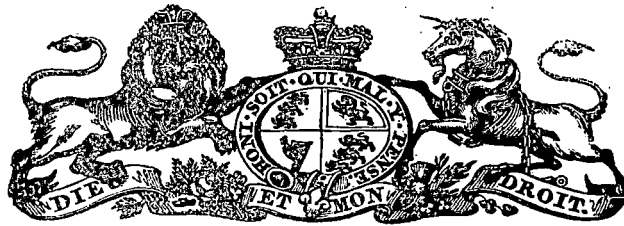


(No. 91.)



1881.

T A S M A N I A.

LEGISLATIVE COUNCIL.

M I N E S :

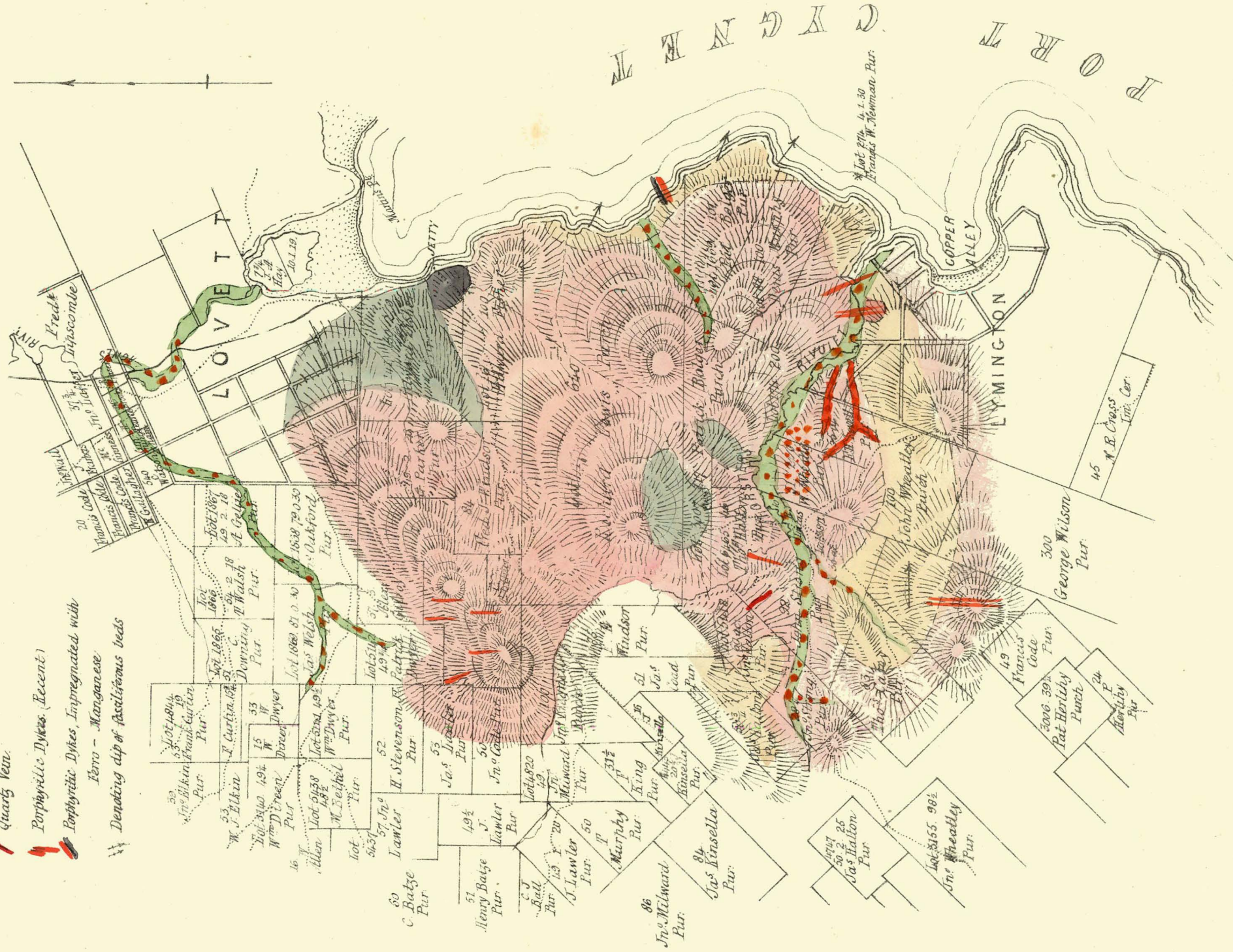
MR. THUREAU'S FURTHER REPORTS.

Laid upon the Table by Mr. Moore, and ordered by the Council to be printed,
September 29, 1881.

PORT CYGNET GOLD FIELD

Scale 2 Inches to a Mile.

- Metamorphic (Carbonaceous)
- Alluvial (aur)
- Carbonaceous
- Porphyritic (Schistose)
- Diluvial Clays (aur)
- Basaltic
- Quartz Vein
- Porphyritic Dykes (Recent)
- Porphyritic Dykes, Impregnated with Iron - Manganese
- Dendritic dip of fossiliferous beds





REPORT ON THE GOLD DEPOSITS AT AND IN THE VICINITY OF LYMINGTON.

Port Cygnet, 26th August, 1881.

SIR,

I HAVE the honor to report that I have, in pursuance of your instructions, examined these deposits very carefully, and in the following the result of my investigations are submitted for consideration.

In order to arrive at a reliable conclusion as to the extent, commercial value, and permanency of these deposits, I determined to trace the more recent deposits to the older, and these latter to the probable matrix or source. It was found that Forster's Rivulet, which empties into Port Cygnet Bay at the Township of Lymington (*see geological sketch map*), would afford the information required, and consequently it formed the base of my movements. The recent alluvial in that stream consists of fragments of rocks—very little quartz—carried down from higher elevations, and, though auriferous to a limited degree, it soon became evident that that gold had been derived from some older auriferous formations. It may be stated, that the bedrock for this alluvial deposit of gold was a fossiliferous sandstone and shale belonging to the carbonaceous era, and frequently such may have been mistaken for silurian sandstone or slate, owing to the peculiar position of its bedding planes.

Nearly opposite Lot 174, to the south west, two gullies fall into the Forster's Rivulet (from the west), which have been wrought for gold for nearly their whole length. The peculiar character of these deposits in the gullies alluded to is such as to require special mention. They may be described as forming a clayey deposit,—viz., surface soil one foot in depth; greyish clay, three feet; mottled yellow clay, five feet; grey clay, two feet; at the base of which occasionally a few rounded pebbles of quartz or porphyry are found to rest on a porphyritic (decomposed) soft bedrock, besides the gold which occurs in these gullies. It will thus be perceived that a wide difference is established in comparison with the auriferous washes in other gold-producing countries, inasmuch as there is a total absence of tertiary gravels, which have accumulated through powerful diluvial action, associated with swift currents or the action by waves, in those periods.

Higher up this same Forster's Rivulet, in passing into Lots 3781 and subsequently into Lot 92, the same angular and more gravelly recent wash obtains—the same as below the two gullies described—also containing gold, but of a coarser character and somewhat more remunerative. (It should be stated that I was informed by miners that they could, by working these deposits, make on the average from £1 to £1 15s. each per week.) The alluvial workings consist of principally open cuttings; their width averaging from twelve to twenty feet, and their depth from ten to twenty feet. The gullies are shallower where they fall into the rivulet than at the head, owing to denudation near the watercourse draining at present the country. At the head of these gullies, and on the low dividing spurs between them, gold is also found to be sparingly distributed through a hard grey sand enclosing angular quartz, which is very probably derived by decomposition or disintegration of the porphyries and of the quartzose conglomerates of the carbonaceous formations in the vicinity.

The gold obtained by the miners is of a very pure character, and it obtained the second prize at the late Sydney Exhibition.

Almost parallel with Forster's Rivulet and its tributaries, a mile further north another gully has its outlet near the Regatta Jetty, and it runs up a considerable distance north west towards Lots 1669 and 88. It is a remarkable fact that though the largest piece of alluvial gold (15 dwts.) in the district was found in that gully, this gold commanded a price of but £2 17s. per ounce (containing much silver), as against over £4 per ounce from the first-described deposits.

Still further north, beyond the township of Lovett, where the first gold was discovered some years ago in the western tributaries of the Agnes River, which tributaries were worked in Lots 1867, 1868, 1869, and 5142, it was observed that the gold was but sparingly distributed throughout the alluvial deposits.

Looking at the geological sketch map accompanying this report, it will be observed that there are actually two distinct localities where the sources of these auriferous deposits (alluvial and older tertiary) could possibly exist,—viz., the southern Lots 92 and 6465, and on the Crown lands located between Lots 4820 and 84 in the north west and north east. Previous to my offering any opinion as to whether mining generally would become to be more remunerative in the working of the matrices (if any) than what it has been in the less permanent alluvial deposits, a concise description of the geological features of this district is essentially necessary in order to elucidate the deductions I have arrived at in regard to same, and which I shall submit at the conclusion of this report.

Geological features observed in the Lymington District.

Lymington is located on the peninsula situate between Port Cygnet and the Huon River. It is in rather a hilly country, and good agricultural land is but sparsely found, owing to the prevailing rocks, after decomposition, forming a sandy soil resting on heavy clays. The prevailing rocks, in their order of prominence, stand as follows:—An unusual variety of porphyritic rocks, highly felspathic principally; also the same rock of more recent origin in dykes; fossiliferous beds of sedimentary rocks underlying the coal measures; and though these beds have been very frequently protruded by the “porphyrites,” it was observed that, beyond a certain amount of transmutation from soft sandstones into very dense and hard rocks in which the fossils were, so to speak, obliterated, there was not much shifting of the beds from their original and more or less horizontal deposition to elevations or “tilting” to higher angles: there are also some dykes belonging to the basaltic and greenstone intrusive rocks. It will thus be seen that there is a total absence of the permanent auriferous formations which carry in other gold-bearing countries the well-known quartz reefs and veins charged with gold. In place of the quartz reefs, which in Australia are now the principal sources for gold, and which have led to such very extensive mining operations of a thoroughly permanent character, there occur—were the porphyrites taking the place of the silurian slates and sandstones at Lymington, which they do not—more recent dykes of porphyry, which traverse the older porphyrites in a direction not varying much from north by south. As regards these dykes of recent porphyry, I found them more or less quartziferous, and that this quartz contained occasional patches of pyrites. The quartz had, however, been altered by plutonic action into an impure indurated sandstone-like mineral, not at all resembling the “veinstone or quartz” of the silurian sandstone and slate formation. Other quartzose or siliceous minerals were found in contiguity to the dykes and the fossiliferous beds, viz., hornstones and jasper, chiefly of a deep brown or red colour, conchoidal in fracture, and evidently the product of transmutation of clays, shales, or siliceous deposits found adjoining porphyries and other plutonic rocks, to which they most likely owe the change they have undergone.

There appears to be, however, one exception to this view, viz.—upon Lot 92 a defined vein of glassy, flinty, whitish, and moderately mineralised quartz has been found embedded in jointy sandstone. This vein consists of a series of semi-detached blocks of stone underlaying west, with a strike of N. 12° E., and about 2 feet 6 inches in width.

At the western or hanging-wall the quartz exhibits, on breaking, pyrites (iron) in cubical and dense forms. In order to set the question at rest as to whether this stone, impregnated with such pyrites, is auriferous or not, I would recommend that a sample (which accompanies this report) should be tested for gold by some disinterested analyst.

