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T A S M A N I A.

H O U S E O F A S S E M B L Y.

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W E S T C O A S T:

P R O G R E S S R E P O R T S O N M I N E S B Y M R. G. T H U R E A U, F.G.S.

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Laid upon the Table by the Minister of Lands, and ordered by the House to be printed, August 10, 1881.

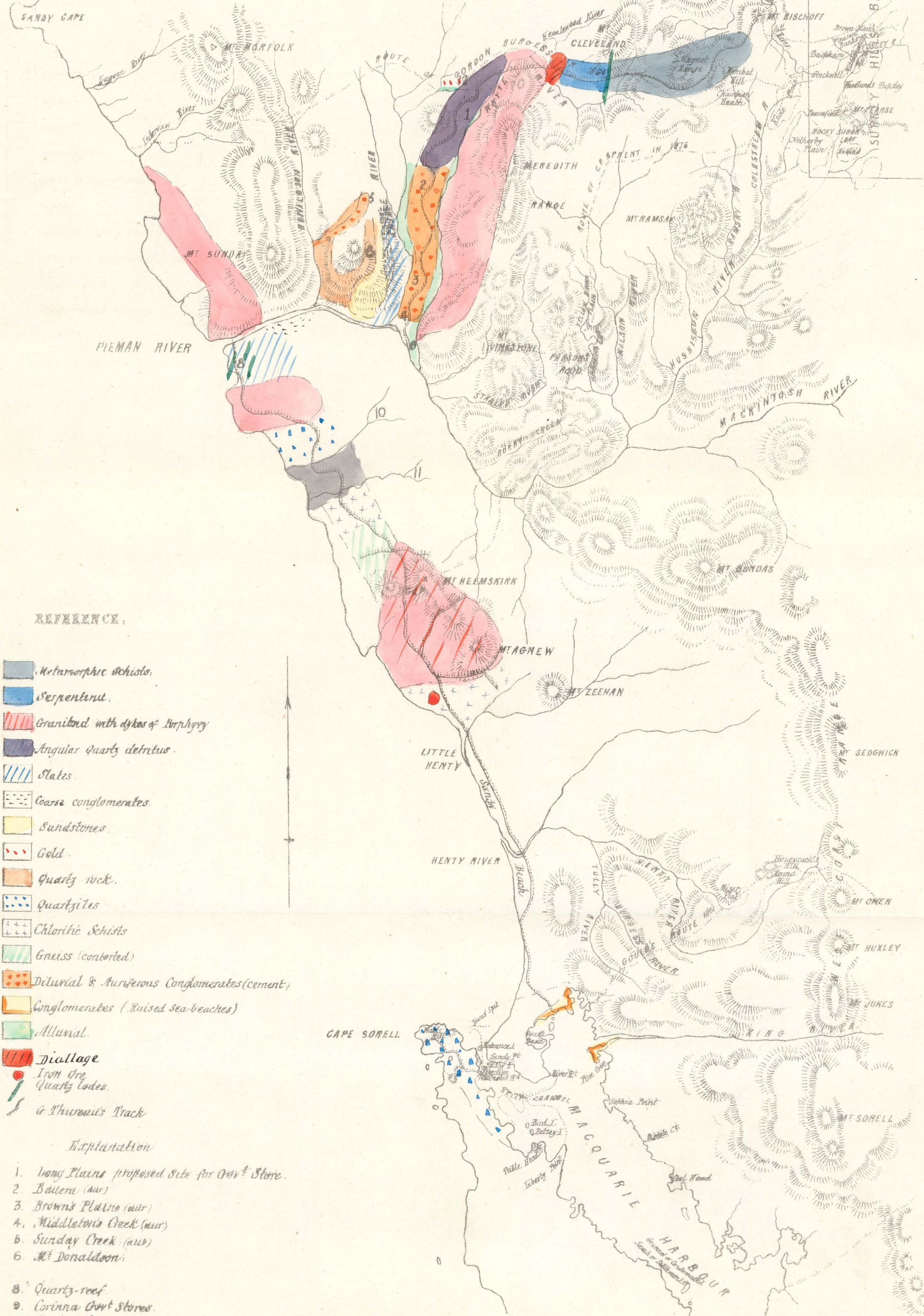


# REPORT ON THE MINERAL RESOURCES

## AT THE WEST COAST

BY MR G. THUREAU, F.G.S.

Scale 5 Miles to an Inch



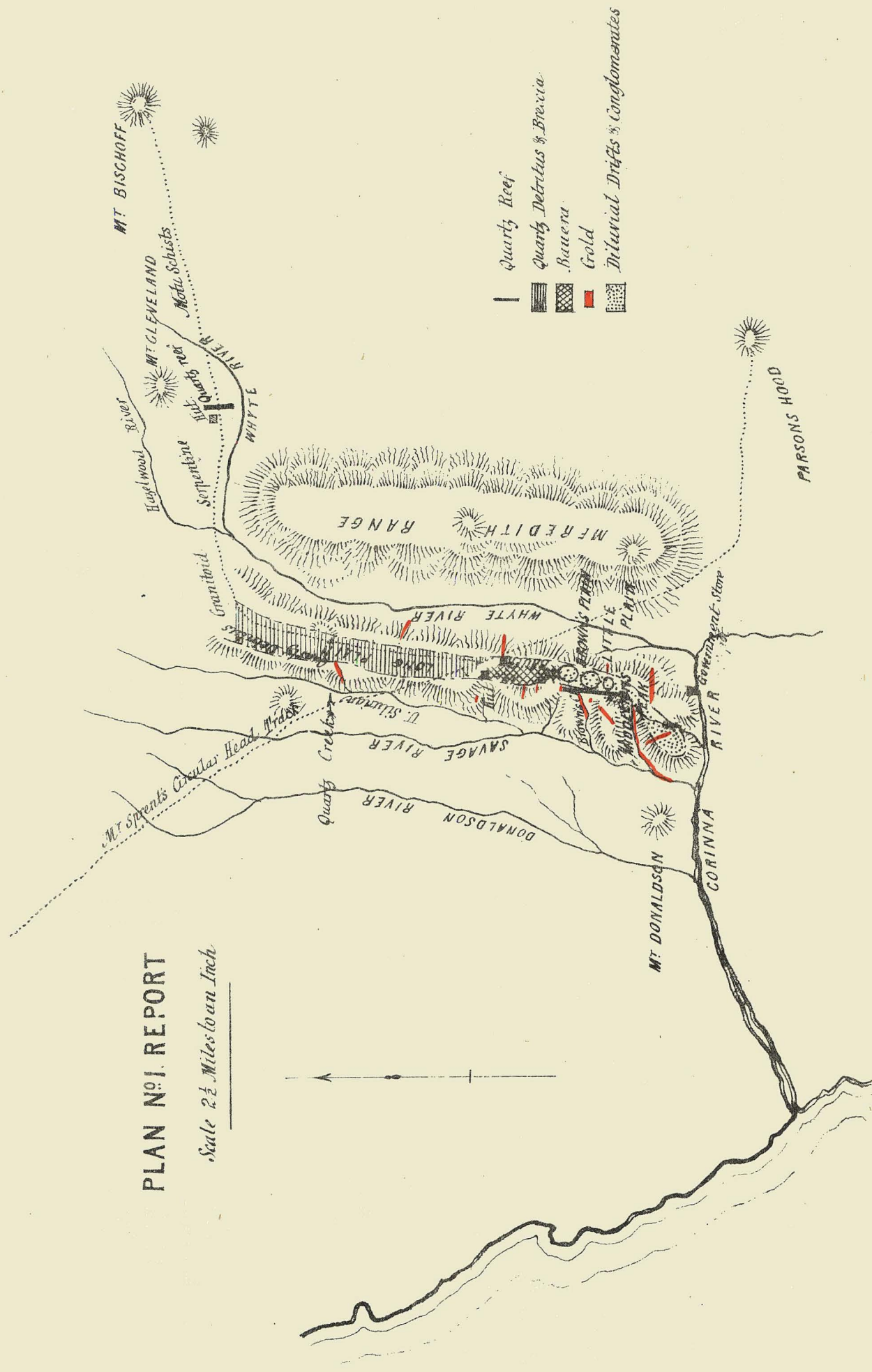


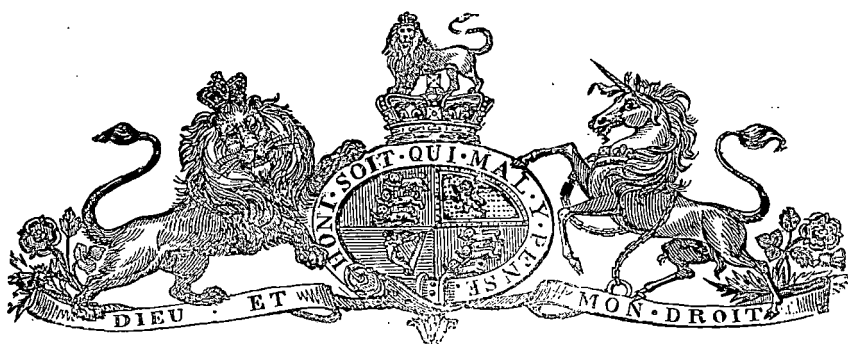
# PLAN NO. 1. REPORT

Scale 2 1/2 Milestoan Inch



- Quartz Reef
- Quartz Debris & Breccia
- Bancroft
- Gold
- Glacial Drifts & Conglomerates





## WEST COAST, TASMANIA.

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SIR,

*Government Stores, Pieman River, 1st June, 1881.*

I HAVE the honor to submit for your approval my first Progress Report (with corrected maps and sketches) upon the Mines and Mineral Resources, &c. of the Pieman Gold Field, together with some suggestions as to the opening of the country by means of tracks, &c. Seeing that the miners have hitherto passed over the tertiary washes, and only worked the creeks, I would strongly recommend that my suggestions as to a prospecting party for tunnelling under and through the hills would be favourably entertained by the Cabinet, as upon the value of those gravels the prosperity of the District chiefly depends. I dispatched, by letter *via* Bischoff yesterday, a telegram to you, asking to be permitted to return to Hobart direct, instead of walking back to Bischoff, which latter I am quite unable to do, as my health has been and is very bad after the wet, fatiguing, and tedious journey just now accomplished. You would therefore oblige me much by forwarding telegraphic instructions whether the Cabinet will charter a steamer to bring stores, &c. to Macquarie, and afford me and guide room to return by. I shall be at Macquarie Harbour before the first of July if so instructed.

This District will repay a closer examination in the dry season, as now many places of interest and prospective value are totally inaccessible.

I have honor to be,  
Sir,

Your very obedient Servant,

Hon. C. O'REILLY,  
*Minister of Lands and Works, Hobart.*

G. THUREAU, F.G.S.

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## PROGRESS REPORTS.

