REPORT ON MATHINNA GOLD-FIELD.

PART II.

[With Two Plans.]

Government Geologist's Office,
Launceston, 27th August, 1906.

SIR,

I HAVE the honour to submit Part II. of my Report on the Mathinna Gold-field. Part I. dealt with the properties on the Gate line of reef, from the New Golden Gate northwards. I now proceed to notice those in the southern part of the field.

The same belt of reefing-country continues southwards through the sections 425-G, W. D. Stephens; 423-G, Stevens and Dick (Miner's Dream); 422-G, W. D. Stevens (South Miner's Dream—now A. J. Gabell); 426-G, G. Webb; 471-G, Volunteer Consolidated Extended; 419-93G, Telegraph; 409-93G, City; 322-G and 209-93G, Jubilee and Mountaineer. This is as far south as I have gone yet; but before I have finished with the field I expect to trace the line still further in that direction, as I find the strong axial fold of the country persistent through to the Jubilee; the strata north of the Jubilee Creek underlying east, and south of it underlying west. There is, therefore, a very good reason why reefs should be met with all along this line. The more I examine this zone the more astounded I am at the pessimism of those who look upon it as exhausted. This line, running north and south for 20 miles, denotes a persistence of gold quartz to great depths, and stamps the districts through which it passes as permanent gold-fields for generations to come.

The Hill ridge, south of the South Gate shaft, follows a direction east of south, falling into a saddle south of the mine, and then rising past the Pride of Mathinna shaft and, further on, the old Telegraph shaft. In the saddle at the race the slates are vertical, and fall away east and west from this line towards the Long Gully on the one side, and Black Horse Gully on the other. The first mine met with on this line is—

The Miner's Dream.

This is on Section 423-G, 12 acres, in the name of W. G. Stevens and D. Dick. Three chains south of the

north boundary, and 2½ chains east of the west boundary, is the old Pride of Mathinna shaft, which was sunk 70 feet to intersect a small north-west reef trenched upon at surface. This was cut in a crosscut at 50 feet east from the shaft, dipping east, but no definite information about it is obtainable. It is said to have been only a foot wide where it was cut. It is a little too far west to be a continuation of either of the South Gate east reefs; on the other hand, it ought to have been intersected in the west crosscut from the South Gate shaft. A formation, or wall, is shown on the mine-plan in the west crosscut, at 107 feet west of shaft, about where the Pride of Mathinna vein would come in; but to connect the two is quite speculative.

The work preliminary to the discovery of the Miner's Dream reef consisted of loaming up the east side of the hill from the race. A little gold was always followed, and 9 feet west from the shaft on the west side of the hill the discovery was made which led to the present sink and drive being undertaken. This was towards the end of 1903, and in a few months' time the fortunate finders obtained 140 ozs. of gold, valued at £4 0s. 5d. per oz. The mine has been worked only on the scale of a working miner's claim, but the quality of the stone has been excellent. The quartz has been crushed at the Volunteer Consolidated Company's battery, and the output has been as follows: —

	Quartz crushed.	Gold obtained.
For quarter ending—	tons.	ozs. dwts.
31st March, 1904...	10	50 0
30th June, 1904	11	90 10
30th September, 1904	11	57 4
30th June, 1905	12	40 0
30th September, 1905	13	37 11
31st December, 1905	10	26 0

The discovery of this reef after the spot had been tramped over for years is another instance of how gold-bearing stone may exist anywhere just below the surface in this belt unsuspected and unworked.

A small vertical shaft has been sunk on the western slope of the hill for 20 feet; and then a rather flat reef has been followed down for 150 feet on the underlay, bringing the present end to 100 feet below the surface, which is as far as it can be extended with the present system of working. The average underlay of the reef is about 27° from the horizontal, though at the end it has

become a little steeper. The width or thickness of the stone has varied from 1 foot to 2 feet. The mean direction of the drive is S. 50° E. No crosscuts have been put in from the drive, and, accordingly, very little knowledge of the reef is ascertainable. We do not even know at what angle to the strike the drive has gone in on. If at right angles, the reef ought to outcrop just east of the Pride of Mathinna shaft, and would be too far east to be cut in the crosscut from that shaft. From the indications, however, it seems more probable that the real strike of the reef is a few degrees west of north, and that the drive has been taken obliquely across it. But in this case it ought to have been seen in the old shaft. We shall not learn anything definite until more work has been done. The reef-quartz is white with rusty stains, and carries a little mineral, and the veinstone has been followed all along the floor of the drive. In the face it is growing steeper, as if it might change into a vertical vein, and the slate strata are dipping north-east. To continue work in this mine a new shaft further east and higher up the hill will have to be sunk, which is warranted by the good returns obtained from the stone. The work has now grown beyond the resources of working miners. The mine is situate in the Gate reefing-belt, and deserves to be proved in a serious way. It is quite possible that the flat lode may prove to be a feeder of, or dropper from, a more important reef. On the other hand, it may be that it is quite independent of any vertical reef, and in that case it will be rather difficult to work. This, however, can only be settled by further work, and as the vein has been such a good gold-producer, it ought to have a thorough trial.

About 40 feet south of the shaft a small shaft has been sunk to 35 feet, and intersected a flat gold-bearing vein, which was not payable at that point. This is probably the same as the main lode. In a pit a little further south a reef was cut about 18 inches wide, striking east into the hill, with a southerly outlay. A ton of the stone was crushed with the richer stuff from the other workings, and it was estimated to be worth 15 dwts. per ton. This will be found to intersect the flat reef in the hill, and there is a chance of something being found at the junction.

South Miner's Dream.

South and adjoining the Miner's Dream is the South Miner's Dream, a 10-acre section hitherto held by W. D. Stevens (422-G), but now held by Mr. A. J. Gabell.

An attempt has been made to intersect the Miner's Dream reef, about 500 feet further south, by driving a tunnel from the Long Gully side of the hill. The tunnel has been started 40 feet above the New Golden Gate Company's race in the abandoned section (439-G), and driven 380 feet in the direction S. 55° W. into the hill, through slate underlying east.

At 158 feet in, a reef formation about 2 feet wide was passed through, consisting of broken slate and three or four bands of quartz, from 2 inches to 7 inches in width, the whole underlying east, at an angle of 70°. It is said to be just gold-bearing.

