TASMANIA.

REPORT

OF THE

SECRETARY FOR MINES

FOR

1897-8,

INCLUDING THE REPORTS OF THE COMMISSIONERS OF MINES, THE INSPECTORS OF MINES, THE GOVERNMENT GEOLOGIST, THE MOUNT CAMERON WATER-RACE BOARD, &c.

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CORRIGENDA.

On page xiv., line 9 from top, read "as well as to the W." instead of "N."

On page xxiii., line 17 from bottom, read 1 per cent. "Zinc" instead of "Tin."

REPORT OF THE SECRETARY FOR MINES.

Mines Department, Hobart, 26th July, 1898.

SIR,

I HAVE the honour to submit my first Report upon the Mines Department, and the progress and condition of the Mining Industry of the Colony, for the year ending 30th June, 1898.

Appended will be found Reports from the Commissioners of the condition of the Mining Industry in the Divisions under their charge; the Reports of the Inspectors of Mines; the Annual Report of the Government Geologist; the Annual Report of the Mount Cameron Water-race Board; a Report on the Tasmanian Smelting Company's Works; and the Government Geologist's Report on the Mineral Fields in the neighbourhood of Mount Black, Ringville, Mount Read, and Lake Dora, with Returns of the operations of the Diamond Drills, together with Returns showing the yield of gold, coal, tin, silver ore, blister copper, and copper ore; the number of persons engaged in mining; the number of leases and area of land held under lease for mining purposes; the net Revenue paid into the Treasury from Mines; the number of Mining Companies registered during the year; the total area of land applied for during the year; and the total amount of rents and fees received by the Department during the year.

General remarks.

During the year more legitimate mining has been carried on than in any previous year.

The amount of Revenue received by the Department is the largest since 1891, and the quantity of gold won is 79,981½ ozs., being a record for Tasmania; of this amount more than one-fifth has been produced by Mount Lyell. There is a slight falling off in the quantity of tin and silver ore exported, but this is more than counterbalanced by the increase in the quantity of coal, blister copper, and copper ore. The decrease in the quantity of silver ore exported may be accounted for by the severe loss sustained by several Companies through the disastrous bush fires, which raged through the West Coast during last summer, and destroyed buildings, machinery, and mining plant; also to the fact that many Companies are stacking their second-class ores until such time as the Tasmanian Smelting Company is prepared to treat them.

The total value of minerals and metals raised has exceeded £915,881, out of which dividends to the amount of £301,448 have been paid.

Mount Lyell.

The Mount Lyell Mining and Railway Company, Limited, have continued steadily at work, and during the year have exported 5062 tons of blister copper and 23,545 ozs. of gold.

Other mines in the vicinity are doing good prospecting work.

On the 15th February last the land known as the Mount Lyell Reserve, comprising an area of 2305 acres, was thrown open to applicants for leases under "The Mining Act, 1893." So keen was the competition for land in this locality, owing probably to its close proximity to the Mount Lyell Mine, and to several known discoveries of gold and copper within the reserve, that 450 applications were received by the department, embracing an area of over 25,300 acres.

After the pegging a meeting was held at Queenstown, and the applicants decided to amalgamate and form a large company to work the ground. This has since been done, and the applicants, with two or three exceptions, have transferred their applications to the Mount Lyell Reserve Copper and Gold Mine, No Liability, and the company, having succeeded in getting a Bill

through Parliament authorising the transfers and granting certain concessions, will be entitled to leases for the whole area.

This was undoubtedly the best course to pursue, as it will prevent litigation and having to decide by lot to whom leases would issue, while the fees returnable—over £7000—will be appropriated by the company as capital for working the mines.

Zeehan. This district is in a very flourishing condition, and is rapidly increasing its population. There has been a slight decrease in the quantity of ore exported during the year through the Comet Company's plant being destroyed by fire last summer, but new machinery has been erected: work will very shortly be resumed. Many new discoveries have recently been made which promise to substantially increase the output.

The Tasmanian Smelting Company have erected large and costly smelting works, which will prove of great benefit to the West Coast mines. A report and plan of the works is annexed.

Dundas. With one or two exceptions none of the mines in this district are producing ore. Active prospecting and development is going on at some of the mines, but many sections are still held upon which little or no work has been done.

Mount Bischoff. The output from the Mount Bischoff Mine for the year is 2256 tons. This company still continues to pay its dividends regularly, having up to the present time distributed among its shareholders £1,509,000 in dividends, equal to £125 15*s.* per share.

With the exception of the Magnet, Rio Tinto, and Rocky River Mines, very little work is being done in this district.

North-West Coast. Very extensive iron deposits are known to exist in the vicinity of the River Blythe, but up to the present time very little work has been done. The claims are protected at present, but there is a prospect of a large amount of capital being introduced shortly to thoroughly develop the mines.

A little coal is being obtained from the Dulverton and Mersey Mines.

At Middlesex, Bell Mount, &c. four mines are in active operation, and 50 men are employed. Prospecting is being carried on in other parts of the field. About 50 sections are held under lease, but until there is good road communication it is very doubtful if mining operations can be successfully carried on.

Beaconsfield. The yield of gold from the Tasmania Mine is less than last year, owing to an inflow of water at the 718-feet level, which prevented operations being carried on at the lower levels for some months. The quantity of ore crushed was 29,998 tons; yield, 26,168 oz.; value, £98,590.

No dividends were paid during the last half year, but £14,553 was distributed during the first half of the year. The total amount paid in dividends is £667,161.

There is a probability of English capital being introduced to test the section to the south of the Tasmania Mine. The negotiations with English capitalists to deposit £40,000 to work the sections east of the Tasmania Mine have fallen through.

Lefroy. The New Pinafore and Volunteer Companies are engaged in sinking their shafts in search of reefs at the lower levels. The former is now down below 1150 feet, and the latter 1300 feet.

There are six other companies at work, and about 25 prospectors, but so far with very indifferent success.

The amount of gold won for the year is 1977 ozs.

North-Eastern District. Owing to the scarcity of water during the summer months many of the alluvial tin claims in the district were idle, but now that the wet weather has set in, and the market price of tin is improving, mining operations have been resumed.

At Mount Victoria considerable progress has been made during the year, and the future prospects are most encouraging. One company has opened out a reef at a low depth, and obtained 663 ozs. of gold from 363 tons of quartz.

Mathinna. Seventeen claims are being worked and prospected in this locality. The New Golden Gate Company are working at the 1300-feet level. The main shaft is down 1330 feet. The yield of gold for the year is 20,894 ozs., value £77,525. Total quantity of gold won to date, 114,871 ozs. Total amount paid in dividends, £194,400.

The reef has been struck in the two adjoining claims, and consequently a great impetus has been given to mining in the district.

Mangana. The Mangana (Tasmania) Gold Reefs, Limited.—This company has done a lot of work, having driven and sunk over 2579 feet, and have crushed 1537 tons of stone, yielding 384 ozs. of gold. They are employing at the present time 68 men, and have expended about £6000 in mining.

The shaft of the Salmon Gold Syndicate of Tasmania, Limited, is down 181 feet, with reef showing strong and payable. A large dam has been constructed ready for the battery.

Several other claims are being prospected with encouraging results.

Weldborough. Owing to the continued drought very little work has been done at these mines, and the population has decreased in consequence.

Lottah. The three principal mines are the Anchor, Australian, and Liberator. The Anchor Mine has been recently shut down pending the arrival of directors from England. A new manager has been appointed to take charge of the Australian Mine. A 30-head battery has been erected, which is driven by steam. Had they sufficient water-power to drive the plant this mine would pay well, as the stone is said to be fairly rich, giving 1½ per cent. of tin. The Liberator plant, which is almost purely automatical, was erected at a cost of over £12,000, and is most complete. The ore is not touched by hand from the time it leaves the face until it comes out ready for market. The trucks are run down from the face to the battery, a distance of about 400 yards, the full truck bringing the empty one back. 20 trucks per hour, each carrying about 16 cwts., are run down the incline to the battery. There are 20 heads working. The whole of the works are fitted up with electric light, and they are using an electric drill (the only one, I believe, in Australasia). It bores a 10-foot hole in 1½ hours which would take two men eight hours to do. The prospects of this mine are most encouraging.

Mount Nicholas Coal Fields. The Mount Nicholas and Cornwall Coal Mines are being worked with good results. As compared with last year there is an increase of over 3000 tons of coal raised. The Jubilee Mine is shut down at present, but the Company is prospecting an adjoining section.

Seymour Coal Fields. The Morning Star Company hold a large area of land at Seymour, and several good seams of coal have been discovered, but very little work has been done at present.

St. Helens. Very little alluvial tin has been obtained during the year owing to the scarcity of water during the summer, but as soon as some races (now in course of construction) are finished, I hope to see a revival in this district with good results.

The Wolfram Mine, near St. Helen's, is in the hands of a Melbourne syndicate for flotation.

Several discoveries of tin have recently been made giving, I believe, as much as 2 and 3 ozs. to the dish, and will be worked as soon as the water-races are completed.

The foregoing matters are here mentioned to show the progress of the Mining industry. Fuller details are given in the attached Reports of the Commissioners, &c.

Discoveries. A number of extended prospecting claims under Regulation No. 5 have been granted during the year, and active prospecting operations have been carried on, resulting in discoveries being made and reward claims being applied for as follows:—*Gold.*—D'Argular Range, about 10 miles from Birch's Inlet, vicinity of Corinna, on the Pieman Track; Dial Range; Edison Range, north of Gordon River; Whale's Head, Port Davey; Bridport; Red Hill, Parish Calder; and Flinders Island. *Silver.*—Dial Range. *Coal.*—Mt. Pelion, west. *Tin.*—Flinders Island. *Limestone.*—Vicinity of Queen River.

Mineral Specimens. The large and valuable collection of mineral specimens which were exhibited at the Tasmanian International Exhibition has been lent by the Department to the Tasmanian Museum.

Quarterly Reports. Quarterly Reports on the Mineral Industry of Tasmania, compiled by the Government Geologist, are regularly forwarded to the Agent-General in London for free distribution.

Mine Managers' Certificates. No candidates for examination for mine managers' certificates have presented themselves during the year, but five service certificates have been granted.

School of Mines, Zeehan. During the last 12 months the Zeehan School of Mines has been steadily developing along the lines which had proved so successful during the former year. Some 70 students attended the school during the year, the number on the books at one time being usually between 40 and

50. The feature of holding the classes in duplicate so as to allow of working miners attending at whichever class best suited their hours of work has been of great benefit. With the present accommodation and teaching staff the school can hardly accommodate more students: this is especially noticeable in the metallurgical section. The erection of a lead and copper smelting plant within a mile and a half of the school has given a great impetus to this branch of the work, and the chemical laboratory, which was originally fitted up for 6 students, has now to find room for 14, and others have had to be refused admission. Such additions as the building will admit of are now being carried out, and for its size the laboratory will be an efficient one. Instruction is being given in advanced analytical work to quite as high a standard as that given in any mining school in the colonies, and the examinations, which are held under the Mines Department, are a good guarantee that the work will be kept up to the standard. Recent appointments of assayers in Zeehan have shown that the public fully recognise that the school's certificates are the best mark of a man's fitness to deal with our local ores and their peculiarities. Classes are also being held in Mathematics, Mechanics, Mechanical Drawing, Geology, Mineralogy, Ore-dressing, &c., and are well attended. All improvements having to be made out of revenue is a serious handicap to the school's progress, as the fees for tuition have to be kept down to the lowest point.

Mineral Production: Gold.

The yield of gold for the year has been 79,981½ ozs., as against 56,870 ozs. for the previous year, an increase in value of £97,264. Beaconsfield produced 28,418 ozs., and Mathinna 20,541, as against 35,934 ozs., and 16,117 ozs., respectively for the year ending 30th June, 1897; and Mount Lyell produced 23,545 ozs., valued at £98,889.

Silver.

The output of silver-ore was 15,120 tons, valued approximately at £177,160. The figures for the previous year were 21,123 tons, valued at £232,350, so that there has been a decrease of 6003 tons.

Tin.

There has been a decrease of 1278 tons in the output of tin ore for the year.

Coal.

There has been an increase of 1827 tons in the output of coal.

Blister Copper.

4956 tons of blister copper, valued at £397,927, have been exported during the year.

Division of the Colony.

For departmental convenience the Colony is divided into Districts, as follows:—The Northern and Southern, comprising the country on the right and left banks of the River Tamar as far west as the River Forth, and on the east to the Scottsdale District, with such mineral country as there is in the southern portion of the colony, and includes the gold-fields of Beaconsfield, Lefroy, and Lisle. The North-Eastern District comprises the whole of the north-eastern country, including several important tin-fields, with the gold-fields of Waterhouse, Warrentinna, and Mount Victoria. The Eastern District comprises the eastern portion of the Colony, and includes the tin-fields of Weldborough, Blue Tier, Gould's Country, Ben Lomond, and St. Paul's River, the extensive coal-bearing country around Fingal and Seymour, with the gold-fields at Mathinna and Mangana. The Western and North-Western District embraces the wide area of country extending from the River Forth northwards, southwards, and westwards to the sea; it includes the celebrated tin deposits at Mount Bischoff, the River Iris, an extensive area of tin-bearing country at Heemskirk and Cox's Bight, the silver-fields at Heazlewood, Zeehan, and Dundas, the gold-fields at Mount Read, Mount Lyell, and the Linda, with other more or less important mining centres.

Departmental Staff.

During the year the Department and the mining community of the Colony have sustained a very severe loss through the retirement and subsequent death of Mr. Francis Belstead, late Secretary for Mines. Mr. Belstead was appointed Commissioner of Mines at Launceston in 1882, and succeeded Mr. Bernard Shaw as Secretary for Mines when that gentleman was appointed Commissioner of Police, and retained the position until the 31st December last, when, owing to ill-health, he was obliged to retire from the service upon a well-earned pension. Unfortunately his health still continued to decline, and he died on the 23rd April last. During his term of office Mr. Belstead proved himself a most capable and efficient officer, and gained the respect and esteem of all those with whom he came in contact.

Consequent upon my appointment as Secretary for Mines and the appointment of Mr. W. A. Pretyman as Chief Clerk in succession to me, the whole of the clerical branch of the Department have received a rise in position and salary. This has not only given general satisfaction to the officers themselves, but members in other branches of the service have expressed very great pleasure at the manner in which the re-organisation of the Department has been conducted.

The only other changes have been the appointment of another Clerk and Draftsman in the Department; Mr. F. N. Stops, Registrar of Mines, Queenstown; Mr. O. H. Root, Registrar of Mines, Scottsdale, *vice* Mr. E. W. Bonner, deceased; Mr. J. Fidler, Registrar of Mines, Waratah, *vice* Mr. G. Tegg, removed; and Mr. M. J. Griffin, Inspector of Mines, Gladstone.

It affords me very great pleasure to record my thanks to the various officers connected with the Department for the loyal, able, and willing manner in which they have performed the duties allotted to them since my appointment.

The Report of the Board is annexed.

Mount Cameron Water-race.

Details of the work done with these machines are appended.

Diamond Drills.

In conclusion, I have much pleasure in reporting that more legitimate mining work is being carried out than heretofore, and the future prospects are most encouraging.

I have the honour to be,

Sir,

Your most obedient Servant,

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

The Honourable the Minister of Mines.

REPORTS OF COMMISSIONERS.

Mr. Commissioner GLOVER reports :—

During the past twelve months no new development worthy of special mention has taken place on the Northern Goldfields.

The problem of the future of Lefroy as a goldfield still remains unsolved. The hopes of those interested in the success of this field, either by personal interests or general economic considerations, are at present centered in the operations of two mines on the New Pinafore and Volunteer reefs respectively. The proprietors of these have continued to sink in search of a renewal of the productiveness of the reefs at deeper levels; the former has now attained a depth of over 1150 feet, and the latter 1300 feet, and both companies express a determination to persist in deeper sinking as long as means to meet the expense of the operation can be obtained. This, however, can now only be accomplished by the contributions of shareholders, notwithstanding that, in the case of one of these mines, up to a few years ago some £70,000 had been distributed in dividends to the fortunate shareholders of that period before the productiveness of the lode ceased, at about 400 feet from the surface. In addition to these two creditably worked mines, there are, at Lefroy, six other regular mining operations; but, however promising the indications of some of these may be, being, as they are, dependent on the contributions of shareholders, unless some fortunate chance may disclose sufficiently rich "shoots" of gold at comparatively shallow levels, as has hitherto been the case with the temporarily successful mines at Lefroy, there is, I fear, little chance of any fortunate result. Unfortunately it has been the practice of mining companies to distribute in dividends from the commencement the profits which should reasonably be devoted to the work of effectually developing their mines, and the existence of the evil is likely to continue unless some means be adopted to check it. If a covenant were introduced in leases that, until a prescribed depth be attained, at least 40 or 50 per cent. of every dividend declared should be reserved and expended in the due development of the mine, it would cause many mines in the future to be worked to a successful result, instead of being closed at 400 or 500 feet, as has hitherto been almost invariably the case at Lefroy. There are some 25 prospectors at present engaged in the neighbourhood, some of whom are employed by Associations, but from the labours of whom no reliable result has yet accrued. There are in all about 145 men engaged on this goldfield.

At Beaconsfield the great impediment to progress is, the same as at Lefroy, the absence of sufficient capital. There is no local capital adequate to the effective development of a mine on the northern goldfields. It is a somewhat remarkable circumstance that, although the exceptional depth, extent, and continuous richness of the lodes of the Tasmania Mine are proved and established beyond the possibility of doubt, the enterprise of capitalists has never been enlisted for the purpose of locating the continuation of those lodes through the ground beyond that company's boundaries. It is true that several abortive attempts with inadequate funds have been made during the last 15 years, but no success has attended such efforts. During the past year the lessees of the sections on the east and the south of the Tasmania ground had all but completed negotiations with English capitalists, who had agreed to deposit £40,000 as a working capital, but for some unknown cause the negotiation was suddenly broken off. The owner of the southern sections is now in treaty with

other capitalists in London, and those of the eastern sections are now adopting the plan of following the principal reef from the Tasmania Company's ground into their own. The Ballarat Deep-Lead Company, which had expended some £8000 in the effort to prove the deep alluvial formation at the foot of the Cabbage-tree Hill range, having ceased active operations for several years owing to exhaustion of funds, their claims have been seized by "jumpers" as abandoned ground, and are now the subject of litigation. The old mining operations to the west of the township are still proceeding, but without any satisfactory result. A mine which was established a few years ago, known as the North Tasmania, as a gold mine, has developed into a silver and copper mine, the assays from the lodes of which are reported to afford highly favourable prospects, though at present this mine is only in process of development.

A sudden greatly increased inflow of water in the Tasmania Mine, which is well known to be one of the principal factors in the gold yield of the Colony some months ago, put an effectual stop to the mining operations in the lower and most productive levels of the mine for some months until the water could be discharged. So large a portion of the mine being precluded from work seriously diminished the yield of gold from Beaconsfield, the quantity of which for the past year amounted to 30,145 ounces, value £109,399. There are at present 632 miners employed on the Beaconsfield gold-field. The work of prospecting is actively proceeding in various directions about the locality.

The old alluvial gold-field of Lisle, being destitute of sufficient water for large sluicing operations, may be said to be worked out. During the past year, however, I have declared the whole gold-field available to diggers in extended claims of an acre each, and it continues to hold out inducement to some 40 diggers, and yields about 800 ounces of gold annually. The country comprising the Denison, Golconda, Panama, &c., occupies many prospectors, but want of capital prevents the development of several promising claims.

At Middlesex Plains, Bell Mount, &c., there are four mines in active operation employing 50 men, though as yet only in process of development. Nine or ten prospectors are employed on this field.

Should success attend the deep-sinking operations now in progress at Lefroy, of which analogy furnishes a strong presumption it will, it will certainly result in the application of the principle to the many now dormant mines at Lefroy, which, after the distribution of large dividends, were closed at a depth of some 400 feet, when they ceased to be productive; and at Beaconsfield the tracing of the Tasmania lodes into the adjoining claims will result in the establishment of other mines as rivals of that celebrated mine.

Mr. Commissioner O'Reilly reports :—

During the past year considerable progress has been made in the Mount Victoria locality in carrying on mining operations, and the prospects of this gold-field have very materially improved. One company having opened out a reef at a low depth, which is of good size, has commenced crushing from it, and won 663 ozs. of gold from 363 tons of quartz. Other claims are driving for reefs, prospecting and erecting machinery, &c., and a considerable amount of activity in this way prevails. It is considered that the propects of the place are very promising, and I look for very material and satisfactory progress being made during the coming year.

At Warrentinna there are four claims being worked, principally sinking on or driving for reefs, &c., but no gold has been won. The prospects of the field are represented as very good, but some of the claimholders do not appear to have sufficient capital to sink a sufficient depth to properly open out their mines.

In the Mussel Roe and Gladstone localities gold-mining operations are being carried on in a small way, but sufficient work has not yet been done to test the value of the reefs at a low depth.

The Waterhouse gold-field is practically abandoned, nothing having been done there for many years. This is much to be regretted, as the reefs have not been tested to a sufficient depth to warrant this neglect. This field is worthy of the attention of capitalists, and offers reasonable inducements for a moderate amount of capital being expended in prospecting at a good depth.

Some extent of alluvial gold deposit exists on freehold land situate near New River, in the Mount Victoria locality, and a portion of this area is now being mined profitably; 30 ozs. of gold has lately been won there by four men in a short space of time.

There are 112 men now employed at gold-mining in this district.

In consequence of the protracted drought and the low price of tin ruling during the past year, tin-mining operations have been carried on under very discouraging circumstances.

Owing to the short supply of water a good many of the claims were compelled to cease mining operations, and many miners had to leave the district and seek employment at the West Coast

mining fields. However, the recent rains have afforded a fair supply of water, and mining operations have been resumed with much vigour.

The recent advance in the price of tin ore will largely stimulate the carrying on more extensively of mining operations, and I look for a return to more prosperous times for the mining industry in this district during the coming year.

Mr. Commissioner DAWSON reports:—

The output of ore for the 12 months ending June, 1898, is less than the previous year. This to a certain extent can be accounted for by the shortage of water during the 12 months, in consequence of the long drought. The men working under their Miners' Rights have had a very bad time of it during the long drought. The same may be said of lessees holding sections. Now that the drought has broken up, and the supply of water being ample for all mining purposes, things are looking much better for all concerned.

A very large expenditure of money, over £50,000, has been expended by the three following Companies—Anchor, Liberator, and Australian—in the erection of most elaborate plants of machinery for treating the lode-stuff in the vicinity of Lottah and Blue Tier. I have no exact information as to the yield of this lode-stuff treated up to date, but it is generally reported that the yield is not exactly up to expectations. This applies to all three mines referred to. I must await further development before I can report as to the exact yield of tin ore from these mines.

The Golden Gate keeps up its reputation as a dividend-paying mine, and I am assured by the manager that the mine looks below ground as well as ever it has.

The Extended Golden Gate Company have reported that they have struck gold-stone at 900 feet, and the manager quite believes that he has struck stone in every way like the stone at the Golden Gate.

Prospecting is being actively carried on at Mathinna and the surrounding district. Some of these shows are reported to be very satisfactory. Without being over-sanguine, I am of opinion that further development will be satisfactory in the vicinity of Mathinna.

Mining for gold in the Mangana District is looking up. Mr. Goodall, manager of the Mangana Company, speaks very hopefully as to the prospects of that mine. I have seen some splendid stone from this mine. Mr. Goodall is now pushing on his adits, and is now crushing the stone at his battery, but I have not yet heard the result of the crushing.

The Salmon (an English company, of which Mr. Clerk is the Manager), has excellent prospects at a depth of some 80 or 90 feet, the stone showing gold freely. This company's ground is about 5 miles from Fingal, lying between the Mangana and Mathinna roads.

Prospecting is going on briskly in and around Mangana, and the prospectors appear to be very sanguine of success.

Coal-mining is now a settled industry in this District. The coal keeps of excellent quality, and the output is increasing. Both mines are fully employed, and are in excellent working order.

Mr. Commissioner HALL reports:—

There has been a considerable falling off in the amount of ore raised in the northern portion of the Western Mining Division during the last twelve months as compared with the previous year. This may be attributed, as regards silver-lead, principally to temporary causes, such as the cessation of work at the Oonah Mine while the concentrators were being erected, and the unfortunate destruction of the surface erections at the Comet Mine by bush fires. The district viewed as a whole is prosperous, and is growing rapidly in the value of its discovered mineral wealth. A good test of its prosperity is that the estimated population is nearly 16,000 for the Western Division, and there is no lack of remunerative employment for those able and willing to work. Many new discoveries have been made during the year which promise in the future to substantially increase the mineral output; but the last year's production has been mainly contributed by the same mines as in the previous year.

The total amount of silver-lead ore sent away from the Zeehan Railway Station during the year was 15,058 tons, value, approximately, £177,079, to which each of the following mines contributed £10,000 worth or over:—Montana, 3156 tons, value £42,531; Western, 3192 tons, value £38,304; Smith's Section, 1714 tons, value £21,731; Silver Queen, 1469 tons, value £13,406; Oonah, 884 tons, value £10,462. Other mines which have contributed in varying quantities are:—Mount Zeehan (Tasmania), New Mount Zeehan, Tasmanian Crown, Comstock, Montagu, Empress,

Silver King, Queen Extended, Wise's Section at Zeehan; and Comet, West Comet, M'Kimmie, Bonnie Dundee, Commonwealth, Fahl Ore, Rich P.A., Curtin-Davis, S.W. Curtin-Davis, No. 1 Curtin-Davis, and Kozminsky, at Dundas.

The Western Mine still has the deepest workings on the field, and has lately recommenced sinking the main shaft. It has been carried down to 540 feet, and will be taken on to about 640 feet before another level will be opened out. During last month a large quantity of the ore raised was stacked at the mine, and does not appear in the total amount sent away.