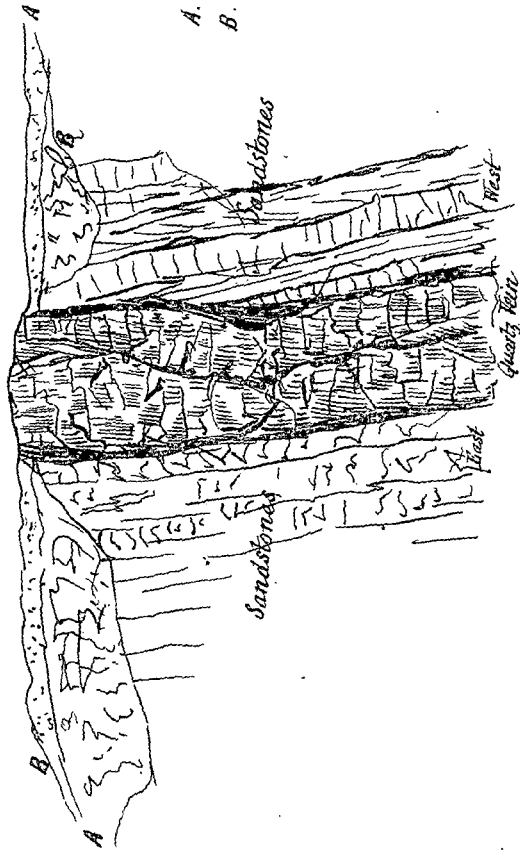
During my examinations of the District, as shown on the sketch map, I have collected valuable information for the furtherance of my labours. And as those dykes of recent porphyry have been referred to, a description of same will precede the concluding remarks of my report.

There are two varieties of these dykes, viz.—those massive dykes which are found on the hill (see map) west of Lymington, at or upon Lot 92, and one in the south east of Lot 4820: the other comprise narrower and less quartziferous formation of a similar description. The dyke which has been wrought, or is being still prospected, upon Lot 92, is a very strong formation of plutonic rock embedded in a friable, whitish, and highly felspathic wall-rock, changing, however, at the southern end into a greenish sandstone, also soft, and evidently metamorphic in character. This dyke is over 20 feet wide, and the underlay of same is about 85 degrees south west, with a strike of N. 5° W. It is considerably stained by brown iron ore, probably decomposed pyrites; and it is exposed to view in a large cutting from the surface nearly 14 feet deep for its whole width; and the wall-rocks have likewise been removed, in order to gain access to their dyke, for a length exceeding 20 feet. A small prospecting shaft is now being sunk through the hanging-wall (22 feet) in order to intersect the dyke at a lower level.

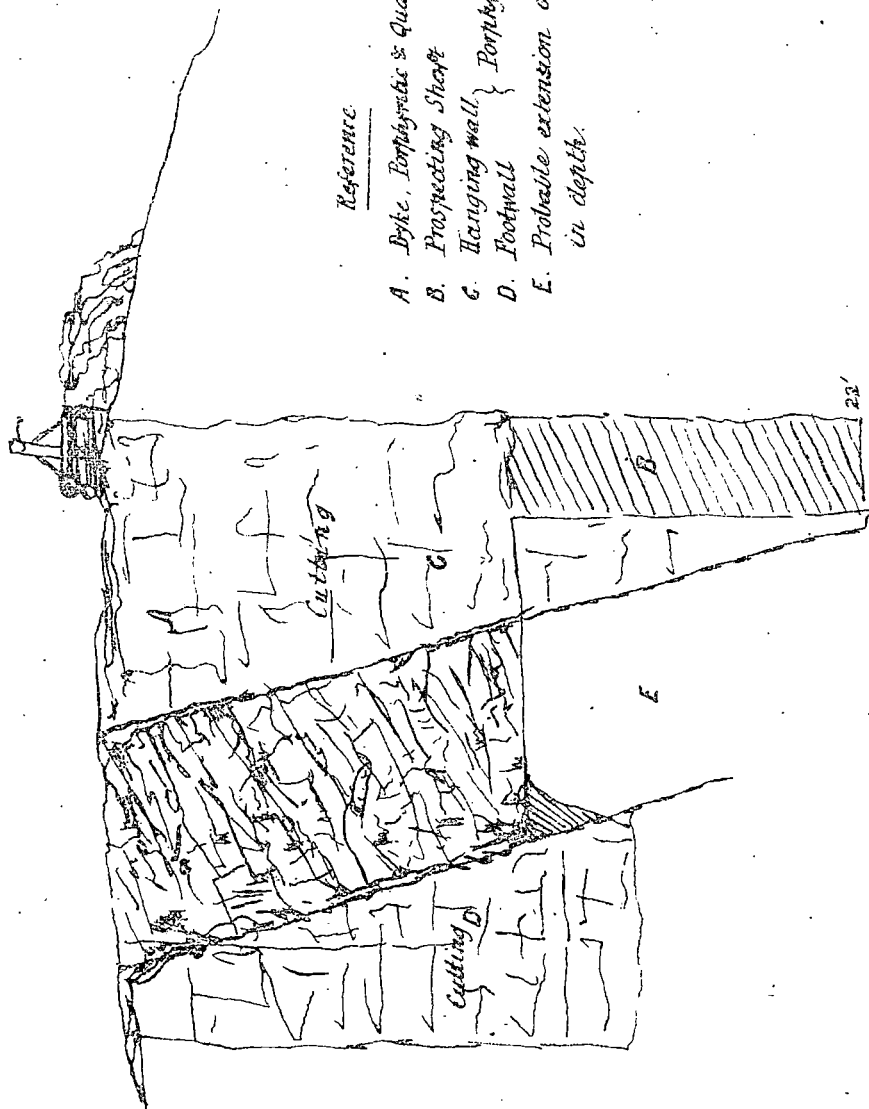
The quartz, which occurs irregularly as stated above in this dyke, is of a very dense description, and does not assimilate to other quartz of an auriferous character.

The other dyke is situated in the southern group and to the east of Lot 4820. It is from 10 to 12 feet wide, and its strike is about N. 5° E., with a western underlay; the porphyry at both walls is quartziferous, stained brown. Farther into the dyke, at the foot-wall, iron pyrites abound in

- A. *Detritus Quartzose*
B. *Surface gravel*.



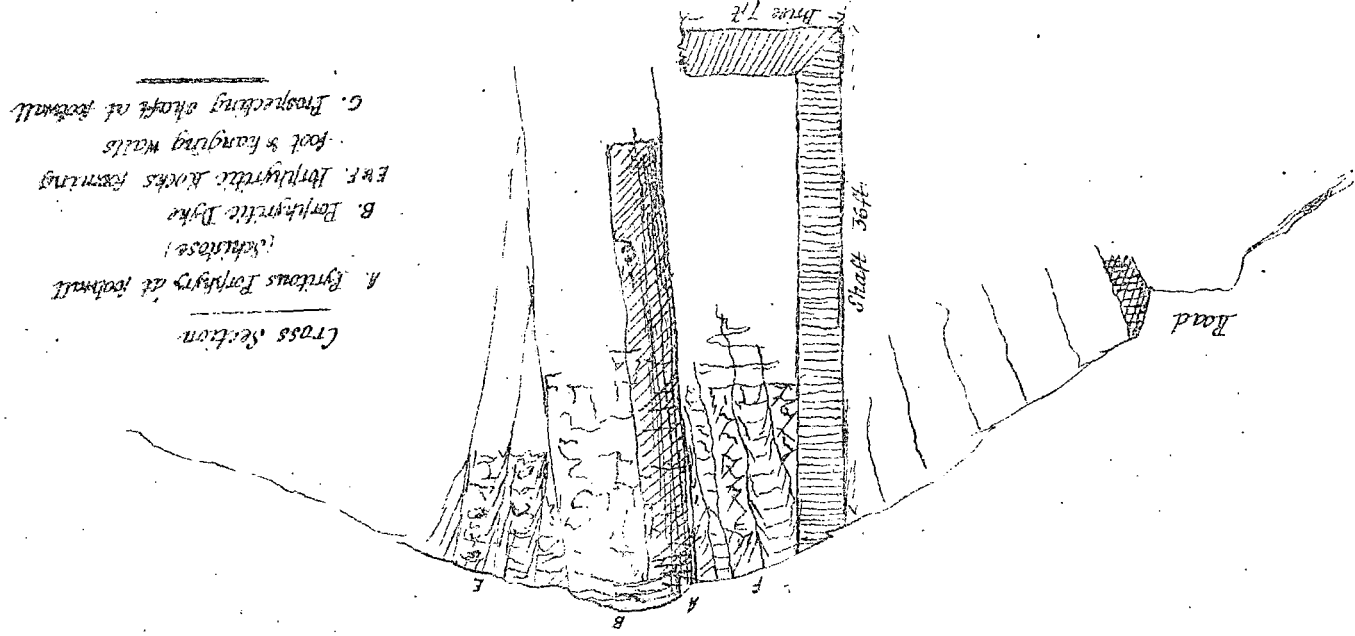
SKETCH.



Reference

- A. Dyke, Porphyritic & Quartzose
- B. Prospecting Shaft
- C. Hanging wall, Porphyritic
- D. Footwall
- E. Probable extension of Dyke in depth.

SCOTT



veins and bunches in this porphyry for a thickness of from 16 to 20 inches. Tests are reported to have been made yielding after the rate of nearly one ounce of gold per ton; but owing to the fineness of the gold, and the want of effective treatment with efficient appliances to save this fine gold, are said to have caused the temporary abandonment of operations. If such are really the causes that have led up to the cessation of working, I think, with the yield *as reported*, a proper treatment could be found to work this deposit with profit.

The porphyry which is exposed at the side of the road is of laminated kind and very porous: the cavities are lined with crystals of specular iron thin hexagonal tables, which in sunlight are translucent with a dark cherry-red colour. The country rock in the vicinity of the dyke is permeated with sulphurets, by the decomposition of which a hydrate of same imparts a greenish yellow hue to the rock, and, altogether, if *gold exists* in these sulphurets, some means should be taken for a further test.

I may state that rich gold quartz was shown me, it being represented that such had been found in the creek near Lot 92. That specimen could not possibly have come from there, as it was evident that it had been broken out from a gold-bearing reef *below* the water-level,—most likely hundreds of feet beneath the surface.

To account for the sources whence this limited quantity of gold came from, and to adduce satisfactory grounds upon which the opinion I have formed is based, is rather a difficult matter, inasmuch as this region, as shown, differs in every respect from the gold regions in Victoria, New South Wales, and California. True, in the two first-named countries gold is found in the diorites—also a plutonic rock, like porphyry now under view; but these diorites occur in slate and sandstone country (silurian), and these dioritic dykes are always strongly interlaced with numerous veins and bands of quartz, which, on intersection with each other, form rests or pockets of highly auriferous pyrites or sulphurets; so that in that respect but a very slight resemblance exists in this district.

As the washes, whether found in the clayey formation of the tertiaries in those two gullies or the more recently formed angular alluvial gravels in the modern water-courses, are very poor in gold, I opine that the matrices are likewise neither extensive nor rich in gold. The matrices which produced the gold hereabouts I am of opinion will be found (if the tests I have suggested are non-productive) in the recent porphyry dykes, which are more or less of a quartzose character. Local decomposition and tardy denudation of poor quartziferous dykes of porphyries account, I submit, for the poverty of the alluvial and older tertiaries in gold.

It is quite evident that already a considerable amount of money has been spent here in prospecting, by means of shafts, cuttings, and trenches; but, without the gold is actually *seen* in the stone (which so far I have not myself, and I am assured it has not been by others), in payable quantities, and without other new discoveries are made in the future, the permanency of mining operations in the matrix cannot be relied upon; though the alluvial may give for some time to come employment, at low rates of remuneration, to a limited number of miners.

I have, &c.

G. THUREAU, F.G.S.

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

REPORT ON THE COAL MINES IN THE VICINITY OF GARDNER'S AND RANDALL'S BAYS.

