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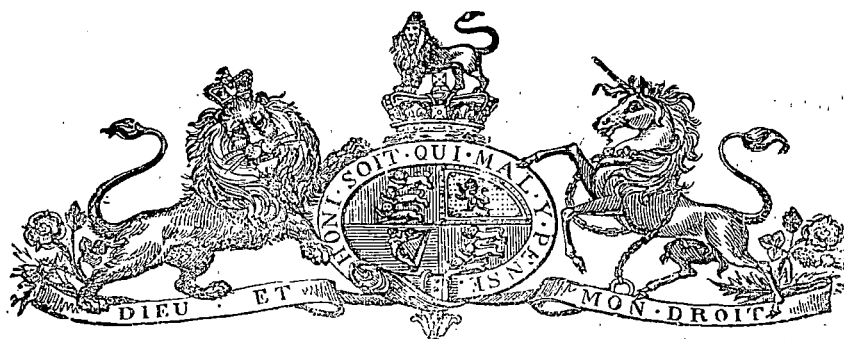
T A S M A N I A.

LEGISLATIVE COUNCIL.

MOUNT HEEMSKIRK, WEST COAST:

REPORT ON TIN MINES BY G. THUREAU, ESQ., F.G.S.

Laid upon the Table by ^{Mr.}Mr. Moore, and ordered by the Council to be printed,
September 5, 1882.



Lands and Works Office, Hobart, 5th June, 1882.

SIR,

I HAVE the honor to instruct you to visit the West Coast, Mount Heemskirk, to report on the mineral prospects and permanency of the Tin deposits, whether lode or alluvial; and also as to the progress that has been made in the development of the mining industry in that locality since your former visit.

I may also state that it is left to your own option whether you proceed to Heemskirk per steamer *Amy*, returning *via* Long Plain to report on the gold-fields in that locality, or, if you prefer it, travel *via* Mount Bischoff to Long Plain and Heemskirk, returning per steamer.

It is very desirable that you proceed to the West Coast at your earliest possible convenience.

I have the honor to be,

Sir,

Your obedient Servant,

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

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

Mount Heemskirk, 10th July, 1882.

SIR,

I HAVE the honor to inform you that, since my arrival at Trial Harbour on Saturday last, I have decided upon the manner in which I shall proceed with the examinations of the Mines and mineral deposits in this vicinity in compliance with your instructions.

To-morrow I shall visit the Orient and Mount Agnew Mines, returning next day; then the Cumberland and West Cumberland; the Gap Mines to follow, concluding with the Mines in the vicinity of the Montagu, Cliff, and along the north-western sea shore.

There is now fair weather, and under any circumstances I shall use every endeavour to return by the *Amy* next trip.

I regret to have to report that the Montagu and Empress Victoria Mines have suspended mining operations, preparatory to their selecting and erecting proper machinery for hoisting, pumping, and ore-dressing.

I have, &c.

G. THUREAU, *F.G.S., Inspector of Mines.*

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

MEMO.

Mount Heemskirk, 10th July, 1882.

DURING my detention at Strahan and Macquarie Heads I have been shown specimens of valuable metalliferous ores, chiefly obtained by prospectors near the Gordon River, Frenchman's Cap, and Point Hibbs. These minerals consist of very promising (for gold) iron pyrites, (Gordon River); ferruginous copper pyrites (Frenchman's Cap); and rich copper pyrites ("peacock ore"), Point Hibbs. If to these the lignites, 10 miles south of Swan Basin, Macquarie, and the recent discovery of gold between the two Hentys, are added, it will be admitted that a very promising belt of metalliferous and mineral deposits exists, chiefly south of Macquarie Harbour, and which deserves to be examined thoroughly during the more favourable season of the year.

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

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

Hobart, 4th August, 1882.

SIR,

I HAVE the honor to present you with the following Preliminary Report on the permanency and prospects of the Mineral Deposits at Mount Heemskirk, which I have recently examined in accordance with your instructions.