One hundred and fifty-four feet further in is another reef formation, 2½ feet wide, carrying 7 inches of white quartz, also carrying gold, but even less than the first reef.

Seventy feet further is the end. The adit has just been driven far enough to reach the line of the Miner's Dream workings, but it must not be forgotten that those workings will plunge below the level of this adit. The only chance which it seems to me that the adit has, and it is a fair one, is of cutting some reef in the heart of the hill. Judging from the quantity of loose quartz lying on the surface of the ground ahead of the adit face, there ought to be some undiscovered reef between here and the crest of the hill. In addition to this, the position is excellent, being in the centre of the reefing-belt.

Volunteer Consolidated Extended.

This company owns two sections south of the South Miner's Dream, viz., 426-G (8 acres), in the name of G. Webb; and 471-G (10 acres), charted in the name of the company. The work is being carried on upon the latter section. This mine is situate up the Black Horse Gully, about 180 feet above Mathinna. Mr. J. Turner found gold here, and was joined by Mr. Webb and another, but they did not succeed in picking up the reef; and when the company suspended operations on its leases west of the township, it took this claim in hand.

The upper workings comprise an adit driven into the hill north-east for 60 feet, 45 feet of which have been across what appears to be a fault-fissure formation, consisting of rubbly clay, slate and lumps and arched bands of quartzite, mixed with a little vein-quartz. The adit has been driven right across this into slate. At 16 feet in the drive, a crosscut has been put in N. 38° W. for

17 feet on the course of the formation, which dips north-easterly into the hill; an opposite direction to that of the enclosing slates, which dip south-westerly. From a winze inside the entrance, and 12 feet below the adit, a crosscut was driven for 17 feet south-east, but this is inaccessible. In driving the above adit 23 tons of dirt were crushed at the Volunteer battery, and returned 6 dwts. 18 grs. gold per ton. The width of this formation in the adit is 45 feet. The prevalence of quartzite, and the small quantity of purely vein-quartz, are remarkable. The reason is most likely to be that a bed of sandstone alternated here with the slate. It has been shattered, in all probability, by faulting, and permeated by silica from veins carrying gold.

At the entrance of the adit an underlay shaft has been sunk for 50 feet. At 6 feet from surface the rubble formation was lost, and slate entered. Twelve feet from the bottom of the shaft a small vein, 3 inches wide, of quartz and quartzite was struck, which has expanded from 10 inches to a foot in width, and has been followed south-east for 60 feet on the northern wall of the drive. A little behind the end the stone is a foot wide, but does not carry gold there. At intervals in the drive, it is being bored through with a view of ascertaining its value. The reef does not come away easily from the country; and at my last visit I found it had pinched in the end of the drive, though it still appears to continue. A short crosscut has been put in behind the end, but will have to go a little further to intersect the formation.

At 20 feet from the shaft crosscuts have been driven—one, 29 feet north-east; the other, 28 feet south-west. At a few feet in the south-west crosscut the same rubbly formation is met with as was cut in the upper level, but here it is not more than 12 feet wide. It rises in a peculiar manner to 10 feet above the roof, and is then covered by solid slate rock. The veins in it are flat. A little slate underlies it at the entrance to the crosscut, and slate overlies it in the end. The covering of slate may be explained by irregularity of wall of the formation-channel causing overhanging projections of the enclosing slate. Near the entrance to this crosscut is a 5-in. band of quartz, said to be gold-bearing, underlying the formation and separated from it by a little slate. In the end of the crosscut is slate, with normal dip to the south-west. Although the soft formation closes in over the roof of the drive, I believe it is continuous with the channel intersected in the upper adit.

In the north-east crosscut, which is through slate, dipping south-west, at about 10 feet a little gold-bearing stone was met with in the sole of the drive. In the end a small quartz formation is showing.

The small vein followed in the main drive has been ery persistent, but it is of subordinate importance to the fault-formation, though proportionately richer in gold. The veinstone is for the most part quartzite or sericitised sandstone (wall-rock), veined with a little pure vitreous quartz. The most feasible method of development will be to follow it into the hill, and crosscut west at intervals through the parallel formation until the latter begins to carry solid stone. If this is unsuccessful, sinking will have to be resorted to, for all the gold in the crush-dirt of the formation has certainly come from lode action somewhere in this channel.

A shaft a little higher up the hill is necessary to test this reef-channel at a proper depth.

The formation and vein strike in the direction of the old Telegraph shaft higher up the hill. They are probably parallel to that reef, and this indicates the existence on the property of a zone of reefs running N.W.—S.E., which should be traversed in depth by crosscuts from a main shaft.

This zone is west of the Gate zone.

Telegraph Mine.

About 500 feet south of the Volunteer Consolidated Extended boundary is the old Telegraph shaft, which was sunk 55 feet on a quartz vein 12 to 18 inches wide, running N.W.—S.E. An adit was started to come under the shaft from the east side of the hill, and is said to have passed through unimportant veinlets of quartz, but nothing solid and defined. Work was suspended fifteen years ago, but the continuation of the adit would be good work, as it would prove the hill at a rather favourable point; for the quantity of quartz lying about at surface is considerable, and points to the existence of a yet undiscovered reef. Less than 300 feet more driving is required to bring the adit end under the old shaft.

City Mine.

In the south-west corner of Section 400-93G are the workings of the old City P.A. A tunnel was driven east from the west boundary of the section for about 120 feet, and at 50 feet a wide mullocky formation was struck,

carrying quartz and pyrites. This was driven through for 25 feet, and appeared to strike a few degrees west of north, with an easterly dip. The width of this channel, and its position, have suggested the idea that it may be identical with one of those met with in the east crosscut in the South Gate Mine. The distance between the two is nearly half a mile, and the bearings are not quite the same, but we undoubtedly have here a prolongation of the same reefing-line. The more important matter, however, is to settle the relations of this reef with that of the Jubilee Mine, which is not far to the south.

A small shaft has been sunk at 60 or 70 feet above the adit, but I have no information about it.

Jubilee Mine.