Port Cygnet, 26th August, 1881.

SIR,

I HAVE the honor to inform you that, in accordance with your instructions, I have inspected the Coal Mines in the above-named localities, and I now beg to submit the following Report thereon.

The Coal Mines in the vicinity of Gardner's Bay are about four miles distant from Port Cygnet; they are located at the head of the Albert Rivulet, a southern tributary of the Gardner's Creek, and to the south east of the summit of Mt. Cygnet, as delineated on the geological sketch map accompanying this Report. The prevailing rocks from Mt. Cygnet to Randall's Bay belong to the carbonaceous formation, being, in a great measure, continuations of the Lymington beds across the bay, and so fully described in my Report on the "Lymington Gold Deposits." Besides these, porphyries, greenstones, and a ferruginous dense schistose porphyry occur in places.

The Coal Mines are opened at the north-eastern side of a spur from the main range (Mt. Cygnet), about 100 feet above the main creek, and there are, so far, two distinct seams of coal being operated upon. They have been bared by means of open cuttings until they dipped under the superposing strata in a southerly direction. The outcrop occurred in an arenaceous clay, in which the coal formed a

black clayish band, as a result of decomposition through atmospheric action and influences. The enclosing clay rapidly passed into a hard micaceous and laminated sandstone, forming the roof of No. 2 seam, whereas a similar sandstone forms the bottom of the other and higher seam. When the enclosing rocks became more solidified the seams not only increased to their present size, but the "black band," i.e., carbonaceous clay, gave way to the coal now worked.

This coal as occurring here is, properly speaking, an anthracite; it has a black colour, metallic lustre, is from friable to hard, and burns brightly without smoke, though a bituminous smell can be perceived. As the seams are being followed into the hill they become more bituminous, in fact, they appear to be in the transition state between anthracites and common coals; the transmutation observed was most probably caused by the porphyries so frequent of occurrence in the vicinity, transforming, as it were, the bituminous coal into the "*mineral coke*," as the anthracites are sometimes termed. The seams under view are impregnated more or less with pyrites, calcites, and siliceous matter, which impurities have the effect of leaving, after burning, a large residue of ashes; but it is evident that these residues will diminish in due course, as the seams will not be subject to so much infiltration containing minerals in solution the farther the workings progress into the seams, and probably, if no other plutonic rocks interfere, these anthracites will become more and more bituminous at the same time. There are many instances on record where this transmutation from common bituminous coal into anthracite (*mineral coke*) have been found due to plutonic action of porphyries or other rocks of the same class.

On the plan the seam marked A is nearly 3 feet thick, of which 2 feet 4 inches constitutes a good marketable coal, which ignites rapidly, and throws out a good heat, with a bright flame. It is suitable for burning in grates, and, with suitably arranged fire-bars, it would burn well under steam boilers. An adit (prospecting) has been driven along the seam for a distance of over 30 yards, and, so far, the quality of the coal has perceptibly improved. The direction of the dip of this and the higher seam is about the same,—viz., S. 20° E.,—at an angle of one foot to over four feet.*

About one hundred yards up the same gully the top seam (*b* on plan) has been discovered, and it has been opened to a greater distance than the lower seam (*a*) also by means of an adit, proving same for a uniform thickness of 5 feet. This seam has a very good appearance, is rather more anthracitic and pyritous, but of late more favourable features have been noted which appear to indicate that this coal will likewise become a marketable commodity when exploited farther into the hill. A fault, or "throw," has disordered this seam at near the end of the adit, but of course such faults are of common occurrence in a locality where there has been much plutonic action, and a little experience (local) will soon rectify these temporary interruptions. It will be seen that this seam lies 64 feet vertical above No. 2 seam, and also that the upper seam is likely to extend beneath the southern portion of Mount Cygnet.

Owing to the limited extent of the workings on these seams, no reliable data can yet be given as to the probable capacity of the outputs of coal; at the same time, the "measures" even now are sufficiently encouraging to justify the extension of the workings, and providing means for speedy delivery on board of vessels, in order to develop this coal trade. Judging from what was seen at these (embryo) coal mines and of the country down to Randall's Bay, I consider that systematic coal mining will yet become the principal pursuit at Port Cygnet and its vicinity. A low level tramway or railway connected with a similar adit will permit the hewing of coal nearly 180 feet on the dip of the coal, which can be done cheaply, and there is a well sheltered inlet of Port Cygnet for the shipping.

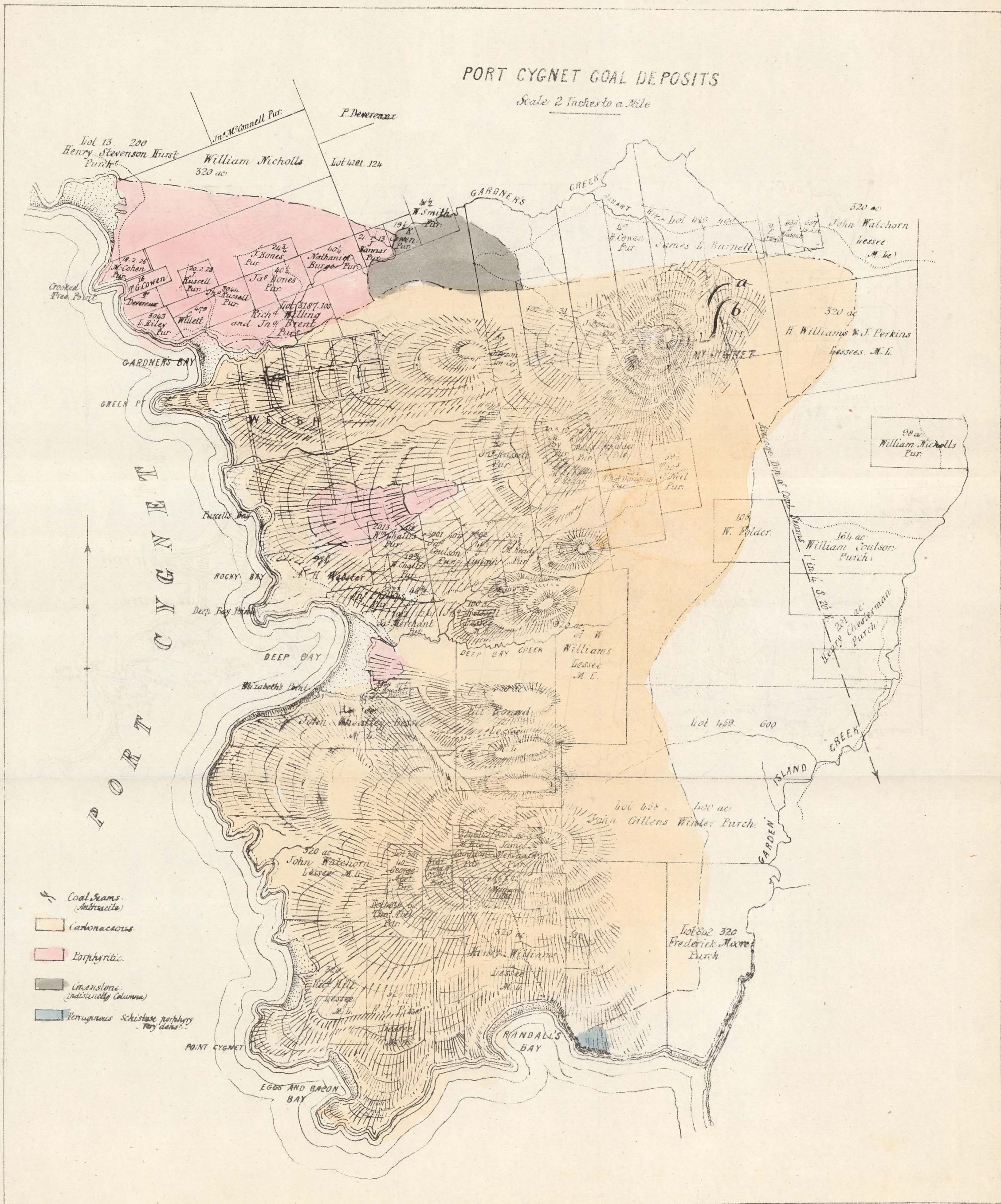
The geological sketch map indicates amongst other information the "average dip of coal seams at S. 20° E.," and in consequence of this fact I would recommend the extensive use of the diamond drill in this district, for the purpose of ascertaining the following:—Firstly, whether, in the direction of this dip, *other seams overlay* those two seams already working; and to prove whether the latter show any further improvement when intersected again at greater depths by the drill. The sites for these bore-holes could be determined as soon as the machines arrive at Hobart. In order to carry on, by means of the drills, a course of systematic prospecting at deep levels, (whereby the lands in the vicinity would probably attain a higher value than at present, I would also suggest the reserving of all Crown lands from sale from the present time). I would also draw attention to the utility of boring along the opposite course or dip,—viz., N. 20° W.,—for this reason, viz., the carbonaceous formations extend in that direction, and it would therefore be advisable to ascertain whether any other seam or seams of coal *underlay* the two seams of coal already so frequently referred to.

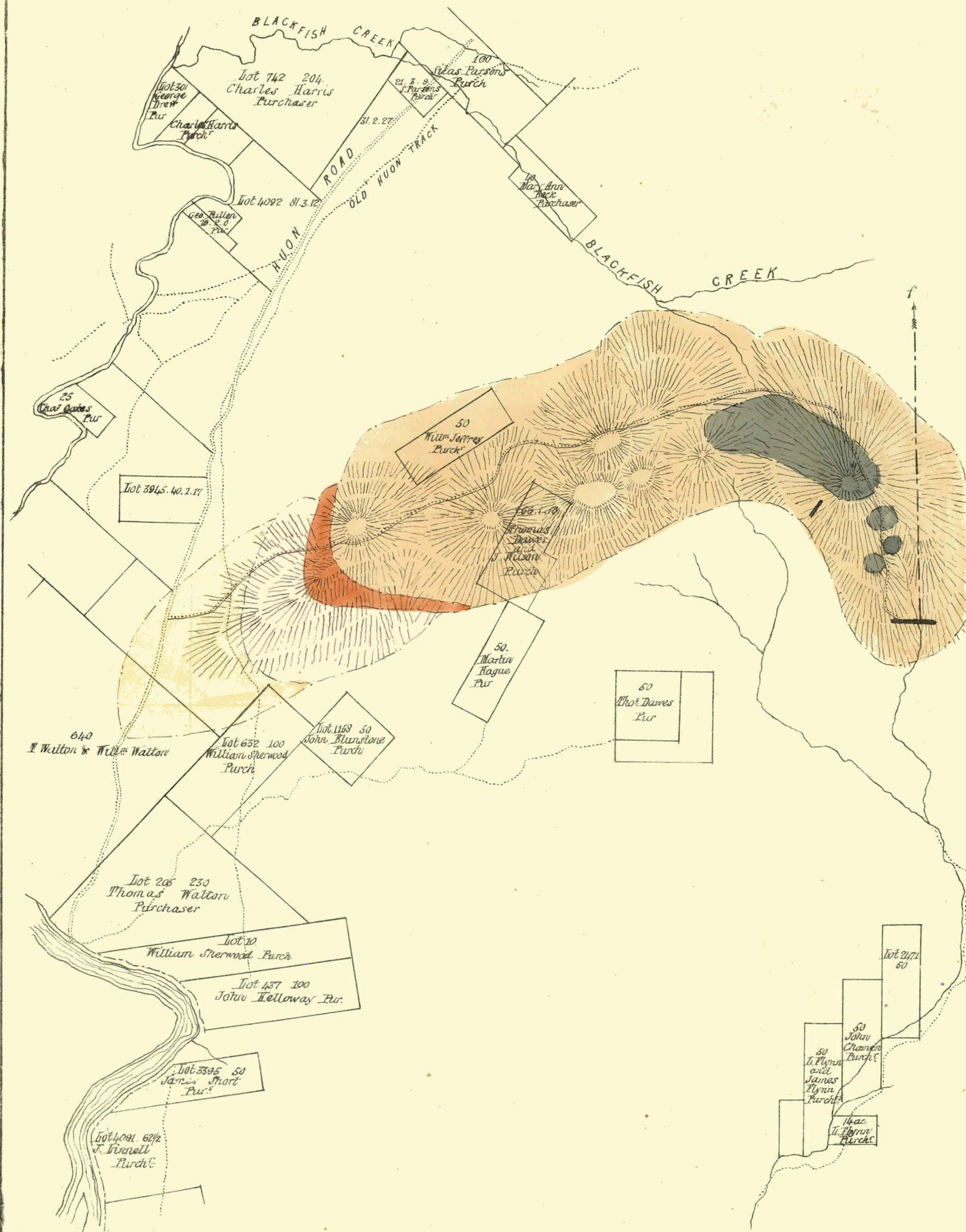
In recommending the Government to consider this matter of further developing these coal measures, either at the expense of the authorities, or in the same way as they do in Victoria, where the Government hires these machines out with a governmental staff of workmen and engineers, I

