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REPORT ON THE PROGRESS OF THE MOUNT ZEEHAN AND MOUNT DUNDAS SILVER-LEAD FIELDS.

Geological Surveyor's Office, Launceston, 25th November, 1890.

SIR,

In accordance with your instructions, I have again visited the Mount Zeehan and Mount Dundas Silver-Lead Fields, and have now the honour to report on the progress visible since my former visit in March last, and on the state of the fields generally. I shall frequently have to refer to my previous "Report on the State of the Mining Industry on the West Coast" of 25th April last, as the present Report is supplementary to it.

MOUNT ZEEHAN DISTRICT.

The progress made in the Mount Zeehan District has been rather in surface work than in developing the lodes. This is largely owing to the fact that in most instances the mines have to be equipped with drainage machinery before sinking on the lodes is possible. In such cases as it has been possible to work by means of adits, steady underground mining has been carried on with more or less success. Where sinking must be done, it has not been possible to get the necessary plant owing to the very wet weather that has prevailed. This made the road from Trial Harbour to Zeehan impracticable for heavy loads, so that boilers, engines, and pumps could not be brought from the coast even when they could be landed there, which has been far from often. At best only comparatively light machinery can be imported by this route, and as this would have soon to be replaced by more powerful plant, it is better for the owners of mines to get the latter in the first place, even though this course involves awaiting the completion of the Strahan-to-Zeehan Railway. Some of the companies, it is true, have at great expense got drainage machinery up from the coast, but the necessity for more powerful plant has been exemplified lately in the case of these same mines, the Silver Queen and Argent mines having been flooded out, while the Mount Zeehan (Colonial) Company has barely been able to keep the water down by working the engine much above its proper speed. It is quite clear that economy demands the erection of powerful engines at once, and that small temporary ones are only thrown away. The difficulties with water experienced last winter are very largely due to the great amount of rainfall, and during the summer they may be expected to be much less troublesome. As the surface of the ground becomes cleared, drained, and grassed, so that the rain water will not lie on it, but run away into the watercourses, less water will be found underground. The clearing and drainage of the sections is therefore of considerable consequence, and should be pushed on with when other work is slack.

The Township of Zeehan has grown very much, and buildings are going up in every direction, proving the faith of the residents in the future of the field. Tracks have been made to most of the sections, and if a great deal of prospecting has not always been done, preparations for it in finer weather have thus been undertaken. On a large number of sections prospecting has been carried on in spite of all difficulties, and on some with great energy and vigour. There are still, however, too many of them on which absolutely no work has been done. The popular excitement over the discoveries at Mount Dundas causing attention to be diverted from the older field, has doubtless been responsible for some of this neglect, but it is also indubitable that some of the lessees have no intention of working their ground until they are forced to do so. Everywhere there is plenty to do that ought to be done without delay. Even if ore cannot be raised for want of engines, there is a great deal to be done in tracing the lodes, preparing machinery sites, cutting and sawing timber for buildings, making roads and tramways, and generally preparing for getting briskly to work when the railway is ready to bring in the machinery.

In my former Report I have referred to the volcanic rocks found throughout the Zeehan District as being in most cases probably dykes of a rock allied to diorite. The new work in Balstrup's, the Manganese Hill, and the Silver Queen mines, and the extensive prospecting trenches and tunnels of the Silver Queen Extended Company, have, however, thrown much new light upon the subject, and I am now of the opinion that these masses of clayey rock are really, in most instances, tuff-beds lying between the beds of silurian slate and sandstone conformably, and therefore being, like the latter, frequently inclined at high angles of dip. In the clayey rock between the two lodes in the Western mine a bed of volcanic breccia containing scoriaceous fragments has been found dipping almost vertically. In the second crosscut in Balstrup's mine the bedded structure of the tuffaceous rock is also very apparent. On the Maxim section it is very clearly seen, the beds being thin and of different colours and textures. One of these, of very white colour and standing vertically, had been trenched upon, and was about to be further exploited by an adit in the belief that it was a kaolin lode. These tuffaceous rocks must have been deposited in the waters of the silurian sea, partly probably as showers of volcanic ashes falling upon the water, and partly as ashes washed into the sea in immense quantities immediately after eruptions, at the time when what are now slates and sandstones were being deposited as sediments. It is quite possible, and probable, that flows of lava and the intrusion of dykes accompanied the pouring forth of showers of volcanic ashes, and consequently some of the volcanic rocks now found may prove to be of the former nature. As the workings of the mines extend, the relationship of the volcanic rocks to the slates and sandstones will doubtless become more clear. The question is one to be studied with practical interest by miners on the field, as a radical difference in the country rock in which lodes occur is extremely likely to be accompanied with a difference in their ore contents.

The following brief notes on the various properties visited will show the progress that is being made. Many sections are not here mentioned at all, as I had not time to go to them, though I believe that I visited almost every one on which any work of consequence was being done, the only exceptions I know of being the Silver Duke, Oonah, and Junction Companies' holdings, on all of which work was going on, but which I could not make opportunity to go to.

Silver Queen.—(Sections 1666M., 1636M., 1641M., 1642M., 1637M., 1638M., 1639M., and 1640M.,
Visited 11th October, 1890.)

Work from the main shaft in Section 1637M. has had to stop on account of the mine being flooded. This disaster has been compensated for by the discovery of a new and very rich lode on Section 1638M. This was first cut on the side of the main road, 2.64 chains from the west and 7 chains from the south boundary of the section, as a mere seam of whitish clay, but on following it it increased in width and soon showed carbonate of lead rich in silver. The drive on it goes N. 40° E. for 142 feet, then N. 68° E. for 38 feet. In this the lode averaged about 20 inches in width, varying from 12 to 30 inches. Excellent high grade ore was obtained for about 140 feet, when the country changed from tufaceous rock to black slate, and the lode became pinched and the ore dipped underfoot. Since my visit a winze has been sunk at this point and a drive southward, that is, back towards the mouth of the first adit, has been constructed. I saw several bags of ore from this, consisting mostly of galena crusted with cerussite (the carbonate of lead). It was very pure ore, and, according to the Company's bulk assays, very rich in silver. I was informed that the lode in the winze and drive had widened out to from 3 feet to 3 feet 6 inches. The ore in the upper drive was at first mainly cerussite, containing some blue and green carbonates of copper, a little quartz, and some clay, but as work progressed a good deal of galena made its appearance. The lode is evidently making into galena at no great depth. At the time of my visit 98½ tons of high grade carbonate ore had been sent to Trial Harbour for shipment, and since then a great deal more has been sent. The purity and high silver value of the ore in this lode have made the discovery a most valuable one, and if the shoot goes down to a depth, as it may fairly be expected to do, it will be a real Bonanza for the Company. When I saw the workings it appeared as if the ore was going to be confined to the tufaceous country. It will be very interesting and instructive to notice if it goes into the black slate country at a greater depth.

The course of this lode should carry it into Section 1639M. In this another tunnel has been driven north through hard tufaceous rock from a point eight chains from the south, and six chains from the east boundary of the sections. On the surface of the ground above the tunnel there is a great deal of loose brown iron ore, and a piece of carbonate of iron carrying galena and blende was found just at its mouth, so that there is reason to believe that there is a lode in the near vicinity. A small vein of iron-stained clayey matter crossing the drive yielded a few bags of ore assaying 54 ounces to the tons in silver, and assays show that the country rock itself carries a little of the precious metal.

The discovery of the cerussite lode on this property has been of great service to the Zeehan field by recalling public attention to it when all eyes were fixed upon Dundas. It has also led to a great deal of prospecting being done, especially in the tufaceous formation. Numerous assays have shown that this rock often contains a small quantity of silver, and it is therefore likely to prove a good matrix for rich lodes.

Balstrup's Manganese Hill.—(Section 1209M. Visited 11th October, 1890.)

This mine shows a great improvement since I last saw it. At 370 feet from the mouth of the adit a crosscut has been put in to the north, which struck the lode, six feet wide, at from 12 to 18 feet, and was then continued to a distance of 240 feet without any further result. The country was tufaceous rock all the way. An airshaft 130 feet deep having been sunk on the lode where struck by the crosscut, a drive on the lode easterly was then begun, and had been driven 195 feet when I saw it. In this the lode proved to be from six to eight feet wide as a rule, and consisted of iron and manganese oxides, with occasional crystals of cerussite, but not payable. In the face a change had just come in when I saw the mine, the ore having changed to carbonate of iron with lode-slate and strings of galena, though the latter was not yet in payable quantity. Some antimonial lead ore, assaying from 114 to 120 ounces of silver to the ton, was also found here, and the width of the lode increased to 15 feet. From the frequent occurrence of cerussite crystals in the gossany portion of the lode, together with their absence in the outcrop on surface, the inference may be drawn that the lode is improving at a depth. The assays of the stuff from the drive, too, show a considerable improvement in their silver returns over those of the surface stuff. It appears as if during the alteration of the lode-matter of the outcrop under the influence of surface waters and their dissolved gases, which resulted in the formation of iron and manganese gossan, both lead and silver have been leached out and probably carried to a lower level. Where the atmospheric influence stops at or about the water level, the lode will probably be found to be enriched by these solutions from the higher portions. A winze is to be sunk shortly in the floor of the drive on the lode to try if the lode continues to improve with depth. As galena and carbonate of iron have been found in the drive, it is possible that as it gets further into the hill a considerable portion may be found to be unaffected by surface oxidation, and good ore may be stoped from above the tunnel level; but should the gossan extend down to water level it is extremely likely that the good ore will lie rather below the tunnel. Should this prove to be the case the mine will have to be worked from a shaft.

A second crosscut has been made to cut the lode, starting from a point 806 feet from the entrance to the old adit. It was in about 200 feet when I saw it, but had not yet reached the lode. It passes through a tufaceous rock containing fragments of slate in places.

In my former Report, and the map attached thereto, I find that through some mistake I have marked Balstrup's lode as running S.W. and N.E., whereas it should be N.W. and S.E., the outcrop running through the south boundary of the section, about 4 chains from the S.E. corner, and then running on through Sections 724-87M and 741-87M. It is very strongly marked, the ironstone often rising into a high ridge or wall.

This mine looks very promising, and I have great hopes of its turning out well. As it is typical of a large number of gossan lodes in the Dundas District, its further development will afford much information as to their probable behaviour in depth.

Despatch—(Section 243-87M. Visited 12th October, 1890.)

No work is just now being done upon this Section, which is in very low wet ground. A lode which, from its bearing and position is very likely to be the Silver King lode, is cut in it in several trenches. Course N. 35° W. It passes through the northern boundary of the Section, about 2½ chains east of the N.W. corner-peg, running into Section 1666M of the Silver Queen Company. It is from 3 to 7 or 8 feet wide in the various trenches, shows gossan and galena, and has been traced almost through the section.

The Silver Queen lode in Section 1666M, mentioned in my former Report, crosses the north boundary of this Section about 7 chains east of the N.W. corner-peg. As the course of this is only 15° to 17° W. of N. it should run into the first-mentioned lode about 10 chains south of the north boundary line. This should be a good mine when opened, but will require plenty of power to deal with the water which accumulates on the surface in the wet season.

Silver Crown—(Sections 197-87M, 198-87M, 199-87M, 201-87M, 736-87M. Visited 12th October, 1890.)

The tunnel in Section 736-87M, mentioned in my former Report, has since been driven to within 40 feet of the shaft, without striking the lode. The shaft is down 56 feet, and has yet to be sunk 24 feet to connect with the tunnel. When the connection has been effected the lode in the shaft will be followed, and judging from the quality of the ore obtained from the shaft, the stopes should produce payable galena. As the lode in the shaft has varied very much in size, and been at times much split up, some work must be done before the quantity of ore that can be raised can be estimated.

