1st Summary Report on the Osmund-Thirkell Hill Area to 5th Feb., 1958

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18th February, 1958 195

To: Mr. G.F. Hudspeth.

First Summary Report on the Osmund - Thirkell Hill Area

To 5th February, 1958

1. Introduction

In distinction to last year's work on regional mapping, it was considered that this year instead of issuing a report for each camp, an overall summary report would be prepared at convenient intervals of time. In this way the geology of an area can be presented as a continuous story rather than as a series of disjointed chapters.

Reports on geophysical anomalies are still issued separately.

This first regional report includes work by the following parties:

1956-1957	1957-1958
M. Banks (Point Hibbs area)	R. Elms
K. Beck	I. Gregory
J. Gilfillan	M. Paltridge
D. Sampey	M. Penney
B. Scott	B. Scott
Man days = 219	Man days = 213

Mapping has been carried out from the normal field camps with the exception of work in the Thirkell - Hasell Hill area which was completed by helicopter traversing.

Prior to the beginning of this year's field season a series of 30 and 80 chain topographical and geological maps were prepared from the

001 aerial photographs/mosaics. In addition an amount of photo-geology was interpreted on these sheets: this technique has proved to be most useful in this area.

2. General Topography

The area has been peneplaned at some time giving rise to a surface which is at present approximately 800 feet above sea level. The level of this plain falls towards the coast and typically ends in precipitous cliffs 1-200' high. Above this level stand what must have been "islands" at the time of peneplanation, notably the hills of Mt. Osmund (1210'), D'Aguilar Range (2500'), Mt. Lewis (2600'), Moore's Lookout (1300') and the Lawson Range area (1500-1750').

Recently (Tertiary?) the entire area has been uplifted which has emphasised certain topographical features (i.e. D'Aguilar Range) and established a superimposed drainage system which is still finding its new erosion base-level. Consequently, the rivers flow in deep gorges 1-300' below the general level of the plain, with abundant rapids and waterfalls.

3. General Geology

The following formations are present:

Youngest	Macquarie Beds (Tertiary)	
	UNCONFORMITY	
	Gordon Limestone	Junee Group (Ordovician)
	Caroline Creek Sandstone	
	Owen Conglomerate	
	Dundas Group (Cambrian)	
Oldest	Precambrian	

The general distribution of these formations is shown on the accompanying preliminary map 2A.

The Devonian, Permian and Jurassic association found at Point Hibbs by M. Banks is not described in this report.

The general feature of the whole area is the north-south trend of the strikes of the bedding and schistosity, and the major shear directions. This is shown in the folding and faulting which gives the present day picture of the outcrop of the varying horizons.

On a broader regional basis the area of Dundas, Owen Conglomerate and younger rocks exist on the western edge of a Precambrian land mass, which extends eastwards towards Hobart.

A. Macquarie Beds (Tertiary)

These beds are only important in that they cover the older rocks (Owen Conglomerate and Dundas) which are known to contain sulphide mineralisation elsewhere on the West Coast. At the present time the Macquarie Beds extend from Macquarie Harbour, southwards along Birch Inlet to Hazell Hill and demonstrate the presence of an older, and larger, Macquarie Lake.

Typically they are flat, or gently dipping, sediments which consist of unconsolidated sands and conglomerates with occasional lignitic horizons. Their thickness appears to be variable but it is undoubtedly measured in hundreds of feet at their greatest development.

B. Gordon Limestone and Caroline Creek Beds

These beds do not directly extend into the Osmund area and are not discussed here.

C. Owen Conglomerate

The Owen Conglomerate shows its best development in the Osmund Syncline (between Mt. Owen and Hazell Hill) and the west limb of the D'Aguilar anticline. The sediments consist of at least 5900 feet of shales, orthoquartzites, pebble and cobble conglomerates which are lithologically identical to those seen in the Queenstown-Darwin area.

This great thickness of sediments shows a consistent trend of wedging out to the east and is ultimately represented by 4 to 500 feet of felspathic sandstones and orthoquartzites.

Two differences noted between the Osmund Syncline and the Queenstown area are the absence of the boulder conglomerates and Jukes Breccia in the former locality.

The Conglomerate is extremely useful in its application as a marker horizon which brings out the post-Dundas folding/faulting extremely well.

