



PROGRESS REPORT on the Mount Zeehan Silver and Argentiferous Lead Lodes, and other Ore Deposits, in the County of Montagu, West Tasmania.

Mining Geologist's Office, Launceston, 14th December, 1888.

In the following Report it is respectfully submitted that it does not appear to be quite necessary to recapitulate here what has already been said in my Reports of last March, and over three years ago; consequently, this Report should be perused conjointly with the others. I therefore propose to deal now with the progress made since in the mining operations, the description of the principal new discoveries made by several proprietaries, the general prospects, and the wants in order to aid in the development of this extensive and very valuable silver region.

First on the list I place the Silver Queen Company, who have made good progress under difficulties, owing to the delay of delivery of steam machinery plant in order to sink to deeper levels, drain the mines of water whilst raising large quantities of rich ore. A main shaft has been sunk about 30 ft. from the surface, poppet-heads 40 ft. in height erected over the same, and a capacious feed-tank, 11 ft. 6 in. inside square measurement, constructed in connection with the upper brace. The main shaft measures 12 ft. by 3 ft. 6 in. in the clear, is strongly timbered, and divided into three compartments, two for winding and one for pumping. Besides this, three and a half acres have been cleared of its dense timber, in order to facilitate general operations at the surface. I descended, on the 29th October last, their lode shaft (all these works are situated on Section 1636M)—the deepest on this field—which had been purposely and very kindly kept clear of water, which is very heavy, for my inspection, to the 50 ft. level. The lode was found near the surface but a few inches wide, but it gradually, without interruption, increased to 3 ft. 6 in. in width at the above-mentioned depth. This in itself is a very reassuring and valuable circumstance, if regarded in the light of the permanency and extension to considerable depths of "lodes" on this mineral field. Another lode, 2 ft. 6 in., was intersected in this 50 ft. level crosscut, at such an underlay as to make a junction of both ore bodies lower down a certainty, which would then represent 6 ft. of solid rich ore. The ore is of a high percentage in silver, as has been proved by several assays, and from its appearance I am quite satisfied as to its proportionate commercial value. The matrix is very pure, solid, and of a permanent character; it consists of coarsish to fine-grained ore, streaky, i.e., antimonial, and "Fahl" ore.

New Discoveries.

On the same Section, 1636, a large formation (1 on plan) has been found, 14 feet wide, of which over 3 feet was good ore; from its mineralogical appearance and the course of its strike, N. 40° W., it is very likely to form the continuation of the Silver King Lode.

Another lode (2 on plan) exhibits a cap, 4 feet wide, of gossan, striking N. 47° E. On Section 1666M another massive lode was discovered, with a cap of carbonate of iron, from 3 to 6 feet wide, carrying good galena, striking N. 20° W., underlying about 55° westerly. An assay gave at the rate of 107 ozs. of silver per ton of ore. On the same section some branch lodes (3, 4, and 5 on plan) have been found, striking on the average N. 20° E., all underlying east. On Section 1643M three more lode formations were cut: the first, (6 on plan) 4 feet wide, bearing N. 28° E., and exhibits some chlorides and galena; the second, (7 on plan) 2 feet 6 inches wide, underlies east, carrying galena and some other mineral, which, unfortunately, I did not obtain a view of, but hope to receive specimens; the third (8 on plan) consists thus far of principally galena streaks and carbonate of iron, underlying east, bearing N. 35° E. On Section 1665, (9 on plan) a large lode formation has been discovered, over 10 feet wide, consisting of galena, carbonate of iron, and other minerals.

(2)

It will be now perceived that this proprietary has not only done solid work for the proper development of their first discoveries on the central section, but, likewise, they have never ceased prospecting on their other sections, resulting, from above concise description, very satisfactorily indeed. By so doing they have not only enhanced the value of their leaseholds, but have afforded additional and substantial proof for the Government that the limits of the extent of these mineral deposits have by no means been reached, and that the field is even now still extending.