No other work is going on upon these sections, which are mostly open swampy button-grass land. A good deal of trenching has been done with sufficiently favourable results to show that the ground deserves better than to be let lie idle. It appears to me a most promising property. In Section 197-87M, about 4½ chains from the east and four chains from the north boundary, a lode, said to be 7 or 8 feet wide, was cut in a trench now full of water. The ore is galena, with a gangue of siderite (carbonate of iron). This lode requires further tracing. The Silver Queen lode of Section 1666M is likely also to be found in this section, and Section 201-87M ought almost certainly to have the Despatch lode. In Section 197-87M also there is a large outcrop of ironstone, carbonate of manganese, siderite, and oxide of manganese, carrying a little galena, situated about 5 chains north of the middle of the south boundary. As far as can be seen from the trench, the width of lode is about twenty feet, and its course N. 32° E., but the latter is not at all clear. There are four or five veins, carrying galena, cut in trenches close to this large lode, and a little further to the north there are several others. As the trenches were full of water I could see nothing of the size of these. Nothing can be done to test this ground without machinery to drain the workings, but it appears to me that the prospects warrant giving it a thorough trial.

Silver Crown Extended—(Section 848-87M. Visited 12th October, 1890.)

A great deal of trenching has been done in low ground on this Section, without much result, except the finding of a little loose galena associated with blende. The depth of the loose surface soil and the wetness of the ground have prevented the lode, if there is one, from being found in solid country. The galena found in the trenches appears to be taking a course about N. 2° W. The indications here are as yet not very promising, but perhaps in the dry season it might be possible to sink a few feet on the galena veins and learn if they become more defined.

Western—(Sections 755-87M, 756-87M, and 854-87M. Visited 12th October, 1890.)

Work in this mine has been steadily carried on since I last reported upon it. The lower adit is now 502 feet, the country passed through having been all curly black slate. In the upper adit, the No. 2 lode has been driven on for 187 feet. At 100 feet it split, and the eastern leg was followed for 87 feet, but at 65 feet from the split the lode dipped away under foot. A crosscut was then put in to the westward a distance of 58 feet, where the other leg of the lode was cut. This was from one to three feet wide. In the crosscut several veins of galena one quarter inch to two inches thick were cut through, all dipping westerly towards the main vein. This has now been driven on for 16 feet, and, though small, furnishes a fair quantity of very good galena. The country rock is tufaceous. On the No. 1 lode the northern drive has been extended to 131 feet in hard black slate. The lode is now very small, only showing about three inches wide in the face.

The manager informs me that altogether 96 tons 3 cwt. of ore have been exported from the mine, 33 tons having come from No. 1 lode, 56 tons from No. 2 lode, and 8 tons from No. 3 lode. About 50 tons of second-class ore from No. 2 lode are now on the surface. In spite of the high charges for freight to Trial Harbour, the ore exported has returned enough profit to pay for the mining work that has been done.

The drive on No. 2 lode has yet to be extended some 200 feet before connection can be made with the lower adit. This will require a winze 40 feet deep. From the lower tunnel to the surface there will be about 94 feet of backs on the lodes, so that a large quantity of ore can be got from the stopes. Should the adit strike No. 2 lode carrying ore there will be a length of over 300 feet of it to be stoped to surface from the upper level. This mine has very fair prospects before it.

Mount Zeehan Silver-Lead Mine—(Sections 559M and 909M. Visited 13th October, 1890.)

On Section 559M underground work has been pushed on with at the 120 and 60 feet levels. Water has been very troublesome, and the pumping engine has had to be run to its utmost capacity. A much more powerful one is urgently required. The lodes have been rather poor, though occasional bunches of ore have been obtained. The manager estimates that he has 80 tons of first-class ore and about 400 tons of second-class at grass. This mine is being well worked, and deserves greater success than it has yet had. I feel confident that it will be a large producer of ore in time.

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Manganese Hill—(Section 724-87M. Visited 13th October, 1890.)

In this property an adit is being driven from the lowest level obtainable to cut a large outcrop of ironstone and oxide of manganese which runs through the north-east corner of the Section, and is almost certainly part of Balstrup's lode. The tunnel had been driven 470 feet at the date of my visit to it, and had yet to go another 200 or 250 feet to reach the lode. The country is easy for driving, being clayey, vertically bedded turfaceous rock, often enclosing angular fragments of brittle slate. Till the lode is cut nothing can be said as to the future of this mine. The outcrop is of a favourable nature, and there is good likelihood of ore being found at a greater depth. It remains to be seen if the adit is low enough, or if it will be necessary to have a shaft.

The Silver King—(Sections 217-87M, 218-87M, 219-87M, 220-87M, 221-87M, 222-87M, 223-87M, 468-87M, 469-87M, and 470-87M. Visited 14th October, 1890.)

So far as work on the lodes is concerned, this property is just as it was when last reported on. all energies have been devoted to getting the winding and pumping machinery erected at the main shaft. After great difficulties and expense this has now been practically completed, and sinking and exploitation of the lode should now proceed rapidly. The erection of machinery was not quite completed when I visited the mine, but was nearly so, and the formal starting of it has since been reported in the newspapers. Should the lodes in depth come up to the promise of the surface prospects, this Company should soon be paying dividends.

Silver Bell—(Section 480-87M. Visited 14th October, 1890.)

The tunnel on the lode in this excellent little property has been extended to connect with the shaft. I was so unfortunate as to visit the mine when all the men had gone away for some reason, and consequently could not get accurate information as to the distance driven. A large quantity of splendid-looking ore is stacked on the surface, and I quite believe the current report that its value is nearly, if not quite, equivalent to the nominal value of the mine as shown by the price of the shares. The drive has been in ore throughout its whole length, and ore is known to be underfoot, therefore ready to be taken out when drainage machinery shall have been erected and a lower level can be driven. This mine gives promise of being one of the best on the field.

T. L. Fowler's Section—(547-87M. Visited 14th October, 1890.)

In this section a lode, which from its position and mineral character has been conjectured to be Balstrup's has been cut by trenches in two places in low-lying ground. In neither trench has the outcrop been completely cut through, but it is evidently a wide one, quite 20 feet of it showing in the trenches. The course of the lode as taken from the trenches is about N. 25° W., which is much too northerly for Balstrup's lode, but may be only local. The outcrop contains a great deal of carbonate of manganese in rose-red crystals, also oxide of manganese, and a good deal of carbonate of lead. As Balstrup's lode is characterised by richness in oxide of manganese, which would result from the oxidation of the carbonate, the large quantity of the latter found in Fowler's lode favours the belief that they are identical. Nothing has been done on this property for some time, and it will require machine drainage before the lode can be worked to any depth. It appears to me to be well worth developing.

F. G. Duff's Section—(1148-87M. Visited 14th October, 1890.)

A new find is here just being opened out. The lode is about 10 feet wide, and runs about north and south, as far as can be seen at present. A small adit has been driven to cut it. In this the lode is mainly made up of lode-slate mixed with galena, though the latter is not yet found in payable quantity. Where seen on surface, in the side of a creek, it is mostly siderite impregnated with galena and blende. Though nothing payable is yet in sight, the lode is worth prospecting.

Bell and Hall's Sections—(419-87M., 420-87M., 421-87M., and 422-87M. Visited 14th October, 1890.)

Very little has been done to this since I last saw it, only a few trenches having been dug. In these nice crystals of carbonate of lead are freely obtainable in the gossan. Course of lode N. 30° W. The prospects of this lode are much too good for it to be lying idle as at present. A geological point of great interest occurs on this ground. In the bottom of a trench through some loose masses of ironstone, at the main outcrop near the centre of the property, I found a magnesian limestone containing fossils belonging to the marine beds of the coal measures; fragments of a *stenopora* being most common. It is probable therefore that a portion at least of the flat ground in the valley, in which these sections lie, is occupied by strata belonging to the coal measures, instead of the usual silurian rocks. What extent of these latter rocks there is will be known only when some more work has been done on the ground. I do not anticipate that there is more than a small patch; but as I subsequently found coal-measure strata in the vicinity of the Big Henty River, it is quite possible that these latter rocks occur in several other of the low-lying valleys between Mount Zeehan and Strahan. As I found shales carrying fossil ferns beneath the marine beds at the Henty, it is quite possible coal may exist in the formation, and some of the patches of coal-measure rocks might prove valuable. An analysis of the limestone made by Mr. S. Cullingworth, assayer to Balstrup's Manganese Hill Company, was kindly given to me by Mr. J. F. Heighway. It was made to test its value as a flux for smelting, and was as follows:—

Lime, 34.35 % CaO.
Silica, 8.00 % SiO₂.
Magnesia, 10.89 % MgO.
Iron and Lead not estimated.

These figures indicate a percentage of carbonate of lime (CaCO₃) of 61.34, and carbonate of magnesia (MgCO₃) 22.87. Being low in silica, this limestone would prove useful if no better were available; a much better limestone has, however, been found on the Pyramid Company's ground.

Pyramid—(370-87M. Visited 14th October, 1890.)

Work has been abandoned for some time on this Section, presumably because machinery is required in order to sink on the lodes. Two strong lodes have been found and exposed in trenches close to the large creek which runs through the section. The larger of these two is quite 12 feet wide, course N. 65° E., dip to N.W. A vein of calcite over a foot wide runs along the footwall. The lode is composed of calcite, carbonate of iron, and galena, and has a distinctly banded structure. There is a splendid show of galena, well seen by the lode having been stripped for about 30 feet along its course. The second lode runs into the first; it is about 9 feet wide, course N. 25° W., and shows a large body of fair galena ore. It cannot yet be seen whether the two lodes join one another, or whether one crosses or is thrown by the other. The N. 25° W. lode runs into a high hill on the south side of the creek, and may perhaps be worked by an adit, but as it rises up the hill it appears to be much oxidised to gossan, and it may prove to contain ore only at or near water-level. On the north side of the creek I am not aware if this lode has been found. If it crosses the other lode at all it should be found on that side running into another steep hill suitable for tunnelling. There is a really fine show of galena ore in this property; I am informed, however, that it assays much below the average of the field in silver.

The stuff thrown out from a small shaft that had been sunk close to the intersection of the lodes consists of a very pure limestone of light yellowish-grey colour, apparently the country rock. One sample of it, assayed by Mr. Cullingworth, gave—

Lime, 52.2 % CaO.
Silica, 6.7 % SiO₂.
Traces of Iron and Magnesia.

The lime is equivalent to 93 % of carbonate of lime. Another sample taken by myself was analysed by Mr. W. F. Ward, Government Analyst, with the following result:—

Lime	51.1 per cent.
Magnesia.....	1.3 per cent.
Oxide of Iron	1.5 per cent.
Silica	4.1 per cent.
Sulphuric Acid (SO ₃)	traces.
Carbonic Acid, moisture, and organic matter lost on ignition...	42.0 per cent.

TOTAL 100.0 per cent.

Mr. Ward says, "a minute quantity only of iron pyrites was found. Limestone of this quality would form an excellent flux."

These analyses show a very good fluxing limestone, and as it occurs close to the railway line it can be readily carried to wherever it may be required. This discovery will probably result in smelters being established on the field instead of at Strahan.

The Pyramid property is a genuinely valuable one, and only requires to be taken in hand by a Company strong enough to work it to become a large producer of ore.

Grubb's—(Sections 1562-87M., and 1580-87M. Visited 26th October, 1890.)

Almost no underground work has done on this ground since my last visit. From the drive on the west side of the creek a few tons of excellent galena and cerussite ore have been taken from the small lode encountered in it. A machine site has been levelled, and a main shaft sunk to the adit level, and poppet legs have been erected. A manager's house, office, and several other buildings have also been built, and all energies are now devoted to the construction of a tramway which is to connect the mine with the terminus of the Strahan-to-Zeehan Railway, on the Silver King Company's ground. This tramway is projected to be 3 feet 6 inches wide, with no steeper grade than 1 in 40, and no curve of less than 5 chains radius, being in these respects the same as the railway. If carried out on these lines it will be a very excellent tramway. I cannot, however, see the necessity of having so expensive a one in the present state of the mine; a narrow-gauge light tramway would answer all purposes for a long time. If the line is to be carried out as at present proposed it should be laid with heavier rails, the same as those on the main line, so that the railway trucks might run right up it without transshipment. The tramway will be close on 3½ miles in length; it will be of great service to many other Companies besides this one.