D. Dundas Group

The Dundas Group can be subdivided into a western and a southern/eastern area.

a. Western Area This area is west of the Osmund Syncline, and Macquarie Beds. It is typical "Dundas" country in that the association of lavas (andesites and basalts), tuffs and lapilli tuffs, black/grey-green shales and micaceous quartzites weather easily and support a dense growth of timber and scrub. The southerly extent of this area terminates at the coast in a zone of extensive shearing with associated chloritisation and epidotisation at Green Point-Sandy Point.

b. Eastern and Southern Area This area extends southwards from the Wanderer River, on the east side of the Osmund Syncline, to the mouth of the Lewis River, and Elliott Bay. In complete distinction to the previous area it appears to consist of a highly siliceous/felspathic series of tuffs/lapilli tuffs with subordinate lavas. The area is covered with a thin layer (5 to 25 feet) of unconsolidated gravels and gives rise to extensive open grassy plains.

E. Precambrian

The Precambrian contains a series of quartz/mica/garnet schists, with metaquartzites and conglomerates. It is this old land mass which appears to have supplied most, if not all, of the sediments for the Owen Conglomerate.

F. Granite

Three areas of granite have been located; from west to east these are:

a. Low Rocky Granite A coarse grained, highly potassic granite which should give a marked radioactive anomaly due to a relative abundance of radioactive potassium.

b. Drake Creek Granite A basic variety, approaching a granodiorite in composition.

c. Elliott Granite This granite extends as a great north-south lobe from Elliott Point in the south to the Wanderer River. It supports a thick timber/scrub growth and information is difficult to obtain but it appears to be an intermediate variety of granite (an adamellite?).

All three granites are heavily sheared at and near the major faults.

4. Economic Geology

On the basis of the regional mapping it can be stated of this area that:

a. It contains favourable rocks for sulphide emplacement (i.e. Dundas).

b. It contains favourable structures for sulphide emplacement (i.e. the southerly continuation of the Lyell Shear, immediately to the west of the Osmund syncline).

c. It contains sporadically disseminated copper/iron sulphide mineralisation over an extensive area, particularly in the southern area between the Lewis River and Elliott Bay.

Obviously, the object of the entire future campaign in the Osmund-Thirkell area will be to determine whether or not the sulphide mineralisation noted in (c) above can be sufficiently localised by (a) and (b) above so as to produce a workable sulphide deposit.

The regional mapping has delimited three favourable zones so far, in which points of particular interest will have to be localised by airborne geophysics owing to the cover of dense vegetation, or recent sediments.

A. Area of Dundas Sediments

It must not be lost sight of that the application of the rules of ore localisation from known and tested areas to untested areas has only an empirical basis. Consequently, despite the fact that favourable, localised areas have been defined on this basis, the other areas of Dundas sediments cannot be ignored.

B. Lyell Shear

This folding/faulting direction is a regional feature which can be traced from at least the Tullah area in the north to the Lewis River in the south, an extent of 80 miles.

The shear has a typical expression in this area of faulting Dundas against Owen Conglomerate, and upsweeping the affected limb of Owen Conglomerate to either a vertical or steeply inclined position. It can be traced from the north of the map, west of Thirkell-Hazell Hills, west of Mt. Osmund and to the Lewis River. It is not yet known whether the Shear enters the sea at Elliott Bay, or north of Low Rocky Point.

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C. Moore's Valley

This name has been given to the cross cutting fault structure which trends NNW- ESE between Thirkell Hill and Hazell Hill. This structure, which resembles that causing the Linda Valley near Queenstown, must have been a depression in Tertiary times to account for tongue of Tertiary sediments which swing SE through this zone. At a first, preliminary examination the cross cutting faults do not appear to be as strong as those associated with the Linda Disturbance as only the northern fault can be traced eastwards into the Precambrian. However, we have a structure which appears to be a replica of that which localised the ore-zone at Queenstown - the intersection of the north to south Lyell shear and twin east to west faults. The area is partially covered by an unknown thickness of Tertiary sediments which could present difficulty in the full testing of this zone although a considerable amount of this material has been removed by the Wanderer and Swanson Rivers.

5. Conclusions

The regional mapping of the Osmund-Thirkell Hill area is proceeding satisfactorily and according to plan. The area shows favourable areas for ore localisation, in particular the structure called Moore's Valley, which structurally resembles the Linda Valley and the southerly extension of the Lyell Shear.

Work is continuing in the area.

B Scott

Geologist-in-Charge.