Old Mines in Limestone

Tasmanian Crown.

Preliminary Statement.

1. Location
2. History
3. Geology
4. Extent of Information
5. Work Contemplated.

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Preliminary Statement

① Location.

Adjoining Block 1. This limestone belt extends north-westwards therefrom and constitutes what it is proposed to call Blocks A + B. Its length in a north-west direction is approximately 3600 feet.

It lies to the east of Dunkley's Tram which skirts its western boundary.

② History.

Trenching in the swampy ground began in 1890 but water and vine were a deterrent to further progress. Nevertheless the Tasmanian Crown Company sank a shaft in the older rocks to the west from which they attempted to diamond-drill eastwards into the limestone. This was in 1894.

In 1907 the area became the property of the Zeehan-Montana Company and shallow work by tributors produced appreciable parcels of ore.

Nothing has been done since.

③ Geology.

The limestone belt starting from the Monks Tear Fault runs about north-west, being thus orientated with a distinctly more westerly trend than Blocks 1 + 2. In the vicinity of the Tasmanian Crown Shaft the Crown Tear Fault divides this Block A from Block B the orientation of which is closer to the meridian.

Block B continues to the Clark Tear

Fault. Block B thus shows an orientation of approximately 360° as compared with the 315° of Block A.

The Wallis Upthrust forms the western boundary of the limestone while the eastern limit is the usual white sandstone series. The width of the limestone bed, although not yet measured, is apparently of the same order of magnitude as usual.

(4) Extent of Information.

Development in Blocks A & B is less than in Blocks 1 & 2. The greater part of the limestone outcrop is untested. Records are meagre even in the south-eastern and north-western portions where work was carried out. But significant information is accumulating as to a widespread of mineralisation including important concentrations.

(5) Work Contemplated.

The paucity of information relative to that accumulated for Blocks 1, 2, 15, 16 and 19 prevents at present the preparation of reports as comprehensive as those on such blocks. More field work is called for.

In addition, old trenches recently located and surveyed will be drained, cleaned out, deepened if necessary, and sampled.

The area lends itself to preliminary stabbing with the Post-Hole Borer. It is reported that slugs of galena have been found wherever the black pug has been exposed. This wide area of black pug will thus be submitted to preliminary testing.

A full report will be prepared when this testing and field work have been completed.

Old Mines in Limestone

Tasmania Crown

① Location and Access

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Old Mines in Limestone.

Tasmania Crown

① Location and Access.

The Tasmania Crown is on the northern side of Zeehan. It is distant from the Zeehan Station via Main Street and Dunkley's tramway formation 140 chains. From the Post Office it is distant 73 chains, again via Main Street and Dunkley's Tramway formation. The distance along the latter in both cases is 38 chains. This old tramway formation is usable by jeep, but would have to be drained at two or three places and the surfacing widened for access by truck.

② History.

In July 1888 the Silver Crown Company was formed in Launceston to work sections 197-87M, 198-87M, 199-87M, 201-87M, and 736-87M. The first four sections had been held by a prospecting association and had been reported on by G. Thureau in March 1888. Thureau refers to a 'strong ferruginous and somewhat galeniferous deposit' outcropping at the surface, but mentions that no work had been done on it.

In October 1890 Montgomery made an examination, but found no working on. He however, mentions that a good deal of trenching had been done, but all these trenches were full of water. Nevertheless he examined the spoil from these trenches. In section 197-87M he refers to the width of lode as twenty feet in one trench, but draws attention to a number of other veins and lodes in the 'open swampy button-grass land'. He ends his report by saying:-

> "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." ①

Gilbert on Tilly in 1890 said of the Silver Crown:-

> "Several other lodes have been found by

① A. Montgomery "Report on Progress at Zeehan etc" Sec. for Mines Report 1890.

trenching, notably a very wide formation traced about 80 feet from east to west in section No. 199." (2)

In 1892 a British Company took over under the name of Tasmania Crown. This Company under their English manager started a shaft in the Nubeena Quartzites & Slates on the higher ground just west of the limestone flat and by June 1893 had it down to 196 feet. In the meantime they extracted trial parcels from the outcrops exposed in the trenches and had them milled. Some shallow shafts (35–40 feet) were sunk on one formation and some driving done at that shallow level.

Crosscuts into the limestone were put out at the 100 ft and 170 ft levels. Towards the end of 1893 a mud-burst occurred. The mine was cleared of mud by November 14th 1893 and crosscutting continued, but work ceased before the north drive at the 170 ft level had got under the prospect shafts. This was late in 1894 or during 1895.