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No. 1.

*Pieman River, 1st June, 1881.*

*PIEMAN RIVER GOLD FIELD, its present Condition and future Prospects  
as regards Productiveness and Permanency.*

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### PRESENT CONDITION AND DESCRIPTION.

STARTING from the Mount Bischoff on the 26th of May for the Pieman River Gold Field, the first indications of gold were observed on the 29th May at Quartz Creek, a camp located about half a mile below the Circular Head track, where, in the Long Plains, an extensive deposit of quartziferous detritus covered the underlying strata. This detritus, composed of exclusively angular pieces of quartz of various sizes, was likewise capped by a quartzose *breccia* with a silicious base as a binding medium. The Quartz Creek having been found auriferous, and the gold obtained by sluicing exhibiting the general features of reef gold, attempts have and are now being made, so far unsuccessfully, to trace same to a quartz lode, vein, or leader. In this creek, however, I found, besides quartz gold, a vein of quartz carrying tourmaline and crystalline graphite, also a sedimentary deposit, nearly two feet thick in places, of a highly ferruginous character, in which angular quartz was embedded, resting on the loose quartz gravel containing the gold referred to. This quartz detritus continues on this divide between the Whyte and Savage Rivers (see map) right down to and a short distance beyond the "Bauera." Before reaching the Bauera, Sprent's copper lode occurs, but little can now be seen, as the workings have all closed in. Emerging from the Bauera, or about 29 miles from Mount Bischoff, an important change was observed in the general aspect of the

country, inasmuch as a lower stratum of quartzose deposits was here exposed to view, which consisted of more extensive deposits of quartziferous gravels, with this difference, however, that same was formed of *rounded* (washed) quartz pebbles and boulders, besides a hard conglomerate of same overlying the quartzose gravel in places cropping out at the brows of the hills. The general outline of the landscape was also altered, passing from high plains into low-crowned rounded hills, intersected by short gullies at the west side, several of which had contained patches of alluvial gold. (I was informed, besides, that equally as rich gullies were worked on the east side, as indicated on the maps). Amongst these I may enumerate the following:—Donnelly's, Chinaman's, and another unnamed. These hills exhibit similar features to those in the Australian gold-producing colonies and California; and they have here not yet been properly tested for any gold they may contain. They evidently belong to the tertiaries of the pliocene epoch. These tertiaries rest principally on a soft micaceous schist bottom, which of course facilitates mining to a considerable degree. And though the gullies referred to have only contained patches of coarse gold up to 2 oz. pieces—and to which gullies Walter's Gully should be added—the same thing has occurred on Bendigo, Maryboro, Talbot, and other places in Victoria and elsewhere, with "made" hills and gullies intervening.

Before reaching Brown's Creek, where our camp was to be pitched that night, these hills gradually turned to the west, where a large white quartz reef intersected them from north to south, and after crossing that creek they can be traced easily through the Little Plain, the horizontal scrub at the head of Middleton's Creek, down to the latter's junction with the Savage River.

It is necessary, however, for the purposes of this Report, for me to refer specially to some mining operations carried on by the Messrs. Harvey and Co., at Brown's Creek, in order to confirm the opinion I have already expressed as to the geological era in which these hills or deposits were formed, inasmuch as the correctness of my views will have an important bearing upon the future prospects of this gold field.

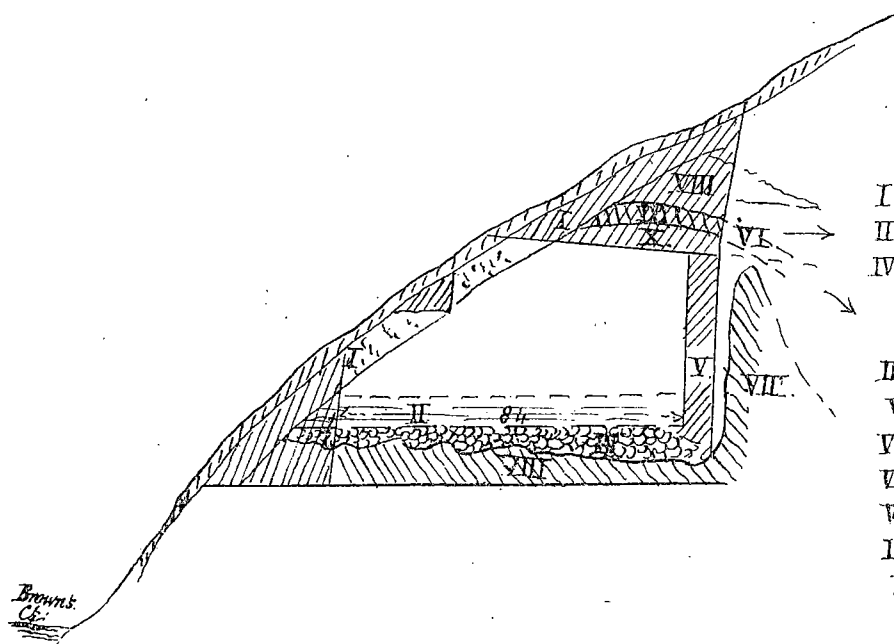
The Messrs. Harvey obtained and hold a protective area of fifty acres on Brown's Creek, originally "to prospect for a reef," the blocks of conglomerate cropping out at the brow of the hills at the south-east side of the creek having been mistaken for a quartz reef. This party commenced a tunnel near the base of the hill at a point where the bedrock, composed of a dark-coloured stratified sandstone dipping south east, was overlaid by the gravel. In the surface cutting, as well as in the tunnel, the bedrock shows a slight incline into the hill under the gravel—"a shelving reef"—with the usual undulations of similar bedrocks in alluvial workings. The miners passed through a white coarsish wash two feet thick, following the lines of the surface slopes, which wash was evidently derived from the higher and older tertiaries through denudation.

Then followed a series of more or less horizontal layers of washes and gravels. But it will be seen from the diagram that the washes above the apex of the slate bar VII. show an inclination into the hill in the direction of the arrow at O, thus proving that bar to be only a temporary obstacle often met with. That layer resting immediately on the bedrock has been found gold-bearing, not yet payable, in the pockets of the former. Although this occurrence of gold upon the bedrock, at a much lower level than at Donnelly's Gully, above the Bauera, is satisfactory to some extent, the occurrence of fossilised wood and of lignite also, together with other lithological features in this gravel, not only confirm my views, but also bear out my anticipations as to the future prospects such would have upon the future permanency of this part of this gold field.

And it is a source of satisfaction to me to be enabled to state that there are here indications for this part of the Island to contain similar diluvial formations in deep ground, more or less, as those in Victoria. And it should likewise be remembered that the miners have, so far, scarcely even impinged upon these tertiaries, which may, on being tested, pay very well; for of course I could not estimate their prospective value except from what yields have been obtained by washing secondaries, or those deposits derived by disintegration and denudation of the original deposits yet *in situ*.

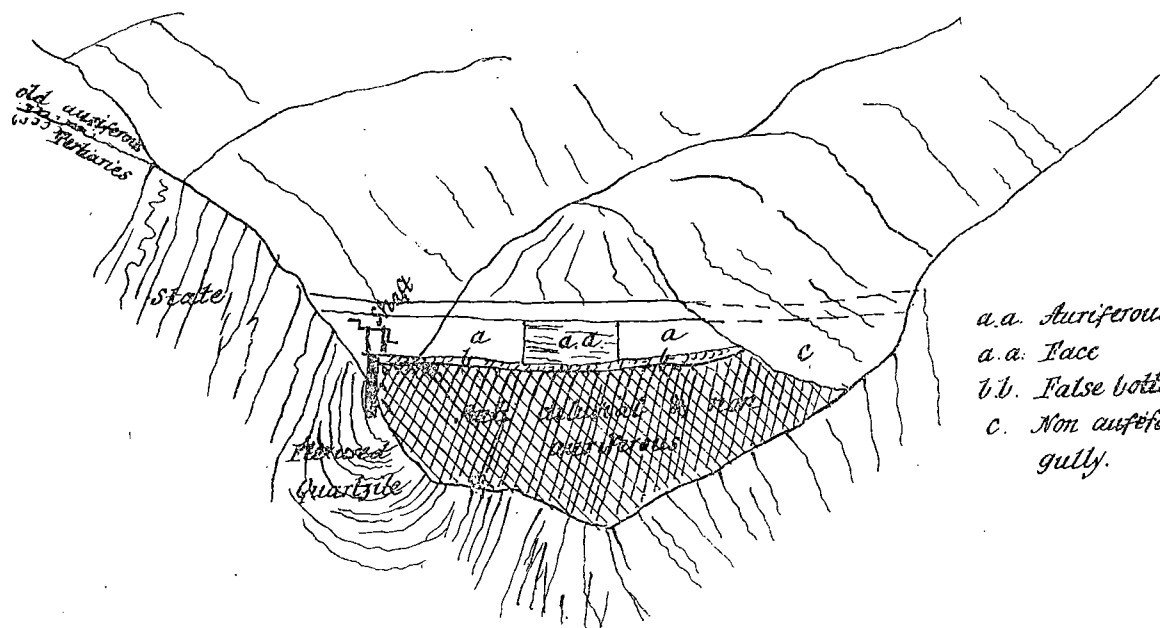
To resume. The deeper tunnel was driven for a length of 84 feet from the face in the cutting, but at the end a bar of slate intervened, which rose abruptly to nearly 11 feet above the tunnel level. Instead of the miners driving through this bar, they commenced a fresh tunnel still higher up the hill, such tunnel having an incline of three feet for its length into the hill to the point where this slate bar hindered their progress below. Since then they have connected both upper and lower tunnels by means of an air and drainage shaft, and are now continuing their upper inclined tunnel, though even their lower workings may not be deep enough for the deeper ground ahead, to judge from present appearances.

*Middleton's Creek.*—As I was informed of some extensive workings having been made there, and some good yields obtained therefrom, I have inspected same, especially as in that vicinity the main spur contained—if no other outlet exists—the farthest point of termination of these tertiary deposits, *i.e.*, "ancient rivers," within a width of a little over a quarter of a mile. It appears that several gullies have here produced good heavy gold in patches; and, as in all these cases of gullies



#### Explanation

- I. Coarsish White Wash.
- II. Dark grey Wash.
- IV. Do. Do. Do. with boulders of Serpentine & Fossilised wood with lignite. i.e. Wash dirt containing gold.
- III. Bedrock... sandstone.
- V. Air & Drainage Shaft
- VI. Inclined Tunnel.
- VII. Slate Bar.
- VIII. White Wash
- IX. Black gravel.
- X. Grey wash.