Tasmanian—(Sections 1468-87M., 1467-87M., 1469-87M., 1688-87M., 1470-87M. Visited 26th October, 1890.)

The work done on this property also since I last saw it is principally preparatory. A site for an engine-house has been levelled, and a main shaft 63 feet deep has been sunk and connected by a crosscut 55 feet long with the main adit. It is now proposed to bring a tramway in from the main road at the Comstock to the mine. On Section 1470-87M. a shaft has been sunk 78 feet through a clayey tufaceous rock full of green talcose particles. About 3 feet of the clayey lode formation containing pyrites and a little loose galena were passed through in this shaft, which is about 2 chains from the boundary of Section 1005-87M., and 10 chains west of the boundary of 1681-87M. It was sunk to look for No. 2 lode.

Block No. 1, Britannia—(Section 1005-87M. Visited 26th October, 1890.)

Some prospecting has been done on this section in the endeavour to pick up the Tasmanian Co.'s No. 2 lode. About a chain north of the south boundary an adit close on 300 feet in length has been driven due west; at about 130 feet from the mouth, about which distance the lode was expected to be met with, two small strings of quartz and pyrites were cut, but nothing more definite.

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About a chain from the northern boundary some trenches have been dug in which quartz highly charged with pyrites and containing a few specks of galena has been got. Owing to water the trenches could not be sunk to any depth. The galena was rather more abundant towards the bottom of the trench. This Company has evidently yet to find its lode.

Mount Zeehan (Tasmania) Silver-Lead Mines, Limited. (Visited 26th and 30th October, 1890.)

This English Company holds nine Sections, which are generally known by the names of the Companies that formerly held them, but as some of these are still in existence, having sold only part of their ground, this nomenclature leads to confusion. The manager has, therefore, decided to call them by Block numbers, as follows:—

- Block No. 1. 193-87M., formerly held by the Argent Company.
- Block No. 2. 192-87M., ditto ditto.
- Block No. 3. 1643M., ditto Silver Queen Company.
- Block No. 4. 1665M., ditto ditto.
- Block No. 5. 189-87M., ditto Silver Queen Extended Company.
- Block No. 6. 196-87M., ditto Silver Spray Company.
- Block No. 7. 195-87M., ditto ditto.
- Block No. 8. 994-87M., ditto Britannia Company.
- Block No. 9. 2154-87M., ditto Montana Company.

Since taking possession of these properties the Company has been working vigorously to get them into a producing state. A tramway is being made to the site chosen for the smelting furnaces, and bricks are being made on the ground for these and for general use. The machinery erected on Block No. 2 by the Argent Company has proved unequal to its work, the water rising in spite of the engine, so that underground work has had to be abandoned here for a time. The pumps on Block No. 5 are, however, at work, and sinking and driving are being proceeded with. A new shaft is also being sunk on Block 5, and is now down over 55 feet. This shaft is about 80 feet from a lode known as No. 4, and 55 feet from another known as No. 3. The former strikes N. 10° E., and the latter N. 55° E. They run together in the small creek passing through the Block. Both these lodes are small, but they show from 4 inches to 6 inches of galena frequently. The main shaft is situated 4½ chains from the north and 245 feet from the east boundary of the block. No. 1 lode is 100 feet west of the shaft; it shows a lot of galena on surface, runs N. 7° E., and is from 2 to 5 feet in width. About 386 feet further westward No. 2 lode is encountered. Some very fine galena was obtained from a small shaft on this, which is now full of water, preventing the width of the lode or its course from being seen; the lode has not been trenched on surface, and its course is not certainly known, though supposed to be about N. 10° E. From No. 2 lode to the junction of Nos. 3 and 4 is about 400 feet. It is intended to drive a crosscut westward from the main shaft to the new shaft, cutting the various lodes; the new shaft will then serve as an air shaft.

On Block No. 9, the old Montana Company's section, the lodes have been stripped a good deal and better traced than when I last saw them, and a large quantity of good galena has been stacked. Work is progressing vigorously on this block.

On Block No. 8 nothing is being done at present. In this a lode containing galena and blende with much pyrites has been cut in a trench in about the position where the Tasmanian Company's No. 2 lode might be looked for, but the course was about north and south where I tried it with the compass. It is said to be three feet wide in the trench, but as the latter was full of water I could not verify this. Close to this lode is a large gossan outcrop, mostly composed of brown oxide of iron, into which a short tunnel has been driven without cutting through it. This ironstone is reported to have assayed well, and has evidently been thought worth saving, as there is a neat heap of it stacked outside the mouth of the drive. The gossan can be traced in a north-westerly direction on surface for a considerable distance.

From a conversation with Mr. Elliott, the manager of the British Company, I gather that the smelting furnaces will be of two types,—ore-hearths for treatment of rich pure galena, and water-jacket cupola furnaces for the re-smelting of the slags from the ore-hearths, and for less pure ore. Such ore as is too poor in lead for furnace treatment is to be concentrated by means of jigs and buddles. From the energetic way in which the Company is working it should be but a short time before the necessary plant is on the ground. The blocks of land secured comprise several of the best-looking "shows" on the field, and the Company should reap a rich reward for its enterprise.

E. Dardus's Section—(1635-87M. Visited 27th October, 1890.)

In passing over this lease on my way to the Silver Stream, I noticed that several small gossan lodes had been cut in shallow trenches on top of a ridge. Nothing has been done to prove their extent, or if they carry anything of value.

Silver Stream—(1642-87M. Visited 27th October, 1890.)

Some trenches in low-lying swampy ground have obtained good pure galena in black surface soil, but at the time of my visit there had always been too much water to allow of sinking into the solid rock below. The galena in the trenches appears to be following a definite line, about N. 10° E., and in all probability a lode is close underneath. Some of the galena was said to have assayed 129 ounces of silver to the ton. In one of the trenches some ironstone was obtained containing native copper. A small shaft is being sunk to test the ground further. In another part of the section a tunnel has been driven 66 feet to cut across a continuation of the Tasmanian Prospecting Company's magnetite lode. The magnetite in this tunnel was very soft and friable; no lead or silver ore was found with it. Should the loose galena be traced to a lode this property might turn out well; when I saw it its success was quite problematical.

Tasmanian Silver Prospecting Company—(Sections 1919-87M., 2095-87M., 2096-87M., and 2173-87M.
Visited 27th October, 1890.)

This Company must not be confounded with the Tasmanian Silver Mining Company, Limited, above mentioned. A large strong wide outcrop of magnetite of good quality runs in a north-westerly direction from Section 1642-87M., through 1830-87M. and 1919-87M. No work has been done for some time, and the old workings on the last-named section are now full of water and cannot be examined. Several small shafts and drives have been made towards the north end of the outcrop of magnetite. From the fragments of material lying on the surface it is evident that lode stuff, consisting mainly of quartz carrying pyrites and blende in large quantities was obtained from these workings, and I have also been shown fair samples of galena said to have been got from them. Even these, however, were much mixed with blende and pyrites. The load-matter from which the ore was obtained appears to lie on the south-west side of the magnetite lode. The country west of this is a highly metamorphosed slate, and a little further to the westward the granite of Mount Heemskirk comes in. I do not think it at all likely that the magnetite outcrop will prove to be the capping of a silver-bearing lode. The occurrence is a very interesting one from a geological point of view, and on that account I should like to see some sinking and driving done on it; but I very much fear that it will have no commercial value until some future day when iron ore can be profitably mined.

Comstock—(Section 712-87M. Visited 29th October, 1890.)

Work here has been confined to driving a tunnel to intersect the two lodes seen in the surface trenches. This is now in a distance of 580 feet. Bad luck was experienced in cutting No. 1 lode, in a spot where it was very large and very barren. The tunnel passed through crystalline dolomite, similar to the gangue of the lode in the surface workings, for 65 feet,—the rock containing a little talc, occasional strings and specks of galena, and some blende and pyrites. The walls are well defined, and there is also a large well polished slickenside in the middle of the mass. There can be little doubt that this really is the lode, and that it has been cut in one of the barren parts so common in all similar formations. It will now be necessary to drive along its course to the northward to get under the place where ore is known to exist in it. It is, however, the intention of the manager to push on the tunnel till No. 2 lode is cut, as the latter contains ore on surface almost above the tunnel. This lode should be almost at hand now. The country in the face is blue limestone, with white streaks, similar to that found alongside the lode in the large surface trench. Though this Company has been unfortunate in not striking ore in the lode at once, it should be remembered that the point where it is cut by the adit is a long way from the place where the good ore was got on surface, and there is no need to despair of ultimate success. I see no reason to alter my previously expressed opinion that this will be a good mine.

South Comstock—(Sections 803-87M. Visited 29th October, 1890.)

Since my last visit to this property a very long prospecting trench has been cut up a small creek which runs down to the Comstock ground. A large mass of pyrites with some galena in it and some large loose pieces of good galena were obtained, but no defined lode. The country is much disturbed. There must be a lode somewhere in the vicinity, but further prospecting has to be done to find it.

Silver Queen Extended—(Sections 188-87M. and 187-87M. Visited 30th October, 1890.)

In Section 188-87M. a tunnel has been driven 326 feet through rather hard slate country; it has to go 690 feet altogether in order to cut the first of a series of five or six parallel lodes that have been discovered in the creek running through the Section. Two of these are close together, not more than 20 feet apart; a short tunnel has been driven to cut these, and some surface trenching has been done on them in the bed of the creek. The first lode is from 4 to 5 feet wide, consisting chiefly of carbonate of iron carrying blende and galena, but not yet in payable quantity. The width of the second lode is rather indefinite; the country between the two is much impregnated with lode matter, so that it is probable that they will come together at no great depth: course N. 30° W. The main tunnel will strike these lodes about 100 feet below their outcrop in the creek, and, as the hills rise steeply on each side of the latter, a good height of backs should be available in them. Four other small lodes, running more or less north-west, exist higher up the creek about 11 chains from the eastern boundary of the section; nothing has yet been done on these, only their gossan outcrops having been noticed in the creek.

In section 187-87M. a great deal of prospecting has been done in the endeavour to pick up a continuation of the Silver Queen lode in Section 1638M.; the country is all the tufaceous rock above referred to. Just south of the south-east corner of 1638M. a tunnel 192 feet long has been driven due west nearly to the boundary of the Section; several small veins of ironstone were cut in this, one of which contained fine crystals of pyromorphite, which proved on assay to carry very little silver; this vein has a north-westerly course.

At a point about 420 feet west of the south-east corner of Section 1639M. and 56 feet south from the boundary line, a vein of somewhat siliceous black gossan was discovered, from 6 to 12 inches wide, running north-easterly; 20 feet east from this a shaft was sunk to a depth of 45 feet and a drive put in to the westward for 50 feet, which cut the vein again 24 feet from the shaft; nothing of value has yet been got from this vein, which in the drive from the bottom of the shaft is still as thoroughly oxidised as at surface. Going to the south-west the vein is found again in several trenches, now of much larger size, being from 6 to 9 feet wide. This is not unlikely to be the Queen lode; a new tunnel is to be started to cut it about 60 feet below where it is seen on the surface. It appears to be most necessary in this tufaceous country to get as low down on the lodes as is possible in order to have any chance of getting ore in them.

Sacramento—(Sections 1852-87M., 1287-87M., and 1288-87M. Visited 30th October, 1890.)

No one was working on these leases when I visited them; the only sign of work that I could see was one trench about three chains long near the boundary of the Silver Queen Extended and Sylvester Companies' Sections. A small vein, a few inches wide, of nice looking galena was cut in this trench, which is mostly through black slate.

Sylvester—(Sections 820-87M., 821-87M., 877-87M., 878-87M., 879-87M. Visited 30th October, 1890.)