Balstrup's new discovery, on Manganese Hill, is the practical result of a considerable amount of prospecting, in order to prove if argentiferous ores occurred, as I have intimated they would, beneath those huge blocks of manganese. Their persistent labours have now been rewarded by the discovery of a very promising and very rich silver lode near the north-western corner of their 80 acre Section, 1209m. A narrow vein of manganese ore was found at the surface, which, on being followed by an open cutting into the hill, 30 feet in length, increased in that distance from 12 to 20 inches in width. An adit was then started, bearing S. 46° E. on the same, and, at a further distance of 62 feet, the now very compact and rich lode was found to be 4 feet wide, and is still widening; the underlay is west, at about 75 degrees. Throughout the whole length of driving the thickness was, at regular distances, ascertained as a control and for guidance. The matrix at first consisted of ferro-manganese, gradually becoming more and more quartziferous, thus producing its present laminated appearance. The ore contents comprise chlorides of silver, both green and brown, the latter more prevalent, indications of sulphides, and, in cavities, clusters of green crystals, mistaken for rich silver ore, but which I found to be "prase," a silicious mineral of no value. This now proved lode runs towards those huge manganese boulders mentioned above, rising over 350 feet above the adit, the country rocks being metamorphic schists and sandstones.

An assay made of ore procured from the end of the tunnel gave, I am informed, over 480 ozs. of silver per ton, which is, so far, the highest yield yet obtained in this Colony.

On Section 189/87m the Silver Queen Extended Company is developing some very promising manganese outcrops of considerable dimensions, affording small but encouraging test proofs of silver. They have likewise opened two galena lodes. No. 1 on plan occurs as 5 chains apart from No. 2, and the former gave, with a matrix of 5 feet wide, a remarkably good return, viz., 173 ozs. of silver per ton. No. 2 is at present not well defined; it is 3 feet wide, and consists of a confused matrix of galena largely mixed with country rock, yet an assay gave over 100 ozs. of silver per ton.

On the line of the manganese country, but on the south-south-western slope of the hill, which descends to a tributary of the Badger River on Section 724/87m under the name of W. Pead, additional manganese outcrops have been prospected, as well as others. One of these (1 on plan), has a very promising appearance, striking N. 23° W. This lode is over 3' 6" wide, and it evidently, owing to the now well-established valuable prospective character of manganese ores in this district, and its being in line with Balstrup's, only on the opposite side of the hill, and is, besides, of a very similar mineralogical character, and I was informed that traces of silver had been obtained from it. At No. 2 on plan, a metamorphic sandstone occurs, considerably impregnated with finely granulated silver-lead ore, which gave 81 ozs. of silver per ton on assay, and another, taken higher up the hill, 102 ozs. of silver per ton. Though these assays were, to some extent selected, owing to the ores being mixed with gangue or country rock, yet they afford, without doubt, good indications of richer ore deposits occurring if the ground were penetrated to greater depths, and every means should be employed to develop the same. Another ferro-manganese outcrop has been prospected 8 chains from the one first described, bearing S. 23° E; and No. 3 lode on plan consists of a matrix of carbonate of iron and some galena, both of a very dense description.

On Section 735/87m the Silver Prince Company have opened two lodes only; the bearings of *a* and *á* on plan are almost as identical as the description of the ores they are composed of, consequently I consider them as one and the same formation, though both places of operations are at some distance from each other. It exhibits a very regular and solid outcrop at both places, from 5 to 8 feet wide, and so for several chains along its strike of N. 15° W., and it takes the form of blocks which have a northerly dip, disappearing at times beneath overlying country rocks, but making again to the surface further on, and altogether it appears to be of a very permanent character. An assay of the very fair percentage of galena it contains gave 52 ozs. of silver and 77 per cent. of lead per ton.

The most remarkable lode, perhaps, even in this so diversified mineral district, is lode *b* on plan. To judge from the *débris* near the shafts and open cuttings—which were all full of water—the matrix is chiefly quartz, galena, and a large percentage of sphalerite—i.e., zinc blende, ochre, and a soft, friable mineral of a blackish-blue colour (argentite?). Assays made at various times gave the following results, viz.:—

77	ozs. of silver,	52	per cent. of lead,	per ton.
63	"	45	"	"
57	"	36	"	"
48	"	28	"	"

(3)

The last assay gave also a yield at the rate of one ounce one pennyweight and fifteen grains per ton of gold. The occurrence of gold from the peculiar kind of ore is new to Tasmania, but in California several mines yield something like it, and find that with depth the percentage of gold increases, and the bullion I examined there would, from a depth of 1300 feet, represent, besides the inferior metals, from 80 dollars of gold to the ton. Therefore, this company should not lose any more time, but at once resume active operations.

On the western boundary of No. 223/87M Section of the Silver King Co., marked 16 on plan, and west of their main lode, a fine and compact body of pure silver-lead ore has been discovered; it is 16 inches in width, and it has been traced for nearly six chains on its strike, underlying west. To judge from its fine-grained character and purity, it should yield well in the smelting furnaces.

