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Ag-Pb-Zn MINERALIZATION

THE COMSTOCK GROUP OF VEINS

THE MINSTOCK TRIBUTE AREA (WITHIN CONSOL. ML123M/47)

ZEEHAN DISTRICT

WESTERN TASMANIA.

T.G. SUMMONS,
SUMMONS GEOSERVICES PTY. LTD.
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INTRODUCTION

The Zeehan mineral field lies between the Heemskirk Granite and the town of Zeehan on the west coast of Tasmania. Between 1887 and 1913, approximately 42 mines on the field produced approximately 200 000 tonnes of lead (Pb), 2750 tonnes of zinc (Zn), and 27 000 000 ozs of silver (Ag), (840 tonnes).

Production from the Comstock mines (Silver Stream, Slyvester, Comstock, Boss, Susannite, TLE and Swansea), located approx. 5km west of Zeehan was 3676 (1625) tonnes of Pb, 2670 (2100) tonnes of Zn, and 276, 421 (165,000) ozs of Ag, with the Comstock production figures shown in brackets.

Accordingly, the Comstock group of mines are characterized by sphalerite (Zn) rich ore, which is relatively galena (Pb) poor.

The Minstock group of properties include the Silver Stream, Comstock, Boss and Swansea mine areas; this report covers the geology, Ag, Pb, Zn, mineralization and Ag, Pb, Zn ore potential of the Tribute Area (held by Minstock Mining), within consolidated Mineral Lease 123M/47 (held by the Electrolytic Zinc Coy. of A'sia) over the Comstock area.

REGIONAL GEOLOGICAL SETTING

A. STRATIGRAPHY

The Comstock area consists of Late Proterozoic and early Palaeozoic sedimentary rocks forming the southwest flank of the northwest trending Heemskirk Anticlinorium. The appropriate section of the stratigraphic sequence is as follows:

Cambrian : grey/red mudstone, grey wacke and spilitic tuffs, (correlate of the Crimson Creek Formation);

Eo Cambrian : quartzite, slate, dolomitic shale, spilite and spilitic tuff, (correlate of the Success Creek Group);

Late Proterozoic : Oonah Formation
Upper Unit : ? acid/intermediate volcanics, siltstone, limestone, dolomite, and basal graphitic shales;
Lower Unit : quartzite and shale/slate.

Details on the distribution of these sediments are shown in Figure 1., from which it can be seen that the Comstock mines are situated in the Oonah Formation. In addition, limited lithological data suggest the Comstock lodes are located in the upper unit of the Oonah Formation.

B. STRUCTURE

The area has experienced several deformational events namely the Penguin, Jukesian, Tabberabberan and an un named post-Permian (? Tertiary) event. Major structure in the area are due to the Tabberabberan deformation which induced two phases of folding, resulting in main NW trending folds, superimposed on, or contemporaneous with, W-E and NE-SW cross folds. Associated faulting was orientated NNE, NE and WE. Probably Tertiary age structures are mainly block faults which strike NW and WE, and which essentially represent reactivation of older Tabberabberan faults (eg. Tenth Legion Fault).

? Tertiary movement along older faults appears to range from thrusting to high angle reverse faults. The Tabberabberan (M. Devonian) and ? Tertiary deformations are expressed in the statistically preferred directions of WNW

