind that parallel reefs in this zone are the rule and not the exception, and that a reef generally has its companion not very far off. Capital provided for any of these properties should include a sufficient amount for exploratory work to a reasonable extent.

### *Una Mines.*

This group comprises the most northerly sections on the field. They are situate from ½ to ¾ mile north-west of the Hinemoa, and include Sections 134G, 10 acres, R. O'Brien; 298G, 5 acres, P. Counsel; 133G, 10 acres, B. Soley; and 337G, 10 acres, to the south of the above, has been taken up by W. J. Conder.

The old Una workings are on Soley's and O'Brien's sections, the low tunnel and battery site being on Soley's, and the top tunnel, where the main workings were, on O'Brien's. P. Counsel's small section is between these two.

The main work has been done at the upper tunnel, ¾ mile north-west from the Hinemoa. This is just inside O'Brien's

south boundary, and is driven from the creek N. 25° W. on the main line of reef. The country-rock is slate, dipping south-west. About a chain in there is a step in the level, where the timber has given way, and I did not go beyond this. Further in I understand the reef was faulted or turned, and the level was continued another 90 feet in country-rock, but that a crosscut west was put in recently and recovered the reef, said to be 2 feet wide and gold-bearing. A small prospecting shaft was sunk 30 feet on the reef many years ago ahead of this tunnel, and produced highly payable stone.

The first crushings from the level stopes are reported to have been good, the later ones less so, and the proprietors went off to the western silverfields. There was a 5-head battery on Soley's section, which was afterwards taken to the Starlight, and then to the City of Melbourne Mine. There is a small underhand stope at the tunnel entrance, and the last crushing was taken out from this and carted to Alberton, *viâ* Ringarooma.

Mr. G. P. Sinclair, of Zeehan, who examined the workings last year, reports that the reef is 2 feet wide in the back of the drive, and has widened to 5 feet in the sole, and that his samples assayed 15 dwts. gold per ton. Mr. Hickson dollied at one time 21 ozs. from 3 tons of stone from this reef.

Inside the northern boundary of Soley's section a low tunnel on the west side of the creek and 15 feet above it has been driven 80 feet W. 30° S. across slates bearing N. 5° W. and dipping west. A make of quartz has come in in the end, and a drive has been put in north-west for about 50 feet on 18 inches of impure stone and veined country. The stone is more solid in the first part of the drive, but in the end degenerates into veined country-rock. If the tunnel were continued into the hill it would cut ths main lode within a few chains.

Northwards the main lode runs through P. Counsel's section, where it has been trenched in a few places. Inside Sohle's south boundary it is well exposed by a cut in the hillside, where a good strong body of quartz 3 feet wide has been broken through. At this point the assay of my samplings gave a return of 6 dwts. gold per ton, The reef consists of nice-looking grey-mottled stone carrying pyrite and a little copper pyrites with some graphitic slate. It extends southwards into W. J. Conder's section.

It is thus a long persistent reef running through all the properties, and from its direction may junction further south with a small but rich iron sulphide lode, which has been cut

into at creek-level on Soley's section. This is a vein of quartz very highly mineralised with arsenical and iron pyrites, 8 inches to 1 foot in width, which has been exposed just below the soil for about 14 feet, running north and south. Hardly enough work has been done on it to enable a proper opinion to be formed of its value, but samples which I took from it assayed 14 dwts. 16 grs. gold per ton. Mr. G. P. Sinclair obtained some very high assay results from this lode, viz:—9 ozs. 10 dwts. and 2 ozs. 4 dwts. gold per ton.

Other lodes are said to exist on the properties, but since work ceased the growth of fern, &c., has been considerable, and is an obstacle to examination. For a satisfactory inspection, a little work is needed in the way of clearing the ground, exposing the outcrops, deepening the trenches, putting the tunnel in order, &c. From what I could see, however, it was quite apparent that a resumption of work is warranted. All the work done hitherto has been very shallow, and it was suspended when the first difficulty was encountered. The low tunnel has not been driven far enough to intersect the main reef, and a good part of the upper tunnel would appear to have been driven off the reef. This reef, being a long one, is likely to carry different shoots in different parts of its course, and when the position of a shoot has been defined, it should be followed both horizontally and vertically. Good backs for driving are obtainable northwards, but not much can be got along the course of the reef southwards, and sinking eventually will become a necessity.

The mine is 500 to 600 feet higher that the Hinemoa, and the creek runs from one mine to the other.

*Conclusion.*

In travelling over a field which has been neglected for a time, I should have experienced greater difficulty had it not been for the assistance of those on the spot with local knowledge. For aid in this direction I beg to acknowledge my indebtedness to Mr. T. Hickson and Mr. Armitage; also to Mr. S. P. Crisp and to his representative, Mr. F. J. Ernst, F.R.G.S., who made arrangements for my stay in the bush, and likewise kindly allowed me to make use of several of his reef surveys, which were of assistance to me in preparing this Report. When I am on the Mathinna field, I think it will be desirable for me to return to this

district and connect the strata instrumentally both with North Mount Victoria and Mathinna, as all three fields form a geological unit.

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

W. H. TWELVETREES,
*Government Geologist.*

W A PRETYMAN, *Esq.*,
*Acting Secretary for Mines,*
*Hobart.*

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JOHN VAIL,
GOVERNMENT PRINTER, TASMANIA.