On a section west of Doherty's, the gossan indicated upon my plan of March last has been found, after superficial tests, to cover a lode formation, as predicted then, of a very promising character, containing carbonate of iron—that sure indicator of galeniferous ores in this district—and zinc blende. All that appears to be wanting is depth.

Other Mines.

The Silver King Co.'s principal shaft has been sunk about two feet since my last visit, and is about 14 feet vertical from the surface, and at the bottom there is still a splendid solid lode of ore from five to six feet wide. This same lode has now been traced eight chains north and two chains south of this shaft, underlying west. It has also been found on Section 804/87M, held by the Silver King Extended Co., in a formation of carbonate of iron with small veins of galena 15 feet wide. In the south, on Section 222/87M, it was also found, six chains north of Section 480/87M: and thus good evidence has been obtained for this main lode extending over a very considerable area.

There cannot be any doubt but that, as a preliminary, a proper main shaft should be sunk without any delay west of their principal lode-shaft, in order to raise ore as soon as possible.

On Section 480/87M, the Silver Bell Co. have bared their fine lode fully 6 feet in width. The underlay is to the west at about 60 degrees, and they are now sinking in the footwall an underlay shaft 18 feet deep at an angle of 65 degrees; thus, the further they sink the greater will be the distance between the bottom of shaft and the lode. The lode evidently dips southerly, so that their main tunnel, commencing at 14 chains from the Silver King boundary in the north, must be driven a very long distance for the "cap," and it will be useless for practical work, as it can command but a little over 30 feet of backs.

On Section 196/87M the Silver Spray Co. have discovered a new formation, which I could not see this time. In fact, most of these discoveries were surface outcrops, are very similar in every way, and if not specially massive or rich could well be left to future examination. Though it was well known that for days I was in the district, and I made a list of companies applying for inspection, yet on the last day they wanted me to see something new when my arrangements precluded me from complying with these applications. Again, certain facilities should be provided in the way of track cutting, &c., as I am not a prospector, but engaged on scientific intent.

On Section 529/87M the Silver Sovereign Co. have discovered a promising lode (*a* on plan) 3 feet wide, composed principally of galena and some carbonate of iron, with a strike of N. 20° W.: it contains, besides a heavy black mineral, most likely decomposed galena. Another lode (*b* on plan), 13 feet wide, does not appear so good as the former, but deserves further tests.

On Section 201/87M, the Silver Crown Co. are said to have discovered a new formation 18 feet wide, carrying galena, carbonate of iron, ochre, and also chlorides of silver; but as I did not see the latter, I cannot say anything about it.

On Section 192/87M, the Argent Co. have made several discoveries, one of which I have examined, in a creek, where a lode four feet wide exhibits coarse and fine grained galena with some carbonate of iron. This is evidently a valuable ore deposit. As to the others, they were discovered after I had completed the examination of that part of the district.

This will, I think, complete the list of mines examined, also most of the new discoveries made on the field since last February, not including some outside-lying mines and new discoveries which I could not this time pay attention to.

On the whole, the above described mining properties, if taken in conjunction with those already mentioned in my Report of last March, indicate a vast extent of mineral country, possessing metalliferous resources of almost incalculable value, even if all those silver and argentiferous lead lodes and formations were suddenly to discontinue at the hundred or even the fifty feet level. Of this, however, there is no chance of such ever taking place, because a mining geologist conversant

with the rules appertaining to these kinds of mineral deposits could come only to the conclusion that there is no precedent for it, and moreover, that their very mode of occurrence, as observable here, points directly to permanency and great depth. The only way in which a change may come in would be by a change in the country rocks; but inasmuch as these very valuable ore deposits occur in secondary series or silurian rocks, and, to a small extent, in metamorphic schists, such is extremely improbable, for it must be recollected that this species of rock obtains from the north-west coast, Table Cape being about the centre, down to South Cape, and from west to east, from near Granville Harbour to the head of the Canning River. Of course, all this country is not galeniferous, because mineral deposits generally occur under certain conditions only, which, in the case under view, it has not been possible for me to ascertain and study; but it may be taken for granted that such an enormous development of ore is not due to accident, but must proceed from a permanent source not at present discovered. It appears as somewhat singular that the mineralogical character of all the ores is identically the same, thus pointing to one epoch of origination, which, from the opportunities afforded me for examination, I believe to be due to the ascension of aqueous solutions and to sublimation combined.