The Montana and Oonah Mines have completed and put in use their concentrators, and the Western Extended Mine has nearly completed its concentrator, which will make the tenth erected in the district.

At the Montana Mine the pumping and winding plant have been finished. The main shaft has been enlarged to 18 feet by 6 feet in 4 compartments, and is now down to a depth of 292 feet, and going down at the rate of 8 feet per week.

A tramway is about to be laid from the Zeehan Tramway Company's line to connect with the workings at Smith's section. This section is worked entirely by tribute and several sub-tribute parties. It would be probably managed more advantageously if all the parties were to follow the example set lately by a couple of them, and amalgamate.

In the Dundas District the mines are scarcely doing more than prospecting or early developmental work. With one or two exceptions none have begun to systematically produce ore. There are a great number of sections—more than a fair proportion—on which practically no work at all has been done. The Comet mine was unfortunate enough to have its surface buildings and over 30 feet of the main shaft timbers destroyed by bush fire in February last. Work below ground at once ceased, but, as the company have energetically begun repairing the damage, it is fair to assume that before long mining will be resumed.

The Hercules mine has prepared the formation for laying a line of rails for a self-acting tramway to connect the mine with the North-East Dundas Tramway at Deep Lead, the distance being about a mile. The rails are laid for the greater part of the way. The Mount Reid mine will have a short line to connect it with the Hercules tramway; the survey for it is now being done.

A large settlement has sprung up at Rosebery in anticipation of the mines developing there. It is understood that smelter machinery has been ordered for the Tasmanian Copper Company, and will be delivered some time after the end of the year, when the Waratah-Zeehan Railway is ready to carry it. Developmental work is being carried on in the other mines in this portion of the district.

Considering the nature of the country—its steep and thickly timbered hills and heavy rainfall—prospectors are pushing with commendable perseverance inwards from the older districts. New discoveries are being made every few days, but the work of development is woefully slow. That in rough country where means of access are so few and difficult is to be expected, but in the older portions of the district it is a pity that many lessees could not be induced to open up their sections instead of in so many cases allowing them to remain a considerable time idle.

It is probable that the coming year will see a most material advance in the prosperity of the district. The Tasmanian Smelting Company have commenced near Zeehan, about 1½ miles from the Zeehan Railway Station, the building of a smelter plant to carry three furnaces—two for silver-lead, one for copper. Railway connection with the Strahan-Zeehan Railway has been completed, and the excavations for the plant made. Building will commence very soon, and early next year the furnaces should be completed. It is anticipated that many mines which have large bodies of low-grade ore that cannot be profitably worked now will be able to resume operations and sell their products to the Smelting Company at a price remunerative to both parties.

Only about 60 ounces of gold have been purchased by the banks during the year. The quantity now being raised is practically *nil*.

No tin ore is being won. The low price ruling in the market does not offer sufficient inducement.

Mr. Commissioner Fowell reports:—

The Mount Lyell Company have continued steadily at work during the past year, and have shipped at Strahan over 5000 tons of blister copper. Six furnaces are now in blast, and four others in course of erection.

Prospecting work has been carried on vigorously at the North Lyell, Tharsis, and South Lyell, and, in the two former, very successfully. The other sections most notable are West Lyell, Prince

Lyell, King Lyell, Glen Lyell, Crown, North Crown, Lyell Pioneer, South Tharsis, Wesrern Tharsis, North Lyell Consolidated, Comstock, Mt. Lyell Blocks, and Mount Lyell Extended.

There are other properties also being prospected; but, at the same time, there are a number which should be at work, and on which no work has been done, the holders applying for protection upon the ground that efforts are being made to float companies in Europe, and so obtain capital to develop. But such proceedings are not fair to those companies who are showing their *bona fides*, and consequently I have given notice that protection will only be granted where work has been done, or where it is shown it is absolutely necessary.

A considerable amount of land has been taken up at Mounts Jukes and Darwin. At Mount Jukes the Proprietary, King Jukes, Intercolonial, Casboult, and North Jukes Companies are prospecting. There are said to be large deposits of minerals, but not yet sufficiently prospected to determine their actual value.

The North Lyell Company's Railway, when constructed, will very materially assist in developing this portion of the district; but all development will be retarded until the bar at Macquarie Harbour Heads is removed to allow admission of larger vessels and competition. Considerable reduction in freight and direct communication with the places where the ore is to be finally treated would enable many mines which carry low-grade ore to be worked profitably; this railway communication can never do.

On the leases taken up for gold in the neighbourhood of the Queen River the only work done during the year has been by the Messrs. Murray, who have taken upon tribute some land near the Macquarie and Woody Hill Mines; they have erected a small battery, and have commenced crushing, but not yet cleaned up. The gold sections at Mt. Jukes known as Harris's Reward, had a considerable amount of money spent upon them, and the holders are now endeavouring to float a fresh company to enable them to more thoroughly prospect and work their property.

There has been very little alluvial mining done. This, I believe, is principally caused by the increased demand for labour and, during the summer months, the unusual dryness of the season.

Another settlement is springing up at Kelly's Basin, at the south end of Macquarie Harbour. It will be an advantage to prospectors, and I look forward during the coming summer to hear of valuable discoveries in that neighbourhood. On the opposite side of the harbour is situated Birch's Inlet. Good gold prospects have been obtained between this and Rocky Point. Prospectors will be able to take their supplies from the township at Kelly's Basin.

Taking into consideration the enormous difficulties to be overcome, I am quite certain that the general progress of the mining industry is satisfactory.

Mr. Registrar FIDLER writes:—

I know very little about mining, and I have no opportunity here of visiting any of the mines; the only mine that I visit is the Mount Bischoff, and I can say that I believe it keeps well up to the record for tin, and is likely to do so for many years to come.

The Magnet Silver Mine is reported by those employed there to be what miners term a "good thing,"—of course they mean for the owners more often than for those employed.

The Rio Tinto and *Rocky River Mines* are both raising ore, and are reported to be good mines, only kept back owing to having no means of getting the ore to market. There are several new finds in the vicinity of the new line of railway. There are a number of men out prospecting, and I frequently hear of new finds. There can be no doubt about it but that the Emu Bay Railway will be the means of opening up a large extent of mineral country that is at present almost inaccessible. At the present time there appears to be what the expert terms a "slump" in the market, and there appears to be an all-round depression in the mining business; but it is rather difficult to know what causes these booms and slumps by those outside the know.

On the whole I believe the mining industry is in as healthy a state as ever it was; in this division there does not appear to be any what is termed "wild cat" shows on the market.

ANNUAL REPORT OF THE CHIEF INSPECTOR OF MINES.

Mines Office, Launceston, 19th July, 1898.

SIR,

I HAVE the honour to submit my Annual Report as Chief Inspector of Mines for the year ending June 30th, 1898.

Inspection of Mines.

During the year I have inspected the mines in the northern part of the Island as frequently as my other duties would allow, and have found them on the whole in satisfactory condition. All cases of fatal or serious accidents have been enquired into, but it has not been found necessary to take any legal proceedings, with the exception of the case mentioned in my last Annual Report, in which a conviction was obtained against a mine manager for allowing men to be raised and lowered on the bucket.

Ropes and cages have been examined and tested, and two of the former and one of the latter condemned.

At the begining of the year Mr. M. J. Griffin, of Gladstone, was appointed Inspector of Mines for the North-Eastern and Eastern Districts, which include the tin mines of the Ben Lomond, St. Paul's, Blue Tier, Derby, and Mount Cameron Districts, the coal mines of Mount Nicholas, and the gold mines at Mathinna, Mangana, Mount Victoria, and Warrentinna. In future these mines will be inspected regularly every three months.

Accidents.

The number of accidents, I regret to say, shows a still further increase. 13 men (all Europeans) were killed, and 32 Europeans and 1 Chinaman were more or less seriously injured. Total 46, as against 38, of which 7 were fatal, for the previous year. This increase is chiefly due to the great increase in the number of men employed, the average number of men employed in or about mines during the year ending June 30th, 1898, being 5533 as against 4303 during the previous twelve months. The causes of the accidents were as follows :—

Falls of Earth.—Three accidents, one fatal and two not fatal, happened through falls of earth in alluvial workings. The man who was killed, Edward Henry Allen, was working by himself on a tin claim, under a Miner's Right, when he was overwhelmed by a fall from the face, his body being found buried beneath about three feet of gravel and cement. Of the injured men, one was a European, who after having been warned, ventured too close to a high face when a fall was being taken down : he was caught by a portion of the earth and gravel and severely bruised. The other was a Chinaman who was working in a tail-race close to a vertical face, part of which fell and injured him rather severely. Sufficient attention is not paid to keeping working tail-races at a safe distance from high faces, and there is no provision in the Mining Act regulating this. The Inspectors have given frequent warnings, but it is difficult to make alluvial miners, especially Chinese, work with a proper degree of caution.

Falls of Rock, Timber, &c. in Underground Workings.—One man was severely hurt internally, and another sustained a compound fracture of the leg by falls of rock when working out the effects of shots in the Western and Tasmanian Copper mines respectively. While attempting to free a pass which had become hung up, at the New Golden Gate Mine, a man had a very narrow escape. The quartz started to run, and he fell away with it into the pass and was buried, but escaped with severe cuts and bruises. Three men were injured in the underground workings at the Mt. Lyell Mine, one at the Oonah, and one at the Ringarooma Mine, through pieces of rock falling on them. At the Montana Mine a man had his leg broken by a prop which he was attempting to land from the cage falling on it, and at the Tasmania Mine a man had his leg bruised by a piece of stope timber falling on it. Total, ten (10).

Fall of Coal.—One man had his hand badly lacerated by a fall of coal in the Mount Nicholas colliery. This is the only accident reported from the coal mines during the year.

Shaft accidents.—Four fatal and one non-fatal. Four of these accidents, three fatal and one not fatal, happened in the main shaft at the Tasmania Mine, Beaconsfield, but in none of the cases was any blame due to the management. The first accident happened to a man named Mark Lay, who was being raised to the surface in the cage with three other men, when he suddenly collapsed and slipped between the cage and the frame sets of the shaft, falling to the bottom, a distance of about 550 feet. The cage was provided with a bar about 3 feet from the floor as an extra protection, and it is surmised that the man fainted. In the pump compartment of the same shaft one of the pitmen, John Campbell, was using a bar, which suddenly slipped from its hold, and the man lost his balance and fell down the shaft, but was caught on the next platform, 25 feet below : he was severely shaken, and injured internally. Daniel Brown was assisting to land a long piece of timber, when he either slipped or stepped backwards into the shaft, and fell to the bottom of the shaft, a distance of 100 feet, being killed instantly. The barrier of the shaft had been temporarily removed for the purpose of landing the timber. The plat was well lighted by electricity, and no blame was attachable to any one. The fourth accident happened to a pitman named Richard Parry, who was cut in two by the tank, but there was no evidence to show how he got into the shaft. In this case the jury added a rider to the effect that a regulation should be

introduced to prevent men working alone in isolated parts of a mine. At the Silver Queen Mine, Zeehan, James Atters lost his life through falling off the staging in a shaft which he was engaged in skidding.

Foul Air.—Three men, Edmund Dillon, Edward Ryan, and James Wicks, lost their lives through being overcome by foul air in a small prospecting shaft at Port Cygnet. The shaft, which was on private land, was about 55 feet deep, and a start had been made to drive from the bottom. Dillon was in charge, with Ryan as braceman. He had noticed the presence of foul air (probably carbonic acid gas) on the day before the accident, and the weather was very sultry, which made it all the more likely for it to accumulate, yet he was lowered down the shaft without testing the state of the air. He fell off the rope before he reached the bottom of the shaft, and Ryan thought that the rope had been broken, not suspecting foul air. He obtained assistance and then climbed down the rope, but he, too, was overcome. A third man, James Wicks, then volunteered to go down, but refused to be tied on to the rope, and succumbed on reaching the bottom. It was not until then that any efforts were made to get rid of the bad air, and it was about three hours before the bodies were recovered. Thus three lives were sacrificed through ignorance or want of forethought.

Explosions.—The number of accidents due to explosions has been unusually large, two men having been killed and twelve injured. One man was killed and eight others injured through a heavy charge of powder, in one of the open cuts at the Mt. Lyell Mine, blowing into a drive in which the men were having "crib," the concussion forcing them against the timber and sides of the drive. At the North Mount Lyell Mine a man had his hand shattered by the explosion of a charge which he was getting ready. Two men were injured at the Commonwealth Mine by an explosion which took place as they were boring in the bottom of an old hole in which a charge of gelignite had been previously exploded: one of the men had his face terribly cut, but the other escaped with slight injuries. The practice of boring in the remains of old holes is a most dangerous one, and is forbidden by the regulations. In this case the offenders were proceeded against, and a conviction obtained. In the Montana Mine, Zeehan, a man had one of his eyes badly injured by a shot going off in a stope through which he was passing on his way to the shaft. A man named Thomas Snooks received fatal injuries at the Lyell Dundas Mine through the explosion of a charge which he supposed to have missed fire, and to which he returned after waiting only a few minutes. This is another dangerous practice, which the Inspectors have done their best to put down by frequent warnings.

Truck Accidents.—One man received slight injuries through getting his hand caught between two trucks at the Mount Lyell Mine; another man was injured internally through some of the trucks on which he was riding getting away on the Mount Lyell Haulage Line. At the Anchor Mine a man had his foot cut by the wheel of a truck while assisting to remove machinery.

Machinery in Motion.—One accident only happened from this cause: this was to an engine-driver at the Tasmania Battery, who got one of his fingers caught in the eccentric of the engine, and had to have the top of it taken off.

Struck by a Windlass Handle.—A man named Alfred M'Guinness received injuries from which he died six days afterwards, through being struck on the head by the handle of the windlass on Horton's Tribute, Smith's Section, Zeehan. He was lowering timber in the bucket, and proceedings were taken against the Manager for not providing suitable appliances for sending down timber, but the case broke down on a technical point. A similar accident, but not attended with serious injury, happened at the Tasmania Mine, Beaconsfield. A man was raising dirt from a winze, when the bucket caught in the skids, and the handle of the windlass was jerked from his hand, and struck him in the face.

Burst of Water.—Wm. Archer lost his life through a sudden burst of water and sludge in the Sylvester Mine as he was engaged with others in opening out a chamber from the shaft. The shaft was provided with a ladderway, but he was unable to reach it in time, the others barely escaping with their lives.

Other Causes.—One man had his thumb smashed by placing it on top of the drill which his mate was striking. At the Mt. Lyell Company's limestone quarry near Queenstown a man named Thomas Slade lost his life. He was working out the effects of a shot, when the rock on which he was standing fell away. A third man broke one rib and sprained his ankle through falling from an overhead tramway which he was helping to construct at the Florence Battery, Beaconsfield.

Mine Plans.—Information has been laid against several mine-owners for neglecting to furnish plans and sections of the underground workings, as required by Section 97 of the Mining Act, 1893, but further time has been given, and the cases have not yet been brought into Court.

Registration of Mine Managers.—There are still a good many mines of which the names and addresses of the mine managers are not registered. Circulars are now being sent to mine-owners, drawing their attention to the necessity for this, and unless this has the desired effect, legal proceedings will have to be taken.

The Reports of Inspector Harrison and Inspector Griffin are enclosed herewith.

I have, &c.

J. HARCOURT SMITH, *Chief Inspector of Mines.*

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

Mr. Inspector HARRISON (stationed at Zeehan) reports :—

In forwarding my annual report I regret to state that the accident list is again a heavy one, being—Fatal, 6; serious, 11; not serious, 9.

Very few complaints have been made during the year; those received were attended to without delay.

The mines on the field are well equipped with safety appliances, which are tested as required; several ropes have been condemned.

We have 3 magazines at Zeehan, 1 at Ringville, 1 at Queenstown, and 1 at Gormanston; they are at present in a clean condition. I destroyed 5 cases of damaged explosives during this term.

Legal proceedings were taken in three instances, one against a manager for not providing suitable appliances for lowering timber, the others were endeavouring to drill out miss-fires. The former I lost on a technical point; a verdict was obtained on the others.

During the year there has been a slight falling-off in the output from the Zeehan field, the principal cause being the destruction by fire of the Comet plant last summer. I am happy to say the Directors of that company have lost no time in providing fresh and powerful machinery, the erection of which is nearing completion; pumping will soon be resumed. The Western Mine is still keeping up a good output; within the last few weeks there has been a decided improvement in some of the deeper levels. During the year the Montana has erected a good dressing-plant, also powerful pumping and winding gear, capable of going to a depth of 1000 feet. The shaft is being pushed down as fast as possible. The mine is looking well throughout, and has a couple of years' ore in sight. At the Oonah a dressing mill has also been erected, which is doing good work, and there is another in course of erection at the Western Extended.

The splendid smelting works now in course of erection will no doubt give a considerable impetus to mining, by affording facilities to quite a number of Companies for the disposal of their ores that cannot at present be exported to advantage. This not only applies to several of the silver-lead mines in the immediate vicinity, but also to numerous mines in the Ring River, North-East Dundas, and Mount Reid Districts, where large bodies of pyritic ores are being opened up.

In the Lyell District the Mount Lyell Company are opening up an immense body of ore. They are keeping six 100-ton water-jacket furnaces constantly going, and have five others in course of erection. The North Lyell and Lyell Tharsis are both opening up well; the same can be said of several of the adjoining mines. It only requires the completion of the railway to Kelly's Basin to make this district a wonderfully productive one.

Several new finds have been made along the proposed line at Mount Jukes and Mount Darwin.

The Mount Murchison District is attracting considerable attention at present through the fresh discoveries that have been made at Red Hills, Moxton's, &c., the chief obstacle to the development of this field being the want of rail communication. Indeed, from nearly every point of the compass most encouraging reports are coming in, and I confidently look forward to the West Coast becoming one of the largest ore-producing districts in the Australian Colonies.

Inspector GRIFFIN (stationed at Gladstone) writes :—

I have the honour to report having commenced my duties as Inspector of Mines for the Eastern and North-Eastern Mining Divisions in February of the current year.

All underground mines being worked, as also all deep-faced mines working for alluvial tin, were visited and inspected in March, and again in June, of this year.

One accident of a rather serious nature occurred by which a man (European) had his hand badly crushed by a fall of coal; this accident appears to have been unavoidable, and no blame is attachable to anyone.

One or two complaints of a trivial nature were received, and attended to.

Cages and ropes have been practically tested, and several of the latter condemned, also one cage on account of a defective spring on the spindles of the eccentric grippers.

The careless handling and storing of explosives in many of the mines is a practice to be condemned. I have frequently found both gelignite and caps or detonators placed together within a few feet of a travelling road or working face; contractors appear to be the chief offenders in this direction, and since frequent cautioning is of no avail, more stringent measures will have to be resorted to.

In quite a number of mines, especially the smaller ones and prospecting shows, proper ladder-ways, as required by Regulation XXIII. (Section 122) of the Act are not provided; in many cases a sort of ladder is fixed in such a way as to be rather a source of danger than otherwise to those for whose use it is provided. All defective ladders have been condemned, and those in an overhanging position ordered to be altered or replaced, if necessary, by new ones.

Great laxity is still shown by many of the mine-owners in the matter of registering their mining managers, as required by Section 91 of the Mining Act of 1893. It not unfrequently happens that a mine is inspected where the work of shaft-sinking or even driving is being carried on without any responsible person being appointed to supervise the work. Owners often save the cost of managing by letting their mine to tributors or contractors; these latter are careful not to take any responsibility when interviewed by the inspector. Circulars, giving a final notice to all mine-owners who have neglected to comply with Section 91, are now being issued, and I beg to recommend that prompt compliance with the Act in this direction be insisted on, otherwise the work of inspection cannot be effectively carried out.

The ventilation of the mines inspected is generally very good; some few exceptions, however, are to be met with, where proper attention is not given to this matter, and where other sanitary precautions are neglected, all of which have been noted and commented on.

On the whole the mining interests on these fields may be said to be entering on a more prosperous era. After a year of unprecedented drought, affecting alike the gold-mining as well as the tin-mining industries, the long-looked for rain came in April, and by the end of the following month an abundant supply of water was obtainable all round.

In the vicinity of Derby, the Briseis, Brothers' Home No. 1, and Brothers' Home Extended Tin Mining Companies, as also the Brothers' Home—private mine—are in full swing, sluicing on good tin-bearing grounds, and good outputs of tin may be expected from these mines ere long.

A head-race, several miles in length, is being constructed from an off-take on Main Creek, from which stream it is intended to supplement the at present inadequate supply of the Briseis Tin Mine.

The Brothers' Home Extended Tin Mining Company (north of river) are also having a head-race constructed to bring water on to their mine from Main Creek. A substantial column of 18 inches diameter flanged pipes is being laid to carry the water across the Ringarooma River near Main Creek junction, from which point it will be conveyed to mine by means of earth-channel. Both these water schemes will give a good head or pressure to their respective mines, but it is questionable if the supply available from Main Creek at any season will prove sufficient to be divided between two large mines such as the Briseis and Brothers' Home Extended.

Mr. Sheard, C.E., is now having punts built to carry a hydraulic dredging-plant intended to be used for dredging and sluicing the tin-bearing gravels confined to the river-bed in the vicinity of Derby, also the deposits of river and adjacent flats lower down. There is no reason why hydraulic dredging, such as is being successfully carried on for gold in the other colonies, especially at Yackandandah, in Victoria, should not be applied to the profitable raising and treating of the tin sands and gravels that exist in the river-bed and adjacent flats of the Ringarooma, from Derby to the sea, a distance of over 40 miles on the course of the river.

At Pioneer and Gladstone tin-mining had almost come to a standstill, owing to the great scarcity of water and the low state of the tin market. This state of affairs, I am glad to say, no longer exists. There is now a plentiful supply of water. The tin market has already reached £72 10*s*., this quotation being the highest for the past four years (in October, 1896, tin was as low as £57 10*s*. in the English market), and the outlook is altogether brighter. The alluvial tin deposits of the Gladstone Field are very extensive, and, although not rich, can be made to pay when the market price of metallic tin is not less than £70 per ton.

In the vicinity of Lottah there are three big companies at work. At the Anchor Mine a very extensive tin-dressing plant—comprising a 100-head battery, with classifiers, jigs, frue vanners, and buddles, all of the most approved type for drilling and dressing tin-ore in large quantities—has been erected. Two stone-breakers—one "Gates' No. 4," and the other a "Blake-Marsden"—are in use for reducing the stone to a size suitable for feeding to the battery. The whole of the machinery, including an air-compressor for rock-drill, and dynamo for electric lighting, is driven by water-power, operating on Pelton wheels. A more complete plant for the economical milling and treatment of lode tin it would be difficult to find anywhere. From figures furnished by the Manager it is shown that the total cost of quarrying, crushing, and dressing the stone does not exceed 4*s*. per ton, which is equivalent to paying all working expenses with half ($\frac{1}{2}$) per cent. stone, allowing the tin ore to be worth £40 per ton on the ground, which is about the present price. Only one battery—50 heads—is being worked at present. Unfortunately for the

owners, the prospects of obtaining even the half per cent. required to pay expenses on this mine are not good at the present time, but the manager is hopeful of obtaining better results as the face of the quarry is advanced into the hill, and also extended to the full width of the tin-bearing porphyry. The two faces at the lower or main working level are nearly connected ; when this is done the whole will represent a continuous face nearly the full width of the tin-bearing formation. No rock is rejected, as the intention is to thoroughly open up the mine, sending everything to the battery. Indeed it would be a difficult matter to class the stone, as any tin visible may be found in portions of the lower and harder rock as readily as in the softer superficial porphyry.

Liberator Tin Mine.—The crushing and dressing plant on this mine comprises a 20-head battery, two classifiers, 8 double jiggers, 10 frue vanners, and 2 running concave buddles. The transit of the rock from the quarry to the battery—a descent of 400 feet vertical—is by means of a self-acting tramway, the trucks delivering directly into the hopper of the stone-breaker, where the larger lumps are reduced by the breaker to a suitable size for the mechanical battery feeders ; thus the stone passes from the mine to the battery, is crushed and treated, without re-handling, and at the smallest possible cost per ton. This is a model plant, well planned, and most substantially constructed. The whole of the machinery, including dynamo for electric lighting, is driven by two Pelton wheels, under a 400 feet head of water. The working face of this mine is opening up on the south side and near the top of a small rounded hill, and is intended to be carried forward in a northerly direction. The tin-bearing area, which is a quartz porphyry, same as the Anchor formation, extends over about 6 acres of the hill top. The rock over about one-third of this area has been bared by ground-sluicing, from which good results are said to have been obtained. The rock in the face now being opened up close to the top of the self-acting tramway is very hard and poor in tin. Better results are obtained about 200 feet further west, where a second face at the same level, and eventually intended to connect with the first-mentioned, is being worked. The superficial rock at the latter face is more decomposed than at No. 1, and shows fairly good tin in places. A shaft 12 feet was put down to test the rock in advance of No. 1 face, and good payable tin obtained in the first 8 feet from the surface. Here, as at the Anchor mine, the intention is to thoroughly open up the tin-bearing porphyry by extending the working face to the full width of the formation. This is a system to be commended in the working of any mine where the metal or ore is sparsely disseminated through the rock. It is a matter for regret that more has not been done to test the value of these deposits to greater depths, as it is evident—especially in the case of the Anchor mine—that the "tin floor" has not been reached.

Australian Tin Mine, (Puzzle).—Steam-power is employed for driving the machinery at this mine. A 30-head battery is in use for reducing the stone. The dressing appliances are somewhat different from the Anchor or Liberator plants, being more of the Kayser (Bischoff) type. The stuff from the battery goes through classifiers of the Spitzbutten make, thence through double jiggers, the slimes, or fine ore, being treated on convex rotating tables. The working-face (open cut) is in the quartz-porphyry formation at an elevation of about 700 feet above the battery site ; the stone is sent down by means of a self-acting tram of the ordinary kind for the first hundred yards or so, from which point a sort of hybrid tram, half aerial, half ground-line, is in use, but does not appear to give satisfaction. This portion of the line is about 700 yards in length. The prospects of success in this mine would be greatly enhanced by a better system of working, and the introduction of water as a motive power. The stone is said to be fairly rich, giving from 1 to 1½ per cent. It was, however, rather poor at the time of my last visit.

