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# GEOCHEMICAL REPORT ON

# SOUTH WEST TASMANIA

see 65-3518 for raw data



PREPARED BY

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1965-66?

AMG REFERENCE POINTS ADDED

## INTRODUCTION

The results of stream sediment samples collected and analyzed to date were studied and also examined in the field in relation to the geological and topographic settings.

Owing to the difficulty of traversing in certain locales in this area, sampling has not been as systematic as desired for an accurate interpretation. As a result, the effectiveness of the reconnaissance geochemical survey to delimit areas of anomalous metal concentrations and to point to possible source areas has not yet been fully recognized. Nevertheless the geochemical data has focussed interest on certain sections and aided the geologist in assessing the mineral potential of that portion of the area sampled.

The following outline summarizes the salient features shown by the geochemical data. Alterations in the stream sampling programme are also recommended as a result of discussions with Messrs. Harms and Hall. These alterations will be tested prior to completion of the present activities at the end of April. It is hoped that these alterations will speed up the sampling and at the same time give a much more systematic coverage than is possible at present.

GENERAL

Interpretation of the data has been based on a combination of statistical calculation and inspection. For copper and zinc the threshold value and concentration groupings calculated by Hall (1965) are essentially unchanged.

For tin, however, a lower threshold has been interpretated by the writer so that the anomalcus tin areas defined by Hall (1965) have been modified.

The following concentration groupings were selected for the various metals:

| Metal | | Range | Calculated ppm | Graphica |
|---|---|---|---|---|
| HCl Cu | Green | Background | 0-9 | 0-8 |
| Cu | Blue | Threshold | 10-12 | 9-11 |
| | 1 Red | Anomalous 3rd Order | 13-17 | 12-13, 14-16 \| 12-16 |
| | 2 Red | Anomalous 2nd Order | 18-28 | 17-24 |
| | 3 Red | Anomalous 1st Order | +28 | 724 |
| HCl Zn | Green | Background | 0-5 | 0-5 |
| | Blue | Threshold | 6-8 | 6-9 |
| | 1 Red | Anomalous 3rd Order | 9-13 | 10-13 |
| Zn | 2 Red | Anomalous 2nd Order | 14-22 | 14-19, 19-22 \| 14-2 |
| | 3 Red | Anomalous 1st Order | +22 | 722 |

| Metal | Range | ppm |
|---|---|---|
| Total Tin | Background | 0-14 |
| | Threshold | 15-23 |
| | Anomalous 3rd Order | 24-41 |
| | Anomalous 2nd Order | 42-77 |
| | Anomalous 1st Order | +77 |

A number of one sample anomalous values with no supporting threshold data will not be considered in this report. These isolated anomalies cannot be interpreted in those areas in which the stream sediment sampling has not been completed. More samples are required in order to delimit the entire anomalous area. Where sampling has been completed, the one sample anomaly in this rugged terrain suggest a small source area. A review of these low priority anomalies would be best at a later stage in the investigation.

DISCUSSION OF ANOMALOUS AREAS

A) Coincident Copper and Zinc Anomalies. Three coincident copper and zinc anomalies have been delimited as follows:

1. Wilson Bight Area. This anomaly is better defined by copper results which increase in value upstream from the coast. The anomaly is not completely defined and more sampling is necessary in order to delimit the entire anomaly and effectively indicate the possible source area. Geologically this area is underlain by pelitic and graphitic schists in contrast to quartzite and quartz-sericite schist in the immediate surroundings. On general inspection, the anomaly is probably related to the more basic character of the rocks and not to any major economic mineralization. Of note, however, is the occurence of two airborne magnetic anomalies in these pelitic/graphitic rocks, in what is generally a magnetically flat area. Furthermore Hall (1965) records a possible copper-bearing sulphide mineral from this area.