A fuller Report is now in course of preparation, and will be submitted for your approval during the course of next week.

I have, &c.

G. THUREAU, F.G.S.

The Hon. Minister of Lands and Works, Hobart.

AD INTERIM REPORT ON THE STANNIFEROUS DEPOSITS AT MOUNT HEEMSKIRK, WEST COAST, TASMANIA.

Hobart, 4th August, 1882.

SINCE my last Report, about fourteen months ago, several of the mines have been engaged in proving the character of their stanniferous lodes, dykes of impregnations, &c. to greater depths, by means of shafts, levels, and adits.

The greatest depth at which remunerative tin ore has been found is at 103 feet from the surface, at the Montagu Mine. The Cumberland Company have found an equally as strong lode, rich in parts, at the 100-foot level, as they had on surface. Other instances came under my observation which have assisted me in forming an opinion favourable to the permanency of some of these lodes carrying tin ores. And I think that if the Companies holding leases from the Crown would, without delay, erect ore-dressing machinery, the output of tin ores would be increasingly large in future.

All that is wanted at Mount Heemskirk is legitimate mining by means of the best procurable appliances, and equally as effective ore-dressing and concentrating machinery.

It would be necessary also to aid these mining companies, during the summer season approaching, by appliances to land machinery at Trial Harbour, and also to construct a high-level tram or railway from the mines into the timber country near the Henty Rivers, so that suitable timber may be obtained for the mining and machinery requirements of these proprietaries.

As regards Trial Harbour, I consider that this landing-place is only a temporary affair, very convenient until the tram or railway has been constructed down to Strahan, Macquarie Harbour, which latter will doubtless form the chief harbour eventually.

G. THUREAU, F.G.S.

REPORT on the Prospects and Permanency of the Tin Deposits, whether Lode or Alluvial, at Mount Heemskirk; also, as to the progress that has been made in the development of the Mining Industry in that locality since a former visit.

THE developments made during a period of over thirteen months, or since my visit last year, are of that character as would tend to confirm the views then expressed in my Report on the West Coast, No. 77, presented to Parliament on 10th August, 1881, as to the occurrence of both permanent lodes and of the less reliable impregnations of porphyritic dykes with tin ores.

As to the former description of metalliferous deposits, it has now been proved in several mines that the original outcrops at the surface exhibiting stanniferous vein-stone have continued to do so with much regularity to depths slightly exceeding one hundred feet vertical; and at those levels the ores appear to contain similar per-centages of tin ores as at any higher level. The width of the lodes, in the instances under view, remains likewise in accordance with what is seen at the surface and in the workings, ranging from less than a foot to fourteen feet. Judging from the numerous samples tested, a yield of from two to twenty per cent. of dressed ore may be anticipated. Although the higher yields will doubtless suffer a reduction when the ores are treated, instead of the samples that have been sent elsewhere for testing same, in much larger quantities by means of ore-dressing and concentrating appliances to be erected at these mines, there would still remain, in my opinion, a fluctuating margin of profit over and above current working expenses.

So far as the permanency of some of the more regular lodes is concerned, that has been proved in the more or less vertical workings—shafts and winzes—and their lateral extensions horizontally, by means of adits and levels driven upon the course of the tin-bearing strata, thereby opening up a considerable area for actual mining purposes. The supply of ores from these stanniferous formations, therefore, can be depended on for a considerable time to come, but, of course, such is governed by the greater or lesser development of these mines, and the capacities, or rather capabilities, of the crushing, grinding, and concentrating machinery about to be obtained and used for these purposes.

