

REPORT ON THE DISCOVERY OF GOLD AT PORT CYGNET.

Government Geologist's Office, Launceston,
9th December, 1898.

SIR,

IN accordance with your instructions, I have visited Port Cygnet and examined the work that has been done in the locality in search for gold, and have now the honour to submit the following Report :—

LOCALITY AND ACCESS.

Port Cygnet is really a branch or arm of the River Huon, about five miles long and from half a mile to two miles broad, running in a general northerly direction, but the name is generally applied to the township of Lovett, which lies at its head, distant by road about 34 miles from Hobart. Lovett is the centre of a large fruit-growing district, and although alluvial gold was discovered over ten years ago near Lymington, it is only quite recently that it has been discovered *in situ*.

GENERAL GEOLOGY.

On the eastern shore, going up from Garden Island, flat-bedded sandstones and mudstones are seen, and at Mount Cygnet, about four miles east of Lovett, a coal seam is being worked, which Mr. R. M. Johnston has determined to belong to the upper division of the Lower Coal Measures (*Permo-carboniferous*), corresponding with the Adventure Bay beds.

In the immediate neighbourhood of Lovett argillaceous sandstones and mudstones also occur, but it is difficult to distinguish their bedding-planes; the discovery of fossils of *Spiriferæ* and *Fenestellæ* near the Livingstone Mine and elsewhere proves that they belong to the marine beds of the *Permo-carboniferous* system. The principal rocks of the district, however, are of igneous origin, and, from their great diversity, they offer a most interesting petrological study. They apparently occur both as contemporaneous sheets (lava flows intercalated with the sedimentary strata) and also as intrusive dykes. They are essentially porphyritic in structure, consisting of felspar crystals in a compact ground mass, which in different parts is white, ashen gray, brown, yellow, greenish, and occasionally almost black. The felspar crystals are sometimes small and numerous, evenly distributed throughout the mass, giving the rock at first sight the appearance of a holo-crystalline structure; occasionally they are few and unevenly distributed, and in some cases the rock is almost entirely made up of large tabular crystals up to $1\frac{1}{2}$ inches long and one inch wide, the edges of which are sometimes rounded and corroded. They are frequently partly kaolinised, but in unweathered pieces glassy crystals of sanidin can be recognised, and from their tabular habit it is probable that many of the larger kaolinised crystals are also sanidin. Hornblende is frequently seen, and occasional crystals of triclinic felspar can be recognised by the fine parallel striations due to repeated twinning. In some parts there is a good deal of pyrites disseminated throughout the mass. Although there is such a diversity in these rocks they all bear a strong family resemblance, and, pending microscopical examination, which is now being undertaken by Messrs. Twelvetees and Petterd, they may be provisionally classed as Trachytic Porphyries. With few exceptions they do not, as might have been expected, form bold outcrops, and no attempt was made to define their limits, but they are said to extend right through to Oyster Cove.

A short description will now be given of the mining work that has been done.

Livingstone Mine.—This property lies about two miles N.E. of Lovett, and consists of two 20-acre sections adjoining Lot 198 of 500 acres purchased by John Thorp, jun. These sections have recently been granted as reward claims for gold to the original prospectors, Wm. Anderson and J. Thorp, who had previously done a considerable amount of work. A narrow ridge runs through the sections in a N.E. and S.W. direction, and on the western fall of this, near the top, at an elevation of about 630 feet above sea-level, a quartz reef was discovered, on which an underlay shaft has been sunk to a depth of about 60 feet. The reef varies in thickness from about 2 ft. 6 in. to 4 feet, and strikes, as far as can be determined at present, about N. 70° E. Near the surface it is almost vertical, but at the bottom of the shaft has a considerable underlay to the S.S.E. The quartz is in places fairly solid, but generally occurs in small parallel bands separated by thin seams of decomposed porphyry, which give it a somewhat laminated appearance. The country rock on either wall is a brownish, somewhat decomposed porphyry, which has been locally called diorite. The manager kindly showed me the assay certificates of several samples of the quartz sent to Melbourne for assay. Two picked samples assayed 3 ozs. 23 grs. and 1 oz. 12 dwts. 6 grs. gold per ton respectively, and a sample of 48 lbs., treated at Messrs. Parker and Co.'s works as Footscray, yielded at the rate of 10 dwts. 13 grs. free gold per ton. A bulk sample of about one ton yielded at the rate of $5\frac{1}{2}$ dwts. free gold per ton.

