

1886.  
NEW ZEALAND.

# THE OWEN REEFS, NELSON

(REPORT ON), BY W. C. WRIGHT, Esq.

*Laid on the Table by the Hon. Mr. Larnach, with the Leave of the House.*

Mr. W. C. WRIGHT to the CHIEF SURVEYOR, Nelson.

SIR,—

Survey Office, Nelson, 31st May, 1886.

I have the honour, by your instructions, to furnish the following report on the Owen Reefs, which I have prepared from survey, and from a careful examination of the different lodes and of the locality generally.

In following this report it will be borne in mind that the reefs described are in no way developed, but are outcrops of quartz, frequently of great magnitude, which even in the older claims have in no case been opened up. These outcrops are numerous, but those only are shown which come within the limits of actual survey.

*Plan No. 1.*—The area described is contained by the watershed of the Owen River and its tributaries, and is in length twelve and in width eight miles. It is enclosed on the north-east and west by lofty mountains, and on the south by the Buller River. The Owen junctions with the Buller on the coach-road from Nelson to Reefton at a point distant sixty miles from the latter and seventy-six from the former place.

In following down the Buller River from Nelson, at about ten miles before reaching the Owen, a belt of syenitic granite occurs, being about five miles wide and extending northward from Mount Murchison, which is also of granite.

This belt appears to be the eastern termination of the gold deposits of the Buller, which, although rich below this line, have produced no yields of any importance above it. From this fact it may be inferred that the rocks which have so enriched the river and its tributaries are lying westward of and above the granite.

This granite, as a continuous and lofty mountain range, forms the eastern watershed of the Owen, and the superincumbent strata in the Owen Valley are beds of slate and sandstone, a formation most favourable to the existence of mineral lodes.

The slates change greatly in character, from a bright-brown argillaceous rock, with a regular cleavage, to a dark, semi-crystalline, and brittle mass with angular fracture. They are both, however, traversed by numerous quartz lodes and veins all more or less auriferous, but the brighter coloured slates appear to contain all the richer reefs at present discovered. These rocks change to blue in mining, and iron pyrites on the cleavage surfaces of the slate takes the place of the oxide of iron nearer the surface.

The strike of the strata is nearly north-west and the dip south-west, the angle of dip being about 50°.

The quartz lodes which are found cropping to the surface at almost every spur, and which are frequently exposed by the creeks and rivers, are in systems of parallel reefs; the crops are frequently immense bodies of stone; the hanging-wall well defined, with a strong selvage of a greyish clay. Their strike is about 33° north-west, and the underlie conforms nearly with the dip of the strata.

The foot-wall varies in every case both in strike and underlie, in some places bearing nearly north and south, and standing almost vertical.

From this peculiarity it is evident that the reefs will not be found lying between two regular and almost parallel walls, but in the shape of huge blocks of quartz, forming in the south-east probably, and dropping into the hanging-wall as they are traced northward—a formation difficult to follow where the blocks are small; but on this field the blocks appear to be of immense size, and the quantity of stone, if it contains sufficient gold, should fully compensate for the trouble of prospecting for them. (See Sketch No. 1.)

In every case where I could test the hanging-wall, I found it to be richer in gold than any other part of the reef; and other minerals that usually accompany gold near the surface—oxide of iron, magnetic iron ore, lime, &c.—have given a peculiar honeycomb character to the stone in that direction. The quartz on the foot-wall is more frequently found hard and massive, and contains much less gold and very little other mineral.

The gold is of one character in all the different reefs. Being granular and heavy, it makes no show in the stone, even in hand-specimens that will yield 8oz. to 10oz. to the ton, but it will be easily saved in passing through the battery.

*Plan No. 3.*—The leases held for mining purposes are situated from eight to ten miles above the junction of the Owen with the Buller, and are fourteen in number. They, with the several quartz crops they contain, are shown on the accompanying plans. Nine of them are occupying ground on the line of the Bulmer Reef.