Operations have been mostly confined to Section 820-87M. On this a lode running about N. 20° E. has been discovered, and traced by means of several trenches. The lode consists of clayey oxides of iron and manganese, and contains a good deal of pyromorphite poor in silver. Towards the south it appears to split into two branches, 2 ft. 6 in. and 5 feet wide respectively. Higher up the hill to the north it is about 6 feet wide. A shaft 14 feet deep has been sunk on it, but the lode soon dipped to the eastward and left it. Another small lode mostly of quartz, about one foot wide, is found running N. 20° W. a short distance west of the shaft. It should soon run into the first one. It is stained with oxides of iron and manganese, and contains a little pyrites. A tunnel is to be driven from the creek near the south boundary of the section on the main lode. As the outcrop rises rapidly up hill from the creek, this will test the lode to some depth.

Maxim—(Section 924-87M. Visited 1st November, 1890.)

Two lodes of carbonate of iron carrying galena are found near the centre of the section in very low swampy ground. One is about 18 inches wide, and strikes N. 35° W.; the other is 2 feet to 3 ft. 6 in. wide, and runs N. 20° W. The two should junction at no great distance from where they are laid bare. Some loose galena has also been found in black surface soil near the line of these lodes. There is not much galena in sight in them, but they are very promising, and well deserve a trial. Pumps will be required to sink on them. As previously mentioned, the supposed kaolin lode in the south of the section proved to be only a whitish vertical bed of tufaceous country.

Serpentine is found on the south boundary of this section, and I was told that it is also met with in Section 1148-87M. It carries a little galena on the faces of the joints, but nothing to speak of. Should the lode in Fowler's Section 547-87M. be indeed Balstrup's, it can hardly fail to pass through the north-east corner of the Maxim ground: it is worth looking for. The section has good prospects on the whole.

Percy Fowler's Section—(1055-87M. Visited 1st November, 1890.)

About 5 chains north and 3½ chains east from the N.W. corner of the Maxim section an outcrop of ironstone is found, under which a short tunnel has been driven, cutting a lode of carbonate of iron showing galena freely, though not in payable quantity. The thickness and course of the lode are not ascertainable till some more work has been done. Should it prove to be a north-westerly lode, it will probably be connected with the Maxim lodes. There is, however, another large outcrop of ironstone, carrying a little galena, in the side of the Manganese Creek, close to the north boundary of the section. Should this be part of the same lode as the first, its course would be about N. 40° E. This outcrop is, however, much in the position where Balstrup's lode might be expected to be found. It is evident that a lot of prospecting has yet to be done on this section to prove what it really possesses. It has a very good show, and deserves to be worked with vigour, instead of lying idle as at present.

MOUNT DUNDAS DISTRICT.

In my former Report on this District I expressed the opinion that "a detailed examination of it twelve months hence would be quite soon enough to give an idea of its value." In this opinion I still remain, for so little has been done in opening up the lodes that there is in most cases little except surface indications to examine, and these, while giving good grounds for sanguine hopes as to the future of the mines, do not allow anything to be predicted of them with an approach to certainty. An immense number of outcrops of iron and manganese oxides have been discovered all over the field, but in only a few instances has work proceeded far enough to show what like the lodes underneath them are. When a good many more of these gossans have been sunk and driven through, evidence will be forthcoming to form a judgment of the probable value of the still unproved ones, but now any estimate is pure guesswork.

There is no reason to fear that good ore will not be found under the ironstone—rather is it likely that it will be; but every mining district has local peculiarities, and until something is known about these it is premature to be positive as to the behaviour of the lodes. During the next six months of dry weather, if work on the claims is carried on with energy, a good basis of facts will be laid on which a judgment can be founded with some confidence. The most important contributions to our knowledge of the Dundas lodes as yet have been derived from the tunnels of the Mount Dundas, Maestri Broken Hill, Comet, and Adelaide Proprietary Companies, to which we may add Balstrup's at Mount Zeehan, as it is a precisely similar occurrence. In all these instances tunnels have been driven into the lodes from low levels, very little above the probable water-level of the localities. In the Adelaide tunnel, and to a small extent in Balstrup's, unoxidised ore—viz., carbonate of iron and galena—has been found after getting well into the hills enclosing the lodes. In Maestri Broken Hill tunnel galena and cerussite were found, together with a little carbonate of iron, but the bulk of the lode stuff was thoroughly oxidised. The same was the case in the adjoining tunnel of the Comet Company, only that galena and carbonate of iron were not found above water-level, and carbonate of lead was not obtained till a winze had been sunk nearly to it. In the Mount Dundas Company's tunnel, though 200 or 250 feet below the outcrop on the top of the hill, the lode-stuff was found to be thoroughly oxidised. Chromate of lead in fine crystals was found, but no galena or even carbonate of lead. These instances would seem to show that many of the large gossan lodes may be expected to be thoroughly oxidised down to the water-level, and as it appears certain that one result of this is the leaching of the silver and lead contents from the oxidised portions, the latter may be expected to be almost barren

except near the water-level, where, however, it is very probable that they will be rich, the enrichment being the result of the deposition at water-level of the metallic contents dissolved from the oxidised upper parts of the lodes. The celebrated Broken Hill (N.S.W.) mines appear to be thus enriched, the gossan outcrop of the lode being as a rule poor in both lead and silver, while in the bottom the galena and sulphide ores found are also poorer than the intermediate rich zone of carbonate of lead and chloride of silver ores. Should it prove at Mount Dundas that the large lodes are thus oxidised down to water-level, most of the mining will have to be done from shafts, and the advantages of natural drainage will be lost. This thorough oxidation is more likely to take place in the case of large wide lodes than in that of narrow ones, the former offering greater facilities for the passage through them of the water which with its dissolved gases is the cause of their decomposition. Several instances can even now be seen in the field that show that the smaller lodes at any rate are not altogether changed to gossans. For example, high on the slope of the hill south of the Comet property a lode has been struck (in Section 2297-87m.) showing galena almost on the surface. When this is traced on to the top of the hill (in 1796-87m.) it is nothing but gossan without a trace of lead. This is at a height of 63 feet above the galena, which itself is 315 feet above the water-level shown by the adjacent workings of the Comet and Maestri Broken Hill Companies. It is clear that in this instance, though oxidation has begun in the lode, it has descended to no depth to speak of. The same will probably be the case with many other of the narrower lodes, and very likely with some of the wider ones as well, so that the exceptionally good facilities of the field for drainage by means of adits will not be thrown away, but be here, as elsewhere, a strong recommendation in its favour.

The Dundas field has been enormously extended of late, and is still widening day by day. Great numbers of the sections are not yet surveyed, and consequently nothing has been done to develop the lodes upon them. On most, therefore, the gossan outcrops are seen in their natural state, quite undisturbed, and any conclusions that may be drawn as to the value of the ground and the future of the mines must be deduced from their appearance alone. This is not enough to go upon, further than to warrant the spending of some money in sinking and driving to ascertain what lies beneath. Finding that this was the state of the field I did not attempt to visit one-tenth of the total number of sections, but contented myself with seeing such as had something done upon them, or as I could learn were best worth going to. The majority even of the surveyed sections had no one working upon them, and as there are very few tracks it is a matter of impossibility for a stranger to find the lodes, supposing him to be able to find the sections themselves to begin with. The dense bush covering everything makes this no easy matter. A great deal of track-cutting will have to be done before underground work can be begun. The Government track north from the Zeehan-Dundas road to the Pieman River will be an immense convenience to the district, and the sooner it is widened and formed into a road the better it will be for all concerned. I am not at all sure that a horse tramway would not be as cheaply made as a road, and it certainly would be more easily maintained, for some years at least. From the configuration of the country this must be the main road through the Dundas and Pieman River field, numerous branches connecting it with the mines. The difficulty of getting tools and supplies to the claims is retarding the development of the mines exceedingly, everything having to be carried in on men's backs at present. The labour of thus getting in such things as a blacksmith's forge, with its anvil, bellows, and grindstone, is so great as to be deferred till the last possible moment; yet no driving can be done without a forge for sharpening picks and drills. Combination among the owners of sections is greatly required in the work of cutting tracks. This should be set about without delay, so as to be finished before next winter. If not hurried on with there will be next to nothing done before wet weather is again set in, when progress will be both difficult and expensive to make. On the present summer's work it depends whether the field will be really opened in 1891, or left practically idle for another year or more.

Leaving Mount Zeehan on the 15th October, I went to the northern portion of the Dundas field first. This is most easily reached by going out through the Despatch, Silver Crown, and Western sections on to the open button-grass country, where a northerly course is followed for two or three miles to the edge of the bush. Through this a foot-track has been cut by Mr. Meredith, the original prospector of this northern part of the field. This is a fair foot-track, but requires to be made passable for packhorses before much work can be done on the claims. As it is the best way of getting to a large number of valuable sections, I would recommend that the widening and improvement of it be taken in hand by the Government. It is doubtful if the above-mentioned track northward to the Pieman River from the Zeehan-Dundas road will come near enough to these sections to be of much benefit to them. Having spent a day in looking at several discoveries in the north, I then came south-east and south through a number of sections not yet on any published chart of the district, though several of them have been surveyed, passing through Fletcher's, the Caledonian Company's, Renison Bell's, Robb and Webster's, Glock's, the Madam Melba Company's, and other sections to the North Dundas Company's Camp. From here I went to the Great Nevada property, and thence south along Moore's new track to the main road from Zeehan to Dundas, by which the centre of the Southern Dundas field was reached. It is rather a misnomer to call the northern portion of the field by the name of Mount Dundas, as it is on the basin of the Pieman River, and quite away from even the base of Mount Dundas. As sections are now being taken up on the north side of the river also, it might be well to call the whole of this the Pieman River Silver Field. The mineral belt appears to be running northward straight for the Heazlewood and Whyte River fields, and there seems every probability that it will extend right through.

As showing how entirely undeveloped the northern field yet is, I may say that between the Pieman River and the South Dundas field I saw only four places where there was any payable ore in sight. These will be mentioned presently when the various sections examined are described in detail. Large numbers of gossan lodes were, however, seen, and from their great size and length there can be little doubt that important discoveries will be made beneath the ironstone. Most of this yields two or three ounces of silver to the ton on assay, which gives promise of the improvement of the lodes in depth. I did not, however, see any lead minerals in these outcrops, except in the few cases above referred to where galena was in sight.

In these, carbonate and phosphate of lead were found in the ironstone close to the galena, but higher up the gossan was barren in them. This is favourable to the idea that good ore exists under the other gossan outcrops, for if we find that a lode which shows galena where cut through in the bed of a creek passes rapidly into barren gossan as we ascend the hills on each side, it is safe to expect that similarly barren gossans will have galena below them in like manner.

There can be little doubt that the unoxidised gangue in the lodes below the ironstone caps will prove to be carbonate of iron, just as in lodes on the Zeehan field. This mineral has been struck under the gossan in the Adelaide Proprietary tunnel, and shows along with the galena in some of the northern sections. Another reason for predicting its occurrence in depth is that the ironstone outcrops frequently contain pseudomorphs of brown iron oxide after siderite, that is, crystals of brown iron ore which have the characteristic shape of carbonate of iron (siderite) crystals, and have been formed by the slow oxidation of the latter. Where they are visible it may be assumed that the oxidation of the outcrop does not descend to any considerable depth, and that carbonate of iron, and with it its close associate galena, will be found a short distance below the surface. I noticed this feature more commonly in the lodes of the Pieman River district than in those of South Dundas, and infer from it that the former will be found to be less oxidised in depth than the latter. Some of the prospectors call these pseudomorphs "tomahawk iron," from the resemblance of the crystals to the blade of an axe.