This property comprises four sections—322, 323, 324-G, and 209-93G; in all, 40 acres. It was originally known as the Derby. The Derby Company opened up the mine on the Sections 209 and 322, which are on the Gate axial line, and three-quarters of a mile south of that mine. A good length of reef was worked—about 300 feet on the Derby reef, and nearly 200 feet on the Flat reef. A main shaft (the Derby shaft) was sunk 150 feet, and a crosscut driven to the reef, and some distance south on it, which carried gold at that point, but not enough to be payable. The reef had been stoped up to the surface from creek-level and 40 feet below, with good results. The average yield from the two reefs is reported as having been 1 oz. per ton. Operations were suspended in 1881. The Jubilee Gold Mining Company took over the mine in 1887, and did a little work on the Flat reef, which gave them stone averaging 9 to 10 dwts. per ton. This Flat reef is one which is situated a little farther to the north, but slightly to the east of the main reef, and has at one time connected with the latter at a higher level. This connection has been denuded, and the two are now quite separate. Two tunnels were driven on the Flat reef, and the stone stoped out between them and to surface.

In 1896 the Tasmanian Exploration Company Limited, took over the leases; and in 1897 cleaned out the main shaft to 168 feet, and cut it down and timbered it to the 160-feet level. Sinking was resumed, and the shaft deepened to 272 feet by May in the same year. The mine survey shows that the crosscut south-west from the main shaft intersected the reef at the 160-feet level, at 98 feet

from shaft. From reports which have been kindly placed at my disposal by Mr. H. J. Wise, I gather that the reef at that point was strong, and 3 feet in width. In the drive south the width of the reef decreased to 2 feet, carrying 18 inches of solid mineralised stone, and at 150 feet from crosscut was only 6 inches wide. Driving was discontinued at 177 feet. A winze was sunk for 42 feet from this level below the old stopes overhead; but it only showed clean slate, with a small seam of pug on footwall.

The north drive at this level was on a reef 2 to 3 feet wide, but poor; and at 68 feet it showed only 6 inches of stone on footwall side. A large quantity of stone had been taken out previously over the drive and near the surface, and it was thought that the drive would enter payable ground. A slide, however, displaced the stone; and the same displacement was met with in a winze from the floor of this level.

The main crosscut was driven to 318 feet from the shaft through slate, which, at 160 feet, changed from green to dark blue, of a very favourable character. At 188 feet, bunches of quartz were passed through, letting out a good deal of water; and at 200 feet numerous mineralised quartz leaders were intersected. This quartz zone continued for a width of 70 feet, when clean slate country was again driven in to a distance of 318 feet from the main shaft.

The main crosscut was also driven north-east from the shaft for 38 feet through hard slate with bands of quartz, when, from the plan, a reef-formation would appear to have been struck and driven on north. Where intersected it was 18 inches wide, and well defined. In driving north it widened to 3½ feet, between two good hard walls, carrying highly-mineralised stone 2 feet wide, but of poor quality. It was eventually reported as small, and tight for driving.

260-*feet Level.*—At this level crosscuts have been driven from the main shaft 183 feet south-west, and 38 feet north-east.

On starting the south-west crosscut 4 feet of quartz spurs were driven through, and at 85 feet quartz veins were again passed through for 2 feet. At 112 feet a channel was struck carrying 3 feet of stone, and a drive south was put in on its course for 140 feet. The reef soon fell off in width, and degenerated into bunches of quartz, and eventually to a small leader. All through this drive the stone was of poor quality. The western exten-

sion of the main crosscut passed through slate country, dipping south-west.

No. 1 Tunnel.—An adit was driven in the early days north of the present workings in a north-easterly direction for 70 feet; and as the recent Company, in stripping the main shaft, passed through a quartz formation at 20 feet from the surface (striking north and dipping east), it was decided to extend the adit with a view of proving whether this formation was connected with the gold-bearing stone previously worked. The extension was driven to 100 feet, through slate with mineralised quartz leaders.

No. 2 Tunnel.—120 feet further north is a parallel tunnel, which has been driven 217 feet into the hill. At 90 feet in is an old drive south, connecting the two adits, and at 120 feet beyond this a drive north-west was put in on the course of the reef for 50 feet. This reef was, where struck, a strong body of quartz full width of the drive, carrying a good deal of iron pyrites, galena, and a little gold. At 30 feet in the drive the quartz was still wide, but poor, and the lode walls were irregular and broken. At 47 feet a big body of stone was reported as still in the face, but its full size is not known, as the hanging-wall was not carried. A small winze was started in this drive, but passed through the reef not far below the floor or level.

The adit was continued north-east in slate, with numerous mineralised quartz leaders; and at 200 feet a hard wall was struck, dipping east about 2 in 6, and carrying 3 inches of soft flucan and 6 inches of highly-mineralised stone. This was driven on 16 feet north, the formation being gold-bearing, 2 feet wide, and showing 8 inches of stone. It becoming small and somewhat broken, a drive was started on it south-east, and continued for 30 feet. The reef carried a little loose gold, and varied from 6 inches to 2 feet in width. As it showed signs of strengthening underfoot, a winze was begun on the gold-bearing stone passed through in driving the adit. Here it was solid, fully 4 feet wide, but of rather poor quality. At 20 feet down, the main hanging-wall was struck, underlying east 1 in 6. The formation at that point was 2 feet of dark slate and quartz, and the hanging-wall portion carried a little gold. At 45 feet down the reef was small, but more defined.

The work done from the old tunnel on the south side of the creek is inaccessible, and I can only refer to Mr. Montgomery's report. The ground has been stoped from the back of the tunnel near creek-level to surface for a

length of 140 feet, and north of the tunnel for about 40 feet down from surface for a length of 190 feet. At the end of the tunnel, which has been driven 216 feet in a south-easterly direction, a branch reef comes in, known as Stevens' reef, which was reported as carrying 18 inches of stone. It appears to have been driven upon 32 feet north-west.

Inspection of the plan shows where work in this mine might be usefully resumed. The 260-feet level is so far to the south-west that it involves a change in the underlay of the reef, which, however, seems well established as being to the north-east. The inference to be drawn is that the reef-channel has been passed through in the crosscut unnoticed, and that the reef at that level has not been proved at all. The bunchy quartz followed was probably mere country quartz. It would seem to be good policy to examine the crosscut carefully, and pick up the true reef-channel for driving.

