

SILVER DEPOSITS OF TASMANIA

Geographical and Geological Distribution

The metalliferous rocks of Tasmania are all of Archaean and Lower Palaeozoic age; consequently the Geological Map of the Colony indicates at a glance the localities where useful metallic ores are likely to be met with, namely in the North-eastern corner of the Island and along its West coast where these formations are shown as prevailing. Throughout these districts tin, gold, silver and lead have been discovered, the tin ore always in or near granite, the other metals generally in rocks of Silurian age. Owing to the comparatively recent date at which the great fields of the West coast have been opened up and the very little geological work that has been done on them the division of the Silurian formation into Lower and Upper Silurian has not yet been satisfactorily effected, but there seems reason to think that while gold occurs in both, our silver deposits are confined to the Upper Silurian strata. Be this as it may, the Silurian rocks generally speaking, are the principal matrix in which the Tasmanian silver lodes are found.

In the North-eastern district the granites and Archaean rocks predominate; those of Silurian age forming only a small portion of the whole area coloured on the map as being occupied by the oldest formations. Hence gold and tin are here the chief objects of mining pursuit. Silver has however, also been obtained. Near the mouth of the Scamander River a dyke of quartz porphyry traversing Silurian sandstones and schists has been found to contain veins of quartz carrying iron and arsenical pyrites, galena, silver and a little gold. The galena and other sulphides have proved to contain highly payable percentages of silver, but the output of ore required for commercial success not being forthcoming the mines were soon shut down. Other discoveries of argentiferous and auriferous arsenical pyrites and galena have been reported from the same neighbourhood, and in time profitable mining may result. Further to the westward, silver has been got with galena at Rix's Hill, south of Ben Lomond, in close association with tin ore.

Following the ancient rock formations as shown on the map still further to the westward, it is seen that along the north coast occasional patches of them connect the rocks of the North-eastern with those of the Western districts. Silver discoveries now have become much more frequent. At Mt. Claude mines have been opened on lodes similar to those of the West coast field in mineral character, containing argentiferous galena and blende with carbonate of iron. As yet the lodes found have been small, but such ore as was got was of highly payable value if found in any quantity, and better lodes may yet be found. At the Hampshire Hills native silver was found many years ago, but no mining has been done. At the Vale of Belvoir, and along the River Leven, discoveries of silver ores have also been made, as yet without commercial results. All these are on the eastern edge of what appears to be the great silver-bearing belt of the Colony. On looking at the Geological Map it is seen that to the westward of a line drawn from the mouth of the River Leven to the South Cape the country is coloured as being almost all composed of the ancient rocks, - Archaean schists and quartzites,

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and Silurian sandstones, slates, and conglomerates. The boundaries of the various formations have never yet been defined: indeed much of the country, especially south of Macquarie Harbour, is almost unexplored. The Archaean strata have as yet not been found to carry much, if any silver, which appears to be confined to those of Silurian age - sandstones and slates and associated volcanic dykes, tufas, and breccias. Though the search for silver is yet of recent date (since 1887 practically), and the country is most difficult to prospect, large areas have been proved to contain the metal, and doubtless as the unknown ground becomes opened up still further discoveries will be made. The first important lodes of argentiferous galena were found in the vicinity of Mount Zeehan and very soon afterwards good ore was got at the Heazlewood River. From these two centres the fields rapidly spread, till now an area of over 130 square miles has been applied for or taken up in mineral leases. From Mount Zeehan northward to the Pieman River and eastward over Mount Dundas to Mount Tyndall and Mount Murchison, the country appears to be full of argentiferous lead lodes. Further to the south, in the vicinity of Mount Lyell and the King River more lodes have lately been found. Explorations to the northward of the Pieman River along the slopes of the Meredith Range have resulted in still further silver-bearing country being discovered and there seems every probability that a chain of lodes will soon connect the Zeehan and Heazlewood fields. The latter has extended eastward to the Whyte River and on to near Waratah, and westward to the Savage River. The recent discoveries near Waratah were preceded by the discovery some years ago of galena, stibnite, blende, and antimonial lead ores, all more or less argentiferous, at Mount Bischoff, though not in lodes of payable richness. The new discoveries now indicate that there is a more extensive silver field in this locality than was supposed. Going northward from these to the coast, we find that veins of silver-bearing galena were long ago found on the beach at the Penguin Creek, and were worked in a small way and abandoned when water became troublesome. Attention having been drawn to silver ores by the rich finds at Mount Zeehan and Mount Dundas, prospecting has recently set in again in this neighbourhood with the result that some very promising discoveries have been made and a large number of mineral sections have been taken up at the Dial Range, inland from the old mines.