- a.a. Auriferous gravel.
- a.a. Face
- b.b. False bottom
- c. Non auriferous gully.

along the western slopes of these deposits from the Bauera to the Savage River, which cover a distance of six miles in a straight line, they were found productive up to a certain point above and below in these gullies, and not any farther up the slope. I opine that these deposits of gold were so limited through the older tertiary deposits having only been partly encroached upon by disintegration and denudation. At Middleton's Creek, especially, I noticed that the older deposits of tertiary gravels had not yet been mined, and only, so to speak, secondary gravels washed down the gullies from above had been operated upon, more or less successfully. In one of the gullies there a shaft had been sunk 60 feet deep through a non-auriferous gravel on to a peculiar kind of rock, which I found to be "flexured quartzite" (metamorphic), thus rendering any further sinking injudicious. That in the Middleton's Creek the gold occurred on a kind of hard false bottom can be explained thus, and by means of the following diagram.

The Savage River bed was not so deep in antediluvial periods as it is now, nor were its tributaries, so that an older and now auriferous gravel was deposited in these watercourses previous to the disintegration and denudation of the auriferous tertiaries still, in great part, *in situ*; so that the older antediluvial and non-auriferous gravels became the now-called false bottom.

I would at this part of my Progress Report upon the mines and mineral resources of the Pieman River Gold Field, and previous to reporting upon other portions of same not yet inspected, respectfully submit the following for consideration and approval:—

The advisability of establishing a Government store at Long Plains, so as to assist the numerous prospectors thereabouts, who have now to pack their provisions either from Mount Bischoff or Pieman River. This would be the means of opening up the Meredith Range, yet unexplored;

To construct footbridges over the Arthur and other rivers, instead of single logs;

To cut the tracks on the sidelings of mountains in clayey ground on the Victorian plan, viz., with a small slope into the hills,—as thereby drainage is effected, and the tracks widen of themselves, and are always dry;

To cut the button-grass on Long, Brown, and Little Plains, and fill up between tussocks;

To freshly cut tracks or remove roots from old track through horizontal scrub past the Little Plains up to new Pieman track;

To cut a new track from Government store, Pieman, to Heemskirk, and also to the Whyte River;

And, as a means for proving whether these made hills contain a stratum of auriferous wash whence all these gullies were fed with gold, to organise and despatch a prospecting party of good miners for tunnelling under the hill situated between Donnelly's and Chinaman's Gullies; also that narrow neck near the Savage River.

#### *The Pieman River Goldfield, continued.*

*Geological Features.*—In connection with this peculiar occurrence of a "false bottom" formed of an older drift, and as mentioned before, non-auriferous, I have since ascertained from inspections made, not only at Middleton's Creek, but also at Sunday Creek—which is situated nearly due north of Mount Donaldson, and west of the Savage River—that in both localities the auriferous drifts contain, or rather are composed of fragmentary portions of siliceous stalactites, and possibly stalagmites, which occur undisturbed in a bed of considerable extent and thickness *in situ* as overlaying the bedrock, a dense indurated sandstone. Some of these stalactitic fragments are very perfect, and present on the whole a very peculiar appearance on account of the manner concentric layers of variously coloured—from deep blue to snow white—are arranged around a common centre, frequently a narrow borehole or aperture.

The gold in Sunday Creek, and some of the adjacent gullies, has been exceptionally of a high value; as much as £4 2s. 6d. per ounce having been paid for it by the Mint at Melbourne.

The southern flanks or spurs of Mount Donaldson exhibit some very interesting geological features, and several beds of distinctly marked rocks were examined. The lowest of the series comprises dark blue slates with cubic cavities; the pyrites at one time therein enclosed having been totally removed by atmospherical action. These slates would be classed as Upper Silurian, but, owing to metamorphism, not the slightest vestige of petrifications could be distinguished. A massive layer of indurated slates and sandstones followed, encompassing nuclei of sandstones in the former, and rounded pebbles of a hard quartzose character in the latter. The next higher bed consisted entirely of conglomerates composed of large round pebbles of quartz, sandstones, serpentines, and quartzites, with an argillaceous base as a binding medium. Quartz rocks—not vein quartz—overlay the last mentioned, followed by fine grained indurated sandstones, and, finally, quartzites complete this metamorphic series of transformed sedimentary rocks.

*Permanency.*—In order to obtain a view of the *locale* of the Long Plains, Bauera, Brown's Creek, Little Plains, down to the Savage River, I ascended the southern spurs of Mount Donaldson,

and ascertained that these especially noteworthy localities occupied positions, somewhat lower, though parallel with a divide immediately east of the Savage River; and, therefore, the diluvial deposits occur, until they approach the head of Middleton's Creek, nearer the Whyte River. And to judge from the formation of the country generally, the sources where these gold-bearing strata derived their metalliferous deposits are likely to exist in two localities, viz., at Long Plains, where already some indications of auriferous quartz have been discovered (Quartz Creek), and where others may occur beneath the detritus, already several times referred to, and to the west-north-west of Mount Cleveland; and as that region is not yet made accessible, a track should be cut in that direction in order to assist prospectors in their endeavours to prove the value of that mountainous and heavily timbered locality.

Quartz reefs, that is such as are carrying gold, have not, so far, been discovered on this goldfield, though what is termed specimen quartz gold has been found in various places, but all endeavours to prove really payable lodes have not met with that success the prospectors have undoubtedly deserved. At the head of Middleton's Creek, the Messrs. Crotty and Co. are at present prospecting a "make of stone," which they term an east and west lode. The eastern lode consists of a white quartz devoid of minerals, but it gives a prospect of gold in the pan after pounding in a mortar; the western lode is highly impregnated with the green peroxide of iron. A short distance along the strike of these lodes an outcrop of quartz occurs, which is much more mineralised than that in the workings of the other two lodes, and tests exhibit both sulphurets and carbonates of iron as associated with this quartz. Further developments in that locality are therefore fraught with considerable importance, and they deserve every attention, because upon the existence of permanent auriferous lodes the future existence of this goldfield principally depends.

Though the advanced state of the winter season, and the consequent impossibility of personally inspecting such localities as Badger's Creek and others adjacent for the present, I have gained sufficiently reliable information as to the necessity of such examination at a more favourable period in the year. It is stated that similar diluvial conglomerates as those on Brown's Plains obtain at Badger's Creek also, and at heads of Badger's Creek and others. The slate is overlaid by basalt without the intervention of drift, so far as is known at present, thus holding out inducements to search for deep sub-basaltic river channels. So far, however, the miners have preferred the creeks only, but eventually their attention will doubtless be turned to the working of the older tertiaries as farther towards the White River. The opening of the "terraces," as some miners designate the tertiaries, would open a new era of gold mining in Tasmania, and, to judge from indications, promises to be of a more permanent and successful undertaking as when the creeks were worked in the last few years.

*Pyrites Lode.*—In the bed of the Sunday Creek I observed that below a certain point all the pebbles and boulders in the "wash" were encrusted with a hard, brown, iron ore, whilst above that point the gravels were totally free from such a coating. This was explained by the discovery of a strong lode of pure iron sulphurets, from which an ochreous fluid exuded, thus eventually precipitating the harder iron casing. This lode is about 2½ feet wide, underlays west, with a north by south strike. It is a very peculiar formation, inasmuch as it also belongs to the stalactitic mode of occurrence, like the siliceous beds already described, and in this case probably due to infiltration.

In concluding for the present this report, I beg to state that the miners on this goldfield are favoured with an unlimited supply of running water, which can be used both for sluicing (in boxes, or hydraulically, with hoses and jets), and as a motive power. Besides that, an almost inexhaustible supply of useful timber can readily be obtained to work their mines economically and rapidly with fair promises of success.

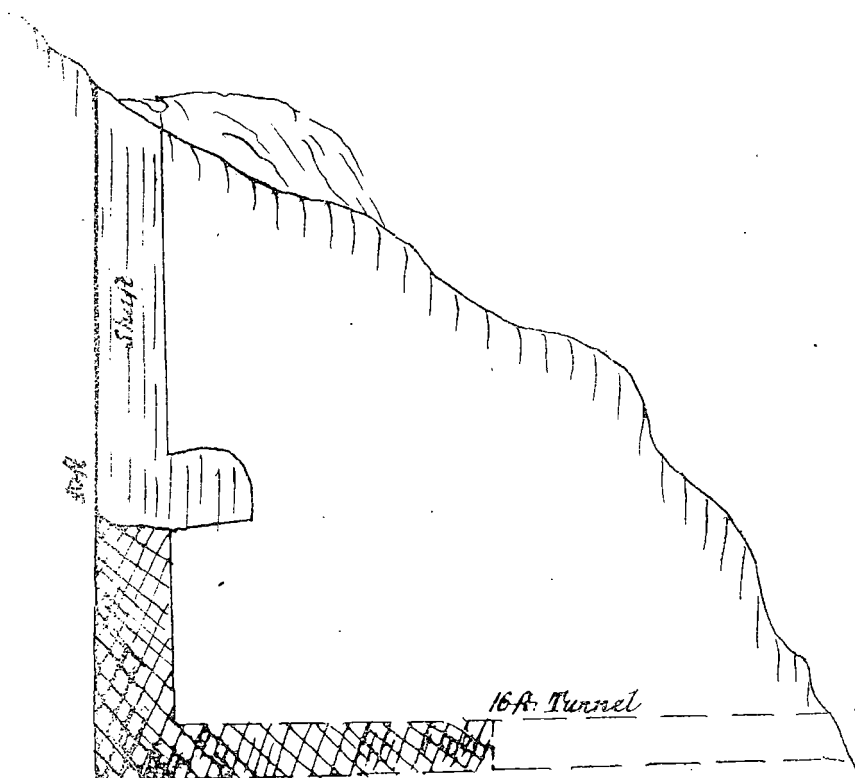
Inasmuch as it is very desirable that the miners, especially the prospectors, should be aided in their operations, the cutting of tracks, the bridging of mountain streams, and the building of accommodation huts become questions of importance for consideration by the authorities.

For instance, I have ascertained that the proposed new track from opposite the Government stores, Pieman River, to Heemskirk, can only accommodate foot passengers—a pack-track being out of the question on account of the precipitous character of the ranges intervening. Therefore all the goods must come *viâ* Pieman Heads, either direct by sea or from Macquarie Harbour *viâ* Heemskirk, to the mouth of the Pieman River, in which case the old track through the low swampy lands skirting the sea, and through the "three-mile timber" on to the high swampy plains beyond, should be widened (6 ft.), but also made passable for pack-horse traffic. A steam launch—Government or private—from the Pieman Heads to the Government stores up the river would prove eventually of considerable convenience, when an increased traffic has made more rapid communication necessary.