The parallel reef east of the shaft has been driven on very little. It appears to have been well defined, and carrying promising quantities of pyrites. The mere fact of it diminishing in size when work was suspended should not prevent further work on it. I am credibly informed that, in general, it was an encouraging lode, and considered likely to make stone at any time. There is now a level at 260 feet, and this reef might well be proved at that depth.

It will be gathered that I do not consider that the property has yet had an exhaustive trial, and it would be a pity not to test it thoroughly, after obtaining such good yields from the upper part of the reef.

As for the Flat reef, such reefs are always difficult to work, and are often more important for what they lead to than for what they are in themselves. A good deal of quartz has been crushed from it, and it is probably connected with a reef of the normal character; perhaps with the eastern reef.

Between the City tunnel and the North Jubilee workings encouraging loams have been got on the side of the hill. I understand that at the north end of the old surface-workings 35 ozs. of gold were obtained from 30 tons of stuff. There is no doubt that the property is a seat of lode action. It is to be noted that in the western part of the workings the country underlies south-west, as is also seen at surface, while near the main shaft the underlay is towards the north-east. This, and the general

position, show that the mine is on the Gate axial fold. This circumstance has weight with me in considering the likelihood of gold existing in depth. The probabilities are neither more nor less than those for the Mathinna field proper, and if there are reasons for believing that field worth working seriously, the same reasons hold good here also.

Mountaineer.

South-east from the Jubilee, and between 200 and 300 feet up the steep hill which rises from the south side of the creek, are old workings, respecting which I was unable to obtain information. Some shafts have been sunk and adits driven, in one of which I noticed the stone was 12 to 16 inches wide. The reefs worked have a north-west strike, and a north-east underlay. It is the continuation of the Mathinna belt; and though there may not be much to induce expenditure on the hill flank, reef-channels will undoubtedly persist in depth, and it will probably be found here, as elsewhere in this district, that deep mining is the only class that will pay.

This is the farthest south to which I have as yet traced the Gate axial line. To the west of this line there is another reefing-belt, in which the reef-fractures take a more westerly direction, while the strikes of the strata and the cleavage planes remain generally the same.

This is an intermediate zone, between that of the Gate and the City of Hobart, and comprises, at the southern end of the field (which is the portion examined so far), the reefs of the Gladstone hill, the Eldorado, and the Victorian Golden Gate. The most southerly property is the—

Gladstone.

Section 1033-87G (10 *acres*).—This section is on the steep slope of the high hill south of the Eldorado, and the old workings were on a reef parallel to that one. The strike is N. 70° W., and the underlay to west of south. The reef is about 2 feet wide, and crosses the country slate, which bears N. 20° W., and dips south-west. The old timbered shaft, 6 feet 6 inches by 4 feet, is filled with water. To the west, the reef has been worked down from surface to 15 or 20 feet for a distance of a chain, and nearer the shaft to 30 or 40 feet. Mr. Guy took a crushing from this of about 10 tons, which, he says, averaged 12 dwts. The old crushings are said to have been 60 tons, worth 9 to 11 dwts. gold per ton. I am informed

that this was amongst the earliest reefs opened upon at Mathinna. The distribution of gold in it, however, was found to be irregular. It is situate a good way up on the north fall of the spur, which is separated by a deep ravine from the Eldorado property.

For 300 feet east of this is a series of trenches and shallow shafts on other reefs. The most easterly shaft was put down a couple of years ago on a reef coursing N. 55° E., and is stated to have given a small crushing of rich stone. The average width of quartz is 4 to 6 inches. A couple of chains further west a shaft has been sunk on a 6-feet formation of country slate, with bands of vitreous quartz, not well exposed. Between this and the old main shaft the ground has been trenched at one or two points, but as it is near the crest of the spur, not much backs are available.

About 300 feet up the hill to the south-west is a reef-line running N. 50° W., underlying south-west, and carrying a foot of strong white quartz, said to be of low grade. Mr. Stevens opened a cut upon it between two and three years ago, and other openings have been made further west, but nothing very rich has been found so far. The reef continues right through the section. Oxidised veinlets traverse the stone, and the gold probably has its source in these, for no mineral is visible in the quartz.

About 2½ chains west from the preceding, and higher up the hill, T. Parker has opened upon a parallel reef striking N. 25° W., and dipping south-west. The stone has much the same character as that of the other reef, but fair prospects of gold are obtainable. The quartz is about a foot wide.

Near the above is Guy's reef, with a foot of quartz exposed in the cut. The reef is said to be 2½ feet wide, and some good gold was found at one spot, but not picked up again. The strike is N. 55° W., and dip south-west. It is here 400 feet above the road, and just south-west is the hill summit. The reef crosses the spur, and would have to be worked from lower down. Unfortunately, it dips into the hill, and the spur is not very wide.

Further along towards the north-west corner Mr. Clarke has trenched up the hill from the gully on the boundary. Loose stone was found, and good gold prospects obtained. Further south some solid quartz was met with, but poor.

The whole of the hillside is strewn with quartz, and a lot of superficial prospecting has been carried on. Gold

has been found in several places, but it has given out, and men have continued work only as far as they could get down with the pick.

Most of the reefs course north of west and south of east, and this strike would take them into the Volunteer Consolidated Extended and Telegraph sections, on the eastern side of Black Horse Gully. They are not wide at surface, but they are numerous, and superficially have shown short shoots of gold frequent enough to suggest that deeper exploratory work might result in something a good deal better than has been found hitherto.

Ophir (formerly North and New Eldorado Mines).

Sections 1629-93G (New Eldorado), 1630-93G, 1631-93G, 1632-93G, 1633-93G, 1652-93G (North Eldorado)—in all, 52 acres; charted in the name of J. N. Lawson.

The principal works are situated on 1629 and 1652, nearly three-quarters of a mile south of the Mathinna township. The old work done from the former main shaft and from the upper tunnel was examined by Mr. Montgomery, and described by him in 1892.