* The following analysis has been shown to me; viz.—No. 2 seam: specific gravity, 1.492; volatile, 19.9; fixed carbon, 64.8; ash, 14.1; sulphur, nil; water, 1.2; = carbon in coke, 78.6







PORT CYGNET GOAL DEPOSITS

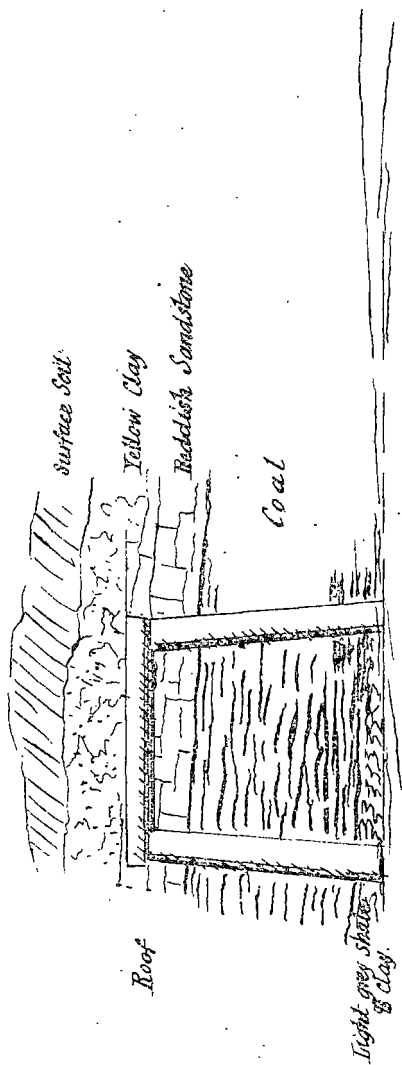
Scale 2 Inches to a Mile





SANDFLY COAL MEASURES

-  Coal Seam
 Coarse Drifts (fluvialite)
 Grey Sandstones
 Coarse Grits
 Sandstones & Shales (fossiliferous beds in places)
 Greenstones (schistose) these out-
 liers cap the coal measures and
 form the summits of the ranges
 f. Dip of Coal, North, 1' in 2'.
 Track:



may be permitted still further to suggest that the sites of the bore-holes should form part of a comprehensive system, subject to the approval or otherwise of the Government or the experts deputed to act on its behalf.

Randall's Bay.

From Mount Cygnet a range of hills descends towards Randall's Bay, which is situated nearly due south from that mount. The latter and nearly all the intervening country consists of carbonaceous sandstones and shales, here and there transmuted into harder rock wherever the porphyries appear to have protruded to the surface. The carbonaceous formations at Randall's Bay do not appear to have been disturbed by plutonic action, and they remain consequently in their original horizontal mode of deposition. Under these circumstances outcrops of coal are scarcely met with, unless they are exposed to view by the denudation of the strata overlying same. In a shaft 18 feet deep, below high water, a seam one inch thick was cut, and another seam is to be seen at low ebb from 4 to 6 inches thick; but it is doubtful whether or not they are not one and the same. A bore put down inland, west of these seams, would prove whether this coal belonged to another set of measures,—because, if coal is found here, it would not only overlay the Mt. Cygnet measures, but also be separated from the latter by a considerable distance. In a shaft (further up Port Cygnet Bay), sunk and bored to a depth of 120 feet, a bed of dark shale was intersected, indicating probably coal still deeper.

I have, &c.

G. THUREAU, F.G.S.

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

REPORT ON THE COAL MINE NEAR VICTORIA, HUON RIVER.

(Part of Sandfly Coal Measures.)

Hobart, 30th August, 1881.

THIS mine is situated about six miles north east from *Picnic*, Victoria, and, as will be perceived from the geological sketch accompanying this report, the carbonaceous beds (which form high escarpments at the western side of the Huon River near the bridge) crop out at the base of the long range (on the southern spurs of which the seam has been exposed to view by preliminary mining operations), are overlaid by recent tertiaries and fluvial gravels. In ascending the range coarse grits follow, succeeded by fossiliferous sandstones, more or less micaceous, and shales; and the summits of the range are formed of dense greenstones, which overlie in detached masses (outliers) those rocks in which the coal occurs. The total elevation above sea-level of the seam of coal would approximate to about 800 feet. Near these outliers of greenstones the soil, though thickly encumbered with timber, is of a rich fertile character, whereas the sandstones are thinly covered only with a much poorer quality of land.

The coal was discovered near the head of a gully which empties into an eastern tributary of the Huon River, nearly opposite Franklin. Only a limited amount of work has been done, though sufficient for examination and for the purposes of this report. The seam measures at the mouth of the tunnel or drive 3 feet 8 inches in thickness, and at a distance of 18 feet farther into the hill 4 feet. It rests on a light-coloured grey shale and clay, strongly impregnated with impressions of fossil leaves and stems of plants; whereas the roof is formed of a hard micaceous sandstone. The seam dips north as one foot in nine feet.

This coal is of a slaty character, especially near the roof; but thin bright patches of bituminous matter intervene here and there. These gradually increase and form regular horizontal strings about the centre, ultimately rendering the lower parts of the seam nearly all bituminous, thus making it a better coal than that of Port Cygnet, though the latter has this advantage,—of its being far more accessible for shipment, and therefore can be disposed of at lower rates to consumers.

As there is a very considerable area of land not yet alienated from the Crown in this vicinity, I would recommend same to be reserved from sale for the present, especially so in the direction of the dip of the seam (now known); and it would, in my opinion, be likewise judicious on the part of the Government to ascertain, by means of a survey and taking of levels over the range into the Blackfish Creek, whether (or not) this seam crops to the surface at the southern slope of Blackfish Creek. If the coal is found there, a much better route for a tramway to *Picnic* could be got than at present. There are indications of other seams of coal existing in the coal measures beneath the one now reported on.

G. THUREAU, F.G.S.

REPORT ON THE GOLD DEPOSITS AT LITTLE OYSTER COVE.

Hobart, 2nd September, 1881.

NEAR the head of the Oyster Cove Rivulet, and at the southern slope of same, five or six short gullies fall into that watercourse, and they have been found to be auriferous. The gold is like that at Lymington, of two distinctly different values, owing to the admixture, more or less, with silver.

The geological sketch furnished with this report delineates the peculiar features of this locality; and it may here be stated that "porphyrites" also form a prominent feature of the strata which, together with an outlier of greenstone, deserve attention. The sedimentary rocks occurring hereabouts come into contact with the porphyrites; and the former belong to the carbonaceous series, more or less horizontally bedded and metamorphosed. Near the highest point of the ranges a dense and very hard metamorphic mudstone has been lifted to high angles of deposition, and it resembles somewhat slate of a coarse-jointed description. Lower down the rivulet mudstones alternate with sandstones, and the latter are diversified with intervening beds of conglomerates and shales; but all these beds terminate at and against the porphyry, the contact with which, however, has not caused that alteration in deposition or character that is ordinarily or generally caused by such strata having been penetrated by plutonic dykes, *i.e.*, porphyry.

As the gullies referred to present, with the exception of No. 1, similar features, it may be stated that the gold found is alloyed considerably with silver, besides exhibiting that peculiar hackly-honeycombed appearance so frequently found as having been shed from quartz reefs.

In the other gullies the gold is much purer and heavier; it has a deep red color, and it is, to some inconsiderable extent, waterworn.

The wash, or gravel, in which the gold has been found is, however, similar in all the gullies, consisting of a great deal of angular and round quartz pebbles, greenstones, micaceous conglomerates, quartzites, and fragments of black slates.

Auriferous Gravel Deposits.

Black soil	2 feet
Dark grey wash	1 foot
Light colored ditto	2 feet
Coarse wash and clay, containing most of the gold ..	1 foot

Bedrock : Carbonaceous beds of strata.

Owing to the present watercourse (Oyster Cove Rivulet) having denuded the lower portions of these gullies, only a part of the original auriferous gravels remain *in situ*, thus limiting the extent of such deposits very considerably. The diagram adduced illustrates the features of what may be termed an abnormal occurrence of gold-bearing strata, in comparison with Victorian and Californian experience.

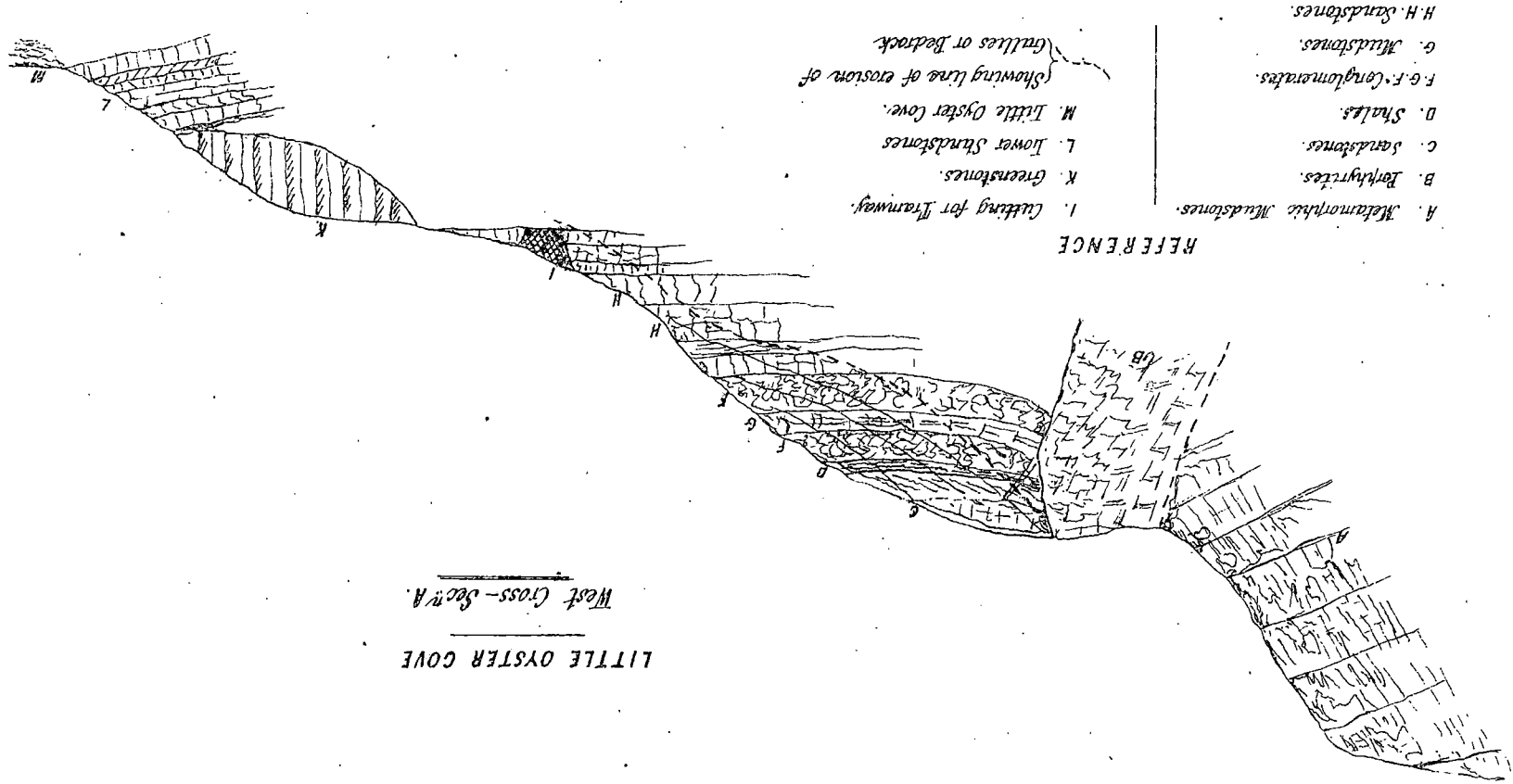
The gold, of whatever quality it has been hitherto, has in all cases been traced up to the line of contact with the porphyry, and all endeavours to find its continuation beyond have been of no avail; so that it would appear almost a matter of certainty that the source of this gold is contained within or close to that zone of contact of the plutonic rock with the carbonaceous beds of sandstones, mudstones, and shales. This view is strengthened by the fact of an auriferous "leader" of quartz, 4 inches thick, having been discovered in No. 3 gully protruding through the beds referred to, thus establishing an interesting feature of a vein of quartz-bearing gold having been formed contiguous to porphyry and being of a more recent age than the carbonaceous strata in which it was found embedded.

