

Old Mines on Zeehan Lodes

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The Bell

① Location and Access

The Bell mine is situated 65 chains S.S.E of the Zeehan station. It lies 4 chains due east of the Zeehan - Straban Railway at Bell Siding.

Access is by road via Smelters Road and Bell Siding.

② History.

The lode was discovered in 1887. The northern portion was held by the Silver King Prospecting Association and the southern by the Silver Bell Coy.

The Silver Bell Coy drove a shallow adit along the lode from the southern end. By 1893 it had become the New Silver Bell and the sinking of the Bell Shaft had started. In 1900 it was the Zeehan Bell and the shaft had reached 180 feet. Operations ceased in 1901. A tributing party in 1902 pumped out the mine, but failing to find solid galena shut down after a few weeks. It has not been touched since.

In the meantime a North-West Coast potato farmer, driven by dust blight to the mining fields, started sinking on a gossan outcrop along the lode to the north of the Bell in ground held by the Silver King Prospecting Association. His name was Fahey. He very soon opened up rich ore and "Fahey's" workings steadily developed. The very rich shoot of ore pitched south towards a similar rich shoot which had been worked by Burridge at the extreme north end of the Bell a few years before.

By 1901 Fahey's shaft was down to 200 feet but the rich ore was worked out and it was closed down in 1902 and has not been reopened since.

③ Output and Profit.

The total output was approximately 10,000 tons as actually sold. This contained in round figures:-

Lead: 7000 tons
Copper: 5 tons
Silver: 400,000 ounces

The Bell companies apparently made no profit, but Fahy and Bwidge became quite rich.

④ Geologic Environment.

Ⓐ Country Rocks.

The enclosing rocks are sandstones and shales of the upper portion of the Silurian series. The disposition

Ⓑ Position Relative to Regional Structural Pattern

The disposition of the beds is not in concordance with the normal easterly dip on the western limb of the syncline. Westerly dips are observable and a minor fold shows at the collar of the Bell shaft.

The investigation of the local structure is incomplete but it would seem that the Tear Fault relationship shown in the Structural Map of Zectan¹ must be amended. It now appears more probable that the British-Argent-State group of Tear Faults are the controllers and not the Bell-Spin Hop group. This must be further studied. Waller² mentions a slide thus:-

"The big shoot of ore..... lived for a short distance into the Zectan Bell ground but was cut off by a slide dipping north".

But he gives no indication of its strike.

Ⓒ The Fracture.

The fracture has been proved to be continuous over a length of 1420 feet. Its strike is markedly straight over this distance having a bearing of 328° . It dips westerly at from 60° - 80° .

If the fracture continued northwards on its general bearing it would join and coincide with that at the King.

① Cyprus Hills "Concise Statement on Lead-zinc-silver Orebodies of Zectan 1946 Drawing No. 2
② S.A. Waller "Report on Zectan Silver-lead Field" 1904 p. 99.

At about half-way along its length it swings with a bearing of 338° for 150 feet and then resumes its normal strike just north of the Tear Fault.

Waller assumes this connection: ⁽³⁾

"The main lode of the King Mine is one of the most persistent lodes in the Zeehan field. It has been traced through the Zeehan Bell sections."

But there is a gap of unproved ground 2200 feet in length between the two workings. As this space is crossed by four Tear Faults it is by no means certain that the fracture will be found to have continuity through them.

Nevertheless there seems to be a similarity between the two fractures. They both show brecciation and the general order of magnitude of width is the same. Dip and strike correspond closely.

The fracture is a compression effect and not a tension crack.

(5) The Lodes.

(a) Number and Spacing.

The Main lode dominates the picture of mine workings. But 100 feet to the east and about 900 feet to the west there is surface evidence of two other lodes.

It is possible that the lode to the east, which was looked for by the crosscut at the 100 ft level but was not reached, is one of the counter lodes thus referred to by Twelve trees. ⁽⁴⁾

"These branches are said to be a feature of the southern part of the King-Bell lode, narrow veins called 'indicator veins' rich in pyrite being stated to junction with the main lode on its eastern side at different points along its course"

(b) Proved Length and Width

The overall length proved by mine workings is 1420 feet mineralisation being continuous over this distance.

The width according to what records are available varied

⁽³⁾ G.A. Waller "Report on Zeehan Silver-lead Field" 1904 p 97.