Scamander River.—The only mine working in this locality was the Eastern Proprietary Copper Mine, where prospecting work has been carried on by three or four men since the beginning of the year. Operations have now ceased altogether.

Coal Mines.—The Mt. Nicholas Colliery, also the Cornwall Mine, have been visited and inspected twice since January last. In the former, work is carried on on the "longwall" system, which is more expeditious and profitable to the owners, but not so safe for the men employed as the "Pillar and Bord" system of working carried on at the neighbouring Cornwall Colliery. Sufficient attention to timbering and ventilation has not been given in the past to the workings of the Nicholas Colliery. A down-throw fault has just recently been met with in this mine that will, in all probability, necessitate the opening up of new works. The course of the fault is from east to west, depth of down-throw about 3 feet.

At the Cornwall Colliery work is progressing in a satisfactory way. The bush fires in February last destroyed the manager's residence, and great difficulty has since been experienced in keeping the fires, which have taken a firm hold of the slack heaps, from destroying the tramways, or, even worse, getting a hold of the coal seam on the out-crop. Fires are still burning in the slack heaps at both collieries.

Coal discoveries on East Coast.—Seymour and Bicheno were visited in June for the purpose of inspecting the new coal discoveries made by the Morning Star Company. Unfortunately, the work of prospecting had just ceased on the day prior to my arrival, and I was unable, for want of a guide, to visit more than one place where prospecting had been done.

The Morning Star discoveries, which are all above sea-level, extend from Picanini Point, about 3 miles north of Seymour, to Llandaff, 8 miles south of Bicheno, a total distance of about 24 miles. Good coal is said to have been obtained more than 50 years ago by the Douglas Company, whose colliery was situated on the flats on the bank of the Denison River, six (6) miles north of Bicheno, and close to the seashore. A tramway was constructed from the colliery to Bicheno, from whence the coal was shipped. Very little is left to show the position of this company's workings, but in all probability the seams worked were below sea-level. Six miles further north is the site of the East Coast Coal and Harbour Company's workings, at Seymour: here also the workings were in the flat, not far from the seashore. Coal of good quality for domestic purposes, but not fit for coking, was obtained.

The following information, furnished by Mr. Surveyor Mason, will give some idea of the Morning Star discoveries:—

"F.—Claim at Llandaff—thickness of seem, 3 feet 6 inches; height above sea, 400 feet; adit in 50 feet, horizontal; coke test—fixed carbon, 55·5; gas, 33·75.

"A 1.—At Steep Creek, 5 miles south of Bicheno—thickness of seam, 3 feet 2 inches, slight dip to south; adit in 50 feet; above sea, 520 feet; coke test—fixed carbon, 56·20; gas, 27·0. There are 17 seams of coal at this place, A 1 being the third seam from the top.

"B 1.—On Denison River, 6 miles north of Bicheno, two miles west from sea—an old adit put in some years ago for Mr. Thomas Bateman.

"B 2.—New adit in 65 feet on same seam as B 1. This seam is about 275 feet above sea-level, and not far west of the old Douglas Company's workings before referred to. The river at this place falls rapidly, consequently the coal seam, which is apparenly horizontal and on a level with the river water at the entrance of B 2 adit, is high above the stream further east, and of course is lost sight of altogether in the opposite direction, or west of the adit. The floor of the adit was covered with 4 or 5 inches of water, backed from the River, at the time of my visit. I am therefore unable to say for certain what the nature of the floor is at the inner end of the adit. At the entrance it is a hard sandstone roof and floor.

"*Description of B* 2.—Beneath roof, 20 inches good coal, 2 inches bushing or white band, 9 inches mixed coal, 6 inches clean coal, with from 6 to 8 inches of clay "holing" at bottom. The 20-in. seam is a bright bituminous coal, save a few thin mud layers, and should be a good coking coal. The 6-in. layer, in same seam, is also of good quality. The floor is wavy or undulating, but on the whole will be found fairly horizontal, that is so far as can be judged from the limited extent of the work done. There are several other seams higher on the range than B 2, varying in thickness from 20 to 30 inches. A test made by Launceston Gas. Co. of coal from B 2, as follows:—Gas made per ton of coal, 10,800 cubic feet; coke, 13 cwts. 3 qrs. 22 lbs."

Of the various other discoveries made by the company I was only able to obtain sparse information. There can be but little doubt of the good coking quality of the coal obtained at Llandaff, Steep Creek, and the Denison River. Further exploration will show whether the apparent facilities for working can be put to the practical test. The dip—if any—of the seam is in such a direction as to prevent the drainage of the mine by adit working, is one consideration. Sufficient "holing" or soft underlayer to allow of these shallow seams being worked without cutting the roof or floor rock must also be considered. As to the shipping of coal, the distance from the Denison to Cole's Bay seems a little too far.

Mangana.—The principal mine at this place, and the only one producing gold, is the Mangana Gold Reefs Company. The mine is worked by 4 adit levels, in each of which the lode is of a good thickness up to No. 4, near the top of the hill, where it opens out into an immense body of stone about 25 feet across. Some rich specimens have been taken from this, but the gold does not appear to be disseminated through the whole mass. The facilities for working this mine are exceptionally good, and when the new crushing and concentrating plant proposed to be erected is finished, good payable results should be obtained. On the whole the state of the workings were found in satisfactory condition.

Robertson's Freehold.—This is a prospecting show on Specimen Hill, close to the township on the west side. A shaft, 6′ 6″ × 3′ is down 135 feet, opened out at 120 feet, and crosscut 30 feet. A number of gold-bearing leaders have been cut. Hauling by means of a whip, shaft timbering, ladders, and rope in good order. No mining manager appointed for this claim.

Great Unknown.—Situated about 1½ miles west of Mathinna Road, nearly opposite the Malahide Estate homestead. Underlay shaft down on lode 65 feet; a good body of stone 8 feet in thickness, gold prospects fairly good. Two men employed. Works in good order.

Salmon Gold Syndicate.—Fairly good progress has been made at this mine since my last visit in March. North main level adit in 380 feet, 200 feet to go to cut reef at shaft level, 180 feet below surface. The reef as shown in the shaft at this level has pinched a little, but there is still a good body of stone showing gold freely. A good site has been chosen on the sloping ground outside entrance of main adit on which a battery is to be erected. The prospects of success for this mine are first-class, workings in good order, careless use of explosives only cause of complaint.

New Golden Gate.—This mine needs no comment. To say that it is in its usual flourishing state is sufficient. The works on the whole are in good order. Safety-cages were tested, and one condemned on account of a defective spring on eccentric spindle.

Gate Extended.—Work in cross-cut west from shaft only. This is now extended a total distance of 760 feet from the shaft. Ventilation not very good. Cages and ropes tested and found all right.

North Gate Mine.—Shaft sinking, also cross-cutting from 900-feet level. A good body of payable gold-bearing stone was cut in the shaft at 917 feet on the day of my arrival (23rd June). This is only a fitting reward for plucky perseverance on the part of the owners. To strike gold at any level is good, but to get it in a large body of stone 900 feet below the surface is a magnificent result, not only for those directly interested, but for mining in general throughout the Colony. The workings of this mine are in good order. Ordered a safety-hook to be used on hauling-rope to prevent accident through overwinding.

Jubilee Mine.—Cross-cut from shaft 20 feet east, and drive on lode formation north 40 feet. Country very hard; four men employed. Machinery and everything about this mine in good order.

The October, *Mabel*, and *Record Mines*, about five miles north of Mathinna, were visited. Nothing worth recording in connection with the prospect of these. Their style of working is none of the best.

Hickson's Gold Mine, in the same locality, has been idle for some time, but is now about to resume work.

Alberton, Mount Victoria.—Mercury Gold Mine.—Driving No. 3 adit, which is now in 134 feet, is the only mining being done. The work of repairing the old water-wheel and erecting a new 10-head battery is nearly completed, and mining and crushing stone from the old upper levels will be proceeded with in a short time. Good results are expected.

Ringarooma Gold Mine.—Work at this mine is now in full swing. Battery stone is being obtained from South Rosalind on course of lode known as No. 3 Gumsucker. Some very rich stone is obtained from this part of the mine, and a more expensive crushing-plant is all that is required to obtain first-class results. The 10-head battery driven by water-power is altogether too small for a mine of such promise as the Ringarooma. Everything in connection with the mine and workings found in highly satisfactory condition.

Bright Star Company.—About 16 tons of stone at grass ready for trial crushing. No work being done in mine at present.

Alberton Mine.—Shaft down 104 feet. Ladderway and centreing unsatisfactory. It is to be hoped that the new manager now about to take charge will improve matters at this mine.

Warrentinna.—Derby Gold Mine.—Very little work being done here; work at main tunnel abandoned. Ladders ordered to be renewed in shaft on south section, also new windlass-rope to be procured before work of driving on course of lode at 95-feet level is proceeded with. Only two men employed.

East Volunteer.—Main adit in 915 feet; 165 feet to go to cut "Blue Reef."

Coronella Mine.—No work at present, pending the crushing of a quantity of stone at the East Volunteer battery.

ANNUAL REPORT OF THE GOVERNMENT GEOLOGIST.

Government Geologist's Office, Launceston, 18th July, 1898.

SIR,

I HAVE the honour to submit my Annual Report as Government Geologist for the year ending June 30th, 1898.

The following Reports have been prepared and forwarded to you:—

On the Mineral Field in the neighbourhood of the Minnow River.

On an alleged discovery of Coal-bearing Strata in the vicinity of Quamby's Bluff.

On the Mineral Fields in the neighbourhood of Mount Black, Ringville, Mount Read, and Lake Dora.

In October last, according to instructions from the Honourable the Minister of Mines, I compiled a short pamphlet on the mineral industry of the Colony, and since then have prepared a supple-

mentary report at the close of each quarter. As there is no statistical staff in connection with the Mines Department, it is exceedingly difficult to obtain complete and accurate returns from all the mines. I would respectfully suggest that it be made compulsory on all mine-owners to furnish detailed quarterly returns, showing the quantity and value of the minerals or metals obtained, value of machinery and plant, average number of men employed, &c.

Geological Survey.—I am of opinion that much good would result from a detailed geological survey of the Island, especially of the West Coast Districts, but it is impossible to do this under present circumstances. It would require the undivided attention of two or three men, and very little satisfactory work can be done until a proper topographical survey has been made.

In the charts of the mineral fields issued by the Mines Department, the tracks, rivers, mountains, &c., are as a rule only sketched in, and they are sometimes very misleading. Sections are often applied for remote from any previously surveyed blocks, and, as a connecting traverse would be very troublesome owing to the broken nature of the country and the generally dense bush, an independent survey is made, starting generally from the magnetic meridian at a point whose relative position is only approximately known. When the intervening sections are surveyed and plotted it sometimes happens that the positions of mountains, rivers, &c., as shown on previous charts have to be shifted several miles.

Diamond Drills.—Neither of the two diamond drills have been in use during the year, but several enquiries have been made about them. No. 1 Drill has lately been thoroughly overhauled and is likely to be soon at work, but No. 2 Drill, which is at Zeehan, is in a very bad state of repair.

I have the honour to be,
Sir,
Your obedient Servant,

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

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

REPORT OF THE MOUNT CAMERON WATER-RACE BOARD FOR THE YEAR ENDING 30TH JUNE, 1898.

1st July, 1898.

SIR,

WE have the honour to present the Report of this Board for the year ending the 30th June, 1898.

This Board has met as frequently as occasion required.

The staff consists of a Manager and three watermen and channel-keepers.

The duty of the Manager consists of the entire charge and supervision of the Race, which, with its branches, is thirty-three miles in length. He keeps all accounts, weighs the tin raised under the royalty system, and collects and accounts for the royalties thereon, prepares plans and specifications for all works of construction and maintenance, levels head and tail races for customers when required, and generally manages and supervises all matters connected with the safety and efficiency of the Race. His salary is £200 a year, with forage allowance £50, and a cottage. He is expected to keep a horse, which is partly used for conveying tools and materials used on the works.

The duties of the watermen and channel-keepers are to distribute water to the customers, to do all work necessary, night or day, for the preservation of the safety of the Race, and for cleaning and keeping the same in order. Their duties are of a responsible nature, and any neglect of them would involve the Board in a loss which might entail hundreds of pounds to make good.

The flumings upon the old portion of the Race, which, owing to the advanced state of decay into which they had lapsed, were the cause of a very considerable and increasing loss of water, and consequent diminution of revenue, have now be replaced by earth-channels, and the Race is now in fairly good order. This work has been somewhat costly, but no doubt it has been true economy to have undertaken it, and the cost of maintenance has been much lessened.

Up to the year 1897 the Race has always been able to pay a balance, over and above the amount required for maintenance, to the Public Debts Sinking Fund. Last year, owing to the low price of tin, the stoppage of water for certain periods while important construction work was been carried on, and to the exceptionally dry summer and shortness of water, the Race did not quite pay working expenses. Certain reductions in the cost of management have now been effected, which will save the Government £162 10*s.* yearly. The Manager's salary has been reduced by £100, and the wages of one waterman (who is at the extreme end of the Race and, is seldom called upon to do more than turn the water on in the morning and off again at night), has been reduced from 8*s.* to 4*s.* per diem; he is, however, allowed to perform private work during such part of the day as he is not required by the Manager.

Having in view the recent depressed state of mining and consequent low revenue from the sale of water, the Mount Cameron Water-race Board does not consider it desirable to offer the Race for sale at the present time, but to defer the sale until tin-mining becomes more prosperous, and this may be reasonably looked for through the enhanced price of tin. Any proposed offer of the Race for sale should, in our opinion, be accompanied by mining concessions in the way of the reservation of a large area of mineral-bearing land for the use of the purchaser.

The Statistics for the year are as follows:--

Average per week of claims supplied	15
Greatest number supplied in any one week	19
Present number supplied	19
Total number of heads of water supplied	3901
Tons of tin ore raised	90 tons 11 cwts. 19 lbs.
Average number of miners employed—13 Europeans; 37 Chinese	50

	£	*s.*	*d.*
Total receipts for the year	629	0	0
Cost for maintenance and management	729	18	10
Paid to Public Debts Sinking Fund, 1897	*Nil.*		
Total cost of purchase and construction	34,572	19	0

W. H. WALLACE, *Chairman of the Board.*
C. O'REILLY,
J. HARCOURT SMITH,
S. HAWKES,
JOHN SIMPSON,
} *Members.*

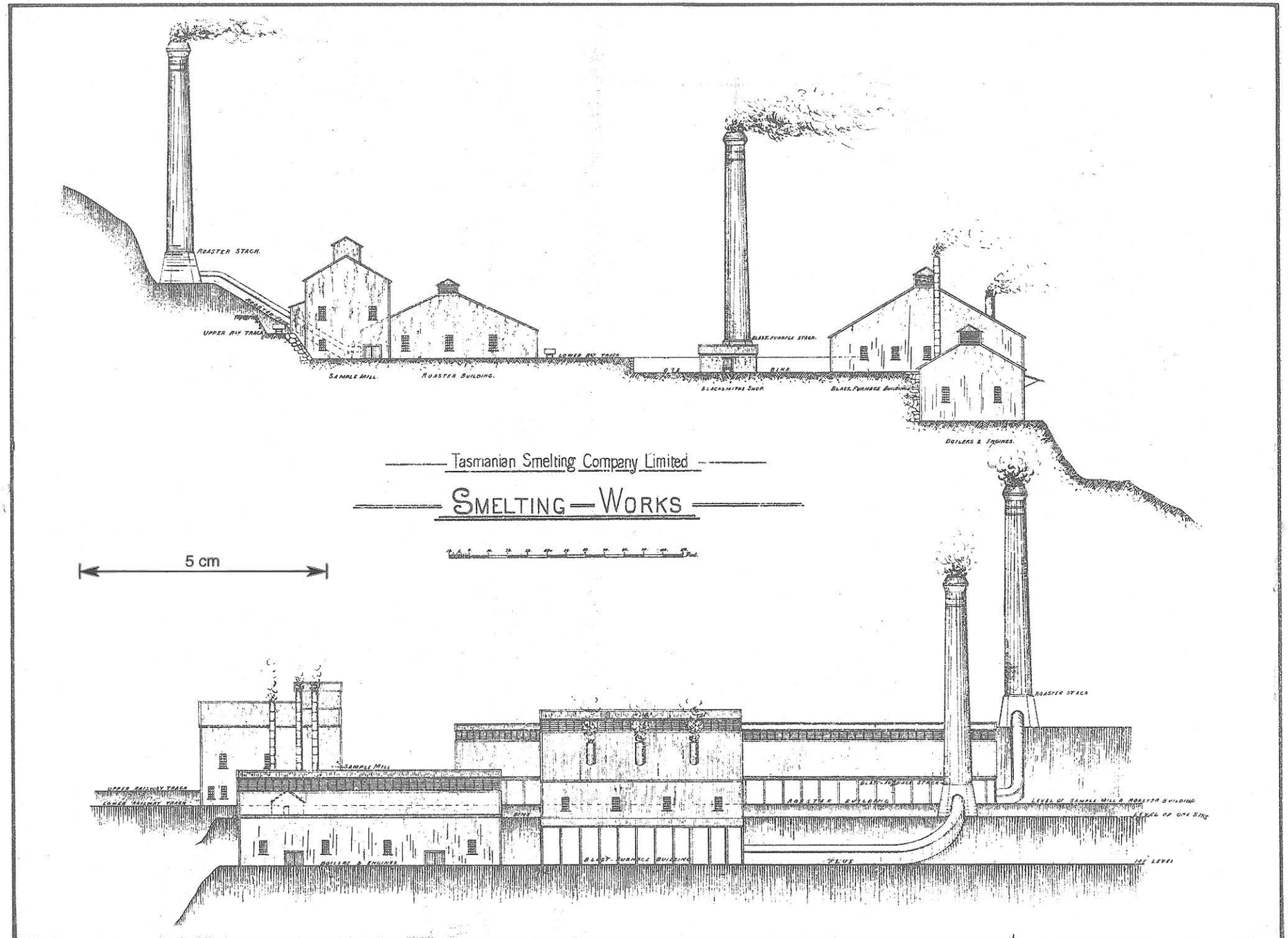
TASMANIAN SMELTING COMPANY, LIMITED.

As the result of the investigations made at the end of 1896 and beginning of 1897 by Mr. Haber, on behalf of the Deutsche Bank, Berlin, and Mr. W. Schmidt, on behalf of the Metallgesellschaft, Frankfort a/M, the Tasmanian Smelting Company, Limited, was organised for the reduction of the ores of the Zeehan field and adjoining districts, and a Manager engaged for the immediate erection of the works.

The Company is registered in London, with a capital of £85,000, and has the following Board of Directors:—M. Steinthal, Esq., Berlin; M. van Gember, M.E., ditto; A. Goerz, Esq., London; Z. Hochschild, Esq., Frankfort a/M.; Walter Schmidt, Esq., M.E., Melbourne. Max Heberlein, Zeehan, Tasmania, is General Manager, and Mr. H. Militz, London, Secretary of the Company.

The rapid advance in smelting made in the United States during the last few years caused the engagement of a metallurgist with American experience, and Mr. Heberlein arrived on the field in November, 1897.

After a delay of several months for the proper adjustment of preliminaries, active operations were commenced on the smelters. The site is situated some two miles south of the town of Zeehan, on the Zeehan and Strahan line of Government railway, on the slope of a hill in the immediate vicinity of extensive limerock deposits, which were previously acquired by purchase.


ROASTER STACK.
UPPER RLY TRACK
SAMPLE MILL.
ROASTER BUILDING.
LOWER RLY TRACK
BLAST FURNACE STACK.
BINS.
BLACKSMITHS SHOP.
BLAST FURNACE BUILDING.
BOILERS & ENGINES.
Tasmanian Smelting Company Limited
SMELTING—WORKS
5 cm
ROASTER STACK
SAMPLE MILL
UPPER RAILWAY TRACK
LOWER RAILWAY TRACK
BLAST FURNACE STACK
ROASTER BUILDING
LEVEL OF SAMPLE MILL & ROASTER BUILDING
LEVEL OF ORE BINS
BOILERS & ENGINES
BLAST FURNACE BUILDING
FLUE
100 LEVEL

The slope of the hill permits the application of terrace arrangement, by which all materials are handled by gravitating towards their final depositions. This arrangement called for heavy excavation for the building, and an expensive railway connection of some distance in order to obtain the proper delivery of all materials on their respective levels. The grading for the works was commenced on beginning of March, that of railway on April 1st. All this work has been completed, and the delivery of building materials, which was utterly impossible without a railway track, commenced, so that the actual construction is under full swing.

The accompanying plans plainly show the situation of buildings. The sulphide ores are delivered on upper track to the sample mill, capacity 100 tons per shift, or, in the case of concentrates, to the sulphide bins direct. The crushed sulphides go to their respective bins. These bins are 5 feet below railway track, on level with top of calcining furnaces, of which 7, 72 feet long by 17 feet wide, are provided.

The lower track is 13 feet below the upper, on level with sampling-mill floor and roaster building. Oxide and such ores which do not require crushing, fluxes, fuel, &c. &c., are delivered on this track in such manner that wood goes directly to the places of consumption, while other material is discharged into an arrangement of bins, which allow the least possible inconvenience in handling, and give ample room for storage and bedding of the different ores.

This bin-room is on blast furnace charge-floor level, 7 feet below lower track level, and measures 150 feet × 350 feet. The blast-furnaces, three in number, of an aggregate capacity of 250 tons ore per 24 hours, are situated on the lowest level, 25 feet below bins and charge-floor. On the same level are the boiler and engine-houses and machine-shop. The disposal of slag and refuse is facilitated by a "dump" of 45 - 80 feet in height. In addition to the above buildings, commodious offices, laboratory, storehouse, blacksmith's shop, bath-house for employees, and cottages for the staff, are provided. A double haulage-line will connect the bins with the limerock quarry and woodyard, and also deliver the products, silver-lead bullion and copper mattes, to the railway main line.

The works will be far enough advanced to receive ores as soon as the necessary storage-room is completed.

The materials of construction have been contracted for, and nearly all machinery, which comes from best shops of their respective line, is now *en route* from the United States and elsewhere.

The whole plant is so arranged as to permit an increase of capacity without change in its systematic working at a small expense, spare engines, blowers and boilers being already included in present construction.

Two brick chimney stacks connected by flues and condensing chambers to calcining and blast furnaces will carry the fumes above the crests of the surrounding hills, and are of sufficient size to accommodate future additions to either department.

The water supply is derived from a creek at bottom of slag-dump, and pumped by compound steam-pump through a system of water-mains with branches, which not only furnishes a continuous supply to the different departments, but gives efficient protection against fire, the minimum pressure being 60 feet over the height of most elevated buildings. The general stores are kept in a magazine situated between upper and lower track at their junction.

The completion of these works means very much for the Zeehan, Dundas, and Mt. Reid districts. No pains have been spared to make it an up-to-date smelting-plant for the reduction of customers' ores. The machinery is all of approved and most modern type to ensure efficiency and economy, and this, with the financial standing and the experience with enterprises of such dimensions, will surely prove a benefit to the West Coast and to the whole of the Tasmanian Colony. Already the stimulating effects of this first and only silver-lead smelter in Tasmania are felt, and the semi-monthly pay-days are welcomed by merchants and business-men in general. The natural increase in population will greatly benefit other portions of the Colony as well, as the market for their products is enlarged by new consumers, not only the men directly employed by the Tasmanian Smelting Company, Limited, either at their work or in the bush, but also by the additional employment of miners opening new properties by finding a cash sale for heretofore valueless products.

DIAMOND DRILLS.

Statement of Work done to 30th June, 1898.

Year.	Locality.	Direction of Bore.	No. of Bores.	Total Distance bored.	Average cost per foot, inclusive of Labour and Fuel.
	No. 1. Drill.			feet.	£ s. d.
1882-3	Back Creek—For Gold	Vertical	7	1330	0 10 9
1883	Lefroy—For Gold	Ditto	4	1011	0 5 3
1884	Tarleton—For Coal	Ditto	1	401	0 5 6
1886	Longford—For Coal	Ditto	2	1585	0 4 0½
1886-7	Harefield Estate—For Coal	Ditto	1	725	0 6 5
1887	Cardiff Claim, Mount Malcolm—For Coal	Ditto	1	562	0 17 11¾
1888	Killymoon Estate—For Coal	Ditto	1	504	0 4 7¾
1888-9	Seymour—For Coal	Ditto	5	2266	0 7 8½
1889 } 1890 }	Beaconsfield (Phœnix G. M. Co.)—For Gold	Ditto	1	781	2 0 2
1890	Beaconsfield (East Tasmania G. M. Co.)—For Gold	Ditto	1	978	0 14 9½
1891	Spring Bay—For Coal	Ditto	4	937	0 6 10
1891	Ravensdale—For Coal	Ditto	1	114	0 11 1½
1891-2	Back River, Prosser's Plains—For Coal	Ditto	2	854	0 6 1¾
1892-3	Lefroy (Deep Lead Syndicate)—For Gold	Ditto	4	979	0 15 9
1893	Lefroy (East Pinafore Co.)—For Gold	Ditto	1	317	0 10 3
1895-6	Sandfly—For Coal	Ditto	4	2130	0 11 5
	Total		40	15,474	
	No. 2 Drill.				
1882	Beaconsfield—For Gold	Horizontal, underground	1	68	No record.
1883	Mangana—For Gold	Ditto	1	546	0 15 1
1884	Guy Fawkes Gully, near Hobart—For Coal	Vertical	1	612	0 5 6
1885	Malahide Estate, near Fingal—For Gold	Ditto	5	1397	0 5 6
1886	Carr Villa, near Launceston—For Coal	Ditto	1	571	0 5 4
1886-7	Waratah (Mount Bischoff Alluvial T. M. Company)—For Tin	Ditto	7	1548	0 6 1½
1887	Waratah (Mount Bischoff T. M. Co.)—For Tin	Ditto	7	841	0 11 8
1887	Ditto	Horizontal, underground	1	53	0 7 8
1888	Old Beach—For Coal	Vertical	1	593	Abt. 0 10 9
1888	Campania—For Coal	Ditto	1	600	0 7 7⅓
1888	Richmond—For Coal	Ditto	1	500	0 5 1¾
1889	Back Creek—For Gold	Ditto	4	787	0 8 5½
1891	Macquarie Plains—For Coal	Ditto	2	989	0 4 5½
1891	Jerusalem—For Coal	Ditto	1	344	0 4 9⅓
1892	Langloh Park—For Coal	Ditto	4	1249	0 5 3¼
1893	Southport—For Coal	Ditto	1	612	0 5 3
1894	Zeehan (Tasmania Crown S. M. Co.)—For Silver	Horizontal, underground	2	319	1 0 2½
	Total	...	41	11,629	

Aggregate number of bores 81
Total distance bored ..... 27,103 ft.