As the source of the alluvial gold here is, to all appearances, so clearly indicated, it would be judicious, perhaps, to test this locality further by sinking and driving *within* the planes of contact of the porphyry with the sedimentary rocks, especially in the vicinity of where the gold-bearing quartz-vein was discovered.

In comparing the geological features of this locality with those observed to the west of this peninsula, it is becoming more and more apparent that a narrow belt of auriferous strata traverses from east to west this southern portion of Tasmania. The value of these at present unremunerative gold deposits will have, however, yet to be ascertained and proved by careful investigations and mining operations in the locality now reported upon, where the indications are stronger and confined to so limited an area as against those near Lymington.










G. THUREAU, F.G.S.

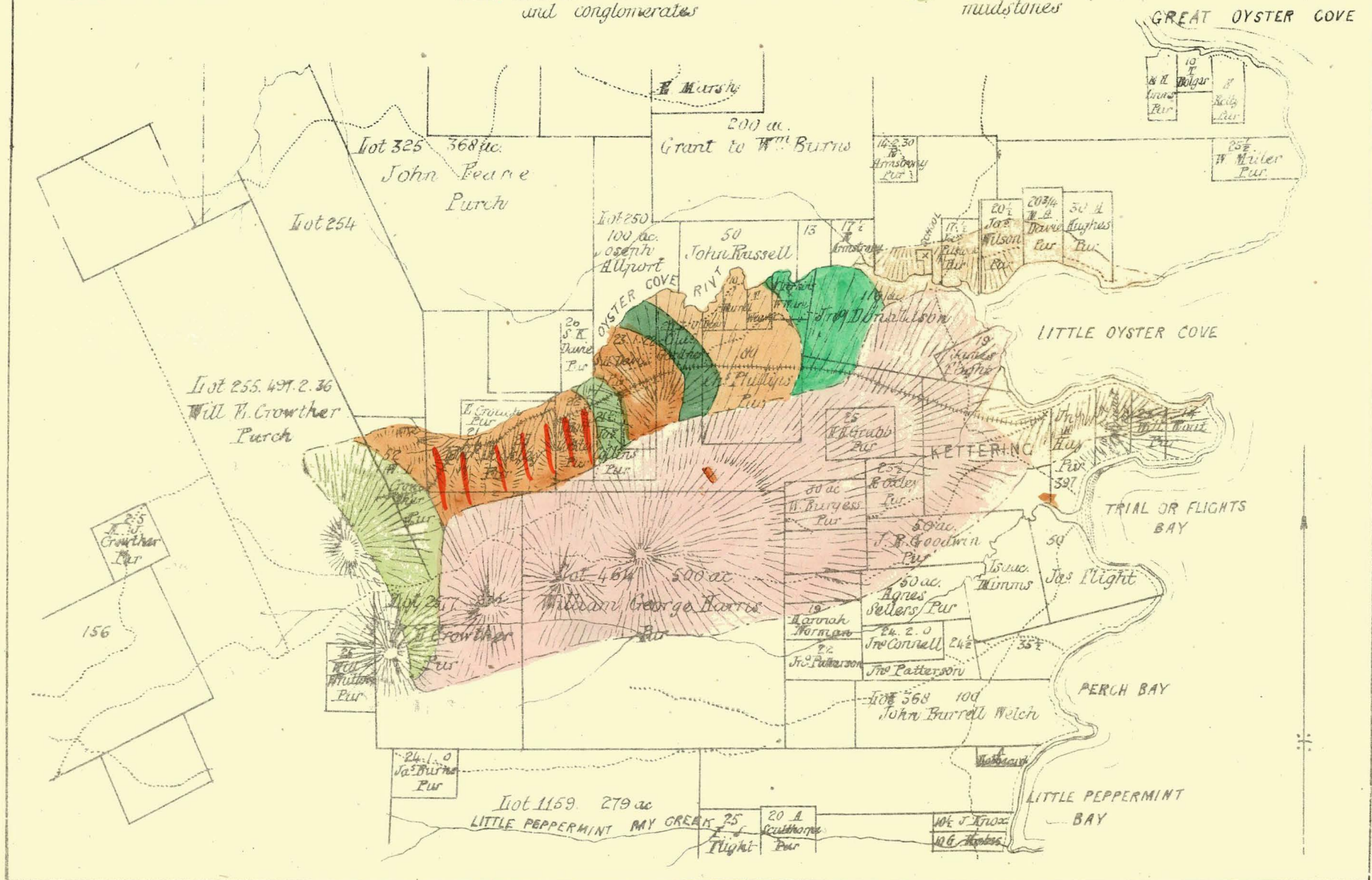
LITTLE OYSTER COVE
West Cross-Section A.



OYSTER COVE GOLD FIELD

Scale. One Inch to One Mile

- | | | | | | |
|-----------------------------------------------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------|
|  | Porphyry with veins of quartz |  | Sandstone |  | Mudstones |
|  | Lower thin bedded sandstones |  | Mudstones and shales |  | Thin beds of blue fossiliferous sandstones |
|  | Greenstone |  | Alternate beds of red sandstone and conglomerates |  | Metamorphic (very dense and hard) mudstones |
- GREAT OYSTER



Launceston, 6th September, 1881.

DEAR SIR,

I HAVE the honor to hand you herewith assay of two samples of stone containing iron pyrites, received from Mr. Thureau yesterday :—

Sample, marked A, does not contain gold.

Sample, marked B, does not contain gold.

The samples were very small. I should hardly place much reliance on results from small pieces like these.

I remain, &c.

E. W. WOODGATE.

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

REPORT ON THE BEN LOMOND TIN DEPOSITS.

Launceston, 9th September, 1881.

THE stanniferous deposits which I have lately examined of Mount Ben Lomond proper occur in several groups; and they are located to the south south west and to the south east of the highest peak of that mount. The geological features of this region, as observed on the track from Avoca, consist (after crossing the South Esk River) of alluvial sands and gravels resting on conglomerates covering the bedrock, principally sandstone and granite. (These conglomerates have been proved tin-bearing higher up the river.) The fine and coarse-grained sandstones crop out at the foot of the leading spur, and these form the lithological base of beds of rock overlying each other in succession; viz.—indurated sandstones, hard and dense metamorphic schists, porphyrites (dykes), and very coarse-grained granites, which dykes principally form the wall-rocks of the veins or impregnations of tin ores.

Gipps' Creek, which empties into the South Esk River some distance below the Township of Avoca, skirts the ground (at a considerable level below same) taken up by several proprietaries, west of Lot 213, which is situate about twelve miles from Avoca. Only one Company was at work there with a full complement of miners; and I may here remark that, where so much ground is held under lease from the Crown, and in a locality where a rich vein of tin ore has been discovered, and consequently the mining operations have passed beyond the stage of prospecting only, it is disappointing to find so very little work done since the ground was taken up. Without more rapid progress is made in mining operations by the adjoining leaseholders, it is impossible to test and to develop an extensive tin-bearing region such as now has been proved to exist on the slopes of Ben Lomond.

On Messrs. Powell and Evans' leases, of 80 acres each, prospecting and permanent mining has been carried on, and from time to time impregnations of crystalline tin ores have been found in the porphyritic wall rocks. At present the indications for permanency have become more satisfactory, on account of a vein carrying rich tin ore having been discovered, which presents a very promising appearance. The ore, i.e. the vein, is about one foot wide, highly metalliferous, and fully one-third of same is rich "cassiterite;" it presents a good laminated appearance, the matrix being of a quartziferous nature. Veins of fluor-spar, of a fine deep violet color, arsenical and iron pyrites, occur regularly; also spots and nests of felspar, radiating tourmaline, and chlorite.

In following this veinstone in its eastern underlay for some distance beneath the surface a "slide" or "fault" disordered the hitherto regular course of the lode, and after some considerable search the lode was found in the footwall side, but thrown for a distance of twenty feet to the west of the original course of the lode above the slide. Under or beneath the slide the vein is somewhat poorer and smaller, but in mining experience this is frequently the case, and by intersecting the vein at the 60-foot level from the main shaft, and by driving along same, the indications are favorable for this lode resuming its former productive character. The lode has a strike of N. 30° W., with an underlay of one foot in nearly three feet; the hanging-wall is well defined, but on the opposite side the ore gradually disseminates through the strata underlaying the ore, there being no defined footwall. The whole formation has a promising appearance, especially on account of the metalliferous character exhibited.

The only drawback to tin-mining hereabouts consists in the want of a good road (or tramway) of easy gradients to Avoca. The mines being situated at a very considerable altitude, the transport of minerals would otherwise be both tedious and costly to Avoca, which will become, in course of time, the centre of an extensive mining district.

Close to the south-western peg of Jas. Handley and party's 80-acre sections, and north-west of sections last referred to, a large porphyritic dyke crops out of the surface, having a strike of nearly

N. 9° W. This dyke occurs at the brow of a hill above Gipps' Creek, thereby offering facilities for a test at a lower level by means of a tunnel. The ore has been tested, I am informed, giving 12½ per cent. of ore per ton, or 26 per cent. metallic tin per ton. The mining from the surface with that per-centage, and the dressing, transport expenses, &c. would leave not much to the owners. A further test to or at deeper levels would be judicious, especially as this porphyritic dyke contains, besides tin, other metalliferous substances favourable to future developments at greater depths.

South east of and immediately adjoining Lot No. 682, and about 4 miles from the lode described as situate upon Messrs. Powell & Evans' leases, four sections have been taken up, forming a part of Lot No. 20. Two shallow alluvial gullies have there been worked, with moderate results; and some work has also been done in two places, close to the alluvial, upon tin-bearing impregnations, which deposits resemble each other considerably.