By February 1896 operations had been transferred to section 736–67 M adjoining the Western and Montana mines, the obvious attraction being the spectacular results being achieved by those Companies.

From that time until 1906 these deposits and workings in the limestone lay untouched. Waller does not even mention them in his 1904 report. By 1906 the area had become the property of the Montana Company and the occurrences were rediscovered. They became the subject of search and tributing under John Craze which continued until late in 1907. This tributing was at shallow levels from new prospect shafts; the old Tasmania Crown shaft was not reopened.

By the time Twelvetrees and Ward arrived on the scene in 1909 these deposits had again sunk into oblivion as they are not mentioned in Bulletin No 8.

The original trenches cut in 1891 are still traceable in some cases but others have become silted up and are unrecognisable.

(2) Gilbert on Talley: "Wild West of Tasmania" 1891 p. 59.

(3) Output and Profit.

In 1893 Montgomery reported 12 tons of galena from the Tasmania Crown. During the remaining years of the British Company's attention to the deposits in the limestone a total of approximately 50 tons of galena was sold.

During the 1906-1907 tributing period about 100 tons of galena were produced.

The total production of galena has therefore been 200 tons.

No information is available as to any profit made. The original prospecting association made a profit in selling to the British Company, but it is doubtful whether the latter showed any profit.

The Montana Company showed a profit on tributors' royalties and the tributors themselves did quite well for a time.

(4) Geologic Environment

(a) The Limestone Bed.

As the outcome of photogeological mapping plus close field observations in relation thereto, the boundaries of the limestone have been closely fixed. As shown in the accompanying composite plan these boundaries are not absolutely correct in every detail, but any future refinements in fixation cannot affect the significant picture.

A consideration of the Tasmania Crown as such would be incomplete without incorporating in the structural and economic picture the area immediately to the north and south. There must thus be brought into the picture limestone Block 1 of the 1946 submission and progressively northwards limestone Blocks A, B, C & D. Block C is specifically the Tasmania Crown.

These limestone blocks are the resultants of the combined effect of the transverse tear faults and the Waller Fault. These faults will be described and discussed in the next section of this report, but exclusive of any consideration of them, the

limestone bed within the respective blocks possesses characteristics which demand enumeration.

Block	Orientation	Width of Outcrop.
1	310°	600 feet
A	300°	650 feet
B	300°	750 feet
C	360°	950–1050 feet
D	310°	450 feet.

Now the thickness of the limestone bed in the Zeehan region is 1000 feet. The above variations in width of outcrop could be explained by variations in dip, but the dip within all the blocks is not far from the vertical, the range being from 65° to 80°. Therefore the true explanation must be looked for elsewhere. The sudden change in width, combined with the extent of the divergence in the distance (550 feet in 4000 feet along the strike) rule out original sedimentary variation. There remains the one true explanation which involves the conception of the Waller Fault. This has effected a varied truncation of the western edge of the limestone bed.

The variation in the orientation of the respective blocks is due to the differential lateral movements along the transverse tear faults.

(b) The Waller Fault.

This major structure has been subjected to the doubts of new-comers during the last three years, repeatedly but resumes its proper place as each doubter does further field investigations. The time has come to treat further queries and doubts as they are put forward with peremptory positiveness.

The close examination given to the Tasmania Crown area is the latest occasion for the denouement of certitude as to the Waller Fault. It is intersected by the tear faults and displaced both laterally and in orientation. The lateral displacement, however, does not exceed 200 feet.

(c) The Tear Faults.

As the outcome of Professor Carey's photogeological interpretation the existence of the transverse faults deduced from field observations has been definitely

confirmed. It must be noted, however, that the orientation has not the originally conceived rough parallelism at a few degrees north of west. It is now clear that there is no such parallelism, the directions ranging from 225° to 285°.

There are four of these tear faults in the area covered by this report. From south to north they are named as follows:- 'Monks', Recreation, Crown and Target. Of these the Crown Tear Fault alone has a north of west orientation its bearing being 285°.

All of these faults displace not only the Waller Fault and the limestone but also the beds overlying the latter in the higher ground to the eastwards.

(d) Possible Meridional Faults.

It cannot be said with any certainty that these exist. The available descriptions of the underground work at the Tasmania Crown point to irregular veins and bunches and disseminations rather than any defined lode.