Reviewing the whole field, I do not think that there can be any question that we have here a very extensive and valuable mineral district. From the rugged and heavily timbered nature of the country it will necessarily be some time before the mines can be opened up so that an estimate can be formed of their ore-producing capabilities, and a still longer time before they are in a position to send steady supplies of ore to the furnaces. The great number of the lodes is itself against the rapid development of the ground, as the available capital becomes distributed in small amounts over a large number of mines, instead of being concentrated on a few of the best. This has the advantage, on the other hand, of leading to the prospecting of a greater number of the lodes, from which it will better be found what ones are best worth further expenditure. I may here take this opportunity of referring to a practice which is much too common, of floating companies with a large nominal capital, of which only perhaps £2000 or £3000 is available for working the mine. The promoters receive large interests in paid-up shares, and often considerable sums in cash besides. The amounts thus paid are usually quite out of proportion to the value of the mines as calculated on any sound basis of valuing. They are in fact such "fancy" prices as the high expectations of the promoters may excite them to ask, and the enthusiasm of the public for fashionable stock may tempt them to give. No matter how good a mine may be, if the owners cannot bring it themselves into a paying condition, it is of little value to them. They must therefore be prepared to make sacrifices to attract the required capital. Where the future of the mine is a matter of speculation the price that should be paid for it ought really to be very small, as there is only a chance in a lottery to pay for. If the original holders of the ground are recouped for their time, trouble, and expenses in securing it, and get a large interest in anything of value that may be found, and further secure that enough money to open the mine properly is spent upon it, they receive all that any fair valuator can consider due to them as a price for it. If it turns out well they participate largely in the profits, if badly, they suffer no loss. There have been a few glaring instances of rapacity lately on the part of promoters of companies at Mount Dundas that lead me to draw attention to this matter. In the best interests of the district it is necessary to protest against the way in which the money that should go to working the mines is diverted into the pockets of these men. The field cannot get on without money being freely spent in working it, and cannot pay a penny in dividends till it is worked, and it is therefore absolutely essential that capital should go into the mines, and not be thrown away in buying out the rights of first holders. The public are greatly to blame in giving the high prices asked for, especially as they generally do so on the exaggerated representations of the promoters themselves, and without any thought of the probable cost of bringing the mines into a paying condition. Perhaps the reiteration of the fact that very few of these properties can raise at the present time one hundredweight of payable ore, and that their value is entirely prospective and speculative, may help to impress upon the public mind the necessity of requiring that the bulk of the money subscribed should be spent on the ground in mining work. These remarks must not be construed to mean that there is nothing of any value at Mount Dundas—far from it. The indications and probabilities of the existence of great mineral wealth are extremely good, only it has to be mined for, and consequently money must be put into the ground. It is only by doing so that it can be ascertained which of the lodes are valuable, for among such a number it is in the nature of things that there should be many worthless. When the lodes have been proved to contain payable ore, it is quite time enough to pay large prices for interests in them. I have to take some trouble to say that I am not running down the Dundas field, for my last Report was construed by some writers in the public press into a condemnation of the whole of the West Coast districts, which it most certainly was not. If I do not extol its prospects to the extent that is often done, it is because it is good enough to stand on its merits without any such aid. There is much more to be feared from the evil results of "booming" the field than from a simple exposition of how matters stand. A "boom" is sure to be followed by a reaction and depression; and while anxious to see capital going into the mines, and believing that it will yield a good profit if properly applied, I should be very sorry to see the properties raised to absurd prices by the fever of speculation.

I shall now give a few notes on the sections visited. In a few instances the applications had not been surveyed, and it is within the bounds of possibility that in some of these the lodes will be found to come within the leases of previous applicants. The applications are often so close to each other that when the surveys are made there is no ground left for the later applicants.

Sections 2522-87M and 2523-87M. (Held in the name of Henry Gore. Visited 16th and 17th October, 1890.)

On these sections a very fine lode is exposed in a creek near the boundary line between them, in two places, about two chains apart. It has not been cut through so that its true thickness can be seen, and this is somewhat difficult to determine from the outcrop, as the lode dips easterly about 55°, and at the same time crosses the creek diagonally, so as to appear larger than it really is. As nearly as I could judge, it is from 10 to 12 feet wide. Course N. 15° to 17° W. The lode appears to be made up of several bands, the largest being from 3 to 4 feet thick. Splendid fine-grained galena is seen in thick bands in the exposed section, and payable ore could be at once knocked out. Some of this galena contains antimony, and gives very high assays, one of over 1800 ounces to the ton having been obtained from it. The gangue of the lode is quartz, siderite, and iron pyrites. This has every appearance of being a strong permanent lode. On the south side of the creek it can be traced up the hill to a height of about 63 feet, the outcrop changing into an ironstone gossan, with no lead ores showing in it. Close to the galena, however, pyromorphite and cerussite occur plentifully. As the creek falls rapidly, I do not think there would be any difficulty in getting a tunnel from it to cut the line of lode 50 or 60 feet below the outcrops of galena. A large quantity of ore could be obtained by driving on the course of the lode from where it is cut by the creek. This discovery gives excellent promise of making a good mine.

In another creek on Section 2522-87M, some 7 or 8 chains S.E. from the above, a lode formation 10 or 12 feet wide, and striking about N. 30° W., is found. Nothing has been done to prove this, but in all probability it is part of the same lode as the last-described. One seam 8 or 10 inches wide in it shows galena freely.

Section 2470-87M. (Held in the name of Henry Gore. Visited 16th October, 1890.)

Some 8 or 10 chains north from the centre of the southern boundary of this section there is a very large outcrop of iron and manganese oxides, with a good deal of quartz. The strike of the deposit is not yet determined. The gossan outcrop is close on 300 feet above the level of a creek close by it, so that the lode could be easily tested by an adit.

Sections 2471-87M and 2473-87M. (Held in the name of Henry Gore. Visited 16th October, 1890.)

About the centre of the boundary line between these two sections a lode about 5 feet thick has been found in a creek, consisting of siderite and carbonate of lime, with galena, blende, and iron pyrites disseminated through these. Course N. 10° W., dip westerly. In Section 2471-87M, what may be the same lode is again struck, but not exposed sufficiently to make out its course. Some nice loose galena was here obtained. So far these lodes are not payable, but deserve further examination.

Towards the centre of the same section a lode of carbonate of iron is cut, showing about one foot thick, and containing some galena. Course N. 65° W., dip towards N.E. This requires to be further stripped and trenched upon. The country here is limestone, itself carrying a little galena.

Sections 2492-87M and 2493-87M. (Held in the name of Henry Gore. Visited 16th October, 1890.)

At the western end of the boundary line between these sections, and on the east boundary of 2470-87M, a large strong outcrop of brown iron ore, 10 to 12 feet or more wide, has been found, containing numerous pseudomorphs of limonite after siderite ("tomahawk iron.") Course about N. 14° W. About 5 chains E. from the centre of the W. boundary of Section 2582-87M another ironstone outcrop is said to occur on the line of this lode, and another again in the centre of Section 2472-87M. I did not see these two outcrops, but can rely on the information as to their existence. The lode where I saw it appeared to be strong and well defined, and I should quite expect that it would extend into Sections 2582-87M and 2472-87M.

Section 2529-87M. (Held in the name of T. C. Fletcher. Visited 17th October, 1890.)

A huge outcrop of gossan is found in the centre of this section, and running to the S.E. from it through the middle of the two sections of the Caledonian Company, 2548-87M and 2578-87M. It is said to have been traced for nearly two miles. Course about N. 75° W. The gossan is composed of brown oxide of iron (with "tomahawk iron"), some oxide of manganese, and a good deal of quartz. This should be a very large lode, and ought to be tested without delay.

Section 2547-87M. (Held in the name of T. C. Fletcher. Visited 17th October, 1890.)

This section lies immediately to the south and south-east of 2529-87M. In the centre of it a large ironstone outcrop with a course N. 20° W. shows very clearly for about two chains. It is said to have been traced for more than a mile. The gossan consists, as usual, of iron and manganese oxides with quartz. No work has yet been done on it.

Sections 2956-87M and 2663-87M. (Held in the names of R. T. Moore and F. Burns respectively. Visited 17th October, 1890.)

In cutting the boundary line between the two sections, about 8 chains from the N.E. corner of Burns' section, a lode was discovered by the surveyors. It consists of about six feet in width of carbonate of iron and galena with a little oxide of iron, oxide of manganese, and carbonate of lead. A trench has been cut across it revealing galena in what is probably payable quantity. The course of the lode is not distinctly seen, but appears to be about N. 40° W. and with a north-easterly dip. From its position this might well prove to be part of Meredith's galena lode found in Sections 2522 and 2523-87M. The lode is in somewhat low ground, but probably 50 feet of backs could be obtained upon it without much length of an adit. It looks very well, and deserves early development.

Sections 2537-87M, 2536-87M, 2534-87M, and 2535-87M. (Visited 17th October, 1890.)

These sections were not surveyed when I saw them, and with several others were applied for by the Renison Bell Prospecting and Mining Company, No Liability. They extend in a south-easterly direction from east of Section 2578-87M of the Caledonian Company's previously mentioned. They have been taken up so that a large ironstone lode found on them will pass approximately through the centre of each section. The course of this lode is about N.N.W. The gossan in one of the sections forms a cliff quite 20 feet high, and is of great width. The lode-matter seems to be thoroughly oxidised to a great depth, for where it crosses a large creek it still shows as gossan without any lead minerals such as cerussite and pyromorphite. From this creek to the top of the hill towards the south end of the sections must be from 500 to 700 feet vertically. The lode can be easily tested by driving on its course from the place where it crosses the creek. From its great width and length this should prove a very important lode. The facilities for working it by adits are especially favourable.

Sections 2958-87M and 2959-87M. (Visited 18th October, 1890.)

The first of these two 80-acre sections is applied for by R. Webster and C. Robb, and the second by C. Robb. They were not surveyed when I visited them. They lie to the south and east of the Renison Bell's Co. sections just spoken of. A very large ironstone lode runs about N.W. and S.E. through these two sections, crossing the boundary between them at the centre of the line. The gossan consists of iron and manganese oxides, and in places cannot be less than three chains in width. The lode may be easily tested either by a drive on its course or by a crosscut. Its appearance is promising enough to call for a thorough trial. As a surface "show" it is quite equal to many of the best at South Dundas. The same might be said of the Renison Bell, Caledonian, and Fletcher's ironstone lodes.

Section 2566-87M. (Visited 18th October, 1890.)

This unsurveyed section is applied for by M. Glock. An ironstone lode, whose thickness I could not properly see, has been found in it, running through the centre of the section, about N.W. and S.E. The gossan is of a favourable nature. No work has been done to expose the lode.

Section 2567-87M. (Visited 18th October, 1890.)

R. Webster has applied for this section, also unsurveyed at the time of my visit. In a small creek on it a small gossan lode has been cut, said to be on the line of the above Glock's lode. The application notice is in the centre of the ground applied for, close to the place where the lode has been found.

Section 2595-87M. (Visited 18th October, 1890.)

This is in the name of W. M'Loughlin on the September chart of the Dundas District, but I understand that it, with several other adjoining ones, is held by the Madame Melba Company. The country rock in this vicinity is serpentine, thus differing from the sections previously described, which were all on slate and sandstone. About the centre of the section a fine lode has been cut in a small creek. It is 26 inches wide, and consists of almost solid antimonial lead ore (Jamesonite probably), with a little quartz, blende, and pyrites, and some blue calcite and green talc. Course N. 25° W., dip S.W. 80° to 83°. On the slope of the hill, north of the creek, it has been cut again 2 feet 6 inches wide, but composed entirely of iron and manganese oxides, with a little quartz. Though this lode is small, it is almost solid ore where cut in the creek; and if this continues for any distance it is quite large enough to give handsome returns to the owners. A tunnel can be driven from lower down the creek to cut the lode at a considerable distance below the outcrop. I unfortunately arrived on this section just after all the men working on it had left to go to the township, and consequently I was unable to find another lode that exists on the property. The antimonial lead lode, however, is of itself good enough to stamp the section as a valuable one.

Section 2629-87M. (Held in the name of W. M'Loughlin. Visited 18th October, 1890.)