Having examined, as far as possible, the more prominent mines, and their underground workings, as they alone could afford me the information needed on which to base my opinions, it may be observed that equally as rich ores as those found in the outcrops of lodes and their surface “sheddings” have, since my last visit, been discovered embedded in the matrices forming such lodes. Besides, these matrices, on being traced to lower levels, exhibited a strong metalliferous character similar to tin-lode formations elsewhere. Thus, pyrites of copper, iron, antimony, and arsenic occur in laminated forms with chlorites, tourmalines, fluor, and calcspars, and likewise molybdenum and bismuth. All these components, it may be remarked, represent doubtless the features so frequently observed with permanent lode or vein formations. Tin lodes, however, exhibit in all mining districts different features, though on the whole there is a general resemblance; these may be described, as far as Heemskirk is concerned, as follows: the stanniferous lodes or veins are enclosed within more or less regular walls, in the form of “blocks,” “pipes,” and “streaks,” which comprise the richer “shoots” of ore generally, and which are frequently semi-detached from each other, the intervening portions becoming frequently poorer and attenuated at the same time. These features have all been observed at Mount Heemskirk, and thus afford evidence as to general permanency.

If to the above, or the more regular tin deposits, there are added those that comprise the porphyritic dykes impregnated with tin ores, and likewise the surface sheddings of rich tin-stones from outcropping lodes, together with the stream tin in modern and ancient watercourses, the output of tin ores from the Mount Heemskirk District will doubtless increase with the future progressive development of the mines.

The porphyritic dykes referred to deserve, on account of their tin-bearing character, attention, because at Heemskirk no estimate could so far be arrived at as to the value and permanency of strata so impregnated, lacking, as they do, the usual central streak of ore so frequently met with in “lodes” carrying tin. These dykes occur in the vicinity of the sea, and likewise, as I was informed, at the Gap and North Heemskirk. At both the latter places it appears, from what I could learn, there exist very promising surface indications of veins and perhaps of lodes also, which, if developed, would possibly add considerably to the future prospects of those mining districts; but, at the same time, they would not in their present state furnish that evidence as to their permanency which deep mining only can afford with any degree of reliability.

Along the course of some of the lodes angular detritus occur rich in tin ores, and these “sheddings” form quite a feature in the Heemskirk district; in some instances these fragmentary deposits yield considerable quantities of impure tin-stones (in sluice-boxes), which only need crushing and concentration to produce rich dressed ores.

Then, again, the stream tin deposits in the creeks and watercourses (at North Heemskirk principally) will, for a limited period, produce additional supplies of ores for shipment. In my last Report I drew attention to the probable existence of older tertiary tin deposits in ancient watercourses; evidence is accumulating now bearing out that view. Near the Heemskirk River Falls, and further to the north west, those older tertiaries have been proved stanniferous, and require careful attention. The extent and probable direction in which this pliocene river system, since obliterated by the more recent drainage, traverses that locality appears to be from east to west; the Emu Co.’s camp forming about the centre of these gravels, which are there overlaid by basalt.

Some of the companies at Heemskirk, it should be mentioned, had suspended operations pending the selection and future erection of mining and dressing machinery, and that others were anticipating the arrival of such machinery in August. A great number of leases had but very little work done upon them, and in several cases the number of employés was not according to the requirements of the Act. This apathy on the part of some proprietors appears to be quite unaccountable where the prospects are really good. In one instance, where thirteen months ago very good vein tin was raised from a shallow shaft (8 feet deep), the original depth had only been increased by ten feet. No other mining work had been carried on during that time, except the building of huts, &c., and the sluicing of detritus, which had produced about two tons of impure tin ore. I would most respectfully submit that a stricter observance of the labour covenants of leases would be wholesome, as, at this rate of working, the development of the stanniferous deposits at Heemskirk are being retarded at the expense and to the detriment of other proprietaries which have so very energetically carried out their mining operations at great cost. And this matter cannot be overlooked in the sought-for communication with the seaboard at Strahan, Macquarie Harbour, to aid the companies in the profitable disposal of the future yield of their mines, because this non-

working of those leaseholds to their fullest extent and utmost capability will necessarily reduce the revenues to be collected for the use of tram or railway they require for the purpose of receiving by it supplies of timber and stores, and despatching ores for shipment. At the same time, it is to be observed that all these companies carry on their operations at an increased cost, ranging from 15 to 20 per cent., for goods supplied to them; and that, owing to the climatic influences, they cannot get full value of the labour they employ.