Montgomery's reference to the occurrence on the old Silver Queen Block 1 (practically on Recreation Tear Fault but just in Limestone Block A) on which a shaft was sunk rather suggests a lode with longitudinal development. But there is so little information available that it must be left in uncertainty at present.

(5) The Ore-bodies.

(a) The Outcrops.

Some at least of the outcrops located in 1888 are still visible. None of these is very prominent. They do not stand out as reefs or ridges, but show themselves as black or dark brown scbrations projecting through the button-grass.

Some of the original trenches are still traceable, but they are mostly filled with water or debris and the sides overgrown with rank vegetation. Nevertheless it would be by no means difficult to clean them up and examine what they disclosed. A portable pump would be called for.

Past refurences to the outcrops are as follows:-

G. Thureau in 1888 reports:-

"A prospecting association holding sections 197-87M, 198-87M, 199-87M, 201-87M, has not yet opened a strong ferruginous and somewhat galeniferous deposit which has been found on the surface"

A. Montgomery in 1890 reported as follows:-

" Sections 197-87M, 199-87M, 201-87M, 736-87M 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. This lode requires further tracing. 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 twenty feet, and its course N32° 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."

The Zeehan & Dundas Herald of 4th March 1891 reports as follows:-

"Another instance that the Zeehan portion of the field has not been by any means thoroughly prospected, has again occurred. The Silver Crown consists of five 40-acre blocks, situated north-west of the Silver Queen, the Despatch and other important properties, and directly on the line of the Silver King lode. Recent prospecting operations have proved the existence of large lode formations on the lower ground. Almost in the centre of the property there is exposed a very fine lode, consisting of sulphide ore, iron gossan and carbonate of lead. Its width has not been determined, but it is evidently large. This lode is apparently coursing 35° to the west of north.

Some distance to the east a shaft was begun and sunk 12 ft on a gossan formation, the cap of which had just been touched when the influx of water became too strong to admit of further work being prosecuted. This lode, although it seems to be coursing to the east of north, is I think identical with the one just referred to, which therefore gives it a width of not less than 85 feet.

Besides these, several other lodes have been exposed on other parts of the property. One of these shows a width ~~a width~~ of 12 feet, carrying galena in a limestone matrix. On the north block also in a trench there is to be seen another distinct formation carrying loose galena. These very important formations occur, however, on low ground, and therefore, in the absence of machinery they cannot be worked."

It was sixteen years later that attention was renewed to this area with some references in the I & D Herald to the outcrops

On 9th January 1907 the following occurs:-

"Cooper and party are prospecting a very big formation on the north section, several chains north of the old Crown shaft workings. They have sunk a shaft 20 feet on the flat north of the creek coming down from the Western mine, and are now driving in a westerly direction on one section of the formation, which shows galena distributed through decomposed limestone and carbonate of iron. There is one vein of galena now showing for about 6 inches in width underfoot, and this should certainly encourage the tributors to prosecute work to a deeper level, seeing that there is also much fine galena through the pug matter alongside the vein."

In the issue of 21st February 1907 there is a description of the work being done by Hutton and Clarke on their tributes. As this deals with underground work the quotation will be given under the next section dealing with underground evidence. It is sufficient at this stage to indicate that the location of these workings ~~was~~ is immediately east of the old Tasmania Crown Company's workings, and to quote the final portion of the article as it deals with outcrops. Here it is:-

"About five chains south of the above tributes, Messrs Fernich and party are working on a formation composed of carbonate of iron and pug. A winze has been sunk 23 feet on the formation which is about 3 ft wide. A bulk parcel of the decomposed lode matter recently sent to the smelters returned Pb 12%, Ag 21 ozs.

On 25th May 1907 the Z & D Herald contains the following:-

"Trenching operations recently carried out on a section applied for in the name of W. Easterbrook, which lies to the north-east of the Crown section of the Zeehan-Montana Coy., have disclosed a lode formation about 2 ft 6 ins wide, which

contains small slugs of galena throughout. The prospects are sufficiently encouraging to warrant the lode being tested at greater depth, and with this object a start has been started in the footwall country. It is intended to sink this to a depth of 20 feet and then crosscut west to intersect this lode. The country rock is of sedimentary nature and evidently contains a good deal of lime. The lode is striking east of north and dipping to the east and if it continues on its present course and rises with the hill to the north a fair amount of backs will be gained."