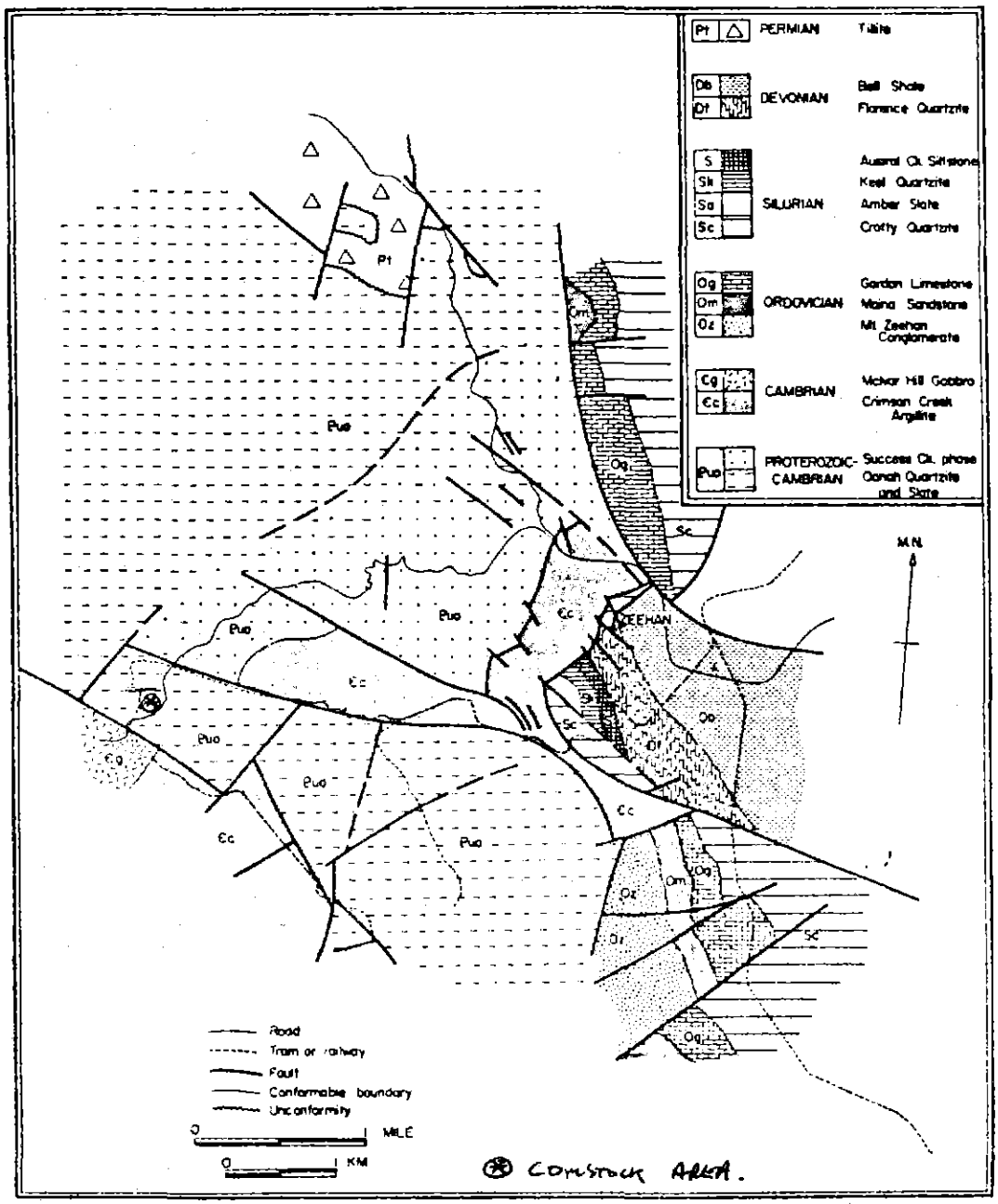


Figure 1. *Geology of the Zeehan field*

5 cm

to NW, N-S, and NE for faults in the Zeehan area.

In the Comstock area, the major bounding faults trend WNW (Comstock and Tenth Legion Faults) amd NE, as shown on Figure 2, while within this (horst) block, the faults are inferred to trend NNW, NE and ENE to ESE (Figure 3).

The apparent order of formation of these faults is:

1/. NNW faults - probably M. Devonian in age and closely related to axial surfaces of tight to overturned NNW trending faults;

2/. NE faults (minor) - also probably M. Devonian in age, and may have formed in response to cross folding;

3/. ENE faults - probably originally M. Devonian in age (tension faults), but with major post-mineralization reactiviation in ? Tertiary time. Dislocation across this group of faults is readily apparent in Figure 3.

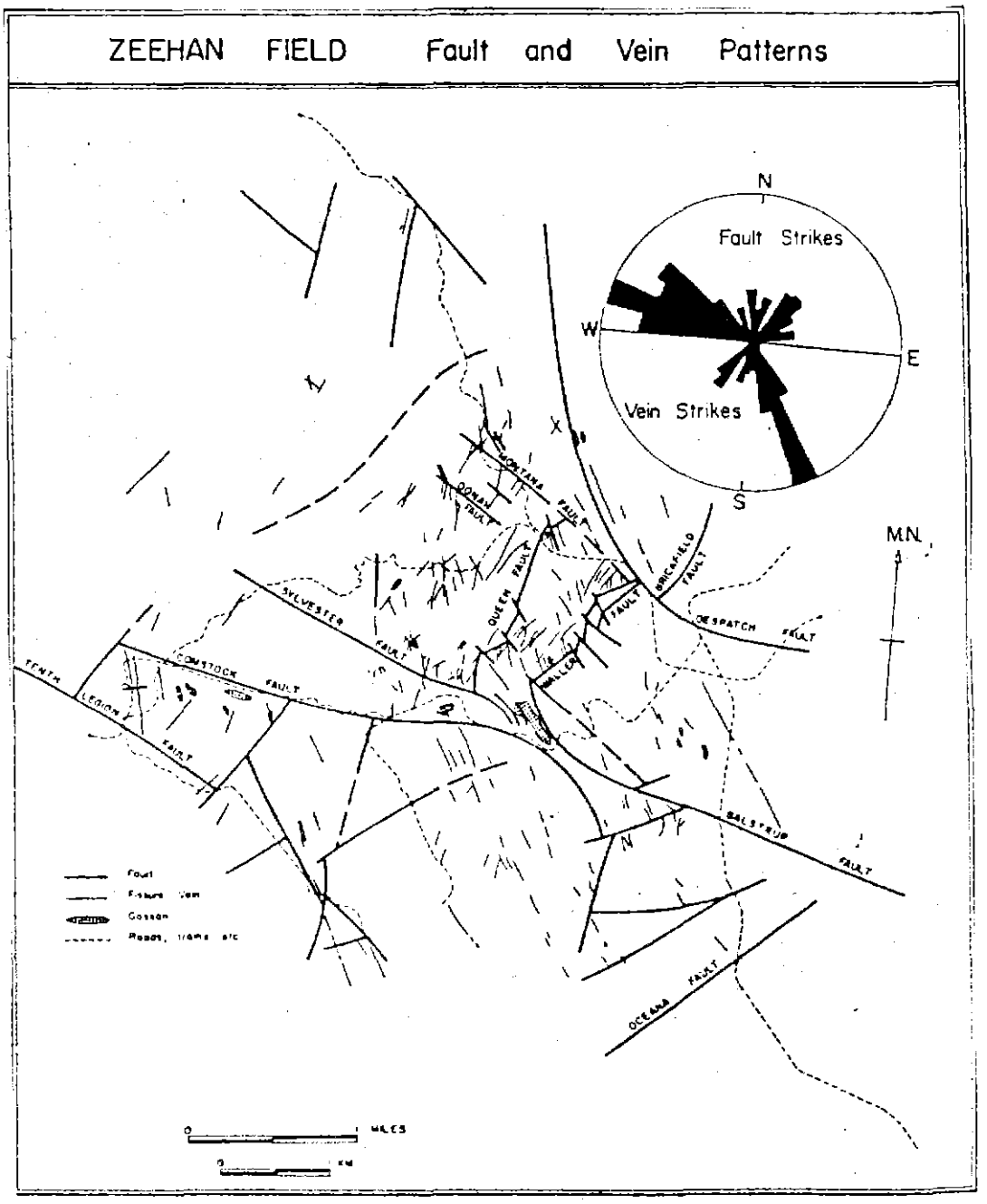


Fig. 2. Fault and vein distribution in the Zeehan field.