*Plan No. 2.*—The Bulmer Creek is the pioneer claim of the district, and occupies a sharp steep spur facing the south; a marked feature in the area being a precipitous bluff in the slate rock extending east and west across the ground, which in the face of it exposes three large reefs. No. 1 is a blow of stone of a thickness not yet ascertained, the hanging-wall not being exposed. It would be safe to say it is 20ft., but it is probably much more. This is accompanied by a gold-bearing leader to the westward of it, which has been traced a long distance up the spur. No. 2 is a well-formed reef of 3ft. in thickness, also having a rich leader on the hanging-wall; and No. 3 is a reef of 5ft. in thickness, but shows no gold. These reefs have scarcely been touched, as the workings, which are considerable, have been drives entered with the object of cross-cutting them at a lower level (Nos. 1, 2, 3, and 4). No. 1, 240ft., shows no reef; No. 2, 90ft., has cut the No. 2 lode, but has not been driven upon it, although the quartz is 5ft. thick; No. 3 shows no reefs; and No. 4 has cut a lode which, for position and underlie, nearly corresponds with the No. 2 lode. This drive will be useful as a main low level when the reefs are developed; but, instead of following the reef which has been cut at that level, it would be better to open on those which are known to contain gold, and to prove them, when the work could be carried on at the greater depth with more certainty.

The trials made of the quartz in this claim yielded, from the eastern leader, No. 2 reef, 1oz. 15dwt.; from the western leader, No. 1 reef, 12dwt. 4gr.; and from the reef in the No. 2 cross-cut, 5dwt. 14gr. per ton. These, which were taken as generally as possible over all the faces exposed, were intended to avoid picked stone, and this applies to all the other tests herein mentioned.

At the south end of this area, and extending three or four chains into the Wakatu and half-way across the Uno ground, in a line parallel with the bluff, is a belt of huge quartz blocks, scattered and disconnected, but highly auriferous. Some of the largest carry with them the whole of the lode-formation, and would, except for the changed position, be easily mistaken for reefs in the solid. About 40 tons of quartz have been taken from one of these blocks by the Bulmer Creek Company, and perhaps 80 or 90 tons from another by the Wakatu, the latter yielding 19dwt. 13gr. to the ton, and the former about the same; both containing a great deal of quartz of a richer character, which would yield 3oz. to 4oz.

The Wakatu drive passed 40ft. along one of these blocks, and was afterwards extended to a cross-course, which it cuts at 132ft. This cross-course is at right angles to the reefs, and dips towards the south-east, and has all the indications of having been a very considerable slide, by which the whole of the reef-formation was brought down from the bluff into the Uno Valley, and scattered in the pell-mell position the blocks now occupy. The quantity of quartz in these blocks is very considerable, for a great number of them are exposed to the surface, and what are buried beneath cannot be estimated. A test from them gave 19dwt. 10gr. per ton.

The Uno has two strong lodes—one, 5ft. thick; the other, 2ft.—marked 4 and 5 on plan; which, running northward and rising eastward on their underlie, will pass through this belt of blocks, and may have thrown down the eastern portion of them.

The Wakatu United is putting in a cross-cut to intersect these reefs, and (by rises) to work the blocks. The drive is in some 70ft. in good country, and is the best method that could have been adopted for prospecting the mine.