The skeleton map of Tasmania, furnished to me by the Hon. Minister of Lands and Works, is being utilised in my filling in those tracks, bridges, huts, &c. where most urgently required.



*Pretzman's Section.*  
Lode S.W. E.W.



*The Lower Pieman River, the Heads, Track to Heemskirk, and at Heemskirk.*

On June 5, I left the camp at Mount Donaldson, and proceeded on board of the government boat to Pieman River Heads; examined the West Coast in a southerly direction, where, at about two miles from Foster's store, a strong quartz reef cropped out below high-water mark. This reef was embedded in black slates at one wall, and sandstone at the other, each dipping towards the reef (thus forming a synclinal section), which underlays to the east, or inland. The quartz was highly impregnated with iron pyrites and some sulphurets of antimony, and the indications were favourable to the presence of gold. Some shallow workings had been made, now filled in by the wash of the sea, but comparatively speaking, nothing had been done practically in the way of prospecting this reef at a lower level.

Next morning left Foster's *en route* for Heemskirk. After passing the above reef, observed metamorphic schists north of the "Needles," a bold cape formed of large blocks of coarse granite. South of this granite, on the "Four-mile Beach," dark metamorphic slates, with bunches of quartz carrying some galena, occur, succeeded by chloritic schists and indurated sandstones of coarse grain. In one creek a ferruginous black gravel obtains, which is slightly auriferous, and near the "three-mile timber" gneissous beds, very much contorted, and in almost vertical a position, rested on the Mount Heemskirk granites.

Took up quarters on June 7 in the Latrobe Tin Mining Co.'s hut, and arranged everything—as the horses had to be sent back to Foster's—for a thorough inspection on the following day (8th June.)

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No. 2.

MOUNT HEEMSKIRK.

*Mount Heemskirk, its Mineral Deposits and Mines.*

Mount Heemskirk forms the central summit of an extensive aggregation of mountains, less in height than the principal peak, and all these belong, geologically speaking, to all the varieties of the granitoid series of rocks, metamorphic schists, and porphyries in places. The coarser granite, in which the usual components can be the more easily discerned, generally occurs on the higher peaks of the ranges.

The principal mineral deposits (tin) which have been discovered up to the present time are located as follows:—North of the Mount; to the south, chiefly high up the mountains, including the Montagu and Cumberland mines; and those south-east of Mount Heemskirk, at the southern base of Mount Agnew. These three principal groups of tin deposits will be dealt with in the following, according to the above-named order:—

*The Northern Tin Deposits.*

A number of sections were taken up by different persons and proprietaries, north of Mount Heemskirk, for the purpose of working alluvial stanniferous deposits, which occur in several creeks emptying themselves either into the Tasman or the Pieman Rivers. All these sections, however, are now either abandoned or held over, because the alluvial deposits have mostly been exhausted. The only company which appears to have done some work recently is the Pieman Extended, at nearly the extreme eastern end of this group.

The country in which these mines are located comprises chiefly low barren foothills, stretching from west to east, and the metamorphic schists which prevail are overlaid either by an angular quartz detritus, or by an upper tertiary breccia, in which fragments of syenites, granites, and sandstones are embedded. In several places where this wash and breccia have been removed by subsequent fluvial action, "veins" of tin ore have been discovered, and some very good surface specimens of "cassiterite" have, from time to time, been found in their vicinity. Amongst these, the most prominent vein occurs on Mr. Pretyman's section, held by the Heemskirk T. M. Co., which proprietary have endeavoured, by means of a shaft, and partly by a tunnel, to develop the deposit in question. This vein crops out on the surface, on the western ridge of one of the foothills, about half a mile due east of the base of Mount Heemskirk; the bunches and impregnations of tin ore appear to be nearly vertical in the shaft, sunk to a depth of about 30ft. from the surface, and the strike of this vein is S.W. by N.E. The width of the tin-bearing strata varies from 6in. to 12in. The country rocks consist, principally, of very hard metamorphic schists, with bands of flinty indurated sandstones. Near the foot of this steep hill, on which the shaft has been sunk, a tunnel has been started, which would cut the vein about 20ft. beneath the bottom of the present shaft; but after driving only 16ft. N.W. by S.E. work was stopped, so that a test of this promising vein at a lower depth was left unaccomplished. From the conformation of the country it is evident that this vein, in traversing to

the south-west, not only crossed several watercourses (as mentioned before) which were enriched with alluvial tin by this vein, but also that there may exist richer shoots of ore along its course; and any future exploration should not only proceed from the tunnel, but wherever it crosses the creeks, and by following this mode of working a limited proprietary can obtain remunerative returns.

The ore is of a highly crystalline character, rich, and does not require much dressing, except where it impregnates the adjacent strata.

Further to the east, and south of the "three-quarter mile timber," a smaller vein of tin ore has been prospected, with but indifferent results, as the ore occurs chiefly as incrustations and thin coatings in the cleavage and bedding of the country rocks.

Two miles farther, still in the same direction, the Pieman Extended Tin Mining Co. have been testing an east and west vein of tin ore by means of numerous surface cuttings and one main shaft. The country consists of rather a softer kind of rock than any other prevailing in the vicinity, it being a light yellow argillaceous schist and sandstone. In these rocks black "schorlaceous" impregnations form the stanniferous zone, which is, besides, traversed by numerous veins of quartz, running parallel, or at almost any angle, with the vein in question, which averages from 18in. to 2ft. in thickness. On the surface the vein has been traced for about 150 yards, and, as in other cases, very rich surface specimens have been found occasionally, though below the surface the ore appears to occur principally in the cavities of the strata in large crystals and as incrustations, the latter necessitating a considerable amount of dressing the ore in order to reach a sufficiently high commercial value for its profitable disposal, which this vein at present would scarcely furnish in sufficient quantities. The main shaft has passed through. The shaft referred to has been sunk to a depth of over 40ft. through the soft schists described. To judge, however, from the spoil heaps outside, the quartz veins have become more frequent, and they are besides—below the water level—very strongly impregnated with iron pyrites.

The northern declivities of Mount Heemskirk proper are also mineral-bearing, and the so-called "iron face" has attracted the attention of miners generally. This formation appears to be a "dyke" of feldspathic granite impregnated with an unusual percentage of brown iron and of chromic iron ores; it occurs in the granite, is over 80ft. wide, with an outcrop —ft. in length, disappearing or dipping beneath the granite at both ends from the surface. The proper "iron face," which dips to the north, constitutes one of the divisional bands which frequently traverse these dykes at right angles with their walls, which in this bear to the south west. Bands or seams of pyritous granites of fine grain, and also of tin ore, occur in the vicinity of this singular formation, indicating the presence of other metalliferous deposits.

The alluvial tin deposits having been mostly worked to exhaustion, there remain in this group those deposits which probably exist in the eastern portion of the same. For instance, near the camp of the Emu Bay T. M. Co., the main branch of the Tasman River, the track crosses that stream by a bridge; on the opposite side the bank rises to about 50ft., of which the lower 30ft. exhibit an older "wash" than what has been worked for tin in the creeks thereabouts. Regular layers of white sand, clay, fine and coarse gravel alternate, and the whole is capped by a basaltic boulder drift in rich brown soil. This wash has not so far been tested; and as the ancient rivers at the New South Wales tin fields and elsewhere are found to be richer than, generally, the more recent alluvials in the creeks, these deposits there deserve attention.

Then, again, a kind of angular quartz detritus extends from that company's camp in a north-westerly direction for over two miles; but after passing the "three-quarter mile timber," a regular round gravel comes into sight, the detritus having been removed by denudation; and if similar veins of tin ore occur beneath this gravel, as mentioned above, there is a probability of these gravels proving stanniferous. Inasmuch the modern watercourses have been evaded here sometimes through these gravels into the underlying bedrocks (slates and sandstone), tunnelling these hills would soon prove whether such tin deposits exist or not, the indications being favourable to their so occurring.

### *The Southern Tin Deposits.*

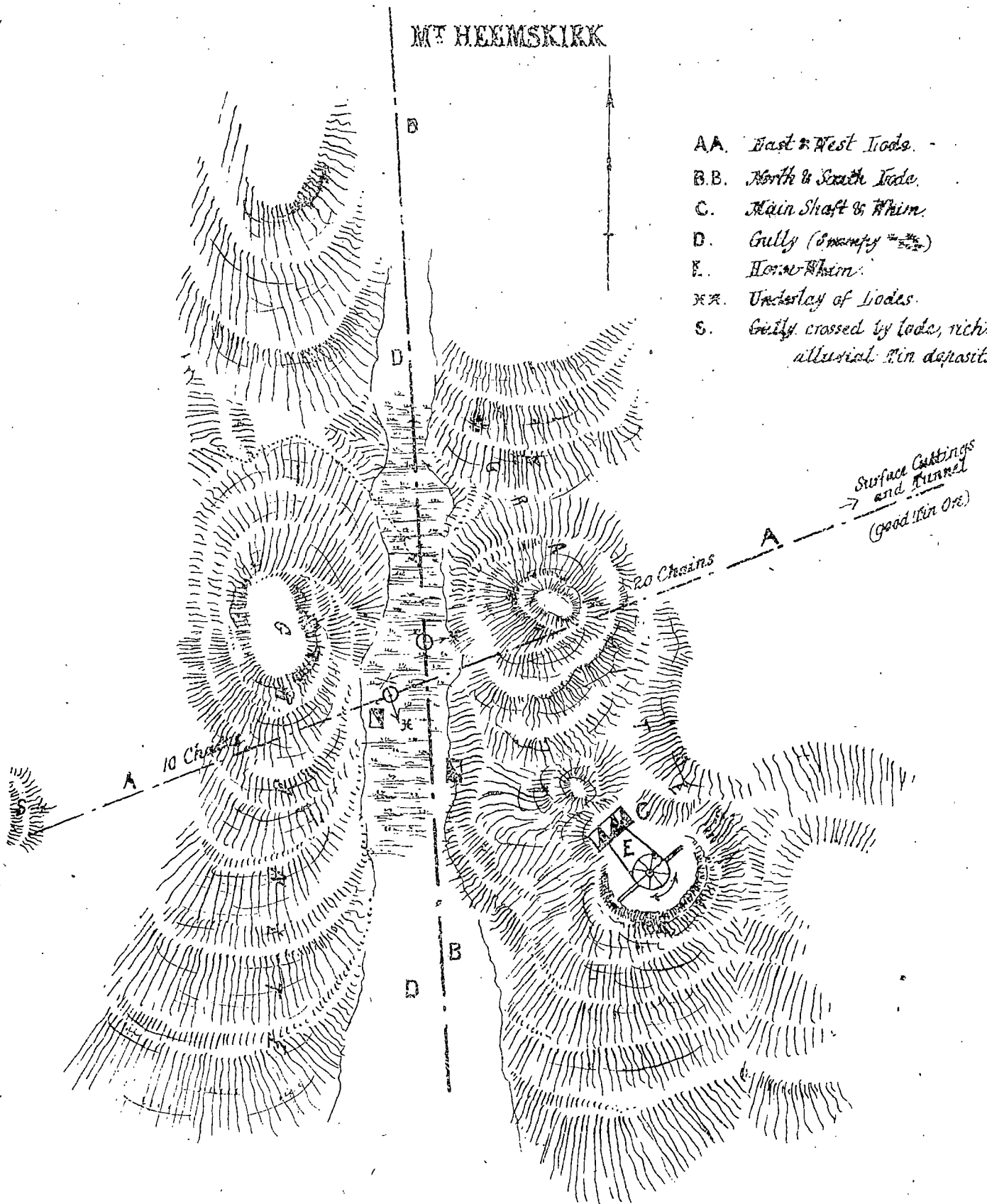
In the second group, south of Mount Heemskirk, the two most prominent tin mines on the West Coast of Tasmania are to be found, viz., the Montagu and the Cumberland; besides which, however, quite a number of mines or claims, as yet of lesser note, have been taken up, and some of these latter are now preparing for active work. In fact, so much ground has been taken up and pegged off as to render it difficult for anyone to distinguish one claim or mineral section from another, owing to the superficial way a great number of these sections, &c. have been indicated by means of all manner of unsubstantial pegs, and without these pegs being written upon in sufficiently clear a style as to applicants, area, date and year, and addresses. This mode of claiming ground, more or less valuable *in prospectu*, will, no doubt, lead in the end to tedious and expensive litigation amongst the parties interested, and therefore deserves the serious attention of the Authorities.