5 cm

MINERALIZATION

A. HYDROTHERMAL ZONING

The Ag-Pb-Zn ore veins of the Zeehan field have been considered as class examples of hydrothermal zoning centred around the Heemskirk Granite.

Mineralogical studies have confirmed the zoning, and shown that several apparent anomalies are due to both multiple mineralization and post-mineralization faulting.

The zoning consists of progressive changes in ore and gangue mineralogy with increasing distance from the granite as follows:

Cassiterite, pyrite, siderite-pyrite, and siderite. This zonal sequence corresponds with the Paragenetic sequence as follows:

Early Stage : cassiterite, wolframite, bismuthinite, magnetite, pyrite, arsenopyrite pyrrhotite, marcasite, quartz.

Intermediate Stage : sphalerite, siderite, stannite, cassiterite, chalcopyrite, arsenopyrite, calcite, quartz.

Late Stage : galena, tetrahedrite, boulangerite, bournonite, pyrargyrite, argentite, chalcopyrite, pyrrhotite, pyrite, marcasite, arsenopyrite, quartz.

more pyrite than pyrrhotite at Comstock.

Ore minerals in the Comstock lodes are shown underlined ; of which sphalerite and galena are the most important.

B. TYPES, ORIENTATION AND MECHANISM OF VEIN FORMATION

The Comstock lodes occur as both fissure-fill and as fissure-replacement type veins within the pyrite gangue zone. Fissure -fill veins typically occur in quartzite, slate or volcanic host rocks, while the fissure-replacement veins are hosted by carbonate (limestone or dolomite) lithologies.

Available evidence suggests that the lodes are thicker in carbonate host rocks than the fissure-fill veins which are regarded as having formed with fractures representing brittle failure in the non-carbonate rocks. Considerable wall rock alteration is recorded along the Comstock main lode (fissure-replacement type), and is shown by the development of talc and

tremolite from limestone and dolomite.

The Comstock Main, No. 2 and East Lodes all strike NNW in common with the majority of the veins in the Zeehan field , and this feature is considered to reflect the Tabberrabberan NW trending folds.

Evidence for E-W cross folding appears in the vicinity of No. 1A Shaft at the southern end of the East Lode, where a limestone unit strikes approx 080°; the lode mined from this shaft had a long axis generally aligned in this direction (ENE), and the southern (undiscovered) limb of this inferred anticline may contain further mineralization.

Although the Main and East lodes dip steeply east, the No. 2 lode apparently dips westward, while the ENE trending lode (worked from No. 1A shaft, dips to the north.

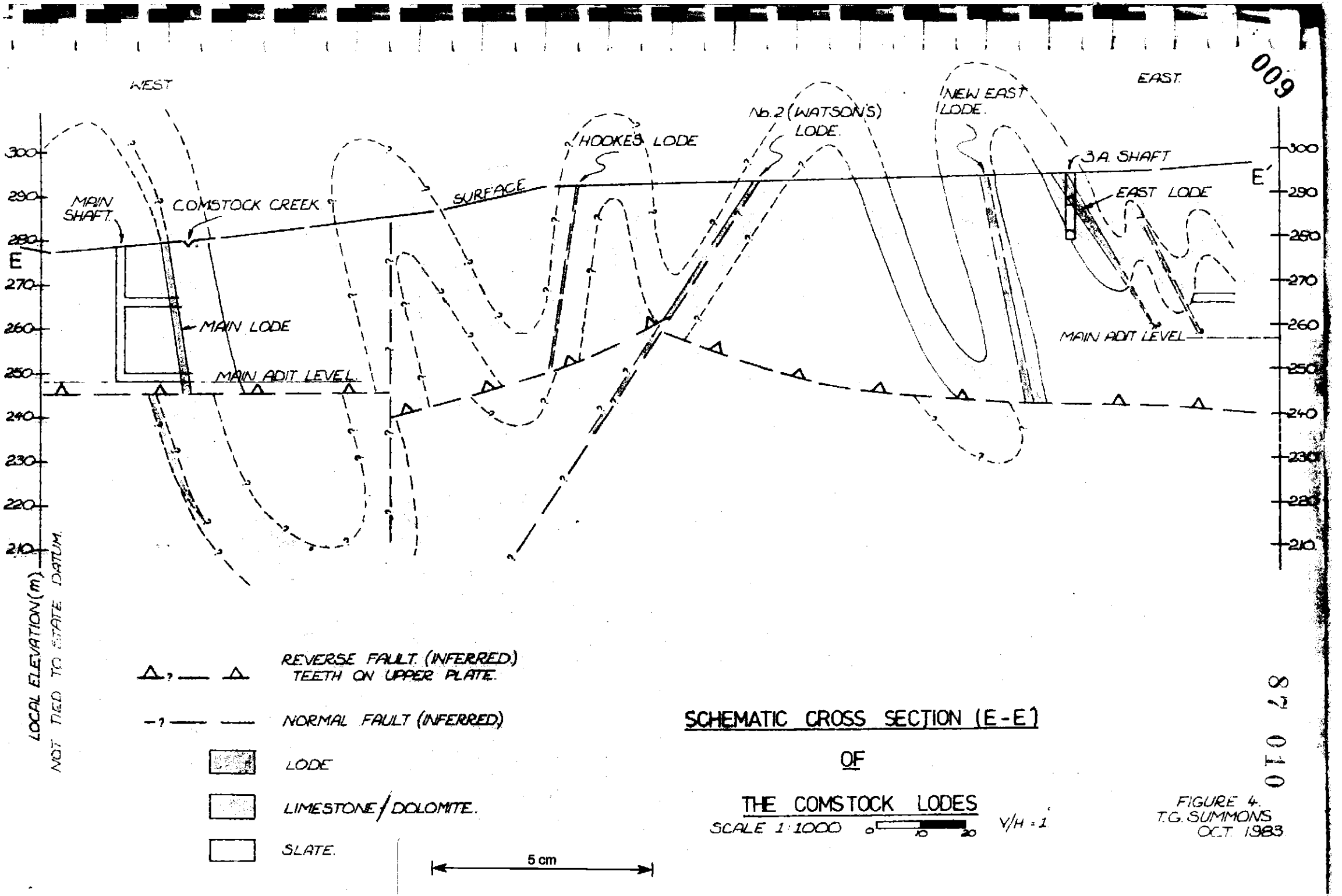
These features are incorporated in the sketch cross section (Figure 4), where it can be seen that both the Main and East lodes are inferred to occur in the eastern limbs of anticlines over turned to the west. Both lodes have unexploited "new" lodes immediately to their west, which are interpreted as being located in the western limbs of the anticlines described above.