2. New Harbour Area. The trend of this anomaly is north-northeast again following the strike of pelitic and sub-pelitic quartz-chlorite schists. The anomaly is very patchy for both copper and zinc although there is a copper concentration at the northern limit of the anomalous zone. The anomaly is again considered to be indicative of the pelitic rocks compared to the surrounding massive quartzite rather than the presence of economic mineralization. As in the Wilson Bight anomaly, however, the metal may be present as disseminated Cu and Zn bearing sulphide minerals. Rock exposures along this section are abundant. No sulphide concentrations were observed and hence the anomaly is considered to be non

significant in terms of economic Cu/Zn mineralization.

3. East of Horseshoe Inlet. In this locale, the anomaly is also somewhat patchy and follows the line of the Melaleuca Fault. This type of anomaly may indicate a mineralized fault zone, but often the fault has merely represented a zone of precipitation of metal carried in ground waters. This latter interpretation is suggested here in view of the occurence of a tin anomaly over Balmoral Hill reflecting a possible mineralized source not associated with the fault.

These copper-zinc anomalous areas do not appear to be significant in terms of economic mineralization. Anomalies one and two appear to indicate certain geological formations. It is recommended, however, that they should be reconsidered after completion of the stream sediment sampling programme when a fuller interpretation will be possible.

B) Copper Anomalies. Only one copper anomaly warrants discussion at this stage in the investigations and is as follows:

1. West of Schooner Cave. Copper values are only slightly anomalous or threshold and suggest weak Cu mineralization in the quartz-sericite schists in this area. This interpretation is supported by the discovery of a specimen of schist containing disseminated pyrite from this area. The copper is probably associated with the pyrite.

C) Zinc Anomalies. Only one zinc anomaly is discussed below:

1. East of Cox Bight. Three anomalous zinc values occur in this area. Sampling, however, is not completed and hence the full extent of this anomalous area cannot

yet be defined. It is an interesting anomaly in its association with graphitic schist. The relatively high zinc content may simply reflect the relatively basic character of the rock rather than mineralization. Nevertheless similar graphitic schists mapped in other parts of the area show only patchy low order anomalous or threshold zinc values in association with relatively high copper concentrations. Copper values are background in this zinc anomaly suggesting that the zinc has some other association in this area compared to the other pelitic/graphitic schist areas. Additional results will enable a more accurate delineation of the anomalous zone and aid interpretation.

D) Tin Anomalies. The pattern of Tin distribution is both interesting and intriguing. Interpretation is limited, however, in view of the incomplete sampling. In general, the tin background values tend to be relatively high in the area as a whole, (a tin province), emphasizing the favourability of the area for tin occurrences. Alluvial tin has been worked in two areas, one of which is still in production. These two areas are described by Hall (1965). The geochemical tin anomalies are as follows:

1. Cox Bight. In this area the tin is associated with the Cox Bight granite in which narrow tin-bearing quartz veins have been found. The area of anomalous geochemical tin values is relatively small and points to a small source area. The extent of the granite, however, is unknown, as the flat coastal area is covered by alluvial gravels below a large thickness of humus overburden. A larger anomalous tin area is indicated by the occurrence of relatively high tin concentrations in the Cox Creek area. Whether this indicates underlying granite

or tin in the aureole around the granite intrusion is not known. Additional samples have been collected around Cox Creek, the results of which may permit a clearer interpretation.

2. Moth Creek Area and Extensions. The tin in this area is alluvial but directly overlying tin-bearing quartz-sericite schist carrying cassiterite in the schist and in quartz veins. No granite is known to be present in the immediate vicinity. This geochemical tin anomaly is supported by anomalous zinc concentrations. Both tin and zinc remain relatively anomalous along the valley to the west of the Moth Creek anomaly. The anomalous tin zone can be traced from Hammant Inlet on the west coast to Moth Creek. The anomaly continues eastward into the Moulten Creek area where alluvial tin is known. This anomalous tin belt is not well defined at present and hence this interpretation will be reviewed when additional tin data come to hand. The rock type underlying most of this area is quartz-sericite schist and the source of the tin is thought to be similar to the Moth Creek area - cassiterite-bearing quartz lodes in the schist. This type of tin deposit may not be economic as a large scale operation but warrants further investigation. (The possibility of an underlying granite source cannot be excluded.)