Selecting a few of the mines at Heemskirk, it will be seen that those companies have done a large amount of work, at the expense of a considerable portion of their capital. In the following list of mines care has been taken, in order to arrive at a fair average, to exclude as nearly as possible all expenditure not directly chargeable to mining proper, and the approximate estimates include only what has been paid away in wages for iron and for timber.

The Cumberland Company hold leases aggregating to 560 acres, and their expenses, on the above limit, have reached £3144. Since my last visit a great deal of work has been done at the mines. On the Wilson's lode a prospecting shaft has been sunk 100 feet in depth, nearly vertical. On cross-cutting for the lode the latter was proved to be 14 feet wide, of which there were from two to three feet rich, and the remainder probably remunerative when operated upon in large quantities. As this shaft had proved the lode so very regular and permanent, with every prospect of continuing in depth, and as the *locale* presented good facilities for working it, and also Fawknor's lode, by means of a main adit, which provided "backs" 270 feet in height, that important adit was taken in hand vigorously, and at the time of my visit it had reached (bearing N. 48° E.) a total length of 130 feet open cutting and of 512 feet tunnelling, thus making same the largest mining undertaking at the West Coast. The grade adopted exceeds by a little one per cent in one hundred feet; and this tunnel is a very fine piece of work. The preliminary arrangements for mining the lodes as soon as intersected, within another 100 feet of tunnelling, and those that govern the water supply for working ore-dressing machines, &c., are on a scale proportionate to the extent of the stanniferous deposits existing; and the dressing machinery is now ordered, and will be selected by a competent engineer. The site for the storage reservoir has been cleared, and the tramway connecting the tunnel with the proposed works will soon be completed; so that there is a probability of operations on a large scale being soon commenced, affording employment to a considerable number of persons.

The Montagu Company occupy 260 acres. They have discovered two lodes, one east by west and the other north by south, and their mining expenses have been upwards of £3800. This company has proved the value of *deeper mining* more than any other. Their shaft was sunk to a depth of 123 feet from the surface, and they opened out their first level at 103 feet from the surface, where, in cross-cutting west for the adjacent north and south lode, the latter was found two inches wide only. On driving 80 feet north it was found that the tin-bearing strata there measured 28 feet from wall to wall, being composed of remunerative tin ore and pyrites of various kinds, with tourmaline. It will be seen from a sketch in my first report that these two lodes join or cross each other at a certain point, and this accounts probably for the great width of the lode at that level. Driving along the eastern lode prospects markedly improved as the country became more settled. Without describing the several operations undertaken in order to obtain reliable data as to the value of the tin deposits, it may be stated, however, that the very rich surface ore in the gully was followed down in its underlay to the 103-foot level, the first 41 feet being especially rich, and, owing to the "shoot" dipping south, the prospects still continued to be good to the bottom of the underlay shaft. This company lately ceased operations because they could not cope with the water by means of the whim employed, and because the manager had come to the conclusion that proper pumping, winding, and ore-dressing machinery had become a necessity in order to develop the stanniferous lodes they have proved to be so valuable. The motive power which it is intended to use in future is water, of which a continuous supply has been secured, in conjunction with the Cumberland Company, at a high level, commanding high pressure, so that the operations can be carried on at a cheap rate.