Iron and copper pyrites occur irregularly distributed through the quartz, and gold is said to have been seen in the stone in the last few feet of sinking; but a sample which I took across the reef near the bottom of the shaft and sent to Mr. Ward, Government Analyst, contained no gold. Of course, however, a better idea can be obtained of the true value of the stone from a bulk sample than from a sample of five or six pounds such as I took, as gold is invariably very unevenly distributed through the stone.

The reef cannot be traced on the surface, owing to the covering of angular *débris*. On the western side of the ridge, about 150 feet vertically below the mouth of the shaft, a tunnel has been driven about 350 feet. This starts in a north-westerly direction, but has been turned considerably towards the west, and in the end is running a little west of north. The country passed through consists chiefly of compact mudstone and sandstone with several bands of porphyry, the last one passed through near the end of the tunnel being about 10 feet thick, standing almost vertical and striking approximately north and south. Had the tunnel been kept on its original course the distance driven would probably have intersected the line of the reef, and something definite would have been known as to whether the reef lived or not. I am of opinion that it is a contraction fissure and likely to be confined to the porphyry. The simplest way to prove this would be to drive both ways from the bottom of the shaft, which, however, is far too small for a working shaft. I would strongly advise that a trial lot of at least 20 tons of stone be sent away for a bulk test. With the natural facilities that exist for economic mining, and the easy accessibility to the mine, a yield of half an ounce of gold to the ton should pay all expenses.

Mount Mary Mine.—Gold has also been found south of Lovett on private property, just outside the town boundary, and some prospecting has been done by a local syndicate. The gold-bearing rock is generally fine-grained to compact, but in parts numerous rounded and sub-angular fragments of quartz, slate, &c. can be seen, which leave no doubt as to its fragmental character. The main mass is probably a very fine volcanic ash or tuff. The outcrop of the formation is on a ridge running S.W. from the township of Lovett at an elevation of about 400 feet above sea level. A hole has here been sunk about 9 feet, the formation being about 3 feet wide, striking E.N.E., and dipping to the N.N.W. at an angle of about 55°. A good deal of the rock is stained red from disseminated hematite, and there are numerous fine cracks filled with brown oxide of iron. On breaking some of the stuff thrown out from the hole I found fine specks of gold in several pieces, and a rough sample of some of the most likely looking pieces which I sent to Mr. Ward contained 4 dwts. 2 grs. gold per ton. About 25 feet W.N.W. from this hole a vertical prospecting shaft was sunk, which passed through the formation, and from the bottom, about 60 feet from the surface, a crosscut to the N.W. intersected it in about 16 feet. It is here about 4 feet wide, with about the same strike and dip as at the surface, but it is much broken, the joints being faced with kaolin, probably due to the decomposition of the felspar of the tuff. I took a sample from different parts across the whole width exposed, but this showed, on assay, only traces of gold; a previous sample from here is said to have assayed 2 dwts. 7 grs. of gold per ton. The country passed through in the shaft and crosscut is mudstone, containing occasionally rounded pebbles. A larger shaft has now been started about 20 feet further west, but had not cut the formation at the time of my visit. Possibly, in driving along the course of the formation richer patches of gold-bearing stone may be met with, but I see no reason for supposing that the average gold contents will increase with depth, and the prospects do not seem to me to be sufficient to warrant spending much more money on it.

Most of the surrounding land is freehold, but a short distance to the S.W. is an 80-acre block of Crown Land, and on this a ten-acre Section, No. 1306-93 G, locally known as Murphy's Section, has been taken up for gold. A little below the track from Port Cygnet, near the northern boundary of the section, at an elevation of about 750 feet above sea level, is a bold outcrop, which, from a distance, resembles the outcrop of a quartz reef, but a closer examination shows it to be a compact whitish rock containing porphyritic crystals of sanidin, with pyrites finely disseminated through the ground mass.

Two or three chains further south a hole has been sunk about 9 feet, now half full of water, from which a little gold is said to have been obtained. The stuff broken out consists of reddish siliceous rock, with blebs of glassy quartz, and occasional crystals of felspar. Some pieces are curiously streaked with fine parallel lines of white and red, and the whole has a somewhat brecciated appearance. It is probably a dyke which has partially fused together fragments of the country through which it burst. In some parts it is traversed by thin veins filled with chalcedony or opal, due to hydrothermal action. A little further S.W. a deep trench has been cut through an outcrop of fine-grained porphyry, containing a little pyrites, but, so far as can be seen, nothing of any value.