The present company has done a little work from the old upper drive, prospected at surface in different parts of the property, and sunk a new main shaft to a depth of 121 feet in the north-west corner of Section 1652. The idea seems to have been to sink here to some depth and crosscut east and west, perhaps more particularly east, to intersect the supposed faulted part of the New Golden Gate reef south of the crosscourse in that mine. The policy is sound, provided the reef in question has really been faulted, for its heave, according to all the rules of faulting, should be to the west of the Gate drives. But I have shown in my previous report that there is reason to doubt whether faulting has actually taken place, and the exploratory crosscut west from the 1200-feet level has not come across the missing part of the reef, though it has been advanced to within 90 feet of the western boundary of the 3-acres section. That is to say, the crosscut has reached a line which, if produced southwards into the Ophir section, would be about the same distance, viz., 90 feet east of the Ophir new main shaft. This zone of 90 feet accordingly represents a distance which has not been proved, and in which the lost reef could occur if, as said above, it has been displaced by a fault. To set this question at rest, the shaft might be deepened another 100 or 150 feet, and the crosscut east driven at that

depth. I do not think that it is necessary to sink deeper than that for this purpose before opening out, for at this depth the country rock will be found perfectly solid and favourable for reefs.

The shaft, however, is in a position for proving, by means of a crosscut at any depth that may be determined upon, the formations which were intersected by the old North Eldorado adit, 3 chains to the east. The old underlay shaft, 170 feet north of the new shaft, is said to have been sunk 110 feet on a reef running N.W.—S.E., about 18 inches wide, and a few tons of quartz crushed. The adit was driven to prove this reef, and has been put in 400 feet in a south-westerly direction. The first formation of any note that was passed through is a quartz vein 18 inches wide, dipping north-east at 70°. This was also cut towards the bottom of the new shaft, where it yielded a few colours of gold. Past the intersection in the adit quartz is occasionally seen in lumps and patches associated with flat arches of quartzite. Bunchy quartz in a belt of sandstone 3½ feet wide would appear to represent the reef sunk on by the old 110-feet shaft; at least, according to its position, but the two are dipping in opposite directions. At 30 feet behind the end of the adit a winze has been sunk 34 feet, where there is a quartz formation about 1 foot wide; and in the end, another quartz and quartzite formation, dipping flat to to the west, is visible. The quartz all through this adit is barren, so the gold-bearing stone taken out of the 110-feet shaft must have been a short shoot. The line of the winze reef is about 200 feet south-west of the new shaft, and as it is underlying into the hill, the deeper the shaft is sunk the further the crosscut will have to be driven. The same applies to the reef at the 110-feet shaft. A crosscut of about 500 feet from the new shaft, in a south-west direction, would prove all ground between the shaft and the new Eldorado adit, but it should be looked upon as purely speculative and prospecting work.

New Eldorado (*Section* 1629).—The old work done on this has been described in detail by Mr. Montgomery, and there is no necessity for me to go over the ground covered by his report. The surface workings in the centre of the section show that a reef half a foot to 2 feet in width runs in a direction 20° south of east, and has been stoped down to varying depths, the maximum being over 50 feet. The stone is said to have yielded

from 18 dwts. to 1 oz. of gold per ton, and some of it nearly 4 ozs. per ton. The old drive east is now unsafe, and the stopes above are inaccessible. An underlay winze has been recently sunk from this drive to a depth of 42 feet on quartz which yields prospects of gold, but not payable. A little free gold is noticeable. In the drive above this winze, onwards for 50 feet, the quartz has been found gold-bearing, and the work has connected with the old workings on the surface. The main adit, continued further south for 20 feet, passes through what has been regarded as the other part of the reef, which has been followed for a couple of hundred feet west. The channel is 4 to 5 feet wide, filled with clay and soft rock. A winze sunk near the beginning of the drive went down 60 feet, carrying a couple of inches of stone on the south wall. A little west of this a rise has been put up 18 feet, but no stone stoped from it. A small vein of milky quartz has been followed in the drive, but it was not worth anything, though a nice bit of stone was met with now and then. A flat lode crosses the drive from north to south, dipping east at right angles to the southerly dip of the main reef. It has been driven upon south, but the drive is filled with mullock. At the west end of the main level the vein is small and tight, carrying a little gold, but practically of no value. A crosscut north from this level might have disclosed better stone, but nothing permanent can be expected without proving at greater depth. The disturbances in consequence of slides will make work rather difficult and uncertain. A little work has been done by a short drive east, but very little stone was met with. A main shaft was sunk in the south-east part of this section to a depth of 171 feet, and a crosscut begun at the 163-feet level to intersect the reef at somewhat more than 100 feet below the levels just described. I could not learn in which direction this crosscut had been driven, but the best direction for avoiding the disturbed ground and reaching the reef quickly would be due north.

New Eldorado (Section 1630).—On this section, 120 feet north of the south boundary, is an old underlay shaft (Whip shaft), sunk to 113 feet, from which, I undertsand, three short drives were put in on a reef about a foot wide. Mr. Montgomery reports 77 tons as being taken from this shaft, and yielding 105 ozs. of gold. The reef runs about east and west, and dips to the south,

The works are inaccessible now, but the good stone found in the old days makes it likely that there is something here which is worth exploring. No solid stone is seen, and probably the reef consisted of bands or leaders in comparatively soft slate. Some recent trenching to the east disclosed a little gold in the softened slate. The ground in this part of the section is traversed by several outcropping veins, which have been tested by Mr. Hitchcock, the mine manager; but as the result in each case is about the same, I need not particularise. Some long outcrops have been sunk or trenched upon, and have occasionally given gold prospects, but when followed down a little the quartz is replaced by clean country.

Section 1632.—This section is traversed by more than one line of reefs, running north-west. One such line passes out of the section, at its north-west corner; another passes south-east down below the Whip shaft. These lode-lines are characterised by short shoots of quartz with variable gold contents. The country is slate, with thin beds of sandstone, often sericitised, striking N. 30° W., and dipping south-west. A good deal of trenching and superficial work has been done on these lines, and the quartz, rather white and free from sulphides, should be favourable for specimen gold. Its occurrence is so irregular at and near the surface that up to the present shallow work has been unsuccessful. Either something more definite will have to be located or hopes must be fixed on deep exploration.

During the past year the Ophir sections have been diligently prospected by Mr. Hitchcock without coming upon anything which promises to be permanent. The work offering most result appears to be the deepening of the new main shaft, and exploring from it into the hill. We are here in a different zone of reefing-country from that of the Gate line. The reefs run much more west of north, and seem to be subsidiary to the main north and south reef-lines of the district, filling fractures which, as it were, connect the parallel north and south main zones. This makes any prediction hazardous, but it is probable that the good stone formerly met with at comparatively shallow levels will be replaced in depth by a more permanent make, provided that the troublesome faults can be avoided. The chance of meeting with a faulted part of the Gate reef is slender; but, apart from that, the property offers facilities and fair prospects for deeper exploratory work.