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

Launceston, 27th July, 1898.

No. 1.

COMPARATIVE Statement of Gold won during the Years 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, *and the first Half-year of* 1898.

YEAR.	QUANTITY.	VALUE.
	ozs. dwts.	£
1880	52,595 0	201,297
1881	56,693 0	216,901
1882	49,122 6	187,337
1883	46,577 10	176,442
1884	42,339 19	160,404
1885	41,240 19	155,309
1886	31,014 10	117,250
1887	42,609 3	158,533
1888	39,610 19	147,154
1889	32,332 13	119,703
1890	20,510 0	75,888
1891	38,789 0	145,459
1892	42,378 0	158,917
1893	37,687 0	141,326
1894	57,873 0	217,024
1895	54,964 0	206,115
1896	62,591 0	237,574
1897	77,131 0	296,660
1898 for first half-year	29,599 10	114,175

No. 2.

RETURN showing the Quantity of Gold obtained from Quartz during the Years 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, *and the first Half-year of* 1898.

YEAR.	QUANTITY.	VALUE.
	ounces.	£
1880	34,345	130,622
1881	45,776	174,956
1882	36,215	137,183
1883	36,672	138,060
1884	30,540	114,630
1885	33,266	124,234
1886	25,004	87,516
1887	33,427	123,453
1888	34,156	126,139
1889	33,069	116,517
1890	17,829	64,184
1891	33,659	126,221
1892	34,386	128,947
1893	30,163	113,111
1894	52,239	195,896
1895	51,628	193,605
1896	59,453	222,948
1897	74,937	288,432
1898 for first half-year	28,464½	109,919

No. 3.

QUANTITY and Value of Coal raised during the Years 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, *and the first Half-year of* 1898.

YEAR.	QUANTITY.	VALUE.
	tons.	£
1880	12,219	10,998
1881	11,163	10,047
1882	8803	7923
1883	8872	7985
1884	7194	6475
1885	6654	5989
1886	10,391	9352
1887	27,633	24,870
1888	41,577	37,420
1889	36,700	33,030
1890	50,519	45,467
1891	43,256	38,930
1892	36,008	32,407
1893	34,693	27,754
1894	30,499	24,399
1895	32,698	26,159
1896	41,904	33,523
1897	42,196	33,757
1898, for the first half-year	23,378	18,702

No. 4.

COMPARATIVE Statement of Tin exported from Tasmania during the Years 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, *and for the first Half-year of* 1898, *compiled from Customs Returns only.*

YEAR.	TONS.	VALUE.
		£
1880	3954	341,736
1881	4124	375,775
1882	3670	361,046
1883	4122	376,446
1884	3707	301,423
1885	4242	357,587
1886	3776	363,364
1887	3607½	409,853
1888	3775¼	426,321
1889	3764	344,941
1890	3209¼	296,368
1891	3235	291,715
1892	3174	290,083
1893	3128½	260,219
1894	2934	198,298
1895	2726¾	167,461
1896	2700	159,036
1897	2423½	149,994
1898, for the first half-year	926¾	59,462

No. 5.

QUANTITY and Value of Silver Ore exported from Tasmania during the Years 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, *and the first Half-year of* 1898.

YEAR.	QUANTITY.	VALUE.
	tons	£
1888	417	5838
1889	415	7044
1890	2053	26,487
1891	4810	52,284
1892	9326	45,502
1893	14,302	198,610
1894	21,064	293,043
1895	17,980	175,957
1896	21,167	229,660
1897	18,364	200,167
1898, for the first half-year	6998¾	85,734

No. 6.

QUANTITY and Value of Blister Copper exported from Tasmania during the Years 1896, 1897, *and the first Half-year of* 1898.

YEAR.	QUANTITY.	VALUE.
	tons	£
1896	41½	1245
1897	4700	322,500
1898, for the first half-year	2234½	156,415

No. 7.

QUANTITY and Value of Copper Ore exported from Tasmania during the Years 1896, 1897, *and the first Half-year of* 1898.

YEAR.	QUANTITY.	VALUE.
	tons	£
1896	34	1020
1897	75	2250
1898, for the first half-year	51	1530

No. 8.

RETURN showing the Number of Persons engaged in Mining during the Years 1880 *to* 1897, *inclusive, and first Half-year of* 1898.

YEAR.	NUMBER.	YEAR.	NUMBER.
1880	1653	1890	2868
1881	3156	1891	3219
1882	4098	1892	3295
1883	3818	1893	3403
1884	2972	1894	3433
1885	2783	1895	4062
1886	2681	1896	4350
1887	3361	1897	4510
1888	2989	1898, for the first half-year	6223
1889	3141		

No. 9.

RETURN showing the Number and Area of Leases held under "The Mining Act, 1893," *in force on* 30*th June of each year since* 1892.

Nature.	In force on 30th June, 1892.		In force on 30th June, 1893.		In force on 30th June, 1894.		In force on 30th June, 1895.		In force on 30th June, 1896.		In force on 30th June, 1897.		In force on 30th June, 1898.	
	NO.	AREA.	NO.	AREA.	NO.	AREA.	NO.	AREA.	NO.	AREA.	NO.	AREA.	NO.	AREA.
		Acres.		Acres.		Acres.		Acres.		Acres.		Acres.		Acres.
For tin, &c. at a rental of 5*s.* an acre	1857	89,962	1547	71,279	997	45,532¾	720	31,207	738	33,077	1150	56,493	1290	66,981
For coal and slate, at 2*s.* 6*d.* an acre rent	47	6874	57	8963	23	4231	37	6551	37	5946	38	6105	41	5943
For gold, at a rental of 20*s.* an acre	489	4606	501	4801	374	3532½	455	4366	602	5712½	615	5789	702	7190
Water Rights, Mineral and Gold, at 20*s.* per sluice-head	173	812 sluice-heads.	185	890 sluice-heads.	198	866 sluice-heads.	176	755 sluice-heads.	160	808 sluice-heads.	155	774 sluice-heads.	159	784

No. 10.

RETURN of the Number and Area of Leases under "The Mining Act, 1893," *in force on the* 1*st July,* 1897, *issued during the Year ending* 30*th June,* 1898, *cancelled during the Year ending* 30*th June,* 1898, *and remaining in force on* 30*th June,* 1898.

Nature of Lease.	In force on 30th June, 1897.		Issued during Year ending 30th June, 1898.		Cancelled during Year ending 30th June, 1898.		In force on 30th June, 1898.	
	No.	Area.	No.	Area.	No.	Area.	No	Area.
		Acres.		Acres.		Acres.		Acres.
For Tin, &c., at a rental of 5*s.* an acre	1150	56,493	482	27,184	342	16,696	1290	66,981
For Coal and Slate, at a rental of 2*s.* 6*d.* an acre	38	6105	9	841	6	1003	41	5943
For Gold, at a rental of 20*s.* an acre	615	5789	329	3654	242	2253	702	7190
Water Rights, Mineral and Gold, at 20*s.* per sluice-head	155	774 sluice-heads.	27	102 sluice-heads.	23	92 sluice-heads.	159	784 sluice-heads.

No. 11.

COMPARATIVE Statement of Net Revenue from Mines, being Rents, Fees, &c. paid to the Treasury for the Year ending 30th June.

YEAR.	AMOUNT.			YEAR.	AMOUNT.		
	£	*s.*	*d.*		£	*s.*	*d.*
1880	8944	5	11	1889	17,254	9	0
1881	20,936	5	5	1890	26,955	4	9
1882	23,077	1	9	1891	37,829	16	5
1883	15,439	14	5	1892	17,568	18	4
1884	6981	11	10	1893	16,971	9	2
1885	11,070	5	7	1894	16,732	7	7
1886	12,523	10	4	1895	15,323	1	9
1887	14,611	11	5	1896	20,901	13	2
1888	23,502	8	4	1897	25,631	0	3
				1898	33,661	13	9

The above Statement does not include Stamp Duties upon Transfers of Leases and Registration of Companies, or the Tax payable upon Dividends, from which sources large sums are derived.

TOTAL Number and Area of Leases in force on 30th June, 1898.

MINERALS.	NUMBER.	AREA.
		Acres.
Gold	702	7190
Silver	766	40,977
Tin	263	8933
Coal	26	3490
Iron	10	602
Limestone	12	1613
Lithographic Stone	2	417
Slate	3	840
Nickel	3	200
Wolfram	2	160
Asbestos	5	316
Precious Stones	1	80
Copper	65	3702
Minerals	173	11,594
TOTAL	2033	80,114

AVERAGE Number of Miners employed during the Year ended 30th June, 1898.

	EUROPEANS.	CHINESE.
Northern and Southern Division	985	...
North-Eastern Division	256	190
Eastern Division	567	70
North-Western Division	261	...
Western Division	3201	...
	5270	260

MINING Companies registered during the Year ending 30th June, 1898.

NUMBER OF COMPANIES.	CAPITAL.
109	£326,135

TOTAL Area of Land applied for during the Year ending 30th June, 1898.

MINERAL.	NO. OF APPLICATIONS.	AREA.
		Acres.
Gold	351	3437
Silver and other Minerals	1589	103,404
Tin	46	1387
Coal, Limestone, &c.	20	1961
TOTAL	2006	110,189

In addition to the above, applications for 81 Water Rights for 512 sluice-heads of water were received.

TOTAL Amount of Rents, Fees, &c. received by the Mines Department during the Year ending 30th June, 1898.

HEAD OF REVENUE.	AMOUNT.		
	£	*s.*	*d.*
Rent under "The Mining Act, 1893," for Gold	5731	7	2
Fees " " "	689	10	2
Rent " " for Minerals	25,007	6	9
Fees " " "	3648	15	3
Survey Fees	16,489	7	4
Rent of Diamond Drills	5	6	9
TOTAL	£51,571	13	5

REPORT ON THE MINERAL FIELDS IN THE NEIGHBOURHOOD OF MT. BLACK, RINGVILLE, MT. READ, AND LAKE DORA.

Government Geologist's Office,
Launceston, 10th June, 1898.

SIR,

I HAVE the honour to submit the following Report of a brief examination of the above-named fields made in March last.

The first mines visited were those of the Cutty Sark District, situated to the north-west of Mount Black, close to the River Pieman. Leaving Zeehan on the morning of March 2, I travelled as far as Ringville by the North-East Dundas Narrow (2-feet) Gauge Railway. For the first five miles from Zeehan this line runs through fairly level country; it then crosses the North-East Dundas Road, and from that point has a continuous up-grade, with many sharp curves for some miles, following the general direction of the old Grey Ore Pack Track, which it crosses several times. The highest point on the line is the top of the Confidence Saddle, 1500 feet above sea level, and from there it winds down into the valley of the Ring River, which it follows up to Deep Lead, the present terminus at the foot of Mount Read.

The Town of Ringville lies about 300 feet below the line, the bridge over the Ring River being, according to my aneroid measurement, 700 feet above sea level. From here a good corded track has been made to Rosebery, about five miles distant, but the grades are in places very steep. Two miles from Ringville, at the top of the Colebrook Hill (1650 feet above sea level), a branch track leads to the Colebrook and adjacent mines, and the main track winds round the hill through densely-wooded country into the valley of the Natone Creek, a tributary of the Pieman, which is crossed at an elevation of about 800 feet above sea level. From this point the track has a very fair grade, with the exception of two or three sharp pinches, one of which leads down to the bridge over the Stitt or Koonya River (elevation 450 feet), close to Rosebery Township. From Rosebery the track has been formed and corded for about a mile, passing the Primrose, Tasmanian Copper, and North Tasmanian Copper Mines, of which further mention will be made later on. From the end of the cords the track is very rough and steep, passing over the top of the Hawkesbury Hill, 1750 feet above sea level, a rise of 1200 feet from Rosebery in a distance of two miles. On the other side the grade is even worse, the fall to the Cutty Sark Camp on the Pieman being 1300 feet in two miles. This is a fair sample of the average tracks on the West Coast, and will serve to show the difficulties of getting provisions and mining supplies into these remote parts. At the foot of the Hawkesbury Hill this track intersects Innes's Mole Creek Track, which was being continued to Rosebery round the hill, instead of over the top of it; and I understand that this has since been completed, and a very good grade obtained with only a slight increase in the distance. The principal rock in the Cutty Sark District is a hard dark greenish rock consisting essentially of quartz and chlorite, with occasional porphyritic crystals of feldspar. In places it has a decided schistose structure, and pending further examination may be classed as a chlorite schist; but it is very doubtful at present whether it was originally a sedimentary rock or an igneous one, in which the schistose structure has been produced by pressure and shearing.

Cutty Sark Mine.—The Cutty Sark Prospecting Association holds three sections, viz., 1770-93M, of 77 acres, on the south side of the Pieman, and Sections 1775-93M and 1776-93M, of 80 acres each, situate on the other side of the river on what is known as Boco Creek. The main workings are on Section 1770-93M, on which four so-called "lodes" have been discovered. No. 1 was cut in a trench close to the camp, but, so far as can be seen, is of little value. No. 2 lode is seen further south in the bed of a creek, with precipitous banks, which joins the Pieman a few chains below. It shows a small seam of iron and copper pyrites striking a little W. of N., and the country rock on either side is impregnated with pyrites for several feet; no work has been done on this with the exception of putting in a few shots, but it seems worth further testing by driving south along its course, though, owing to the narrowness of the creek and the steepness of its banks, there is very little room for a tip. The principal workings are some chains further to the south west, on what is known as No. 3 lode. From the E. side of a narrow ridge, running approximately N. and S., a tunnel is being driven almost due west, and at the time of my visit was in about 145 feet. This tunnel is about 140 feet below the summit of the ridge, and about 250 feet more driving would take it through to daylight on the other side. Splashes of pyrites are seen in the country throughout the tunnel, but so far no defined veins have been cut, and I could see no signs of any solid ore body on the surface. On the west side of the ridge, a little to the north of the line of the eastern tunnel and 40 feet above it, the approach was being cut for another tunnel, and several

irregular seams of iron and copper pyrites are seen. To get some idea of the value of the pyrites, I took chippings from the more solid ore, which Mr. Ward, the Government Analyst, has assayed, with the following result:—Copper, 2·3 per cent.; gold, a trace; and silver, 9 dwts. 19 grs. per ton. No. 4 lode has been cut in several trenches to the south west of the main workings close to the Pieman. It is a well defined vein about 1 foot wide, striking about N. 15° W., consisting chiefly of iron pyrites, and is worth further prospecting.

The site for the bridge across the Pieman, on the Burnie-Zeehan Railway, is close to this spot, and between here and Rosebery several deep cuttings will be necessary, which will be an excellent prospecting work.

Work is also being carried on by the Cutty Sark Prospecting Association on the Boco Creek sections. For crossing the river, a cage working on a wire rope has been erected close to the main camp. The river here runs in a deep gorge, and during heavy floods rises 40 to 50 feet above its normal level, but at the time of my visit it was very low, and I was able to cross on a log about three-quarters of a mile above the cage, a little below the junction of Boco Creek and the Pieman. On Section 1776-93M a tunnel has been started from the creek and driven a few feet in a S.S.E. direction, showing several small veins and strings of iron and copper pyrites with a little chalcocite (black sulphide of copper) and native copper, and there is a good deal of pyrites disseminated through the country. A little lower down the creek a small vein of carbonate of iron carrying a little pyrites and galena is seen, running almost parallel to the tunnel. Nothing payable has so far been discovered, but the indications for the occurrence of a true lode are more encouraging, and when the tunnel gets further in under the hill a crosscut should be driven E. and W. The survey of the Burnie-Zeehan Railway follows the valley of Boco Creek for three or four miles, and several sections have been pegged further north along the line, but as I could not hear of any work being done on any of these I did not visit them. No work was going on on Sections 1830-93M and 1838-93M belonging to the North Cutty Sark Mining Company, or on Sections 1839-93M and 1840-93M, held by the Cutty Sark Consols Mining Company; but several prospecting trenches have been cut on the south side of the river showing pyrites disseminated irregularly through the country. One of these cuts, after passing through about 20 feet of rock, comes into alluvial ground, which has not been bottomed. It consists of river sand, and all along the banks the remains of old river terraces are seen, which are likely to contain a little gold.

Section 1841–93M.—To the south west of the Cutty Sark main workings a little trenching has been done on this section, which is held by the Robbie Burns Mining Company, but work has been abandoned for the present. In one trench a small vein was cut running N.W. and S.E. carrying galena, zinc blende, and pyrites, but not in payable quantities. Further south the country changes to slate, and a deep trench has been cut across the top of a low ridge, through kindly-looking slate, but nothing of value was cut. The slate strikes about N. 20° W., dipping at high angles to the E., and is probably a continuation of the slate seen in parts of the Rosebery District, on the eastern side of the schist belt, and prospecting is to be recommended further west.

Hawkesbury Mine, Sections 1700–93M and 1701–93M, 80 acres each.—These sections lie to the south of the Cutty Sark Mine, and the same belt of pyritiferous rock has been traced through them. A good deal of surface trenching has been done on the west side of the ridge which runs through the centre of the sections from north to south, and, wherever shot into, the country rock shows pyrites disseminated through it with occasional bunches and splashes carrying a good deal of copper pyrites, but no defined ore bodies. Near the boundary between the two sections a shaft was sunk 54 feet (now full of water), and a cross-cut driven about 40 feet to the east, but so far as I could see from the stuff at the surface nothing of value was cut, and the shaft has been abandoned. Further south, on Section 1207–93M, a deep trench is seen close to the track, about a chain in length, showing a little pyrites irregularly disseminated through the country. This section is held by the Ladas Mining Company, which also holds Sections 1206–93M and 1208–93M, but no work was being carried on so far as I know at the time of my visit, and I did not hear of any other prospecting work having been done.

It will be seen that all the mines in the Cutty Sark Group present very similar features. There is an extensive belt of country through which metallic sulphides, chiefly iron pyrites, with a little copper pyrites and galena, are disseminated. The formations resemble "stockworks" rather than true lodes, and, although in several instances the indications are sufficient to encourage further prospecting, it seems extremely doubtful if any permanent ore bodies of a payable character will be discovered.

Kershaw and Sandison's.—About 2 miles north of the southern section of the Cutty Sark P.A. a large deposit of iron pyrites has been discovered, locally known as Kershaw and Sandison's Big Show, and several sections have been applied for, which were not surveyed at the time of my visit. The formation outcrops near the top of a ridge, running approximately N.E. and S.W. about 1450 feet above sea level, the rise in the last mile of the track being 850 feet. 100 feet below the top of the ridge a shallow trench about 2 chains long has been cut, running about N. and S. The country rock is a siliceous schist, which is more or less impregnated with pyrites for the entire length of the trench, and towards the north end the pyrites become more solid, and contain a good deal of barytes. A little further north a tunnel has been driven about 20 feet through fairly solid pyrites

mixed with a good deal of quartz, and another small cut has been made into the solid pyrites about 150 feet lower down. As yet not enough work has been done to define either the approximate size or the strike of the ore body, but it is evidently a very large one, and large quantities of ore could be easily won by open cuts with very little stripping. As far as can be seen at present, however, the ore is far too poor to be payable, a sample which I took as fairly representing the ore in sight yielding, on assay by Mr. Ward, traces only of gold and copper and 19 dwts. 14 grs. silver per ton. Much better assays are, however, reported to have been obtained, and the formation is well worth further testing, which can be very easily done by tunnelling. At present it is impossible to do this economically, owing to the great cost of getting in supplies, and it is not likely that very much work will be done until the railway is completed.

Between Kershaw and Sandison's and the Pieman the country is mostly heavily timbered with a thick undergrowth, making it difficult to see the country rock, but in one place the track passes round cliffs of porphyritic felsite. This rock, as far as seen, is not mineral-bearing, but is likely to have had an important influence on the adjacent schists.

ROSEBERY DISTRICT.

To the west of Mount Black is an extensive belt of light-coloured argillaceous schists, in which there are several mineralised zones comparable with the Fahlbands of Norway. In these zones the schists are impregnated with sulphides of iron, zinc, lead, and copper for a considerable width, and on the Tasmanian Copper Mine and adjacent sections solid bodies of dense sulphide ore have been discovered. The schists have a general strike of about N. 20° W., dipping at varying angles to the E.N.E. In the eastern portion of the above-mentioned sections they gradually merge into black slates, and there can be little doubt but that the laminations of the schists correspond with original bedding-planes. The ore bodies are on the whole conformable with the schists, and may be classed as bedded veins. The ore has probably been introduced in aqueous solutions circulating along planes of weakness, the more or less shattered schist being dissolved and replaced by metallic sulphides. In other parts of the field lodes of the true fissure type have been found. The principal difference between these two classes of deposits is, that "a true lode" pre-supposes the existence of a fissure (generally crossing the strata) in which the ore has been deposited, whereas a "bedded-vein" is parallel with the enclosing strata, and the pre-existence of a fissure is not absolutely necessary, although it is probable that, as in the case under consideration, open spaces have been formed by the foliation of the schists, and subsequently filled with ore. It is now generally admitted that in many true lodes metasomatic replacement of the wall-rock has taken place to a greater or lesser extent, so that it is often hard to discriminate between the two classes, and in the following description of the work done on the different sections the "ore-body" will generally be referred to as the "lode."

Tasmanian Copper Mine (formerly called the Rosebery Mine).—The Tasmanian Copper Company, Limited, holds Sections 59-93, 60-93, and 61-93, 25 acres in all, under lease for gold, and Sections 95-93M, 206-93M, 207-93M, 208-93M, 254-93M, 258-93M, 277-93M, 339-93M, and 1205-93M, aggregating 434 acres, held under mineral lease, and a considerable amount of work has been done in opening up a large deposit of sulphide ore which runs in a N.N.Westerly direction through Sections 60-93 and 59-93, underlaying to the E.N.E. About 4 chains from the northern boundary and 5 chains from the eastern boundary of Section 60-93 is the mouth of what is known as No. 4 tunnel, which has been driven about 450 feet, more or less, along the course of the lode. The tunnel starts on a course of N. 34° W., and after passing through 30 feet of alluvial wash containing large water-worn boulders, comes into friable sulphide ore and gossan, some of which is said to have yielded very high assays for silver. These give way to dense sulphide ore, consisting of an intimate mixture of varying proportions of iron and copper pyrites, zinc blende and galena, and the drive is continued obliquely across the lode to the west or footwall, which is struck at about 100 feet from the entrance. The drive is then continued in a northerly direction through the lode, gradually making over towards the hanging-wall. At 120 feet from the entrance cross-cuts have been driven a little north of east and south of west 53 feet and 13 feet respectively. In the east end the hanging-wall is very well defined, showing the ore-body to be conformable with the schists, which here strike N. 20° W., and dip at an angle of about 40° N. 20° E. For a width of 60 feet measured along the cross-cuts it is nearly all solid sulphide ore, presenting a laminated appearance, with one or two small bands of mineralised schist. 150 feet further in, a cross-cut has been put in on either side of the drive across the lode, which here contains about 25 feet of solid ore. The drive continues all in ore for about 60 feet, when the footwall is again struck and followed for about 40 feet, the lode being here rather broken. At 120 feet past No. 2 cross-cut a cross-cut has been driven 48 feet S.W. to connect with an air-shaft 96 feet deep, which was started on the hanging-wall side and sunk through the lode into footwall country. This cross-cut is chiefly in schist, some of which is heavily impregnated with pyrites. Beyond this the lode seems a good deal disturbed and broken, with occasional bunches of quartz and copper pyrites, and it is probable that it has been shattered by a fault.