⁽⁴⁾ Twelve trees & Ward "Geol. Surv. Tas Bull 8 p 125"

from a maximum of 21 feet down to 2 feet. In general the width in the northern part of the workings is greater than that in the southern. Tschek describes the lode it towards the north end at Fahey's 100 ft level: (5)

"The lode does not seem to have any proper walls; they are walls behind walls; but such as they are, they are exceptionally good showing graphitic slate and pug. In the end there is no hanging wall visible, but the lode track hugs the footwall on which pug and soft carbonate of iron are lying. The rest of the face is lode-slate streaked with carbonate of iron and galena."

© Orientation.

The general aspect of the lode resembles the Spray and the King in its straightness and clearly differentiates itself from the Western-Montana-Oreah meandering lodes. Its continuity over more than 1400 feet gives it a special significance.

The dip is not as steep as the Spray or even the King but is pronounced.

⑥ The Ore.

① Character of Lode Material.

The ore is fundamentally siliceous. It is partly replacement and partly fissure-filling. It clearly occupies a brecciated zone being altogether similar to the King in this respect.

② Constituent Minerals.

The metallic minerals are galena and sphalerite with accessory chalcopryrite and tetrahedrite.

The gangue minerals are quartz with accessory siderite. The groundmass is quartz or silicified rock & unplaced slate with sporadic siderite.

The ore is essentially a siliceous galena-sphalerite mixture the galena and sphalerite occurring in distinct

⑤ W. H. Tschekes "Report on Mineral District of Zetun" 1900 p. 28.

aggregations of dimensions varying from say $\frac{1}{2}$ inch up to many feet.

© Ore Shoots.

(i) General Characteristics.

The outstanding ore-shoot was that worked by Burridge and later by Fabey northwards from the Tear Fault. Waller thus described it. ⑥

"This shoot was one of the most massive bunches of galena which have been mined at Zeehan. It was 14 feet wide at best, and contained about 50 percent galena."

"Messrs Fabey and party started work on a large gossan formation 400 feet north of the Bell Boundary. This proved to be 122 feet long, and was 21 feet wide 30 feet from the surface. The whole mass averaged about 90 ozs silver per ton. Besides the gossan 25 tons of copper ore (malachite etc) were sold from this patch assaying 17 percent copper. The gossan only lived to a depth of 30 feet, and was then replaced by 4 feet of galena, assaying 100 ozs to the ton, which continued down 60 feet more. Below this level the ore was not so massive and was only medium grade [i.e. as to silver values C.L.H.] assaying on an average 45 ozs of silver per ton. This shoot appears to have pitched south, and junctioned with the shoot formerly worked by Burridge from No. 1 level of the Bell. It was stoped by Messrs Fabey & party from No. 3 level upwards. The best of the ore did not live to No. 3 but was very good in the second stoppe above No. 3 and from that upwards."

This of course was spectacular but the lode outside this shoot carries good ore. An examination of the dumps forcibly compels this conclusion. Good grade ore is plentiful and the whole of the dumps are clearly the richest

(6)

at Zectan. It seems clear that this has been due to the presence of plentiful sphalerite ^{as well as} the crudity and inefficiency of Fatey's concentrating plant with no plant at all on the Bell. Only very rich ore was worthy of attention. Twelvetreces thus refers to the lode contents on Fatey's 100 ft level northwards from the pay-shoot: ⑦

"The N. level has been driven 293 feet..... on a lode from 2 feet 6 inches to 4 feet 6 inches wide, bearing slightly W. of N. dipping 1 in 5 and carrying dressing ore with carbonate of iron gangue."

Waller says: ⑧

"There is still a large amount of second-class ore obtainable from Fatey's old workings"

"Most of the ground tested by the Zectan Bell drives consists of second-class ore. Mr Peter Irvine, the former manager, was strongly of the opinion that the lode would pay to work if the mine were equipped with an efficient concentrator"

According to Twelvetreces the zinc contents are said to increase going south. This seems to be borne out by the ore in the dumps but zinc characterises all of the dumps.

The general silver ratio was about 1 oz per unit at Fatey's and 0.5 oz at the Bell.

(ii) Grade of Ore Mined.

There are no accurate figures available but certain indicators are significant.

In 1893 Montgomery says of the New Silver Bell: ⑨

"The ore heaps taken from the drive on the lode did not turn out nearly so well as they were estimated. 450 tons sent to the Mount Zectan Mill yielded 116 tons of concentrates, assaying 70 per cent lead and 30 ozs silver per ton"

This means 18.2% Pb recovered. At that time the Zectan

⑦ W H Twelvetreces "Report on Mineral District of Zectan" 1900 p 28.