In particular, the presence of the Comstock Main and West ("new") lodes in the vicinity of the South Comstock open cut provide an explanation for the relatvely large thickness (15m) of ore worked in this area, as shown in Figure 5.

The genisis of these lodes is considered to be due to a combination of fissure-fill (bedding plane translation in the limbs of the fold, tending to increased dilation of beds in the hinge region of the fold), and fissure-replacement veins (replacement of carbonate rich sections in zones of maximum fracturing due to tensile stress). Overturning of folds would enhance the chance of mineralization in the hinge region of the fold, or alternatively may facilitate greater remobilization of ductile sulphides into the same region.

C. MINERALOGY

Comstock ore consists of sphalerite-galena-chalcopyrite-tetrahedrite-boulangerite, with a gangue of pyrite (pyrrhotite/marcasite)-arsenopyrite-


WEST
EAST
009
MAIN SHAFT
COMSTOCK CREEK
SURFACE
HOOKE'S LODE
No.2 (WATSON'S) LODE
NEW EAST LODE
3A SHAFT
EAST LODE
E
E'
MAIN LODE
MAIN ADIT LEVEL
MAIN ADIT LEVEL
300
290
280
270
260
250
240
230
220
210
LOCAL ELEVATION (m)
NOT TIED TO STATE DATUM
REVERSE FAULT (INFERRED) TEETH ON UPPER PLATE.
NORMAL FAULT (INFERRED)
LODE
LIMESTONE / DOLOMITE.
SLATE.
5 cm
SCHEMATIC CROSS SECTION (E-E')
OF
THE COMSTOCK LODES
SCALE 1:1000
0 10 20
V/H = 1
FIGURE 4.
T.G. SUMMONS
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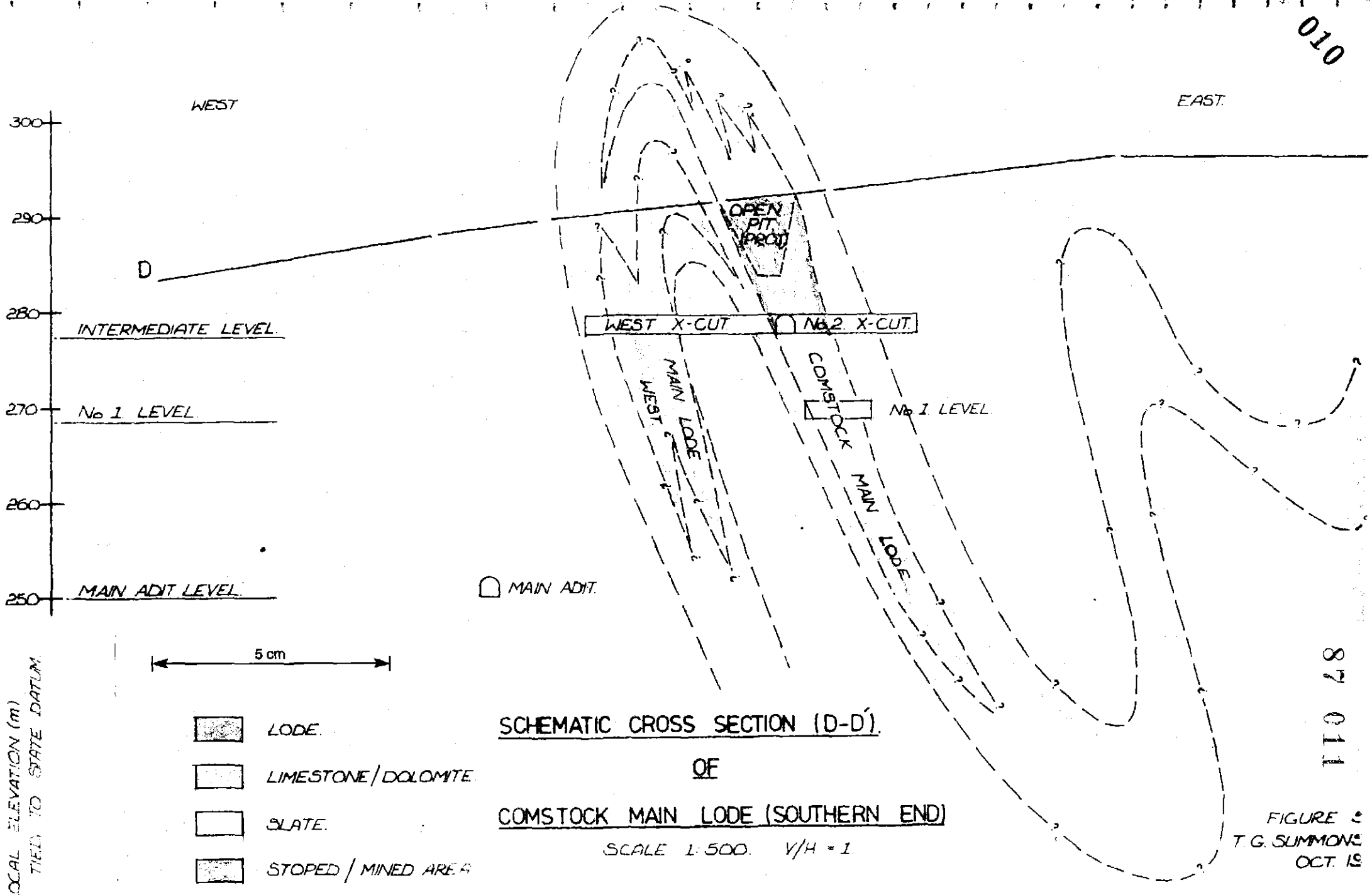