Such are the references available as to outcrops. It is now necessary to attempt to sort them out and identify the outcrops. A tabular representation will help:-

Origin of Information	Section No.	Present Identity
Thureau 1888	Probably 197	In Trench A.
Montgomery's 1st	Printed as 197 but most probably 199	Site of old Crown workings.
Montgomery's 2nd	197	In Trench A.
Z+D Herald 4/3/91 1st	199	Site of old Crown workings
Z+D Herald 4/3/91 2nd	199	Site of Hutton + Clarke's tributers
Z+D Herald 4/3/91 3rd	Probably 197	Probably Trench A.
Z+D Herald 4/3/91 4th	198	Probably Trench F.
Z+D Herald 9/1/07 1st	199	Cooper's Shaft
Z+D Herald 21/2/07 (Fornick's)	201	Unlocated
Z+D Herald 25/5/07 (Easterbrook's)	198	Probably Trench F.

It is obvious that the position is not clear, but there does emerge the impression that there exist several 'mineralised zones' within the limestone. These will be indicated by numbers.

There is no doubt that a mineralised zone exists over an area incorporating the old Tasmania Crown workings and those of the tributors Hutton + Clarke. This we will call "Mineralised Zone No 1". Another, embracing Trench A and the vicinity, will be termed "Mineralised Zone No 2". "Mineralised Zone No 3 incorporates Cooper's Shaft and the neighbouring

outcrop still visible in its virgin state. The outcrops in old section 198 apparently in or in the vicinity of Trench F. will be referred to as "Mineralised Zone No 4". The work done by Kernich in 1907 within section 201 lies about 400 feet south of Zone No 1 and this is on the south side of the Crown Tear Fault. It would be best therefore to regard these occurrences as in a separate zone, so we will call it "Mineralised Zone No 5". Between this zone and the known occurrences at the Despatch to the south, the contents of the limestone bed (the surface exposure of which is a continuous swamp) are unknown except for the occurrence at the old Queen Block 1 shaft. This latter will be referred to as "Mineralised Zone No 6".

(b) Underground Evidence.

(i) Mineralised Zone No 1.

This has been the subject of most of the underground work accomplished on the proposition here termed the Tasmania Crown. There are two periods represented — 1890 to 1896 and 1906 to 1907.

From the old Tasmania Crown shaft there are two levels penetrating the zone — 100 ft and 170 ft. The crosscuts are 30 ft and 135 ft respectively, but the 100 ft level was turned at 30 feet and directed towards the two prospecting shafts. The 170 ft level was continued eastwards and cut the mineralised zone at 80 feet from the shaft; it was in the mineralised zone for 55 feet without reaching the eastern limit. At this 170 ft level the zone was only driven on for 30 feet northwards. At the 100 ft level, however, it was driven on for 150 feet with a crosscut in the northern portion connecting with the deepened Prospect Shaft No 1 totalling 50 feet. At 100 feet north of the Main Shaft on this 100 ft level there is a west crosscut of 30 feet and an east crosscut of 90 feet, but there is no information as to what was encountered.

At the 43 ft level from the Prospect Shaft No 2 the mineralised zone was driven on for 60 feet.

We come now to what was disclosed during 1906 and 1907. This work was located east of that just described, but still within Mineralised Zone No 1. It was all shallow level

work. There were two shafts – Hutton's and Clarke's – both down to 43 feet. The total length driven within the mineralised zone by these two distributors was 300 feet. The distance east of the former workings varies from 30 to 50 feet. The general orientation of what was followed in these workings is given by the following extract from the Z+D Herald 9th Jan 1907:-

"In Clarke's workings the lode has been driven on for over 70 ft, producing a fair quantity of ore considering the decomposed nature of the formation. Although the course of the lode in Hutton's workings is slightly east of north, it trends round gradually in Clarke's drive until the strike is west of north; while at a point 60 ft in it is found to be striking almost east and west. Where the vein driven on junctions with the other vein coming in from the east, there is a fine make of ore, and the drive now being extended in that direction has shown a very considerable improvement in a very few feet."

Complete details of Hutton's & Clarke's workings are not available, but the workings as shown in the composite plan accompanying this report give the general picture.

(ii) Mineralised Zone No 2.

The occurrences embraced herein are recorded by Thureau 1888, Montgomery 1890, Z+D Herald 1891 and Waller 1903. The location is Sld section 197. The only work done was trenching, the sole relic of which is Trench A, the other neighbouring trenches mentioned by Montgomery having become obliterated. This is what Montgomery says:-

"In Section 197-8 M also there is a large outcrop of ironstone, carborate 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 20 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 & 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."