# SKETCH OF THE MONTAGU T. M. COMPANY'S MINE

MT HEEMSKIRK

- AA. East & West Tade.
- BB. North & South Tade.
- C. Main Shaft & Rhine.
- D. Gully (Sandy  $\frac{1}{2}$  to  $\frac{3}{4}$  ft.)
- E. Horn Rhine.
- XX. Underlay of Lodes.
- S. Gully crossed by lode, rich alluvial tin deposits.



Starting from the Emu Bay Tin Mining Company's camp by way of the Gap of Mount Heemskirk, the granitoid rocks, which exclusively prevail, exhibit tourmalines and some impregnations of tin ore on the north side of the Gap; whilst at the south side porphyries, porphyritic granites, and bands of splintery quartz crop to the surface.

About 3 miles from the Montagu camp the Great Western Tin Mining Company have done some prospecting on a streak of tin ore embedded in chlorite. Though a good-sized shaft was sunk to a depth of fifty feet, no perceptible improvement took place, and consequently operations were temporarily suspended.

The western foot hills (the *locale* of the Montagu and the other mineral sections) are but scantily supplied with useful mining timber, and even firewood is scarce; so that good and accessible timber areas in the adjacent forests on the ranges have become a most valuable desideratum now, and will be more so in the future.

The track from the Emu Bay Company's camp is in a tolerably good condition, although in one or two places new bridges should replace those that were washed away recently by the floods.

The tin ores which have hitherto been found in this vicinity comprise the beautifully crystallised, from black to light brown in colour, and the latter slightly transparent; the denser ore in the lodes and veins, associated more or less with iron; and the isolated crystals impregnating the soft country rocks in the vicinity of heavier ore deposits. These impregnations, however, also occur very frequently as separate from any other more regular deposits: thus the prospectors need to exercise a great deal of caution to distinguish mere patches from the more permanent lodes and veins which are also carrying the ore in irregular bunches and nodules. Then again, fine prospects of tin ore are frequently found to occur in veins of splintery quartz, and within the planes of contact betwixt the granites and porphyries; but in neither case can their permanency be much relied upon. Taking a comprehensive view of all these tin deposits, I have formed favourable conclusions as regards certain zones of same, and consequently prefer those which exhibit the general features of lodes and veins. The impregnations, if occurring in conjunction with the former, follow and finally the contact impregnations and the alluvial. The granites in their varied forms, the flexuous gneissous rocks, and the porphyries interstratifying and intruding the two first-named, are here very considerably associated with tourmalines and chlorites; in fact these two minerals may be considered as indications for tin ores, with this exception, however, that the coarser kind of tourmalines as occurring in solid veins, in nests of crystals, and as irregular crystalline patches, are not accompanied by this ore; whereas the finely crystallised needle-like globules to half an inch in diameter, which on being fractured exhibit circular forms in which the needle-like crystals radiate as from a common centre, are generally and mostly found in contiguity to and in connection with rich tin ores in lodes and veins.

The alluvial deposits which have been found within this section of South Mount Heemskirk have so far been of very limited extent only, and those that have been discovered led up, so to speak, to the discovery of lodes and veins; therefore, this tin-mining region differs materially from most others on this island, through all mining operations being principally directed towards the exploration of and the development of the permanent formations as found embedded in the country rocks. Except in the gullies, where such are intersected by already known veins and lodes of tin ore, the alluvial is confined to patches; along the outcrops of such lodes, &c. heavy fragments of ore are likewise sparsely distributed.

The Montagu Tin Mining Company's (Registered) works are in an advanced state of progress, and are being carried on vigorously night and day by a full complement of experienced miners, under the supervision of the mining manager, Mr. Ingleton. It is very evident that this proprietary means to lose no time in opening their mines, after having satisfied itself, by means of expensive and judiciously planned prospecting, of the existence of at least two very promising lodes carrying rich tin ores in a ferruginous matrix. Mining operations are carried on very systematically, and it is very certain that future extensions underground will be on a proportionate scale. Even now their main shaft, measuring 9 feet long by 3 feet 6 inches wide in the clear of timber, is the deepest on the West Coast, having been sunk to a depth of 93 feet through hard grey granite, red porphyry, now in blue granite and light brown porphyry. A suitable horsewhim has been erected, which facilitates works greatly, especially as there are three miners at the bottom in each of the three shifts.

It appears that tin was first found in the gully D, and principally so below the junction of the north and south lode with the east and west lode (which junction appears, to judge from the bearings of same, to take place in the centre of that gully); and, in fact, the working of the alluvial wash the north by south lode was found, leading eventually to the disclosure of the east and west lode also. Both lodes have been thoroughly prospected previous to the planning of operations on a larger scale by means of the capacious engine shaft (as it will become in time) now sinking. The manager intends to sink to a depth of 120 feet, and open the first level at 100 feet, thus leaving a well of 20 feet as a preventative against a sudden influx of water from what apparently will prove a very wet lode when such is being intersected.

*Mount Heemskirk.—The Montagu Tin Mining Company.*

The character of the ore, as discovered so far, is very good, and as their main shaft has passed through the upper and harder granite rock, and is now progressing in the more easily wrought porphyritic strata, every probability exists for the two lodes described to be met with in good size and of fair qualities. It is the intention of the Manager, and in fact he has made every preparation, for using water or steam power in the carrying on of future explorations, as soon as the lodes have been met in the cross-cuts, at something like eighty feet beneath where they were prospected before, nearer the surface.

*Permanency.*—Although it would, at first sight, appear a difficult matter for one to definitely give an opinion upon the permanency or otherwise of these lodes, yet it will be conceded that, in mining experience in other parts of the globe, all lodes and veins which crop out along the surface in the direction of their "strike" for long distances, showing good qualities of ore thereon, are proportionately more or less permanent, and descend to greater or lesser depths. In other words, the more extensive the longitudinal outcrop obtains, the deeper or more permanent these lodes will be found to continue. The two lodes in the Montagu mine, if measured by this accepted rule, will therefore most probably continue to great depths. Further, the east by west lode can be seen for about a mile in length, and it (the lode) eventually traverses—tin-bearing—the adjoining Company's property (the Cumberland). Then again, these two lodes, as far as has been ascertained, assimilate with other lodes, though not necessarily carrying stanniferous deposits. And it should be also stated, that this Montagu mine is situated nearly three miles to the south west of the Cumberland Company, but that the Montagu set of lodes is located over seven hundred feet below the surface level of the outcrops of the ore bodies exhibited so strongly within the Cumberland Company's areas or claims. It would thus appear, that the Montagu deposits had been denuded by means of marine action of that height of country as stated above, thus also more directly proving the permanent continuance in depth of these important Heemskirk tin lodes.