On the centre of the north boundary of this section some loose gossan may be seen, and there is an outcrop of decomposed serpentine rock that looks something like a lode. I could not ascertain if this had been mistaken for a lode, or if anything else had been found on the section.

North Dundas Company—(Section 2306-87M. Visited 19th October, 1890.)

This section is on the lode described in my former report as Webster and Bennett's. A tunnel has been driven on the course of the lode for 108 feet, running S. 28° E. The lode-gossan is seen on the hill above the tunnel, and again below it; but where the drive has gone in, the lode must either have been thrown to one side of its average course, or else been filled by a large "horse" of country, as the drive has not been successful in finding it. One small crosscut, 15 feet long, was put in at 86 feet from the entrance without touching any lode-matter. It is intended to drive 150 feet, where the adit would be vertically below the outcrop of the lode on the surface, and, if the lode is not then cut, to crosscut the country until it is found. It cannot be far distant, and it is only a question of a short time till it is picked up. The adit is 250 feet below the crown of the hill, and another level 250 feet lower could also be got on the course of the lode, the nature of the country being very favourable for working by adits. It is very unfortunate that this Company should have had difficulty in finding the lode at the point they selected for driving on, as it is one of the typical gossan lodes of the district, and its behaviour in depth will be a great guide as to what to expect in other similar cases. Should it prove, for example, to be entirely oxidised at the level of the present adit it would be well, in Fletcher's and Renison Bell's big lodes, not to drive at a high level at all, but to test them at as near water-level as an adit can be obtained. On the contrary, should lead ores be found in this tunnel, there would be great hope of getting them also in the higher portions of other gossan lodes.

This lode is now said to have been traced through five sections, from 2364-87M on the north, through 2316-87M, 2306-87M, and 2305-87M, to 2304-87M on the south. A large outcrop of iron oxide in the N.W. corner of 2237-87M may also be part of it. Meredith's ironstone lode, running from Section 2470-87M to 2472-87M, and the galena lode running from Section 2523-87M to 2663-87M, are both approximately on the line of this big lode, and may, perhaps, prove to be connected with it. The lodes seem to have a general north-westerly course, more or less parallel to this line, all through the Pieman River portion of the Dundas field.

Great Nevada—(Sections 2456-87M, 2394-87M, and 2393-87M. Visited 19th October, 1890.)

A strong well-defined outcrop of iron and manganese oxides, with a great deal of quartz, is found running N. 50° E. for about 12 chains through the middle of Section 2394-87M and the north-west corner of 2393-87M. A small portion of it passes through the S.E. corner of 2654-87M.

The ground is rather low-lying on the whole, and the lode will probably have to be worked from a shaft. A tunnel is being put in to test the lode, but has as yet got nothing but thoroughly oxidised ore, and I fear that sinking will have to be done before any payable ore will be met with. The tunnel was only 48 feet in length at the time of my visit, 23 feet being through the lode, which, however, was not yet cut through, and must therefore be even wider than this. The quantity of quartz in the gossan makes me rather doubtful of its probable richness in lead and silver in depth, as quartz does not decompose, and may be expected to be found in depth in equally large proportion as in the outcrop. The lode is a strong one, however, and deserves to be prospected.

Comet—(Sections 1794-87M and 1796-87M. Visited 20th October, 1890.)

This property has deservedly attracted a large share of public attention, not only on account of its proximity to the rich discovery of galena and cerussite ore in the adjoining Maestri Broken Hill mine, but also from the number of lodes occurring in it, and the facilities for working them by means of adits. The principal workings are on Maestri's lode in the N.E. corner of Section 1796-87M. Beginning at a point about 4½ chains south of the north boundary and one chain west of the east boundary of the section, a tunnel has been driven to the north about 295 feet. Taking the bearings of the tunnel with an ordinary hand compass, I found that the course was N. 50° W. for 216 feet, then N. 17° E. for 79 feet. This brings the end of the tunnel on to the north boundary of Section 1796-87M. The whole of the tunnel is through somewhat clayey oxide of iron and oxide of manganese, except about 22 feet at the inner end, where a soft breccia of angular slate fragments is met with, apparently forming the footwall of the lode. If this point is joined to the point in Maestri's tunnel where the footwall of the lode is met with, the course of the lode is found to be N. 68° W., which I believe is not far from the truth. I am surprised that the Comet and Maestri Broken Hill Companies should be content to remain so much in the dark as to such a very important thing as the true course of their lode. It is quite worth the expense of driving to the boundary in each mine along the footwall. It is not even yet quite certain that both mines are on the same lode, though I think that there can be very little doubt that this is the case. As both adits are in gossan ore from the mouth, it is clear that the lode cannot be less than 4 chains in width, measured on a horizontal plane. If the apparent dip of 35° seen in the footwall in Maestri's tunnel is anything like the true dip of the lode, its thickness must be about 150 feet measured at right angles to the walls.

At 29 feet back from the end of the adit a winze 18 feet deep has been sunk on the lode, and two drives have been made from it, one S. 70° E. 12 feet, and the other N. 12° E. about 14 feet. The last 6 feet of the latter was in the breccia met with in the adit overhead. In sinking the winze, crystals of carbonate of lead soon began to appear, and became more and more plentiful as it went down, till in the bottom really good ore was obtained. In the two drives from the bottom of the winze cerussite crystals occur very freely, together with yellow oxide of lead, locally known as "canary ore." The ore appears to be improving every foot it is sunk upon, and there can be little doubt that even better ore is under foot. Unfortunately, water became troublesome, and the winze could not be sunk deeper. The adit is only a few feet above the level of the creek which traverses the Maestri Broken Hill and Comet properties. In order to strike the lode at a lower level, the manager has determined to drive from another gully in Section 1794-87M. This work was just begun at the time of my visit. The drive will strike the lode only 40 feet below the first adit, or 22 feet below the bottom of the winze. It is believed by the mining manager that the lode will be struck in 360 feet of driving, but this is on the supposition that the course of the lode is about N. 27° W. Should it prove to be, as I incline to believe, N. 68° W., the distance to be driven will be over 500 feet. Under the present circumstances of impossibility of getting pumping engines on to the ground, the policy of driving this adit at so small a depth below the first one is, in my opinion, quite justifiable, especially as it will prospect a good deal of ground and settle the question of the course of the lode. Both this and the Maestri Broken Hill Mine will, however, ere long require to be worked from shafts equipped with good pumping machinery.

The Maestri Broken Hill Company's eastern lode, running about N. 30° W. has been found cropping out, has an ironstone gossan on Section 1794-87M, but nothing has yet been done to test it.

In the south section the ground rises very rapidly into a steep hill 486 feet in height above the level of the creek at the tunnel mouth. The southern boundary of the section lies along the ridge of the hill. The lode in Kozminsky's Section 2297-87M, which I described as Lambie and Davis's in my former Report, has been traced into the Comet ground, several trenches having been dug upon it. In one of these it is seen as a gossan of iron oxide 27 feet wide, and a pit has been sunk upon it about 10 feet without coming to any unoxidised ore or lead minerals. This is about 63 feet higher up the hill than where galena is seen in the lode on Kozminsky's section. The course of the lode appears to be about N. 35° W. Going west-

ward along the south boundary of 1796-87M another lode is struck, 126 feet lower than the above trench. Here there is a small lode of galena and carbonate of iron, running about N. 30° W., about 2 feet wide. This continues south into Kozminsky's section, and has been bared for about two chains in a surface trench. It is in the valley of a small creek, and could be worked by an adit driven from a point some distance down this. Both these lodes are well worth testing. The upper one has been proved to contain galena over 300 feet above the water-level.

Maestri Broken Hill—(Sections 2356-87M and 2355-87M. Visited 23rd October, 1890.)

This mine has at present the best show of ore on the field. The workings are in the S.W. portion of Section 2356-87M, close to the boundary of the Comet ground. About a chain east of this boundary carbonate of lead was found in the large creek passing along the south of the sections. Somewhat soft iron and manganese oxide gossan being found cropping out on the north side of the creek, a tunnel was driven into it in a direction N. 12° E. This almost at once struck rich cerussite and galena ore, which continued to be found in large quantities through the iron and manganese oxides that form the bulk of the lode, for about 120 feet. At 120 feet from the mouth of the drive a band of carbonate of iron striking N. 25° W. was encountered. After passing through this the drive continued in iron and manganese oxides to 206 feet without coming upon any more lead ore. The gossan ore in this portion of the tunnel is arranged in bands running about E. and W. At 206 feet the footwall of the lode was struck, also running east and west, and dipping southerly at an angle of 35°. The country rock from here onwards was brown slate and sandstone, much stained with oxide of iron, and much broken by joints, so as to have a somewhat rubbly character. Occasional crystals of cerussite and pyromorphite and some talc were found through this country. At 447 feet the course of the drive was changed to N. 35° E, so as to go more directly towards the eastern lode seen on surface. About 70 feet had been driven on this new course at the time of my visit. At about 482 feet a vein of manganic ironstone, 1 foot 6 inches wide, was cut through, running N. 55° W. The drive is to be continued to cut No. 2 lode, which ought not now to be far distant.

The ore in the first part of the adit seems to run obliquely across the lode, supposing the course of the latter to be E. and W. as shown by the footwall, or N. 68° W., as calculated from the evidence of this and the Comet mine. At 55 feet from the mouth of the drive a course of ore from 6 to 7 feet wide, carrying galena in bands up to a foot and more in thickness, was passed through, running N. 2° W., and dipping to the west. Another course of excellent galena ore in the mouth of the drive runs obliquely across it also a little to the west of north. Taking the run of these galena bands with that of the carbonate of iron band cut at 120 feet, I think that it will be found that there is a shoot of ore crossing the lode obliquely in a north north-westerly direction. This would agree with the discovery of ore in the Comet winze, which is on the northern side of the lode, whereas Maestri's find is on the southern side. A line running N.N.W. from Maestri's winze would not go far from the Comet winze. Should this theory prove correct, it will be likely that other shoots of ore will in the same way be found to lie obliquely across the main lode mass. A supposition suggests itself that the ore belongs to a north-westerly lode running through the large east-and-west one. This is possible, and will be tested by the new adit in the Comet ground.

A winze has been sunk 25 feet in from the mouth of the adit to a depth of 21 feet, but, as water began to collect, two drives were opened out at 16 feet eastward and westward, on a course N. 75° W. The east drive was 9 feet clear of the winze when I saw it, and the west drive 15 feet. The latter was in splendid cerussite ore, with a good deal of galena and sulphate of lead. The eastern drive was not so rich, though still very good. The lode in the winze and these drives is very rich. The manager estimates that he has obtained 40 tons of first-class galena, 8 tons of good mixed galena and cerussite, and 70 tons of cerussite ore from all the workings. No bulk assay has been made, but numerous small parcels assayed have all given rich returns of silver. It may be seen without assay that the ore is rich in lead, and the assays give every reason to believe that it has a high silver content. The owners of this mine have been fortunate in striking this rich bunch of ore right at the outset of their mining operations. Even though the shoot should prove to be of limited extent, which the find in the Comet renders unlikely, there is good ore enough now in sight to pay for machinery to sink on the lode to a depth of 200 or 300 feet.

Part of the difficulty of ascertaining the course of the Maestri's and Comet lode lies in the fact that the outcrop cannot be traced any distance on surface with any certainty, as the ground soon becomes covered with loose gossan from the outcrop of No. 2 lode, lying higher up the spur. This is a very large outcrop of iron and manganese oxides, covering in places two or three chains in which, running north-westerly across the top of the bridge under which the adit is driven. Pyromorphite has been found in the ironstone in places, but in no quantity; one or two shallow trenches have been dug on it, but nothing further. The extension of the main adit should soon reach this lode. Should it contain payable ore the value of the mine will be immensely enhanced, as it is a very large lode, and there is likely to be a much greater length of it in the sections than of the No. 1 lode. From the difference in their courses these two lodes ought to run into one another.

width?