The tin ore occurs, as an impregnating medium, in a greenish, soft, feldspathic matrix, with indistinct crystals of quartz, bunches of radiating and very brittle tourmalines, also of a greenish hue. The veins are, so far as prospected to a depth not exceeding 13 feet, narrow, and the ore impregnations occur, for a width of from 4 to 9 inches, in small and large (complete) crystals throughout the matrix referred to, which is enclosed by granitoid and porphyritic rocks.

Several other alluvial deposits have been discovered; but as the mining operations thereon are, as yet, very limited in extent, further developments are requisite before such deserve examination with a view of specially reporting on same.

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

THE ST. PAUL'S RIVER TIN DEPOSITS.

Launceston, 8th September, 1881.

THE Avoca Valley, which is watered by the South Esk and St. Paul's Rivers, is covered for a considerable length and depth by a flow of basalt, which, as far as seen, descends down that valley as far as Corners Station on the Main Line of Railway. Having already, in a former report, alluded to the great probability of a sub-basaltic gravel or ancient river-bed existing there, it should be mentioned that above the Township of Avoca some tin-bearing tributaries fall into the South Esk and probably into the St. Paul's River also; and that tin ore has been known to exist for a very considerable number of years past. At several points on that and the St. Paul's River also stream tin has been found, and worked on a limited scale.

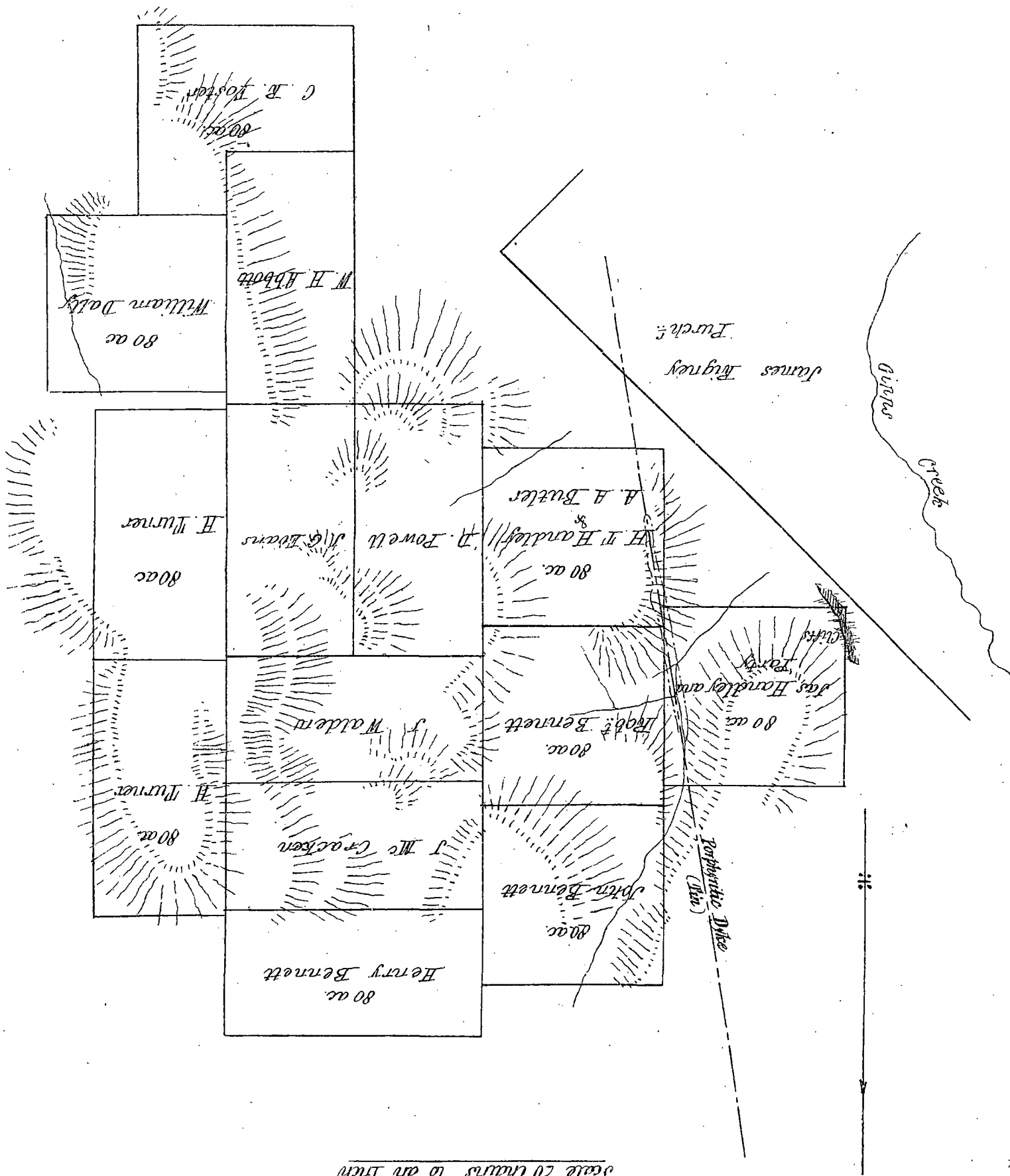
One of the sources higher up the valley, whence these tin deposits appear to have been derived from, is situated in the Parish of St. Andrew's, upon Lot 692, nearly due north-east from St. Paul's Dome. Unlike the granitic country rocks enclosing tin ores near Ben Lomond, the strata here consists of a variety of porphyrites, indistinctly stratified, in which however the denser and more feldspathic bands are impregnated with a good crystalline description of "cassiterite." At the surface the ore has been liberated after decomposition of the matrix; and, consequently, good prospects were obtained by washing the surface soil in the pan. The principal zone of these tin impregnations consists of a dyke (porphyritic) from 15 to 20 feet wide, a smaller dyke about 3 feet wide, and some others less distinct. These dykes are mostly of a quartzose character; and they exhibit, as component parts, the following minerals; viz.—Tourmalines, chlorites, and felspars. The underlay of the tin-bearing strata, parallel, though some distance apart, is synclinal, thus indicating a probable junction at some depth below the surface. The features observed in this vicinity are such as to deserve to be thoroughly prospected by means of a main shaft and cross drives at a greater depth than yet reached.

The facilities for transporting in future (should the locality be worked for tin as suggested) the ore to the Main Line of Railway, along a capital road, is an important advantage, if looked upon in comparison with mines located nearer to Avoca and the railway, inasmuch as they have much greater obstacles to overcome previous to shipping their ores.

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

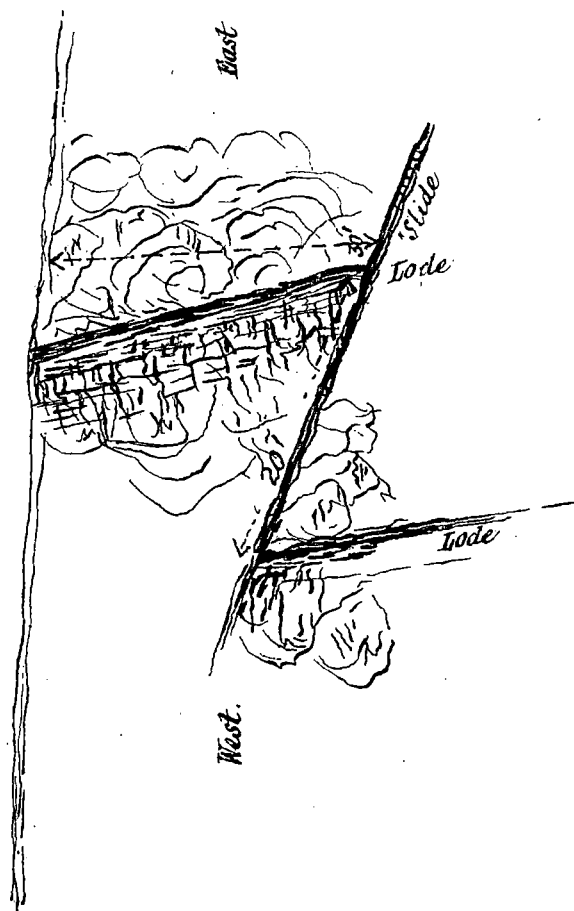
BEN LOMOND TIN DEPOSITS

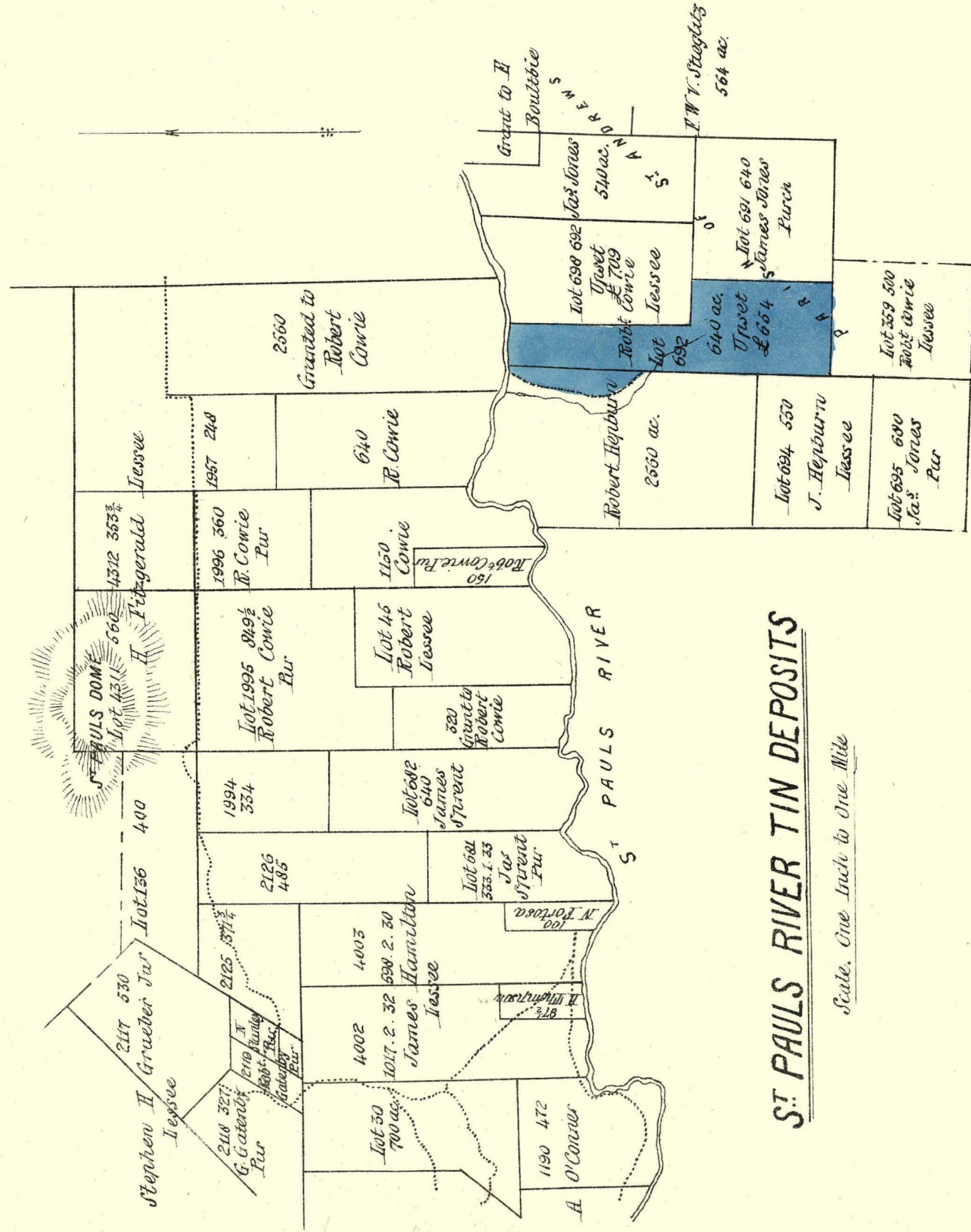
Scale 20 chains to an Inch



CROSS SEC.