Other than the anomalous tin belt described above, anomalous tin values tend to be scattered and somewhat erratic. Only one other tin anomaly is noted below. Additional sampling is necessary in order to delimit the anomalous areas more precisely. The nature of cassiterite dispersion by mechanical means will tend to give the pattern of spotty high areas of accumulation if the source areas are

small and sporadic. Generally the anomalous areas are close to the source even in rugged terrain.

3. East of Horseshoe Inlet. This tin anomaly was mentioned above in association with the copper and zinc anomalous zone which follows the line of the Melaleuca Fault. The tin anomaly lies within schists and conglomerates of the younger group (Hall 1965). The source of the tin is not known.

## CONCLUSIONS AND RECOMMENDATIONS

The stream sediment data have indicated a large anomalous tin belt probably associated with cassiterite-bearing quartz veins in quartz-sericite schist.

The Cox Bight tin anomaly associated with the Cox Bight granite may be more extensive than indicated by available data as this area is overlain by alluvial quartz gravels beneath a thick humus cover.

The copper and zinc anomalies tend to reflect the relatively argillaceous and basic sediments in the sequence and hence the anomalies are more indicative of geology rather than economic concentrations of sulphides.

Prior to any major follow-up investigations of these anomalous areas, it is recommended that reconnaissance stream sediment sampling should continue in order to complete those areas as yet unsampled. The completion of reconnaissance phase will permit the delimiting of the entire anomalous areas and provide a clearer interpretation as to possible source areas.

In order to speed up sampling and at the same time cover the area more systematically than at present, the sample interval will be increased to ½ mile and helicopters will be used more effectively than at present. There are many difficulties in relying on increased use of helicopters for sampling purposes, but on general discussions with Messrs. Harms and Hall it was decided that an attempt should be made to complete the reconnaissance phase of sampling in the Port Davey area before the end of April. Certain alternatives have been suggested and with Mr. Hall's experience in this area, the optimum sampling procedure will be effected.

FOLLOW-UP PROCEDURES

The applicability of soil sampling in order to determine the source areas of the stream sediment anomalies was examined. Soil profiles were studied in the field and a line of soil profile sections examined and sampled. All geologists and geochemical field assistants were present during the examination and sampling of the various soil horizons.

The soils in the area vary considerably and any soil sampling programme will be subject to certain limitations. Locally, it will be valid to use soil sampling techniques, but its use is recommended at a detailed stage in the investigations and complimentary to the detailed geological mapping.

In most areas rock exposures are abundant and hence detailed geology is recommended as the next phase in the investigations. Where the stream sediments delimit relatively large anomalous areas, more detailed stream sediment sampling is recommended prior to or in conjunction with geological examination. The detailed stream sediment results will help to define the source area more accurately. Sampling of all streams is recommended at a sample interval of not more than 1000 feet.

The soils developed in the southwest may be described under three main headings as follows:

a) On hill tops and hill slopes underlain by quartzite and quartz schist there has been little or no oxidation and the accumulation of sequi-oxides does not occur. The profile is essentially raw humus on bedrock with the possibility

of a ½ to 2 inch layer of quartz or quartz-sericite sand depending on the underlying rock.

b) In valleys two main profiles were observed.

(1) Raw humus
Weathered bedrock
Bedrock

(2) Raw humus
Transported gravels
Bedrock

In (1) above, weathered bedrock comprizes sand with rock fragments. The thickness of humus varies from 6 inches to +7 feet.

In (2) above, the transported gravels comprise angular to sub-angular quartz gravel with very little fine-grained material. There may be numerous layers of these gravels interspersed with humus layers. Residual material appears to be completely absent and the gravels overlie bedrock directly.