No. 2 tunnel is about 170 feet below No. 4. It starts in Section 277-93M on the footwall side of the lode, and was driven as a cross-cut bearing N. 35° E., passing within a few feet of the N.W. corner of Section 62-93 belonging to the Primrose Company. A little pyrites is seen in places disseminated through the schist, but the solid ore was first struck at 618 feet from the entrance, and

a cross-cut put in at this point a little north of east to the hanging-wall shows about 30 feet of dense sulphide ore. The main tunnel is continued obliquely across the lode, and at 646 feet a drive has been put into the north following the hanging-wall for about 95 feet. A drive has also been put in about the same distance to the south from the main tunnel along the footwall. The ore seen in the cross-cut and drives at this level is very similar in appearance, so that in the upper tunnel, the mouth of which is about 250 feet measured horizontally from where the lode was struck in No. 2, and from surface indications there is reason to expect that the ore-body will be found continuous between these points. It is proposed to drive another adit (No. 3) intermediate between No. 4 and No. 2, and eventually a fourth adit will probably be put in about 100 feet below No. 2, but this will have to be driven a long distance before reaching the ore. It will, however, prospect the footwall country, and it is quite probable that other parallel deposits will be discovered. A good deal more work will have to be done by cross-cutting, sinking, and rising in the lode before any definite figures can be given as to the approximate amount of ore in sight above the present levels, but it is quite sufficient to warrant the erection of reduction works, provided it can be shown that the ore can be treated at a profit. The management could not allow me to take samples from the mine with a view to publishing the results, so that I can give no idea of the value of the ore. In the Report on the progress of the work at the mine during 1897 made by the engineer in charge it is stated that there are 10,000 tons of ore at grass, and the average of over 2000 determinations made during the year is given as follows:—

	£	s.	d.
Gold, 0·15 oz. per ton, valued at.....	0	13	0
Silver, 12·85 ozs. per ton, valued at	1	6	0
Copper, 2·34 ozs. per cent., valued at	1	1	0
Total value of the ore per ton.....	£3	0	0

No mention is made of the zinc or lead contents, which are likely to have an important bearing on the degree of success attending the treatment of the ore, the presence of zinc blende in large quantities being decidedly detrimental in smelting. The ore for the most part is very free from gangue, but in places there is a good deal of quartz and sometimes barytes, and it is noticeable that where the quartz occurs it is generally accompanied by bunches of clean copper pyrites. At times the various sulphides occur in layers which would admit of handpicking, but, as far as could be seen, in the great bulk of the ore they are too intimately mixed for this, and any attempt to separate them by wet concentration would be attended by very imperfect results, and probably great loss in silver and gold, besides leaving the ore in a finely divided state unsuited for direct smelting.

An excellent site has been chosen and the ground cleared for reduction works, which it is proposed to erect as soon as railway communication is established. The ground has also been cleared for a self-acting tramway about 1600 feet long, which will deliver the ore direct from No. 2 tunnel to the smelters, so that there will be very little expense for handling. On the Stitt River a water-right of 40 sluice-heads (representing approximately 6000 gallons per minute) has been secured, and a race is now in course of construction to bring this in; the total length of this race will be about 5½ miles, of which about half is completed. On the Pieman 100 sluice-heads have been secured, and a survey is now being made for a race which will be about 15 miles in length.

It is probable that the ore will be treated by a modified form of "pyritic smelting," a process which is yet in its infancy and is becoming more widely used every year. The great advantages of this process are that it avoids the expensive and tedious operation of roasting, and effects a great saving of coke in the blast furnace, the rapid oxidation under the influence of a hot blast of the sulphur, arsenic, antimony, &c. present in a suitable ore furnishing sufficient heat to smelt the charge. Zinc blende in large proportions is very detrimental in this as in other methods of smelting: it carries silver and gold into the slag, which it makes pasty, requiring a large proportion of flux; it also causes great loss of silver and gold through volatilization, and forms infusible accretions in the furnace, thus shortening the campaigns and thereby increasing the costs of smelting. The limit of zinc which can be successfully treated in the blast furnace is from 8 to 12 per cent. of the charge, and it will be necessary to reduce the zinc down to these or lower limits by the "drowning process," *i.e.*, by mixing with other ores free from zinc. This will at once create a demand for clean copper ores, and many of the surrounding mines whose ore is too poor to export may thus be worked at a profit.

Primrose Mine, Section 62-93, 10 acres, and Section 290-93M, 16 acres.—On Section 62-93, formerly known as the South Rosebery, the continuation of the Tasmanian Copper Company's lode was cut in a deep trench about 160 feet from the northern boundary of the section, showing dense sulphide ore for about 15 feet across. On the hanging-wall side of the lode a vertical shaft has been sunk 40 feet, and connected with the adit level. In the shaft the solid ore was struck about 15 feet from the surface, and continued to within a few feet of the bottom, when it passed out to the east. At this point a cross-cut has been put in six or seven feet to the west in footwall schist impregnated with pyrites. In the tunnel a little ore was cut at about 50 feet from the entrance, and for a width of about 30 feet the schists are strongly impregnated with pyrites. At 65 feet a drive was started in a northerly direction going obliquely across the formation, the hanging-wall of which is touched about 60 feet from the tunnel, and followed in a N.N.W. direction. For the first 80 feet

from the tunnel the drive is chiefly in mineralised schist with small bands of solid ore, after which it continues nearly all in ore for about 170 feet. At 150 feet from the tunnel a cross-cut was put in to the west to connect with the shaft, showing about 10 feet solid ore measured perpendicular to the walls. 90 feet further a second cross-cut has been put in to the footwall showing about the same thickness of ore. About 20 feet beyond this, alluvial wash is seen in the back of the drive, and beyond this the formation is very broken, the last part of the drive, which was continued to within 12 feet of the boundary, having collapsed. I took a sample by chipping from all parts of the drive between No. 2 cross-cut and the shaft, which assayed as follows:—Gold, traces; silver, 17 ozs. 3 dwts. per ton; copper, 0·4 per cent.; lead, 14·6 per cent.; and zinc, 28·9 per cent. A second sample taken from the solid ore south of the shaft to the tunnel yielded—gold, 3 dwts. 6 grains; silver, 12 ozs. 5 dwts. per ton; copper, 0·4 per cent.; lead, 14·4 per cent.; and zinc, 27 6 per cent. These and all other samples which I took were assayed by Mr. Ward, the Government Analyst.

According to these assays the ore would seem too poor to smelt with such a high percentage of zinc, but it is only fair to add that much higher assays have been obtained, and it is manifestly impossible to obtain an accurate sample of the ore in sight without spending much more time than I was able to give to it. In any case this level is too shallow to be of much use for working purposes, and it would be advisable to put in a tunnel at a lower level from the Mount Black Prospecting Association's ground.

About 170 feet south of the tunnel a vertical shaft was being sunk in hanging-wall country, and at the time of my visit was down about 50 feet. The schist in the bottom contained a good deal of barytes, and is in places heavily charged with pyrites, with small seams of galena and blende. Since my return it has been reported that the lode has been passed through, 9 feet wide, in a cross-cut, which was driven to the west at 62 feet from the surface.

North Tasmanian Copper Mine, Section 191-93M, 40 acres.—In the northern part of this section, which lies to the north of Section 206-93M of the Tasmanian Copper Company, a trench has been cut from the eastern boundary for about 12 chains in length, running a little S. of W. across the country. Near the western end of the trench the country is a decomposed whitish schist, a good deal broken, in which small veins of blende and galena occur, striking about N.W. and S.E., but so far as could be seen are of no value. Going east along the trench the country gradually changes to black slate, and for a width of about 30 feet, near the east end, it is impregnated with pyrites. This belt is seen again in the bed of a small creek further north, and is probably a continuation of the Tasmanian Copper Company's formation, though it here contains no solid ore at the surface. As, however, the ore is likely to occur in lenticular masses, cutting out both horizontally and vertically, but making again at greater depths, it is quite possible that solid ore will be found below. Several chains south of the trench dense sulphide ore, similar in appearance to that found in the Tasmanian Copper and Primrose Mines, was cut, but its full width is not exposed. A little to the north of this cut a vertical shaft is being sunk, which, at the time of my visit, was about 75 feet deep. This shaft is closely timbered most of the way down, but the lode is said to have been struck at 56 feet, and in the bottom it is about 4 feet wide, underlaying slightly to the east. The ore here consists chiefly of fine-grained blende and pyrites, with a little galena, and is of low grade, a sample which I took from the bottom assaying—gold, traces; silver, 5 ozs. 4 dwts. 12 grs.; Copper, *nil;* lead, 4·6 per cent.; zinc, not determined. The top of this shaft is 1210 feet above sea-level, or nearly 400 feet above the Tasmanian Copper Company's lower tunnel, and so far it has been perfectly dry.

Rosebery Proprietary, Section 104-93M, 78 acres.—On this section, which lies E. and adjoining the North Tasmanian Copper Mine, prospecting was being carried on in a tunnel started by the old Rosebery Company, on Section 206-93M, the first 193 feet being in the latter section. At about 80 feet from the entrance a belt of schist, impregnated with pyrites for a width of 17 feet, was passed through, and a short drive put in to the south without meeting any solid ore. The schist is succeeded by a belt of black slate, having the normal strike of N. 20° W., followed by a band of grit 10 feet wide. Slate again comes in, and continues to within about 35 feet of the end, which is 256 feet from the entrance. The last 35 feet are through a decomposed felsitic rock, which does not seem very likely to carry minerals, and I should not advise any more work being done at this point. A good deal of trenching has been done on other parts of this property, which is very densely wooded and difficult to prospect, but, so far, nothing of importance has been discovered, and the indications are not very encouraging.

Mount Black Mine.—The Mount Black Prospecting Association holds Section 58-93M, 40 acres, and Section 59-93M, 20 acres. About five chains from the western boundary and six chains from the southern boundary of the latter section a lode formation about 6 feet wide is exposed in an open cut. For several feet on either side there is a deposit of brown oxide of iron formed by water issuing from the lode, but the oxidation does not continue for any great depth. About a chain further north the lode has been cut again, and shows 6 to 8 feet wide, striking N. 10° W., and underlaying about 50° to the E. On the footwall is a band of siliceous tourmaline rock, then about 18 inches of iron and copper pyrites, with tourmaline and quartz: towards the hanging-wall fluor spar predominates, with quartz and pyrites, and in some places a good deal of sulphide of bismuth and wolfram. This formation is evidently of different

geological age to that of the Tasmanian Copper Mine. It has every appearance of being a true fissure lode, and from the association of minerals that it contains it is quite probable that it will carry tin ore at a depth. An underlay shaft was sunk about 18 feet on the lode, but has been stopped pending the sinking of a main engine-shaft further to the east, and at the time of my visit was partly full of water. I took a rough sample from different parts of the shaft down to the water level, which gave an assay of 6 dwts. 12 grs. gold, 9 dwts. 19 grs. silver per ton, and 1·1 per cent. copper; but Mr. T. Dunn, the manager, informed me that a bulk sample of 1½ tons from the underlay shaft had been sent away, and gave a return of 1 oz. 3 dwts. gold per ton, no returns being made for silver or copper. The presence of bismuth is not desirable in copper-smelting, but the richest of the bismuth ore would probably pay to pick out by hand, and the balance would make an excellent flux for some of the more refractory ores of the district, and is, as far as I saw, quite free from zinc. To the north the lode has been cut in several trenches, but on the east is deep alluvial wash, which appears to be going down on the hanging-wall, and has not been bottomed. East of the alluvial flat, 190 feet from the underlay shaft, a main shaft has been started which it is anticipated will strike the lode at about 220 feet. This mine has the credit of being the first one in this district to be equipped with winding and pumping machinery, and, as everything has to be sledged or packed from Ringville, this has been a matter of considerable expense and some difficulty. The pump is worked from a water-wheel on the Stitt River by means of a wire rope 950 feet long. The pump was started while I was there, and worked very smoothly; the accumulated water in the shaft, which was then about 40 feet deep, was taken out in about four hours, and the incoming water was easily kept under with the slowest speed of the wheel and the shortest stroke. It is very probable, however, that a large body of water will be cut when the lode is struck. Two other parallel lodes have been cut on this section lying on either side of the main lode, containing a great deal of tourmaline in fine needles through a siliceous matrix with a little pyrites, but sufficient work has not been done to prove their value. A tunnel was also driven by the Mount Black Company from a point about two chains S. of the N. boundary of Section 88-93M, and the main lode was cut close to the boundary between the two sections. Near the centre of the southern boundary of Section 58-93M there is large outcrop of manganese gossan containing a good deal of barytes, but nothing has been done to prove what lies below it. It seems probable that the Primrose and Mount Black lodes junction somewhere about this point, and further prospecting is strongly to be recommended, but as the ground is rather flat this will have to be done by sinking.

Mt. Black Extended, Section 88-93M, 20 acres.—In the southern part of this section what is probably the continuation of the Mount Black main lode has been cut in several surface trenches, but towards the Stitt River it is covered with alluvial wash, which has not been bottomed on account of water. Just inside the northern boundary of the section a small prospecting shaft is being sunk, which it is intended to sink 50 feet, and then cross-cut west for the Mount Black lode, but it would be probably cheaper to prospect this from the tunnel previously mentioned which was put in by the Mt. Black Co.

On Section 220–93M, 80 acres, belonging to the South Tasmania Copper Mining Co., No Liability, a well defined lode formation about 3 feet wide, striking nearly N. and S. and underlaying to the E., has been cut in several trenches close to the *Rosebery Hotel*. The lode-matter consists of quartz and tourmaline, iron pyrites, and a little copper pyrites. As far as seen it is not of much value, but it deserves further prospecting. A tunnel is now being driven in a northerly direction along a lode formation seen in the bed of the Stitt River a few chains above the bridge. In the tunnel the lode is about one foot wide, underlaying considerably to the E., consisting of black siliceous material, with occasional splashes of iron and copper pyrites, carbonate of iron, &c. On the footwall is a thick seam of pug. This tunnel is in about 155 feet, and is about 60 feet lower than the above-mentioned trenches. I do not think that it is on the same lode as seen in the trenches, and it would be advisable after driving a little further to cross-cut E. and W.

The Great South Rosebery Mining Co., No Liability, hold Sections 1064–93M, 1065–93M, 1066-93M, 1067–93M, and 1068–93M, a total of 279 acres, an area far too large to thoroughly prospect with a small capital. On Section 1065–93M several small lodes a few inches in width are seen, carrying iron and copper pyrites, &c., striking a little W. of N. and standing almost vertical, but they are mostly too small to offer much encouragement for opening up. On what is known as No. 1 lode a tunnel has been driven 35 feet bearing N. 35° W. The lode is about 9 inches wide, and carries iron and copper pyrites, with quartz, tourmaline, and a little fluor spar. This lode can be traced on the surface for several chains further north, and contains in places good bunches of ore, picked samples of which are said to have assayed nearly 2 ozs. of gold. Though small, it is worth further prospecting. Further south an outcrop is seen forming a bar across the Stitt River. Its strike is about N. 5° W., and for a width of about 20 feet there is a little iron and copper pyrites disseminated through the country, which is a silicified schist. A short distance north of the river a shaft was started on the east, or hanging-wall side of the formation, but owing to bad standing-ground, water, and lack of funds, was discontinued before striking any ore, and has since collapsed. A tunnel has now been started to cross-cut to the footwall, but is too shallow to be of much practical use.

South Mt. Black.—South of the Stitt River, on Section 281-93M, 57 acres, belonging to the South Mt. Black P. A., several lode formations have been cut, but no work was going on at the time of my visit. The principal work done is an open cut in a southerly direction on a lode about four feet wide, with well defined walls striking about N. 10° W., and underlaying 1 in 2 to the E, The lode filling consists of quartz impregnated with tourmaline, with a little iron and copper pyrites through it, and in places fluor spar. It is probable that this is a continuation of the Mount Black lode, and will doubtless receive further attention should the latter company get good ore at a depth. Two or three chains further west a similar lode has been cut striking, apparently, a little E. of N., and it has been traced by surface trenches for 5 or 6 chains to the north, but approaching the Stitt River it is covered with deep alluvial wash. These lodes have every appearance of being true fissure lodes, the central druse being filled with interlacing quartz crystals perpendicular to the walls.

Byron.—Going S.E. into Section 362-93M, 40 acres, held by the Byron Mining Company, No Liability, numerous threads and small veins are seen running through the country consisting chiefly of quartz and tourmaline, with sometimes a little pyrites. About three chains from the northern and five chains from the western boundary a trench has been cut to the S.S.E. on a small vein containing tourmaline, fluor-spar, and quartz with copper and iron pyrites. This vein strikes about N. 20° W. underlying slightly to the east, and has been cut again about a chain and a half from the southern boundary. The Stitt River runs through the S.E. corner of the section, and from the river level a long trench has been cut in a general westerly direction. This goes through a belt of pyritiferous schist, which is probably a continuation of the sulphide body seen on the other side of the river in Section 141-93M. In the end of the trench black slate is seen, and a small lode formation was cut underlaying to the W., carrying a little pyrites, but nothing of value. Close to the southern boundary and about 12 chains from the western boundary an open cut has been put in about 10 feet to the N. on a lode about two feet wide, chiefly quartz and tourmaline, with a little copper and iron pyrites. The country is very hard, the schist being silicified, probably by the same solutions that deposited the quartz in the lodes. In the eastern part of the section an intrusion of felsite rock is seen, which has probably had an influence on the filling of the lodes. It is possible that these may come together at a depth and form a large lode, but the country is too flat to prove much by means of tunnels, and the only way to prospect the ground would be to sink a shaft in a central position as deep as the water would allow, and then crosscut E. and W., but the water is likely to prove heavy.

Balstrup's Section, 141-93M, 80 acres.—The body of sulphide ore above alluded to was cut close to the river and extends into the river bed, so that its full width is not seen. The ore consists of an intimate admixture of quartz, iron pyrites, blende, and galena. It would be impossible to prospect this without sinking, but the ore is too poor to warrant this, a sample which I took assaying traces of gold and copper, 1 oz. 12 dwts. 16 grains silver per ton, and 6·6 per cent. lead. Further S.W. a prospecting shaft is being sunk on a strong manganese gossan outcrop containing in places a good deal of barytes. This has a very kindly appearance, but the unoxidised zone has not been reached, and not enough work has been done to show the strike or dip.

Berry Consols, Section 363-93M, 40 acres.—On this section six small lodes have been cut, all of which with the exception of No. 6, the most easterly one, strike E. of N. No. 1 lode, which was cut close to the river near the western boundary of the section, strikes about N. 10° E. underlaying slightly to the E. The country rock is a greenish schist, which is impregnated with pyrites for several feet on either side of the lode. A picked sample from here is said to have assayed 4 per cent. copper, 1 oz. 7 dwts. 18 grains gold, and 1 oz. 9 dwts. 9 grains silver per ton. No. 2 lode is seen further south crossing the Stitt River, but no work has been done on it. No. 3 is also seen in the bed of the river a little further E., and has been traced to the northern boundary of the section and into Section 1067-93M belonging to the Great South Rosebery Co.; a tunnel is now being driven on it going south into a small knob rising about 40 feet above the tunnel. The formation is well defined, about 15 inches wide, and shows some nice-looking gossan and copper pyrites. Mr. Sands, the manager, informed me that two samples of copper pyrites from here had assayed as follows:—No. 1 sample, 29·11 per cent. copper, 5 dwts. gold, and 13 ozs. 11 dwts. silver per ton; No. 2 sample, 16·01 per cent. copper, 6 dwts. gold, and 9 ozs. silver per ton. To the east of No. 3 lode is a button-grass flat, in which occasional large boulders of conglomerate are seen; this is probably an old bed of the Stitt River. No. 4 lode is seen in several trenches on a low spur to the east of this flat; it is a good deal broken, consisting of quartz and schist impregnated with pyrites and containing in places a good deal of tourmaline. No. 5 has a strike of N. 5° E.; it is about 9 inches wide, the outcrop showing gossan with iron and copper pyrites, but very little work has been done on it. No. 6 lies to the east of No. 5, and is about 18 inches wide, striking N. 20° W. and underlaying slightly to the E.N.E.; this has been traced for several chains, and a good deal of trenching has been done on it. Going north it branches into two veins, which will probably come together again. I took a sample by chipping from various places where this lode was exposed, which assayed—gold, a trace, silver, 2 ozs. 5 dwts. 17 grains per ton, and copper, 2·3 per cent., but assays as high as 2 ozs. 2 dwts. gold, 2 ozs. 6 dwts. silver per ton, and 2·6 per cent. copper, are said to have been obtained.

All the lodes on this property are small, and very little real mining work can be done without sinking, but the ore being, as far as could be seen, free from zinc, should find a ready sale when local smelters are erected.

New Koonya Mine, Section 413-93M, 80 acres.—This section is situated to the west of the valley of the Stitt River, on the eastern slope of a long spur running down from Mount Read, about 2½ miles south of Rosebery. It is nearly all open button-grass country, the only timber being in the gullies. Large detached masses of conglomerate are seen up to the top of the spur, evidently the remains of a former sheet which once covered all this district. It rests unconformably on a greenish argillaceous schist similar to that seen in the Tasmanian Copper Mine, and there is apparently another parallel mineralised zone. In the south-eastern part of the section, at an elevation of 1400 feet above sea level, a deep trench has been cut running a little S. of W., in which the schist for a width of about 30 feet is more or less heavily charged with iron pyrites. Towards the west end of the trench are two veins of solid glassy quartz underlaying to the W., whereas the schist dips about 45° to the E.; the country is a good deal broken with bunches of quartz through it, and one of the quartz veins has been slightly faulted. I took a sample of the schist from this trench which gave on assay traces only of gold and copper, and 9 dwts. 19 grains silver per ton. About 2 chains further west and some 80 feet above the trench is an outcrop of very kindly-looking gossan. To the east the ground falls rapidly, and a tunnel could be easily brought in to cut these formations at a considerable depth. To the N.W. of this outcrop, at an elevation of 1650 feet, a hole has been sunk a few feet on what is known as the Gossan Lode, striking about N. 25° E. and underlaying 1 in 1 to the E.S.E. Some of the gossan is said to have given good returns for gold, but a sample which I took across a width of five or six feet gave only traces of gold and 19 dwts. 14 grs. silver per ton. A tunnel is now being driven 80 feet below the outcrop to intersect this, and at the time of my visit was in about 190 feet. The country passed through is a decomposed felsitic rock, probably an igneous dyke, with occasional bands of quartz and a little pyrites, but so far no sign of any lode.

Grand Centre, Section 577-93M, 64 acres.—No work was going on on this section but some fairly solid copper pyrites with a little erubescite is seen at the mouth of a shaft a few chains from the southern boundary of the New Koonya. This shaft is now full of water, but I was informed that it was sunk 54 feet, and at 20 feet a lode was cut 4 feet wide. At 50 feet a cross-cut was put in to the E. and cut the lode 3 feet wide, about 9 feet from the shaft.

Chamberlain Mine, Sections 1908-93M, and 911-93M.—On the latter section, about a quarter of a mile to the E. of the pack-track between Rosebery and Ringville, a deep cutting has been made across a formation about 14 feet wide, consisting of laminated quartz with a little iron and copper pyrites throughout, the sides of the cut being stained with copper salts. The formation appears to be conformable with the enclosing siliceous schists, striking nearly N. and S., and underlaying at an angle of about 45° to the E. This is well worth testing at a depth, and a tunnel could be brought in at a considerable depth from the west, the ground falling rapidly. Another parallel lode has been cut several chains further N., lying apparently a little E. of the other, and at the time of my visit a tunnel put in to cut this had just penetrated the lode, which shows very solid ore, containing a good percentage of copper pyrites. A sample which I took from the face assayed 16 dwts. 8 grs. gold, 6 ozs. 7 dwts. 9 grs. silver per ton, and 10·5 per cent. copper, zinc 0·5 per cent. The ore from this mine would be very suitable for mixing with the refractory zinciferous ores of the Tasmanian Copper Mine, and there would be very little difficulty in putting in a connecting tram to bring the ore to the smelter site.

The Chamberlain Mining Co. also holds Section 1908-93M, but, so far as I could hear, no work was being done on this Section.

Glenfine Mine, Sections 1613-93M, 56 acres, and 1614-93M, 80 acres.—The principal work done on this property is a prospecting shaft, which has been sunk 50 feet on a strong gossan formation. From the bottom a cross-cut has been put in W. 26 feet through gossan and iron-stained country, showing in places a little pyrites. In the end there is a great deal of carbonate of iron and carbonate of manganese, and it seems probable that the gossan has been formed from the decomposition of these rather than from sulphide ores. This, and all the adjacent sections, are very thickly wooded, with a dense undergrowth, which makes prospecting very difficult.

S. Glenfine, Section 1818-93M, 79 acres.—About 2 chains south of the centre of northern boundary of this Section an open cut has been made a little S. of W., passing under the old track from Ringville to Rosebery: for a width of about 20 feet the country is a good deal stained with oxide of iron, and several small veins of quartz and pyrites, striking about N. 14° W., are seen, but nothing of value. About 10 chains further W. another formation, known as the West Lode, has been cut in several trenches. In one of these trenches there is about 10 feet of good-looking gossan, and to the W. of this is a band of quartzose grit 5 or 6 feet thick, with pyrites disseminated through it. About 50 feet below this trench a tunnel has been driven about 60 feet, bearing N. 56° W., chiefly through decomposed slate; near the end several feet of gossan have been passed through, and the end of the tunnel is in black slate. The oxidised zone evidently continues for a

considerable depth, but is not likely to extend much below this level, and as it is not possible to bring in a lower tunnel at this point, it would be advisable to sink a winze from the present tunnel. In the eastern part of this section the country rock is schist, which, going W., gradually merges into slate. All this country is favourable for minerals, and, doubtless, fresh discoveries will be made as the bush is cleared.

Great North Colebrook, Section 553-93M, 40 acres.—The workings on this Section are situated close to the junction of the Pieman River and the Natone Creek. In the valley of the Natone above the junction there is a considerable depth of alluvial wash, from which a little gold was obtained some years ago. On the west side of the creek is a high cliff of siliceous ironstone, which outcrops for several chains in width. Just above the creek a tunnel has been driven in a S.W. direction about 90 feet through the ironstone: so far nothing of value has been discovered, but it is quite worth while sinking to test its value below water-level.

On the east side of the creek the ground rises very rapidly, and some trenching has been done on the slope of the hill, on what is known as the "New Find." About 80 feet above the creek a bench has been cut exposing a few feet of conglomerate containing copper pyrites scattered through it. To the east of this slate is seen dipping to the E. A little further N. a trench was being cut in a S.E. direction up the hill through slate country, and at the lower end of this is seen a good deal of copper pyrites and quartz looking more like ordinary lode-matter. On the top of the hill, 120 feet above the creek, is an outcrop of brecciated conglomerate also carrying a little copper pyrites.