Martin's Show.—About a mile south of Murphy's Section, on freehold property standing in the name of Richard Lewis, a little trenching has been done on what is known as Martin's Show. This is a dyke formation, striking about N. and S. and dipping W., but its full width is not seen. The porphyry has been considerably altered by hydrothermal action, and is seamed with small veins of opal. In places there is a good deal of marcasite, or white iron pyrites, and one specimen I brought away contained pyromophite (phosphate of lead). This dyke has, I believe, been traced for a considerable distance, but the surface is now much overgrown with thick scrub. It deserves further prospecting.

ALLUVIAL GOLD.

A little alluvial gold has been found in several of the gullies near Port Cygnet, and at Lymington some rich patches were obtained, but they were of small extent. A company was formed some years ago to work on private property belonging to Mr. Coad; a small dam was made and a long tail-race fluming built, but the latter is not low enough, and the water supply seems to have been very poor. I have been unable to obtain particulars of the amount of gold won, but I was informed that the company nearly paid expenses for about two years, when work was abandoned, and all the old prospecting holes have since been filled in. I was shown a sample of about 10 ozs. of coarse shotty gold obtained from a small paddock on Mr. Coad's farm, and several dishes of the surface stuff washed in my presence all showed a few fine colours of gold. Probably systematic prospecting along Forster's Rivulet would reveal richer patches, but all the land is freehold property, and there does not seem to me to be sufficient inducement to warrant the destruction of the apple orchards and beds of raspberry canes which this would necessitate.

It is probable that the gold exists disseminated through the trachytic porphyries (of which the surrounding hills are largely composed), rather than in true reefs, and by the long continued wearing down of these it has been concentrated in the alluvial, but there is no reason to suppose that it exists in payable quantities in the parent rock. I take this opportunity of thanking Mr. Cranny, who very kindly acted as my guide at Lymington.

CONCLUDING REMARKS.

The great Mount Morgan Mine is stated by Mr. R. L. Jack, Government Geologist for Queensland, to lie in an area of permo-carboniferous rocks traversed by a series of basic igneous dykes; and in the United States and various other parts of the world considerable quantities of gold have been obtained in rocks of this or later age, generally associated with andesites, trachytes, and other volcanic rocks, so that, although no payable lodes have hitherto been discovered in the permo-carboniferous or younger rocks in Tasmania, there is no inherent impossibility of their occurring. In the present case, however, I am afraid the gold only occurs in sufficient quantities to induce money to be spent in search for more, without much prospect of ultimate success.

NOTE ON THE REPORTED DISCOVERY OF GOLD NEAR HOBART.

On my return from Port Cygnet I visited the so-called gold mine on Mount Wellington, and have now the honour to submit the following brief notes thereon:—

The scene of operations is on an extended prospecting area of 25 acres adjoining Regan's estate, the workings being situated close to the Sandy Bay Rivulet, about a mile above the Hobart Waterworks Reservoir. An inclined shaft has been sunk about 90 feet, and from the bottom a drive put in 30 feet to the south. Some years ago a shaft was sunk about 75 feet, and it is said that good assays were obtained for gold, silver, and cobalt, but I could see no sign of any lode or other formation likely to carry valuable minerals. The present shaft was sunk through the old ground for about 35 feet, when it was turned a little to the south to get into the solid country and continued along the dip of the strata. On the footwall side is a bed of black shale, the full thickness of which is not seen, but it is said to be 4 feet thick, and the manager informed me that in putting in some timber in the drives he had come on to limestone underlying the shale. Above this is a somewhat gritty sandstone with occasional patches of quartz conglomerate, the general strike being about N. and S., with a varying but rather flat dip to the east. No fossils were seen here, but a little higher up the creek are the remains of an old limekiln, and the fragments of calcareous mudstone lying about are full of remains of typical *Permo-carboniferous* fossils, amongst which I recognised the following forms:—*Spirifera*, *Strophalosia*, *Terebratula*, *Productus*, *Aviculopecten*, *Fenestella*, &c.

Disseminated through the sandstone are numerous minute garnets, and for a thickness of about two feet there is a good deal of iron pyrites, such as is very frequently met with in the Coal Measures all over the world. A sample of this from the drive was assayed by Mr. Ward, who found it to contain nothing of value, and I cannot see the slightest reason for expecting that any improvement will take place either in driving or sinking. In my opinion it is simply waste of money to continue mining operations here.

I have the honour to be,

Sir,

Your obedient Servant,

J. HARCOURT SMITH, B.A., *Government Geologist.*

W. H. WALLACE, Esq., *Secretary for
Mines, Hobart.*