The Orient Company hold 320 acres under lease. Their mining expenses have exceeded £1200; a main shaft 86 feet deep has been sunk; and at the 53-foot level an adit has been connected with this shaft. The adit is 200 feet in length, from which a crosscut is being driven to intersect No. 1 and No. 2 lodes. There are altogether four stanniferous formations on the ground. The lode No. 1 in the drainage tunnel is five feet in width, laminated, and carries good ore. No. 2 lode is also five feet wide, and tin-bearing. The lowest point at which tin ore was found is at 64 feet in the shaft, but since then it has been traced deeper. Some samples (84 bags) of ore, taken from the heap indiscriminately, gave at the rate of 11½ per cent. of ore. Another tunnel is being driven from a creek, 140 feet in length, which intersects a dyke of porphyry 8 feet wide, impregnated with tin, and which would be remunerative if machinery were available for the purpose, and which is now being arranged for. There is consequently in this mine a considerable quantity of vein stuff waiting to be mined and to be subjected to the concentration process.

The Prince George Company occupy 240 acres, and their mining expenses aggregate to about £1000. They have proved the existence of one east by west, one north by south, and two north-east by south-west lodes. A main shaft, fifty feet in depth; has followed the lode (principal) in its nearly

vertical underlay, averaging two feet in width all that distance. An adit 144 feet long leaves about 60 feet to be driven before a connection can be made between these two workings at the 90-foot level in the shaft. The other lodes have been prospected by shafts and by surface trenches, and rich specimens of tin ore have frequently been found. In the tunnel the lode carries good ore, and ranges from 2 feet to 3 feet 6 inches in width, or, in other words, it occurs in "blocks" of varying thickness. This company possesses a good supply of water, which it is intended to use in connection with proper dressing machinery the directors contemplate erecting shortly.

The Empress Victoria Company lease 250 acres, and their mining expenses have amounted to £2500 to date. Three well-defined tin-bearing strata bearing north and south, and two of the same character bearing in the opposite direction, have been operated upon. The principal tin deposits occur in porphyry; has been opened by means of a main shaft 64 feet in depth, and by an adit 117 feet in length, which connects with the shaft at the 53-foot level, where there is a very heavy flow of water. Tests that have been made of the lode, which is about 10 feet wide, gave 12 per cent., but only 8 per cent. is reckoned on after dressing. There has been some limited quantity of alluvial tin ore. No. 1 (porphyry) has been driven on for a distance of 73 feet, averaging 5 feet in width, but very poor in tin, though a narrow band of copper pyrites follows the hanging-wall, averaging $3\frac{1}{2}$ per cent. of copper per ton. In No. 2 adit, 87 feet in length, the tin-bearing stratum is 6 feet wide, and an assay has been made giving as much as 54 per cent., but no further tests have been made. It appears that the richest shoots of ore occur where these various impregnated porphyries intersect each other. This proprietary has expended a large amount of money in prospecting their ground, and they are now erecting the foundations for a 20-h.p. pumping and winding engine, to be followed by ore-dressing appliances. As stated before, where these impregnated porphyries are tin-bearing and of good width, it is difficult, in absence of any other test than of samples alone, to arrive at any conclusion as to their value. Should the batteries and concentrators give remunerative returns, there is ample scope for the manipulation of similar deposits at Heemskirk.

The Montagu Extended Company hold leases over an area of 200 acres. Their mining expenses reach about £1000. On what is known as Duncanson's lode, good tinstone was followed on the underlay for a depth of 30 feet, when the influx of water compelled them to cease operations. This same lode was supposed to have been cut in an adit 185 feet in length, also tin-bearing to a moderate degree, in a very friable, almost sandstone-like euristic porphyry. On Jones's section seventeen feet were sunk on the course of a highly chloritic vein, enclosed in very dark porphyritic strata; tin ore was found in the loose *debris*, also in the solid veinstone. This lode underlays south, and may be a continuation of the Montagu lode. Copper pyrites and other sulphurets occur in contiguity to and sometimes in the matrix of the vein partly opened.