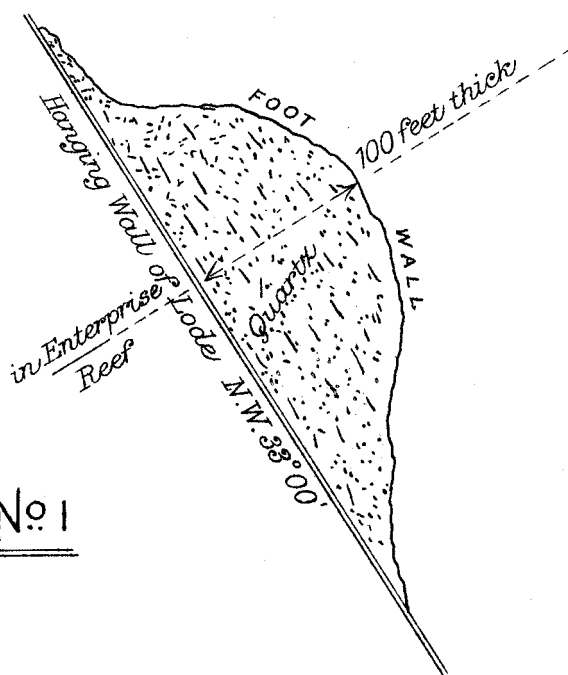
This company has a strong lode or two in the spur west of Spring Creek, but the crops are not sufficiently exposed to admit of any estimate being made of their value.

*Plan No. 3.*—In following the Bulmer lodes southward, the fall of the ground and the underlie of the reefs combined carry them considerably away to the westward of the line of strike. The ground at the creek is unoccupied, but the spurs on the south side of it are within the area held by the Bonanza Quartz-mining Company. Here there are several outcrops, one of which is 40ft. thick, and three others are strong lodes, but unprospected. They all contain gold, but, till they are faced off and stripped to some extent, it will be impossible to give an opinion of their value.

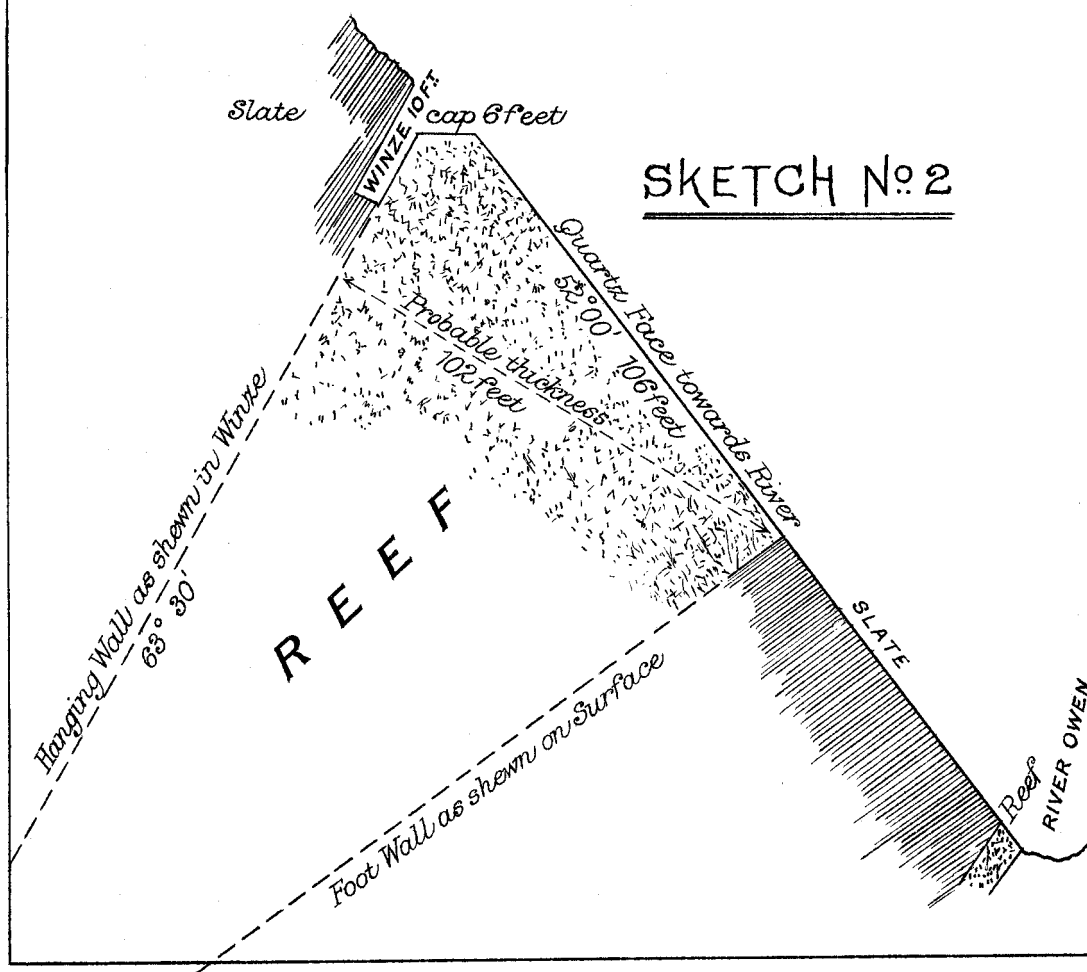
The reefs after rising the Bonanza Spur show the same north-west strike, but the hill is covered with blocks of limestone, the fringe of a bed of the same rock under which the slate dips. On the south side of the spur the slate again appears, and the quartz crops to the surface.