The information obtainable from Waller is confined to his map, which shows on the south boundary of 197 two 'ironstone' formations. In this connection it must be remembered that Waller differentiated between 'ironstone' and 'bog-iron', the latter being recognised by him as being no indicator of underlying ore-deposits. The significance of Waller's plotting of these ironstone outcrops is that they are just south of Trench A.

(iii) Mineralised Zone No 3.

The Z + D Herald of 9th Jan 1907 reported:-

"Cooper and party are prospecting a very big formation on the north section, several chains north of the old Crown shaft workings. They have sunk a shaft 20 feet on the flat north of the creek coming down from the Western Mine, and are now driving in a westerly direction on one section of the formation, which shows galena distributed ~~distributed~~ through decomposed limestone and carbonate of iron. There is one vein of galena now showing for about 6 inches in width underfoot, and this should certainly encourage the tributors to prosecute work to a deeper level, seeing that there is also much fine galena through the pug matter alongside the vein."

The shaft and dump are visible and part of the original outcrop can be seen near a tree 90 feet east of Cooper's shaft. The rest of the surface is covered with slimes from the Western

Mill

(iv) Mineralised Zone No. 4.

The Z+D Herald of 4th March 1891 in describing a series of outcrops exposed in trenches includes the following:-

"On the north block also in a trench, there is to be seen another distinct formation carrying loose galena. These very important formations occur, however, on low ground and therefore in the absence of machinery cannot be worked."

The north block is 198 and Trench F is partly in this block and as it looks the same age as 'C+D' it is most probably the trench referred to.

The only other reference to ore occurrences on this old section 198 is in the Z+D Herald of 25th May 1907:-

"Trenching operations recently carried out on a section applied for in the name of W. Easterbrook, which lies to the north-east of the Crown section of the Zeehan-Montana Coy. have disclosed a lode formation about 2ft 6 inches wide, which contains small slugs of galena throughout. The prospects are sufficiently encouraging to warrant the lode being tested at a greater depth, and with this object a shaft has been started in the footwall country. It is intended to sink this to a depth of 20 feet and then crosscut west to intersect the lode. The country rock is of sedimentary nature and evidently contains a good deal of lime. The lode is striking east of north and dipping to the east and if it continues on its present course and rises with the hill to the north, a fair amount of backs will be gained in driving in that direction."

It is difficult to correlate these two descriptions. The reference to 'rises with the hill to the north' would indicate

that the occurrence is east of Trench F. There are workings on the hill just west of the old Rifle Range Target which could be the attempt to find the northern continuation in the rising ground. This would place the Easterbrook occurrence 400 feet east of Trench F. It would in that position be right on the Target Tear Fault. We must therefore regard this as part of the Mineralised Zone No 4 spread along the tear fault. It is a pity that Easterbrooks shaft has not been located.

(v) Mineralised Zone No 5.

The Z + D Herald of 21st February 1907 reported inter alia:-

"About five chains south of the above tributers Messrs Fernick and party are working on a formation composed of carbonate of iron and pug. A winze has been sunk 23 feet on the formation, which is about 3 feet wide. A bulk parcel of the decomposed lode matter recently sent to the smelters returned Pb 12%, Ag 21 ozs."

No trace of this shaft can be found, which is not surprising as the surface in that vicinity right down to the despatch is an extensive swamp subject to flooding and deposition of silt.

The only piece of evidence available is a verbal statement by J. Clarke that slugs of galena are common in this swamp when accessible during periods of drought.

The five chains south of Hutton's workings is south of the Crown Tear Fault. It may be of course that Kernick was operating on the southward extension of Mineralised Zone No 5, but as it may also be a zone fed southwards from the tear fault and offset eastwards it is best at present to give it its own entity.

(vi) Mineralised Zone No 6.

This is in old section 1666. It is mentioned by Montgomery in his reports of 25th April 1890, 25th November 1890, and 20th May 1893. In the first report he says:-

"In section 1666 a lode 18 inches to 2 feet thick

is found striking 15° E. of S. with a dip to the eastwards. The vein is composed of galena and carbonate of iron. A good deal of cleaned ore was obtained from this outcrop and sent away for sale. This is a very promising lode. It extends into sections 197 and 198 of the Silver Crown Coy. . . . . .

As above mentioned the north-westerly lode found in section 1666 of the Silver Queen passes into the Silver Crown ground, where it has been traced by means of trenches for some ten chains."