The manager of the company informed me that there was a third lode known to exist on the leases held, on section 2355-87M, showing siderite, quartz, iron and manganese oxides, blende, pyrites, and a little galena. I had not an opportunity of visiting this lode, which has not yet been prospected to any extent.

Kozminsky's Sections—(2297-87M, 2332-87M, and 2333-87M. Visited 20th October, 1890.)

Nothing was being done on this ground at the time of this visit, and so far as I could learn nothing of consequence had been done on it since my former visit. On this occasion I again looked at the two lodes in the north-east of Section 2297-87M, but found that nothing new had been done. The bulk of the lode-matter in both lodes is carbonate of iron. In the large eastern lode there is not so much galena showing now as formerly, as the prominent pieces have been picked out, and the whole exposure has become discoloured and dirty. The tracing of this lode into the Comet section has shown that its course is about N. 35° W. It is too good to be neglected as it has been, but as a company has been recently floated to acquire these sections, it may be hoped that work will now be vigorously carried on.

The large gossan lode in the north-west corner of Section 2297-87M, which I formerly described as showing crystals of chromate of lead, has been traced south-west through the south-east corner of 1851-87M, and thus appears to have a N.E. and S.W. course.

Talune Company—(Sections 2379-87M and 2380-87M. Visited 20th October, 1890).

At the extreme S.W. corner of Section 2379-87M ironstone gossan is found freely, and a lode most likely exists in the near neighbourhood.

The work on the leases at the time of my visit was confined to driving a tunnel on the north section (2380-87M), not far from the middle of it. This drive is being put in to the eastward from the side of a creek to cut two gossan lodes found higher up on the hillside. One of these, which should be struck in about 50 feet of driving, is a little over three feet wide in the outcrop, and runs about N. 5° W. The second outcrop has only been touched, not even cut through by a trench, so that its course and thickness are still unknown. A third small gossan lode, about two feet wide, was cut almost at the mouth of the drive. About a chain and a half down the creek from the tunnel yet another gossan outcrop has been found. The manager is waiting for drier weather before cutting through this by a trench in the bed of the creek. Nothing can just now be said as to its size or course.

On the hill to the west of the tunnel and across the creek from it, a more promising outcrop than any of the above is found, but has not yet been touched at all. It appears to run N. 5° E, but this is not very certain, as there is a lot of loose gossan lying about, and there is no guarantee that the two outcrops from which the course was taken are parts of the solid lode, or only large loose blocks. An adit from near the creek, about 180 feet long, should cut this lode at a depth of about 100 feet, as the hill rises very steeply. This outcrop is a much larger and more likely one than those that are now being driven upon, but all require prospecting. Nothing but gossan has yet been found on this section, though the number of lodes and their character give good hope that valuable ores will be found in time.

On the southern section, however, 2379-87M, galena has been obtained in low ground by the side of a large creek passing through the holding. The galena is in large cubical pieces, unlike the general character of the galena in other parts of the field, which is rather fine-grained. The lode appears to run about N. 80° E., and consists of 3½ feet of soft earthy manganese and iron oxides, with a vein of quartz from 8 to 12 inches thick, carrying a little iron and copper pyrites. No galena could be seen in the lode when I visited it, though numerous pieces of it were lying all round, so I presume the galena vein must have been covered up by the loose *débris* which has accumulated on the floor of the small cutting that has been made. A small vein running N. 40° E. has been trenched on each side of the creek, and a few pieces of galena appear to have been got from it. Nothing can be done here except in fine weather or by getting machinery to drain the workings. Efforts should be made in the dry weather to trace the lode further away from the creek. The trenching that has been done seems to me to have been off the main line of lode and only on a branch vein.

Adelaide Proprietary—(Section 2302-87M. Visited 21st October, 1890).

This section is remarkable for the great development of ironstone outcrops upon it, there being three large strong lines of them converging to a point about six chains from the north-east corner of the section on the northern boundary. About a chain to the north of this point, in Section 2303-87M, galena and native silver were found in the outcrop of one of the lodes in a creek. The Adelaide Company, having obtained an easement, began to drive on the course of this lode from a point in 2303-87M, about 30 feet north of their own boundary. The course of the drive is about S. 15° W., and it had been driven about 60 feet when I saw it. The outcrop of the lode stands up as a high ridge of ironstone immediately above the tunnel, and may be traced to the top of the steep hill lying south of it, and over into the next valley. It often forms a wall from 12 to 15 feet in height, composed of oxides of iron and manganese, with some quartz: course, N. 15° W. To the west of this lode another one is found on the side of the same hill, also standing out as a bold outcrop, and having a course N. 30° E., which should make it join with the first one about where the tunnel strikes it. This outcrop consists of oxide of iron, often in reniform fibrous shapes, oxide of manganese, and a good deal of quartz. It is very large, quite 30 feet wide in several places. The third lode is seen in the side of the creek, forming steep cliffs 20 to 30 feet high, about four chains S.W. from the tunnel, and running to meet the other two lodes about where they junction. The outcrop of this lode may be seen for quite two chains along the creek. It consists of oxides of iron and manganese, with but little quartz, and is soft in places, and full of small caves. All these lodes have a very promising appearance, especially the first and third. I understand it is intended to crosscut from the main adit to test the second one above mentioned.

The tunnel passed through soft gossan containing some chromate of lead for 36 feet, and then struck bands of carbonate of iron separated by partings of oxide of iron, and mostly carrying a little galena and blende, together with a few quartz bands. A little fairly good galena was occasionally found between the various bands, and some phosphate of lead was also got in the cellular quartz. All the bands appear to be lying about E.N.E. and W.S.W., which is nearly square across the line of lode as seen on surface. This may be due to the junction of one of the other lodes—the third one possibly, as it has about the same course as these bands; or, as in Maestri Broken Hill mine above described, the shoots of ore may lie across the lode at an angle to its course. So far no payable ore had been got in the workings when I visited them, but I have little doubt that it will soon be found, and that this will prove a good mine. It is encouraging to find galena in it so high above the water-level, as it gives hope that it may be worked by adits for a long time before sinking becomes necessary.

Anderson Proprietary—(Section 2303-87M.)

It was on this section that native silver was found in the outcrop of the first lode of the Adelaide Company's. A manager had been appointed, but had only arrived on the ground on the day when I was at the Adelaide, and as he said that nothing had been done on the section, and that he was only going to begin prospecting it, I did not go over it. The Adelaide lode ought to go right through this ground, and if found on the north side of the creek may be easily proved by a drive along its course. The country north of the creek is mostly serpentine.

Sections 2354-87M—(Dundas Extended) and 2336-87M (Devonport) were in much the same case as the last. Managers had just arrived to begin prospecting the claims, so I did not think it worth while to go to them at the present. The original prospectors could not be got hold of to show what had been found, and without a guide it is quite labour lost to hunt for the lodes.

Bonanza—(Section 2317-87M. Visited 21st October, 1890.)

On this section a tunnel is being driven to cut a lode which crops out strongly on the slope of a high hill. This outcrop is mainly of hard clayey and siliceous oxide of iron. The tunnel had been driven 40 feet when I visited the ground, and the lode was expected to be cut very shortly. The country passed through was brown clay with veins and nodules of brown iron ore. This tunnel is about 207 feet below the top of the ridge. About 54 feet lower down another tunnel had been commenced from the side of a small creek. This was driven some 20 feet or so through the same sort of country as the upper one, but had been discontinued until the upper one should have struck the lode and ascertained its position better. There are two ironstone lodes in the south-east portion of the section, and they should join one another near where the tunnel should strike them. I did not care for the appearance of these outcrops much, as they were very clayey and siliceous, instead of being mostly iron and manganese oxides. From this I infer that the lodes in depth will consist principally of clay and quartz, instead of carbonate of iron, which up till now has been the constant concomitant of the galena wherever found throughout both the Zeehan and Dundas Districts.

In a small creek running south through the section, however, very good-looking loose gossan is found in great quantity. This is probably from Kozminsky's chromate of lead lode, which has been traced S.W. from Section 2297-87M through the S.E. corner of 1851-87M, about to the boundary of the Bonanza section. The manager has begun to trench in two or three places to pick up the outcrop of this lode, which ought almost certainly to be soon found.

Very pretty green serpentine is found on the north boundary of this property. It is, unfortunately, much cracked and jointed; but on being cut into it is very likely that stone fit for lapidaries' purposes may be obtained.

Mount Dundas Company.—(Sections 1708-87M, and 1724-87M. Visited 23rd October, 1890.)

Two very large wide outcrops of iron and manganese gossan are found in Section 1724-87M. A tunnel has been driven, beginning at a point in Section 1708-87M about 600 feet west of the centre of its eastern boundary, on a course of S. 70° E., to prove the ground at a depth of about 250 feet below the crown of the hill on which the more westerly lode crops out. The mouth of the tunnel is in hard black slate, very much contorted. After passing through 322 feet of this, a lode was struck, running about fair across the drive, or N. 20° E., and dipping easterly about 1 in 1, composed of white rubbly cellular quartz, with very little oxide of iron stain. There is an outcrop of quartz on the surface corresponding to this lode, mentioned in my former report on this district. The drive continued to pass through it for 61 feet, when the hanging wall was reached. The country now met with was rather decomposed serpentine, so that this quartz lode appears to be of the "contract lode" character, interposed between slate and serpentine. The serpentine country was cut through till a point 451 feet from the mouth of the tunnel had been reached, and here the footwall of the gossan lode seen on top of the hill was struck. This lode is of very large size in the adit as well as on surface, for it has now been driven across a distance of 179 feet without coming to the hanging-wall. The course of the footwall in the adit is N. 10° to 12° W., and its dip slightly to the east. The lode-stuff varies a good deal. The footwall portion is very flinty, but the bulk of the lode rather soft and clayey. It contains a great deal of cellular and flinty friable quartz, and is more or less stained with oxide of iron, though this is not in any large quantity. On the surface the gossan is very clayey and full of quartz also, but is harder and contains more oxide of iron than in the drive. It is not at all like the iron and manganese gossan found on Maestri's and the Adelaide lodes. From its nature on surface and in the adit I expect that the lode will continue to be very siliceous in depth, and will not contain much carbonate of iron. In the adit the lode-stuff appears to be thoroughly oxidised, and from its porous nature it is probable that it will continue so down to the water-level. If the lode contains lead and silver in any quantity, they will probably be found close to and below this level. The only sign of valuable metals yet found is at from 460 to 476 feet from the tunnel mouth, where a good deal of chromate of lead has been discovered. This shoot of chromate ore appears to be widening as it goes down, being only about 10 feet wide in the roof of the drive, while 20 feet wide in the floor. A winze is being sunk upon it. I look upon this ore as a good indication of better ore being found in depth.

The other gossan lode seen on surface has not yet been tested in depth. It appears to me to be of a rather more promising nature than the first one, the gossan being less siliceous and containing more oxide of manganese. I confess, however, that this preference of the iron and manganese gossan to the clayey and siliceous lodestone may be only a prejudice, as the knowledge yet gained of the anatomy of the Mount Dundas lodes is much too limited to allow any conclusion, favourable or unfavourable, to be safely drawn on the point. It may prove that quartz is a better gangue for bearing lead and silver than the carbonate of iron. (These remarks will also apply to what has been said of the Great Nevada and Bonanza lodes.)

In a lode of the great size of that cut in the adit, it is most probable that the ore exists in patches and shoots, and further prospecting may yet find a Bonanza in it. The discovery of the chromate shoot shows that there is lead ore in the lode, and gives hope of better ores being found below. The further development of this mine will be watched with great interest by all who have anything to do with the field.

Maestri Silver Prospecting and Mining Association—(Section 2549-87M. Visited 24th October, 1890.)