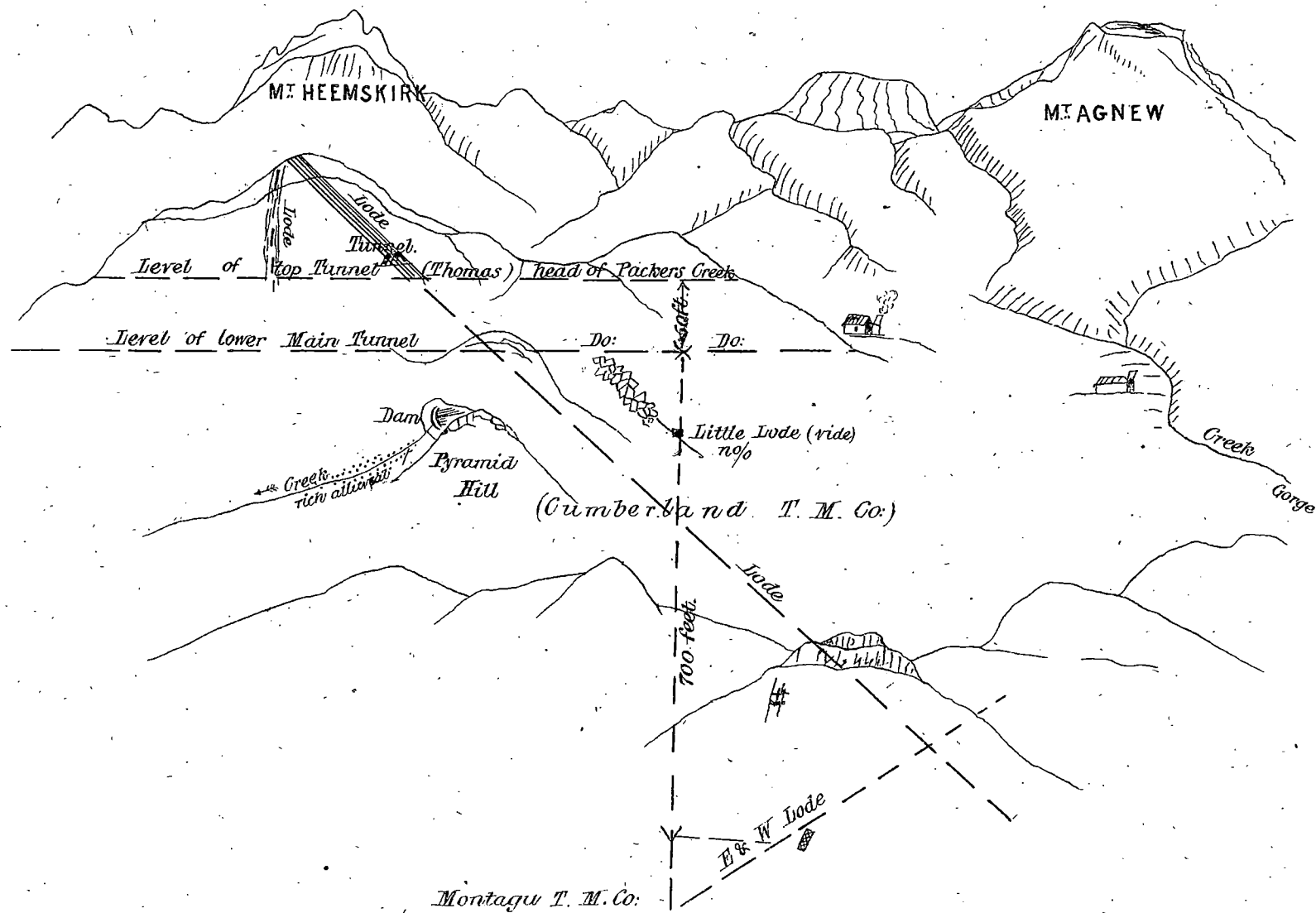
*Cumberland Tin Mining Company.*

The Cumberland Tin Mining Company's ground comprises what appears a favourable position in Tasmania for mines of that description; viz.,—an upland basin in granitoid and porphyritic country rocks. Unlike the deposits at the Montagu, the tin has been shed rather profusely over some places; heavy boulders of rich "cassiterite" are found on the southern slopes of the Wilson's Hill, which elevated ground may be said to contain the matrices of very nearly all the tin deposits discovered so far at that high elevation above the sea level. Lumps of tin ore more than fifty pounds in weight have been found, and the detritus in which they were embedded, besides much smaller pieces of ore, point to considerable fluvial and diluvial action in the previous geological epochs of formation in that part of the island. The practical mining of these lodes, and of the more recently formed deposits, is undoubtedly greatly facilitated by the natural formation of the country, as both the drainage and the rapid disposal of *debris* offers no obstacle to rapid and economical mining. Then, also, the mining of the lode or lodes, occurring as they do in peculiarly formed description of gneissous and porphyritic rocks, nearly schistose in character, will not form serious obstacles to progress at deep levels as if the tin ores occurred in purer and more dense granite. The water supply, and that of good timber for all purposes, is also everything that can be desired; the only drawback being the shipment or transport of cleaned ores from such a high altitude to the ports available in this vicinity, which difficulty applies in a proportionate degree to all the mines at Mount Heemskirk, but as soon as the actual output of ores has been ascertained, means can doubtless be adopted by the combined proprietaries to obviate that kind of difficulty.

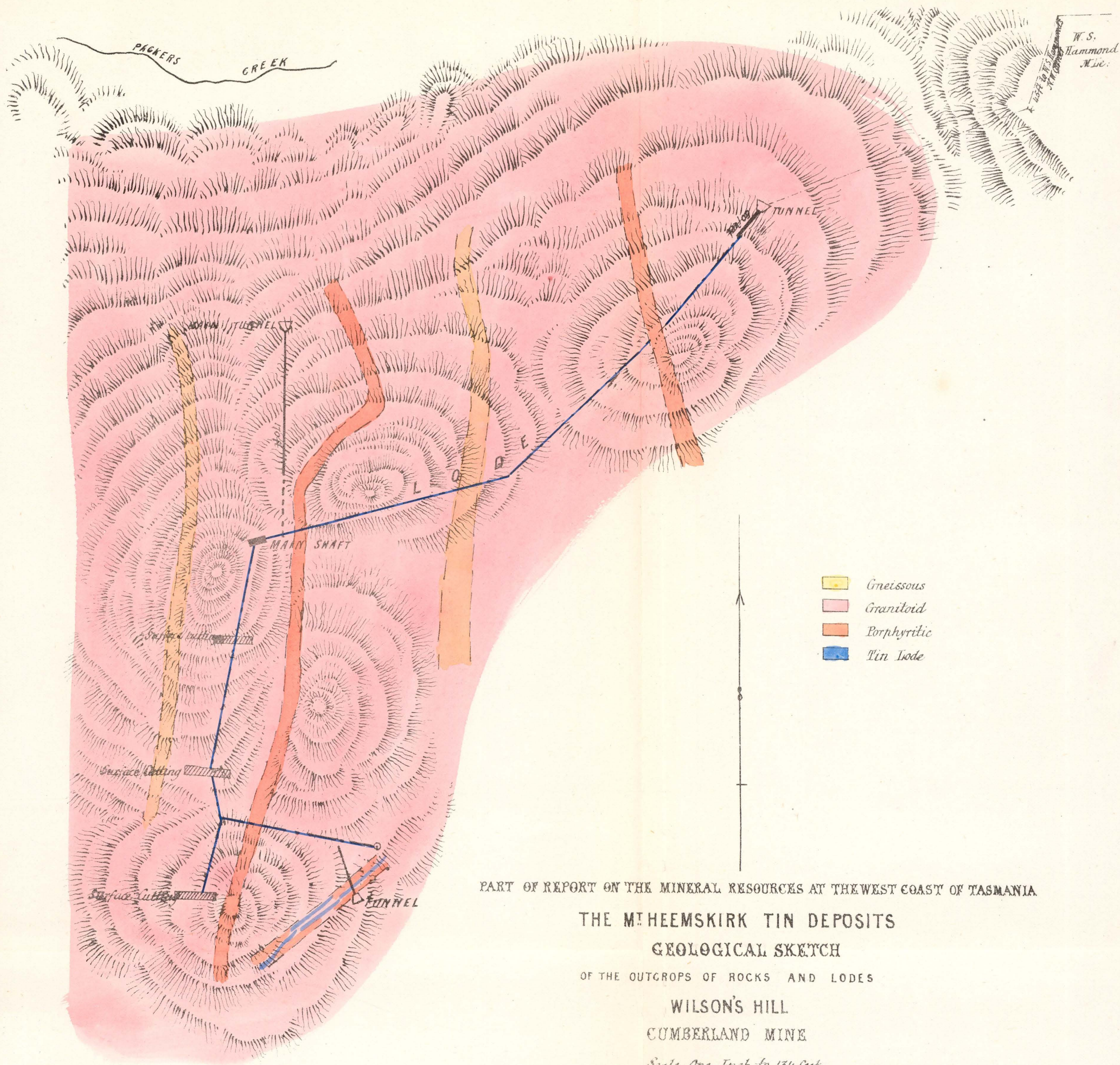
The mining operations, which have been principally projected and carried out by Mr. Wilson, the first discoverer of tin deposits on this ground, were simply to guide the company as to what they would have to do in the near future. Advice was sought at the hands of reputed authorities, and openings of ground by shafts, surface cuttings, and tunnels were taken in hand, and are, to some extent, still in progress; but, so far as I could see, these were all preliminary to any well devised scheme for developing a very valuable mining property on a scale commensurate with its extent and large capacities for producing, for a length of time, a considerable quantity of tin ore. And this is really the point at issue; because if this and the other West Coast mining companies can secure rapid delivery of the ores they are evidently capable to produce for shipping *via* Hobart or *via* other colonial ports, the future of this at present so dreary and altogether unproductive region will be very considerably improveupon, and the prosperity of that coast be proportionately enhanced.



*Sketch showing General Features of the  
Southern Tin Deposits & positions of the  
Montagu & Cumberland Mines.*







PART OF REPORT ON THE MINERAL RESOURCES AT THE WEST COAST OF TASMANIA.

# THE M'HEEMSKIRK TIN DEPOSITS

## GEOLOGICAL SKETCH

OF THE OUTCROPS OF ROCKS AND LODES

WILSON'S HILL

CUMBERLAND MINE

Scale One Inch to 134 feet



## MOUNT HEEMSKIRK.

THE mining operations at the Cumberland Company's mine have already been alluded to, and these will be delineated on the geological sketch I am preparing. Of the lodes occurring in this Company's ground it may be desirable to give a concise description. There is the main lode, of first importance, as it forms, so to speak, the crest of Wilson's Hill; the little lode in the Basin; and one or two parallel lodes, partly impregnations, half way up the southern slope of the rise, or about midway between the former.

The first lode, in its undulating bearings to the south west, consists of two parallel stones or veins separated by a band of friable granite, as shown in a tunnel driven fifty feet from the northern extremity of Wilson's Hill: these veins are poor until they increase in size and join together further south, and this high-level tunnel opens nearly sixty feet of "backs." Proceeding along the outcrop south, it becomes apparent that, owing to the granites, which here traverse nearly north by south, on being replaced by the porphyries and other well-known tin ore-carrying strata, are attended with a considerable increase of the width of this well laminated formation. At the same time the lode does not strike regularly, which is considered a favourable circumstance by miners. At a distance of one thousand feet in a direct line from the tunnel a shaft has been sunk, timbered, and divided into two compartments to a depth of fifty feet; and, as the water had accumulated, I was informed that ten feet had been driven in the footwall at the forty feet level. This site for the shaft had evidently been chosen from the unusually heavy surface stones of tin discovered close by, and the finer tin shed down the steep slopes of Packer's Creek, north of Wilson's Hill. This outcrop looks very well (and the ore is rich\*) and strong; the formation is about twelve feet in width, and on the northern wall peculiar and large bunches of brown iron ore occur, thus adding to the generally favourable appearance of the lode. Owing to the underlay, it appears that the shaft cut through it into the footwall, but met with tin-bearing veins in the latter, in the softer strata than that of the opposite wall. In order to more rapidly work this lode a main tunnel was started from Packer's Creek, so as to provide about two hundred feet of ground to work beneath the mouth of the shaft, and this deep level tunnel has been driven due south for a total distance of one hundred and seventy feet. The strata passed through are porphyritic, and the working is of the ordinary description, because any smaller dimensions would have interfered with speedy delivery of ore and *debris* as soon as the lode had been intersected by the same.

Proceeding along the lode in the same direction similar features were observed, and the size and quality only varied so much as is ordinarily the case with tin lodes, though crystalline quartz impregnated more and more perceptibly the matrix, thus entailing a greater scope for well-devised ore-dressing machinery in future.