By following out these discoveries on the map it is seen how widely the silver deposits are distributed. When it is remembered that the great extension of the fields has taken place during the last two years, and that the country is covered with dense scrub and most difficult to prospect, it is clear that the discoveries already made can be only a small part of what remains to be found when the bush has been burned off and systematic prospecting has taken the place of haphazard search.

Nature of the Ores

The silver ores found on the West coast are almost without exception "smelting ores", being associated with so much lead that no other treatment would deal with them to advantage. Native silver has been found in large quantities in the Godkin mine at the Whyte River, in and along with galena. Chloride of silver is found in the Whyte River field and at Mount Zeehan, especially in the oxidised upper portions of the lodes, generally with oxide, carbonate and phosphate of lead as associates, though at times found in specks in galena as well. The

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main quantity of silver is however not to be found as definite visible compounds of the metal, but impregnated invisibly as sulphide through galena. This mineral is found throughout the West coast fields of great purity and high silver value, assays of it ranging as a rule between 30 and 150 ounces of silver to the ton and averaging about 65 ounces. Large quantities of ore fit for immediate smelting with no other previous treatment than rough hand sorting in the mine can be readily obtained, and the more impure ore is easy of concentration. Though zinc-blende and iron-pyrites often occur with the galena they are not as a rule in quantities to interfere with easy smelting, and careful hand-picking of the ore would in most cases remove them sufficiently for practical purposes. These minerals carry silver themselves and when separated from the galena are not waste, but may be profitably treated by special processes. The oxidised ores of lead, carbonate, sulphate, oxide and phosphate found sometimes in large quantity, are all easily smelted. They are generally much richer in silver than the galena. With them kaolin rich in silver (often containing from two hundred to five hundred ounces to the ton) but poor in lead has been found in the Silver Queen and some other mines. Though this ore is not easy to smelt by itself there is no difficulty in dealing with it in the furnace along with the other ores, as the gangue of these is principally carbonate of iron, which acts as a flux for the kaolin. The quantity of carbonate of iron with the galena is a very noticeable feature and one very favourable for easy smelting. The amount of silica (as quartz etc.) in the ore is generally quite small, though some lodes yield more siliceous material than others. Should further basic flux than that contained in the gangue of the ore itself be required however, it is readily obtainable in large quantities from the huge ironstone or "gossan" outcrops which abound throughout the fields. These are often composed of little else than oxides of iron and manganese almost free from silica. They are the oxidised outcrops of large lodes, the gossan being found to change in depth into carbonate of iron. There is almost always a little silver in the ironstone and sometimes enough to make it worth treatment of itself, and whatever silver is thus present is saved in smelting and goes far to pay for the expense of getting the flux. Limestone the great flux of the lead-smelter is readily obtainable of the very best quality on the fields at Mount Zeehan and the Whyte River. The conditions on the whole are thus very favourable for cheap and efficient smelting.

Some of the galenas contain a good deal of antimony, and occasionally pass into the minerals boulangerite and jamesonite. The antimonial ores appear to be usually richer in silver than the average galenas, one of this character having been found on assay to contain as much as 2,000 ounces of silver to the ton. Highly argentiferous fahlore (tetrahedrite) has also been obtained, though somewhat sparingly.

The lodes in which the ores occur are of the "Fissure vein" type, and have every indication of permanency in depth, for instance, the banded structure so characteristic of many lead lodes in Europe that have been proved to a great depth, is frequently seen at Mount Zeehan. Some of the lodes have been traced for long distances, certainly as much as two miles for example, and there is reason to believe that some of them are much longer. Their average length compares favourably

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with that of similar lodes in other fields, and it must be remembered that very few have yet been systematically traced on surface throughout their entire length, owing to the ground being covered with dense bush.

Taking everything into consideration, the proximity to the sea-board and railway communications, the large number and general richness of the already proved lodes, the presence of suitable fluxes for smelting, the water-power available, the abundance of mining timber, and the great extent of country which may be relied upon to produce ore, it may be regarded as a certainty that the silver fields of the West coast of Tasmania will support a large population and an extensive and remunerative mining and metallurgical industry.

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