The Cliff Tin Mining Company have done but very little permanent work on the lode which I described in my last report, and which I then traced from north to south for a length of 1576 feet. Their mining expenses, including the construction of two dams, buildings, and roads, amount to £600. The lode referred to exhibits largely at the surface, and the "sheddings" have been found rich in coarse, angular fragments of tinstone, which, after sluicing, produced about four tons of impure ore, requiring further treatment to cleanse it from its matrices. Their east and west lode near the sea had been but very little worked during the last thirteen months since I was there last. Considering that the ore can be raised so easily and in such considerable quantities, much more progress should have been made.

The Cornwall Company occupy an area of 340 acres, and their mining expenses account reaches £2000. Three stanniferous deposits in porphyry were examined, but I am informed that quite a number have been discovered besides, on which, however, but very little work had been done. The country consists of a coarse-grained, hugely stratified granite, intersected by dense dark-coloured quartz veins and nests of tourmaline irregularly scattered. In the vicinity of these tourmalines sometimes a greenish quartzose porphyry occurs, which carries tin ore in the joints. Taking a general average of the ore so dispersed, it is clear that very large quantities of this impregnated rock require to be crushed and the residue dressed in order to obtain remunerative results. On Dank's tin-ore deposit some very good surface stones of tin ore crop out, but so far they have not been traced to their former original position underground, though it is probable that a rich "shoot" of ore may yet be discovered. The company have ordered and expect the arrival of crushing and dressing machinery in the middle of August. This plant comprises a large 40-foot diameter water-wheel, stone-breaker, two batteries, and concentrators. Dank's vein is a porphyritic formation, showing tin ore occasionally in conjunction with a great deal of coarse fibrous tourmaline, the whole measuring from 10 to 16 feet in width. All these formations lack those central streaks or shoots of ore so frequent with regular lodes, and it is a question of grave importance what the result may be if manipulated on a large scale.

The West Cumberland Company hold 160 acres under lease from the Crown, and their mining expenses amount to about £1400. Their operations are carried on in two tunnels driven from opposite sides of the spur on which their metalliferous deposits have been discovered, and also at two

different levels vertically. The upper tunnel was the means by which an irregular, but at the same time very promising metalliferous deposit was discovered. There appears to be one principal vein, which is brought into contact with numerous cross-veins, and at a distance of 235 feet from the mouth of this adit a peculiar black flucan was met with, in close contiguity to which nests, spots, and specks of bismuth were found to occur. The bismuth is enclosed and occurs conjointly with stibnite, which latter appears to form the base for the former, and therefore predominates in the gangue. To judge from the rather intricate character of the workings at this high-level adit, it may be advisable to seek for the continuation of these deposits in the lower ground as will be opened by means of the deep-level adit, which has been driven to a distance of 150 feet.

It will thus be seen that the above-mentioned eight mining companies have expended, on the basis adopted, nearly £16,000 in the development of their respective mines, to which amount 20 per cent. should be added for exigencies; and if six of these companies carry out their intention to procure and to erect mining and ore-dressing machinery, the total amount will be brought up to nearly £31,000. In order to assist these proprietaries as much as possible, the tramway between the township of Strahan and the Heemskirk mines on the plateau, or what is known as the "High-level line," has been proposed to be constructed by the Government; and in this connection I would suggest most respectfully that, inasmuch as the companies require now a very large supply of squared timber for foundations to their new machinery, this proposed tramway be commenced *from* the timber country *to* the mines, so that during the ensuing summer the line may be availed of by those companies to the fullest extent. This proposal would likewise be the immediate means of ensuring an increasing revenue for the use of such tramway, to be augmented as soon as the line has been completed to Strahan. With regard to the improvements requisite at Trial Harbour, it should be remembered that most of the machinery will have to be landed there during the milder season soon commencing, and that, therefore, temporary means should be adopted to facilitate the safe landing of such machinery, and the transport of same up to the mines, which are principally located on the plateau some five hundred feet above Trial Harbour.

G. THUREAU, *F.G.S.*, *Inspector of Mines.*