In his report of 25th November 1890 Montgomery says:-

"The Silver Queen lode in section 1666M, mentioned in my former report, crosses the north boundary of this section [the Despatch] about 7 chains east of the N.W. corner-peg."

By May 1893 some work had been done and change in ownership had taken place. The occurrence appears under the heading 'New Great Eastern Mine', but details of the work are lacking. This is all Montgomery has to say at this stage:-

"This is situated in section 1668M, formerly belonging to the Silver Queen Coy. A main shaft was sunk, but the flow of water was so great that it overcame the steam pump provided, and the mine was shut down."

Waller shows the shaft on his map, but does not mention it in his report. Twelvetrees and Ward ignore it entirely. But the shaft is there to-day with its limestone dump. Apparently water beat them before the lode was cut.

© Size and Relationships of the Mineralised Zones.

The underground evidence combined with the exposures in Trench C indicate the width of Mineralised Zone No 1 to be 150 feet. The proved length is 300 feet. Just what is within these limits only exploration will show. But the order of magnitude is in general concordance with the conception of it in 1891. The I + D Herald of 4th March 1891 gives this:-

"Recent prospecting operations have proved the existence of large lode formations on the lower

ground. Almost in the centre of the property there is exposed a very fine lode, consisting of sulphide ore, iron gossan and carbonate of lead. Its width has not been determined, but it is evidently large. This lode is apparently coursing 35° to the west of north.

Some distance to the east a shaft was begun, and sunk 12 feet on a gossan formation, the cap of which had just been touched when the influx of water became too strong to admit of further work being prosecuted. This lode, although it seems to be coursing to the east of north is I think identical with the one just referred to, which therefore gives a width of not less than 85 feet."

The above anomaly as to strike is in concordance with the conditions exposed in Hutton's & Clarke's workings.

Mineralised Zone No 2 according to Montgomery contains one 'make' 20 feet wide. Waller's two ironstone outcrops are 150 feet apart and each is 30 feet wide. The zone thus appears to be 200 feet wide. Montgomery ties this up with the 18 inches to 2 feet of galena near the old Silver Queen Block 1 Shaft. Such continuity for a distance of 1400 feet with nothing showing in between is doubtful, but the statement that it has been traced within 197 by trenches for 10 chains is factual and acceptable. The length of Mineralised Zone No 2 can thus be set down as 600 – 700 feet.

Mineralised Zone No 3 is referred to by the Z & D Herald as a 'very large formation'. It is significant that Cooper and party drove west from their shaft while the present visible outcrop is 90 feet east of the shaft. It would seem therefore that the zone is about 150 feet wide. It is not possible to put any figure on the length based on exploration or outcrop. But if the mineralisation springs from the Target Tear Fault as seems most probable, a length of 500 feet can be visualised.

Mineralised Zone No 4 is not amenable (amenable) to any estimate as to width or length. Its existence must be accepted and it must ultimately enter the economic picture.

Although Mineralised Zone No 5 has been indicated by

only one recorded attack, the location of that attack in relation to the Crown Tear Fault which must be its progenitor would indicate a minimum length of 250 feet. Nothing can be said as to the width.

Mineralised Zone No 6 is stated by Montgomery to cross the northern boundary of the old Despatch section. This indicates a minimum length of 400 - 500 feet. It is most probable that the width is much greater than the 2 ft vein of galena mined at the surface sixty years ago, but there are no data available to enable even a guess to be made.

The relationship between all of these mineralised zones and the faults is significant and inescapable. Mineralised Zone No 1 is at the intersection of the Waller Fault and the Crown Tear Fault. No 2 is on the north side of the Crown Tear Fault from which it undoubtedly springs. No 3 springs from the south side of the Target Tear Fault where it displaces the Waller Fault. No 4 is on the north side of the Target Tear Fault under similar relationship to the Waller Fault. No 5 is undoubtedly the spread of solutions southwards from the Crown Tear Fault. No 6 is on the Recreation Tear Fault and has spread southwards therefrom; whether it spreads northwards is unknown.

It is quite possible that Nos 5, 1, 3 and 4 are continuous. It is not impossible that No 2 and Easterbrook's are connected. Nos 2 and 6 may be continuous as contended by Montgomery but one hesitates about such a conclusion in the absence of indicated outcrops and because of Montgomery's tendency to run 'lines of lode' — a misleading Zeehan obsession!

(b) The Ore

(a) Constituent Minerals

The sulphide minerals are galena and subordinate sphalerite. Pyrite is present in small and sporadic fashion.