The Owen Quartz-mining Company occupies this ground, and has a crop of quartz containing gold. There is a good deal of scattered gold-bearing quartz about the surface, and other indications of reefs.

The Zealandia has two quartz crops in a creek which has exposed them: the upper one is 14ft. thick, and I believe will prove payable; the lower one contains gold, and is probably twice that thickness; but the general test of the stone shows that it will not all pay for working. The quartz containing most of the gold is near the hanging-wall, and it also carries a considerable amount of iron pyrites. The mine can be easily prospected by a cutting through the two reefs on a level with the outcrop, and it would be inexpensive work. The analysis of the stone taken over the whole surface of the reef gave 4dwt. 4gr., but the stone near the hanging-wall gives a far better yield.



SKETCH No. 1



SKETCH No. 2



Although the Broken Hill blow has all the appearance of a gold-bearing reef, I was unsuccessful in testing the stone. Some 20ft. or so of the width of the reef is exposed, but this appears to be only a small portion of it. The hanging-wall not showing above the surface. This, like the Bonanza, requires to be worked to some extent before the value of it can be estimated, as a greater portion of what would, in all probability, be the best part of the reef is hidden. There are indications of other reefs westward of this within the Broken Hill boundary.

The Enterprise is the next on this line of reef, and the area held by that company contains four lodes and several quartz crops upon them. The most important one is facing the Owen River.

On visiting this first, it had the appearance of several big blocks of quartz piled one on another, with soil and moss between them, to the height of 106ft. When the shareholders, at my request, stripped the face in a line eastward from the cap to the river, it proved to be one solid reef, sloping eastward  $52^{\circ}$  to the river; but, this being contrary to the direction of the general dip of the reefs, and of the strata to which they nearly conform, I got them to open the cap and to put a winze 10ft. down on the underlie. The cap proved to be 6ft., and the underlie  $63^{\circ} 30'$  south-west. (See Sketch No. 2.)

I prospected the whole surface of the stone, taking chippings from the whole face exposed, and found, by crushing roughly and panning at the river, 11dwt. 16gr. to the ton; by an analysis of the same amount of quartz, 4oz. 2dwt. 4gr.; stuff from a drill, No. 1, 8dwt. 18gr.; No. 2, 19dwt. 10gr.; No. 3, 3oz. 12dwt. 21gr.: these were 1ft. 6in. deep. No. 4, a drill-hole nearer the cap of the reef, gave a yield of 19oz. 13dwt. 6gr. to the ton, the last two producing a number of small quartz specimens evidently from a joint in the stone faced with gold. Two other tests were made on the foot-wall of the reef, both containing gold but not payable, and a reef at the river-level gave about 4dwt.

The Enterprise reef as now proved has a section as shown in margin, and is probably 102ft. in thickness from wall to wall. The distance exposed on the line of it is nowhere more than 40ft., so that to prove it laterally should be the first work done, when the stone could be quarried in an open face.