SCHEMATIC CROSS SECTION (D-D').

OF

COMSTOCK MAIN LODE (SOUTHERN END)

SCALE 1:500. V/H = 1

FIGURE
T G. SUMMONS
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siderite.

The most common ore minerals are sphalerite (ZnS) and galena (PbS), with minor chalcopyrite (Cu Fe S_2), tetrahedrite $[(Cu, Fe, Zn, Ag)_{12}Sb_4\ S_{13}$ and boulangerite ($Pb_5\ Sb_4\ S_{11}$). The tetrahedrite may also contain tra amounts of Hg, Pb, Ni, Co and Bi.

Pyrite (Fe S_2) is the most common gangue mineral, with minor arsenopyri (Fe As S) and siderite (Fe Co_3). Pyrrhotite ($Fe_{1-x}S$) has been largely replaced by marcasite (Fe S_2) ; and to a lesser extent by pyrite.

The former presence of pyrrhotite characterises the Comstock ores from many of the other Zeehan field types, although the full significan of this feature is presently unresolved.

The sphalerite is dark in colour due to the high iron (Fe) and manganes (Mn) contents;

ie: FeS = 10.6 - 14.8 wt.%
MnS = 1.0 - 1.5 wt.%

It is also relatively free of inclusions, and when present the latter consist of pyrite or quartz. The galena is relatively free of inclus as well, except near siderite, when it contains both tetrahedrite and boulangerite.

Although galena has been regarded as the main source of silver in the Zeehan field, most of the Ag occurs in tetrahedrite, although there is minimal practical difference becasue the two minerals are spatially and paragenetically closely related.

Quantitative details on the proportions of the sulphide minerals in t Comstock ores are non existent, but the following features are consider to portray the general nature of the ore;

1/. Production data for the period 1888-1952 indicate apparent average grades of :

22.4% Pb (equivalent to 26 wt% galena)
28.9% Zn (" " " 58 wt% sphalerite)
22.7 oZ/ton (695g/tonne) of Ag.

Note that the Pb present in tetrahedrite and boulangerite has been apportioned as equivalent galena in the above calculation, and similarly for the Zn in tetrahedrite (as equivalent sphalerite).

These figures for equivalent galena and sphalerite imply that all other minerals represent approx. 16 wt% of the ore. Thus these figures quite clearly reflect selective mining, and/or hand sorting of the ore as discussed subsequently.

2/. Mineragraphic studies indicate that pyrite is by far the most adundant mineral in the Comstock ores, and that sphalerite is present in excess of the galena; (ie, reflecting the paragenetic sequence of early, middle and late crystallization of the three minerals).

3/. Limited data on pyrite : galena ratios suggest a range of 1.5 to 10, with an average of approx. 5:1; this would indicate pyrite 45%, galena 9% and therefore sphalerite 46%.

4/. However, probably more reliable data indicates a sphalerite : galena ratio of approx 2:1 and reconciliation of recorded production with the estimated tonneage mined from the available records shows that :

(a) Recorded production of ore (selective mining etc) approx. 7382 tonnes.

(b) Estimated ore mined (SG of 5.0) approx. 30 000 tonnes.

These figures imply that the valuable consitituents of the ore represent approx. 25% of the total ore,
ie., pyrite 75%, sphalerite 17%, galena 8%.

5/. The best compromise with all the available information is therefore considered to be the following: pyrite 60%, sphalerite 30%, galena 10%.