The gangue minerals are manganosiderite and some calcite. Some silica is present as a siliceous replacement of the limestone.

(b) The Ore Types.

The ore visible in dumps and outcrops is a

replacement of limestone by galena, sphalerite and manganosiderite with a tendency towards partial silicification. When exposed at the surface the ore turns black. This is due to the oxidation of the manganese of the manganosiderite. The gossan outcrops are blackish brown, but the ore in the dumps is jet black with white spots and veins representing the galena now converted on the surface to lead sulphate.

In addition to this type there is the occurrence of slugs of galena in black pug. This was encountered as a 'shot of mud' at the 170 ft level and a slug measuring 4" x 2" x 1" which was picked out of the mud at that time is in the Mines Department collection at Hobart. Similar ore was found in Kernick's and in the west crosscut from Cooper's Shaft. The size of these galena 'slugs' varies from the dimensions given above down to fine particles disseminated in the pug.

(c) The Concentrations.

Although mining operations have been by no means extensive, encouraging concentrations have been encountered.

But first it is desirable to form some idea of the value of the ordinary run of ore. In 1893 the Tasmania Crown Co sent parcels of ore from the Prospect Shaft workings to the Mount Zeehan mill. One parcel of 40 tons yielded 11½ tons of concentrates assaying Pb 71·5%, Ag 92 ozs. This gives the recovered value of the ore as Pb 20·5%, Ag 26·25 ozs. Another parcel of 10 tons gave 13 cwt of concentrates assaying Pb 75%, Ag 52·5 ozs. The original ore thus had a recoverable value in the crude mill of Pb 9·7%, Ag 6·8 ozs. A parcel from Kernichs gave a smelters return of Pb 12%, Ag 21 ozs; this was in 1907.

Within this milling ore there occur concentrations. For example in Hutton's Tribute the Z & D Herald of 9/1/07 reports:-

> "There are good veins of ore showing through the formation for the full width of the shaft, while underfoot in the level worked the indications were very favourable,

particularly in the southerd, where there was about 5 feet in width of practically clean ore exposed."

On the same date the following occurs regarding Clarke's tribute

"Where the vein driven on junctions with the other vein coming in from the east there is a fine make of ore, and the drive now being extended in that direction has shown a very considerable improvement in a very few feet."

Again dealing with Cooper's tribute there is the following:—

"They are now driving in a westerly direction on one section of the formation, which shows galena distributed through decomposed limestone and carbonate of iron. There is one vein of galena now showing for about 6 inches in width underfoot, and this should certainly encourage the tributors to prosecute work to a deeper level, seeing that there is also much fine galena through the pug matter alongside the vein."

The T & D Herald of 21/1/07 reports on Hutton's tribute:-

"About 15 feet north of the winze a formation 4 feet wide, composed of zinc blende & matter poor quality was met on the east side of the branch. In driving along the blende lode another branch vein was cut striking nearly east & west."

The list of recorded concentrations is completed by drawing attention to the 18 inches to 2 feet of practically solid galena reported by Montgomery in 1890 at the Silver Queen Block I.

(4) Mine Workings.

(a) The Adits.

The adit at the Tasmania Crown workings was originally driven to cut a lode in the Natona Quartzites and slates just west of the Waller Fault. It was later used as a drainage channel from the shafts, the effluent from the adit

being carried beyond the mineralised zone via a deep trench which still remains and is shown on the plan. But the adit portal and some feet in have collapsed.

The only other adit is a short one driven into the hill north of Easterway's, apparently stabbing for the rise of the lode into the hill, which because the hill is Crotty Sandstone just does not happen.

(b) Shafts.

The important shaft is the Tasmania Crown Main Shaft which was sunk to 196 feet. Its dimensions are 12ft x 6ft. The collar has collapsed and the site is now an inverted cone 15 to 20 ft deep. It has been sunk in the Nubeena Quartzites and Slates on higher ground overlooking the limestone flats.

The next in importance as far as depth is concerned is the No1 Prospect Shaft of the Tasmania Crown. It is down 115 feet but is only of small dimensions. It was sunk on ore and has not completely collapsed.

The depth of the Silver Queen Block 1 Shaft is unknown, but from the size of the dump it must have been in the vicinity of 100 feet. The collar has collapsed.