The Golden Point leasehold is the last southward on these reefs, and in this the Enterprise will be found to dip under and to follow the bed of the river, and sinking will be necessary. The reef is nowhere exposed in this area, but the wash of the river has, I am informed, been rich in gold of a similar character to that obtained from the quartz, and has been worked for some distance through the Golden Point ground; and has no doubt come from the breaking-up of the reef. The deposit is a local one.

It is probable that the Comstock reef, which has a strike  $4^{\circ}$  to  $8^{\circ}$  westward of south, has intersected the Enterprise somewhere below this point, and that in continuation it follows the eastern bank of the river, along which a reef crops at intervals for a distance of 300 to 400 yards, and that, as is usual in such intersections, one of the lodes has been enriched by the other crossing it.

There are other reefs—four probably—in this ground, and two of them are gold-bearing. A very large lode extends at the back of this, the Enterprise and the Broken Hill, but it has not been proved, and I had not an opportunity of prospecting it; it has however the same character as the other lodes.

North of the Bulmer Creek claim is a lease held as the Lyell Quartz-mining Company, and it is on the line of these reefs.

The Golden Crown is an isolated lease, taking in a hill to the east of the Owen River, the crop being about 700ft. above the foot of the hill. The reef is very little exposed, and the strike of it doubtful, but the underlie is about  $50^{\circ}$  to the westward. The face of the hill has an inclination of  $33^{\circ}$  to  $45^{\circ}$ , and so it would not take a great distance to intersect the reef by driving at any point below the cap. There are parallel reefs in the claim.

I obtained a prospect of 1oz. 5dwt. 16gr. from a rough crushing at the river, and sent the remainder of the stone for analysis to Wellington, where it produced 5dwt. 2gr. The quartz was from every part exposed.

The Golden Fleece and Comstock are on a reef between the Bulmer and the Golden Crown, which runs from  $4^{\circ}$  to  $8^{\circ}$  into the south-west, down a long spur. The lode is an immense one, and crops in four or five places; it has a slight underlie to the south-west, but is quite unprospected. I obtained the colour of gold in the Fleece from the main reef, and found gold-bearing stone on the surface which slopes to the Owen River, which probably came from a parallel lode.

The Southern Star claim is to the westward of the Bulmer Creek, and will, judging from the amount of quartz on the surface, have reefs in the ground.

Several other lodes were examined and tested, most of which showed some gold, and all a good body of stone.

The several tests mentioned were small parcels each being from 4lb. to 10lb. weight, and it is to be regretted that the distance from any battery, and the difficulty of getting the quartz away, prevented a larger sample being treated; but, as that taken was from every portion of the reefs exposed, the result, I think, should give an idea of the value of them. Such small trials are, however, apt to give an exaggerated value or the reverse. I can only say that the quartz is there in any quantity, and that the gold is there also, and apparently in payable quantities; but the permanent character of the reefs must be proved by working them.

The want of a battery is much felt, but there is no mine sufficiently open to warrant the erection of one, except the Enterprise. This claim will no doubt be the first to obtain machinery

when the roads are improved sufficiently to admit of heavy traffic, but at present nothing but light packing can be done on the track, and that with difficulty.

There will be no necessity for steam-power in any part of the district, for the rivers send down a constant and very considerable supply of water. The fall is great, being 3ft. per chain in the vicinity of the mines, and good machine-sites can be had in plenty.

There is plenty of timber for mining purposes, brown birch chiefly, with an occasional black pine and totara; light birch covers the spurs, and heavy timber, with dense undergrowth, the hollows and slopes.

The hills are very steep, and in all the claims taken up 700ft. or 800ft. of backs can be had to the mines, excepting the Enterprise Reef, which would give, perhaps, 300ft. on the northern boundary.