A few words of caution appear to be necessary in regard to assays. During my examinations I observed *prepared* ores, or *quasi* dressed piles of such. If assays were obtained from these the results would not of course, be borne out in the smelting works.

The extent and general compact massiveness of the lodes throughout the District leave nothing to be desired; and having carefully examined most of the principal ore deposits, I feel sure of the general future prosperity of the region, if worked economically and scientifically by practical men, which will result in increasing the output of these valuable ores.

Non-observance of Labour Covenants by the Lessees.

The slow progress made at most of the mines has been severely animadverted upon, and I must say, on very good grounds; for, as it has been officially announced that some twenty-five thousand acres of mineral land have been applied for and probably surveyed, the number of miners in actual work or employed as caretakers did not, on my late visit, exceed 70 men—rather less. It appears, however, that most of these parties have not yet got their leases; others, who have them, have twelve months allowed under the Act before starting actual work: still, remembering the time since which this land was pegged out, there must be a considerable number of leaseholders who do not observe the labour covenants. Now this appears to be very detrimental to the best prospects of the field in and outside the Colony, and is solely due to the greediness of individuals or companies in taking up lands I am perfectly certain they will never be able even to develop or work on the scale requisite for obtaining profits, owing to their want of capital, judging that companies have been floated at less than ten shillings per share, and a limited number of such shares in each of these companies. Having a practical knowledge of silver-lead mining at home, I know that it requires a large amount of readily available capital as a *sine quâ non*; then, the next thing necessary is skill or men trained both scientifically and practically to assume the superintendence of such valuable mines as these.

With this digression, I will now return to the labour covenant question. Considering the limited amount of capital to develop colonial mines, and knowing that some companies hold from 200 to nearly 1000 acres each, it is impossible to work them all on the basis of the covenants. I would therefore draw attention to what the "tribute system" has done for the Bendigo Gold District and in the South Australian Copper Mines. There large areas were held by monopolists under lease, and simply shepherded from year to year. At last the miners demurred, and then the tribute system was, on a commensurate scale, introduced, proving, on the whole, a marked success, while freeing the owners, thereafter called the "parent company," from all responsibility as to covenants. Of course, the new system, which has so very materially helped to build up the fine city of Sandhurst, had to be legalised in order to make the whole subservient to law.

In our case, all proprietaries, it is recommended, holding over 200 acres should be notified and compelled to sublet the remainder of their ground to tribute parties, on terms and within given times as may be agreed upon; proper leases should be issued to them for a number of years (not less than five); that tributors pay the parent company so much in the £ realised finally from ores raised and sold; that all acts and proceedings be subject to the consent of the Board of Directors of the parent company. It would take up too much time now to enlarge upon my suggestion, but as it is in my opinion the only remedy for curing an evil which injures both the State and the Colony at large, it deserves, I submit, some consideration. I forgot to mention that at Sandhurst hundreds of tribute companies are now at work, often very successfully too; they have their own board of directors, managers, plants of steam machinery, &c.

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Conclusion.

Having convinced myself thoroughly of the stability and large extent of the silver and argentiferous lead deposits or lodes at the Mount Zeehan Silverfield, and having, moreover, carefully examined mineralogically a great many samples of ore, besides inspecting authentic records of assays made, I have a very high opinion of this region in the future.

Unfortunately, it is not accessible to a safe shipping port, consequently, the whole district is compelled to remain inactive until proper and rapid communication with such an outlet has been provided. Some companies have sent ores to Reminé or Trial Harbour, but the charges were almost prohibitory, whilst only a very few tons per day could be so forwarded. It is therefore gratifying that, as a preliminary, a sum of money has been voted by Parliament for a railway survey from Strahan, Long Bay, and Macquarie Harbour, where smelting works can be erected, to the Mount Zeehan silver mining district. That that is the solution of the whole difficulty there can be no doubt, and it is to be hoped that ore and goods trains may soon commence the traffic.

G. THUREAU, *F.G.S., Government Mining Geologist.*

F. BELSTEAD, *Esq., Secretary for Mines, Hobart.*

SKETCH PLAN
OF
NEW DISCOVERIES
AT
MOUNT ZEEHAN
Scale 16 Chains to One Inch

Strike of Lodes Double black lines
a a' Branch Lodes
1) 1) These are not New Discoveries
but are put in as the Silver King
Lode has been proved between
both places

feet: G. Thurau F. G. S.,
 Mining Geologist
 Lancaster Dec 1888