Victorian Golden Gate.

This property comprises Section 527-G (10 acres), in the name of S. J. Plain, and Section 349G (10 acres), in the names of G. T. Gibson and J. F. O'Kelly, and is situate about 50 chains south of the Mathinna township.

The recent work is in the southern part of Section 527-G, where, at the bottom of the hill, west of the Eldorado, a crosscut has been driven north-east across grey slates, which dip south-west. At 222 feet in, a reef has been intersected, which appears to run, roughly, in a south-easterly direction. It was followed for 30 feet, and then sunk on by an underlay-winze for 30 feet; but in the drive east of the winze it has been lost, and not recovered, though the level was continued for 200 feet further. The continuation, however, has pursued a north-east direction, which is hopelessly wrong, being nearly at right angles to the observed course of the reef. The position of the workings is not favourable for shallow drives, as the reef will pass under the gully just ahead, but backs can be obtained once the gully is passed. I could learn nothing about results from the quartz taken from the reef. The first thing necessary to be done at this mine is to find the continuation of the reef. It must also be made clear whether it has been displaced by a fault or left by the altered course of the drive. The reef would appear to bear into the Ophir Section 1632. Judging from general experience on this field, exploration by adit is not favourable for permanent work, the large reefs being developed at considerable depths. The poor and disordered character of the reefs disclosed by adits not far from surface inevitably brings driving to a standstill; and if no capital is provided for the difficulties of deeper work, mines are abandoned, and it is not easy to get them re-started, even when there is fair warant for doing so. This hillside gives evidence of reefs existing, from which a certain amount of stone has been taken, and below the zone of superficial disturbance more solid quartz may be expected to prevail.

In the eastern part of 527-G is a belt of reefing-country 5 or 6 chains wide, which has been prospected by means of numerous trenches and shafts. The stone outcropping is a white, glassy, yellow-stained quartz, generally in light-coloured sericitised sandstone, in bands alternating with slate. O'Kelly's reef, in this belt, has a direction of N. 40° W., and consists of a quartz vein in a small band of sandstone, in slate, in a vertical position. A

little gold has been got in it. This mixture of quartz and sandstone is known locally by the name of "native cat." There are parallel runs of such reefs east of the track up the hill, from which gold has been got in the course of prospecting. These reefs are generally a foot or 15 inches wide.

Some very old workings exist on the western side of the hill down the fall to the tunnel, and a rich patch of gold is said to have been struck at one time.

Section 1154-93G (10 *acres*).

This is a vacant section, formerly in the name of T. C. Goodall, when the name of the mine works was the Golden Gate Hinges, otherwise West Gate. The adit is situate 30 chains south of Mathinna, east of the track up Black Horse Gully, and has been driven N. 49° E. into the Golden Gate ridge for 168 feet. At 20 feet in, a rubbly formation of twisted pyritous graphitic slate, with flat veins and blows of quartz, begins, and continues to the end. At 108 feet in, are a shallow winze and short drive to the north-west. Near the winze, the slate, which elsewhere in the drive has an underlay to the north-east, dips west. The easterly dip of the strata on this side of the hill is only seen elsewhere where the track enters Mathinna, nearly opposite the old post office.

Martyn's Section, 451-G (18 *acres*).

This is in the name of Alex. Forbes Martyn, on the east fall of the City of Hobart hill range, half a mile south-west of Mathinna. At about 60 feet above the valley two shafts have been sunk, 150 feet apart. The north shaft has been sunk 72 feet; and at 60 feet a crosscut was driven east through reef-formation, with bands of quartz, said to be 9 inches wide, well mineralised, and carrying a little gold. The bearing is stated to be north-west, and uncertainty exists as to whether this is the same reef as is seen at the outcrop, or whether there is here a junction of two reefs. The shaft was begun about ten years ago, and good prospects were obtained. It went down for 50 feet on the wall of the reef, nearly vertically, and the latter then went right out of the shaft to the east. The strata also dip east in the crosscut. At 100 feet north of the shaft the reef has been exposed in a trench, 15 feet lower down the hill. Mr. Martyn tells me that the gold is finely disseminated

through the stone, no coarse gold being seen. It is his intention to deepen the shaft another 100 feet; a wise policy as far as it goes, but it should be sunk still deeper. Southwards the reef outcrop has been trenched across at intervals, and the south shaft sunk 8 feet east of it to a depth of 50 feet, and then intersected the reef, which consists there of blue quartz, said to be 8 feet wide. The stone is hard, vughy, mottled, blue quartz. Mr. Martyn sampled it in 2-feet sections, and says that on the footwall the assay yield reached 5 dwts. per ton. An old upper crosscut at 25 feet also intersected the reef for 6 feet. Both reef and country at surface dip west, but in descending, become vertical, and then change their underlay to an easterly direction. The reef has been prospected for 130 feet south of this shaft by trenches. The stone, where exposed, is rather flinty-looking, and has given some fair prospects. Endeavours have been made to discover stone higher up the hill to the west, but without success.

The reef is about 3 chains west of the road. It must obviously be a parallel one to that of the City of Hobart. The latter ought to pass through the section from north to south higher up the hill. Notwithstanding the local variableness of the dip of the strata, the general underlay in this belt of country is still in a westerly direction. But we enter here another reefing zone, that of the City of Hobart line, roughly parallel to the Gate line, with which it is connected by the north-west reefs system, already described in this report.

City of Hobart Mine.

The sections are charted in the name of the City of Hobart Gold Mine, Limited, viz.:—472-G (10 acres), 520-G (10 acres), 521-G (10 acres). The main workings, however, are on the 20-acre Section 618, in the name of the Commercial Bank; and two sections (223-83, 5 acres; and 94-93G, 10 acres) are still held by the Tasmanian Exploration Company, Limited.

The properties are idle, and the workings inaccessible. I can, therefore, only form an opinion from information received, and by examining the indications supplied by the work done from the surface.