A short tunnel from the level of the creek would test all this ground at a considerable depth.

Colebrook Mine, Sections 216-93M, 236-93M, and 239-93M, aggregating 208 acres.—On this property an immense body of ore has been discovered, consisting chiefly of magnetic pyrites, with iron, arsenical, and copper pyrites in a matrix composed of axinite, datholite, calcite, and fibrous hornblende, or actinolite. The ore body outcrops on the summit of a ridge which runs about N. and S. at a height of about 1700 feet above sea level, the N. and S. line forming the boundary between Sections 216-93M and 239-93M passing along the ridge. A deep trench, about 35 feet long, has been cut across the summit, and for about 20 feet at the E. end of this there is a good deal of magnetic and copper pyrites, with axinite and actinolite, but in the W. end it is mainly actinolite. The present camp is situated a little S.E. of this cut, in a gap in the ridge; and to the S.E. of the camp is another bold outcrop consisting chiefly of axinite with a little copper pyrites through it. About 60 feet N. of the summit a long trench has been cut down the western slope, following a very regular wall of indurated slate, which has been traced through to the eastern slope, forming as far as seen the limit of the ore body at this point. Two and a half chains S.W. of the summit an open cut has been made about 35 feet wide. On the western side the slate wall is seen striking about N.E. and S.W. Towards the eastern side a great deal of copper pyrites is showing for a width of about 10 feet, and a shaft was sunk 33 feet. Samples of the ore from this shaft are said to have assayed 7 per cent. copper, and over an ounce of silver per ton. 70 feet below this shaft a tunnel has been started which it is intended to drive through the hill to connect with a tunnel from the same level on the eastern side. This tunnel is in the solid ore body, which is here poor and very hard. On the eastern slope of the hill what is called "I. tunnel," 160 feet below the summit, has been driven 40 feet in a westerly direction, the first 30 feet being through oxidised lode-matter, and the last ten feet in solid sulphide ore. A drive has been put in 143 feet to the S., which for the greater part of the distance is between the oxidised and unoxidised portions, but the last few feet are in solid sulphide ore, chiefly pyrrhotite (magnetic pyrites). It is proposed to continue this drive to come under the axinite outcrop mentioned above.

K. Tunnel, about 100 feet further north, and 150 feet below the summit, starts from the slate wall seen on the western side of the ridge, and at the time of my visit had been driven about 55 feet in a south-westerly direction in very hard ore consisting of pyrrhotite, arsenopyrite, and a little chalcopyrite, with axinite and hornblende. It was intended to connect this tunnel with the tunnel on the western side, the distance through the hill along this line being 485 feet, but, as the ground is so hard, the advisability has lately been considered of putting in a horizontal bore with a diamond drill. This would be an excellent way of testing the ore body, and might be used with advantage in other parts of the deposit, but at present it is not possible to get any heavy machinery on to the mine without very great expense. Just below this tunnel the slate wall appears to turn to the N., and forms what is called the western wall of the ore body. Between 4 and 5 chains further N. is an open cut or bench about 85 feet long. In the western end of this cut indurated slate country is seen, which is a good deal broken, the boundary between the ore body and the country being very irregular. Near the wall a good percentage of copper pyrites is showing for a width of 3 or 4 feet, then about 40 feet, chiefly pyrrhotite with a little copper pyrites, axinite, &c., this is succeeded by a belt of more or less oxidised ore showing stains of copper sulphate, and then a bar of slate about 25 feet wide. Between this cut and the tunnel several trenches have been cut showing ore with bars of country, but going S. the ore becomes more solid. About 50 feet below the open cut a tunnel has been driven about 100 feet in a south-westerly direction, and cross-cuts put in to the N.W. and S.E., 27 feet and 44 feet respectively. The main tunnel is in the solid ore body, but the western crosscut has been driven to the slate wall, and in the eastern cross-cut the last 10 feet are in altered slate country, probably the bar seen in the open cut above. About 55 feet

below this tunnel is No. 2 open cut extending from the western wall for a distance of over 100 feet across the ore body. The ore is similar to that seen in the upper cut, containing a good deal of copper pyrites on the western side. 70 feet below this cut a tunnel has been driven about 70 feet in ore, containing very little copper. This tunnel is about 420 feet below the summit of the ridge, and below the ground falls rapidly to the east. To get anything like an accurate idea of the value of this deposit, it would be necessary to take a great many samples, and, as the ore is very hard, this would entail several days' work. Very large quantities of ore are now in sight, and could be very cheaply mined by open-cast workings, but as far as can be seen, and according to the published assays, it is too poor in copper and the precious metals to smelt by itself. It should, however, form a good ore to mix with the more refractory zinciferous ores of the Rosebery mines. Both the axinite and the datholite contain a good percentage of lime and are easily fusible, and the pyrrhotite, although containing a smaller percentage of sulphur than iron pyrites, is more suitable for fuel in pyritic smelting, as the latter parts with half its sulphur at a red heat, and this has a tendency to condense in the upper parts of the furnace and clog the ore together.

The extension of the Great Northern Railway from Rosebery to Zeehan will pass round the foot of the hill, and could be easily connected with the mine by a self-acting tram, so that the ore could be handled very cheaply.

This ore body is unlike any of the other large pyrites deposits in the Colony. It is apparently increasing in size as it goes down, but it has no regular shape, and its origin is a matter of speculation. The flinty appearance of the "wall" slate points to the presence of an igneous intrusion, and it seems probable that the ore body was originally a basic igneous rock, out of which the sulphides have segregated while the magma was still in a pasty condition, and that the boron compounds, axinite and datholite, were subsequently formed by pneumatolytic agencies (ascending vapours). According to this theory, we should expect to find the copper contents more concentrated on the outside of the deposit, a point which experience alone can settle. The presence of considerable quantities of arsenopyrite is somewhat difficult to explain by the principle of "Magmatic Differentiation," and it is quite possible that the presence of the sulphides is due to hydrothermal action. The so-called "intrusions" of country met with in the ore body are probably portions of the original country rock which have been caught up by the igneous mass and more or less altered.

New West Colebrook, Section 321-93M, 80 acres.—The ground falls rapidly to the west into this section from the outcrop on the Colebrook. Close to the eastern boundary several prospecting shafts have been sunk through angular débris, which is, in places, over 30 feet thick, containing fragments of axinite, &c., derived from the waste of the rocks above. The bed-rock appears to be a partly serpentinised gabbro, which is probably connected with the belt of serpentine seen further west. The country is favourable for the occurrence of mineral lodes, and a good deal of trenching has been done, but so far nothing of importance has been discovered.

Clifton, Section 237-93M, 67 acres.—An ore body has been discovered on this section containing the same association of minerals as is met with in the Colebrook property, which it adjoins on the south and east. About 700 feet below the outcrop on the Colebrook a bench has been cut along the western slope of the hill, and for a width of about 100 feet there is more or less oxidised ore with bands of decomposed slate, and in places a good deal of axinite with iron, copper, and magnetic pyrites; samples from this cut are said to have given good assays for gold and copper. 55 feet below the bench a tunnel has been driven about 85 feet, bearing S. 20° E. Near the entrance there is about 2 feet of gossan running north and south, and underlaying to the west. The country in the tunnel is chiefly altered slate, but for the last 20 feet there has been a good deal of axinite and pyrrhotite, with a little copper pyrites. This formation has probably been formed by a dyke from the main mass seen in the Colebrook, and though nothing payable has yet been discovered, the property is well worth further prospecting.

On the track between the Clifton and Colebrook, the belt of serpentine above alluded to is crossed; this passes through the New West Colebrook and is seen further S. in the Lynton and on the track between Ringville and Rosebery.

Lynton Mine, Section 282-93M, 80 acres.—The serpentine outcrops on this section in bold cliffs to the N.W., of which a good deal of trenching has been done on a large irregular outcrop of gossan. Several small veins up to 3 inches thick of solid galena have been cut, associated with calcite and barytes, but they seem to have no regular strike. A tunnel to cut this formation is now being driven through serpentine, but had not reached the ore at the time of my visit.

RINGVILLE DISTRICT.

The prevailing rocks of this district are slates and sandstones, passing into grits, breccias, and conglomerates. As far as can be seen, the latter are conformable with the slates, and belong to an older formation than the conglomerates seen capping the mountains further E. and S. In some of the cuttings on the N.E. Dundas Tramway tufaceous beds are seen, and it is probable that some of the breccias are also of volcanic origin.

These rocks are traversed by a number of more or less parallel lodes striking a few degrees W. of N., containing argentiferous antimonial fahl ore associated with jamesonite and other antimonial ores, galena, zinc blende, iron and copper pyrites, and occasionally a good deal of sulphide

of bismuth. The lodes are fairly persistent in their strike, and some of the ore is very rich in silver, picked samples of fahl ore having assayed nearly 3000 ozs. per ton, or more than nine per cent., but they are all very patchy, and so far the results obtained are distinctly disappointing.

Curtin-Davis Mine.—The most extensive workings are those of the Curtin-Davis Proprietary Co., which holds two 80-acre blocks, Sections 242-93M and 292-93M. The latter section originally belonged to the Curtin-Davis Extended Mining Co., with which the Curtin-Davis Mining Co. was amalgamated.

The configuration of the ground is exceptionally advantageous for economic mining, the rise from the northern boundary of Section 242 to the top of the hill on Section 292 being nearly 1450 feet, and for a great part of the distance the lode is seen outcropping on the steep face of the hill. The following is a brief summary of the work done on this property, the levels being named according the vertical distance below the summit of the hill:—

1430 *feet level.*—This is the lowest tunnel, starting close to the northern boundary of the property, and was driven 88 feet along the course of the lode, which here contained nothing of value.

1150 *feet level* was driven 123 feet across the line of the lode by a former company without cutting any ore.

1000 *feet level.*—This was driven 137 feet on the course of the lode. At the entrance, and for the first 30 or 40 feet, there is a small vein of gossan, samples from which are said to have given high assays for silver and up to 15 per cent. of bismuth, but for the last 100 feet the lode was much broken, and contained only iron pyrites of no value.

840 *feet level* was driven 265 feet on the course of the lode, which varied in width from a few inches up to two feet between slate walls. Some very high grade fahl ore was obtained in driving this tunnel, but it was very patchy. At 95 feet from the entrance a rise was put up 16 feet, starting on good ore, but at the top the lode only contains a little iron pyrites of low grade.

680 *feet level.*—The total length of this tunnel is 456 feet. Good ore was met with in bunches, and about 66 feet has been stoped for a height of 20 feet over the back of the drive. Going S. the lode was lost, and at 289 feet a cross-cut put in to the W. cut it again at 31 feet. From this point the lode was driven on S. 136 feet, averaging about two feet wide with well-defined walls, but containing chiefly carbonates of iron and manganese. Where the lode was cut in the cross-cut a rise was put up and connected with a winze from the next level, 120 feet above. To show the patchy nature of the ore above this level the following test was made by the manager, Mr. Luke Williams, to whom I am indebted for many of the figures given:—One stope 6 feet high and 6 feet long yielded 2½ tons of ore which assayed 11·6 per cent. copper and 177 ozs. silver per ton, and the next six feet produced about 2 tons, assaying 2·7 per cent. copper and 29 ozs. silver per ton.

560 *feet level* driven 370 feet. For 60 feet from the entrance the ore is more or less oxidised about 1 foot wide, with good bunches of copper pyrites and fahl ore. At 110 feet a winze was sunk to connect with the rise from the 680 feet level. Going down the winze the lode gradually widens, and at 35 feet below the level it is about three feet wide, chiefly carbonate of iron with a little copper pyrites. The underlay is very irregular, in places being very flat to the east, gradually becoming vertical, and above the 680 feet level turning slightly to the west At 157 feet from the entrance a rise was put up and connected with the winze from the 420 feet level. From this rise the lode has been stoped for a length of 40 feet N. to a height of 50 feet, and 67 feet S. to a height of 13 to 19 feet. Some high-grade ore was obtained, but it was very bunchy and erractic. From the end of the drive a cross-cut was driven 52 feet to the E., but no ore was cut.

420 *feet level*, 50 feet from the entrance, a little stoping was done, and about 6 tons of oxidised ore obtained, assaying 6·4 per cent. copper and 67 ozs. silver per ton. Going S. the drive got off the line of lode, and at 143 feet cross-cuts were driven 28 feet E. and 19 feet W. The lode was cut in the latter about 2 feet wide, carrying fahl ore and carbonate of iron, and good ore continued in the drive for over 100 feet. In the stopes above this level some good ore is seen, but the shoot seems to be going up in the form of a wedge, and at a height of 25 feet is only a few feet long. Further S. another shoot of good ore was cut 40 feet long, and a rise put up 37 feet on the lode, which varied from a foot to two feet in width. The shoot of ore was stoped N. and S. from the rise for a height of about 16 feet, at which height it is only about 26 feet long. The lode in the end of the drive, which has a total length of 465 feet, shows only strings of carbonate of iron in hard siliceous black slate. Outside this tunnel there is a pile of about 160 tons of gossan broken out by a former company, which is said to average about 30 ozs. silver per ton.

180 *feet level.*—This tunnel was driven as a cross-cut by the old Curtin-Davis Extended Company, and the lode was cut at about 100 feet, and followed S. for 143 feet. At 20 feet S. of the cross-cut a winze was sunk 90 feet. This was inaccessible owing to bad air, but Mr. Williams informed me that 75 feet down he had opened out and driven 27 feet N. and 13 feet S., the lode varying in width up to 2 feet, with good ore in bunches, but it had cut out in both ends. In the S. end of this level a rise was put up to the 100 feet level, the lode being poor. Between the 420 feet and the 180 feet levels a tunnel was driven about 80 feet on what is known as the East Branch, which is about 1 foot wide, gossan showing carbonate of lead.

100 *feet level.*—Total length, 255 feet. For the first 225 feet the ore was chiefly gossan, with occasional patches of fahl ore and copper pyrites, but for the last 30 feet there is a good deal of zinc blende with galena and carbonate of lead, also a little native copper. A good stack of gossan, estimated at 266 tons, assaying about 12 ozs. silver per ton, has been raised from this tunnel.

On the summit of the hill the lode has been cut in several trenches, and shows up to 4 feet wide of gossan.

In the eastern part of Section 242-93M, to the E. of the Montezuma Falls, a little driving has been done on the E. lode, which is supposed to be a continuation of the lode in Block 291, but nothing payable was discovered, and as no work was going on I did not visit these workings. This formation is seen in the railway cutting a little beyond the Montezuma bridge, containing chiefly iron pyrites.

Mr. Williams kindly supplied me with the following figures showing the amount of work done on the property:—Total length of drives on course of lode, 2375 feet; winzes, 304 feet; rises, 205 feet; ground stoped, 20,712 cubic feet, which produced 427 tons of ore, of an average assay value of 3·9 per cent. copper and 32·4 ozs. silver per ton. From these figures it will be seen that the mine has been energetically opened up, but I think it a great pity that more cross-cutting has not been done. At the end of the year a disastrous bush fire swept through the district, destroying all the mine buildings, plans, &c., and no underground work has since been done. It is now proposed to let the mine on tribute, and some of the blocks should yield a good profit. In the upper levels there is a good deal of gossan of rather low grade, but which should pay to work as soon as smelting-works are established at Zeehan. The North-East Dundas Tramway passes round the hill about 600 feet below the 680-feet level, and to convey the ore from this level to the trucks a self-acting ground-tram, 950 feet long, was constructed. The drum has two powerful brakes, and the load of about half ton which is sent down each time is easily controlled. The bagged ore which was being sent away amounted to about 200 tons, which, Mr. Williams informed me, averaged 8·2 per cent. copper and 70 ozs. silver per ton; and the cost of packing this to the railway would have been about 10*s.* per ton, amounting to more than the total cost of clearing, grading, constructing, and equipping the self-acting tram. This line is also utilised by the Curtin-Davis No. 1 Company for sending away their ore.

South-West Curtin-Davis Mine, Section 248-93M.—This section is situated to the W. of the Curtin-Davis Proprietary Company's Southern block. The lode was first discovered on the western slope of the hill, about 8 chains from the southern and eastern boundaries of the Section, and the gossan outcrop containing in places high-grade Fahl ore, was traced for several chains N. and S. Going N. the outcrop is almost level for some distance, so that the bearing of the outcrop practically agrees with the strike of the lode, which is about N. 14° E.; it underlays about 1 in 3 to the E., and the ground falls to the W., so that each successively lower cross-cut is considerably longer than the preceding.

In No. 1 adit, which is about 50 feet below the outcrop, the lode was cut at about 90 feet, and driven along N. 140 feet and S. 210 feet. In the south drive good ore was obtained for about 50 feet, and stoped to the surface. The level was then continued over 150 feet, during which the only ore met with was a patch about 15 feet from the end, containing a large proportion of sulphide of bismuth. In the north drive the lode was small and poor for the first 40 feet, when a shoot of ore about 40 feet long was met with, and this has been stoped out to the surface. Beyond this shoot the lode is poor, containing chiefly carbonate of iron. A winze was being sunk at the end of the cross-cut to connect with the No. 2 adit, which is directly under No. 1, and 96 feet lower. In this adit the lode was cut at 265 feet, and has been driven on about 60 feet N. and S. A little stoping has been done on both sides of the cross-cut on shoots of ore corresponding with those in No. 1 level, but apparently not quite so long. In the north drive a winze has been sunk a few feet on the shoot, and shows very good ore going down. As far as can been seen the shoots of ore go down almost vertically, the pay-ore in them varying in width from 1 inch to 16 inches. Both ends in this level are at present poor, and, judging by the level above, it is probable that a considerable length of blank ground will have to be driven through before meeting any more ore, but it is quite possible that other shoots will be cut which do not reach to the surface. About 3½ chains S. of No. 1 adit, and 78 feet above it, is another short tunnel known as the South Adit, in which the lode was cut at about 30 feet, and driven on a few feet south. From the end of the cross-cut a rise has been put up and connected with a prospecting shaft from the surface, in which some good ore was obtained, but it seems to be very patchy. S. of this the hill rises more rapidly, and as patches of ore are seen in the outcrop it would be advisable to push on the S. drive.

The country rock met with in the workings is chiefly an altered slate, but in places it is an intensely hard brecciated conglomerate, which makes driving very expensive. Altogether about 270 tons of ore have been sent away from this mine, the average assay of which was about 12 per cent. copper and 120 ozs. silver per ton. Most of it has been sent to the Dapto Smelting Works, New South Wales, where it finds a ready sale; but one trial parcel, which was sent to Swansea, England, was refused on account of the bismuth contents. The ore is delivered at the tramway siding by means of a self-acting wire ropeway 20 chains in length.

No work was going on at the South Curtin-Davis and Hecla Curtin-Davis Mines, and so I did not visit these properties.

Section 302-93M.—On this section, belonging to the Block 291 Silver and Copper Mining Co., a wide lode formation has been cut, running about N.W. and S.E., and underlaying to the N.E. For a width of about 20 feet the country, slate and sandstone, is impregnated with pyrites, and

there are several veins up to a foot in thickness of solid pyrites with small seams of galena, jamesonite, &c., associated with carbonate of iron. Several tons of galena and pyrites have been obtained from an open cut, the galena being said to assay up to 48 per cent. lead and 89 ozs. silver per ton. A tunnel was started to cut the lode at a considerable depth, but was discontinued after being driven about 230 feet through altered clay, slate, and sandstone. This formation seems worth further testing, and it is a pity that the tunnel was stopped before cutting the lode. The continuation of this is seen further S.E. in Section 291-93M, the outcrop showing gossan and pyrites with a little galena in a matrix of carbonate of iron. Seventy feet below the outcrop a tunnel was driven S.W. and cut the lode at about 80 feet; the lode was driven on a few feet N.W. and S.E., but here contained nothing of value, consisting chiefly of carbonate of iron. About 150 feet above this tunnel and several chains further S.E. an adit was driven about 330 feet along the course of the lode. Near the entrance it is about 2 feet wide, chiefly carbonate of iron, with iron and arsenical pyrites and a little fahl ore and galena. Good patches of fahl ore were met with in the tunnel, but most of the way the lode was poor, and work has been stopped. Above the tunnel the lode has been trenched up the bed of a small creek to the boundary of Section 343-93M, belonging to the Central Curtin-Davis Mining Co., and near the boundary some good ore was obtained, 7¾ tons assaying 3·9 per cent. copper and 118 ozs. silver per ton, and 18 tons seconds assaying 3·1 per cent. copper and 72 ozs. silver per ton. The second-class ore is concentrated by hand-jigging, but, owing to the brittleness of the fahl ore, this must inevitably be attended with considerable silver losses through sliming, and it would probably pay better to hand-pick more closely.

On Section 343-93M a tunnel has been driven about 100 feet along the course of the lode, bearing S. 30° E. The approach and first part of the tunnel are through sandstone and grit, which are succeeded by black slate much distorted. In places there are small bunches of fahl ore and copper pyrites, but the country is very much broken and disturbed, and the prospects are not very encouraging at present.

No. 1 *Curtin and Davis Mine*, Sections 246-93M, 66 acres, and 317-93M, 40 acres.—These sections occupy high ground on the E. of the Godkin Ridge, to the S. of the southern block of the Curtin-Davis Proprietary Company, the workings being situated nearly 2000 feet above sea level. About 4 chains from the northern boundary and 6½ chains from the western boundary of Section 246, a tunnel has been driven in a westerly direction to cut a lode seen outcropping on the surface about 80 feet above. The tunnel passes through coarse sandstone or grit, in places much broken, and at 93 feet from the entrance the lode was cut and driven on 20 feet N. and 70 feet S. The cross-cut (tunnel) was continued 22 feet in black slate, and near the end a lode formation was cut about 3 feet wide, striking a little W. of N., carrying a large percentage of arsenical and iron pyrites This apparently junctions with the main lode, whose course is a few degrees E. of N. and W. of S. near the end of the south drive; the lode is here 6 or 7 feet wide, and carries a good deal of galena. Some stoping has been done over the back of this drive, and about 37 tons of first-class ore have been obtained, of an average assay value of about 10 per cent. copper and 115 ozs. silver per ton. The best of the ore is fahl ore, with which are associated jamesonite, copper pyrites, galena, and occasionally a good deal of sulphide of bismuth, the gangue being chiefly carbonate of iron. The lode in the stopes is from 2 to 3 feet wide, with in places up to 10 inches of solid fahl ore, but it is very patchy. No new ground is being opened up, but the prospects are sufficiently encouraging to warrant the driving of the south end, and it is a pity this was discontinued. In the N. end the lode was barren, and a rise was put up 77 feet in unproductive ground. Although the mine is only about three-quarters of a mile in a direct line from the Montezuma Station, the country is so broken that it is very expensive packing the ore out. These remarks also apply to the Block 291 and Central Curtin and Davis Mines. From the Curtin and Davis United the ore is packed at a cost of £1 per ton to the Curtin-Davis Proprietary Mine, and sent down the self-acting tram. The company has spent about £80 in improving the track, but it was still in a very bad state when I saw it at the end of a dry summer.

Bonnie Dundee Mine, Section 1610-93M, 54 acres.—One of the characteristic fahl ore-bearing lodes has been discovered on this section, and several small parcels of high-grade fahl ore and gossan have been obtained. The gossan sometimes shows a little native silver, and assays are said to have been obtained up to 1200 ozs. silver per ton. A tunnel has been driven about 160 feet in a southerly direction on the course of the lode, a few feet above the level of the Ring River, and one shoot of ore has been stoped nearly to the surface. In the stopes the walls are about 4 feet apart, and stand almost vertical, striking N. 10° E.; but going S. along the level, the lode turns more to the W., and underlays considerably to the W.N.W. The clean ore is very bunchy, varying from nothing up to 10 inches in width. Going S. the ground rises rapidly, and the drive should be pushed ahead as far as possible, and the country cross-cut for parallel lodes, which are very likely to exist.

Fahl Ore Mine, Section 3212-93M.—This is an 80-acre section E. and adjoining the Bonnie Dundee, which was taken up in the early days of the Zeehan Field, and has been worked at intervals since then. The original workings were situated near the S.E. corner of the section, on the right-hand bank of the Ring River. They are now full of water; but, according to an old plan

of the mine, the shaft, which is about 50 feet from the river, was sunk 100 feet, and cross-cuts driven westerly at 50 and 100 feet cut the lode at 44 feet and 69 feet respectively. At No. 1 level the course of the lode was followed for 100 feet N. and 50 feet S., and at No. 2 level 41 feet N. and 95 feet S.; the strike of the lode being about N. 15° W., with a westerly underlay. These drives are for the most part below the river-bed, and water was very troublesome. Some high grade fahl ore was obtained, but the lode seems to have been very patchy, like all the other lodes in the district. In the bend of the river, N. of the shaft, a lode formation is seen containing small veins of fahl ore, which would apparently pass to the E. of the shaft, and it is a pity that a cross-cut was not put in on this side as well as to the N.

The main lode crosses the river twice, and about 4 chains N. of the old shaft and on the same side of the river a tunnel has been driven over 300 feet along its course, which is about N. 10° W., with a slight underlay to the W. Good fahl ore and copper pyrites have been met with in patches, and at 118 feet a rise was put up 13 feet, showing some good ore in the back, with numerous stringers containing fahl ore on the hanging-wall side. This rise is underneath the reserve for the proposed extension of the N. E. Dundas Tramway to Rosebery, and work had to be abandoned. At 267 feet a cross-cut was driven 29 feet to the E. without cutting any ore: the country rock in this cross-cut is altered slate and coarse sandstone. A shoot of very dense pyrites was cut at 290 feet containing a little copper, but very poor in silver. In the northern part of the section, about 500 feet above the river, a tunnel was driven some years ago 125 feet in a westerly direction, and a very strong gossan formation with carbonate of iron and pyrites was cut, which seems worth further attention. The country is very densely timbered, and much broken, so that it is difficult to judge the position of this lode relative to the other workings without actual survey, but it should not need a very long cross-cut to intersect it from the end of the present tunnel.