⑧ S A Waller "Report on Zectan Silver-lead Field" 1904 p 100.

⑨ A. Montgomery "Report on Progress of Mineral Industry County of Montagu" p 22.

(7)

Mill with crude buddles etc was losing 57 Pb in tailings. The original Pb content of the ore was therefore 23%.

Fakey's shoot apparently averaged Pb. 240%.

The tailings from Fakey's mill are really middlings. Obviously they milled only the richer "seconds", the remainder being dumped with the mullock. The crude mill gave them a saleable concentrate with good values still in the tailings.

When the ^{assaying} sampling of mill tailings, ore heaps and mullock dumps has been completed some further information as to the probable grade of ore will be available. These assays will throw some light on the zinc contents on which no figures are at present available.

(7) Mine Workings

(a) Adits.

There is only one adit — the original drive along the lode by the Silver Bell.

Length: - 410 feet

(b) Shafts.

(i) Fakey's Shaft.

Depth: 205 feet

Dimensions: 12' x 4' inside timbers

Water: 13,200 gals per hour.

Condition: Collar standing but blockage of timber a few feet down.

(ii) Joint Shaft.

Depth: 80 feet

Dimensions: Unknown. Underlay.

Water: Drawn by other shafts.

(iii) Bell Shaft.

Depth: 185 feet

Dimensions: 12' x 4' inside timbers

Water: 18,000 gals per hour

Condition: Collar standing with timbers in position but a few feet down timber loose across shaft.

(8)

The collar of Bell shaft is 28 feet lower than Fatey's. In view of the fact that the Bell and Fatey's seldom operated concurrently it is quite possible that the total water would be at the rate of about 18,000 gallons per hour. Water is probably now standing at Adit level *i.e.* 70 feet below collar of Fatey's shaft.

© Drives.

Shallow Levels: 200 feet

100' Level: 650 feet

144'-160' Levels: 700 feet

200'-208' Levels: 250 feet

④ Crosscuts.

Fatey's shaft to lode: 240 feet. (3 crosscuts)

Bell shaft to lode: 200 feet. (2 crosscuts)

At 100' Level: 2 of 40 + 22 respectively.

At 144' Level: 5 of 10 feet each

At 160', 200' + 208' Levels: None.

⑧ Discussion of Possibilities.

① Available Ore.

With the exception of the stoping on Fatey's shoot practically no stoping has been done. Two small stopes were taken out above the Adit - one 30 feet long & the other 20 feet. All the rest of the lode is standing. The ore on the surface was obtained in driving.

Of the total length of 1420 feet the length of effective stoping has been 300 feet down to the 100' level and only 100 feet at the 160' level. Of the ore remaining Waller says: ⁽¹⁰⁾

"There is still a large amount of second-class ore obtainable from Fatey's old workings, and there is, I think, a fair prospect of payable seconds being found at deeper levels"

"Most of the ground tested by the Zectan Bell drives consist of second-class ore."

At this point emphasis must be laid on the fact that "second-class ore" in Waller's time meant anything from about 20-30 percent lead.

There seems no doubt that driving at the 160' and 200' levels would open up similar ore for stoping.

(A) Diamond Drilling

Exploration below the 200' level could be effected by diamond-drilling from the surface with a series of 300'-500' holes.

Diamond-drilling is also applicable to preliminary staking for:-

- (i) The lode seen at surface west of Fahey's
- (ii) The possible continuation of the Main lode in the 2200 feet between the northern end of Fahey's and the southern end of the King workings. This section is not blank as the following shows: - (11)

"North of Fahey's, just south and E of the railway line, a small shaft was being started by Mr Fahey on a gossan outcrop on the main line of lode. This gossan carries galena"

This point would be 1600 feet north of Fahey's workings. A series of short holes - say 100 feet seems to be called for.

- (iii) The southern continuation towards the Sunrise. The Sunrise ^{is a narrow lode but} is in line and shows light silver with tetrahedrite. Again a series of short holes seems desirable.

(9) Recommendations.

(a) Clear and pick up topmost portion of both Fahey's and Bell shafts.

(b) Unwater. This will probably necessitate pumping down both shafts.

(c) Sample all backs and faces.

(d) A prerequisite is a power-line. The distance to nearest sub-station is 60 chains.

C. Loftus Hills

2nd February 1947.