The No2 Prospect Shaft of the Tasmania Crown, Clarke's Shaft and Hutton's Shaft were from 37ft to 43 feet deep. They were small. The two former are recognisable at the surface, but Hutton's has disappeared in swampy ground. Neither Kunich's nor Easterbrook's can be found. Cooper's Shaft is identifiable; it was sunk to 20 feet.

(c) Crosscuts and Drives.

There are two levels from the Tasmania Crown Main Shaft — 100 ft and 170 ft. At the 100 ft level a short crosscut of 30 feet leads to a drive (directed a few degrees east of north) 240 feet in length which connects with the No1 Prospect Shaft. At the 170 ft level the east crosscut is 130 feet in length. Two drives northwards 35 feet apart were only driven for 30 feet; from the easterly of these a meandering crosscut from the northern end went back westwards for 40 feet. At the No1 Prospect Shaft at the 100 ft level an east-west crosscut totals 45 feet.

At the 37ft level from the No2 Prospect Shaft there is a

drive

60 feet in length.

From Cooper's Shaft there is a west crosscut at 20 ft level about 50 feet in length.

(8) Discussion of Possibilities.

There exist in these six mineralised zones intriguing possibilities. Mineralised Zone No 1 has been penetrated by mine workings sufficiently to indicate the existence of an ore-body with important possibilities. The grade of run-of-mine ore, Pb 9.7 – 20.5%, Ag 6.8 – 26.25 ozs, together with the proved concentrations presents attractions. The ore dumped as wortlers carries values which in a sufficiently large ore-body could constitute an important mining proposition.

The remaining mineralised zones have not had their characteristics disclosed to the same degree as No 1. Nevertheless No 2 and No 3 are established as of appreciable size and value. Nos 4, 5 and 6 are less demonstrative but their existence has been established and they must be included in any exploration campaign.

Mineralised zones in the limestone, related as all these are to the transverse tear faults and with widths of 300 feet, 200 feet, 150 feet indicated in Nos 1, 2 + 3 cannot be ignored. Their significance has been missed for 60 years. The time and circumstances are ripe for a comprehensive attack.

(9) Recommendations.

The method of attack can now be approached with some valuable experience gained during the past three years. Diamond-drilling from the surface presents no attractions and a number of deterrents. Geochemical methods were visualised as applicable but Dr Sokhlov outlawed the area as poisoned (both by) mill slimes and secretions from the mine dump (from Montara mine) ballasting of the Dunkley's Tram.

The Oceana experience makes geophysical methods somewhat doubtful. Nevertheless, in view of the fact

drive

160 feet in length.

From Cooper's Shaft there is a west crosscut at 20 ft level about 50 feet in length

It seems unlikely

⑧ Discussion of Possibilities.

There exist in these six mineralised zones intriguing possibilities. Mineralised Zone No 4 has been penetrated by mine workings sufficiently to indicate the existence of an ore-body with important possibilities. The grade of run-of-mine ore, Pb 9.7 – 20.5%, Ag 6.8 – 26.25 ozs, together with the proved concentrations presents attractions. The ore dumped as worthless carries values which in a sufficiently large ore-body could constitute an important mining proposition.

The remaining mineralised zones have not had their characteristics disclosed to the same degree as No 1. Nevertheless No 2 and No 3 are established as of appreciable size and value. Nos 4, 5 and 6 are less demonstrative but their existence has been established and they must be included in any exploration campaign.

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that such a survey costs the Company very little, it could be done and the results used with adequate discrimination.

Surface trenching in a dry period with a portable pump could be used as a preliminary indicator, making use of the old trenches by cleaning and deepening them.

But in regard to Mineralised Zones Nos 1 & 3 any such preliminaries are not necessary. The Tasmania Crown Main Shaft exists as a convience. The collar can be picked up without any great difficulty and the shaft down to 196 ft should be in good condition as it is in the Natural Quartzites & Slates. It is suggested that this shaft be continued down to 300 feet. From that point an east crosscut of 250 feet, a north drive of 550 feet, with another east crosscut at the northern end of the latter of about 300 feet, will disclose the nature and extent of both Nos 1 and 3 and open the way for detailed exploration and exploitation.

The area southwards from the Crown Tear Fault is unduly swamped because of the damming of the Zeehan Rivulet by the dump of the adit driven into the King Extended Hill east by the Despatch. It is suggested that this obstruction could be removed and the swamp drained of its dammed back water. This of course would be a January - February job. It would facilitate both surface trenching and post-hole boring as well as the Geophysical Survey.

C. Sophus Hills

Hobart
24th November 1949.