On Section 331-93M, which lies to the north of the Fahl Ore, a tunnel was driven W. about 250 feet. The approach and first 25 feet are through gossan, with a little pyrites, probably the same lode as cut in the Fahl Ore Company's tunnel, which is 50 feet below. At about 150 feet the country changes from slate to a brownish much decomposed rock with a greasy feel. This is, probably, a continuation of the serpentine belt seen on the other fall of the hill on the Lynton and other properties, as previously mentioned. For a width of over 40 feet there is a great deal of manganese gossan with seams of rubbly quartz. To ascertain if this was of any value I took a sample across the whole width, but it contained only traces of gold and 6 dwts. 12 grs. silver per ton.

Rich P. A., Sections 1400-91M and 3049-87M, comprising 100 acres.—No work was going on, at the time of my visit, on this property, which lies south and adjoining the Fahl Ore Mine. About a chain and a half from the N.E. corner of Section 1400-91M a shaft has been sunk 33 feet, in the upper part of which, down to the level of the water, the lode is seen averaging about 2 feet wide, containing good bunches of fahl ore, with iron and copper pyrites in a quartz matrix. Further S. a cut has been made into the lode, close to the river, but this was inaccessible owing to floods. On the other side of the river a tunnel has been driven on the course of the lode: this is kept locked, and I did not visit it, but, from the strike of the lode, it seems probable that it will soon pass into block 2329-93M. The North-East Dundas Tramway passes above this tunnel, and from this point follows the river valley up to Deep Lead. Just beyond the Rich P. A. a belt of fine volcanic breccia is passed. Some of the deepest cuttings on the line are through semi-consolidated angular detritus, which forms an excellent ballast, but the prevailing rocks are slates with a general strike of about N. 10° W. and an easterly dip. Just above Conliffe's Creek is a cutting, through heavy boulder-wash, and I noticed pot-holes in the bed-rock filled with pebbles, evidently marking a former level of the river. From this point up to Deep Lead the cuttings are through pinkish, brown, and whitish altered clay-slates, in some places much distorted and folded.

Svengali Mine, Section 386-93M, 80 acres.—In the railway cutting above what is known as Dead Man's Creek, for a width of about 30 feet, there are numerous irregular veins of quartz and siderite running through the slate, giving it quite a brecciated appearance. Further up the spur, which rises rapidly to the S. from the line, a few trenches have been cut, showing a little gossan in decomposed iron-stained slate, and to the W. of the spur a tunnel has been started from the level of Dead Man's Creek bearing S. 60° E.: at the time of my visit this had been driven about 10 feet through black slate, with small veins of siderite, containing splashes of copper pyrites. The country has evidently been shattered, allowing a passage for the circulation of mineral-bearing solutions, and it is possible that these stringers may make into a solid lode at a depth, but the prospects do not seem very encouraging. North-east of this another tunnel is being driven, a few feet above the level of the Ring River, to cut a similar formation seen a few chains higher up, above the junction of the Ring River and Conliffe's Creek. The country in the tunnel, which was in about 54 feet, is altered slate, of various colours, with small veins of siderite running through it, but so far nothing of value.

New Palace Mine, Section 266-93M, 80 acres.—On this section, which lies N.E. of the Svengali, a small lode, carrying fahl ore, has been discovered, and a few tons of good ore have been

obtained. A shaft was sunk 66 feet, and connected with a rise from a tunnel 100 feet below the mouth of the shaft. At 66 feet a drive has been put in, about 20 feet to the S., on the lode, which consists chiefly of gossan, with bunches of clean fahl ore. From the entrance of the tunnel to the rise is 157 feet, bearing S. 10° E.; the tunnel has then been turned to the E., and continued about 50 feet through black slate country, striking about N. and S. and dipping E. No ore is seen in the rise, but a short distance further in the tunnel several small oxidised veins, carrying a little fahl ore, are seen crossing the drive, and it would be worth while testing these by driving to the S. and cross-cutting.

MOUNT READ DISTRICT.

To the east of Deep Lead the slates soon give place to schists, which are, practically, continuous to Rosebery, though varying considerably in texture and composition.

A good corded track has been made from the terminus of the North-East Dundas Tramway to the Mount Read and Hercules group of mines, and most of the mine supplies now come this way instead of being packed from Dundas *viâ* the Pimple. It is a very great improvement on the old track, but is too steep for wheeled traffic, the average grade being between 1 in 6 and 1 in 7.

Mount Reid Mine, Section 3302-87M, 80 acres.—A large deposit of sulphide ore, consisting of a mixture of blende, galena, iron pyrites, and a little copper pyrites, is being opened up on this property by means of open-cast and underground workings. Work was stopped between May and December, 1897, but since then has been carried on continuously. Close to the northern boundary of the section, at an elevation of 2760 feet above sea-level, a tunnel has been driven in a southerly direction in rather flat ground. Ore was struck at about 300 feet from the entrance, and connection made with a shaft 37 feet deep sunk in the ore near the *Mount Read Hotel*. From this point the drive has been continued 135 feet in solid ore, following the hanging-wall most of the way. The ore is very free from gangue, but contains a very large proportion of zinc blende, and Mr. G. P. Sinclair, the manager, informed me that the average assay of the ore from this drive was 35 to 40 per cent. zinc, 10 per cent. lead, trace of copper, 15 ozs. silver, and 3 dwts. gold per ton. About 40 feet ahead of the end a prospecting shaft, now full of water, was sunk 50 feet; the ore body at the bottom is said to be 25 feet wide, and a drive has been made 40 feet S. along the footwall. The bottom of this shaft is about 3 feet above the level of the tunnel. South of this is No. 1 open-cut, the ore body being here about 60 feet wide. On the eastern or hanging-wall side there is solid ore, with small bands of schist impregnated with pyrites for a width of about 30 feet, but on the footwall side it contains a great deal of silica. A cut about 10 feet wide is being taken in in the centre of the ore body. The face shows a good deal of galena, and on the eastern side there is a vein of gossan which will be broken down separately. Thirty feet above this is No. 2 bench, in which the ore body is about 35 feet wide. It is highly siliceous, but shows some good bunches of clean copper pyrites. In places it has a nodular appearance, the ore being evidently a replacement of the schist. In the face of this cut the hanging-wall is almost vertical, and strikes nearly N. and S., but the average strike is about N. 15° W. and the dip easterly 60°–70°. Going E. the country is seen to be a good deal disturbed, and the schists gradually become flatter.

No. 3 bench is about 50 feet above No. 2. The hanging-wall has been stripped, and on the western side of the cut the top of the ore body has been cut, but it dips underfoot, going S., and another cut has been started 10 feet lower.

Going S. along the ridge several prospecting shafts have been sunk, but these were all full of water, and I am indebted to Mr. Sinclair for the following particulars:—In what is known as No. 2 shaft ore was struck at 10 feet from the surface, and the shaft was continued 4 feet in ore, but no cross-cutting was done. No. 3 shaft, a chain further S., is 20 feet deep, ore was struck at at 11 feet from the surface, and a cross-cut from the bottom reached the hanging-wall in 6 feet. On the footwall side of the shaft is hard quartzite, which has not been driven through. No. 4 shaft is a chain S. of No. 3 and is also 20 feet deep; ore was struck at 10 feet from the surface, and cross-cuts from the bottom proved the ore body to be 25 feet wide. This shaft is about 180 feet above the tunnel-level near the northern boundary. No. 5 shaft, a chain S. of No. 4, was sunk 25 feet with cutting the ore. The ore from these shafts contains much less blende and galena than it does further north, and is mixed with a good deal of flinty silica, but it is said to be of high grade for gold, the average from No. 2, 3, and 4 shafts being about 10 dwts. gold, 15 ozs. silver per ton, 5 per cent. lead, and 12 per cent. zinc.

About 7 chains W. of the main workings, on the western fall of a spur overlooking the valley of Booker's Creek, a shaft has been sunk 32 feet, and cross-cuts E. and W. from the bottom show the schist to be impregnated with pyrites for a width of about 24 feet, but so far nothing solid has been cut. It would be very advisable to put in a low-level cross-cut from this side of the spur to the main ore body, which would be thus proved at a considerable depth, and at the same time the footwall country would be prospected for any parallel deposits.

Several small parcels of picked ore have been sent to England and New South Wales for treatment; the assay results of these, as well as the average assay of daily mine samples up to March 29, 1898, are given in the following table kindly supplied to me by Mr. Sinclair:—

Locality.	Gold per Ton.		Silver per Ton.			Lead per cent.	Zinc per cent.
	dwts.	grs.	ozs.	dwts.	grs.		
No. 1, Open-face, average of daily assays	4	12	25	3	21	14·3	27·0
No. 2, ditto	5	0	9	1	12	16·5	23·0
No. 3, ditto	5	12	21	1	12	15·0	25·0
Tunnel	3	10	15	1	6	11·0	35·0
Gossan	10	1	31	11	11		
No. 1, Open-face, bulk sample of 2½ tons sent to England	7	20	54	4	12	8·0	21·2
No. 3, ditto, 2½ tons, ditto	6	12	9	9	11	15·0	25·0
Nos. 1 and 3, ditto, 5 tons, sent to Dapto	10	10	40	12	17	8·5	26·2
Nos. 1 and 3, ditto, 1 ton, ditto	13	1	74	14	2	14·0	28·0
Nos. 1 and 3, ditto, 5 tons, sent to England	7	20	48	12	3	8·5	23·0
No. 1, Open-face, and Tunnel, bulk sample of 5 tons sent to England	7	20	38	16	3	8·0	28·6

From the above it is seen that the ore is very variable, and though parts of it are rich enough to bear the cost of exporting, the ordinary run of ore, on which the future success of the mine chiefly depends, is too poor for this, and must be treated locally; but it has not yet been decided what method of treatment will be adopted. The percentage of zinc in the bulk of the ore is too high to admit of smelting the ore unless mixed with less refractory copper or lead ores, and although numerous wet processes have been patented for treating complex zinciferous ores, so as to recover the zinc and leave a residue containing the precious metals fit for smelting, the cost of treatment has hitherto proved too high for low-grade ores.

The Tasmanian Smelting Company are now erecting smelting-works near Zeehan, which are likely to have a very important influence on the whole district. By mixing with the lead ores from the Zeehan and Dundas Mines they will be able to work in considerable quantities of the more refractory ores, and it would probably be more advantageous for the Mount Reid Co. to thus dispose of their ore rather than erect reduction-works of their own. The cost of treatment, however, is likely to be high, and it may be mentioned that in America an extra charge of 2*s.* per ton is made by the lead-smelting companies for every per cent. of zinc over 12, so that for an ore containing 27 per cent. of zinc there would be an extra charge of 30*s.* per ton in addition to the ordinary smelting charges.

It is probable that the gold and silver are contained chiefly in the galena and pyrites, and experiments should be made by treating a few hundred tons (accurately weighed) in one of the Zeehan concentrating mills to ascertain what loss would be incurred by reducing the zinc in the concentrates down to 10 or 15 per cent. To insure success all the ores in this district will have to be economically handled; but the matter of local smelting is such an important one for the whole Colony that every inducement should be offered by reducing the freights on the Government lines to as low a rate as possible.

A survey has been made for an aerial tramway from the Mount Reid Mine to Deep-Lead, but I understand that the present intention is to connect with the ground tram which is being constructed from the Hercules Mine.

South Hercules Mine, Sections 15-95 and 23-95.—This property, comprising 19 acres, lies N. and adjoining the Mount Reid Mine. On the centre of the southern boundary between the two sections an underlay shaft has been sunk 50 feet on a body of dense sulphide ore, very free from gangue, but containing a large percentage of zinc blende, which is probably a continuation of the Mount Reid Company's ore body. In the bottom the walls are about 4 feet 6 inches apart, striking about N. 20° W., and dipping at a high angle to the E.N.E.; a drive has been started from the N. end of the shaft, but was only in a few feet at the time of my visit. A sample which I took from the back and sides of this drive yielded traces of gold and copper, 9 ozs. 6 dwts. 4 grs. silver per ton, 11·2 per cent. lead, and 22·5 per cent. zinc. This is too poor to be payable at present, but it is probable that in driving richer shoots will be encountered.

About 140 feet below the top of the shaft, and several chains to the N.W., a long cross-cut has been driven, starting on a course of N. 20° E. At 250 feet from the entrance a vein of dense iron pyrites was cut, and the schist for several feet on either side is much silicified, and has a cherty appearance.

Although the iron pyrites is said to contain nothing of value, it is probable that this is a continuation of the ore body seen in the shaft, and I should recommend driving on it N. and S. From this point the cross-cut continues about 370 feet due E., and about 10 feet from the end a little ore was cut in the bottom, and a drive put in N. 32 feet. This drive carries a little fahl ore, but the end is blank, with a little purple fluor spar showing through the schist.

To the S.W. of the main adit, on the opposite side of a small creek running N. W. through the section, is No. 2 adit, driven W.S.W. through siliceous schist. At 20 feet from the entrance "No. 2 lode" was cut, and this has been followed a little E. of S. for 60 feet. The average width

of the formation is about 3 feet, but the ore seems to occur in very short shoots; it consists of dense blende galena and iron pyrites, with a little copper pyrites, and is said to assay about 20 per cent. lead and from 7 to 20 ozs. silver per ton.

Hercules Mine.—The Hercules Gold and Silver Mining Company holds Sections 88-95, 89-95, 100-94, 101-94, 102-94, and 103-94, a total of 52 acres, under lease for gold, and Sections 1918-91M and 2434-93M, containing 67 acres, under Mineral Lease. Several ore bodies have been discovered on this property, and a large amount of exploratory and development work has been done, which it is rather difficult to describe without plans and sections. What is known as "No. 1 Lode" was discovered about 100 feet from the northern boundary of Section 100-94. A shallow adit was driven to cut this, and a drive put in along its course S. 23° E. for 33 feet. At the surface it showed only a few inches of gossan, which widened rapidly going down. Above the level the ore has been taken out to the surface, and below it was stoped underhand for a length of about 20 feet to a depth of 10 feet. These stopes yielded some very high-grade gossan and sulphide ore, and several small parcels were packed to Dundas. 9 tons 13 cwt. gossan averaged over 10½ ozs. gold and 212 ozs. silver per ton, and 62 tons sulphide ore assayed over 2 ozs. gold and 68 ozs. silver per ton.

From the end of the adit a winze was sunk on the footwall 26 feet, at which depth an intermediate level was driven. The ore in the winze averages from 3 to 4 feet wide, but near the bottom becomes much wider, the hanging-wall going off very flat. From the bottom a cross-cut has been driven through about 12 feet of gossan, and the winze sunk 24 feet below the intermediate level following the hanging-wall. The ore in this winze is chiefly gossan, with a little sulphide through it, but solid sulphide ore was coming in at the bottom. Mr. Booth, the General Manager, informed me that the average assay of this gossan was about 1 oz. 6 dwts. gold and 30 ozs. silver per ton, and of the sulphide ore, 6 dwts. gold and 15 ozs. silver per ton. At the intermediate level the N. drive (N. 15° W.) was driven 28 feet. The gossan obtained from the winze is being stacked in this drive, so that the end could not be seen, but the ore seems to have dipped underfoot, and in the end it is said to be only a small vein The ore from this drive is said to have assayed up to 15 dwts. gold and 50 ozs. silver per ton, bnt south of the winze it was of much lower grade. The S. drive follows the footwall and continues in ore for about 40 feet, after which the ore pinches and gradually cuts out. At about 60 feet from the winze a cross-cut driven 12 feet to the E. shows about 4 feet of solid iron pyrites of no value. From this point the drive was continued in blank ground for about 45 feet, and connected with a rise from No. 2 tunnel about 42 feet below.

About 80 feet S. of No. 1 tunnel a trench has been cut across what is known as the "Big Sulphide Lode," which lies to the west of the line of No. 1: it consists of dense sulphide ore about 40 feet wide, having a laminated structure parallel to the enclosing schists; but on the hanging-wall there is a good deal of galena and copper pyrites mixed with quartz. The ore body underlays rather flat to the E., and a vertical shaft (now full of water), sunk from the hanging-wall, cut the footwall at 46 feet.

Fifty feet further to the S.E. is a large outcrop of gossan, and a prospecting shaft has been sunk about 30 feet, from the bottom of which a drive was put in S. 30° E. about 40 feet, all in gossan. I took a sample of the gossan all along this drive, which assayed 11 dwts. 10 grs. gold and 17 oz. 14 dwts. 10 grs. silver per ton. Below this drive a winze was sunk 9 feet, when sulphide ore was struck, and water became too heavy for baling.

About 85 feet below the outcrop of the "Big Lode" is No. 2 tunnel, which was driven 150 feet a little S. of E., then nearly 400 feet a little N. of E. At about 200 feet from the entrance, solid sulphide ore 2 to 3 feet wide was cut: this is supposed to be the "Big Lode," but in driving S. the ore cut out in a few feet. The drive has been continued about 70 feet, and for the last 20 feet bands of blende are seen running diagonally across the drive with a little galena and quartz: the end, at the time of my visit, was in schist heavily impregnated with pyrites.

Twenty feet past this drive, in the main tunnel, No. 1 Lode was cut, and a rise put up to the intermediate level as mentioned above.

In this rise good ore is seen for about 20 feet, when it gradually cuts out. In the N. drive (N. 26° W.) ore continued for about 60 feet from 1 to 3 feet wide. In the end the country is a good deal broken and stained with oxide of iron, from the water draining from the winze being sunk below the intermediate level immediately above the end. Going S. the ore cut out in about 10 feet, dipping under foot, and the end is in clean grey schist. Going E. along the tunnel, small bands of sulphide ore with a good deal of quartz are seen for about 30 feet, followed by a belt of intensely hard silicified schist, which is, probably, connected with another body of ore. At about 370 feet from the entrance, what is known as the "Antimony Lode" was cut, and driven on S. for about 25 feet. For a width of 7 or 8 feet the schist is impregnated with antimonial fahl ore and galena with small veins of fairly pure ore. A sample which I took from various places in the back of the drive across the whole width assayed traces of gold, 18 oz. 9 dwts. 2 grs. silver per ton, 1 per cent. copper, and 0·6 per cent. antimony. A short distance past this a fault is seen in the country, and a vein of iron pyrites about 4 feet thick has been thrown a few feet to the E. The country in the end of the cross-cut is hard cherty schist, with a little pyrites through it.

Some 8½ chains south of No. 2 tunnel, and about 40 feet above it, is No. 3 tunnel, which has been driven N. 65° E. a little over 200 feet. At 120 feet a gossan formation was cut about 16 feet wide, with a band of sulphide ore on the hanging-wall. A drive has been put in 70 feet to the north along the footwall, which consists of soft decomposed argillaceous schist, striking about N.

15° W.; and at 40 feet in this drive a cross-cut driven to the east shows 16 feet of gossan, with sulphide ore on the hanging-wall. Going N. sulphide ore replaces the gossan for some distance, and in places large kernels of undecomposed sulphide are seen in the gossan, making the ground very heavy. In the S. drive, 36 feet from the main cross-cut, a rise has been put up to the surface 60 feet on the underlay, all in gossan, and just beyond this a cross-cut to the E. cut the hanging-wall at about 10 feet. Going S. sulphide ore replaces the gossan and dips under foot, the face being very much broken with veins of quartz. The gossan from this tunnel is said to average about 12 dwts. gold and 20 ozs. silver per ton.

Immediately over No. 3 tunnel, and about 50 feet above it, the gossan is showing in an open cut, and a prospecting adit proved it to be here, about 20 feet wide; the adit was continued 30 feet further, but did not cut any more ore. This ore body lies considerably W. of the line of those met in the northern workings, and it would be very advisable to continue No. 3 tunnel.

No. 4 tunnel is on the same level as No. 2, the entrance being about 3 chains S.W. from No. 3. At 240 feet from the entrance a small vein of sulphide ore was cut, which on driving N. widened in a few feet to 3 or 4 feet solid ore, with a little quartz, striking about N. 10° W. At 35 feet from the cross-cut a rise has been put up about 40 feet, and I took a sample of the ore exposed, which assayed 3 dwts. 6 grs. of gold, 20 ozs. 18 dwts. 3 grs. silver per ton, 0·5 per cent. copper, 16·2 per cent. lead, and 16·5 per cent. zinc. Going N. the drive continues all in ore for some distance, the hanging-wall not being seen, but in the end, 40 feet beyond the rise, the ore is cutting out, and the country is getting very hard. This is evidently a different run of ore to that worked in No. 3 tunnel, the latter lying further E., and having an easterly underlay. A few feet beyond the N. drive a drive has been put in 30 feet S. 40° E.; a little ore has been obtained in bunches, but nothing permanent. The end is in nodular schist, which seems to be unfavourable for ore. The main cross-cut has been continued about 60 feet beyond the S. drive, the end being in kindly looking schist, with small veins of carbonate of manganese. At the mouth of the tunnel is a large pile of ore obtained from the N. drive, shewing patches of copper pyrites and a little fahl ore, which is said to average 10 dwts. gold and 20 ozs. silver per ton, and 12 per cent. lead.

About 115 feet above this tunnel is an open cut, close to the pack-track from Deep Lead. In this cut a band of sulphide ore 18 inches to 2 feet wide is seen on the western or footwall, and about 12 feet of gossan on the hanging-wall, containing a good deal of carbonate of lead, with 2 to 3 feet of schist between the two. A prospecting shaft has been started in the gossan, and at the time of my visit was down about 15 feet. The band of schist gets smaller going down, and in the bottom of the shaft solid sulphide ore is coming in on the footwall side.

The experience gained, so far, goes to show that the ore occurs in lenticular bodies generally parallel to the foliation of the enclosing schists, and it has probably been deposited along planes of weakness in a shear zone, in a similar manner to the Rosebery deposits. It is to be expected that the ore bodies will gradually cut out in depth, but, judging from the experience gained on similar deposits in other parts of the world, there is little doubt but that it will make again at a lower level. Frequent cross-cutting will be necessary at different levels to ensure that no shoots of ore are missed. Probably as the deposits are better opened up it will be found that they occur according to some general rule, and, for determining this, accurate plans of the workings with frequent cross sections will be of great assistance.

The ground falls rapidly to the W., and since my visit a fifth tunnel has been started between No. 2 and 4, but 150 feet below them. This will have to be driven a considerable distance before reaching the ore bodies seen in the upper levels, which all underlay to the E. into the hill, but it will prospect the footwall country for other parallel deposits which are very likely to be found. It is proposed to shortly introduce rock-drills, which will effect a great saving both in time and money, as some of the country is very hard for hand-drilling. Firewood is scarce, and it is probable that the Montezuma Falls will be utilized to generate electricity, which will be conveyed to the mine by cable, and either used to work electrical drills or to drive an air compressor.

A ground tramway is now being constructed to connect the mine with the N.E. Dundas Line at Deep Lead, the fall from the top of the haulage line on the Barlen Hercules Section being, according to my aneroid measurement, 1530 feet, and the length of the line is about a mile. This point is a few feet lower than the mouths of Nos. 2 and 4 tunnels, with which it will be connected by a tramway along the side of the hill.

An offer was made sometime ago by the Tasmanian Smelting Company to take 500 tons of gossan, 750 tons suphide ore, and 250 tons antimonial ore per month, on what are stated to have been very advantageous terms; but I understand that this offer has been refused, and I have been informed on good authority that the Hercules Company contemplate erecting smelting works close to the Burnie-Waratah Railway about 22 miles from Burnie, where a suitable site has been chosen, with limestone and ironstone close at hand. The sulphide ore is similar to that of the Mount Reid Mine, and the bulk of it contains too much zinc to be smelted by itself, but it is proposed to drown the zinc by mixing with clean lead ores and with the gossan from the mine. The oxidised lead ores of the Magnet Mine which are too poor to export would be very suitable for the purpose, and if the works were erected doubtless several of the mines in the Whyte River and Heazlewood Districts would be re-opened. It will be difficult to connect the mine with the Burnie-Zeehan Railway. The rise from Rosebery to the Hercules Mine is over 2000 feet, the distance in a straight line being about five miles, and the intervening country is very broken, so that an aerial tramway will probably be necessary.

Barlen-Hercules Mine, Section 30-92.—This is a small property of 10 acres lying N. and adjoining Section 100-94 of the Hercules Company, and a lot of prospecting work has been done on it, with disappointing results.

About 4½ chains from the S.W. corner of the section, close to the southern boundary, a shaft was sunk 26 feet by the original holders of the section, and from the bottom a cross-cut was driven to the E., cutting a small vein of rich sulphide ore about 130 feet from the shaft, but this soon cut out when driven on to the N. The shaft has now been connected with the surface by a cross-cut W. from the bottom about 25 feet long, and in the eastern cross-cut a little further prospecting has been done, but nothing of consequence discovered. About 2½ chains to the N.W. is No. 1 adit, which has been driven almost due E. about 370 feet through argillaceous schist, which for the first 90 feet is very much broken and disturbed. The first ore was cut at about 145 feet from the entrance, and a drive was put in 23 feet to the S. and about 6 feet to the N. In the S. drive the ore cut out in about 20 feet, and going N. it cut out almost at once. 100 feet further in, a vein of sulphide ore was cut about 2 feet wide, striking about N. 28° W. with an easterly underlay, and the course of this has been followed about 130 feet N. of the cross-cut, and 67 feet S. In the N. drive mixed sulphide ore was obtained for 45 feet, after which the ore is chiefly low-grade iron pyrites, with occasional patches of copper pyrites. A few feet from the main cross-cut a winze was sunk on the hanging-wall side, and it was expected to cut the footwall at about 20 feet, but at 39 feet a cuddy put in to the W. showed the footwall to be 6 feet away, and underlaying W. A rise has now been started, and was up about 8 feet at the time of my visit. A little ore is showing in the top which is said to assay about 7 ozs. silver and 2 dwts. gold per ton. At 50 feet a cross-cut has been driven 55 feet E.N.E., and a small vein cut carrying quartz and blende, but nothing of value.