Nothing came under my notice that would lead me to think other minerals than gold are present in sufficient extent or value to pay for the working. There is coal, galena, and antimony; but nothing like a bed of the one or lodes of the other have been met with. The Owen River is a receptacle for all the rocks and minerals in the district: blocks of granite, quartz, limestone, sandstone, slate, marble, iron ore, rubies, and some gold are to be found in it, and the latter has been worked to some extent, but the immense boulders of granite which exist all along its bed makes the work costly, and it has not hitherto been profitable.

*Plan No. 1.*—There is a considerable area of land fit for settlement between the Buller and the head of the valley, probably 4,000 acres, which could be leased and occupied so as in no way to interfere with mining; and there is an excellent site for a township on Flower Flat, two miles south of Bulmer Creek.

The line of road laid off by Mr. Jackson, of the Public Works Department, is the best in every way for grade, shortness of route, and economy of construction, and it will open a considerable extent of land for settlement, which the Owen River line would not. About two miles at either end require to be thoroughly made, when traffic could pass over the remainder with a little clearing without difficulty.

The only thing I see against the district is the peculiar disposition of the quartz in the reefs, being in huge masses and not continuous; and I would strongly advocate a system of extended claims, so that in the event of a block being worked out the companies will have others to fall back upon; but, if the other blocks exposed prove, on being opened up, as big as the Enterprise appears to be, I see no reason why they should not be made to pay, for I have never seen lodes that could be worked at so little cost.

The section of the Enterprise as given in this report, supposing it to continue in depth 200ft., would give 500 tons of quartz for every foot in length, and 100ft. along the line of reef would give 50,000 tons in the block, and this could be proved by three months' work, in three shifts, easily. The other blocks on the same reef may be equally as large, but the river has prospected and exposed this to view, and in fact opened a mine.

Ten head of stamps will do more to open this field than all the mining, for it will enable the companies to obtain trial-crushings as the work proceeds. At present to stack quartz without a knowledge of its value might be attended with considerable loss. A road and a battery are necessary before any of the mines can be thoroughly prospected.

The limestone which occurs at the summit of the Bonanza spur covers the whole of that hill to the westward; it appears on Mount Owen, and extends across the gorge of the left-hand branch. I did not go beyond this, but Mr. Bulmer, who has been there informs me that the slate appears again to the westward of the limestone, and that there are outcrops of quartz. I regret that the weather prevented me from examining this.

An extension of the field as at present occupied may be looked for in this direction, and also in a line parallel to the granite, both up and down the valley; but I observed no reefs down the Owen below the left-hand branch, where the rocks change to sandstone.

A few specimens of the rocks accompany this report.

The Chief Surveyor, Nelson.

I have, &c.,

W. C. WRIGHT, Surveyor.

#### *Memorandum.*

The Chief Surveyor, Nelson.

WITH reference to that portion of this report describing the reefs and workings of the Wakatu United Quartz-mining Company, I have, since writing it, received a copy of a telegram sent by the Mine Manager to Mr. Reeves, of Nelson, to the following effect: "10th July, 1886.—Just touched reef in top of drive, payable, cannot say more till cut through; it will take a few days." From another source I find this to be correct, and that the reef has been driven through for 10ft. without reaching the hanging-wall. This, in position, corresponds with the No. 5 lode marked on plan, and which is mentioned as likely to pass through the eastern portion of the surface-blocks.

17th July, 1886.

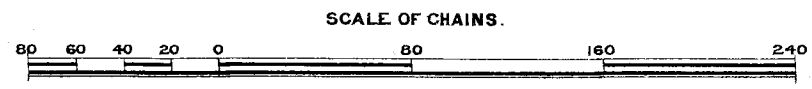
W. C. WRIGHT.

[Approximate Cost of Paper.—Preparation, nil; printing (1,850 copies), £2 16s. 6d.]