Ben Lomond T. Mining Co's Lode





ST. PAULS RIVER TIN DEPOSITS

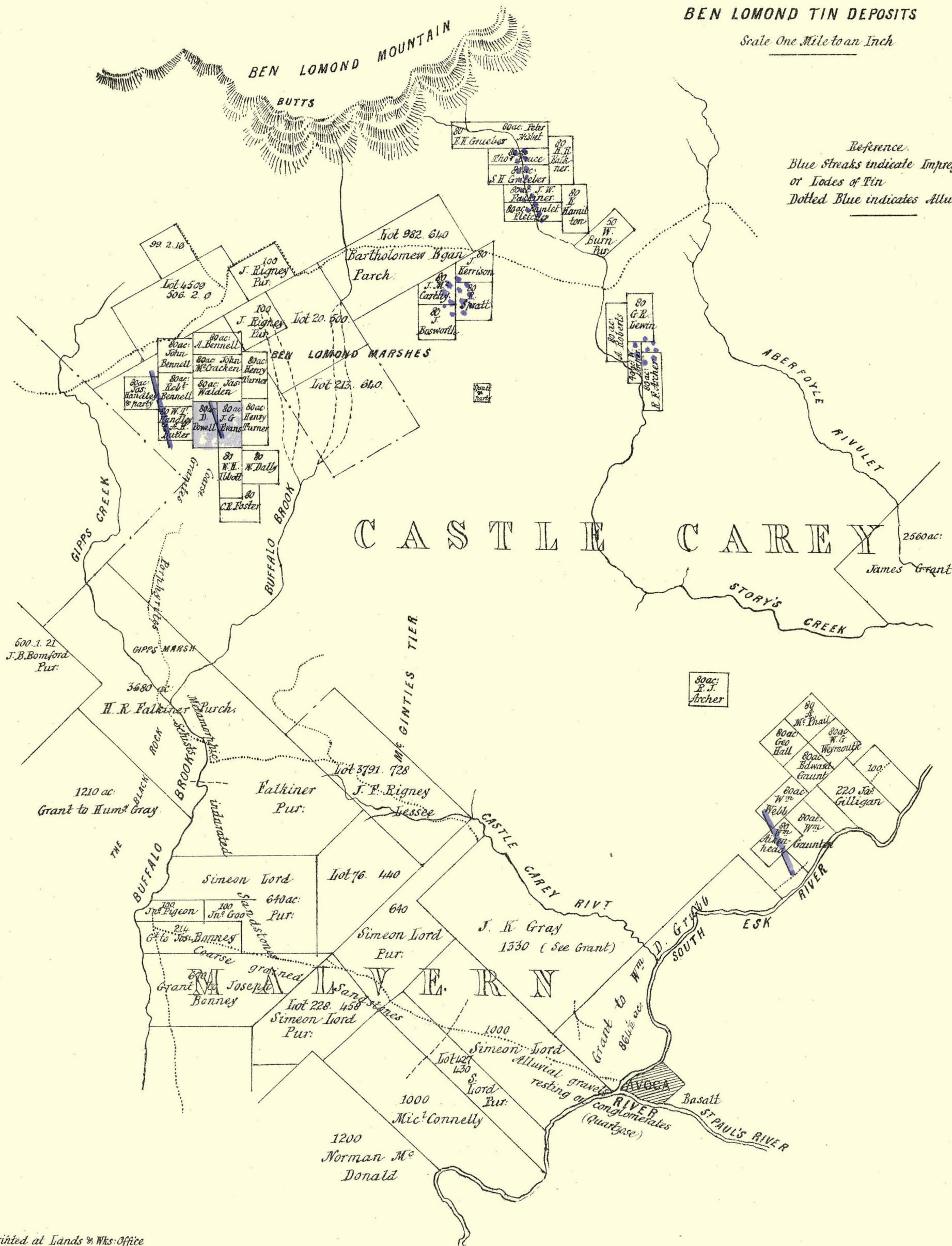
Scale, One Inch to One Mile



BEN LOMOND TIN DEPOSITS

Scale One Mile to an Inch

Reference.
Blue Streaks indicate Impregnations
or Lodes of Tin
Dotted Blue indicates Alluvials



(*In continuation of Legislative Council Paper, No. 91.*)

REPORT ON THE SOUTHERN COAL MEASURES AT SANDFLY,
PARISH OF LONGLEY, COUNTY OF BUCKINGHAM.

LEAVING the Huon Road from Hobart, at the northern bank of the North West Bay River, for the branch road leading to Port Cygnet, the Cook's Rivulet is followed for some distance to near its upper end, where a rapid rise takes place, the mountain chain eventually obtaining an altitude of some fourteen hundred feet above sea level. On the banks of the North West Bay River (Diagram 1), a laminated coarsish sandstone of the carbonaceous period (lower) forms cliffs of some considerable height; but this rock is not adapted for building purposes on account of its rapid decomposition on exposure to the air after being quarried, owing probably to its being saturated by some saline ingredient. This sandstone formation underlies that in which the coal measures, reported on below, occur; indications for coal, however, are not wanting in the same, though its position is some hundreds of feet below the Sandfly coal measures proper. Ascending the hills by way of the Port Cygnet Road, other sandstone formations, overlying the first mentioned, with thin beds of shales, are found right up to the greenstones which cover same, and form at the same time the summits of these ranges.

Whilst the soil covering these sandstones in the lower ground, and on the slopes, is very peaty and poor, the greatest possible difference in that respect is observable in the vicinity of the greenstone rocks (aphanites), which after decomposition furnish a rich brown soil, very suitable for agricultural and horticultural purposes, though situated at a considerable elevation above the water-courses of the district.

At Farrell's farm—about one mile from the Coal Mines—a stratum of a whitish plastic clay intervenes between the sandstone formation and the greenstones, but on testing same by burning I found it to be of too calcareous a character to be of much use or commercial value, except perhaps for mixing with poorer clays, as it possesses a good body for manipulating colours.

Passing through the "Gap" near Blackman's, late Spicer's, holding, the carbonaceous formations enclosing the coal deposits crop out at the surface on the southern slopes of a range running nearly due east by west, and about six miles from the *Longley Inn* on the Huon Road, are met with upon Messrs. Lucas and Gough's leasehold of 210 acres. (Diagram 2.) There the No. 1, or Hurst's seam of coal, deserves particular notice, because of its superiority as a bituminous deposit over others examined in the vicinity. The seam referred to has been opened by means of a tunnel, following the dip of the coal, eighty feet in length, and which tunnel has been driven in an almost due north direction under the hill side. I may here state that I inspected these coal deposits under very unfavourable circumstances, inasmuch as the various workings had been, for a considerable time past, filled with surface water, and consequently the seams were saturated to such an extent as to seriously depreciate the character of the coal, both as seen in the workings and outside, the coal being then much softer than usual, and of a duller appearance than would otherwise have been the case.

The Hurst seam measures from bottom to roof four feet in thickness, and it dips to the N.N.W. at an angle of about one foot in thirty. The whole length of the tunnel discloses a solid roof of dark-coloured sandstone, and the bottom is somewhat similar, though the rock is more laminated and micaceous. The coal does not contain much pyrites, it is of a good colour, comes out in good-sized lumps, and it is much more bituminous than any that has come under my notice in Tasmania. It is, besides, pretty free from bands of shale, so very frequent with coal seams in the southern part of the island. As already stated, this coal had been submerged under water for some time; still a heap of it, ignited outside the tunnel, burnt with a good flame and threw out a considerable heat, thus demonstrating its superiority over some other coal mined in the vicinity. It does not cake or form clinkers; leaves, comparatively speaking, few cinders in a light white ash; the more shaly portions of the seam, however, retain after burning the original form of the pieces, though deprived of their combustible properties.

To judge from general appearances in this tunnel—and it is a matter for surprise that with such a seam not more and systematic mining has been carried on for the more extensive exploitation of this and other seams associated in this coal measure—there is every probability of this coal improving as it is followed into the hill, thus offering inducements to work continuously what is a valuable deposit. Besides this main seam several other smaller seams occur both above and below same, but sufficient work has not been done to determine whether or not these are really detached seams or only separated from each other near the surface.

About one mile south of this tunnel a seam of coal has been intersected in a shaft sunk to a depth of thirteen feet. (Diagram 3.) A similar seam of coal has likewise been found in the next adjoining holdings of C. Manting and of A. Kearney respectively, all of which at first sight would appear to form separate and probably higher seams; but owing to the abrupt configuration of this mountain range, the undulating contour lines, and those of the outcrops of such coal along the face of these hills, establish the latter simply as continuations of Hurst's and its associated seams. This view is borne out by the fact that that seam rests invariably in all these workings, which are scattered through the scrub over a space of about two miles and a half in length, upon a dark blue fossiliferous shale, which appears to form a characteristic feature of these measures. In the shaft alluded to the coal is about two feet nine inches thick. Some portion of it has evidently been removed by denudation or abrasion, because where the roof has become solid an increase to over three feet is perceptible in the length of the shaft. This coal is of a similar nature to that obtained from that in the tunnel, though it had a more shaly and earthy appearance, from water covering same for some time past. This, however, did not appear to interfere with combustion, as it burned well, with a good flame and heat.

In C. Manting's ground, further south, this seam is four feet thick, and in A. Kearney's holding four feet six inches, so that this "upper" coal measure extends over an extensive area, and, if properly developed, is capable of producing a large quantity of serviceable coal which is better adapted for general requirements than any other I have hitherto examined; and it is only a question whether this combustible, so easily mined, can be removed from so considerable an altitude at a reasonable cost to supply consumers.