In the S. drive the ore cut out in a few feet, but soon made again and continued to about 55 feet. In the end the country is very much broken and disturbed.

About 290 feet from the entrance of the tunnel a large burst of water was met with, and for about 9 feet there is a good deal of quartz and pyrites through the schist, but nothing payable. The end of the tunnel is within about 90 feet of the E. boundary of the section.

No. 2 adit starts about 70 feet from the western boundary, and has been driven over 400 feet parallel to No. 1, and about 90 feet below it. At 295 feet from the entrance a vein of sulphide ore (an intimate mixture of pyrites, zinc blende, and galena), about 3 feet wide, was cut, striking about N. 18° W., and a drive was put in 63 feet to the S., but the ore cut out in a few feet. From the end of this drive a crosscut was driven W.S.W. 23 feet without cutting any ore. A drive was also started N. of the main crosscut and driven about 7 feet, when the ore pinched, and the drive was discontinued. About 80 feet further in the schists are heavily impregnated with pyrites for several feet, and a drive has been put in 52 feet to the S.S.E., passing directly below the winze sunk from the upper level; 15 feet further along the main cross-cut a drive has been put in 45 feet to the N.N.W. A little low-grade sulphide ore was obtained from these drives, and in the N. drive a patch of barytes, carrying clean copper pyrites, was cut, but only lived a few feet. The end of the cross-cut is about 20 feet beyond the N. drive, in hard quartzose schist striking N.N.W. and dipping to the E N.E.

North Hercules, Sections 96-94 and 97-94, containing 20 acres held under lease for gold, and Section 200-93M, 43 acres, held under mineral lease.—A prospecting tunnel has been driven about 400 feet on Section 96-94, but no ore has yet been met with. The country rock is very hard, and does not seem favourable for the occurrence of ore.

Messrs. Twelvetrees and Petterd have made a microscopical examination of several specimens of rock from this property, and are of opinion that it is a schistose felsite or porphyroid. It probably represents an ancient lava flow or tuff interbedded with the sedimentary strata, the schistose strata being due to intense shearing action.

Similar rocks are seen on Section 234-93M belonging to the Hercules Consols Copper-Silver Mining Company, on which a prospecting tunnel has been driven about 180 feet, the country in the end showing a little pyrites, but nothing of value. On the pack-track beyond the tunnel the schist is seen slightly impregnated with pyrites, blende, and galena, but I do not know if any other prospecting work has been done, as the manager was unfortunately away at the time of my visit.

Ring River Mine, Section 252-93M, 40 acres.—A belt of pyritiferous schist passes through this section, and a good deal of work has been done on it. About 8 chains from the southern and western boundaries of the section the outcrop is seen on the hill above the pack-track to Mount Read at an elevation of 1540 feet above sea level. The country consists of argillaceous schists similar to those seen in the Rosebery District, striking a little W. of N. and dipping to the E., and for a width of about 18 feet they are impregnated with iron and copper pyrites, which appear to be making more solid underfoot. A vertical shaft was sunk 50 feet, from which some very solid ore, containing a good deal of copper pyrites, was obtained. The shaft passed through into footwall country, and from the bottom a cross-cut was driven E. about 28 feet to the hanging-wall and connected with a rise from the tunnel level 87 feet below. In this cross-cut the schists are impregnated with pyrites for about 20 feet, with bunches of solid ore, and on the hanging-wall there is a seam of solid iron and copper pyrites, about 18 inches to 2 feet wide.

No. 1 tunnel, which is 137 feet below the top of the shaft, is driven S. 55° W. about 240 feet, cutting the hanging-wall of the formation at 220 feet, and drives have been put in along the

hanging-wall 82 feet N. and 190 feet S. The end of the cross-cut is in clean footwall country, the schist containing a little ore for about 10 feet past the drive. Where cut the formation carried a good shoot of ore pitching to the N., and in the N. drive it goes under foot about 25 feet from the cross-cut; from this point to the end the drive has been unproductive.

In the S. drive, at 22 feet from the main cross-cut, a winze was sunk 15 feet and some good ore obtained, but the water proved too heavy for baling. At 38 feet is the rise 87 feet high connecting with the cross-cut from the vertical shaft as mentioned above, and 12 feet beyond the rise a cross-cut driven 22 feet to the W. passed through 3 or 4 feet of solid ore, average samples from which are said to have assayed 10 to 19 grains gold per ton, 10 to 15 ozs. silver per ton, and 21 to 24 per cent. copper. The drive continues along the hanging-wall, showing a little ore in places, and a good deal of barite. About 70 feet from the end the country is very much broken, and a cross-course dipping S. has been followed W. for about 20 feet, carrying a little soft friable ore. The country in the end of the main drive is crumpled schist, with a little pyrites through it. I took a sample from the ore exposed in this level and in the rise, which assayed traces of gold, 4 ozs. 18 dwts. silver per ton, 9 per cent. copper, and 0·7 per cent. zinc. Although low in silver, this ore would be valuable to mix with the Mt. Read or Rosebery ores. About 30 feet from the entrance of the tunnel a parallel formation carrying a mixture of blende, galena, and pyrites, was cut, and has been followed S. about 50 feet. 100 feet below No. 1 tunnel a second tunnel has been started about 5 chains from the northern boundary of the section. Its course is about S. 11° W., so that it will cut the "lode" at a very acute angle, the reason for giving it this direction being that towards the N. and E. the ground falls rather rapidly towards the Ring River, which runs through the northern part of the section. This stream is said to contain about 4 heads of water in the middle of summer, and would be very useful for driving concentrating machinery, a good fall being obtainable by going a short distance up. The mine could be easily connected with the N. E. Dundas Tramway at Deep Lead.

Ring Hercules Mine, Section 259-93M, 40 acres.—The belt of mineralised schists has been traced southward into this section. In several trenches near the top of the spur the schists are seen heavily impregnated with iron and copper pyrites for a considerable width, and it is probable that a solid body of ore will be found at a depth. The ground falls rapidly to the west, and a tunnel is being driven in an easterly direction about 2 chains from the northern boundary of the section. At the time of my visit this tunnel was in about 120 feet, but will have to be continued a good deal further before reaching the formation seen in the trenches. The country passed through in the tunnel is a siliceous schist spotted with iron pyrites.

South Jupiter, Section 1390-93M, 52 acres.—A prospecting tunnel is being driven on this section, and was in about 100 feet when I saw it. The country passed through is a hard grey spotted schist, with transverse joints, which cause it to break into large blocks. Several varieties of this rock are seen in the district, and require careful study. They are highly metamorphosed rocks, but whether originally of sedimentary or igneous origin is at present doubtful. So far as can be judged they are not favourable for the occurrence of ore.

Jupiter Mine, Sections 409-93M, and 410-93M, formerly known as Allom & Morley's.—About the centre of this property, close to the Deep-Lead Saddle, some trenching has been done across an outcrop of schist, which for over a chain in width is impregnated with iron and copper pyrites, and a tunnel is now being driven bearing S. 70° W., to cut this formation at a depth of about 125 feet. At the time of my visit this tunnel had been driven about 230 feet through greenish argillaceous schist, similar to that seen in the Tasmanian Copper Mine, striking a little W. of N., and dipping to the east. A little copper pyrites was met with at about 80 feet from the entrance, and at 125 feet a vein of fairly solid cupriferous pyrites was cut about 18 inches wide in the bottom and 6 inches wide in the back of the level, and beyond this for nearly 50 feet the schist is strongly impregnated with iron and copper pyrites, with several small veins of solid ore. From this point to the end of the tunnel the schist contained very little pyrites, but for the last few feet it is very heavily mineralised, and other veins of solid ore will probably be cut. I took a sample by chipping from the veins already cut, altogether about 4 feet in thickness, which yielded traces of gold, 2 ozs. 9 dwts. silver per ton, 9·5 per cent copper, and 0·5 per cent. zinc. These veins are well worth further prospecting, and experiments should also be made to find out what proportion of the valuable metals could be saved by concentrating the mineralised schist. To the N. of the outcrop the ground falls towards a small creek, one of the numerous feeders of the Natone Creek, and from the level of the creek an adit could be brought in about 280 feet below the outcrop.

The corded track which is now being constructed between Deep Lead and Rosebery will pass within a short distance of these workings. This track will be of great advantage to the district, and the grades should be made so that it can be converted into a cart-road if necessary.

North Jupiter, Section 1612-93M, 79 acres.—This is an irregularly shaped section lying to the west of Section 409-93M, but overlapping it on the N. and S. A tunnel has been driven about 100 feet nearly due N., parallel to the schists, which, as seen in a long trench above the mouth of the tunnel, are more or less impregnated with pyrites for a considerable width. In the tunnel a little solid ore, consisting of an intimate mixture of blende, galena, and pyrites, is seen underfoot in several

places. The schist throughout contains a good deal of quartz which carries splashes of copper pyrites, and in the end there is a good deal of carbonate of manganese. At 70 feet from the entrance a cross-cut has been driven about 35 feet to the E., and a vein of sulphide ore about 3 feet wide was cut, consisting chiefly of zinc blende, with galena and iron and copper pyrites. This is worth further testing by driving N., although the ore at present seen is of little value. The belt of mineral-bearing schist seen in the Jupiter Sections is, I think, a good deal to the east of the tunnel but prospecting is difficult owing to the dense undergrowth.

Venus Mine, Section 581-93M, 40 acres.—On this Section several trenches have been cut across a well defined gossan outcrop, which has been traced for 3 or 4 chains. It is about 3 feet wide, striking N. and S., and underlaying about 70° to the E. Not enough work has been done to determine its value, but it has a promising appearance, and is worth further prospecting. A tunnel has been started about 65 feet below the outcrop, and at the time of my visit was in about 60 feet, but will probably have to be continued 70 or 80 feet further before cutting the lode. To the east of this line, and several chains further north, some trenching has been done in the bed of a small creek running to the west, and a little pyrites is seen disseminated through the schist, but nothing of any importance.

Section 471-93M, 79 acres belonging to the Orion Mining Company, lies to the north of the last-mentioned section on the western fall of a long spur running down from Mount Read. A tunnel had just been started close to the southern boundary along a vein of quartz containing oxides of iron and manganese about 2 feet wide, striking apparently a little E. of N. and underlaying E. The outcrop is seen in a trench higher up the hill, but so far as seen contains nothing of value. Some chains further N.W. is another strong outcrop of quartz and gossan running about N. and S., on which a few feet of driving have been done. This gossan is of a very "kindly" nature, and is worth further testing, which could be easily done by a short cross-cut, as the hill slopes steeply to the west.

LAKE DORA DISTRICT.

I went to Lake Dora *viâ* the Red Hills, the track passing over the top of Mount Read 3660 feet above sea-level, and on the way had a look at the workings of the Red Hills Mining Co. This company holds Sections 714-93M, 715-93M, 753-93M, 760-93M, 953-93M, 954-93M, 1484-93M, 1485-93M, 1927-93M, 1928-93M, a total of 485 acres, situate at the south end of Mount Murchison. The workiugs are situated on either side of a broad barren ridge running a little W. of N. and E. of S., the highest point being about 2900 feet above sea-level. On the western slope, about 90 feet below the summit, a tunnel has been driven 53 feet bearing N. 70° E. through a compact greenish rock, the exact nature of which I have not as yet been able to determine. Splashes of iron and copper pyrites occur all through it, with bunches and small threads of red felspar. It weathers with a reddish brown crust, whence the name Red Hills. Near the top of the ridge above the tunnel a small trench has been cut showing hematite and iron and copper pyrites. The country has here more of a schistose structure, resembling chlorite schist, but it is undoubtedly an altered igneous rock. Going N. along the ridge a great deal of red oxide of iron with pyrites is seen, and good assays for silver and gold are said to have been obtained.

In a trench towards the eastern side a very interesting occurrence is seen. To the naked eye the rock appears to consist chiefly of earthy hematite with well-defined scattered crystals of felspar. Messrs. Twelvetrees and Petterd have made a microscopical examination of a specimen which I have brought away, and have kindly furnished me with the following note:—

"*Composition of rock.*—Original constituents: Porphyritic crystals of orthoclase felspar; secondary constituents: chlorite, epidote, quartz, and hematite. The felspars preserve their original outlines, are seamed with decomposition cracks filled with ferruginous matter, and sometimes with grass-green chlorite, now and then with small epidote veins.

"The ground-mass is largely occupied with chlorite and fan-shaped feathery radial aggregates of epidote. The individual sods of epidote extinguish in polarised light in the direction of their greatest elongation, are pleochroic, and polarise in high interference colours: a deposit of iron oxide marks their graceful curves. Occasionally this tufted silicate may be seen to have entirely replaced the substance of some large porphyritic crystal. Veins of pale green chlorite, often associated with epidote, traverse the stone: occasional grains of quartz (probably secondary) occur.

"The great feature of the specimen is that it is an iron ore (hematite) which has nearly wholly replaced the original substance of an igneous rock; hence this sample is highly instructive. The theory of metasomatic replacement has been suggested as the most probable explanation of the origin of the ore bodies in the schist belt of the West Coast of Tasmania, but hitherto no direct evidence has been forthcoming. We have now an indisputable illustration of the process which has here converted all the rock, with the exception of a few felspar crystals, into hematite, apparently subsequently to chloritisation and epidotisation. The material is not sufficient for the determination of the original rock; the orthoclase felspars resemble those occurring in felsite, but the chlorite and epidote must have been derived from a ferro-magnesian mineral, such as hornblende, biotite, or augite. Further samples should be sought, for this solitary insignificant looking specimen has thrown a flood of light on the genesis of ore bodies in the West Coast Range."

On the eastern slope, which is here very steep, a tunnel has been started, bearing S. 70° W. on the line of the western tunnel, but 140 feet lower, near the entrance, a good deal of pyrites is seen for several feet, with hematite, magnetite, quartz, and a little copper pyrites. To the S.E. of this, and 75 feet below it, a third tunnel was started and driven about 30 feet; for several feet near the entrance there is solid hematite with magnitite and iron pyrities, which is said to carry a little silver and gold, but not in payable quantities.

Since my return a new discovery has been made on one of the northern sections, from which I have seen good-looking samples containing solid copper and iron pyrites with magnetite. A good deal of ground has been pegged in this vicinity, and prospecting was being carried on on several sections which I was unable to visit. From general appearances the district seems a very promising one, and, as it is nearly all open country, prospecting will be comparatively easy, but better means of access are urgently required. The track by which I came, over the top of Mount Read, is quite impracticable for horses, but I believe that connection could be made with the pack-track from Mount Read to Dora in two or three miles with a good grade, and it would be advisable to make this at once. It is probable that a good track could also be found to the north of Mount Read, either crossing the leading spur and going to Deep Lead, or winding down into the Koonya Valley to Rosebery, and this would open up some very likely mineral-bearing country.

From the Red Hills my route lay past the S.W. corner of Lake Selina (elevation, 1725 feet above sea), thence S.E. across a large button-grass flat (probably the silted-up bed of an old lake), on to the Read-Dora track, which goes past the north end of lake Rolleston, and winds up the spur to the S.E. on to the Lake Dora Plateau. With the exception of a few belts of timber in the gullies and more sheltered spots, it is all open country covered with button-grass, and occasionally huge boulders of conglomerate are seen. The general level of the country round Lake Dora is between 2400 and 2500 feet above sea-level. To the west the ground rises to Walford Peak (3300 feet), which is separated by a rough gorge from Mount Tyndall. To the south are the conglomerate foothills of Mount Sedgwick.

In the neighbourhood of Lake Dora the principal country rocks are quartzose, micaceous, and chloritic schists, passing into slate, grits, and conglomerates. The general strike is from N. 10° W. to N. 20° W., approximately parallel to the schists in the Rosebery and Mount Read Districts, but, whereas the latter dip to the E., the Dora schists dip to the W., so that they are on opposite sides of a huge synclinal fold. As far as could be seen, the surrounding hills are all capped with conglomerate resting uncomformably on the schists. In addition to Lake Dora, which is a narrow lake about a mile long, there are numerous other smaller lakes with their longer axes lying approximately parallel to one onother. From the general configuration of the country, the rounded hummocks (Roches moutonnées), the planed-like surface of the rocks, and the huge scattered boulders of conglomerate, it is evident that the country has been subjected to glacial action, which has doubtless helped to carve out many of the deep valleys further north.

A great number of sections have been pegged on this field, but on comparatively few has any work been done.

Lake Dora Mine, Sections 729-93M and 730-93M, 160 acres.—On the east side of a ridge running N. 10° to 15° W. through the southern block Section 730-93M, a tunnel had just been started at the time of my visit, bearing S. 60° W., in a coarse grit containing occasional rounded pebbles. On the top of the ridge, 90 feet above the tunnel, a trench has been cut across a formation containing hematite with a little galena and copper pryites, but it is not well defined, and the country does not seem favourable for a good body of ore.

On the northern section near the S.E. corner, and about 50 feet from the southern boundary, a deep trench has been cut about 70 feet long, running about N. 70° E. In the west end of the trench is a hard brecciated rock gradually merging into schist, and for a width of about 25 feet there is a great deal of iron pyrites disseminated through the schists with several bands of solid pyrites, striking about N. 20° W., and a little copper pyrites is seen throughout. This is worth further prospecting, and to the N.W., near the head of a small lake, the approach has been cut for a tunnel to come in under the trench, but, as this would only give 90 feet of backs in about 350 feet of driving, it would probably be cheaper to sink a prospecting shaft on the formation and then crosscut.

About 2½ chains from the northern boundary of the section, and 11 chains from the western boundary, a trench has been cut to the S. W. about 40 feet above Lake Dora. For the whole length of the trench, which is about 55 feet long, copper pyrites is disseminated more or less all through the schist, and in some places small bunches of clean ore are seen. I took a sample by chipping from both sides of the trench for a width of about 25 feet, which contained traces of gold, 3 ozs. 18 dwts. 8 grs. of silver per ton, and 1 per cent. copper. This is too poor to send away as it is, but it might be possible to make a marketable product by concentrating, and tests should be made to find out what the loss in silver would be by bringing the copper contents up to, say, 10 per cent. It is probable that the ore will become more solid at a depth, and it would be well worth while sinking a prospecting shaft.

Royal Dora, Section 2010–93M, 78 acres.—Going N.W. from the last-mentioned trench several small trenches are seen on this section showing similar dark green chloritic schist more or less impregnated with iron snd copper pyrites. About 6 chains from the southern boundary a shaft has beeh sunk about 20 feet, close to the southern margin of a small lake, through schist splashed with

copper pyrites. The shaft is at the N.E. end of a trench about 100 feet long running S. 30° W., the schist containing a little copper pyrites all through it, but not in payable quantities. The top of the shaft is only about 40 feet above the level of the small lake before referred to, which lies about 10 feet higher than Lake Dora, and a shallow trench has been cut between the two lakes, which it was proposed to deepen for the purpose of draining the smaller one, but the cost of this work would be quite out of proportion to the advantage gained. The country seen in the trench is altered clay slate, striking about N.N.W. and dipping W.S.W. It contains a good deal of calcite, and in places a little pyrites is seen through it, but nothing of any value.

On Section 677-93M, belonging to the Lady Dora Copper Mining Company, No Liability, a prospecting shaft is being sunk close to the eastern boundary on the line of the pyrites-bearing belt seen in the Lake Dora and Royal Dora Sections. The copper contents of the schist gradually decrease going N., and at this point very little ore is seen.

On Section 2011-93M a little trenching has been done, and a few shots have been put in where the schist outcrops. The schists contain frequent nodules of calcite and blebs of quartz, and occasionally a little pyrites and galena is seen, but I saw nothing of any importance.

Dora Reward, Sections 14-96 and 15-96.—These are two 15-acre blocks at the N.W. end of Lake Dora, which were originally granted as reward claims for gold About 7 chains from the northern boundary of the northern section a tunnel has been driven W. about 60 feet. Near the entrance the schists for several feet are impregnated with pyrites, and a little pyrites is also showing in the end. At about 40 feet a small vein of solid iron pyrites was cut and followed a few feet S. 20° E., but did not prove of any value, and work has been abandoned. To the west, 70 feet above the tunnel, a few shots have been put into an outcrop of quartzose schist, striking about N.N.W. and dipping W.S.W., which for several feet is strongly impregnated with pyrites. 3 or 4 chains further north several trenches have been cut in a westerly direction showing a little copper and iron pyrites disseminated through the schist. From the west end of one of these trenches a shaft has been started, and at the time of my visit was down about 10 feet. For a width of 15 feet in this trench there is a good deal of iron and copper pyrites, with bunches of magnetite, and occasionally scales of native copper lying between the foliation of the schists, but so far nothing payable has been met with. In the shaft the country is seen to be traversed by a series of transverse joints, which might sometimes be mistaken for the walls of a lode.

Sections 752-93M and 2009-93M.—These sections, containing 121 acres, are held by the South Dora Gold, Copper, and Silver Mining Co., No Liability, and a good deal of prospecting has been done on the northern block, Section 752-93M, which is west and adjoining the Dora Reward sections. The principal work is a prospecting tunnel, which, at the time of my visit, had been driven about 50 feet, bearing N. 55° W. The country passed through is a somewhat compact felsitic rock, with blebs of glassy quartz, and may, possibly, be of igneous origin; but it is much altered, and its nature cannot be determined without microscopical examination. On one side of the tunnel a flat vein of broken quartz and pug is seen apparently faulting the country. To the N.W., 60 feet above the mouth of the tunnel, a small vein of copper pyrites, with malachite and azurite, is seen, and 40 feet higher up a cut has been made across a formation showing iron and copper pyrites, with the somewhat rare minerals erythrite or cobalt bloom and glance cobalt. Further attention should be paid to these minerals, as, if present in any quantity, they would be of considerable value. Both of these formations can be easily prospected from the tunnel.

On what is known as the "West Lode" a cut has been started to the S.E. showing a good deal of copper pyrites, bornite, and chalcocite, for a width of 5 or 6 feet. This ore is of low grade, a sample which I took from the face returning only traces of gold, 6 dwts. 12 grs. silver per ton, 6·2 per cent. copper, and 1 per cent. tin; but it is worth sinking on to see if the ore improves in depth. The formation has been traced for several chains to the S.E., containing chiefly iron pyrites.

On the southern section, close to the northern boundary, a trench has been cut to the N.E. through nodular schist containing a good deal of magnetite and iron pyrites, but nothing of any value.

Dora Mine, Section 676-93M, 75 acres.—Close to the southern boundary of this section a shaft was being sunk, which, at the time of my visit, was down about 30 feet, showing occasional bunches of iron and copper pyrites through the country, but nothing of any value. The shaft is sunk at the W. end of a deep trench, and for about 6 feet east from the shaft the schists, striking N.N.W. and dipping about 80° to the W.S.W. are slightly impregnated with pyrites. To the N.W. of the shaft several trenches have been cut, all showing a little pyrites through the schists, and in the most northerly one, about 10 chains from the shaft, and 90 feet above it, there is more or less iron and copper pyrites and zinc blende for a width of about 25 feet, but the indications are not very promising for the existence of a solid ore body below. To the east the country changes to a felspathic grit.

North Dora, on Section 681-93M, 80 acres.—An approach about 45 feet long has been cut and a tunnel driven S.E. about 25 feet through dark green quartzose schist, with a little copper and

iron pyrites irregularly disseminated through it. About 250 feet beyond the mouth of the tunnel, and 65 feet above it, a few shots have been put into an outcrop of schist, showing a good deal of iron and copper pyrites with stains of malachite for a considerable width. The N.W. corner of this section is about 120 feet below the tunnel, so that a lower working tunnel could be put in should anything payable be discovered in the upper one. The same company also holds Section 1074-93M, of 40 acres, lying to the N. of Section 681, and a little surface trenching has been done showing pyrites through the schist, but so far as I could see nothing of importance has been discovered.

Mount Dora, Section 735-93M, 76 acres.—This is one of the few heavily timbered sections on this field, lying on the steep slope at the S.E. end of Lake Rolleston. Work at the time of my visit was confined to trenching, near the southern boundary, to try and pick up the belt of pyritiferous schist seen in Section 681. In the northern part of the section a few shallow trenches have been cut, in which a little pyrites is seen disseminated through the schist, and in one trench several small veins of gossan were cut, with bunches of quartz carrying a little galena. The ground slopes steeply to the W., and 80 feet below this trench a tunnel was started a little N. of E., but was discontinued after driving about 10 feet through schist, carrying a little pyrites and galena. This would be a useful prospecting work, and should be continued.

From the above brief description of the work done on this field, it is seen that it is still in the prospecting stage, and, owing to its remoteness, development is likely to be very slow.

Copper-bearing minerals, carrying a little gold and silver, have been found over a large area, and though so far nothing payable has been discovered, the surface indications in several instances are sufficient to warrant further prospecting. This is very expensive owing to the great cost of getting in supplies, and very little surface work can be done to advantage in the winter owing to the inclemency of the climate. In most cases it will be necessary to sink before the ground can be properly tested, and it would be very advisable for two or three of the companies to amalgamate and sink a good prospecting shaft. I do not think that water is likely to prove very heavy, and it is probable that a depth of 100 feet could be reached with a whim or a whip.

Should the Great Northern Railway be extended from Rosebery to Mount Lyell, it will probably pass through the gap to the west of Lake Selina, and a short branch line could easily be made to connect with the Dora Field in the event of payable ore being found in sufficient quantities.

I take this opportunity of thanking the various mine managers, to whom I am much indebted for the hospitality and kindness extended to me throughout the trip.

I have the honour to be,

Sir,

Your obedient Servant,

J. HARCOURT SMITH, *Government Geologist.*

W. H. WALLACE, *Esq.*,

Secretary for Mines, Hobart.

WILLIAM GRAHAME,
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