The old main shaft (now fallen in) is on Section 618, a quarter of a mile south-west of Mathinna. The first work was carried on some thirty years ago by adit, a crosscut tunnel striking the reef, 4 feet wide, at

50 feet from surface. This was then driven upon for 500 feet, much of it proving mullocky; but Mr. A. A. Butler reported that the quartz obtained from 120 feet of reef was crushed, and averaged 1 oz. of gold per ton. The main shaft was sunk 660 feet, and according to Mr. Peter Irvine, who was the mine manager from 1877 to 1881, the reef carried about 3 feet of loose quartz, worth over 1 oz. of gold per ton, down to a depth of 300 feet. At 580 feet a slide displaced the reef west and north. The reef where the shaft was sunk has a north and south bearing, and is nearly vertical, or with a slight dip to the east. At a depth it is stated to have changed its underlay to the west. Though the stone was good the shoot of gold was short. An expensive system of 60-feet levels was followed, and shaft-sinking continued without accompanying driving on the course of the lode. The slide was met with, and the company became discouraged, though if, as I am credibly informed, £80,000 worth of gold was obtained, there was certainly ample warrant for continuing work. In a southerly direction, about 150 feet from the main shaft, a small prospecting shaft (City Extended) has picked up a vein 6 inches wide, carrying gold; and 200 feet further south, just inside the north boundary of 521-G, is another shaft, supposed to have struck gold-bearing stone. There are several runs of veins in this zone, and it is difficult to connect the different workings satisfactorily; but the surface-trenching would indicate that the northern shaft is on a continuing vein of the main reef.

In the north-western part of Section 618 are several old shafts and trenches on a lode apparently running north and south along the western boundary, and known as the North City of Hobart reef. The deepest shaft was 180 feet deep. The reef-channel seems to be a couple of feet wide, and has been worked at surface for some distance along its course. Reports state that it is a low-grade reef, averaging only 2 or 3 dwts. per ton. Its bearing is east and north, and it dips east, a parallel reef evidently to the main reef; there being a distance of about 3 chains between the two, if each maintains its course. A little to the east of this line a new main shaft has been sunk recently, but work was suspended when it reached a depth of 100 feet, and I do not know whether the reef was struck. In cutting the engine-plat a reef was exposed, prospects from which, I am told, went 3 dwts. of gold. Not long ago Mr. T. Andrews cut the excavation

for a new shaft, 130 feet west of the old main shaft, with a view of working the main reef from it. The idea was to drive south beyond the old workings, prove the reef upon which the property was floated, and test the junction of three distinct reef-chanels in that direction. The position of the proposed shaft seems favourable for these objects, and it enjoys the advantage of being in solid ground.

In the south corner of this section are the old Champion shafts on more than one reef. The principal reef, which is reported to have yielded 7 dwts. per ton, strikes a little south of north-west, and dips south-west; if continuous, it must intersect the City main reef.

The North City and the Main reef are both reefs that require prospecting, especially the latter, which has yielded so much gold-bearing stone of good quality. Mr. Irvine has stated that below 300 feet the white friable quartz is replaced by blue laminated quartz, heavily charged with auriferous arsenical pyrites. It would seem, therefore, that a good plan for the owners is not to attempt restoring the old main shaft, but to pick up the main reef from a new shaft well out of the influence of the old workings, and open out on it at a moderate depth. Each of the sites which have been contemplated, viz., that of the new shaft already begun, and that prepared by Mr. T. Andrews, has advantages of its own, according to the aim in view.

It is singular that what may be called an ounce proposition has remained idle for so long. The neglect to keep exploratory work well ahead while production and sinking were going on was undoubtedly responsible for the despair which settled down on the proprietors after they had picked the eyes out of the mine, and which eventuated in the abandonment of a property which had promised so well. The consequence is, the exploratory work remains to be carried out. Though nothing certain can be predicted there is good reason for expecting that judicious development expenditure would be well repaid. The lode junctions, which must take place at some points, the converging directions of several of the veins, even the narrowness of many of them, indicate a system of fractures which will possibly, in more than one place, unite to form larger bodies of stone, accompanied by concentrations of gold, which past work has shown the reef to hold. This is really all that can be said at pre-

sent. The zone is indisputably gold-bearing, but search for the shoots cannot be properly undertaken without the outlay of considerable capital.

Alluvial Flats.

In both the Black Horse and Long Gullies there is a good deal of alluvial, which has been washed down by the main crecks and their tributaries. As these creek-courses intersect reef-lines, besides receiving the sheddings from auriferous reef outcrops on the hill flanks, a good deal of gold must have found its way into the valleys. Thirty-five years ago a considerable number of men were engaged in working the ground, which, I am informed, has never been what may be called rich. Considering the number of gold-bearing reefs in the surrounding hills this might be thought inexplicable, if we did not take note of the fact that the gullies are comparatively recent in origin. They have been formed while the country has been assuming its present configuration, and consequently there has not been time for any large concentrations of gold to accumulate. The best part of the alluvial field has been that at the mouth of the Black Horse Gully, east of the township, where the deposit averages from 6 to 7 feet in depth. Higher up the gully the depth increases to between 10 and 30 feet, finally shallowing to a few feet. It would seem, therefore, that some bar of bedrock crosses the valley lower down, damming the alluvial to some extent. The lead on this line has been turned over at intervals for $1\frac{3}{4}$ miles for a width of about 400 feet. In the early days small nuggets up to 4 or 5 dwts. were common, and I am informed that once a piece was found weighing 1 oz. 19 dwts. The gold is always well waterworn. Mr. W. Stevens tells me that he found the alluvial east of the Golden Stairs yielding 3 grs. to the dish.

For a long time it has been thought that the cradling operations of former days did not exclude the possibility of the deposit being payable if treated by the modern method of hydraulic sluicing. Mr. Leslie Jolly has recently endeavoured to ascertain the value of the ground, and some extensive boring was carried out by Mr. Geo. Webb, of Mathinna. Eighty-seven holes were put down, a chain apart, in 10 lines; the lines being 8 to 10 chains apart.

Mr. Jolly has kindly furnished me with the results of these: —

		Average depth.	Gold per cubic yard.
		ft. in.	grains.
1st line	7 holes	7 4	0·43
2nd „	10 „	7 6	2·58
3rd „	13 „	5 0	5·904
4th „	8 „	5 5	6·43
5th „	10 „	7 6	22·80
6th „	11 „	7 0	11·88
7th „	10 „	6 2	13·881
8th „	8 „	7 4	10·101
9th „	5 „	6 1	24·384
10th „	5 „	6 11	26·782

Average yield, ½ dwt. gold per cubic yard.