ORE RESOURCES

The status of the available data relating to the nature and distribution of the Ag-Pb-Zn mineralization in the Comstock area is insufficient to allow estimation of ore reserves.

It is therefore considered appropriate to view the Ag-Pb-Zn ore resources of the various lodes as either inferred ore (not a reserve), or as hypothetical ore (not a reserve), and definitions for both categories are provided in the Appendix.

The following review of the three major lodes in the Comstock area has been done in terms of ore resource blocks, which coincide with structural blocks as shown in Figures 3 and 6, which respectively portray the plan and longitudinal projections of the blocks.
The following legend applies to the estimations:
Previous mining - figures shown refer to block strike length x block width x block height x density of ore (= 5).(see shaded areas on Fig. 6).
Ore potential- figures shown refer to block strike length x block width x density of ore (=5) = tonnes/vertical metre , (T/vm).

COMSTOCK MAIN LODE

CML - 1A (South Comstock Open Cut) Block.

1/. Previous Mining
- (a) Open Cut = 60 x 10 x 10 x 5, approx 3000 T
- (b) Floor of open cut to Intermediate Level : 45 x 4 x 5 x 5 approx. 4590 T. Total approx. 7500 T.

2/. Ore Potential (Inferred Ore)
- (a) Below Intermediate Level to -15m : 50 x 3 x 5 = 750 T/Vm
  ie. inferred ore = 15 x 750 approx 11000 T.
- (b) From 15m to 25m below Intermdiate Level ; 50 x 2 x 5 approx 500 T/Vm
  ie. inferred ore = 10 x 500 approx. 5000 T.

CML - 1B (Main Lode West) Block

1/. Previous Mining - none recorded, the west cross cut on the Intermediate Level explored this ore which is inferred to be the extension of the Main Lode (Figure).

2/. Ore Potential (Inferred Ore)
From -1 to -25m below surface: 30 x 5 x 5 = 750 T/vm
ie., inferred ore approx. 20 x 750 = 15 000 T.

CML -2 (Shafts 1 and 2) Block

1/. Previous Mining - from two shafts, ore reported to have been 20m deep, therefore mining assumed to be 25 x 1.5 x 15 x 5 approx. 2800 T.

2/. Ore Potential (Inferred Ore)
From -20 to -25m below surface (ie. base on Main Adit)
= 25 x 0.5 x 5 approx. 60 T./vm
ie., inferred ore = 5 x 60 = 300 T.

CML -3 (Shafts 3 and 4) Block

1/. Previous Mining - none recorded, ore reported as "poor" in shallow surface shafts.

2/. Ore Potential - (Inferred Ore)
From surface to - 25m (Main Adit Level)
= 25 x 0.75 x 5 approx. 90 T/vm
ie. inferred ore = 25 x 90 approx. 2 200 T.

CML -4 Block

1/. Previous Mining - none recorded, ore reported as "poor" in prospecting adit.

2/. Ore potential (Hypothetical ore)
- Low, may be 45 x 0.10 x 5 approx. 25 T/vm for a maximum depth of 25m ; note that the lode appears to have lensed out in this block

CML -5 Block

1/. Previous Mining - none recorded, no details available for the block .

2/. Ore Potential (Hypothetical Ore)
The ore potential is untested except for Watsons Adit, which may have commenced both above and to the east of the lode position. It is possible that the lode is "blind" in this block as a result of down faulting. A strike length of 80m combined with a width of 1m (ie., 400 T/vm) would warrant exploration of the block to a shallow depth.

CML -6 (Main Shaft) Block

1/. Previous Mining - records state that stoping of ore occurred to a depth of approx. 10.5m, which at the southern end of the block would coincide with the 45' level in the old main shaft; ie., 60 x 1.2 x 10.5 x 5 approx. 3800 T.

2/. Ore Potential - although a level was driven at the base of the old Main Shaft at 30m (100'), there is no record of production; accordingly the ore potential is unknown below 45' level.

CML -7 (Shafts 12, 13 and 14) Block

1/. Previous Mining - records shows stoping of ore to a depth of 10.5m, ie., 60 x 10.5 x 5 approx. 2300 T.

2/. Ore Potential - unknown and untested below - 10.5m.

CML -8 (Whitelaws Shaft) Block

1/. Previous Mining - records show stoping of ore from surface to the 40' level, ie., 50 x 1 x 12 x 45 approx. 3000 T.

2/. Ore Potential (Inferred Ore).
Records do not show production from either the 80', 100' or 120' levels, Underground mapping by the EZ Coy in 1949 suggested a block of approx. 4000 T of ore between the 40' and 80' levels, while a cross cut driven from the 100' level cut 4.3m of ore, and a rise to approx. 5m met 1.3m of ore.
Consequently the inferred ore is as follows:-
40' - 80' Levels : 50 x 1.3 x 5 = 325T/vm x 12 = 3900 T.
80' - 120' Levels : 50 x 1.5 x 5 = 375T/vm x 12 = 4500 T.
TOTAL = 8400 T.

CML -9 (Shafts 18 and 19) Block

1/. Previous Mining - none recorded, ore assumed to be either low grade, or narrow, (or both).

2/. Ore Potential (Hypothetical ore)
? may be 30 x 1 x 5 approx. 150 T/vm ; the block requires more testing, both below the old shafts and to the north along the strike. A maximum strike length of 75m combined with a width of 1m (ie. 375 T/vm) suggests further exploration is justified.