C) On hill tops and hill slopes in more freely drained rock areas oxidation and some accumulation of sesqui-oxides occur. The soil profile, however, shows variation within short distances and over one granite area the following three soil profiles were observed.

| | Soil Horizon | Thickness | Description |
|---|---|---|---|
| 1) | Ao | 6" to 12" | Raw humus |
| | $A_1$ | 4" to 6" | Decomposing humus with sand, dark grey-black in colour |
| | C | 9" | Weathered bedrock - sand |
| | | | Bedrock - relatively fresh |

| Soil Horizon | | Thickness | Description |
|---|---|---|---|
| 2) | Ao | 3" | Raw humus |
| | $A_1$ | 6" | Decomposing humus with sand dark grey in colour |
| | $A_2$ | 4" | Fine grained clayey sand light grey in colour |
| | B/C | | Bedrock with iron oxides present particularly in a narrow 1/8" layer at the top of the bedrock |
| 3) | Ao | 3" | Raw humus |
| | $A_1$ | 6" | Decomposing humus and mineral matter - dark brownish grey in colour |
| | $A_3$ | | Dark brown clayey soil with orga material - gradation from $A_1$ |
| | B/C | | Bedrock with iron oxides particularly in a narrow 1/8" layer at top of bedrock |

As can be seen in the above examples, the soil profile where it is developed to any great extent, varies over relatively short distances. Hence soil sampling is recommended only as a very local tool and extreme care will be required in sampling.

The soil samples which were collected comprise all the layers observed, including the raw humus layer. The samples were collected along a line traversing the Cox Bight granite, across an alluvial fan, over pelitic schist and over graphitic schist. The main purpose of the soil sampling was to instruct personnel in the

soil horizons and methods of soil sampling. The sample results however, will also test a) the presence of tin in the humus and upper transported gravel layers. The organic layers may not necessarily be ruled out as unsuitable in cassiterite prospecting; this layer as well as the $A_1$ layer, however, should be avoided when soil sampling for copper, zinc, lead and the other relatively mobile metals.

b) the extent to which 'C' soil zone sampling will be applicable, as a follow-up technique in order to define the axis of the metal anomaly in the bedrock.

The writer wishes to thank Messrs. Harms and Hall for arranging the field visit and for their help and co-operation.

John L. Walker

196015

# GEOCHEMICAL SURVEY

## PORT DAVEY — COX BIGHT AREA

### EL13/65 SOUTH WEST TASMANIA

APPROX. SCALE OF CHAINS

30 0 30 60 90

5 cm

PORT DAVEY

BATHURST CHANNEL

HANNANT INLET

Hannant Creek

Horseshoe Inlet

BALMORAL HILL

MELALEUCA

LENNY

Alexander Creek

Moth Creek

Melaleuca Creek

Window Pane Ck.

WINDOW PANE BAY

WILSON BIGHT

TELOPEA PT

NEW HARBOUR

COX BIGHT

AMG 437080ME 5186080MN

AMG 416070ME 5186080MN

LEGEND:

- Background
- Threshold
- 3rd. Order
- 2nd. "
- 1st. "

} Anomaly.

975 Sample number

# GEOCHEMICAL SURVEY

## PORT DAVEY – COX BIGHT AREA

EL13/65 SOUTH WEST TASMANIA

APPROX. SCALE OF CHAINS

30 0 30 60 90

5 cm

5 cm

N

LEGEND:

- Background
- Threshold
- 3rd. Order
- 2nd. " } Anomaly.
- 1st. "
- 975 Sample number

PORT DAVEY

BATHURST HARBOUR

HANNANT INLET

CHANNEL

AMG 414070mE 5195700mN

Scheoaer Cove

Hannant Creek

Horseshoe Inlet

BALMORAL HILL

MELALEUCA

MINES HUT

Alexander Creek

Creek

Melaleuca Creek

Creek

Window Pane Ck

WINDOW PANE BAY

40/21

41/20

42/5

WILSON BIGHT

TELOPEA PT

NEW HARBOUR

COX BIGHT

AMG 487080mE 5186080mN

AMG REFERENCE POINTS ADDED