The deposit consists of about 3 feet of clay and small drift, covering quartz-wash mixed with clay, and the whole lying on a layer of pipe-clay, which covers the bedrock. I was informed that the gold is found on and in the pipe-clay.

General information is to the effect that sufficient water for hydraulic sluicing can be brought in from the Tyne with 100 feet of pressure; and the report furnished to Mr. Jolly is to the effect that the total cost of recovering the gold would not exceed 3d. per cubic yard, or say, equal to 1½ grains of gold. The ground is certainly shallow, but there is a total absence of boulders and tree stumps.

The valley of the South Esk must certainly hold a good deal of gold in the aggregate, brought down by that river and Dan's Rivulet, and all the lateral tributaries. It is, however, a broad valley, and the gold will no doubt be found considerably scattered. The best alluvial is nearest to the present river. I understand that boring was carried on at Marshall's some years ago, and that as much as half a dwt. per dish has been obtained there. Some desultory hole-sinking has been done here and there in the alluvial of this plain, but without result. If the South Esk alluvial could be systematically prospected, there is a fair chance of some discovery of payable ground, for there must be places where concentration has taken place. For ages quartz gravel and any accompanying gold have been carried down from the Mathinna and South Mount Victoria fields, and deposited in the Esk Valley. I suppose that everywhere over this rather broad plain a little gold can be found; but it is

also extremely likely that definite channels of concentration exist somewhere as yet undiscovered.

Conclusion.

In concluding this part of my report, I realise more than ever that the intermittent and half-hearted way in which so many of these properties have been worked has been very disadvantageous to the interests of the field. A little money has been raised, and when it has been spent, and the gold-shoot worked out or faulted, operations have been suspended, and the reputation of the field suffers in consequence. The sooner it is recognised that it is neither a poor man's nor a poor company's field, the better. The rewards will only fall to the lot of those who persevere in serious work. The New Golden Gate has been one prize; the other deep mine (The Tasmanian Consols) may be another. The undeveloped properties of the Jubilee and City of Hobart invite an outlay sufficient to really prove their value; and the owners should meet with no insuperable difficulty in procuring the necessary capital.

The Gladstone and Eldorado hills have really only been scratched. The Miner's Dream and Telegraph hill is almost virgin ground, and no one can say what it might develop into in depth. In fact, the part of the field covered by this report could be described in a sentence—"prospected but not developed." But there is no valid reason why work should not be resumed. Ordinary mining risks must, of course, be faced. Gold may not be met with at any given point, but that it exists, and in quantity too, in the reef-channels below this field, does not admit of any doubt whatever.

Part III. of my report on Mathinna will be prepared after a future visit.

I have the honour to be,

Sir,

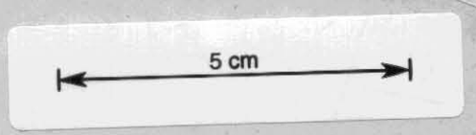
Your obedient Servant,

W. H. TWELVETREES,
Government Geologist.

W. H. Wallace, Esq.,
Secretary for Mines, Hobart.

JOHN VAIL,
GOVERNMENT PRINTER, TASMANIA.

PLAN OF OPHIR MINE



Scale of Chains 0 1 2 3 4 5 6

1633 10
93G
J. N. Lawson

1630 10
93G
J. N. Lawson

1629 10
93G
J. N. Lawson

Old Main Shaft 171 Feet

Drive filled with mullock

Old Stopes inaccessible

Small Slide

Old Surface Workings

Line of Reef

Eldorado Adit

1632 7 ac:
93G
J. N. Lawson

349 10 ac:
G
Gibson and O'Kelly

Winze 34 ft.

Sandstone and Quartz 35°

S.G. Sandstone and Quartz

Lg. Quartz & end Sandstone

Old Shaft 110 ft.

Old Shaft 20 ft.

North Eldorado Adit

Pig Seam

New Main Shaft Present depth 121 ft.

1652 10 ac:
93G
J. N. Lawson

185 3 AC:
87G
NEW GOLDEN GATE
G. M. Co. N. L.

536 10 ac:
G
H. E. Hitchcock

W. H. Twelvetrees
Chief Inspector of Mines
August 1906.

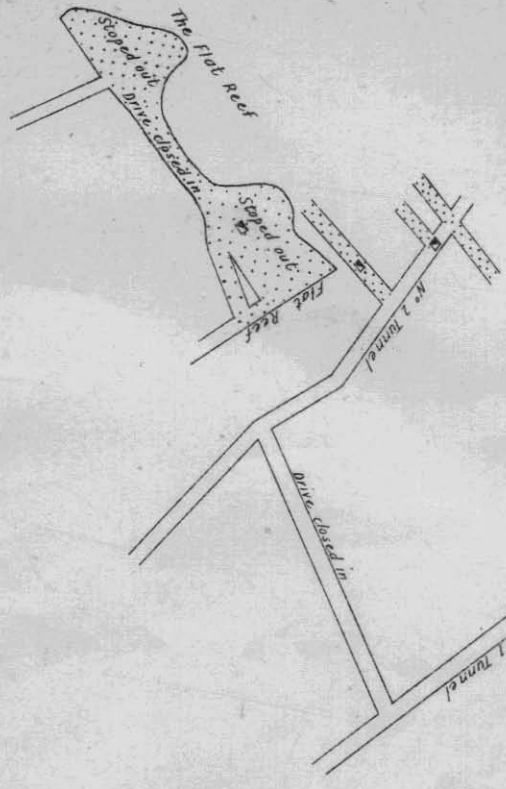
Photo-algraphed by John Vail Government Printer Hobart Tasmania

26/26

PLAN OF JUBILEE MINE

MATHINNA

SCALE OF FEET



211
93G

324
G

209
93G

Eagle Reef

Slide

Main Shaft

260 Foot Level

160 Foot Level on Main Reef

Old Tunnel

Stevens Reef

REFERENCE

Drives on course of Reef

W.H. Twelvetrees
Chief Inspector of Mines
August 1906.

Photo-aigraphed by John Vail Government Printer Hobart Tasmania

5 cm