COMSTOCK NO. 2 LODE

C2L -1 (Flahertys Lode) Block

1/. Previous Mining - none recorded

2/. Ore Potential (Inferred Ore)

Costeaning by Minstock has exposed the ore east of the Zeehan-Trial Harbour road;

From surface to - 5m, 50 x 1 x 5 ≃ 250 T/vm

ie., inferred ore approx. 5 x 250 approx. 1200 T.

C2L -2 (Flahertys Lode) Block

1/. Previous Mining - none recorded, but an underlay shaft (2o) was sunk to a vertical depth of approx. 7m, north from which 150m of driving was completed, (including Watsons Drive in the C2L-3 Block). it is likely that approx. 1500 T. of ore was extracted during this development.

2/. Ore Potential (Inferred Ore)

From surface to -10m, 50 x 1 x 5 = 250T/vm

ie., inferred ore = 10 x 250 = 2500 T.

C2L - 3 (Watsons Lode) Block

1/. Previous Mining - none recorded but probably some ore extracted during development work (see C2L -2 Block).

2/. Ore Potential (Inferred Ore).

From surface to - 5m, 50 x 2 x 5 = 500 T/vm.

ie., inferred ore = 5 x 500 = 2500 T.

Note that the lode in this block may be 90m in length which combined with a width of 2m (ie., 900 T/vm) suggests further exploration of the block is warranted.

ie. inferred ore approx. 10 x 150 = 1500 T.

(c) Below the 27' level, projected north of 3A Shaft for 15m
30 x 1 x 5 = 150 T/vm.
ie. inferred ore = 15 x 150 approx. 2200 T.

(d) North of the road stopes over a depth of 10m
20 x 1 x 5 = 100 T/vm
ie., inferred ore = 10 x 100 = 1000 T.

CEL - 2B Block (New East Lode)

1/. Previous Mining - none recorded.

2/. Ore Potential (Inferred Ore)
This new lode was tested in 3 diamond drill holes by the E.Z. Coy (CP 47, 49 and 58), approx. 25m below the surface;
50 x 2 x 5 = 500 T/vm, provided the lode reached the surface (ie., is not "blind);
ie., inferred ore = 25 x 500 = 12 500 T.

COMSTOCK EAST LODE

CEL - 1A Block

A. W-E Lode.

1/. Previous Mining - this lode appears to have been small and irregular in form, but to have been generally orientated ENE; there appear to be little ore remaining, and production from surface to the 64' level is estimated at approx. 4000 T. (ie. from No. 1 shaft).

2/. Ore Potential - unknown, but probably low, with possible untested extensions both to the WSW and S of the No. 1 shaft.

B. N-S Lode

1/. Previous Mining - none recorded.

2/. Ore Potential (Inferred Ore)
Costeaning has exposed the lode over a strike depth of approx. 50m with an average width of 2m.
ie., inferred ore = 5 x 500 = 2500 T.

CEL - 1B Block (- New East Lode)

1/. Previous Mining - none recorded.

2/. Ore Potential - unknown and apparently untested. A possible strike length of 50m combined with a width of 2m (ie. 500 T/vm) makes this an attractive target for exploration.

CEL - 2A Block

1/. Previous Mining
(a) Road Stopes approx. 2500 T.
(b) No 3A Shaft, (27' - 49' Levels) approx. 30 x 2 x 8 x 5 = 2400
Total 4900 T.

2/. Ore Potential (Inferred Ore).
(a) Below the road stopes to the 27' level, over an average vertic distance of 3m, 70 x 2 x 5 = 700 T/vm
ie. inferred ore approx. 3 x 700 = 2000 T.
(b) Below 49' Level for a depth of approx. 10m,
30 x 1 x 5 = 150 T/vm.

SUMMARY

ORE MINED

CML - 1A Block - 7500 T
CML - 2 " - 2800 T
CML - 6 " - 3800 T
CML - 7 " - 2300 T
CML - 8 " - 3000 T

SUB TOTAL 19 400 T.

C2L - 2 and 3 Blocks 1500 T
CEL - 1A Block (W-E Lode) 4000 T
CEL - 2A Block 4900 T

SUB TOTAL 8900 T.

GRAND TOTAL : 29 800 (Approx. 30,000 T). (See shaded portions o
Figure 6.)

INFERRED ORE

CML - 1A Block - 16000 T
CML - 1B " - 15000 T *
CML - 2 " - 300 T
CML - 3 " - 2200 T
CML - 8 " - 8400 T

SUB TOTAL = 41 900 T

C2L - 1 " - 1200 T *
C2L - 2 " - 2500 T *
C2L - 3 " - 2500 T *

SUB TOTAL = 6200 T

CEL - 1A " - 2500 T *
CEL - 2A " - 6700 T (1000 T *)
CEL - 2B " - 12500 T *

SUB TOTAL = 21 700 T
GRAND TOTAL = 69 800 T. (approx. 70 000 T)
(* TOTAL - 37 200 T).

NB Tonneages shown with an asterisk are those which relate to tonnes/vertical metre > 100, and in which the ore is near surface or out cropping.

IN SITU VALUE OF THE Ag-Pb-Zn ORE.

The in situ value of the Comstock lodes can only be estimated, based on several assumptions as detailed here under:

1/. The ore has an average composition of 60% pyrite, 30% sphalerite and 10% galena.

2/. The sphalerite contains 50% Zn, and the galena contains 85% Pb; the Ag content of the galena - tetrahedrite is approx. 20 oz/ton (ie., approx. 600gm/tonne).

3/. Metallurgical recoveries for the three metals are 75%.

4/. Metal prices of $800/tonne for Zn;
$450/tonne for Pb;
$350/kg for Ag; (Australian dollars).