Near the N.W. corner of the section some work has been done close beside a creek which here falls about 60 feet very rapidly in a succession of small waterfalls; consequently an adit could be driven under very favourable circumstances. In this creek several veins of solid white quartz up to three feet thick are seen. These, however, do not appear to be regular reefs, but rather what miners call "country quartz"—that is to say, irregular veins and bunches of no considerable extent. Near one of these veins a few crystals of galena and blende have been found in the joints and cleavage planes of the schist country rock, but as far as I could see there was no sign of the existence of a lode. A dyke of greenstone about 8 feet wide is found near here, and it is likely that the formation of the quartz bunches and the deposition of the minerals were due to its intrusion. The rock in which the galena was found is undoubtedly the country rock, not lode stuff at all. The occurrence of minerals in fractures in country rock is very common, and no significance can be attached to it.

About seven chains from the south boundary, and one chain from the western one, two trenches have been cut on a steep hillside. Some rather indefinite veins of quartz and gossan have been found in them. The quartz and a silicified schist associated with it carry iron pyrites and a little siderite. The veins are small and do not give much promise of permanence. Some assays are said to have been obtained from them of about $4\frac{1}{2}$ ounces of silver to the ton however, and as they may come together and make it into a better lode in depth, some more prospecting might well be done on them. I do not, however, think that present appearances warrant the driving of a tunnel 300 feet long as is proposed. The outcrops might, with advantage, be cut into a little more deeply on surface so as better to expose the lodes. I have very little hope of the success of any operations upon them.

GENERAL REMARKS.

As far as I could learn there was very little more to see on the field on the Sections not visited than quite undeveloped outcrops of gossan; mining work is only beginning on many of them. The character of the Dundas field can be fairly gathered from the description of the above selection of the Sections. I have no doubt at all as to its ultimate success; that is as assured as any mining district's future can be. If worked in a legitimate manner, and not for speculative purposes, its development should be rapid. The field has several advantages to compensate for the difficulties in opening it up; it has good timber, good water, and great facilities for drainage by adits. Where ordinary tramways could not be constructed there are few places where a short wire rope tramway would not connect the mines with practicable routes for them. Aerial tramways are not in common use in this Colony as yet, but I expect that they will be found very useful at Dundas. I do not like to speak positively as to the possibilities of getting water-power on the field, as I saw it when the streams were all full, after a longish wet season, but I should think that it is quite possible to get a supply of water for power from some of the larger creeks without much difficulty. In the deep valleys in which they lie it is very improbable that there are not many places where reservoirs might be constructed at a low cost. Should water-power be available electric energy might be utilised in a great many ways with great advantage. The use of electricity in modern mining is increasing very rapidly, especially in the United States of America. There is one source of energy that might be utilised for the South Dundas field at any rate, in the Big Henty River. It is not too far to bring electric power from this, and the water supply is a never-failing one. For the northern field there is plenty of power to be utilised in the numerous large affluents of the Pieman River.

In concluding my report of the state of the Dundas field, I have to acknowledge my gratitude to the various gentlemen who took so much trouble to show me over the properties, for the courtesy and kindness which they have showed to me. I am especially indebted to Mr. Charles Robb, who gave up four days of his time to guide me from Mr. Meredith's camp, near the Pieman River, to the South Dundas field. Without his assistance I should not have been able to find my way through the northern field.

COAL MEASURES AT THE HENTY RIVER.

On my return to Strahan from Dundas and Zeehan I made a discovery which may have a great influence on the future of these fields. Messrs. Jones and Bethune having applied for a lease of some ground for limestone, to be used as flux, wished me to look at it, especially as the limestone was full of fossils. The limestone was found in a creek running into the Big Henty River, on the north side, a short distance above the railway bridge. On making an examination I found that there was a considerable extent of ground along the railway line, just north of the bridge, occupied by a coarse white grit or sandstone. I was not able to define the boundaries of this formation, but it must be over two or three miles long and quite a mile in width. The creek in which the limestone was found has cut through this sandstone, affording a section of the strata about 200 feet deep. The stream falls very rapidly, there being about five small waterfalls from 8 to 30 feet in height in the space of about half a mile. The strata appear to lie almost horizontal, and to be very little disturbed. Below the gritty sandstone I found beds of fossiliferous sandstone containing species of *Spirifera*, *Productus*, and *Fenestella*. Going down the creek these sandstone beds were found to alternate with beds of mudstone and impure limestone, containing the same sort of fossils. The limestone is as a rule much too impure to be used as a flux; it contains a great many pebbles which would increase the per-centage of silica in it to far too high an amount. Some of it would probably burn to a fair hydraulic lime or cement, as it appears to be somewhat argillaceous. Below the lowest limestone beds come others of black shale or slate, with but few fossils; and beneath these, again, at a height of only about eighteen feet above

the level of the Henty River at the bridge, I found black shale very full of impressions of ferns characteristic of our lower coal measures, belonging to the genera *Glossopteris*, *Gangamopteris*, and *Næggerathiopsis*. These were the lowest beds seen, for immediately below them down the creek I found clays containing leaves of a Tertiary type, doubtless belonging to the series of Tertiary leaf-beds surrounding Macquarie Harbour. These must rest against an escarpment of the coal-measure rocks. The discovery of the *Glossopteris* shales under the limestones is the point of importance in this section, as the same succession occurs in the Mersey and Don coal-field; and there the coal seams are closely associated with similar *Glossopteris* shales. It is not unlikely that there may be coal at the Henty also underneath them. The probability of this being the case is quite sufficient to warrant testing the measures with one or more diamond drill bore-holes. The first one of these would be well located just where the shales were found, the place being easy of access, and well supplied with wood and water. Should coal be proved to exist, its proximity to the railway from Strahan to Mount Zeehan would render even a small seam valuable. The coal seams, if any, will probably be found to extend under all the gritty sandstone seen on surface; and there is enough of this visible to show that there would be a considerable field. The country has not yet been explored to determine the probable size of this; but the finding of carboniferous fossils at Bell's and Hall's, at Mount Zeehan, makes it probable that the area is greater than might be suspected. We cannot tell, either, that the coal measures do not extend under the Macquarie Harbour leaf-beds, which occupy the flat ground between the Henty River and Strahan. The benefit to be got from the discovery of coal in this locality is so great that a much more remote chance of finding it would be worth trying. There may be no coal at all, or only thin worthless seams; but, on the other hand, there is a good chance of finding a payable seam. I hope to hear of the ground being soon tested.

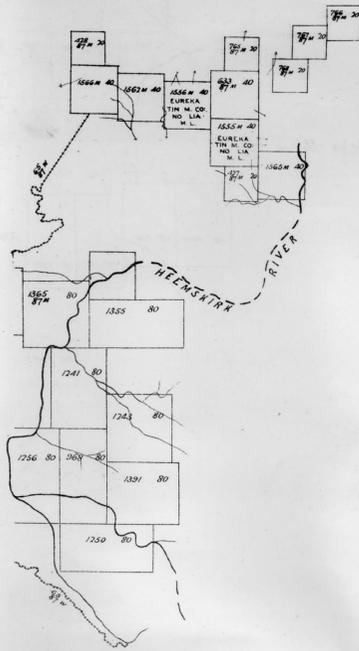
Near the Henty Ferry there is a bed of clay lying underneath the drifted sand-dunes. This appears to the eye to be of good quality, and may be very useful to make into bricks for the furnaces at Strahan and Mount Zeehan, and I therefore draw attention to it.

I have the honor to be,
Sir,

Your obedient Servant,

A. MONTGOMERY, M.A., *Geological Surveyor.*

To the Secretary of Mines, Hobart.



SILVER SECTIONS MOUNT ZEEHAN

SCALE, THIRTY CHAINS TO AN INCH

5 cm

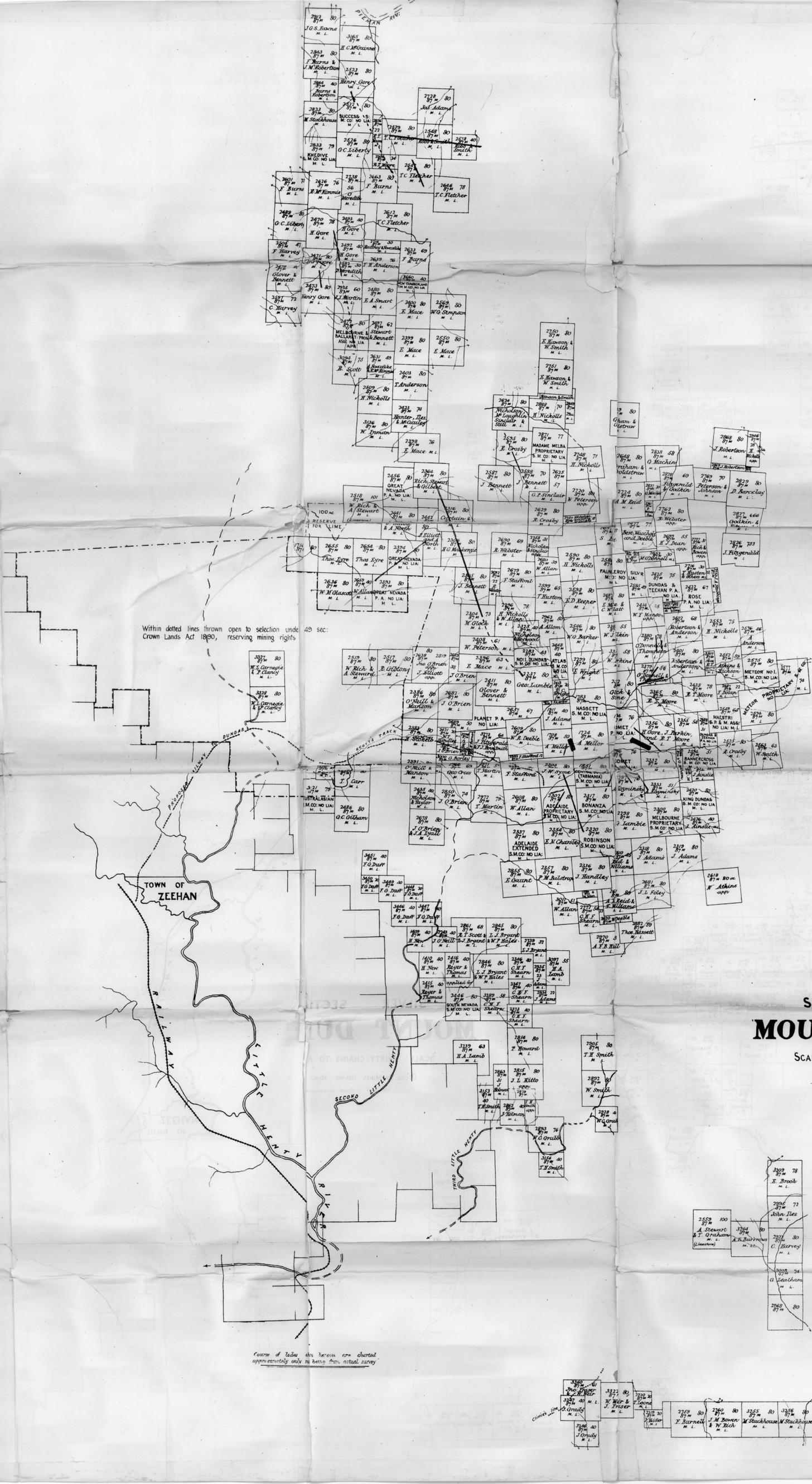
O. J. Reper draftsman



Within dotted lines, thrown open to selection under 49. sec. of Crown Lands Act 1850, reserving mining rights

Course of Lakes shown hereon are charted approximately only not being from actual survey

OFFICE OF MINES, HOBART
MARCH 1850



Within dotted lines thrown open to selection under Crown Lands Act 1890, reserving mining rights 49 sec.

TOWN OF ZEEHAN

SILVER SECTIONS
MOUNT DUNDAS

SCALE. THIRTY CHAINS TO AN INCH

OFFICE OF MINES HOBART MARCH 1891
 Oswald J. Roper draftsman



Course of Little Henry River etc. charted approximately only as basis from actual survey