A peculiar set of tin-bearing porphyries, branch, as it were, from where the main lode disappears beneath the surface in its dip. These porphyries are, like all the others in this vicinity, much contorted, and they contain tourmalines, and are feldspathic. One of these impregnations, rich in places, was intersected by means of a small prospecting tunnel near its mouth, and something near 30 feet was driven through. At right angles in the tunnel which crosses this formation, over 70 feet had to be driven to the opposite wall. One of these cross-veins or impregnations, or possibly the main lode itself, must have been more than ordinarily good, because a streak of stream tin, resting on a soft granite bottom, has been partly traced from the Basin up this Wilson's Hill,—pieces ranging from the ordinary sized ore to masses of nearly half a hundred weight. In the Basin itself, the little lode† was examined and tested. The workings are not yet sufficiently deep to speak of the future permanency, nor is the vein more than about two feet wide, but the pan gave prospects from half a pound to two pounds each. Highly crystalline tinstone was also discovered on the range towards the Montagu, but on the eastern slope of and in the Cumberland Company's ground; and a rich deposit has also been worked in a gully west of the little lode. It will thus be seen that these mineral deposits, even in their present unexplored state, are rich in places; that they are extending rapidly in several directions, especially when it is recollected that the "coast sections" located between the Montagu and the sea, those on the road to and at Mount Montagu itself, are yet to be reported on. There is one peculiar natural feature which deserves mention; viz.—the drainage of the Cumberland basin has necessitated the erosion of a deep precipitous gorge, in which the torrent falls in cascades to a depth of over two hundred feet, the whole distance of which, however, is through a subterranean channel. As this torrent emerges from its cavity below, the *debris* carried down from the higher level has been proved to be payable in tin. Two other similar instances came under my notice; but in those cases the water-shed and cavernous outlets had been obliterated in the past, and only the very coarse wash—stanniferous—remained behind. The second occurs at Tin Creek, Mount Agnew, where a very rich, but so far limited, deposit has been wrought; all prospectings for the source have been unavailing, though this angular boulder drift can be distinctly traced up the flanks of Mt. Agnew. In my opinion a good lode should exist at a considerable elevation above the Tin Creek; and in this view I was confirmed afterwards on examining the Cumberland mine, where, as already described, a coarse rich drift has been shed into the basin

\* The ore obtained at the main shaft analysed up to 35.50 per cent. of ore per ton.

† Ore taken from this cutting gave 55 per cent. per ton.



near the little lode, so that since the pre-historical epochs a very considerable revulsion must have occurred, though the miners may yet derive considerable advantages from observing and prospecting all places where patchy or limited stream tin cannot be traced to its source whilst yet they are overlaid by coarse gravels and drifts.

#### *Mount Agnew.*

This mineral district is approached by means of a track which skirts the forests clothing the southern and south-eastern spurs of both the Heemskirk and Mount Agnew mountains. The foot hills are barren of timber, composed of granitoid rocks, with occasional bands of porphyries. More or less promising indications of tin have been discovered; and a great deal of ground is held or applied for on lease. It may be mentioned here that the granites are bounded in the south by hard chloritic schists, in which narrow quartz veins occur, of no value. The junction of these two rocks was examined in two places, two miles apart; but, beyond irregular nodules of brown iron ores and traces of a white malleable metal (silver?), nothing of sufficient importance was discovered. These schists, farther east, change their character gradually; and, as the creeks at the back of Mount Agnew have been found to carry a little fine gold, the prospectors might be assisted by the Government in the way of cutting tracks through this unexplored country, in order that the minerals which most probably occur thereabouts may be opened up in the course of time.

Referring to the tin deposits, it has already been stated that Tin Creek has produced several tons of tin ore; but operations were suspended because the matrix could not be discovered in the dense scrub on Mount Agnew. A track up the main spur in this vicinity, or along the coarse detritus described, would be of utility, as it is likely that the continuations of the Cumberland and other lodes will be found to establish the source of this tin deposit in Tin Creek.

There occurred in that creek two varieties of ore, viz., the ordinary cassiterite and a greyish-coloured more porous kind. Some miners designated it as white iron, or worthless, thus deteriorating the production of the mine. From examinations made, I think that this peculiar grey colour is probably due to manganese or zinc and iron; but this is immaterial, because its high commercial value has been proved; and miners ought not regret it, because I found this ore associated with the common tinstone near the shaft at the Cumberland mines, it having evidently been broken out under ground from the lode described above. As stated before, the indications on Mount Agnew are favourable to some outlay being incurred to open the country by means of several tracks. The principal one I would suggest to be that which would penetrate from Mount Agnew on its eastern side, and which would come out near the waterfall, also east of Mount Heemskirk, the main track to be cut in conjunction with cross tracks at suitable places. It is only by some such means that a promising mountainous country can be opened for the systematic disclosure of its mineral resources, which exist to so valuable degree on their western slopes.

### THE COAST SECTIONS.

#### *(Mount Heemskirk.)*

Owing to the favourable prospects obtained by the Montagu and Cumberland Companies, at, comparatively speaking, reasonable expense to themselves, the localities situated west, or rather between the Montagu and the sea, were assiduously examined by experienced prospectors. Previous to that Mr. Thorn had traced the Montagu lode a good distance, and he had found tin in the alluvial towards the coast. Messrs. Climie, Holroyd, and others were also persistent in their efforts to add to the mineral resources of the Colony.

Following the line of lodes from the Montagu westerly, Mr. Climie's sections are reached at a moderate distance from the Montagu Company's shaft. (Shown on plan.) Several workings have been made of the ordinary kind, and a shaft has been sunk to a depth of about 50 feet from the surface, striking water at 45 feet deep.

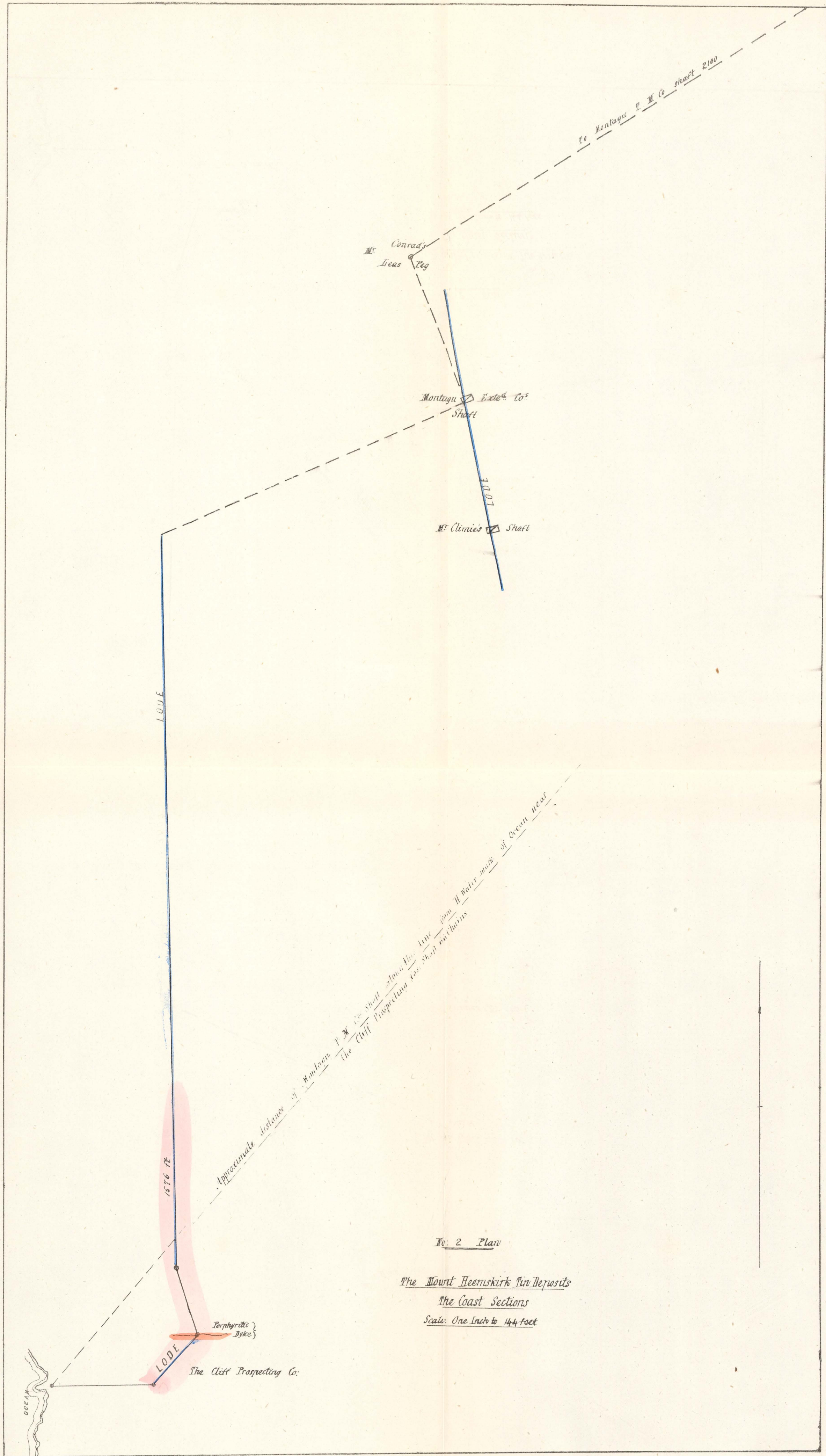
The ore occurs\* in a bed of greyish white porphyry, of a friable character, and highly impregnated in places with large and smaller crystals of tinstone of very good quality. This zone of stanniferous porphyry averages from 6 to 7 feet in width, the west side of decomposed feldspathic rock, having on the east a hard and contorted gneissous band, which can be traced up to the Montagu Extended Company's shaft, 850 feet distant north, 10 west. The country hereabouts is hilly, bare of timber, and forms the foothills to Mount Heemskirk; it is of the same geological character as represented in the Montagu and Cumberland sections, and as the rock is not too dense it is evident that already quite a system of stanniferous deposits have been prospected, with every indication as to their future permanency in depth.

The Montagu Extended T. M. Company are also in the same strata of tin-carrying porphyry, which in their section has also been traced for over six chains in the direction of its strike, a little

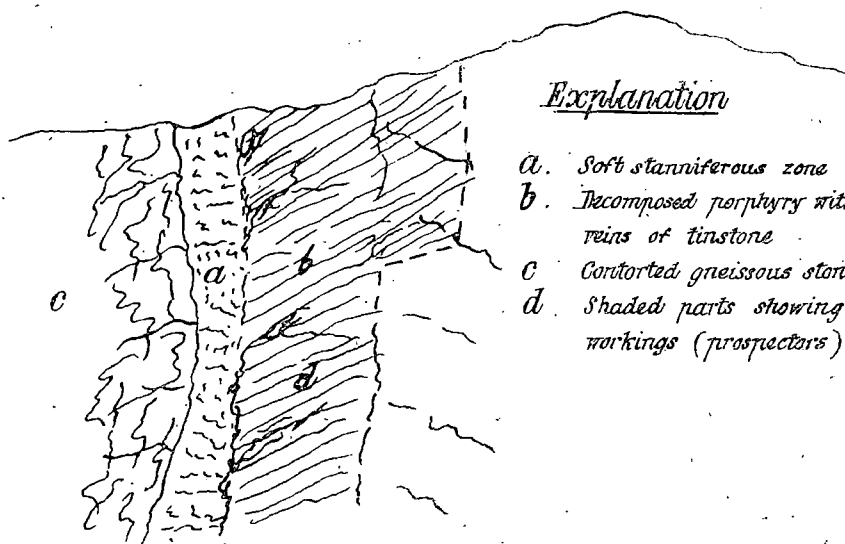
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\* At the 25 feet level this porphyry gave 10 per cent. of metallic tin per ton.