Thus the value of the ore may be stated as the product of metal price, proportion of ore mineral, metal content of the ore (valuable) and recovery;

ie., Value of Zn = 800 x 0.30 x 0.50 x 0.75 - $90.00/T.
Value of Pb = 450 x 0.10 x 0.85 x 0.75 = 28.70/T.
Value of Ag = 350 x 0.10 x 0.60 x 0.75 = $15.70/T.

GROSS VALUE = $134.40/T.

Assuming that concentration and smelter losses, plus high treatment (of concentrates) and freight costs represent 75% of the gross value of the ore, the net in situ value (before mining) maybe approx. 134.40 x 0.25 = $33.60. Allowing for a profit margin of say 15% (= $20), approx. $14 is available for mining (drill/blast/cart) cost; assuming that mining would cost $2/tonne, then a waste:ore ratio of 6:1 would apply for any open cut mining methods.

The foregong discussion is of necessity preliminary and tentative, and no allowance has been made for the capital costs involved in the construction of a concentrator.

CONCLUSIONS

Ag-Pb-Zn mineralization in the Comstock area is expressed as either fissure-fill, or fissure replacement lodes, and the latter category offers the best potential for the discovery of thick veins. Accordingly, exploration should be directed at the location of carbonate host rocks, either along strike, or in shallow down dip positions of the known lodes.

The structural interpretation of the Oonah Formation host rocks suggests that these rocks have been tightly folded, and overturned to the west, such that "mirror image" targets may be postulated.

Possible evidence for such targets may occur in the Main and East Lodes. where the Main Lode West and New East Lodes, occur immediately to the west of the previously worked lodes.

Porduction from the Comstock lodes is estimated to be approximately 30 000 tonnes, from which approximately 7400 tonnes of sphalerite - galena concentrates were produced. Available data indicate an average ore composition of 60% pyrite (+ other sulphides and gangue minerals) 30 % sphalerite, and 10% galena, (all wt %).

Inferred Ag-Pb-Zn ore totals approx. 70 000 tonnes, of which approximately 37 000 tonnes is inferred to occur in near surface resource blocks (most of which is in the "new" lodes discussed above), possibly amenable to open cut extraction. It is emphasised that there is insufficient data available to allow estimation of ore reserves.

Consequently, should the 37 000 tonnes of inferred ore be shown by additional exploration to be substantially correct, the amount of Pb-Zn concentrate potentially available would be approximately 15 000 tonnes.

RECOMMENDATIONS

Thr tribute area held by Minstock Mining within ML 123m/47 requires additional exploration to that already conducted by Minstock.

It is suggested that the following sequential activities would allow the upgrading of the ore resource status from inferred ore to indicated ore reserves;

1/. Marking out of a 100 x 200m grid over the area bounded by the Main and East lodes;

2/. Costeaning of the northern and southern extremeties of the Main, No. 2 and East lodes, to permit mapping of lithologies, and consequently the distribution of prospective host rocks for further Ag-Pb-Zn mineralization.

3/. Drill testing of the down dip positions of both the known (unmined) lodes, and newly discovered lodes. This drilling could be done by either open hole (rotary/percussion) or by cored drill holes.

Logging, sampling and analyses would be essential to supplement the costeaning and drilling phases. In addition, further studies would be required to fully assess the following:

(i) The distribution of the valuable minerals in the ore, and consequently the anticipated metallurgy;

(ii) The reliability of the sample points (costean and drill hole intersections) as indicators of both the chemical and physical parameters of the ore;

(iii) The suitability of the lodes for open pit extraction.

APPENDIX

Definition of "Ore" (Aus. I.M.M. 1972)

The Committee recommends that for the purposes of the above ore reserve classifications, the term "ore" be defined as follows:-
"Ore is defined as a solid naturally occurring aggregate from which one or more valuable constituents may be recovered, and which is of sufficient economic interest to require estimation of tonnage and grade."

Definition of Resource (USBM/USGS 1976)

"A concentration of naturally occurring solid, liquid or gaseous materials in or on the earth's crust in such a form that economic extraction of a commodity is currently or potentially feasible."

Definition of Reserve

USBM/USQS (1976) define a mineral reserve as "that portion of the identified resource from which a usable mineral or energy commodity can be economically and legally extraction at the time of determination." The Aus I.M.M./AMIC states that a reserve is a mineral occurrence of sufficient economic interest to require the estimation of tonnage and grade.
Measured/Indicated/Inferred Aus.I.M.M.(1972)
The definitions below closely follow those adopted by the U.S. Bureau of Mines in 1943.

Measured ore reserves are those for which tonnage is computed from dimensions revealed in outcrops, trenches, workings and drill holes and for which the grade is computed from the results of detailed sampling. The site for inspection, sampling and measurement are spaced so closely and the geologic character is so well defined that size shape and mineral content are well established. The computed tonnage and grade are judged to be accurate within close limits.

Indicated ore reserves are those for which tonnage and grade are computed partly from specific measurements, samples or production data and partly from projection for a resonable distance on geologic evidence. The sites availab e for inspection, measurements and sampling are too widely or otherwise inappropriately spaced to permit the mineral bodies to be outlined completely or the grade to be established throughout.

Inferred ore (NOT RESERVES) is that for which quantitative estimates are based

largely on broad knowledge of the geologic character of the deposit and for which there are few samples or measurements. The estimates are based on an assumed continuity or repetition of which there is geologic evidence; this evidence may include comparison with deposits of similar type

Hypothetical ore is an undiscovered mineral resource predicted to occur in a known mineral district.