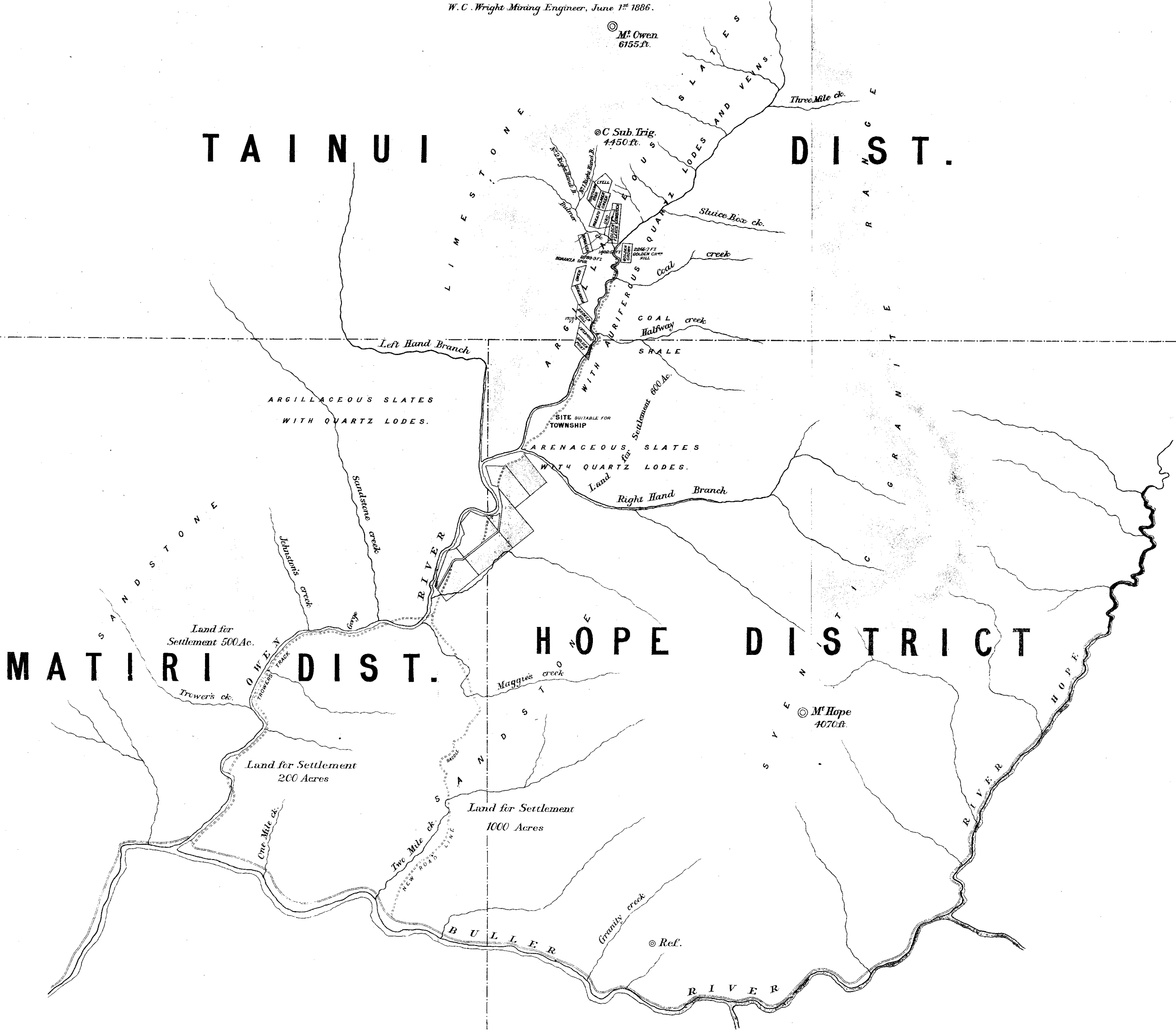
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# THE OWEN REEFS

## MINING AND GEOLOGICAL SURVEY.



W. C. Wright Mining Engineer, June 1<sup>st</sup> 1886.







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