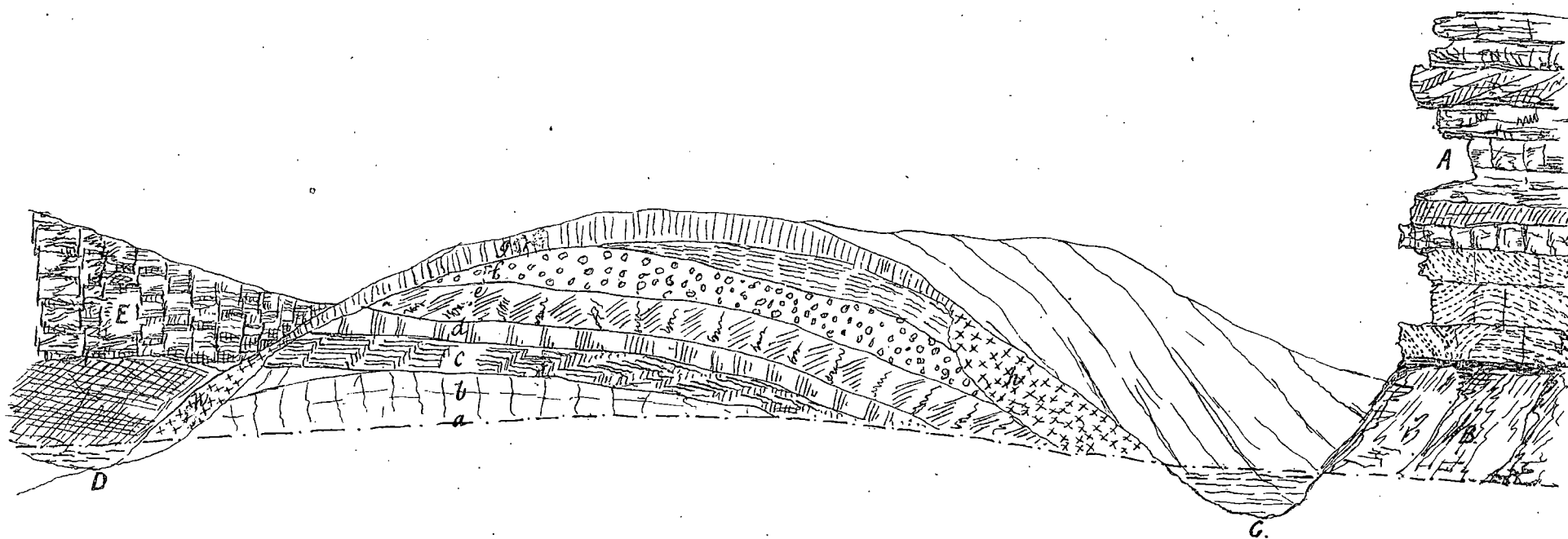
It appears that a still "lower" coal measure has been discovered and prospected upon Messrs. Smythe and Anderson's leasehold of 320 acres, which, however, I regret in having been prevented to examine, owing to the sudden and unexpected change in the weather, the heavy rains making it impossible for me to carry out my intentions. I have, however, been enabled to gather the following reliable information; viz.—The bottom seam in this coal measure has been driven on for a length of 35 feet, the coal measuring four feet in thickness; but it appears that its quality is inferior to that of the Hurst's series, being of a more anthracite character, thus resembling the Port Cygnet seams. Four and a half chains higher up the same range a good bituminous seam, 22 inches thick only, has been followed under the hill by means of a tunnel 40 feet in length. This seam is accompanied by a still smaller seam, fourteen inches thick, also of a good bituminous coal. (Diagram 4.)

Viewing all the attendant circumstances relating to and surrounding these Sandfly coal measures, there can be no doubt of their becoming a valuable property, if systematically opened and mined on an extending scale. As far as the actual mining operations in future are concerned, the formation of the ground is very favourable to the construction of adits, which would serve all purposes for a long time to come; and, therefore, steam power for jumping or winding will not be necessary. It would be advisable, however, in view of future developments, to test, by means of the vertical Diamond Drill the Government is about to receive from America, both these upper and lower coal measures, at some distance from the surface as well as into the hills. If such tests were likewise extended in an easterly direction, in order to ascertain whether or not they occur thereabouts, and also whether any other and deeper coal measures exist "below" the two already described, much expense would be saved. Because, if such be the case, the whole series of coal measures could be wrought from one main adit, thus avoiding the heavy gradients in the construction of the tram or railway now necessary for the purpose of facilitating the transport of the coal from high levels to the shipping port at North West Bay, which is the nearest outlet of the coal for Hobart or other ports.

G. THUREAU, F.G.S.

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

DIAGRAM . 1.
SECTION ON N.W. BAY RIVER

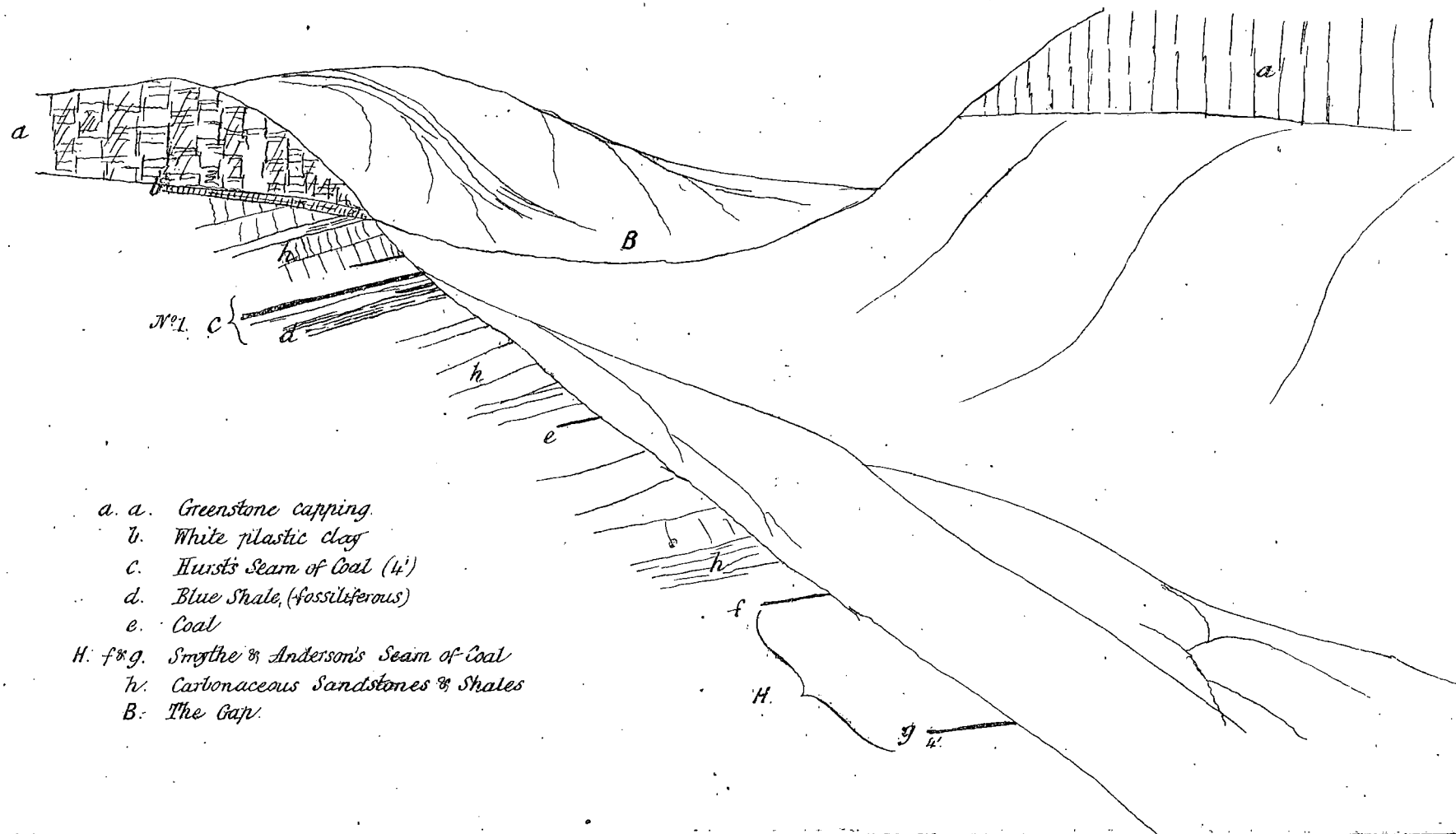


a. Port Cygnet Road.
b. Grey Sandstone.
c. Shale (ochreous)
d. Hard grey Sandstone.

e. Shale (micaceous.)
f. Detritus.
g. Peaty surface soil.
h. Alluvial

A. Sandstone Cliffs.
B. Detritus.
C. Brown's Binulet.
D. Creek.
E. Greenstone.

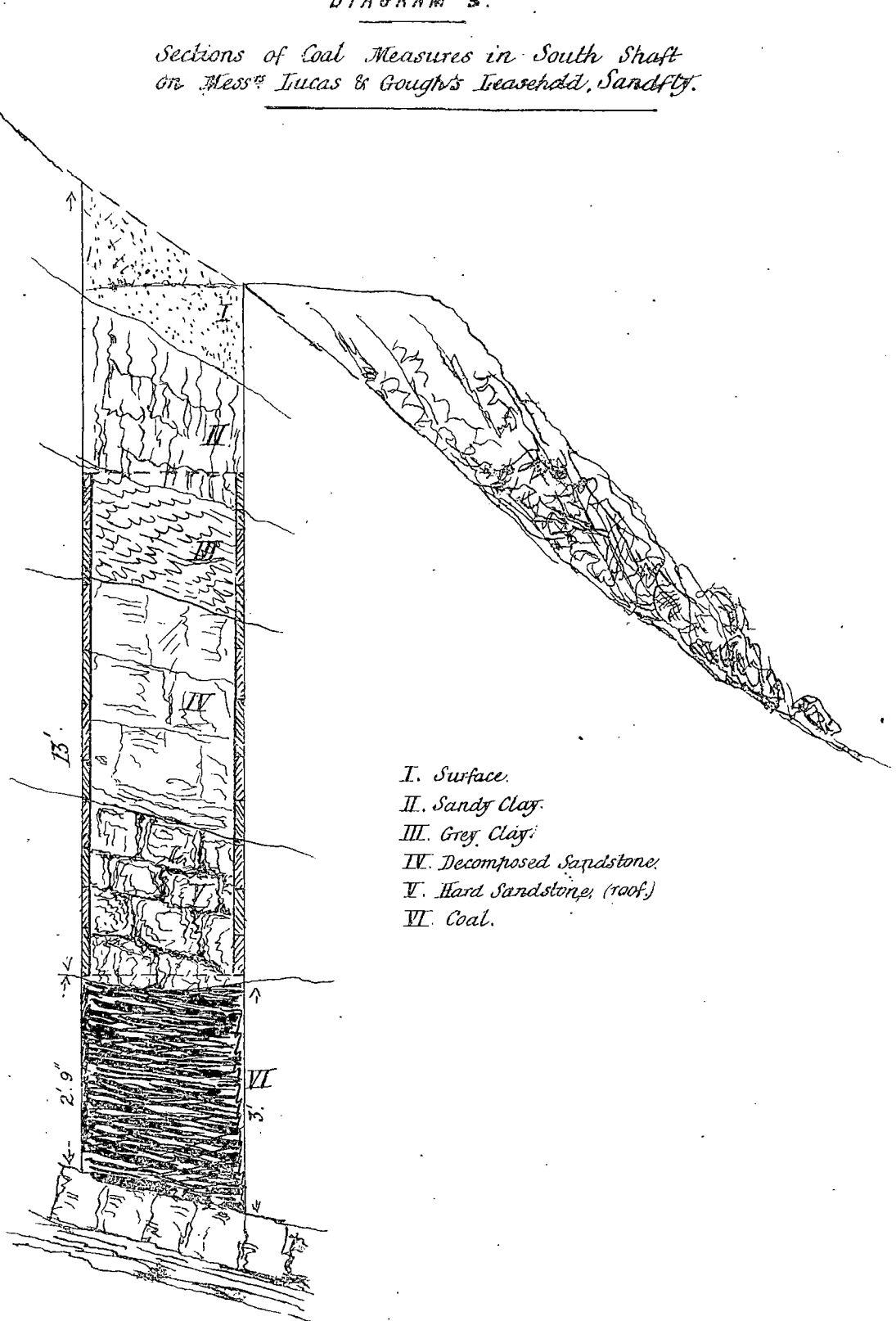
DIAGRAM . 2.
SECTION OF THE SANDFLY COAL DEPOSITS



a. a. Greenstone capping.
b. White plastic clay
c. Hurst's Seam of Coal (4')
d. Blue Shale, (fossiliferous)
e. Coal
H. f & g. Smythe & Anderson's Seam of Coal
h. Carbonaceous Sandstones & Shales
B. The Gap.

DIAGRAM 3.

*Sections of Coal Measures in South Shaft
on Messrs Lucas & Gough's Leasehold, Sandfly.*



GEOLOGICAL SKETCH PLAN

BUCKINGHAM

PARISH OF LONGLEY

SCALE - 10 CHAINS TO AN INCH

DIAGRAM 4.