Explanation

- a. Soft stanniferous zone*
- b. Decomposed porphyry with  
veins of tinstone*
- c. Contorted gneissous stone*
- d. Shaded parts showing  
workings (prospectors)*



west of north. At first the tin-bearing strata was one foot six inches wide only, but, before leaving the West Coast this deposit has become both wider and richer. There is one very reassuring feature in this mine—that the shaft is going down, with six men employed regularly, and that in same and in some of the adjoining companies the occurrence of other minerals besides tin ores is noted. These consist of fine specimens of molybdenite, traces of cobalt, and fibrous tourmaline, which indicate that these veins have some similarity with other metalliferous lodes carrying other metals.

Still farther towards the coast line, at least two very promising lodes were discovered by Mr. Thorn in the sections held by the Cliff Prospecting T. M. Company, and with these, like all the others in this District, the tin deposits are mostly associated with bands of chlorite. The first deposit met with consists of a chlorite vein, showing good prospects; in fact, in one place large pieces can be seen in the surface gravel. My examination of this vein extended to a distance of over one thousand feet on a north by south strike, and it was tolerably wide in its course. Another lode was found only one hundred and fifty feet from high-water mark, but at an elevation of nearly one hundred feet above the sea. This lode occurs in a stratified granitoid country, merging into gneiss, with dykes of porphyry protruding the older rocks; it runs south-west, and the tin-bearing rock measures four feet wide, exhibiting very rich ore in some parts. From the shafts now sinking the ore has been traced for about three chains along its course on the surface, where a large dyke (10 feet thick) of porphyry appears to throw it out of its regular course; and it requires further exploration to re-discover this fine vein in its further extension beyond this dyke.

Having now described the principal features of the Mount Heemskirk Tin Mines, a few observations on them may not be deemed out of place. As far as my investigations have extended they are very satisfactory. I cannot but confess my surprise that these mines should have remained quiescent for so long a period after their discovery. I am likewise surprised at the perfect network of tin-bearing deposits which exists over an extent of ground not comprehensible to those who have not seen the *locale*. Without the slightest doubt Heemskirk will, in the course of time, if the mines are continuously and efficiently worked, become a place of importance to this Colony. At the same time, I would strongly recommend the cessation of the pernicious system of holding large numbers of sections adjacent to or within the already proved tin-bearing sections for speculative purposes only, as is frequently now the case. If leaseholders cannot work their ground themselves, why do they not adopt the tribute system, which has done so much for the development of mining in Australia? The miners becoming thereby indirectly interested would work cheaper, and with more foresight and energy, as is the case where companies employ them as wage earners only.

Then, again, mining being so costly at the Mount, and there is so much unexplored ground yet to be had, the Government might assist by proving such localities by means of the mining diamond drills. What would California, Nevada, Pennsylvania, Victoria, and other mining countries be but for these invaluable machines? In fact, these matters require serious attention, as well as that of a tramway from Mount Heemskirk, the terminus of which should be located where the branch lines from the various mining companies could feed the main line to Long Bay, Macquarie Harbour, whence steam launches could transport goods (both ways) to the mouth of that important sheet of water for direct transshipment, or if not that, for direct despatch.

#### OTHER MINERAL DEPOSITS.

There is but one other deposit that should be mentioned, namely, that of iron; on the track from Heemskirk to the Little Henty River there occurs a very large outcrop of argillaceous iron ore. The ore is of a good quality, and it can be cheaply worked owing to the natural facilities afforded by its location on an isolated hill not far from water. But in the absence—as far as I could see—of coal or lime, this ore must, for the present at least, remain in *statu quo*. Along the track to Macquarie Harbour there was nothing to call my attention in the way of minerals; and as to the track itself it is pretty good, except at the two Hentys, where the Government will now construct bridges. This track is but temporary, in my opinion, as doubtless some time or other a tram or a railway will be necessary for the exigencies of the case.

Macquarie Harbour is not interesting to the mining geologist. Raised sea beaches surround its northern portion, whilst nearer the outlet to the sea quartzites are the principal rocks that I observed. A more extensive examination might, however, disclose features more valuable to the Colony at large.

G. THUREAU, F.G.S., *Mining Engineer.*

Hon. C. O'REILLY, M.P.,  
*Minister of Lands and Works.*

Hobart, 9th August, 1881.

SIR,

I HAVE the honor to hand you the enclosed Recapitulation of my Reports on the West Coast, in so far as such relates to the mineral deposits, &c. The sketches and maps or charts have considerably advanced, but I fear I have already trusted to your indulgence in thus extending the time for the total completion of the work entrusted to me by you. Delays have occurred that were unavoidable, and sickness also interfered, but I am now making rapid progress.

I have, &amp;c.

The Hon. C. O'REILLY, M.P.,  
Minister of Lands and Works.

G. THUREAU, F.G.S.

### RECAPITULATION.

Taking a retrospective and comprehensive view of the Mineral deposits of the parts visited, and carefully examined, which formations extend from (but not inclusive) Mount Bischoff to Macquarie Harbour *via* Long Plains, M'Donald and Chinaman's Hills, Harvey's Claim, Brown's Creek and Plains, Little Plain and Middleton's Creek, Pieman River and Sunday Creek, Coast line (to) and Mount Heemskirk, Mount Agnew and vicinity, I have the honor to be able to report to the Government that, on the whole, my investigations have been attended with considerable success; and I trust that they have been the means of conveying to the public by means of my Progress Reports valuable though concise information in regard to these neglected Districts, owing to the scantiness of the information of a reliable and practical character obtainable.

Having already furnished special information on these important matters as to particularised Districts and their mineral deposits on the West Coast, I would, on that account, confine myself to a few general remarks in the following, with a view of bringing the subject under the notice of the Authorities in a concise form.

I may be permitted to explain that, during my tour, I observed that there existed two principal "Ore Districts;" viz.—

*Gold*, with its associated combinations;

*Tin*, in its varied modes of occurrence. The former existed at, generally speaking, the Corinna Gold Field, and the latter at Mounts Heemskirk and Agnew.

The *Corinna Gold Field* comprises rather an extensive area at present; its source may be safely ascribed to the north-western vicinity of Mount Cleveland (only very superficially explored) down to the junction of Middleton's Creek with the Savage River from north to south, and the other way from Sunday Creek to the Whyte River, including Badger' Creek and other localities. The gold has been found in the alluvial and in the diluvial; the former as indicating the vicinity of yet undiscovered quartz reefs (Quartz Creek), and likewise that gold which has been denuded from the older tertiaries (Middleton's Creek). The diluvial deposits are yet confined to the tertiaries and to the deeper gravels of the same age (M'Donald's and Chinaman's Hills down to the termination of Middleton's Creek, the deeper ground at Harvey's claim, Brown's Creek).

The quality of the gold is generally of a very high per-centage of purity; and some very coarse gold has been found in this District. It may be mentioned that near the Corinna River a miner discovered a nugget of gold more perfect in its crystalline form than any that have come under my observation elsewhere. It formed a perfect octahedron; and it would, on account of the rarity of perfect crystals, be worth (intrinsically) more than if it was sold by weight only.

The prevailing rocks are metamorphic slates and sandstones, and silurian, associated with dykes of porphyry and probably diorites, also quartz veins and lodes.

With regard to the actual production of gold at the various mines visited, it has been most difficult for me to obtain reliable information; but judging from the large amount of work done—hindered so greatly and so incessantly by the dense undergrowth of horizontal scrub and bauera—after months of prospecting unsuccessfully, and the fact that old Corinna miners return to the field from the Australian and New Zealand gold fields, where these difficulties are at a minimum in comparison, the earnings of the miners should be considered of a remunerative character.

As specially mentioned previously, these hardy pioneers should be assisted by the Authorities, by the latter subsidising them in cutting new tracks; also, in order to develop the field thoroughly, that a more extensive examination should be made in the summer, and that one vertical diamond drill should be used to test the deep ground, which offers so favourable indications for a permanent gold field.

## THE TIN DEPOSITS.

The Mount Heemskirk and Mount Agnew tin deposits appear to be, in my humble opinion, of grave importance to the Colony at large, because through their existence on that sterile West Coast it will give an impetus to settlement in the near future; and as the deposits are principally confined to veins, country rocks impregnated with tin, and well defined outcrops of lodes, the development of which is now about to be so energetically pushed by various proprietaries, their permanency has already been proved so far as present workings have progressed. The magnitude, so to speak, of these numerous sets of all kinds of tin deposits, in precisely the similar granitoid rocks, highly impregnated with tourmalines, and traversed by bands of chlorites; the more laminated gneiss, and the dykes of porphyry rich in silica, as in all the other great tin-producing countries. There are several deposits of good tinstone, bearing a satisfactory per-centage of metal to the ton of rock; and the ore itself, after dressing, yields high per-centage of tin also.

Of course, these mines being yet in their embryo state have not yet produced any quantity of ore, all operations being directed to the opening of the deposits underground; but even were the veins to be suddenly cut off by some means or another (which is very improbable), then there would remain a very considerable quantity of tinstone to be manipulated.

I have to submit that, from what I have seen of the deposits in the localities referred to, they possess features which have shaped my opinion to be very favourable to their future behaviour when properly and systematically mined at lower levels than yet reached hitherto; though I have already explained in my Progress Reports that, to a considerable degree, nature has very considerably assisted the miner to prove that problem.

And, in conclusion, I would now embrace this opportunity of conveying my sincere thanks to those with whom I have come in contact during my tour; for without their very kind assistance, hospitality, and the valuable information they afforded me, I could not have carried out the instructions I was honored with by the Government.

G. THUREAU, *F.G.S.*

*The Hon. C. O'REILLY, Minister of Lands, &c.*



# MINERAL SECTIONS

VICINITY OF M<sup>r</sup> HEEMSKIRK

*Scale Thirty Chains to One Inch.*

Lands and Works Office August 1881